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# SCIENTIFIC, TECHNICAL AND ECONOMIC COMMITTEE FOR FISHERIES – 63RD PLENARY REPORT – WRITTEN PROCEDURE (PLEN-20-01)

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Abstract

Commission Decision of 25 February 2016 setting up a Scientific, Technical and Economic Committee for Fisheries, C(2016) 1084, OJ C 74, 26.2.2016, p. 4–10. The Commission may consult the group on any matter relating to marine and fisheries biology, fishing gear technology, fisheries economics, fisheries governance, ecosystem effects of fisheries, aquaculture or similar disciplines. The Scientific, Technical and Economic Committee for Fisheries could not hold its 63rd plenary meeting as originally foreseen on 16-20 March 2020 but was requested to draft its advice by written procedure instead.

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# 63rd PLENARY REPORT – WRITTEN PROCEDURE - OF THE SCIENTIFIC, TECHNICAL AND ECONOMIC COMMITTEE FOR FISHERIES (PLEN-20-01)

## WRITTEN PROCEDURE

## March/April 2020

### 1. INTRODUCTION

The STECF was originally planned to meet in plenary on 16-20 March at the JRC, Ispra. Due to the emergent covid-19 situation in northern Italy and later on the whole of Europe, the meeting was first shifted to Brussels, and then cancelled and replaced by a written procedure with STECF members addressing the ToRs from their home offices.

The original ToRs were re-prioritised by the Commission in order to facilitate the STECF working under non-ideal conditions. In addition, the Commission supported the STECF chair and vice-chair, rapporteurs and those STECF members being able to contribute to the written procedure by issuing individual ad hoc contracts.

Below DG MARE lists the points to be developed under written procedure. All other points originally included in the draft ToR and Agenda are either postponed to one of the future plenaries or to be dealt with under different procedures, or will no longer be dealt with by STECF. After consultation within DG MARE, this exceptional written procedure to replace the Plenary March session, will need to deal with the following points and ToR.

These concern, in summary:

- 2 points in the Atlantic – both technical measures
- 3 points in the Med – some diversity in the subject
- 1 point in the Black Sea – on data collection.

Finalization of the written procedure on all topics was foreseen for 3 April 2020.

## Annotated Terms of Reference for WRITTEN PROCEDURE of STECF adoption of scientific advice (March/April 2020)

Fully-fledged written procedure

1. Improved selectivity measures under Article 13 of the 2020 Fishing Opportunities
2. Evaluation Joint Recommendations discard plan venus clams
3. Joint Recommendation Norway pout fishery
4. Bulgaria request on expanded list of stocks for Black Sea demersal trawl survey

5. Closure area under western Med demersal fisheries multiannual plan

6. Management plan for boat seines in the Balearic Islands

<u>STECF action in context of the written procedure</u>

1. CFP Monitoring

   The annually recurring report of the progress on achieving MSY and related observations is prepared by the JRC scientists. There is no specific legal need for STECF conclusions. In this situation, the Chair, in the overall conclusive report on the written procedure, could acknowledge receipt and confirm that the report is structured and elaborated in the same way as in earlier years.

2. Monitoring of the Landing Obligation

   DG MARE would like to be able to make reference to the work done by ad-hoc experts. A possible approach is that the Chair acknowledges receipt of the report in the conclusive written procedure report, and that it may be reviewed for conclusion during a future Plenary.

## 2. INFORMATION TO THE PLENARY

### Election of new vice-chair

Prior to the originally planned plenary meeting, the committee was informed on the resignation of L. Knittweis as STECF vice-chair due to the change of work place and the committee members were asked by the Commission/STECF secretariat to express their availability and willingness to stand as candidate. Dominic Rihan was the only STECF member who informed to stand as candidate for the vacant vice-chair position.

The election of STECF chair and vice-chairs are governed by Art. 3 of the STECF Rules of Procedure of October 2016 (https://stecf.jrc.ec.europa.eu/about-stecf) conforming with the general rules for Commission Expert Groups.

A 2-step procedure was applied:

Step 1: the secretariat contacted the STECF members and asking for their agreement to waive the secrecy requirement of the election as outlined in the STECF Rules of Procedure. Note: there is no option to conduct a secret election remotely and the secrecy requirement could only be waived by the unanimous decision of the membership. - All committee members agreed to waive the secrecy requirement.

Step 2: the secretariat contacted the STECF members again requesting them to vote by sending "YES", "NO", OR "ABSTAIN" by replying to the secretariat only. – The committee elected Dominic Rihan as vice-chair of STECF.

## 3. WRITTEN PROCEDURE

### 3.1 Improved selectivity measures under Article 13 of the 2020 Fishing Opportunities

**Background provided by the Commission**

Both cod and whiting in the Celtic Sea are regulated as target stocks under the Western Waters Multi-annual plan (WWMAP)[1], but since 2019, only by-catches are allowed for both stocks, a targeted fishery being prohibited. In 2019, ICES' catch advice showed that cod and whiting stocks in the Celtic Sea are below $B_{lim}$. Following Article 8 of the WWMAP, the EU was legally obliged to adopt remedial measures as safeguards, to help rebuild these stocks. The ICES mixed fisheries advice[2] estimated that without any change in exploitation pattern in 2020, catches of cod would have been 2055t, while ICES advised zero catch and while a TAC was agreed at 805t for 2020.

The Fisheries Council of December 2019 adopted the "*Remedial measures for cod and whiting in the Celtic Sea*" under article 13 of the 2020 Fishing Opportunities regulation[3].

The basis for these measures was the urgent need for a general improvement in selectivity by increasing mesh sizes in a specific part of the Celtic Sea and the requirement for bottom trawlers to use fishing gear that avoids cod by-catches. Article 13 requires for vessels fishing in the Celtic Sea cod protection zone with more than 20% haddock catches to use certain gear configurations (paragraph 1a) and, in addition as of 1 June, a "raised fishing line" configuration or another dispositive equally selective for avoidance of cod (paragraph 1b). It also provides for the use of selective gear as alternatives to the above if they result in catches of less than 1% of cod (paragraph 4).

The "raised fishing line" option offered by article 13 has been trialled in several studies; the only recent studies conducted in in the Celtic and Irish Seas was by the BIM in 2017[4] and 2019[5]. However, the basis of these gear trials were for trawls with 80-90mm cod-ends in the former and 80 mm with a 120 mm square mesh panel in the later. However, the requirements under article 13, will see the raised fishing line being used by vessels with 100 mm T90 cod-ends, 110 mm cod-end with 120 square mesh panel and 120 mm cod-ends.

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1 https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1562943926061&uri=CELEX:32019R0472

2 http://www½.ices.dk/sites/pub/Publication%20Reports/Advice/2019/2019/FisheriesOverviews_CelticSeas_2019.pdf

3 https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1581520382306&uri=CELEX:32020R0123

4 http://www.bim.ie/media/bim/content/publications/fisheries/6495-BIM-Raised-Fishing-Line-report.pdf

5 www.bim.ie/media/bim/content/publications/fisheries/BIM-Staggering-the-fishing-line-report.pdf

## Request to the STECF

The Commission is therefore requesting that the STECF:

(a) Considering similar and relevant studies in both the Celtic Seas and other regions, estimate the likely differences in selectivity parameters (e.g. L50 and SR) on cod, whiting and other target and bycatch demersal species observed in the BIM studies when using mesh size combinations of (i) 100 mm T90 cod-ends; (ii) 110 mm cod-end with 120 square mesh panel; (iii) 120 mm cod-ends and; (iv) 100 mm with 160 square mesh panel.

(b) Estimate and contrast the selectivity characteristics (e.g. L50 and SR) of the above mesh sizes with and without the raised fishing line on cod and other species where available, specifically whiting, haddock, megrims, anglerfish (monkfish), hake, pollock, ling and skates and rays (in general). Other commercial flat fish and commercially important species (non-TACs included) should be considered if possible, as were reported in the results of the BIM studies.

(c) Explore whether alternative criteria to the existing haddock threshold would cover equivalent amounts of by-catches of cod, and how the number of vessels covered by the measures under each paragraph of Article 13 would evolve when changing the existing haddock threshold or adding an extra threshold of one or many species to the original haddock threshold of 20%.

(d) The STECF is also asked to identify alternative technical measures(as explored for instance by IFREMER) that would achieve similar selectivity characteristics as the gear combination specified in Article 13.1(a) and 13.1(b)(i), especially those where the selectivity characteristics of which reduce cod or whiting catches but maintain (largely) catches of other species.[6]

(e) An analysis should also consider spatial and temporal restrictions or closures that would give similar outcomes in terms of reducing cod mortality, indicating what duration and spatial coverage of such closures would be needed.

(f) Assess the socio-economic impacts of the above mentioned scenarios including, at least, the following indicators: value of landings, income, gross profit, gross profit margin, employment and average salaries at the level of MS and fleet segment. The number of vessels and fleet segments affected should be also provided for each scenario. External factors, where relevant in this assessment, such as quota uptake and first sale price effects in response to changes in the catch composition should be considered.

6 For instance: Trial of a new escape panel concept to reduce cod catches in a mixed demersal fishery:

https://www.researchgate.net/publication/330882005_Trial_of_a_new_escape_panel_concept_to_reduce_cod_catches_in_a_mixed_demersal_fishery

## STECF answer

This request is very comprehensive, and the different sub-ToRs deal with different questions in relation to the mixed-fishery in the Celtic Sea. Therefore each sub-ToR is treated independently, and partial STECF conclusions are given under each of them. A summary of the overall conclusions is also provided at the very end of the request.

STECF disclaims that most of the analyses presented below have been performed during the limited time of the written procedure and with only limited preparatory work, and cannot thus cover all aspects of relevance for the request. STECF underlines that more in-depth analyses would need to be performed in the frame of dedicated research studies.

## TOR 3.1.a: Considering similar and relevant studies in both the Celtic Seas and other regions, estimate the likely differences in selectivity parameters (e.g. L50 and SR) on cod, whiting and other target and bycatch demersal species observed in the BIM studies when using mesh size combinations of (i) 100 mm T90 cod-ends; (ii) 110 mm cod-end with 120 square mesh panel; (iii) 120 mm cod-ends and; (iv) 100 mm with 160 square mesh panel.

## Summary of information provided to STECF for ToR 3.1.a

DG Mare provided the report of an ad hoc contract, which partially addresses ToR 3.1.a. France provided a number of documents on (i) technological measures to reduce catches of cod by trawlers targeting demersal species and (ii) a summary of information available on the raised fishing line. These submissions along with the STECFs own analysis have been used to answer this ToR.

STECF notes that ToR 3.1.a. refers to two BIM studies (McHugh et al., 2017, 2019) which report on trials to assess the effect of setting the distance between the groundgear and the fishing line to 1 m in comparison to a gear with a conventional groundgear rigging. They use 80 mm (nominal) diamond mesh codends with 120 mm (nominal) SMPs fitted 9 to 12 m from the codline and catch a range of species including cod, haddock, whiting, plaice, lesser spotted dogfish, John Dory, hake, skates and rays, lemon sole, monkfish, megrim and pollock.

## STECF comments on ToR 3.1.a

STECF notes that codend selectivity depends on codend design parameters such as mesh size, mesh shape, number of meshes in circumference, twine thickness and twine number and that the additional contribution that a square mesh panel (SMP) can provide depends on the panel size, the panel mesh size and shape and the position of the panel. Article 13 of the 2020 Fishing Opportunities regulation does not specify what values should be used for most of these parameters. Hence, STECF uses those that are used in the BIM studies (McHugh et al. 2019) and assumes that diamond mesh codends are made from 4 mm double polyethylene with 100 open meshes in circumference and that the SMPs are 3 m long and positioned in the top sheet of the extension 9 to 12 m from the codline.

Of the species observed in the BIM studies (McHugh et al., 2017. 2019) there is a lot of selectivity information for cod and haddock, a lesser amount for whiting and plaice and relatively little for most of the others. Accordingly, STECF is able to estimate the selectivity parameters (L50 and SR) for cod, haddock, whiting and plaice, however this is not possible for the other species.

To answer the ToR, STECF collected selectivity parameters by species from a number of published studies.

*Cod selectivity*

Madsen (2007) carries out a meta-analysis of Baltic Sea Cod. The diamond mesh and T90 mesh analyses he carries out are relevant here and we use his results to estimate the L50 and SR of cod. His square mesh panel analysis, however, is not relevant here, as he only considers SMPs fitted in the final 6 meters of the codend and in escape windows designs such as the Danish window, the Swedish window, the new Danish window and the Bacoma window. These differ considerably from the designs in the Celtic Sea which as stated above are 3 m long and fitted in the top sheet usually at a position 9 to 12 m from the codline.

For the 110 mm cod-end with 120 mm SMP STECF used the analysis of Madsen and Ferro (STECF, 2003) who find a correlation between cod and haddock selection. It is not possible, however, to apply this analysis to estimate the selection of the 100 mm codend with 160 mm SMP as this SMP mesh size is well outside the range of values used to parametrise the model and hence the estimates cannot be relied upon.

*Haddock selectivity*

For haddock, STECF used the selectivity models developed by Fryer et al. (2016). This paper presents a meta-analysis of haddock size-selection based on 21 trials investigating diamond-mesh codend selection and 19 trials investigating the combined selection of a diamond-mesh codend and a square-mesh panel in the upper sheet of the codend or extension. In their analysis, Fryer et al. find a dependency of the SMP contact probability on position and on season. To account for this STECF used the mean value over the year of an SMP that is positioned at 9 to 12 m from the codline, which is approximately 0.46.

The Fryer et al. (2016) model cannot be used to estimate the selectivity of haddock in the codend with the 160 mm SMP as this SMP mesh size is outside the range of values they used to parametrise their model. Instead, STECF used the results of a BIM study (reported in STECF EWG-18-02) which measures the haddock selectivity of such a codend.

Furthermore, T90 codends were not part of the Fryer et al. (2016) analysis, and selectivity estimates for this codend type are based on the following results of an unweighted linear regression of unpublished selectivity data provided by the Thuenen Institute (Germany) in the ad-hoc contract.

L50 = codend * 0.3286; SR = codend * 0.0594.

*Whiting selectivity.*

To estimate selectivity parameters for whiting STECF used the model of Madsen and Ferro (2003) who identified a correlation between whiting selectivity and the haddock L50 as follows

whi L50 = 1.162*had L50; whi SR=0.286*had L50.

As for cod, it is not possible to apply this analysis to estimate the selection of the 100 mm codend with 160 mm SMP as this SMP mesh size is outside the range of values used to parametrise the model, and STECF used the results of a BIM study (reported in STECF EWG-18-02) which measures the selectivity of such a codend for whiting.

*Plaice selectivity.*

O'Neill et al. (2020) investigate the influence that mesh size, the number of open meshes around the circumference, twine thickness and catch size have on the size-selection of plaice (*Pleuronectes platessa*) in otter trawl diamond mesh codends by analysing the data from 164 hauls using 25 gear configurations during 9 trips. They show that the 50% retention length (L50) increases by 1.9 cm for every 10 mm increase of mesh size, and that the selection range decreases by 3.8% for each increase of 10 open meshes and increases by 12.3% for each 1 mm increase of twine thickness. They identify a number of candidate models and here STECF used the simplest model of O'Neill et al. (2020).

STECF also assumed that plaice do not swim up and escape through SMPs that are positioned in the upper panel of the extension, 9 to 12 m from the codline and hence can use the same model to estimate the selectivity of plaice from the diamond mesh codends with SMPs.

To model the escape through the T90 codend, we use the results of Herrmann et al. (2013) who show that a T90 100 mm mesh size, 4 mm double PE codend has an L50 of 17.9 cm and a selection range of 1.98 cm.

$L50 = 24.52 + 0.19(\text{mesh size} - 110)$

$\ln SR = 0.974 - 0.0036(\text{mesh around} - 90) + 0.117(\text{twine} - 4)$

*Selectivity estimates*

All these results (L50 and SR) by species and mesh size combination are compiled in table 3.1.a.1 and figures 3.1.a.1. The 100 mm T90 codend is the least selective codend for all four of these species (cod, haddock, whiting and plaice). For cod, the next best is the 120 mm diamond mesh codend, and the most selective is the 110 mm diamond mesh codend with a 120 mm SMP positioned at 9 to 12 m. Unfortunately, STECF did not have any reliable estimates for cod selectivity in the 100 mm diamond mesh codend with a 160 mm SMP.

There is little difference in the selective performance for haddock and whiting of the 120 mm diamond mesh codend and the 110 mm diamond mesh codend with a 120 mm SMP positioned at 9 to 12 m. The 100 mm codend with the 160 mm SMP is the most selective for haddock and whiting.

For plaice, which STECF assumed will not escape through an SMP in the upper sheet of the extension at a position 9 to 12 m from the codline, selectivity increases with codend mesh size (table 3.1.a1 and figure 3.1.a1).

**Table 3.1.a.1.** Cod, haddock, whiting and plaice selectivity estimates for the four codend types of T0R 3.1.a

| | **cod** | | **haddock** | | **whiting** | | **plaice** | |
|---|---|---|---|---|---|---|---|---|
| | L50 | SR | L50 | SR | L50 | SR | L50 | SR |
| D110_P120 | 41.8 | 8.9 | 36.4 | 8.7 | 42.3 | 12.1 | 24.5 | 2.6 |
| T90_100 | 36.2 | 6.1 | 32.9 | 5.9 | 38.2 | 10.9 | 17.9 | 2.0 |
| D120 | 39.4 | 8.4 | 35.9 | 6.0 | 41.7 | 11.9 | 26.4 | 2.6 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| D100_P160 | | | 38.7 | 15.0 | 52.2 | 13.5 | 22.6 | 2.6 |

## STECF conclusions on ToR 3.1.a

The STECF advises that these results (table 3.1.a.1) be treated with caution. For cod, haddock and whiting they are estimated from different models and data sets. They are point estimates of L50 and SR and do not take into account the large between trip variability that naturally occurs during fishing gear trials. Nevertheless they are indicative and suggest that, based on the value of L50:

(i) The 100 mm T90 codend is the least selective codend for all four of these species (cod, haddock, whiting and plaice).

(ii) For cod, the most selective is the 110 mm diamond mesh codend with a 120 mm SMP positioned at 9 to 12 m. The next best is the 120 mm diamond mesh codend.

(iii) It was not possible to make a reliable estimate for cod selectivity in the 100 mm diamond mesh codend with a 160 mm SMP.

(iv) For haddock and whiting, there is little difference in the selective performance of the 120 mm diamond mesh codend and the 110 mm diamond mesh codend with a 120 mm SMP positioned at 9 to 12 m.

(v) The 100 mm codend with the 160 mm SMP is the most selective for haddock and whiting

(vi) For plaice, for which it is assumed will not escape through an SMP in the upper sheet of the extension at a position 9 to 12 m from the codline, selectivity increases with codend mesh size.

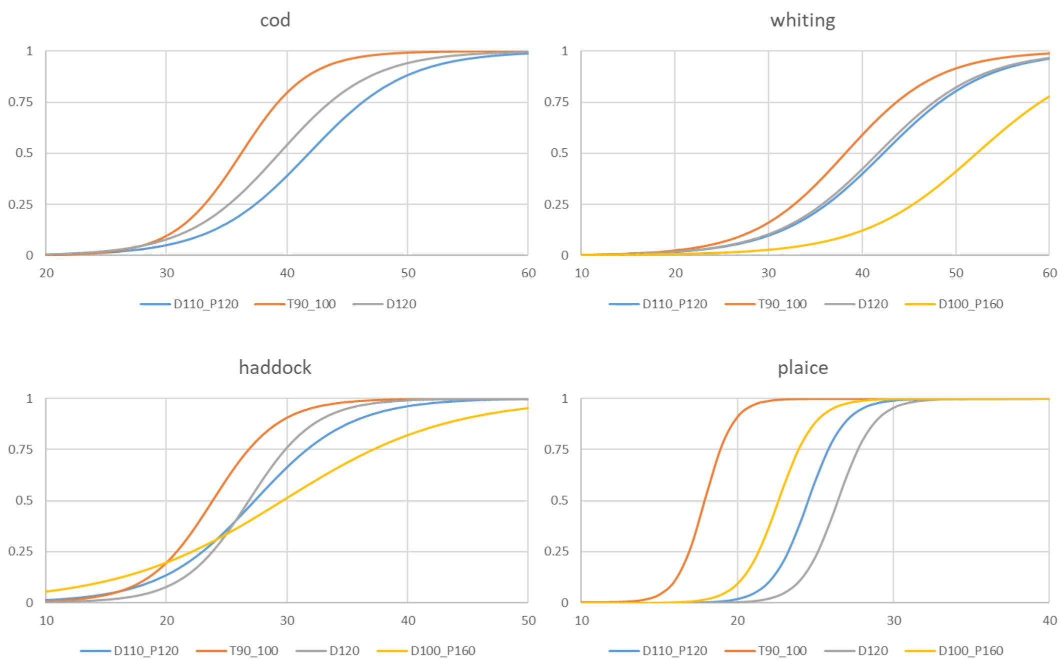



**Figure 3.1.a.1.** Model estimates of the selectivity of cod, whiting, haddock and plaice in the following codends: a 110 mm codend with 120 mm SMP (Blue), a 100 mm T90 codend (red), a 120 mm diamond mesh codend (grey) and a 100 mm codend with a 160 mm SMP (yellow).

## References for ToR 3.1. a


Fryer, R.J., O'Neill, F.G., Edridge, A. (2016). A meta-analysis of haddock size-selection data. Fish Fish. 17, 358–374. https://doi.org/10.1111/faf.12107

Madsen, N. (2007). Selectivity of fishing gears used in the Baltic Sea cod fishery. Rev. Fish Biol. Fish. 17, 517–544. https://doi.org/10.1007/s11160-007-9053-y

McHugh, M., Browne, D., Oliver, M., Minto, C., Cosgrove, R. (2019). Staggering the fishing line: a key bycatch reduction option for whitefish trawlers. BIM Irel. Seaf. Dev. Agency Fish. Conserv. Rep. 8.

McHugh, M., Browne, D., Oliver, M., Tyndall, P., Minto, C., Cosgrove, R. (2017). Raising the fishing line to reduce cod catches in demersal trawls targeting fish species. BIM Irel. Seaf. Dev. Agency Fish. Conserv. Rep. 9.

O'Neill, F. G., Fryer, R. J., Frandsen, R. P., Herrmann, B., Madsen, N., & Mieske, B. (2020). A meta-analysis of plaice size-selection data in otter trawl codends. Fisheries Research, 227, [105558]. https://doi.org/10.1016/j.fishres.2020.105558


## TOR 3.1. b: Estimate and contrast the selectivity characteristics (e.g. L50 and SR) of the above mesh sizes with and without the raised fishing line on cod and other species where available, specifically whiting, haddock, megrims, anglerfish (monkfish), hake, pollock, ling and skates and rays (in general). Other commercial flat fish and commercially important species (non-TACs included) should be considered if possible, as were reported in the results of the BIM studies.

## Summary of information provided to STECF for ToR 3.1.b

The Commission provided the report of an *ad hoc* contract, part of which considers ToR 3.1.b. France provided a number of documents on (i) technological measures to reduce catches of cod by trawlers targeting demersal species and (ii) a summary of information available on the raised fishing line. These submissions along with the STECFs own analysis have been used to answer this TOR.

ToR 3.1.b. refers to two BIM studies (McHugh et al. 2017, 2019) which report on trials to assess the effect of setting the distance between the groundgear and the fishing line to 1m in comparison to a gear with a conventional groundgear rigging. The commercial species they catch include cod, haddock, whiting, plaice, lesser spotted dogfish, John Dory, hake, skates and rays, lemon sole, monkfish, megrim and pollock.

## STECF comments on ToR 3.1.b

### *Effect of the Raised Fishing Line on trawl selectivity*

To investigate the selective properties of the trawl's fishing line raised above the seabed STECF considered the results of a number of relevant studies. These studies examine fish swimming under the fishing line, the effect of a raised fishing line and fish entering trawls with separator panels. While there are essential differences between the studies, they all deal with fish behaviour ahead of the fishing line and the height at which they swim and enter the trawl gears.

The height of the fishing line above the seabed in Krag et al. (2010) and Ingolfsson and Jørgensen (2007) is well defined (equal to 60 cm, the rockhopper diameter). It is less certain in the trials of McHugh et al. (2017, 2019), although it is assumed to be 1 m.

*Escapement by species*

Krag et al. (2010) investigated raising the fishing line of a demersal trawl to 60 cm above the seabed to allow cod to escape beneath the trawl while trying to retain haddock. The selective haddock trawl reduced the total catch of cod by 55% during the day and 82% at night, and 99% of the marketable haddock was retained during the day and 89% at night.

Ingolfsson and Jørgensen (2007) studied the escapement of Atlantic cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*) and saithe (*Pollachius virens*) beneath a commercial bottom trawl, rigged with a 60 cm diameter rockhopper gear. They found that approximately one third of the cod, a quarter of the haddock and about 7% saithe escaped under the trawl's fishing line.

McHugh et al. (2017) raised the fishing line 1 m above the groundgear and showed that 61% of available cod and 57% of commercial flat fish species entered the trawl gear. They also found that there were large increases of haddock and whiting retained (+37 and 87%, respectively), which they suggested is due to the headline height being 1 m higher in the modified trawl.

McHugh et al. (2019) separated the fishing line from the groundgear by 1 m but were uncertain whether the height of the fishing line from the seabed has indeed increased, and suggested that the fishing line may be 'staggered' before or after the groundgear. Nevertheless, this configuration leads to reductions of all gadoids, flatfish, monkfish, skates and rays.

Fryer et al. (2017) carried out a meta-analysis of fishing trials that used trawl gears with horizontal separator panels to direct fish into an upper or lower codend. The analysis was applied to eight North Atlantic species: the gadoids cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), saithe (*Pollachius virens*), and whiting (*Merlangius merlangus*), the flatfish lemon sole (*Microstomus kitt*) and plaice (*Pleuronectes platessa*), and monkfish (*Lophius piscatorius*) and Nephrops (*Nephops norvegicus*). The proportion of fish that rise above the separator panel decreases as the height of the leading edge of the panel increases for six of the eight species. Only monkfish and *Nephrops* have no significant dependency on panel height. While the separator gear is not directly comparable to a gear with a raised fishing line, the results are very useful in assessing the height at which fish swim ahead of a trawl and the extent to which they can be separated vertically.

These studies all demonstrate the possibility of modifying the selectivity of trawl gears by raising the fishing line of trawl gears. In general, there is a good level of consistency between the results. The main exception being the increased haddock and whiting catches during the McHugh et al. (2017) trials, which the authors attribute to the higher headline height of the raised gear during these trials (table 3.1.b.1).

**Table 3.1.b.1.** Share (%) of catch by species that enter the raised gear compared to the unraised gear. The fishing line in the Krag et al. (2010) and the Ingolfsson and Jørgensen (2007) trials was 60 cm above the seabed, whereas it was at 1 m in the McHugh et al. trials. The Fryer et al. (2017) results are predictions for a separator panel at 1 m. (The values in italics are a common value for seven commercial flatfish species).

| | **haddock** | **cod** | **whiting** | **plaice** | **saithe** | **lemon sole** | **monkfish** | **hake** | **skates rays** |
|---|---|---|---|---|---|---|---|---|---|
| Krag et al. | 91 | 39 | 74 | 19 | 97 | 35 | | | |
| Fryer et al. | 81 | 17 | 76 | 17 | 89 | 16 | | | |
| McHugh et al., 2019 | 79 | 71 | 72 | 32 | | 30 | 32 | 93 | 22 |
| McHugh et al., 2017 | 137 | 61 | 187 | *43* | | *43* | 28 | 92 | 20 |
| Ingolfsson and Jørgensen | 77 | 66 | | | 93 | | | | |

*Differences by length*

Krag et al. (2010) demonstrate a length based dependency for cod, haddock and whiting with smaller fish going more under the fishing line than larger fish and fit logistic curves to describe the proportion of fish at length that go under the fishing line (Table 3.1.b.2). Ingolfsson and Jørgensen (2007) find a similar dependency for cod and some evidence of one for haddock, but do not find a relationship between length and escape under the fishing line for saithe. McHugh et al. (2019) find greater proportions of cod and whiting less than the MCRS escape under the fishing line than those greater than the MCRS, but find no difference for haddock or plaice.

**Table 3.1.b.2.** Parameters of logistic curves that describe the proportion of each species that enter trawl over raised fishing line (Krag et al., 2010).

| **cod** | | **haddock** | | **whiting** | |
|---|---|---|---|---|---|
| L50 | SR | L50 | SR | L50 | SR |
| 32 | 20 | 12.4 | 10.4 | 26.9 | 6.9 |

For cod, haddock and whiting, the models presented in Krag et al. (2010) (Table 3.1..b.2) can be combined with the selectivity curves of the codends of ToR 3.1.a to estimate the selectivity of a gear using one of these codends and that also has a raised fishing line. This is estimated by multiplying the proportion of fish that enter a trawl by the proportion that are retained in the trawl given that they enter it, i.e.

P(retained in trawl with raised fishing line) =

P(enter a trawl with raised fishing line) x P(retained in a trawl given that they enter it).

Thus, the L50 and SR in the raised fishing line gear (Tables 3.1.b.3 –5) can be estimated. In this analysis we have used the baseline models and not included a day/night effect.

**Table 3.1.b.3.** Cod selectivity for gears with and without a raised fishing line

| | **Unraised fishing line** | | **Raised fishing line** | |
|---|---|---|---|---|
| | L50 | SR | L50 | SR |
| D110_P120 | 41.8 | 8.9 | 44 | 9.2 |
| T90_100 | 36.2 | 6.1 | 39 | 7.4 |
| D120 | 39.4 | 8.4 | 42 | 9.0 |

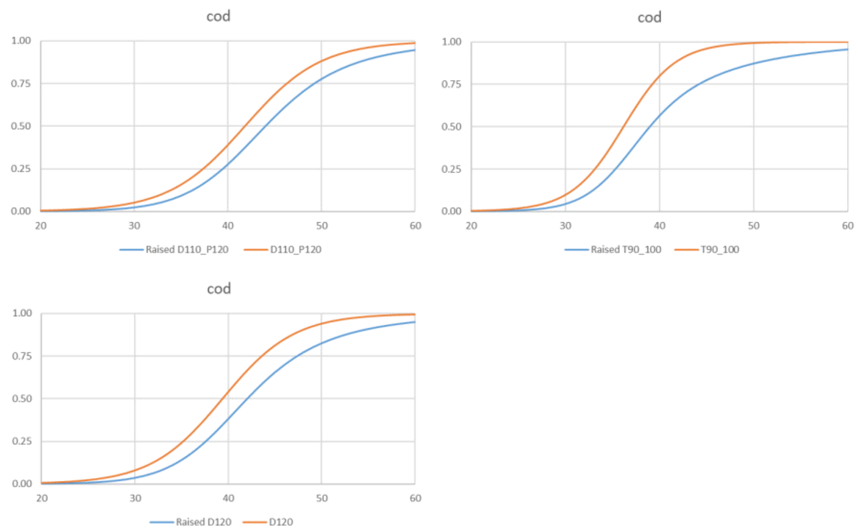



**Figure 3.1.b.1.** The effect of using a gear with a raised fishing line on the selectivity of cod for a 110 mm codend with 120 mm smp, a 100 mm T90 codend and a 120 mm diamond mesh codend.

| **Table 3.1.b.4.** Haddock selectivity for gears with and without a raised fishing line | | | | |
|---|---|---|---|---|
| | **Unraised fishing line** | | **Raised fishing line** | |
| | L50 | SR | L50 | SR |
| D110_P120 | 36.4 | 8.7 | 36.4 | 8.6 |
| T90_100 | 32.9 | 5.9 | 32.9 | 5.8 |
| D120 | 35.9 | 6.0 | 35.9 | 6.0 |
| D100_P160 | 38.7 | 15.0 | 38.8 | 15.2 |

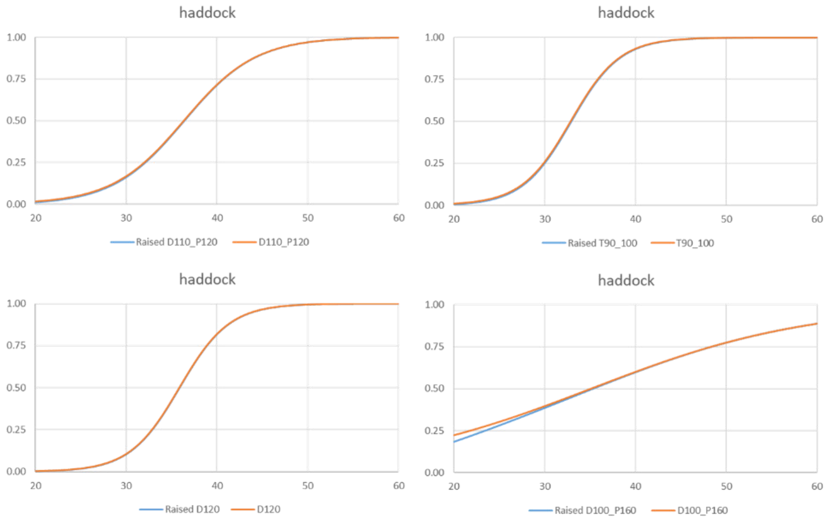



**Figure 3.1.b.2.** The effect of using a gear with a raised fishing line on the selectivity of haddock for a 110 mm codend with 120 mm SMP, a 100 mm T90 codend, a 120 mm diamond mesh codend and a 100 mm codend with a 160 mm SMP.

| **Table 3.1.b.5.** Whiting selectivity for gears with and without a raised fishing line | | | | |
|---|---|---|---|---|
| | **Unraised fishing line** | | **Raised fishing line** | |
| | L50 | SR | L50 | SR |
| D110_P120 | 42.3 | 12.1 | 42.3 | 11.9 |
| T90_100 | 38.2 | 10.9 | 38.4 | 10.0 |
| D120 | 41.7 | 11.9 | 41.7 | 11.4 |
| D100_P160 | 52.2 | 13.5 | 52.2 | 13.5 |

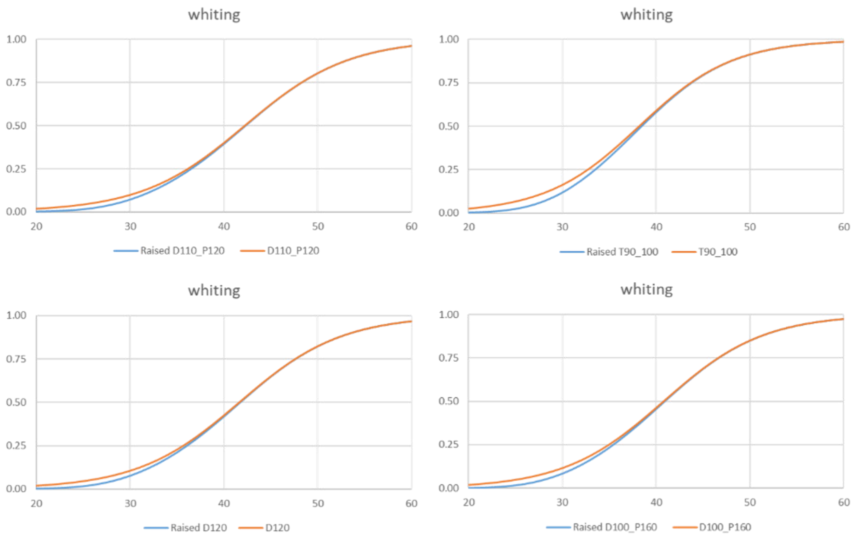



**Figure 3.1.b.3.** The effect of using a gear with a raised fishing line on the selectivity of whiting for a 110 mm codend with 120 mm SMP, a 100 mm T90 codend, a 120 mm diamond mesh codend and a 100 mm codend with a 160 mm SMP.

The raised fishing line improves the selectivity of cod increasing the L50 by between 2.2 and 2.8 cm (Table 3.1.b.3, Figure 3.1.b.1). It also decreases retention of whiting less than about 35 cm (Figure 3.1.b.3), but has very little effect on haddock as most haddock that escape under the fishing line are generally small and would have escaped through the codend if they had entered the gear (Table 3.1.b.4, Figure 3.1.b.2).

For the other species there is not sufficient length dependent information to estimate selectivity parameters, although, for plaice, if we assume a constant proportion across all length classes of 32% enter the raised gear (Table 3.1.b.2; Fryer et al., 2017; McHugh et al., 2019) selectivity profiles are as in Figure 3.1.b.4. Plaice would mainly not be retained in a gear with a raised fishing line.

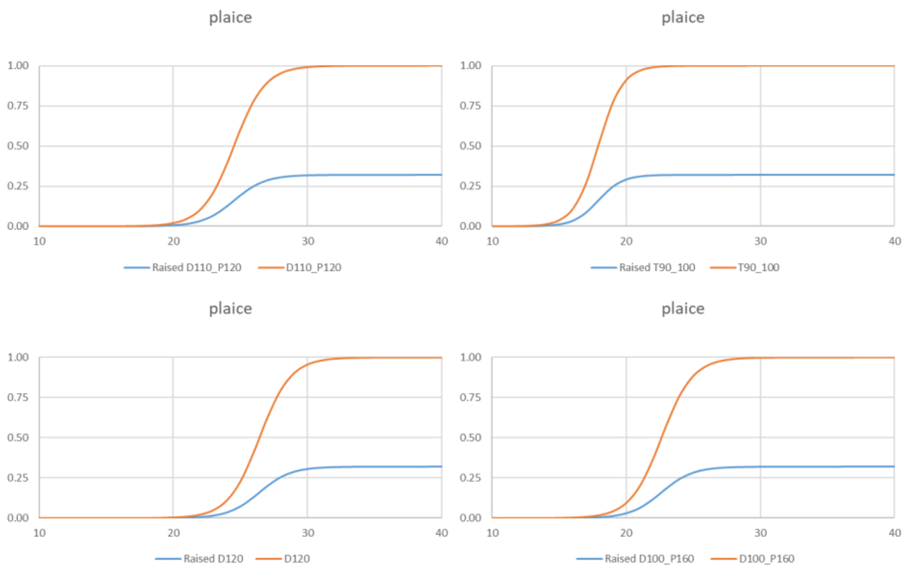



**Figure 3.1.b.4.** The effect of using a gear with a raised fishing line on the selectivity of plaice for a 110 mm codend with 120 mm SMP, a 100 mm T90 codend, a 120 mm diamond mesh codend and a 100 mm codend with a 160 mm SMP.

***Effect of the Raised Fishing Line on catches of cod, haddock and whiting***

To scale up to actual effects on catches STECF needed to combine the selectivity curves above to actual population size distribution, and for this STECF used average size distribution in the stocks from survey data.

The measures in article 13 apply to Union vessels fishing with bottom trawls and seines in ICES divisions from 7f, 7g, the part of 7h North of latitude 49° 30' N and the part of 7j North of latitude 49° 30' N and East of longitude 11° W. These correspond to areas Cn and Cc of the EVHOE survey (Figure 3.1.b.5). The ICES-DATRAS database (http://datras.ices.dk) from 1997 to 2018 is used to derive the average size distribution and population structure of cod, haddock and whiting in these areas to estimate the effect of raising the fishing line on catches (Figures 3.1.b.6 – 3.1.b.8).

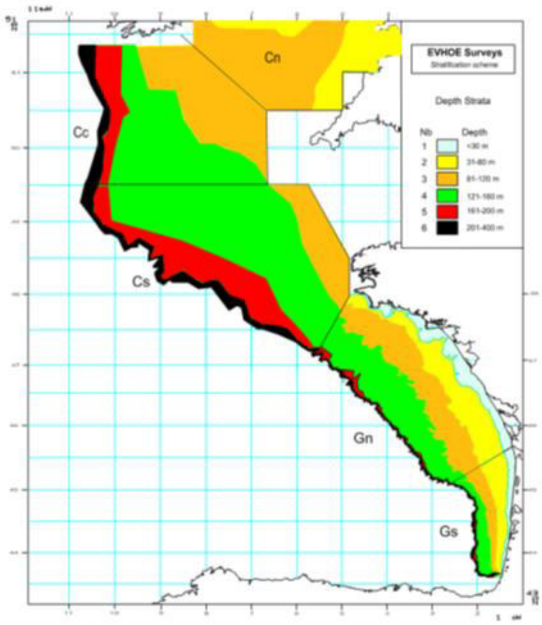



**Figure 3.1.b.5.** EVHOE area in the datras data products. Areas Cn and Cc are considered.

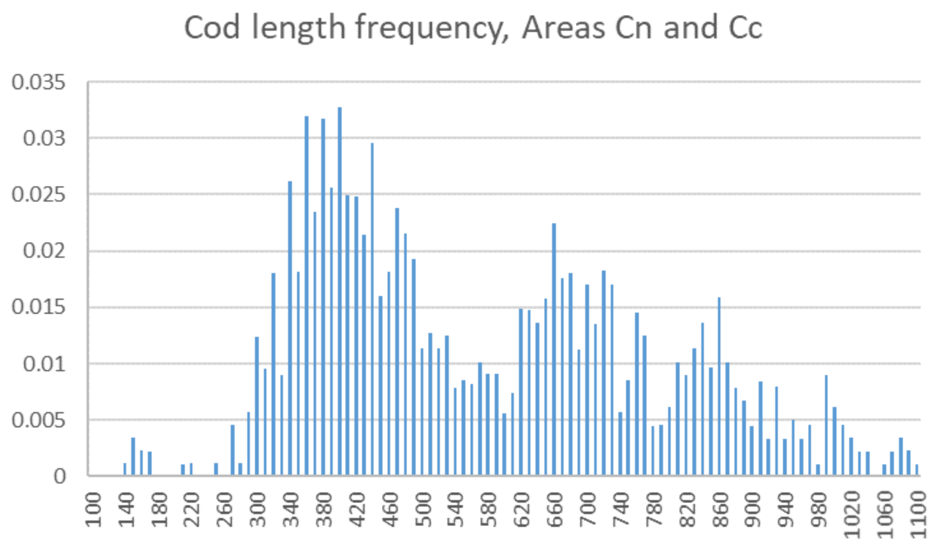



**Figure 3.1.b.6.** Length frequency of cod in the Celtic Sea, areas Cn and Cc, provided by the EVHOE survey (ICES-DATRAS database - http://datras.ices.dk) from 1997 to 2018.

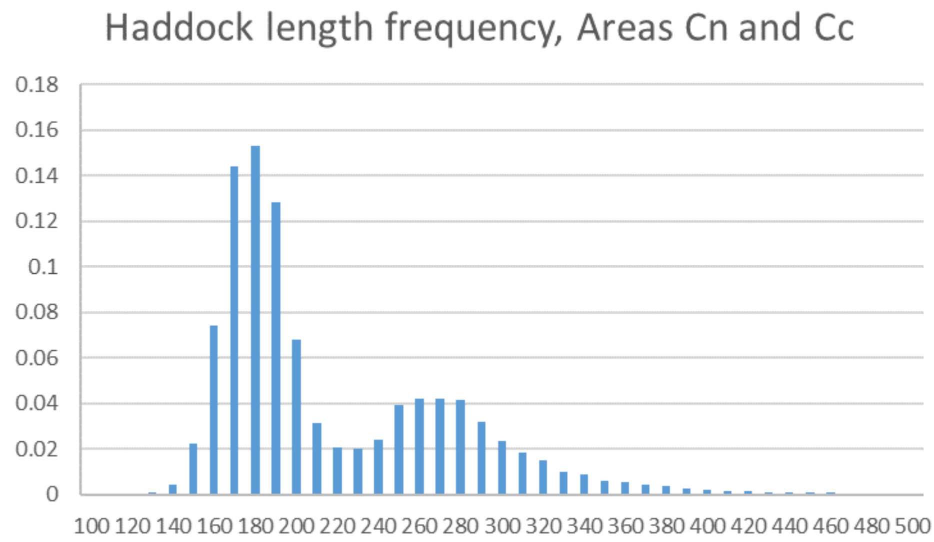



**Figure 3.1.b.7.** Length frequency of haddock in the Celtic Sea, areas Cn and Cc, provided by the EVHOE survey (ICES-DATRAS database - http://datras.ices.dk) from 1997 to 2018.

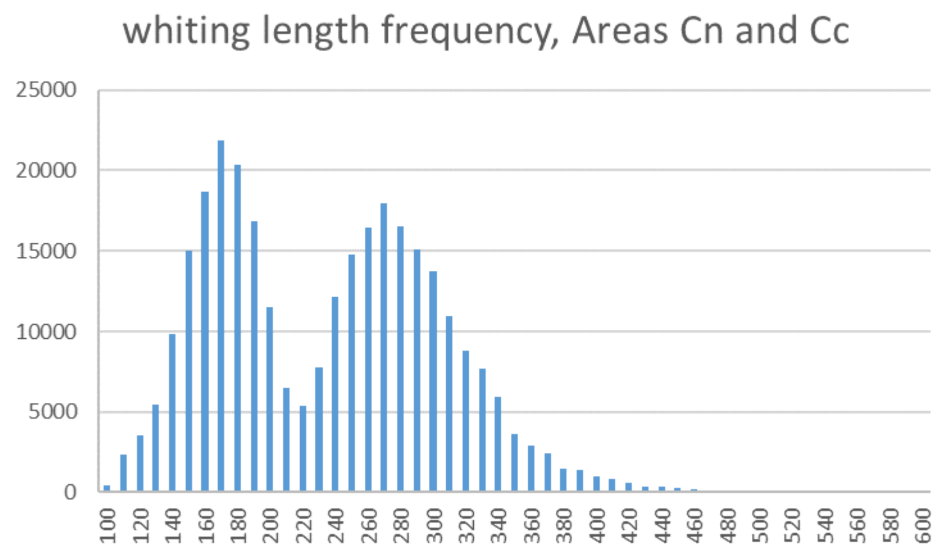



**Figure 3.1.b.8.** Length frequency of whiting in the Celtic Sea, areas Cn and Cc, provided by the EVHOE survey (ICES-DATRAS database - http://datras.ices.dk) from 1997 to 2018.

Applying the selectivity curves to these populations shows that the raised fishing line will result in reductions of about 65% in catches by numbers of cod less than 35 cm; of between 5 and 9% of haddock less than 30 cm; and about 70% of whiting less than 27 cm (Table 3.1.b.6). The cod and whiting estimates are very similar to the values of McHugh et al. (2019) who estimated a reduction of 70 and 63% of undersized cod and whiting respectively, in their trials.

It is important to be aware, however, that these are averaged population based estimates and will vary as the population fished varies.

| **Table 3.1.b.6.** % reduction of catch by numbers under MCRS when using a raised fishing line. | | | |
|---|---|---|---|
| | **cod < 35 cm** | **haddock < 30 cm** | **whiting < 27 cm** |
| D110_P120 | 65 | 6 | 70 |
| T90_100 | 65 | 5 | 70 |
| D120 | 64 | 5 | 70 |
| D100_P160 | | 9 | 71 |

For the other species, where STECF had no length dependent information on selectivity, the results of McHugh et al. (2019) and the results in Table 3.1.b.1 can be used to estimate the relative change in catch for lesser spotted dogfish, John Dory, plaice, hake, skates and rays, lemon sole, monkfish, megrim, pollock and ling.

## STECF conclusions on ToR 3.1.b

The STECF advises that these results of the analyses for this TOR are treated with caution.

The estimates of selectivity are point estimates that come from a limited number of trials and do not take into account the large variability between trips that naturally occurs during fishing gear trials.

The catch estimates are population based and will vary as the population fished varies.

The analysis of the effect of the raised fishing line is based on a synthesis of different studies investigating fish swimming under the fishing line, the effect of a raised fishing line and fish entering trawls with separator panels.

Nevertheless, there is a good level of consistency between the results (as shown in Table 3.1.b.1) and STECF considers the results to be indicative and suggest that the raised fishing line

(i) improves the selectivity of cod increasing the L50 by between 2.2 and 2.8 cm.

(ii) improves the selection of whiting smaller than about 35 cm,

(iii) has very little effect on haddock, as most haddock that escape under the fishing line are generally small and would have escaped through the codends examined if they had entered the gear (Table 3.1.b.6).

(iv) gives rise to substantial reductions of species such as lemon sole, plaice, monkfish, megrim and skates and rays.

## References for ToR 3.1.b

Krag, L.A., Holst, R., Madsen, N., Hansen, K., Frandsen, R.P. (2010). Selective haddock (*Melanogrammus aeglefinus*) trawling: Avoiding cod (*Gadus morhua*) bycatch. Fish. Res. 101, 20–26. https://doi.org/10.1016/j.fishres.2009.09.001

Ingolfsson and Jørgensen (2007). Escapement of gadoid fish beneath a commercial bottom trawl. Fisheries Research 79 (2006) 303–312.

Madsen, N. (2007). Selectivity of fishing gears used in the Baltic Sea cod fishery. Rev. Fish Biol. Fish. 17, 517–544. https://doi.org/10.1007/s11160-007-9053-y

McHugh, M., Browne, D., Oliver, M., Minto, C., Cosgrove, R. (2019). Staggering the fishing line: a key bycatch reduction option for whitefish trawlers. BIM Irel. Seaf. Dev. Agency Fish. Conserv. Rep. 8.

McHugh, M., Browne, D., Oliver, M., Tyndall, P., Minto, C., Cosgrove, R. (2017). Raising the fishing line to reduce cod catches in demersal trawls targeting fish species. BIM Irel. Seaf. Dev. Agency Fish. Conserv. Rep. 9.

Fryer, R.J., Summerbell, K., O'Neill, F.G. (2017). A meta-analysis of vertical stratification in demersal trawl gears. Can. J. Fish. Aquat. Sci. 74, 1243–1250. https://doi.org/10.1139/cjfas-2016-0391

O'Neill, F. G., Fryer, R. J., Frandsen, R. P., Herrmann, B., Madsen, N., & Mieske, B. (2020). A meta-analysis of plaice size-selection data in otter trawl codends. Fisheries Research, 227, [105558]. https://doi.org/10.1016/j.fishres.2020.105558

**TOR 3.1.c: Explore whether alternative criteria to the existing haddock threshold would cover equivalent amounts of by-catches of cod, and how the number of vessels covered by the measures under each paragraph of Article 13 would evolve when changing the existing haddock threshold or adding an extra threshold of one or many species to the original haddock threshold of 20%.**

**Summary of the French dataset provided to STECF for ToR 3.1.c**

No report was provided to STECF for this ToR, however France (DPMA) provided an R script and a dataset that corresponds to an IFREMER processing of French fishing vessels and trip-based logbook data subsetted for the Celtic Sea. Each record in the data gives living weight landed per species per ICES rectangle in 2019, as required for EU logbooks, and was further coupled to sales slips for giving euros of the catches, assigned back to ICES rectangles. The formatting of the data is following the procedure described at https://sih.ifremer.fr/Description-des-donnees/Module-Debarquements-et-effort-de-peche/Consolidation-des-donnees-declaratives/SACROIS

The dataset is restricted to only cover trawlers and which had at least one fishing operation in the protected area in 2019.

The 2019 French logbooks have been assigned to Art.13 geographical sectors based on a list of ICES rectangles impacted by the Regulation and for which French trips were observed (28D9, 28E0, 28E1, 28E2, 29D9, 29E0, 29E1, 29E2, 29E3, 29E4, 30D9, 30E0, 30E1, 30E2, 30E3, 30E4, 30E5, 31D9, 31E0, 31E1, 31E2, 31E3, 31E4, 32D9, 32E0, 32E1, 32E2, 32E3, 32E4, 33D9). The dataset comprises several rows on a given trip along with i) several species catches reported ii) each time a trip is outside and is inside the regulated area.

## STECF comments on ToR 3.1.c

Comments on the dataset

STECF notes that the dataset includes records for trawlers only and STECF has, therefore, no ability to address trawl and seine activity as required by Art. 13. No information is provided to inform whether any seiners are active in the area.

STECF notes that the data provided by the French authorities consists of records of landings, and not catches, i.e. discards are not included.

STECF further notes that the dataset comprises records and reflect fleet activity that could have already been impacted by the discard plan implemented since July 2019. The discard plan may have impacted the French fleet during the second half of 2019. The threshold analyses do not account for this potential change over time.

Disclaimer

STECF emphasizes that the analysis presented below is only an estimate of the amounts of cod that may have been impacted by the Regulation of Art 13 if that had been applied on French fisheries in 2019, along with varying hypothetical thresholds of catch composition. This cannot directly be interpreted as an actual amount of saved cod that would result from a full implementation of the selective mitigation measures implemented to reduce the bycatch of cod in 2020. The analysis is based on past records of catches, and a trip catching cod in 2019 but being mitigated by the Regulation in 2020 would not necessarily mean the cod catch would be 0 for this trip in 2020.

STECF also wishes to disclaim that the analysis for this ToR was entirely performed by STECF during its written procedure, leaving it little time to validate and analyze the results fully. For this reason, STECF was also not able to analyze the effect of a threshold at the level of the categories covered under each paragraph of Article 13.

STECF analysis on trip catch composition

STECF observes that the total landings of cod declared in the French logbook in 2019 in the provided dataset is 351 t, 250 t were made by trips crossing the regulated areas, and 215 t originated from the rectangles considered in the Celtic sea protection zone. These tonnes were caught during 4,107 trips made by 94 French trawlers in 2019, of which 1,239 trips crossed the regulated area (i.e. the trip cover “inside” and “outside” rectangles).

STECF plots hereafter an overview of catch composition patterns in relation to a range of thresholds of the proportion of species in 2019 French landings by trawlers (Figure 3.1.c.1). The list of species displayed in the analyses is only those appearing in the trips catching more than 20% haddock, but the threshold analysis is applied to the entire dataset to explore the catch composition of the French trawlers. (MNZ = Monkfish, HAD = Haddock, LEZ = lemon sole, HKE = hake, MEG = megrim, RJM = Spotted ray, RJH = Blonde ray, JOD = John Dory, NEP = *Nephrops*).

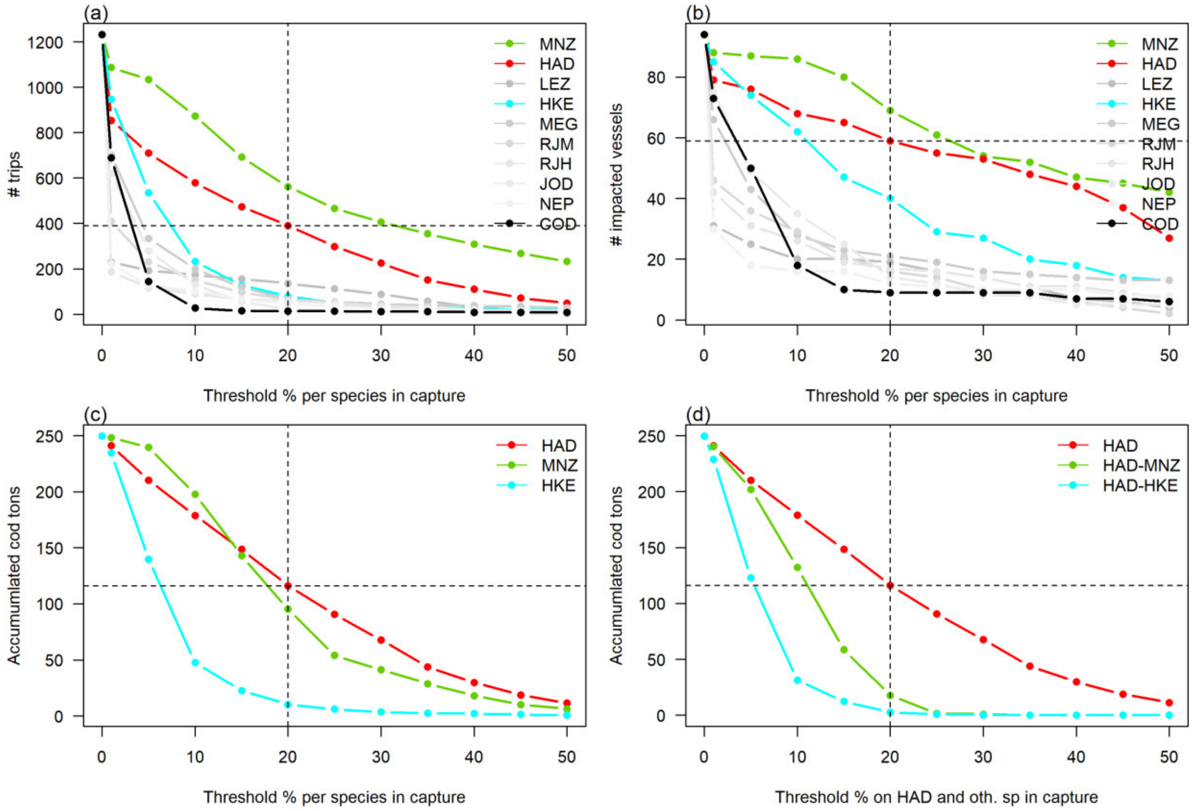



**Figure 3.1.c.1.** Along a threshold in percent of landings per species in French trawlers whose trips cross the regulated area, a- number of impacted trips, b- number of impacted vessels, c- the cumulated landings of cod in tonnes, d - the capture of cod in tonnes along a threshold on the combination of species (e.g., 20% and HAD-MNZ interprets as all the cod tonnes in trips with a threshold of >20% on HAD and a threshold of >20% on MNZ simultaneously). The dashed line gives the 20% threshold on HAD per trip and the corresponding accumulated cod landings in tonnes.

From the upper Figure 3.1.c.1 a) and b) it is seen that the curves for haddock, monkfish and, to a lesser extent hake are rather flat. This means that almost all trips and vessels catch these species, although in variable proportion, and these species can be considered the primary target species in the Art.13 regulated areas. For example, around one third of the trips in regulated area have landed more than 20% of haddock, and around 40% of the trips have landed more than 20% of monkfish. For the other species including cod the curve falls more sharply, which means that only a few trips contain more than 5 or 10% of such species. These can be considered by-catch species because they do not represent a major part of the capture for most of the trips. It does, however not preclude on their economic importance as thresholds in trip catch composition are given in landed weight and not on value.

The bottom figures 3.1.c.1 c) and d) investigate the cumulated cod catches for various thresholds per trip applied for one target species only (haddock, monkfish or hake) in figure c) or for two species together in the same trip in figure d). According to figure 3.1.c.1 c), the cumulated quantities of cod landed in 2019 are almost inversely proportional to the percentage of haddock threshold. So the lower the haddock threshold, the more cod might be covered. These results are fully detailed for all species in Table 3.1.c.1 below. For example, the trips with more than >20% haddock caught 116 t while the trips with less than 20% of haddock in proportion caught up to 130 t of cod (249.6-116.2). Reducing the haddock threshold from 20% to 10% might cover around 60 additional tonnes of cod. Meanwhile, STECF observed from figure 3.1.c.1b) that the numbers of impacted vessels would also increase proportionally to the decrease in threshold. For example a decrease of haddock threshold from 20% to 10% would affect around 10% more vessels (+ 9 vessels from 59 to 68, out of 94).

Figure 3.1.c.1.c) also shows that the curve for haddock is close to the curve for monkfish, indicating that about the same amount of cod would be covered by replacing a threshold on haddock by an equivalent threshold on monkfish. For example, the trips with more than >20% monkfish caught 95 t cod in 2019. However, a threshold on monkfish would comparatively impact more trips and more vessels than the equivalent threshold on haddock (Figure 3.1.c.1 a) and b).

**Table 3.1.c.1.** Cumulated cod landings by the French trawlers deduced from 2019 logbooks along with a threshold per species on trip landing composition (maximum is ca. 250 t cod). The value for cod accumulated catches that would have been impacted by the Art 13 in 2019 is underlined.

| **Species** | **Thresholds per species on catches** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **>0%** | **>1%** | **>5%** | **>10%** | **>15%** | **>20%** | **>25%** | **>30%** | **>35%** | **>40%** | **>45%** | **>50%** |
| MNZ | 249.6 | 248.2 | 239.7 | 197.9 | 142.8 | 95.1 | 54 | 41.3 | 28.8 | 18.1 | 10.2 | 6.2 |
| HAD | 249.6 | 240.9 | 210.1 | 178.8 | 148.6 | <u>116.2</u> | 90.5 | 67.8 | 43.8 | 29.8 | 18.8 | 11.5 |
| LEZ | 249.6 | 35.7 | 34.1 | 32.1 | 27.8 | 24.6 | 22 | 19.8 | 14.2 | 7.5 | 4.5 | 1.8 |
| HKE | 249.6 | 234.6 | 139.8 | 47.8 | 22.8 | 10.2 | 6 | 3.5 | 2.4 | 2.1 | 1.3 | 0.6 |
| MEG | 249.6 | 188.9 | 93.1 | 55.5 | 22.8 | 4 | 1 | 0 | 0 | 0 | 0 | 0 |
| RJM | 249.6 | 107.4 | 49.4 | 31.3 | 19.7 | 12.1 | 7.9 | 5.1 | 3.2 | 1.3 | 0.5 | 0 |
| RJH | 249.6 | 52.5 | 29.2 | 20.7 | 15.8 | 13.8 | 11.2 | 8.7 | 5.8 | 3.4 | 2.3 | 1.3 |
| JOD | 249.6 | 152.9 | 66.9 | 33.3 | 11.3 | 2.3 | 1.3 | 0.2 | 0.1 | 0 | 0 | 0 |
| NEP | 249.6 | 70.1 | 41.9 | 34.8 | 22.8 | 14.7 | 8.7 | 2.8 | 0.9 | 0.9 | 0 | 0 |
| COD | 249.6 | 233 | 77.4 | 18.8 | 4.7 | 3.5 | 3.5 | 3.3 | 3.2 | 0.8 | 0.8 | 0.8 |

STECF also analyzed the effect of cumulating the same threshold for two species simultaneously (Figure 3.1.c.1d above). The interesting outcome is that the cumulated effect on cod is low if the same threshold applies to both HAD and MNZ simultaneously (less than 50 t of cod bycatch in trips both >20% haddock and >20% monkfish at the same time). This suggests that the trips catching both cod and haddock are not the same trips as those catching both cod and monkfish. This is also confirmed when plotting the trips on a map (Figure 3.1.c.2), where it can be seen the Haddock-dominant trips do not distribute in the same area as the Monkfish-dominant trips. For example, the same amount of cumulated cod landed obtained with a 20% threshold on haddock alone (116 t) would be obtained with a simultaneous threshold slightly above 10% of haddock and monkfish (HAD-MNZ), or slightly above 5% of haddock and hake (HAD-HKE Figure 3.1.c.1d). However this two options would comparatively impact more trips for the same amount of cod covered (inferred from Figure 3.1.c.1.a).

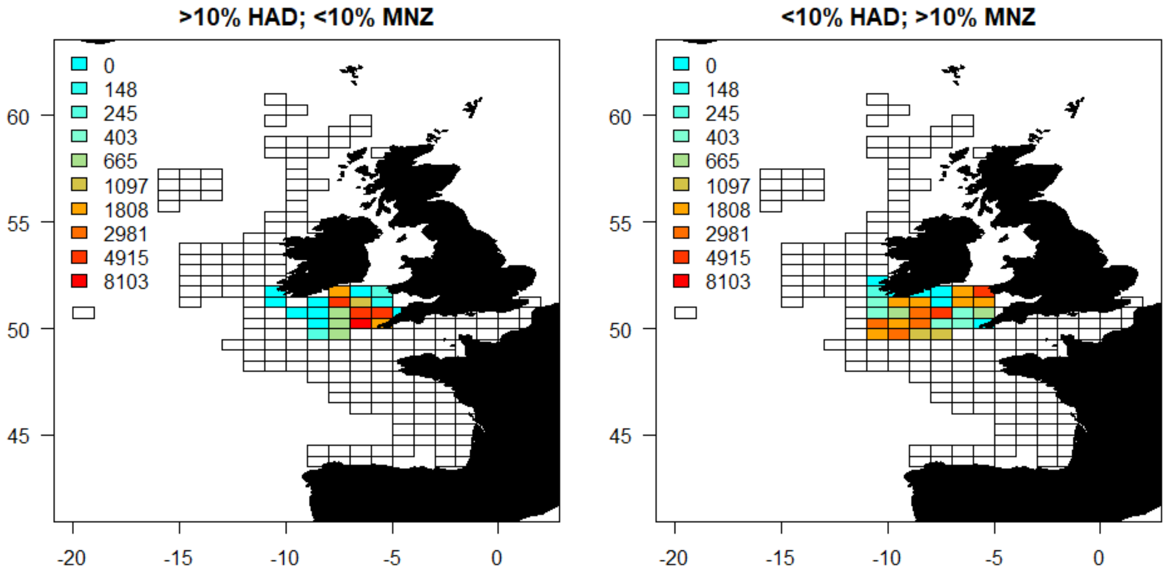



**Figure 3.1.c.2**. Spatial origin of cod landings in kg made by the French trawlers in 2019 for the Haddock-dominant trips vs the Monkfish-dominant trips aggregated by ICES rectangle. Dominance is given in terms of % of the total catch per trip. A certain rectangle has a color level displayed only if marked as being within the regulated area in the French dataset.

To refine this further, STECF investigated the effect of using independent thresholds for the two species (i.e. would need two thresholds with a "OR" in the legislation and not a "AND") (Figure 3.1.c.3). Hence, STECF observes that:

i) Use two thresholds similar to each other will give the little potential for covering cod (Figure 3.1.c.3 or Figure 3.1.c.1d) (i.e. it is equivalent to implement a "AND" in the Regulation)

ii) Similar levels of cumulated cod bycatch could be obtained through with various combinations of thresholds for monkfish and haddock (Figure X.c.3 MNZ HAD) if both thresholds are made independent (with a "OR" in the legislation); For example; 100 t of cod would be either accumulated with slightly less than 20% haddock threshold alone, or 5% haddock and 20% monkfish simultaneously, or something in between.

iii) No benefit for regulating cod bycatch might result from implementing a threshold on hake until a large proportion of trips with hake is impacted, for ex. >10%HKE regardless of the second species (Figure 3.1.c.3 HKE-HAD or HKE-HAD).

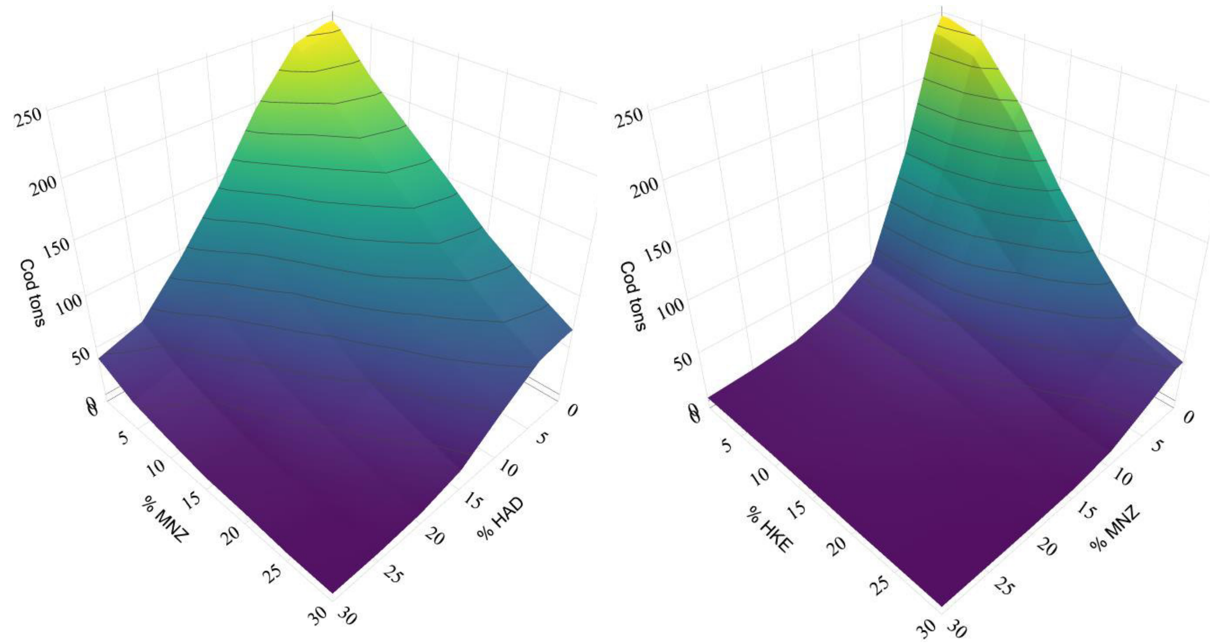
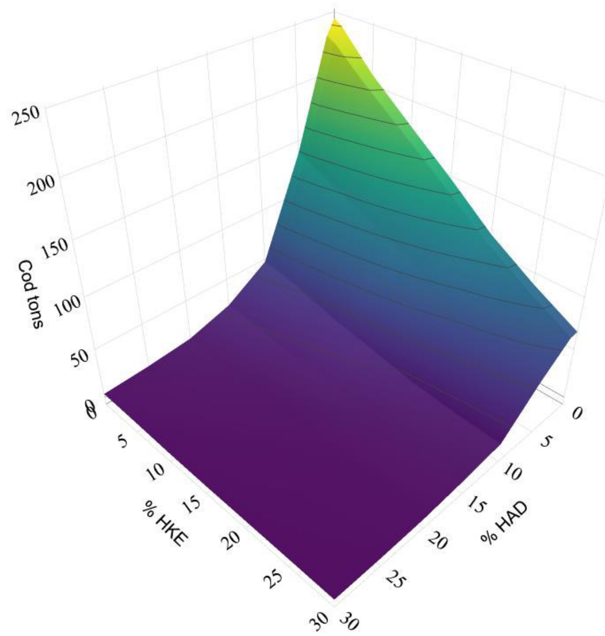



**Figure 3.1.c.3**. 3-D surface of accumulated cod tonnes along with percent trip composition thresholds for HAD, MNZ and HKE applied to 2019 French landings in the Celtic Sea regulated area.




## STECF conclusions on ToR 3.1.c

STECF concludes that in 2019, the French trawler trips performed in the regulated area and landing at least 20% of haddock were responsible for almost half of the total cod bycatch in the area of all French trawlers, summing up to around 116 t cod.

STECF concludes that the cumulated cod catches in 2019 were almost inversely proportional to the haddock threshold. This implies that higher amounts of cod would be covered by decreasing the threshold on haddock. This would also increase proportionally the number of vessels impacted by the threshold limit, and would impact trips targeting other species than haddock.

STECF concludes that substantial amounts of cod are also taken in fishing trips targeting monkfish. For example, trips landing at least 20% of monkfish landed almost as much cod as those with 20% of haddock (95 t cod in 2019).

Nevertheless, the STECF analyses demonstrate that these are two different groups of trips, and the cod caught in haddock-dominant trips is not the same as the cod caught in monkfish-dominant trips. Therefore replacing a threshold on haddock by an equivalent threshold on monkfish would not affect the amount of bycaught cod significantly, while impacting comparatively slightly more numerous trips and vessels.

STECF concludes that combining equivalent thresholds of two species simultaneously in the same trip (i.e., 20% or more of haddock *AND* 20% or more of monkfish landed in the same trip) would not be efficient at increasing the coverage of cod bycatch, because there is only a minimal amount of trips with a high proportion of both haddock and monkfish at the same time.

On the contrary, STECF concludes that the same threshold applying either on haddock or on monkfish would be highly efficient to cover most cod bycatch (i.e. trips landing at least 20% of haddock *OR* at least 20% of monkfish). STECF has also presented options for applying different thresholds for both target species.

**TOR 3.1.d: The STECF is also asked to identify alternative technical measures(as explored for instance by IFREMER) that would achieve similar selectivity characteristics as the gear combination specified in Article 13.1(a) and 13.1(b)(i), especially those where the selectivity characteristics of which reduce cod or whiting catches but maintain (largely) catches of other species.7**

**Summary of information provided to STECF for ToR 3.1.d**

An ad hoc contract report provided by DG MARE in support to STECF and a document submitted by France considered alternative technical measures that could be used to reduce the capture of cod. There was a large amount of overlap in the types of gears examined in the two documents.

The French document categorises the types of alternative gears as being trawls with

- very large meshes i.e. like the "Eliminator trawl"
- netting panels that have very large mesh sizes
- square mesh panels
- with grids
- other concepts

7 For instance: Trial of a new escape panel concept to reduce cod catches in a mixed demersal fishery:

https://www.researchgate.net/publication/330882005_Trial_of_a_new_escape_panel_concept_to_reduce_cod_catches_in_a_mixed_demersal_fishery

**STECF comments on ToR 3.1.d**

The 'Eliminator trawl' was designed to catch haddock and to limit cod. It consists of very large meshes in the front parts (going from 2,400 mm in the lower and upper wings and the beginning of the belly to 200 mm at the end of the belly section (Beutel et al., 2008)). It leads to large reductions in the capture of cod but also very significant decreases in commercial catches (depending on the zones: anglerfish, skates and rays, flatfish, saithe, ling, lesser spotted dogfish, whiting, etc.) (Beutel et al., 2008; Revill and Doran, 2008; Viera et al., 2010).

Trawls that have netting panels with very large mesh sizes (between 300 and 800 mm mesh size) have been tested in the North Sea. The 'Orkney trawl', with its diamond meshes of 300 mm panels in the belly and wing, decreased cod catches by 27% in total, especially on small sizes (<35 cm) and also decreases catches of megrim by 43% and anglerfish of 16% (Campbell et al., 2010).

Trials of 300 and 600 mm in the same parts of the trawl showed a significant decrease in catches of cod (49 and 75%, respectively) but also commercial catches of anglerfish (decrease of 76 and 83%, respectively) and catches of megrim (79 and 93%) and ling and hake (Kynoch et al., 2011a).

Another study with diamond mesh panels of 300, 600 and 800 mm of stretched length 12.6 m in the belly section have shown a significant reduction in cod catches but also in other commercial species for both 600 and 800 mm (Kynoch et al., 2011b).

A large 800 mm diamond panel in the top of the mouth (12 m long) showed a significant reduction in cod catches but also reductions for haddock and saithe (Krag et al., 2014).

Trials with grids to select for cod and haddock have taken place in Norway but there is no information on other species (if any) caught (Grimaldo et al., 2008; Sistiaga et al., 2008). And grids of various configurations, materials and bar spacings have been shown to reduced catches of cod by 31 to 39% by weight (escape between 22 and 37 cm) combined with a reduction in landings of whiting from 38 to 49% and of lemon sole and plaice (Viera et al., 2010).

There have been trials of netting grids designed to reduce cod in the Scottish Nephrops fisheries. The FCAP netting grid found a significant reduction in catches of cod (62%), but also of haddock (74%) and whiting (66%) (Kynoch et al., 2012). Similarly the Flip Flap netting grid showed a significant reduction in catches of cod (73%), haddock (67%) and whiting (82%), and a more limited reduction in catches of monkfish (13%) in megrim (11%) and Norway lobster (4%).

Other concepts include trawls with horizontal separator panels. There have been many trials of this type of trawl and a meta-analysis of the results has been carried out by Fryer et al. (2017). They show that the proportion of fish that rise above the separator panel decreases as the height of the leading edge of the panel increases for six of the eight species they investigate. Only monkfish and Nephrops have no significant dependency on panel height.

Systems using stimulation by ropes, floats, chain curtains and lights that direct fish to escape zones have been tested with limited success for cod (Grimaldo et al., 2018; Krag et al., 2017; Melli et al., 2019). These are active areas of research and may prove beneficial, particularly if used in combination with different types of panels, grids and escape holes.

A system based on the response of cod to hydrodynamic changes was tested in the Shetland Isles by Fraser and Angus (2019). It is a 300 mm square mesh panel (approximately 2 m) placed in the extension piece. All fish are diverted to the top by an inclined panel and a horizontal separating body 120 mm. This arrangement appears to allow for a significant reduction in cod catches (75% of the total catch of cod), without generating a loss in other commercial catches (haddock, plaice, anglerfish, rays, etc.). It seems that only cod return to the counter flow under the separating body and escape through the 300 mm mesh SMP. The authors stress the need for further testing on a larger scale (Fraser and Angus, 2019).

## STECF Conclusions on ToR 3.1.d

STECF notes that the STECF EWG 16-14 proposed a draft framework for the evaluation of proposed alternative technical measures and sets out a series of steps that should be followed in the assessment process. Given the time and resources that would be required, it has not been possible to apply such evaluations to the gear combinations specified in Article 13.1(a) and 13.1(b) and the alternative measures outlined here.

Nevertheless, STECF concludes that very few of these alternative designs will reduce catches of cod and whiting while maintaining catches of other species. The large mesh designs (Eliminator trawls and trawls with panels of large mesh) have been proven successful at reducing cod and maintaining catches of haddock and whiting but lead to reductions of flatfish and monkfish. And sorting grids and square mesh panel designs that reduce bycatches of cod, are also likely to reduce catches of haddock and whiting.

STECF observes that there is scope for further research and development of fishing gears that harness fish behaviour and fishing gear hydrodynamics to separate and select for species in trawl gears. One promising example is the new panel escape concept of Fraser and Angus (2019), which is still at the development stage, and needs testing in a commercial context.

## References for ToR 3.1.d


Beutel, D., Skrobe, L., Castro, K., Ruhle, P., Ruhle, P., O'Grady, J., Knight, J. (2008). Bycatch reduction in the Northeast USA directed haddock bottom trawl fishery. Fish. Res. 94, 190–198. https://doi.org/10.1016/j.fishres.2008.08.008

Campbell, R., Harcus, T., Weirman, D., Fryer, R.J., Kynoch, R.J., O'Neill, F.G. (2010). The reduction of cod discards by inserting 300mm diamond mesh netting in the forward sections of a trawl gear. Fish. Res. 102, 221–226. https://doi.org/10.1016/j.fishres.2009.12.001

Fraser, S., Angus, C.H. (2019). Trial of a new escape panel concept to reduce cod catches in a mixed demersal fishery. Fish. Res. 213, 212–218. https://doi.org/10.1016/j.fishres.2019.01.026

Fryer, R.J., Summerbell, K., O'Neill, F.G. (2017). A meta-analysis of vertical stratification in demersal trawl gears. Can. J. Fish. Aquat. Sci. 74, 1243–1250. https://doi.org/10.1139/cjfas-2016-0391

Grimaldo, E., Sistiaga, M., Herrmann, B., Larsen, R. B., Brinkhof, J., and Tatone, I. (2018). Improving release efficiency of cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*) in the Barents Sea demersal trawl fishery by stimulating escape behaviour. Can. J. Fish. Aquat. Sci. 75: 402–416

Holst, R., Revill, A. (2009). A simple statistical method for catch comparison studies. Fish. Res. 95, 254–259. https://doi.org/10.1016/j.fishres.2008.09.027

Krag, L. A., Herrmann, B., & Karlsen, J. D. (2014). Inferring fish escape behaviour in trawls based on catch comparison data: Model development and evaluation based on data from Skagerrak, Denmark. PLOS ONE, 9(2), [e88819]. https://doi.org/10.1371/journal.pone.0088819

Krag, L. A., Herrmann, B., Feekings, J. P., Lund, H. S., & Karlsen, J. D. (2017). Improving escape panel selectivity in *Nephrops* directed fisheries by actively stimulating fish behaviour. Canadian Journal of Fisheries and Aquatic Sciences, 74(4), 486-493. https://doi.org/10.1139/cjfas-2015-0568

Kynoch, R.J., O'Neill, F.G., Fryer, R.J. (2011). Test of 300 and 600 mm netting in the forward sections of a Scottish whitefish trawl. Fish. Res. 108, 277–282. https://doi.org/10.1016/j.fishres.2010.12.019

Kynoch, R J, O'Neill, F.G., Summerbell, K. (2011). 300, 600 and 800 mm diamond mesh belly panels in demersal whitefish trawl fisheries. Scott. Mar. Freshw. Sci. 2, 17.

McHugh, M., Browne, D., Oliver, M., Minto, C., Cosgrove, R. (2019). Staggering the fishing line: a key bycatch reduction option for whitefish trawlers. BIM Irel. Seaf. Dev. Agency Fish. Conserv. Rep. 8.

McHugh, M., Browne, D., Oliver, M., Tyndall, P., Minto, C., Cosgrove, R. (2017). Raising the fishing line to reduce cod catches in demersal trawls targeting fish species. BIM Irel. Seaf. Dev. Agency Fish. Conserv. Rep. 9.

Melli, V., Krag, L. A., Herrmann, B., & Karlsen, J. D. (2019). Can active behaviour stimulators improve fish separation from *Nephrops* (*Nephrops norvegicus*) in a horizontally divided trawl codend? Fisheries Research, 211, 282-290. https://doi.org/10.1016/j.fishres.2018.11.027

O'Neill, F.G., Mutch, K. (2017). Selectivity in Trawl Fishing Gears. Scott. Mar. Freshw. Sci. 8, 85 pp.

Revill, A. (2007). First results from a pilot study 'North Sea fishing trials using the Eliminator trawl' (No. Defra M0738 & Seafish).

Rihan, D., Doerner, H. eds. (2017). Scientific, Technical and Economic Committee for Fisheries (STECF) - Technical measures (STECF-17-02) 70. https://doi.org/10.2760/51636

Rihan, D.J., Browne, D., McDonald, D. (2009). Celtic Sea cod – Gear Based Technical Measures to help reduce discarding. ICES CM 2009, 15.

Sala, A., Lucchetti, A., Perdichizzi, A., Herrmann, B., Rinelli, P. (2015). Is square-mesh better selective than larger mesh? A perspective on the management for Mediterranean trawl fisheries. Fish. Res. 161, 182–190. https://doi.org/10.1016/j.fishres.2014.07.011

Sistiaga, M., Herrmann, B., Grimaldo, E., and Larsen, R.B. (2010). Assessment of dual selection in grid based selectivity systems. Fish. Res. 105: 187–199.

van Marlen, B. (1993). Research on improving the species selectivity of bottom trawls in The Netherlands. ICES Mar Sci Symp 196, 165–169.

**TOR 3.1.e: An analysis should also consider spatial and temporal restrictions or closures that would give similar outcomes in terms of reducing cod mortality, indicating what duration and spatial coverage of such closures would be needed.**

**Summary of information provided to STECF for ToR 3.1.e**

There was only one document submitted to STECF with information regarding possible spatial-temporal measures. The analysis is based on the logbook data from the French demersal trawl fleet that operates in the CSPZ (Celtic Sea Protection Zone) in 2018 and

2019. The analysis attempts to identify similar gains in cod protection as the raised headline in trawls, namely 29% of cod landings in the CSPZ for bottom trawlers.

The paper concludes that, "*on the basis of 2018 data, the closure of two ICES rectangles (31E2 and 32E2) in February and March would have saved around 30 tons, i.e. (a lot) more than would have had the impact of introducing the raised line from June for trips with more than 20% of haddock*" (12.6 t). However, this result is only applicable to 2018 and only if one considers half of the year (June-December) for only the trips with >20% of haddock (not all trips). In 2019, the same closure did not provide more cod saved than the introduction of the raised headline. Nevertheless, the author argues that "*it may be appropriate to close the area in time in the traditional hot-spots in order to preserve cod in the event of an increase in abundance*".

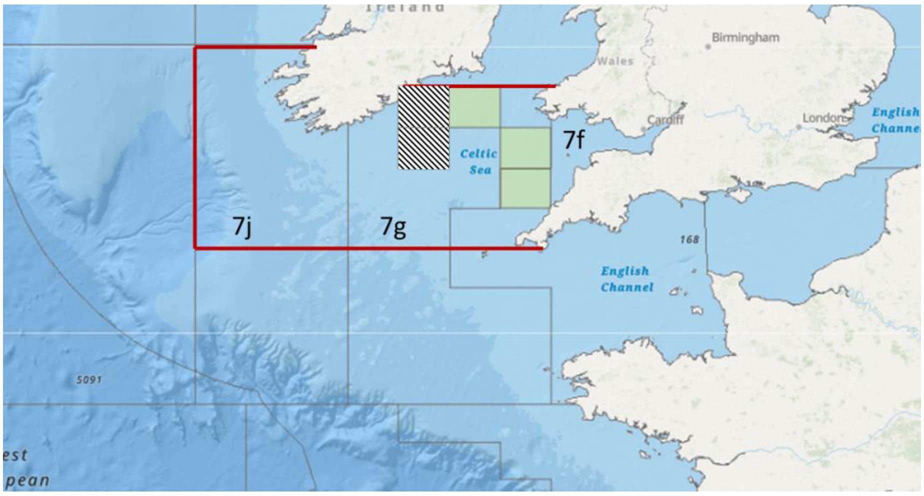



**Figure 3.1e.1.** Map showing the location of the Celtic Sea Protection Zone (ICES areas 7f,g and part of 7j between 50°N and 11°W; red line), possible closure proposed by document submitted to STECF (shaded ICES statistical rectangular 31E2, 32E2; 1 February to 31 March) and existing cod closures (green rectangular 30E4, 31E4, 32E3; 1 February to 31 March; Regulation (EU) 2019/1241). Map not provided in the French study, adapted from http://gis.ices.dk/sf/index.html? widget=StatRec

## STECF comments on ToR 3.1.e

STECF notes the limited scope of the French study since it is based only in two years of French logbook landings data. Furthermore, its conclusions of the closure of two ICES rectangles (31E2 and 32E2) in February and March, have weak scientific basis as it is only applicable to part of one's year data and to a subset of fishing trips.

STECF notes that a study of species abundance and distribution, and possible spatial management measures associated, should entail all national fleets operating in the area and a time series of data, since the possible management measures would apply to all fleets, while species abundance and distribution normally present high annual variability. To this end, STECF proceeded to carry out a bibliographic search to provide more comprehensive information.

STECF quotes its PLEN14-02 advice regarding the Celtic Sea 7f,g cod closure, that "*since the closure has been effective in decreasing fishing effort and that the stock is still highly dependent on recruitment and thus vulnerable to overexploitation, STECF advises that the closure should be maintained until there is evidence that reopening it will not jeopardise* *stock sustainability*". STECF further notes that the Celtic Sea cod stock dependence on recruitment has exacerbated since then, with stock now at historically lowest biomass.

STECF notes that although ToR 3.1.e refers only to cod, the background and context provided by the Commission refers also specifically to whiting, but also to haddock, megrims, anglerfish, hake, pollack, ling and skates and rays. Therefore, STECF also considered these species while searching for information on spatial-temporal distributions and possible associated management measures.

According to the figures published in an earlier study by Verdoit et al. (2003), the distribution of whiting is prevalent in ICES squares 32E2 trough 32E4, and 31E2 trough 31E4, both in autumn and winter, identifying particularly ICES square 32E4.

The H2020 Discardless Project (http://www.discardless.eu) also provides information relevant to cod, haddock and whiting spatial distribution in the Celtic Sea (Reid and Fauconet, 2018; see also Robert et al., 2019; Calderwood et al., 2019). The objective of the analysis was to identify and describe areas with similar landings and discards profiles, using a combined set of multivariate methods. The link between landings and discards species composition in each grid cell was identified by examining whether cells attributed to one cluster in the landings analyses belongs to the same cluster in analyses based on discard data, or whether there are spread in various clusters.

The results show that three discard clusters (16, 15 and 3) illustrate the strong technical interaction occurring in the Celtic Sea highly mixed fisheries, with strong proportion of both discard of whiting, haddock and cod in the same location. Furthermore, landing cluster 11 and discard cluster 10 both characterized by important proportion of *Nephrops* and cod, and landings cluster 9 and discard cluster 15 and 16 both characterized by whiting and haddock (with little amount of cod).

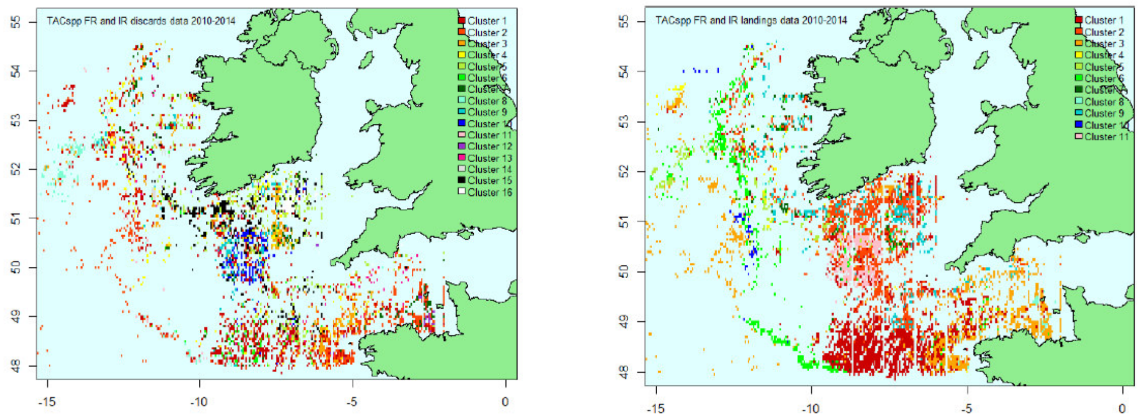



**Figure 3.1.e.2.** Clusters maps of international (French and Irish) discards (left) and landings (right) between 2010-2014. The same colour code was assigned to each 3'*3' square belonging to the same cluster. Species selection: 28 species under TAC in ICES area VIIb-k. Cluster 16 in black shows a hotspot of whiting discards in a restricted area in VIIg. Discards of cod are dominant in two clusters (cluster 15 and cluster 3; Reid and Fauconet, 2018).

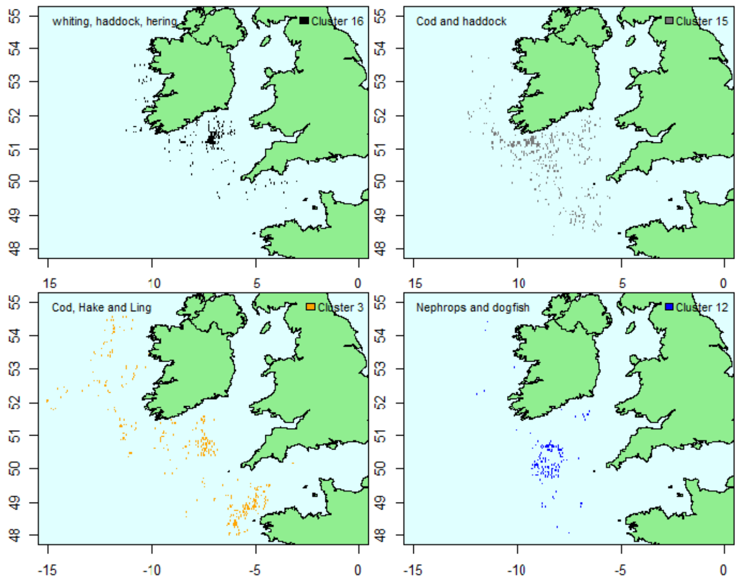



**Figure 3.1.e.3.** Detailed cluster maps based on French and Irish data (Reid and Fauconet, 2018).

A further analysis identified areas with consistently high levels of haddock catches (above and below MCRS), centred around the coordinates 51.1 -6.85 between the south coast of Ireland and the north coast of Cornwall and to the west of Ireland centred around the coordinates 52.5 -11. Catches of whiting are identified in similar locations but east of -7, while for cod only <MCRS catches at the area located south of Ireland west of -7 (Figures 3.1.e.4 and 3.1.e.5).

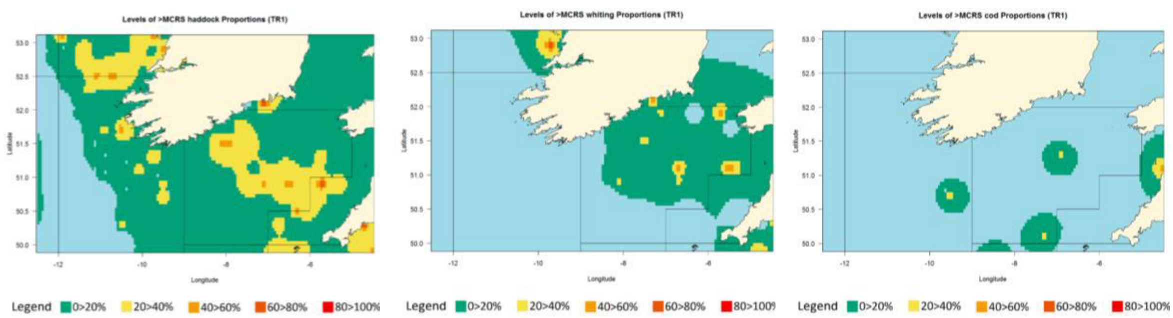



**Figure 3.1.e.4**. Interpolated maps identifying areas with consistent proportion of >MCRS haddock (left), whiting (centre) and cod (right) in the catch by weight over multiple years (2010-2015, Reid and Fauconet, 2018, http://www.discardless.eu/discard_maps).

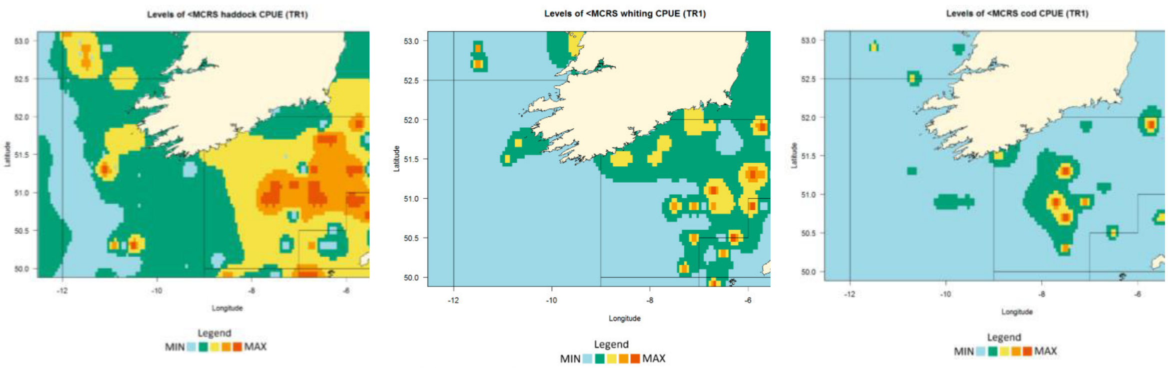



**Figure 3.1.e.5**. Interpolated maps identifying areas with consistent CPUE of <MCRS haddock (left), whiting (centre) and cod (right) in the catch by weight over multiple years (2010-2015, Reid and Fauconet, 2018, [http://www.discardless.eu/discard_maps](http://www.discardless.eu/discard_maps)).

In summary, there seems to be a concentration of fishing activity west and south of the existing cod closure in ICES area 7g, associated also to discards of haddock and whiting, and to some extent to cod.

Based on the evidence presented above, the closure of areas west and/or south of the existing cod closure, which could include the suggested closures in the document provided by France, could possibly decrease cod, whiting and other species catch and discards. However, cod CPUE distribution shows that the closure would need to include Q2 and/or Q3 to have any significance (Figure X.e.8). Furthermore, cod and whiting catches would only be reduced if the displaced fishing effort is not diverted to areas with equal or higher cod and whiting abundance.

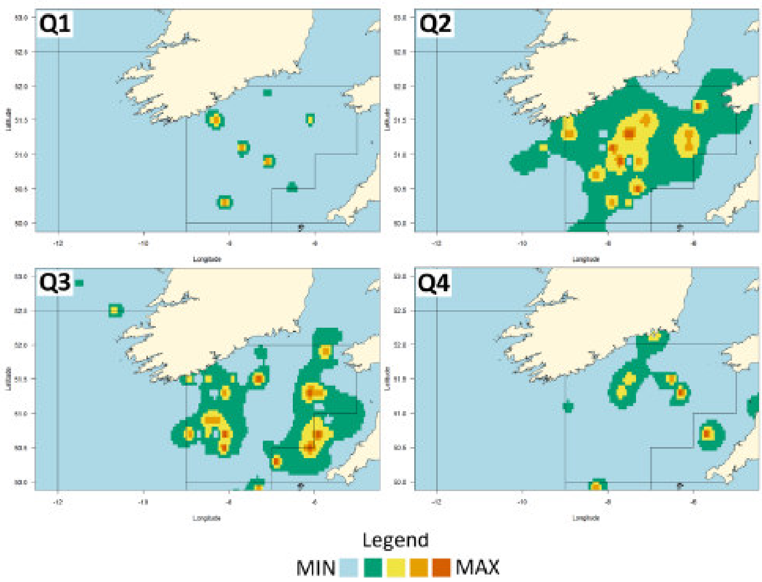



**Figure 3.1.e.6**. Interpolated maps identifying areas with consistent levels of CPUE for above MCRS cod over multiple years (2010-2015) for each quarter of the year (Reid and Fauconet, 2018).

## STECF conclusions on ToR 3.1.e

STECF concludes that a possible closure of areas west and/or south of the existing cod closure, which could include the suggested closures as proposed by France, could possibly decrease cod, whiting and other species catch and discards. This is because there seems to be a concentration of fishing activity west and south of the existing cod closure in ICES area 7g, associated to discards of haddock and whiting, and to some extent to cod. However, the closure would need to include Q2 and/or Q3 to have any significance in reducing cod catches.

Nevertheless, STECF is not able to analyse, and thus recommend, possible specific closures that would give similar outcomes in terms of reducing cod mortality as the "raised fishing line", due to data and time limitation.

Finally, STECF concludes that cod and whiting catches would only be reduced if the displaced fishing effort is not diverted to areas with equal or higher cod and whiting abundance.

## References on ToR 3.1.e


Calderwood, J., Robert, M., Pawlowski, L. et al. (2019). Hotspot mapping in the Celtic Sea: An interactive tool using multinational data to optimise fishing practices. Marine Policy. https://doi.org/10.1016/j.marpol.2019.103511

Reid, D. & Fauconet, L. (2018). Decision support tool for fishers incorporating information from tasks 4.1, 4.2 and information on unwanted catches derived from scientific data. Delivery 4.3. H2020 DiscardLess Project. 201 pp. http://www.discardless.eu/discard_maps

Robert, M., Calderwood, J., Radford, Z. et al. (2019). Spatial distribution of discards in mixed fisheries: species trade-offs, potential spatial avoidance and national contrasts. Rev Fish Biol Fisheries 29: 917–934. https://doi.org/10.1007/s11160-019-09581-z

Verdoit, M., Pelletier, D., Bellail, R. (2003). Are commercial logbook and scientific CPUE data useful for characterizing the spatial and seasonal distribution of exploited populations? The case of the Celtic Sea whiting. Aquat. Living Resour. 16: 467–485.


## TOR 3.1.f: Assess the socio-economic impacts of the above mentioned scenarios including, at least, the following indicators: value of landings, income, gross profit, gross profit margin, employment and average salaries at the level of MS and fleet segment. The number of vessels and fleet segments affected should be also provided for each scenario. External factors, where relevant in this assessment, such as quota uptake and first sale price effects in response to changes in the catch composition should be considered.

## Additional background information provided to the STECF for ToR 3.1.f

There were two additional documents from France provided to STECF regarding:

- Possible economic impacts of implementing the 'raised fishing line' analysing 5 assumptions and,
- Percentage of saved cod compared to the 'raised fishing line' implementation.

In the first document France provided an estimate of the losses of revenues from the application of five assumptions. The range of losses are between 4.4% and 22.8% depending on the extension of the use of the 'raised fishing line' during all trips or only parts of the trips and parts of the area. There is, however, only very limited information where losses exactly occur. Only the saving of haddock and whiting in tonnes is listed in a table without any further detail. It is stated that the saving of cod would mean substantial losses and that costs are very high per kg of saved cod (between €121.5 and €391.3).

**Table3.1.f.1**. Impact of the application of Article 13 in 2019 according to the assumptions made (Biseau, 2020)[8]:

| | **Losses in value** | **Reduction of value in %** | | | |
|---|---|---|---|---|---|
| **Assumption** | **Million €** | **For the trips concerned** | **Total** | **COD saved (tonnes)** | **Cost €/kg of COD saved** |
| 1. perfect knowledge | 3.5 | 41.8 % | 4.4 % | 29.1 | 121.5 |
| 2. conservative | 10.1 | 49.9 % | 12.7 % | 56.0 | 179.7 |
| 3. reference | 16.3 | 50.9 % | 20.5 % | 63.7 | 255.9 |
| 4. maximalist | 14.4 | 53.8 % | 11.5 % | 62.3 | 230.7 |
| 5. Maximalist-2 | 28.3 | 56.1 % | 22.8 % | 72.4 | 391.3 |

As table 3.1.f.1 reveals vessels will have losses in value of landings depending on the assumptions put in place. For two assumptions (3 + 5) losses are beyond 20% of the total

8 For the 'raised fishing line' the following assumptions were analysed (Biseau, 2020):

'**perfect knowledge'** assumption: the 59 concerned vessels use the 'raised line' only for trips which have more than 20 % of haddock, and within the area. Note that this assumption is in line with the letter of Article 13 and assumes full and *a priori* knowledge of the theoretical catch composition.

**'conservative'** assumption**:** the 59 vessels use the 'raised line' in the area regardless of their catches of haddock. The practical feasibility of adapting the gear during the trip is, however, in not guaranteed.

'**reference' (baseline) assumption**: the 59 vessels concerned use the 'raised line', during the entire trip, as soon at during the trip, part of the activity occurs in the CSPZ. Note that this assumption takes account of the fact that catches of haddock within the CSPZ are not foreseeable (in particular, do not present a particular seasonal trend (see Figure 5.2).Vessels therefore cannot, *a priori,* have a reasonable assurance of their catch composition at the end of the trip, and therefore of their obligation or not to use the 'raised line'.

'**maximalist'** assumption: the whole fleet (91 vessels) which have been operated at least once the CSPZ irrespective of their catches of haddock, use the 'raised line' in the CSPZ.

'**maximalist-2'** assumption**:** the 91 vessels which have been visited at least once the CSPZ, regardless of their catches of haddock, use the 'raised line', during the entire trip, as soon at during the trip, part of the activity occurs in the CSPZ revenues from the Celtic Sea. Only for one assumption, the perfect knowledge, losses would be relatively low with 4.4%.

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In the second document, however, no information are presented on the economic impacts on the fishing vessels.

## STECF comments on ToR 3.1.f

***Assessment of impacts of proposed measures***

As detailed in the previous ToRs, the main problem when avoiding cod is the expected losses in other marketable catch (see also STECF, 2008). The value of the losses are dependent on the fleet and the period of the year, so they are difficult to estimate.

STECF notes that the assessment of socio-economic impacts would therefore require a comprehensive modelling exercise applying an available bio-economic model for the Celtic Sea (for example a FLBEIA model has been developed in the DAMARA project (European Commission 2016). The application of this model requires, however, specific knowledge about the fisheries, the involved economic fleet segments and specific information regarding landing ports, involved processing facilities, etc. which was not available or possible to collect during the short time frame available for STECF to address this TOR (see for a protocol for impact assessment (IA) in Simmonds et al. 2011 and IA in the EU fisheries context in Malvarosa et al. (2019)).

STECF notes that the information provided by France does not include such extended bio-economic analyses. The background document from France provides a limited assessment of changes in value of 2019 landing when implementing the 'raised fishing line'. STECF notes that although France provided some information on the possible losses of revenues this covers only (partly) two of the requested indicators of the TOR (value of landings and (partly) income). Those estimates give no indications about changes in behaviour of the fishers following the implementation of those assumptions (measures). Change in behaviour would influence the cost structure of the vessels and, therefore, the impacts on profits and gross profit margins. As salaries often depend on the overall value of landings it also influences the average salaries of the crew members.

No bio-economic model was readily available to STECF to be in a position to run additional analysis of the different scenarios for the assessment of impacts. Therefore, this ToR cannot be answered in great details. However, STECF has provided a bit of qualitative information on possible effects of changing gear to improve selectivity, introduce seasonal or yearly closed areas or other technical measures. Additionally, STECF performed very simple analyses on cod choke situation using the detailed French dataset presented in TOR c).

<u>Summary of information on fleet dependency from the STECF Annual Economic Report</u>

STECF notes that fleet segments from Belgium, France, Ireland, Spain and the UK operate in the area. Member States provided landings and effort data within the economic data call with detailed information on catch composition and effort per ICES rectangle and metíer. This information was compiled to calculate the percentage of catches of the broader economic fleet segments regularly reported in the Annual Economic Report (see Table 3.1.f.2). For a few segments, information is confidential and, therefore, the table does not cover 100% of the landings.

**Table 3.1.f.2**. Percentage of Celtic Sea landings and value as part of the overall landings and values of economic fleet segments in the Celtic Sea in 2017.

| country name | Year | vessel length category | fishing technique | Percentage in t | Percentage in € |
|---|---|---|---|---|---|
| Belgium | 2018 | VL2440 | TBB | 0,129 | 0,147 |
| England and Wales (UK) | 2018 | VL1218 | DTS | 0,009 | 0,007 |
| England and Wales (UK) | 2018 | VL1824 | TBB | 0,057 | 0,044 |
| England and Wales (UK) | 2018 | VL2440 | DTS | 0,037 | 0,054 |
| England and Wales (UK) | 2018 | VL2440 | TBB | 0,125 | 0,114 |
| France | 2018 | VL1012 | DTS | 0,001 | 0,001 |
| France | 2018 | VL1218 | DTS | 0,014 | 0,014 |
| France | 2018 | VL1824 | DTS | 0,199 | 0,207 |
| France | 2018 | VL1824 | TM | 0,019 | 0,031 |
| France | 2018 | VL2440 | DTS | 0,162 | 0,149 |
| France | 2018 | VL2440 | TM | 0,128 | 0,261 |
| France | 2018 | VL40XX | TM | 0 | 0 |
| Ireland | 2018 | VL1012 | DTS | 0,19 | 0,175 |
| Ireland | 2018 | VL1012 | FPO | 0 | 0 |
| Ireland | 2018 | VL1218 | DTS | 0,465 | 0,363 |
| Ireland | 2018 | VL1824 | DFN | 0,025 | 0,023 |
| Ireland | 2018 | VL1824 | DTS | 0,424 | 0,419 |
| Ireland | 2018 | VL1824 | TBB | 0,666 | 0,699 |
| Ireland | 2018 | VL2440 | DTS | 0,247 | 0,286 |
| Ireland | 2018 | VL2440 | TBB | 0,911 | 0,931 |
| Ireland | 2018 | VL2440 | TM | | |
| Northern Ireland (UK) | 2018 | VL1824 | DTS | 0,066 | 0,073 |
| Northern Ireland (UK) | 2018 | VL2440 | DTS | 0,031 | 0,027 |
| Scotland (UK) | 2018 | VL1824 | DTS | 0,011 | 0,015 |
| Scotland (UK) | 2018 | VL2440 | DTS | 0,003 | 0,004 |
| Spain | 2018 | NK | DTS | 0 | 0 |
| Spain | 2018 | VL2440 | DTS | 0,005 | 0,002 |

STECF notes that the economic fleet segments are too broad and for a more comprehensive analysis it would be necessary to disaggregate the DCF economic fleet segment data for the Celtic Sea to identify the specific ‘Celtic Sea fishing fleet segments’. The landings from the Celtic Sea of each vessel differs and the combination of the vessels in one broad segment may underestimate the dependency of individual vessels.

STECF notes that the fleet segments from Ireland have a higher dependency on catches from the Celtic Sea than fleet segments from other MSs and the UK. The segment IR TBB VL1824 has nearly 70% of its landings from the Celtic Sea.

Additional STECF study on weight and value before/after choke for exhausted cod quota

As an additional investigation, STECF used the French logbook data described in ToR c) to roughly estimate when the French fleet would have been choked by the bycatch on cod in 2019, if applying the 2020 French cod quota of 294 t to the 2019 data. This hypothetical scenario is used to estimate what part of the income from landings could be potentially lost because of the choke. Such estimation is assuming the fleet would not be able to compensate for losses by fishing elsewhere, which is likely a pessimistic assumption.

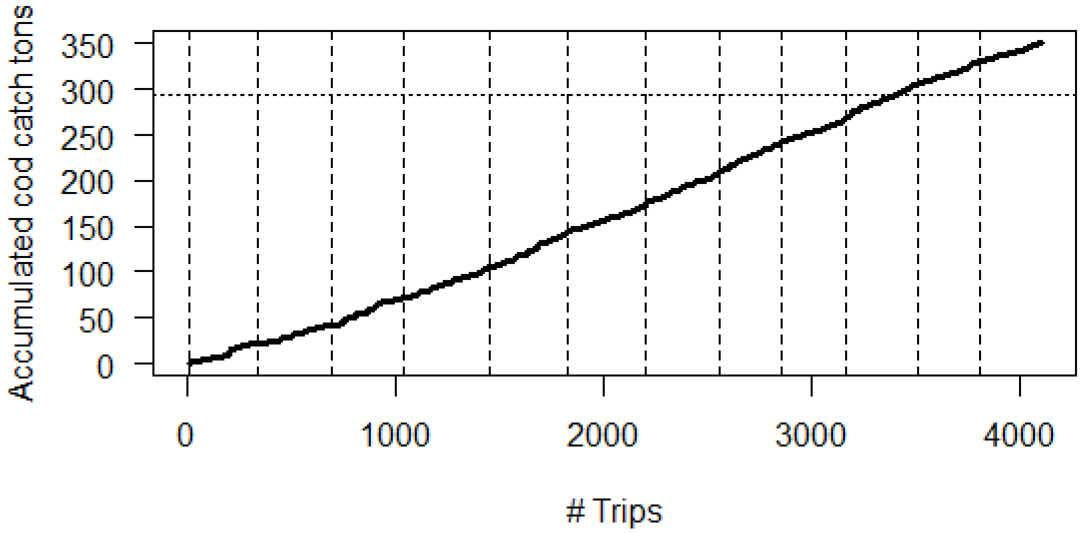


**Figure 3.1.f.1.** Cumulated cod landings in 2019 over time. Dashed vertical lines delimit the month periods. The horizontal line is the 2020 cod quota.

STECF observes that with the 2019 landings patterns, the choke for the 2020 cod quota would occur during October for the fishing vessels included in the dataset (Figure 3.1.f.1). The estimates of possible losses by species (cumulated catches between October and the end of the year 2019) are provided in Table 3.1.f.3.

**Table 3.1.f.3**. Top 20 species in tons before and after the choke in cod, assuming applying the 2020 French cod quotas (294 tons) back to the 2019 French dataset. The French fleet would have been choked by cod during October 2019 if the 2020 cod quota applied.

| Species | Cumulated tonnes before choke | Cumulated tonnes after choke | % difference | ´000 € before choke | ´000 € after choke | % difference |
|---|---|---|---|---|---|---|
| MNZ | 8292 | 1833 | -18 | 36802 | 10614 | -22 |
| HAD | 3492 | 710 | -17 | 7459 | 1679 | -18 |
| HKE | 2032 | 407 | -17 | 5108 | 1568 | -23 |
| WHG | 1915 | 317 | -14 | 3654 | 814 | -18 |
| LEZ | 1840 | 323 | -15 | 5681 | 1244 | -18 |
| GUR | 1205 | 255 | -17 | 747 | 178 | -19 |
| RJN | 908 | 377 | -29 | 1713 | 768 | -31 |
| MEG | 896 | 145 | -14 | 2519 | 566 | -18 |
| BIB | 877 | 197 | -18 | 625 | 198 | -24 |
| JOD | 792 | 145 | -15 | 8249 | 1715 | -17 |
| COE | 643 | 220 | -25 | 618 | 182 | -23 |
| CTC | 601 | 300 | -33 | 1883 | 797 | -30 |
| SDV | 584 | 215 | -27 | 778 | 265 | -25 |
| SYC | 573 | 107 | -16 | 244 | 60 | -20 |
| LEM | 460 | 66 | -13 | 2164 | 388 | -15 |
| RJM | 435 | 94 | -18 | 951 | 231 | -20 |
| WIT | 361 | 90 | -20 | 813 | 225 | -22 |
| SQZ | 347 | 234 | -40 | 2839 | 1397 | -33 |
| NEP | 301 | 13 | -4 | 1985 | 112 | -5 |
| COD | ***294*** | 57 | -16 | 1213 | 253 | -17 |
| **TOTAL** | **26848** | **6105** | **-19** | **86045** | **23254** | **-21** |

A significant part of landing tonnes (6,105 t on the top 20 species out of 32,953 t) and incomes (23,254 out of 109,289 thousand euros) made by the French trawler fleet active in the Celtic Sea regulated area would have been lost if the 2020 cod quota would have applied to 2019. Such a lost in fishing opportunities would have been the results of the French trawler fleet being choked by cod during October provided that they would not have changed activity elsewhere. These estimates do not account for earlier potential choke effects linked to the landing obligation.

STECF notes that in the French analysis the percentage of losses results from a comparison of the status quo with the implementation of the 'raised fishing line'. As noted above a strict implementation of the quota would result in cod being the choke species of demersal mixed fisheries. Losses of other catch would be substantial up to 40% of landings of, for example, inshore squid (SQZ). The losses in value of landings of other species are, therefore, much more severe than cod, around 20%.

This coarse comparison shows that in terms of short term losses in the absence of any adaptation of the fleet, the implementation of the 'raised fishing line' would have the same magnitude of impact as the early closure of the fishery.

## STECF conclusions on ToR 3.1.f

STECF concludes that to fully answer the TOR a comprehensive impact assessment would be necessary, contrasting short-term losses with medium-term benefits in a stochastic bio-economic modelling framework. The information provided by France does not include such analyses, but contrast only changes in value of landings for the 'raised fishing line' scenario on the basis of 2019 activity. It was not possible for STECF to further analyse the impacts on value of landings, income, gross profit, gross profit margin, employment and average salaries at the level of MS and fleet segment.

It was neither possible to analyse the effects of external factors like quota uptake and first sale price effects in response to changes in the catch composition. For the number of vessels and fleet segments affected some information was provided by France and the transversal data of the DCF economic data call was available to show the dependency of the fleet segments on landings from the Celtic Sea.

STECF concludes that following from previous assessments (e.g. STECF, 2008) the loss of catch from species other than cod is more severe than the loss of the cod itself. It is estimated that short term losses when implementing the raised line would be up to around 20% of revenues. As a matter of comparison, STECF has coarsely contrasted this with the potential losses due to an early cod choking of the fisheries in the absence of cod avoidance, which are equally substantial.

STECF concludes that any measure to avoid cod catches would lead to a change in behaviour of the fishing vessels. This will influence cost structures of the fishing vessels and following from that main economic indicators (profit, profit margin, etc.).

STECF concludes that the main problem for the fishers is the uncertainty about future revenues. The implementation of cod avoidance measures will result in short-term costs but will hopefully lead to higher long-term gains. Not implementing strong measures to avoid some of the short-term costs may, on the other hand, lead to lower long-term gains or at least the phase of lower revenues may be longer. The problem is, therefore, the transition phase and MS should elaborate what measures may be possible to ease the short-term losses without compromising long-term gains.

## References on ToR 3.1.f

Biseau, A. (2020). Impact on the turnover of the vessels concerned by Article 13. IFREMER

European Commission (2016). DAMARA project – a scientific decision-support tool for development of a management plan for the Celtic Sea. Luxembourg: Publications Office of the European Union, Luxembourg: Publications Office of the European Union, ISBN 978-92-79-57543-3, doi:10.2771/69952.

Malvarosa L, Murillas A, Lehuta S, Nielsen JR, Macher C, Goti L, Motova A, Döring R, Haraldson G, Accadia PR, Hamon KG, Bastardie F, Maravelias CD, Mardle S, Thogersen T. (2019). Sustainability Impact Assessment (SIA) in fisheries: Implementation in EU fishing regions. Mar Policy 101:63-79,

Scientific, Technical and Economic Committee for Fisheries (STECF) (2008). Report of the SGMOS-08-01 Working group on the reduction of discarding practices (SGMOS 08-01); Publication Office of the European Union, Luxembourg.

Simmonds E. J., Döring R., Daniel P. and V. Angot. (2011). The role of fisheries data and information on the development of multi-annual plan Evaluation and Impact Assessment in support of European fisheries policy. ICES Journal of Marine Science 68(8): 1689-1698.

## STECF overall conclusions for the entire request

This request was very comprehensive, and the different sub-ToRs dealt with different questions in relation to the mixed-fishery in the Celtic Sea. Therefore each sub-TORs was treated independently, and specific STECF conclusions were given under each of them.

France provided extensive documentation and a detailed dataset to support STECF evaluation. Nevertheless, the information provided was not sufficient to assess the full scope of the request, and STECF conducted additional analyses and literature review during the limited time frame of the written procedure. More in-depth analyses would need to be performed in the frame of dedicated research studies.

Regarding ToR a) on the likely differences in selectivity parameters when using different mesh size combinations, STECF concludes that the 100 mm T90 codend is the least selective codend for all four species investigated (cod, haddock, whiting and plaice). For cod, the most selective combination is the 110 mm diamond mesh codend with a 120 mm SMP positioned at 9 to 12 m. The 100 mm codend with the 160 mm SMP is the most selective for haddock and whiting, but it was unfortunately not possible to derive reliable estimates for cod with this combination.

Regarding ToR b) on the effect on selectivity for the same mesh sizes combinations with and without the raised fishing line, STECF concludes that the raised fishing line seems to improve the selectivity of cod and of small whiting, but has very little effect on haddock. Length-based selectivity parameters could not be derived for most other species, but STECF concludes that the raised fishing line would give rise to substantial reductions of species such as lemon sole, plaice, monkfish, megrim and skates and rays.

Regarding ToR c) on the explore of alternative thresholds in catch composition to cover equivalent amounts of by-catches of cod, STECF concludes that in 2019, the French trawler trips performed in the regulated area and catching at least 20% of haddock caught almost half of the total cod bycatch in the area. STECF concluded also that cod amounts are almost equivalent when applying the same thresholds to monkfish, and that the highest amounts of cod could be covered by applying a threshold on either of the two target species (haddock OR monkfish), since they are usually not targeted by the same fishing trips.

Regarding ToR d) on alternative technical measures that would achieve similar selectivity characteristics, STECF concludes that very few of the alternative designs will reduce catches of cod and whiting while maintaining catches of other species. STECF concludes however that there is still scope for further research and development of fishing gears that harness fish behaviour and fishing gear hydrodynamics to separate and select for species in trawl gears.

Regarding ToR e) on alternative spatial and temporal restrictions or closures that would give similar outcomes in terms of reducing cod mortality, STECF concludes that based a possible closure of areas west and/or south of the existing cod closure, which could include the suggested closures proposed by France, could possibly decrease cod, whiting and other species catch and discards. However, STECF concludes also that the closure would need to extend longer than first quarter only (including summer and autumn) to have any significance in reducing total cod catches.

Regarding ToR f) on socio-economic impacts of the various scenarios, STECF concludes that in absence of simulations conducted with a bio-economic model running over several years, this ToR cannot be answered in great details and only very coarse estimates of short-term potential impact are provided. It is estimated that short-term losses when implementing the raised line would be up to around 20% of revenues. As a matter of comparison, STECF has coarsely contrasted this with the potential losses due to an early cod choking of the fisheries in the absence of cod avoidance, which are equally substantial.

## 3.2 Evaluation Joint Recommendations discard plan venus clams

### Background provided by the Commission

The landing obligation is compulsory, as from 1 January 2017, for the species that define the fisheries (other than small pelagics) and that are subject to a minimum conservation reference size (MCRS) according to Annex IX of the Technical Measure Regulation adopted in July 2019. The fisheries targeting the mollusc bivalve Venus clams (*Venus gallina* – as originally described – or *Chamelea gallina*) are therefore subject to this provision.

In 2019, Italy submitted to the European Commission a proposal of a three-year discard plan for the fisheries targeting Venus clams by hydraulic dredges in Italian waters. Following STECF advice, a high survivability derogation was granted for 3 years and a 1-year derogation to MCRS for one year. With the latter derogation in December 2020, the Italian administration is submitting a new Joint Recommendation to update the 2019 discard plan.

After the entry into force of the new Technical Measures Regulation (Regulation (EU) 2019/1241[9]) Member States have the possibility to develop joint recommendations that can be used to amend certain regional baseline selectivity standards through the Commission empowerment to adopt delegated Acts on the basis of these joint recommendations. This permits the tailoring of detailed and technical rules so as to take into account regional specificities. The alternative measures should, as a minimum, lead to such benefits for the conservation of marine biological resources that are at least equivalent to the ones provided by the baseline standards. As such, the joint recommendation shall not lead to a deterioration of baseline standards and also aim at achieving the objectives and targets set out in Articles 3 and 4 of Regulation (EU) 2019/1241.

The new Joint Recommendation is supported by a study which evaluates the possible effects of re-defining the MCRS.

### Request to STECF

STECF is requested to review and make any appropriate comments and recommendations on the draft discard plan for the fisheries targeting Venus clams in the Northern Adriatic Sea and its supporting study.

In particular, STECF is requested to:

- Assess the potential past and future impacts on the stock of the proposed change in the MCRS for Venus clams from 25 mm to 22 mm on exploitation rates and stock biomass.

In making this evaluation, STECF is asked to take into account the works of the STECF-EWG 15-14, 16-06, 19-01, 19-02, and of the European Parliament.

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9 Regulation (EU) 2019/1241 of the European Parliament And Of The Council of 20 June 2019 on the conservation of fisheries resources and the protection of marine ecosystems through technical measures, amending Council Regulations (EC) No 1967/2006, (EC) No 1224/2009 and Regulations (EU) No 1380/2013, (EU) 2016/1139, (EU) 2018/973, (EU) 2019/472 and (EU) 2019/1022 of the European Parliament and of the Council, and repealing Council Regulations (EC) No 894/97, (EC) No 850/98, (EC) No 2549/2000, (EC) No 254/2002, (EC) No 812/2004 and (EC) No 2187/2005. OJ L198, 25.07.2019, p. 105.

## Summary of the information provided to STECF

STECF was provided with two documents to inform its review:

1. Joint Recommendation - Derogation to the Minimum Conservation Reference Size for the mollusc bivalve Venus spp. (*Chamelea gallina*) in Italian territorial waters for 2021-2022.

This document sets out the case for extending the derogation for the Minimum Conservation Reference Size (MCRS) for the mollusc bivalve Venus spp. (*Chamelea gallina*) applying in Italian territorial waters to the Italian fleet. This is in the form of a new Joint Recommendation (JR) under Article 15 of Regulation (EU) No. 2019/1241. Currently, the minimum conservation reference size for Venus clams caught in Italian territorial waters is set at 22 mm. This is a derogation from the legal minimum conservation reference size of 25 mm as established in Annex IX of the regulation (EC) No. 2019/1241. In line with article 5 of Regulation (EU) No. 2020/310, this derogation will remain in force until December 31, 2020.

The JR describes the rationale behind the request for extending the derogation to 31 December 2022. It outlines the results of supporting studies that were carried out in 2019. According to the JR, these studies provide evidence that the current derogation of the MCRS does not have a significant negative impact on the state of the Venus clam stocks, while highlighting the economic importance of the fishery to the Italian sector. The JR concludes that the reduction of the MCRS to 22 mm has led to benefits to the dredge fishery.

The JR states that:

- The survivability experiments clearly demonstrated the high rate of survivability of the *Chamelea gallina* including small individuals below 22 mm sieved onboard.
- The dredge used in the fishery is highly selective for Venus clams smaller than the size at first maturity (estimated at 15-17 mm). The catch is mechanically sieved on board.
- Discarding undersized individuals is allowed for under the discard plan but the discard percentages after sieving are estimated to be very low to almost nil.

The JR also concludes that the management plan in place:

- Protects the nursery areas;
- Protects and enhances spawning areas (within 0.3 MN);
- Replenishes the grounds through restocking operations; and
- Reactivates the fishing grounds affected by coastal defense and beach nourishment work.

Finally, the JR indicates the Italian Management Consortium are planning to create a single legal entity, in accordance with EU regulations, which will manage and stabilize the clam market and improve quality.

10 Commission Delegated Regulation (EU) 2020/3 of 28 August 2019 establishing a discard plan for Venus shells (Venus spp.) in certain Italian territorial waters. OJ L 2, 6.1.2020, p. 1–4.

2. Evaluation of the redefinition of the Minimum Conservation Reference Size of the striped venus clam (*Chamelea gallina*) caught in the Italian waters, based on the article 3 of the new European Regulation 2020 (Annex A).

This document provides information aiming to support the JR. It details two experiments carried out to assess the reburying capacity and the survivability of the striped Venus clam in the Adriatic Sea. These experiments were performed in laboratory tanks (under controlled conditions) and at sea within sheltered waters. The specimens used were caught by hydraulic dredges and handled under normal commercial conditions (i.e. sorted with hydraulic sieves on board the vessel and reproducing the actual sieve-induced stress). Three main size classes of clams were collected for the experiments: 18-21.9 mm, 22-24.9 mm and 25-27.9 mm.

The main findings of these experiments were as follows:

- Clams of medium size (22-24.9 mm) reburied significantly faster than the smallest (18.0-21.9 mm) and the larger (25-27.9 mm) ones. The report highlights that the time required for clams to rebury may be dependent on energy use and on the surface area of the animal, both of which would vary with the size of the animal (Moschino and Marin, 2006).
- The mean percentages of survived individuals were 94.8% and 96.2% in the tank experiments and at sea experiments, respectively. In the tanks, seven specimens (5 above and 2 below the MCRS) out of 135 died during the 21-days experiment. At sea, twelve specimens (8 above and 4 below the 22 mm MCRS) out of 320 died during the 15-day experiment. They died starting from day 4 until day 10, without showing differences in mortality by size class.
- These results, along with previous studies (e.g., Brooks et al., 1991; Moschino and Marin, 2006; Morello et al., 2006; ISPRA, 2012) show that *C. gallina* is a species with a high survival potential. Therefore a very high percentage of specimens discarded at sea survive, and potentially contribute to the restocking of natural populations.

The supporting annex also includes a review of the impacts of the discard plan contained in Regulation (EU) No. 2016/2376[11] from several at sea surveys performed all along the Italian Adriatic coasts, where the bulk of the striped Venus clam dredgers operate. It updates the information already reported in the Italian Dredge Management Plan (DM 17/06/2019) and assessed by STECF PLEN 19-02. It also describes the findings from case studies carried out to assess the impacts on the striped Venus clam population from the reduction of MCRS to 22 mm.

For the two main fisheries areas, the review concludes by stating that:

- In the central Adriatic coast region, there has been a general recovery of the commercial resource (catches), but also of the entire population (stock), with normal patterns observed in stock densities. This recovery is not only for one of the principal clam fishing grounds (Marche Region), but also in less productive grounds such as that in the Apulia Region. The recovery has increased landings in the Marche Region in the last three years after a period of overexploitation. While this recovery could be a stochastic event, the review nonetheless stresses

11 Commission Delegated Regulation (EU) 2016/2376 of 13 October 2016 establishing a discard plan for mollusc bivalve Venus spp. in the Italian territorial waters. OJ L352, 23.12.2016, p. 48.

the importance for the fishery of extending the derogation of MCRS at 22 mm for at least two years to increase knowledge on the effect of the change of the MCRS.

- In the Veneto region, it is observed that despite two extraordinary adverse marine weather events (Storm VAIA 2018 and high water associated with event of Scirocco wind 2019), the recent total production in the fisheries and mean daily production by vessel have been in line with the average production values of the last 20 years. Data on biomass densities (g/m$^2$) over 2003-2018 (available for some years only, not throughout the entire time series) display large inter-annual fluctuations. The density value in 2018, after two years of Discard Plan application, was much lower than in 2017. The ratio between the trend of the catches (tonnes), on an annual basis, and the estimated amounts of *C. gallina* on the suitable areas, determined by the monitoring activities, shows that on average, for the seven years for which information is available, the ratio catch/estimated amount of >20 mm individuals was around 40%, with the exception of years in which increased mortality occurred, where the ratio was about 52% (2009 and 2018). Recruitment in 2019 is amongst the highest in the last 10 years and the biomass values of the most reproductive specimens (> 20 mm) is sufficient to maintain the production conditions of the area.
- The management of the consortia has allowed the resumption of production in all the areas of the coastal strip of the Veneto region. Despite an increase in the number of vessels, the total fishing days decreased in 2019 (10,667 compared to 13,409 in 2017 when the plan was first implemented). Average production per fishing vessel per year has decreased in the last three years (2017-2019), linked to the decrease in overall fishing time and areas of the coastal strip being fished. This is also linked to reactive management following the mortality events caused by the adverse environmental events in the autumn of the 2018 and 2019 seasons, as well as to a decrease in market demand. Data on biomass trend (g/m$^2$) over 2005-2018 in Cavallino-Chioggia are presented. In the last years 2014-2018 biomass has fluctuated around 100 g/m$^2$.
- Finally, the report highlights the likely outcomes if the derogation is not extended. The reduction of MCRS is seen as the main incentive to comply with the management plan. The report points out that if that incentive is removed, fishing patterns are likely to return to 2017 levels with higher quotas per day (600 kg compared to 400 kg under the plan) and a return to a 5-day fishing week instead of 4 days. Further, the report states that costs for companies operating in the fishery will increase and there will be a significant increase in the area being dredged.

**STECF comments**

In line with the request received from the Commission, STECF has considered the supporting information relating to the potential past and future impacts on the stock of the proposed change in the MCRS for Venus clams from 25 mm to 22 mm on exploitation rates and stock biomass.

However, STECF notes that new information has also been provided on survivability, even though the derogation for high survival has been granted for three years and is therefore not to be re-evaluated in 2020. Given that STECF was asked to comment on the draft new plan and supporting study, STECF has also evaluated this additional information relating to high survivability based on two experiments carried out to assess the reburying capacity and the survivability of the striped Venus clam in the Adriatic Sea.

*Summary of previous evaluations by STECF*

STECF 16-06 evaluated a proposal submitted by Italy for a three-year discard plan for the fisheries targeting Venus clams by hydraulic dredges in the Northern Adriatic Sea. The main elements of the plan were: the setting of a new MCRS; the introduction of a tolerance of 5% (weight) from the proposed MCRS and; provisions for the re-stocking of undersized individuals caught alive. The draft discard plan was accompanied by a study which evaluated the possible effects of re-defining the MCRS. Based on the STECF advice, Delegated Regulation (EU) 2016/2376 of 13th October 2016, established a discard plan for mollusc bivalve Venus spp. in the Italian territorial waters. This plan derogated from the minimum conservation reference size of *Chamelea gallina* established in Annex III to Regulation (EC) No 1967/2006, with a MCRS of 22mm instead of 25mm. This discard plan had a lifespan of three years from 1 January 2017 and expired on 31 December 2019.

In 2019, Italy submitted a proposal for a further three-year discard plan that aimed to extend the derogation for the reduced MCRS of 22mm and also included a high survivability exemption to allow discarding of Venus clams below 22mm. STECF PLEN 19-01 and 19-02 evaluated this proposal and the supporting information supplied. Although both evaluations concluded that the past and predicted future impacts of the proposed change in the MCRS on exploitation rates and stock biomass could not be fully assessed with the information provided, STECF 19-02 concluded nevertheless that the request for a continuation of the reduction in MCRS of Venus clam (*Chamelea gallina*) from 25 mm to 22 mm until 31 December 2022 seemed reasonable from a biological perspective. STECF PLEN 19-02 also concluded that the revised JR submitted attempted to respond to the observations made by STECF PLEN 19-01 on the weaknesses in the original survivability studies. Based on the STECF 19-02 advice, the high survivability exemption was granted for 3 years up until 31 December 2022 and the derogation to the MCRS was granted for 1 year until 31 December 2020 pending further supporting information being submitted by the Italian administration (Delegated Regulation (EU) 2020/3).

*Comments on the new evidence provided in 2020 regarding the effect of MCRS*

STECF notes that a similar request to evaluate potential past and future impacts on the stock of the proposed change in the MCRS for Venus clams from 25 mm to 22 mm was addressed to STECF PLEN 19-01, to specifically comment on exploitation rates and stock biomass. STECF PLEN 19-01 suggested that greater focus and reporting was required on those aspects of the monitoring which directly inform on the stock size and exploitation rates. STECF PLEN 19-01 concluded that the information provided in the supporting documents was insufficient to provide any indications of exploitation rate or trends in stock biomass.

The supporting documentation to the new JR provides information on exploitation rates and stock biomass linked to the reduction of MCRS from 25 mm to 22 mm, it updates information submitted earlier in 2019 on the stock structure and changes in production rates over time. It also describes the findings from case studies carried out to assess the impacts on the striped Venus clam population from the reduction of MCRS to 22 mm.

STECF observes however that the information in the supporting Annex still does not fully address the STECF PLEN-01 and PLEN 19-02 conclusions since the information on the actual impacts of reducing MCRS on exploitation rates and stock biomass provided is mainly provided for the Veneto region. Information on exploitation rates or stock biomass in the main fishing grounds (Marche region) is limited.

STECF notes that in order to assess the impact of the MCRS size from 25 mm to 22 mm TL the information should be presented according to these sizes classes, instead of ≥20 mm that is used in the supporting documentation provided.

A main difficulty for STECF is to distinguish the impact of the MCRS alone from the impact of the entire management plan and accompanying measures. STECF notes that the length frequencies distributions (2017-2019) presented in the Annex to the new JR suggest that since the first implementation in 2017 (under Delegated Regulation (EU) 2016/2376) of the smaller MCRS (from 25 mm to 22 mm TL), an increase of abundance of >22 mm individuals has been observed in the stock in Ancona and San Benedetto. Nevertheless, it remains unlikely that this increase results from the reduction of the MCRS. Rather, it may result from the increased compliance with the adaptive management and re-stocking measures foreseen in the striped Venus management plan, or as a result of natural fluctuations in the populations.

STECF observes that it is stated in Annex that after the introduction of the Discard Plan for clams the landings have increased. However, STECF notes that it is not possible to conclude that this is the case. In fact, in San Benedetto, the increase in landings observed over 2017-2019 falls within the range observed over 2007-2016, before the implementation of the plan. In Ancona, the fishing port with highest landings in the Adriatic, the landings over the period 2017-2019 were lower than in the previous years.

STECF notes that the supporting documentation states that if the derogation on the MCRS from 25 mm to 22 mm is not granted, higher effort and quota will result. STECF observes that there is no evidence to support this statement, and that it is unclear why and how managers would increase quotas in the frame of the plan. STECF understands that the derogation to reduce MCRS to 22 mm is the main incentive for fishermen to comply with the plan, since this allows them to increase revenue while reducing discards and fishing effort. Nevertheless, the extent to which such reduced compliance and effort increase would be truly realized if the derogation is not granted is unknown.

Overall, STECF observes that the supporting documentation still does not provide any evidence to support the objective set out in Article 18 of Regulation (EU) No. 2019/1241, which states that changes to MCRS, in this case reducing MCRS from 25 mm to 22 mm, should respect the objective of "ensuring the protection of juveniles of marine species". Rather, it mainly provides evidence that the status of the stocks has not deteriorated since its first implementation in 2017. STECF observes that reducing the MCRS for any species will not ensure the protection of juveniles. However, given the reduced MCRS for Venus clams is still larger than the size at first maturity (15-17 mm TL as reported in Annex), it will probably not be detrimental to the reproductive capacity of the stock. In its 2016 advice, STECF concluded that a reduction of MCRS from 25 to 22 mm was predicted to lead to a reduction of 8% of the reproductive potential, according to the simulations presented.

Incidentally, STECF notes that the reference used for estimating maturity at 15-17 mm is already ancient (Polenta, 1993). Another study is also referenced (Gaspar et al., 2004), but refers to analyses in Atlantic waters in 2004. STECF considers that it would be beneficial to perform updated maturity analyses to verify whether these estimates are still valid.

*Comments on the new evidence provided in 2020 regarding survivability*

Although not specifically required in 2020 since the high survival exemption was granted for three years, the supporting documentation provides the results of the experiments on reburying capacity and the survivability of the striped Venus clam. The updated information on survivability addresses the comments from STECF PLEN 19-01 on the need for survivability experiments carried out under commercial conditions,

On the high survivability exemption, STECF observes that the methodology to generate the new survival estimates is robust. The survival rates estimated around 95.0% are in line with other estimates provided in the studies by Brooks et al. (1991), Moschino and Marin (2006), Morello et al. (2006), and ISPRA (2012).

## STECF conclusions

Documentation on exploitation rates or stock biomass trends for Venus clams in Italian waters provided to STECF only relates to the Veneto region. Little information on exploitation rates or stock biomass is provided for the main fishing grounds (Marche region). Given the paucity of such information, STECF is therefore unable to fully assess the potential past and future impacts of the proposed change in the MCRS for Venus clams from 25 mm to 22 mm on exploitation rates and stock biomass.

On the basis of the information provided, STECF cannot disentangle the impact of the change of MCRS alone from the impact of the entire management plan and accompanying measures. In general, reducing the MCRS is unlikely to ensure the protection of juveniles as required by Article 18 of Regulation (EU) No 2019/1241. However, given that the size at first maturity of Venus clams is below 22 mm, a reduction in MCRS to 22 mm is likely to have little effect on the exploitation rate on juveniles.

STECF notes that the status of the stocks seems to have been stable or improving in those areas for which sufficient information is available (Veneto). STECF cannot assess whether this was related to the implementation of the management plan, or to natural fluctuations in populations. STECF concludes however that the management plan includes provisions which are likely more effective for the management of the exploitation rates on Venus clam populations than the conditions prevailing before 2017.

Although not specifically required to be assessed by STECF in 2020 since the high survival exemption is granted until 2022, STECF acknowledges the provision of additional scientific information supporting evidence of high survival of striped Venus clam, in response to the comments from STECF PLEN 19-01. STECF concludes that the methodology used to carry out the survivability experiments under commercial conditions is robust.

## References

Brooks, SPJ., De Zwaan, A., Van den Thillart, G., Cattani, O., Cortesi, P., Storey, KB. (1991). Differential survival of *Venus gallina* and *Scapharca inaequivalvis* during anoxic stress: covalent modification of phosphofructokinase and glycogen phosphorylase during anoxia. Journal of Comparative Physiology B, 161 (2), 207–212.

Gaspar, M. B., Pereira, A. M., Vasconcelos, P., and Monteiro, C. C. (2004). Age and growth of *Chamelea gallina* from the Algarve coast (Southern Portugal): influence of seawater temperature and gametogenic cycle on growth rate. J. Molluscan Stud. 70, 371–377. doi:10.1093/mollus/70.4.371.

ISPRA (2012). Piano di monitoraggio ambientale (fase di esercizio) del Terminale GNL di Porto Viro e della condotta di collegamento alla terraferma.

Moschino, V., Marin, MG. (2006). Seasonal changes in physiological responses and evaluation of "well-being" in the Venus clam *Chamelea gallina* from the Northern Adriatic Sea. Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology, 145 (4), 433–440. DOI: https://doi.org/10.1016/j.cbpa.2006.07.021.

Morello, EB., Froglia, C., Atkinson, RJA., Moore, PG. (2006). The effects of hydraulic dredging on the reburial of several molluscan species. Biologia Marina Mediterranea, 13 (1), 610–613.

Polenta, R. (1993). Osservazioni sull'accrescimento della vongola *Chamelea gallina* L. Nel Medio adriatico. Tesi di Laurea in Scienze Biologiche. Università degli studi di Bologna.

## 3.3 Joint Recommendation Norway pout fishery

**Background provided by the Commission**

The entry into force of the Regulation (EU) No 2019/1241, new Technical Measures Regulation (TMR)[12] introduces the process of regionalization to amend certain regional baseline selectivity standards. Member States with interests in a given region may adapt various aspects of fisheries management to ensure that activities carried out are consistent with the objectives proposed by the aforementioned legal text. This permits the tailoring of detailed and technical rules so as to take into account regional specificities. In this regard, the Scheveningen Regional Group has developed the attached joint recommendation in accordance with articles 15 of TMR and 18 of Regulation EU no 1380/2013. This joint recommendation needs to be assessed by the STECF in order to determine to what extent it goes in line with achieving the objectives and targets set out in Articles 3 and 4 of Regulation (EU) 2019/1241, and does not lead to a deterioration of selectivity standards.

**Request to the STECF**

Linked to point 6.11, STECF is requested to evaluate the attached joint recommendations on the use of "excluder" grid device in the Norway Pout fishery in the North Sea[13] on the basis of Article 15(4) (5) and (6) of Regulation 2019/1241. It should be assessed to what extent it helps at achieving the objectives and targets set out in Articles 3 and 4 of Regulation 1241/2019, and whether the joint recommendation presented on the use of the "excluder" could lead to a deterioration of selectivity standards.

More specifically, STECF advice is requested to assess, in particular:

- to what extent does it achieve the by catch reduction similarly to the existing grid, or improves it, compared to what was existing on 14 August 2019 (date of entry into force of Regulation 1241/2019)
- Whether the technical specifications of the excluder are appropriate or should be modified for an increase in by catch reduction.
- Whether the materials, methods and statistical analysis used may be considered as adequate and fit for purpose, and whether data and information submitted are considered robust and enough.

12 Regulation (EU) 2019/1241 of the European Parliament and of the Council of 20 June 2019 on the conservation of fisheries resources and the protection of marine ecosystems through technical measures, amending Council Regulations (EC) No 1967/2006, (EC) No 1224/2009 and Regulations (EU) No 1380/2013, (EU) 2016/1139, (EU) 2018/973, (EU) 2019/472 and (EU) 2019/1022 of the European Parliament and of the Council, and repealing Council Regulations (EC) No 894/97, (EC) No 850/98, (EC) No 2549/2000, (EC) No 254/2002, (EC) No 812/2004 and (EC) No 2187/2005

13 As defined by Article 5a of Regulation (EU) No 2019/1241.

- In the event that STECF identifies shortcomings in the joint recommendation, it is requested to provide guidance on whether these can be overcome through further work and if so, the specific elements that should be further considered.

Documentation: Joint recommendation of the Scheveningen Group: Use of the 'Excluder' grid in the Norway pout fishery. Annex to Joint Recommendation.

**Specific Articles referenced in the request:**

*Articles 3 and 4 of Regulation (EU) 2019/1241*

*Article 3 Objectives*

*1. As tools to support the implementation of the CFP, technical measures shall contribute to the objectives of the CFP set out in the applicable provisions of Article 2 of Regulation (EU) No 1380/2013.*

*2. Technical measures shall in particular contribute to achieving the following objectives:*

*(a) optimise exploitation patterns to provide protection for juveniles and spawning aggregations of marine biological resources;*

*(b) ensure that incidental catches of sensitive marine species, including those listed under Directives 92/43/EEC and 2009/147/EC, that are a result of fishing, are minimised and where possible eliminated so that they do not represent a threat to the conservation status of these species;*

*(c) ensure, including by using appropriate incentives, that the negative environmental impacts of fishing on marine habitats are minimised;*

*(d) have in place fisheries management measures for the purposes of complying with Directives 92/43/EEC, 2000/60/EC and 2008/56/EC, in particular with a view to achieving good environmental status in line with Article 9(1) of Directive 2008/56/EC, and with Directive 2009/147/EC.*

*Article 4 Targets*

*1. Technical measures shall aim to ensure that:*

*(a) catches of marine species below the minimum conservation reference size are reduced as far as possible in accordance with Article 2(2) of Regulation (EU) No 1380/2013.*

*(b) incidental catches of marine mammals, marine reptiles, seabirds and other non-commercially exploited species do not exceed levels provided for in Union legislation and international agreements that are binding on the Union.*

*(c) the environmental impacts of fishing activities on seabed habitats are in line with point (j) of Article 2(5) of Regulation (EU) No 1380/2013.*

*2. The extent to which progress was made towards those targets shall be reviewed as part of the reporting process set out in Article 31.*

*Area definition*

*'North Sea' means Union waters in ICES divisions (23) 2a and 3a and ICES sub-area 4*

*Evaluate of the basis of Article 15(4) (5) and (6) of Regulation 2019/1241*

*4. The technical measures adopted pursuant to paragraph 2 of this Article shall:*

*(a) aim at achieving the objectives and targets set out in Articles 3 and 4 of this Regulation;*

*(b) aim at achieving the objectives and comply with the conditions set out in other relevant Union acts adopted in the area of the CFP, in particular in the multiannual plans referred to in Articles 9 and 10 of Regulation (EU) No 1380/2013;*

*(c) be guided by the principles of good governance set out in Article 3 of Regulation (EU) No 1380/2013;*

*(d) as a minimum, lead to such benefits for the conservation of marine biological resources that are at least equivalent, in particular in terms of exploitation patterns and the level of protection provided for sensitive species and habitats, to the measures referred to in paragraph 1. The potential impact of fishing activities on the marine ecosystem shall also be taken into account.*

*5. The application of the conditions in relation to the mesh size specifications set out in Article 27 and in Part B of Annexes V to XI shall not lead to a deterioration of selectivity standards, in particular in terms of an increase in the catches of juveniles, existing on 14 August 2019, and shall aim at achieving the objectives and targets set out in Articles 3 and 4.*

*6. In the joint recommendations submitted for the purpose of adopting the measures referred to in paragraph 2, the Member States shall provide scientific evidence to support the adoption of those measures.*

Specific existing relevant technical regulation from Annex V Part B of Regulation (EU) 2019/1241:

| ***Mesh Size*** | ***Geographical Areas*** | ***Conditions*** |
|---|---|---|
| *At least 16 mm* | *Whole area* | *Directed fishing for small pelagic species which are not covered elsewhere in the table. Directed fishing for Norway pout. A sorting grid with a maximum bar spacing of 35 mm in the Norway pout fishery shall be fitted. Directed fishing for common and Aesop shrimps. A separator trawl or sorting grid must be fitted in accordance with nationally or regionally established rules.* |

## Summary of the information provided to STECF

The documentation provided to STECF consisted of a joint recommendation from the Scheveningen Group: "Use of the 'Excluder' grid in the Norway pout fishery", and two annexes. Annex 1 was a scientific manuscript by Eigaard et al. (2019, unpubl.): "Improved sorting in a netting-based alternative to rigid grids in the small-meshed Norway pout (*Trisopterus esmarkii*) trawl fishery". Annex 2 was a short supplementary note that provided some more results from the trial undertaken on bycatches of species other than those reported in annex 1.

Summarized here is the evidence provided to STECF on i) the North Sea Norway Pout Fishery and current regulations, ii) the fishing gear experimental trial of an alternative trawl design.

i) North Sea Norway Pout Fishery and current regulations

Norway pout is landed for reduction purposes (fish meal and fish oil). The fishery uses large demersal trawls, which catch up to 150 t per haul. The annual total allowed catch (TAC) of Norway pout from the greater North Sea is commonly set above 200,000 t, but has rarely been fully utilized (ICES, 2018). The fishery is nearly exclusively performed by Danish and Norwegian vessels. Denmark holds 99,9% of the EU quota. In recent decades, the reported landings have been on average around 30% of the agreed TACs. The low and variable CPUEs of the Norway pout fishery are a likely explanation of the low quota uptake.

Norway pout is a small short-lived gadoid, which tends to aggregate in small schools close to the seabed which are dispersed across larger areas. Norway pout mixes with similar sized gadoids of other species, mainly juveniles of whiting and haddock, and with herring. Due to its small body size the fishery for Norway pout has to be conducted using trawls fitted with small mesh codend; and because the geographical range of Norway pout overlaps with that of many other species, it is difficult to avoid unwanted bycatch.

In recognition of the level of unwanted bycatch in the fishery, the use of a rigid selection grid is currently mandatory under Union legislation. This is expected to reduce gadoid bycatches, but the improvement to selectivity compared with a trawl without a grid of regulated specification has not been quantified. The current rigid selection grid with a bar spacing of 35mm is a trade-off between release of unwanted bycatch and loss of target species. However, the use of the grid has been met with apprehension from fishermen due to operational and safety concerns. Consequently, an alternative to the grid was tested by the Danish Institute, DTU Aqua, in collaboration with the fishing industry. The introduction of the new 'Excluder' design to be introduced as a regulated alternative to the grid is supported by the North Sea Advisory Council and the Scheveningen Group.

ii) The fishing gear trial of the 'Excluder' trawl

The experimental trials of the 'Excluder' were conducted with involvement of the Danish Pelagic Producer Organisation. The scientific background provided in Annex 1 presents the results of an experiment conducted on board a commercial twin trawler at two locations on the commercial Norway pout fishing grounds in the northern North Sea (East ground and Fladen ground), during November 2018.

The Excluder design

A schematic presentation of the experimental setup is provided in Eigaard et al. (unpublished). In contrast to the grid, the Excluder is constructed of netting and PVC and has no rigid structures. The Excluder is a 30 m netting section inserted before the cod end, made up of an outer-net part (with standard mesh size) and an 11 m inner tapered netting tube constructed of knotless 70 mm square meshes that leads to an escape opening at the base of trawl. The entrance and exit diameter of the outer-net part is kept fixed at 3.25 m by two cylindrical pieces of PVC material. At the end of the inner tapered section, a PVC flap is mounted with the purpose of forcing the fish to either actively pass through the PVC flap and escape, or move through the square mesh netting into the cod end. The Excluder design ensures that it can easily be reeled on to net drums and handled without safety concerns.

The experimental design

The experiment was performed as a catch comparison trial whereby the catches of a Norway pout targeting trawl, as currently legislated with a grid, was compared with the catches of a trawl fitted with the "Excluder" trawl (Results provided in Eigaard et al., unpubl.). The trial encompassed eleven hauls where the grid and the Excluder trawl was swapped after four hauls. Notable is that the cod end mesh size differed between the control (16 mm) and the treatment (12.6 mm).

The trial results

The results indicate that the trawl fitted with the Excluder caught on average more Norway pout (32% by number) than the grid trawl although there was a large variation between hauls (95% confidence intervals ranging from +3% to +95% higher catches). From the length-based analyses, there was a tendency for larger catches (catch comparison rate >0.5) for the most abundant size classes (8-15 cm) of Norway pout, although the only statistically significant difference was for the 9-10 cm size class.

Furthermore, the trial of the Excluder trawl showed reduced average catches of common bycatch species, herring, mackerel, whiting, long rough dab, and witch flounder) of between 30-95%. Catch reductions were, however, size-dependent meaning that catches of large individuals were reduced, relative to the grid, while catches of small individuals were unaffected. For herring, mackerel and whiting, catches of individuals larger than 25.5, 26.5 and 21.5 cm, respectively, were reduced. Similarly, for the two flatfish species, long rough dab and witch flounder catches of individuals larger than 17.5 and 15.5 cm, respectively, were significantly reduced. No difference in catches were found for lesser silver smelt.

Annex 2 contains summarized catches of 13 other bycatch species than the six analysed and presented in Annex 1. However, as these were all caught and sampled in low numbers the information does not allow assessment of the excluder's ability to reduce bycatches for those species. Notable is that one of these species was haddock, one of the identified main bycatch species in this fishery, for which only eight individuals were recorded in the sampled catch.

## STECF comments

*Quality of the gear trial*

STECF considers that the trial methodology overall (design, sampling, analyses) is scientifically robust and follows common guidelines for conducting catch comparison trials (Wileman et al., 1996).

However, the bycatch in the Norway pout fishery is known to comprise primarily juveniles of other gadoid species, notably whiting and haddock, whereas only few juvenile gadoids were encountered in the trials and no statistical evaluation of the performance of the Excluder compared to the grid could be performed for these species. This observation together with the fact that the trials comprised only 11 hauls undertaken at 2 different locations, brings into question whether the results from the trials are likely to be representative of the fishery as a whole. STECF notes that additional catch and size distribution data of bycatch species in the regular fishery (observer or unsorted landings data) is needed to assess the representativeness of the catches taken during the trial. These data would enable a better assessment of the potential benefits or risks for bycatch species of the Excluder design and inform on the impacts of the fishery more generally.

STECF notes it was difficult to interpret how samples were raised and subsequently used in the analyses. It was stated that a subsample size of 12 baskets (360 kg) was taken from each haul and that this corresponded to an average sampling fraction of 2.6% of total catches. The sampling factors presented (which in annex 1 are defined to be the sampled fraction in weight) vary for different species and do not appear to be in the same range (0.4-0.5% for bycatch species) as the reported average sampling fraction (2.6%). STECF notes that clarification of the estimation method of total numbers caught by species and length would provide greater confidence in the results presented.

*Selectivity results*

STECF notes that the results indicate that the bycatches of herring, mackerel, whiting, long rough dab and witch flounder were substantially reduced in the Excluder trawl compared to the grid trawl.

STECF further observes that both the grid and the Excluder designs are size selective devices, which are designed to retain small/juvenile fish and release larger fish, regardless of the species. Therefore, specimens of bycatch species (including quota species), of similar sizes as Norway pout, are potentially vulnerable to capture when using either the grid or Excluder design where distributions of small/juvenile fish overlap with the Norway Pout fishing area.

STECF observes that average length at first maturity ($L_{m50}$) of Norway pout in the Northern North Sea, Skagerrak and Kattegat has been estimated to be 11.7 and 13.1 cm for males and females, respectively (Lambert et al., 2009), and between 11-15 cm in other studies (e.g. Froese and Pauly, 2019). The results presented in Annex 1 with increased catches of Norway pout in sizes around 10 cm thus suggest that catches of juveniles may increase with the Excluder.

STECF notes that the Excluder trials were performed using a smaller cod end mesh size in the trawl with the Excluder than the in the trawl with the grid, which is not appropriate practice when comparing selective devices. However STECF agrees with the interpretation by the authors provided in Annex 1, that the higher Norway pout catches can likely be explained by the higher retention of Norway pout with the Excluder device compared with the grid rather than an effect of the difference in cod end mesh size between the two trawls. This is based on that the expected $L_{50}$ for Norway pout for the cod end mesh sizes (12.6 mm for the Excluder trawl and 16 mm for the grid trawl) likely to be around 3 times the mesh size (based on Tokac (2018) for hake, and Wileman (1997) for cod and haddock), corresponding to L50s of around 4 and 5 cm, respectively. The smallest Norway pout caught in the trials was 7.5 cm total length, well above the expected $L_{50}$ for both gears and most likely above the upper end of the selection range i.e. most fish 7.5 cm in length would be expected to be retained by both trawl cod ends. Hence STECF concludes that the difference in Norway Pout catches was not affected by the difference in cod end mesh size between the excluder and grid trawls as this had little or no effect on the selectivity for Norway pout.

STECF notes that the currently legislated 35 mm grid has not been evaluated with regards to bycatch reduction efficiency in this fishery. However, previous studies that tested rigid sorting grids in this fishery have shown that bycatches can be reduced, although these studies used narrower bar spacing (22 mm, Kvalsvik et al. (2006) and 23 mm, Eigaard et al. (2012)). Kvalsvik et al. (2006) reported reductions of bycatch species (mainly haddock) of 62-95% with a loss of Norway pout of 22-33%, while Eigaard et al. (2012) reported a reduction of haddock and whiting of 88-100% with a 6-14% loss of Norway pout. As for the reduction of bycatches the loss of Norway Pout was size dependent, i.e. larger individuals were more likely to be sorted out by the grid. STECF observes that while the principle of a sorting grid has been proven in these studies, the level of bycatch reduction relative to the proportion of Norway pout retained, when using the legislated grid design, is unknown.

*Technical specifications*

STECF notes that the proposed device implies a modification of the extension piece of the trawl, which means no change in the habitat impact of the gear compared with the grid. The technical specifications of the Excluder are not very detailed in the Annex or the JR. STECF considers that more details will be needed to legislate for such a device, and to assess how easy it would be to define and enforce. In particular, the PVC attachments and flap at the end of the inner netting tube may be difficult to legislate for based on the information provided. STECF notes that it would be beneficial to test a version of the Excluder without the PVC and flap to establish how it influences the selective properties of the design. STECF considers that due to its construction of flexible materials the performance of the Excluder design has more potential to become damaged with use, or be changed unintentionally or intentionally, and therefore may not function as consistently as a grid.

As a matter of comparison, STECF observes that the principles behind the Excluder design are already legislated for in the brown shrimp (*Crangon crangon*) fishery where the use of a sieve net is mandatory, accepting in this case that there are no attachments (i.e. no PVC tubes etc.) to the netting (Regulation (EU) 2019/1241 Article 6):

*'sieve net' means a piece of netting attached to the full circumference of the shrimp trawl in front of the cod end or extension piece and tapering to an apex where it is attached to the bottom sheet of the shrimp trawl. An exit hole is cut where the sieve net and cod end join, allowing species or individuals too large to pass through the sieve to escape, whereas the shrimp can pass through the sieve and into the cod end.*

*Landing Obligation*

Incidentally, STECF observes that the level of bycatch is relevant to the implementation of the landing obligation. Currently, up to 5% of the EU Norway Pout quota may consist of bycatches of haddock and whiting (up to 3,250 t in 2020) as included as a footnote to the TAC for Norway pout in the fishing opportunities Regulation (Regulation (EU) 2020/123). STECF observes that it is unclear whether this amount can be taken irrespective of how much of the Norway Pout quota is taken up. Bycatch can also be covered with the inter-species flexibility, (i.e. bycatches of quota species, including haddock and whiting, shall not exceed 9% of the Norway Pout quota - 5,850 t in 2020) in accordance with Article 15(8) of Regulation (EU) 1380/2013. However, to STECF's knowledge the inter-species flexibility option has not been used so far in this fishery. STECF observes that catch estimates of quota species in this fishery are needed to assess whether the Excluder or the grid trawl enable compliance with these allowable bycatch limits.

## STECF conclusions

STECF was requested to assess

- *to what extent does the excluder trawl achieve the by catch reduction similarly to the existing grid, or improves it, compared to what was existing on 14 August 2019 (date of entry into force of Regulation 1241/2019).*

STECF concludes that, based on the results presented, the Excluder design shows substantial (and statistically significant) reduction (30-95% in number depending on species) in bycatches of larger individuals of herring, mackerel, whiting, long rough dab and witch flounder compared with the currently required grid design. Only bycatches larger than 21-26 cm (whiting, herring and mackerel) and 15-17 cm (long rough dab and witch flounder) were reduced, whereas smaller individuals were equally retained with the grid or with the excluder. Haddock, a species often associated with Norway pout was caught in too small quantities to allow for a statistical evaluation of the performance of the Excluder compared to the grid.

STECF concludes that the results of the trial suggest increased catch efficiency for small Norway pout (including some juveniles) with the Excluder design compared with the grid. From the information provided, it is not possible to assess whether the increased efficiency may also risk increased catches of juveniles of other species in the same size range as Norway Pout where they are encountered together.

- *Whether the technical specifications of the excluder are appropriate or should be modified for an increase in by catch reduction?*

STECF concludes that both the current grid and the proposed Excluder designs select for small/juvenile fish and release larger fish. Small individuals of bycatch species are therefore potentially vulnerable to capture where distributions of small/juvenile fish overlap with the Norway Pout fishing area and depth, when using either the grid or Excluder design. This challenge will thus remain whatever device is used when targeting a small demersal species like Norway Pout.

STECF concludes also that the relative influence on the different aspects of the Excluder design, including mesh size and length of the inner tube, and the PVC components, cannot be determined from the information provided, and so the effect on bycatch reduction of modifying these components are unknown.

STECF concludes that the technical specification of the Excluder design provided is insufficiently detailed for legislative purposes. For example, no net plan was provided. Information on those key components of the design that ensure consistent selective performance should feature in any legislative definition of the design, including the technical attributes and function of the PVC components.

- *Whether the materials, methods and statistical analysis used may be considered as adequate and fit for purpose, and whether data and information submitted are considered robust and enough.*

STECF concludes that the methodology of the underpinning study (design, sampling, analyses) follows common guidelines for conducting catch comparison trials and the analyses undertaken were appropriate. However, the results are based on only a limited number of hauls (11 hauls) carried out in only 2 different locations. In addition, known bycatch species like haddock and cod were not caught in sufficient numbers for a scientific evaluation of bycatch reduction capacity of the Excluder design in the trial. Consequently the representativeness of the fishery as a whole is limited.

- *In the event that STECF identifies shortcomings in the joint recommendation, it is requested to provide guidance on whether these can be overcome through further work and if so, the specific elements that should be further considered.*

STECF concludes that representative data (observer or unsorted landings data) on the catch and size of bycatches taken in the fishery are needed to fully evaluate the design in the context of the whole fishery. These data would be used to assess the risk of catching more small/juvenile gadoids<20cm with the Excluder. Further trials should also be considered so that selectivity data may be collected for species and size ranges not encountered in the reported trial.

## References


Eigaard, O., Hermann, B., and Nielsen, J.R. (2012). Influence of grid orientation and time of day in a small meshed trawl fishery for Norway pout (*Trisopterus esmarkii*). Aquat. Liv. Res. 25: 15-26. doi 10.1051/alr/2011152

Froese, R. and D. Pauly. Editors. (2019).FishBase. World Wide Web electronic publication. www.fishbase.org, (12/2019).

Kvalsvik, K., Huse, I., Misund, O.A., Gamst, K. (2006). Grid selection in the North Sea industrial trawl fishery for Norway pout: Efficient size selection reduces bycatch. Fisheries Research 77 (2): 248-263. doi.org/10.1016/j.fishres.2005.10.002

Lambert, G, Nielsen, J.R., Larsen, L., and Sparholt, H. (2009). Maturity and Growth population dynamics of Norway pout (*Trisopterus esmarkii*) in the North Sea, Skagerrak and Kattegat. ICES J. Mar. Sci. 66 (9): 1899–1914; doi:10.1093/icesjms/fsp153

Wileman, D. A., Ferro, R. S. T., Fonteyne, R., Millar, R. B. (1996). Manual of methods of 555 measuring the selectivity of towed fishing gears. ICES Coop. Res. Rep., No. 215. ICES, Copenhagen. 216 pp.

## 3.4 Bulgaria request on expanded list of stocks for Black Sea demersal trawl survey

### Background provided by the Commission

Following the outcomes of the EWG 19-05 and the EWG 19-12 on the evaluation of the list of mandatory surveys under the DCF, the STECF PLEN 19-03 was asked to address two additional Member States requests for clarification on the list of mandatory surveys at sea. One of these requests came from Bulgaria. Bulgaria requested to limit the list of target species in the Bottom Trawl Survey in the Black Sea (BTSBS) to turbot, while Romania – when asked by COM - requested to keep the list of target species proposed by EWG 19-05 (turbot, whiting and picked dogfish).

STECF, in its PLEN 19-03 Report, noted that turbot, picked dogfish and whiting have been target species in historical bottom trawl surveys in the Black Sea since the 1980s, and keeping them in the BTSBS would assure the continuity of survey time series. Moreover, the data on biomass and density of those species are needed for the tuning of analytical stock assessments, as those are priority species. STECF was aware that in a recent exercise of standardisation of survey indices (within the RECFISH project), there was a lack of Bulgarian data, which caused incomplete coverage of EU waters. STECF noted that these three species were assessed by the GFCM in 2018. The fact that they occur rarely in the surveys can be linked to their status, the picked dogfish stock being assessed as depleted, while whiting is considered to be overexploited. Picked dogfish is listed in Annex II of the Convention on the Conservation of Migratory Species (CMS) of Wild Animals, and considered as endangered in the latest IUCN assessment. Any information on this species that could be gathered from both fishery-dependent and -independent sources of information should be considered as very valuable. Therefore, STECF concluded that the three species should remain target species of the BTSBS and should be collected by all countries participating in the survey, regardless of the number of individuals that are caught during the survey.

Following STECF Plen 19-03 Report, Bulgaria requested further clarifications on the last sentence: '*STECF concludes thus that the three species should remain target species of the BTSBS and should be collected by all countries participating in the survey, regardless of the number of individuals that are caught during the survey*.' Bulgaria would like to clarify whether this sentence means that scientists should calculate biomass/abundance based on a very low number of individuals caught in the survey. The scientists in the Member State have expressed the opinion that they could provide the biological information for the collected specimens, but, in some cases, the number of individuals caught is not sufficient for stock assessment (biomass and abundance).

### Request to the STECF

STECF is requested to clarify whether it would be mandatory to calculate the biomass and abundance of the expanded target species of BTSBS, as proposed by EWG 19-05 (whiting and picked dogfish), in those cases where the number of individuals caught is low.

## STECF observations

*Collection of survey data*

STECF notes that the Bulgarian authorities have not provided clear justification for this request, for example on the basis of excessive operational costs (e.g. person/months, hours at sea) associated with the obligation to collect data on three target species, instead of just one. Collecting data on species that are extremely rare (as stated in the request) should not add any extra burden, and will not increase the workload of the on-board staff and consequently will not affect the cost of the survey.

STECF notes that whiting and all commercial sharks, rays and skates are included in Table 1A (Mediterranean Sea and Black Sea) of the multiannual Union programme for the collection and management of data in the fisheries and aquaculture sectors (EU-MAP; COM Impl. Decision EU 2019/909 of 18 February 2019) and have to be covered by surveys. The EU-MAP also states that Member States' participation (physical or financial) in research surveys at sea accounting for the above species are mandatory when their shares of an EU catch is above the threshold of 3 %. According to GFCM SGSABS, the share of Bulgarian landings of picked dogfish and whiting are 94% and 73% over 2015-2017, respectively, of the total EU landings in the Black Sea (GFCM SGSABS, 2018). Moreover, there are clear recommendations from the STECF EWG 19-05 on the evaluation of the list of mandatory research surveys at sea (STECF, 2019) to use the BTSBS in assessments of picked dogfish and whiting in the Black Sea.

STECF notes that it is a common practice in research surveys (e.g., see MEDITS, 2017) to account for and measure all species caught in the hauls. The fact that some fish species appear in higher or lower quantities would be influenced by the abundance of their stocks and/or the ability of the fishing gear to catch them. The BTSBS should be following a standardised methodology similar to other EU surveys in the Mediterranean and Black Sea region. As such, the numbers of a certain species caught should reflect the true trends in their relative abundance, provided that the abundance index of a given stock is calculated taking into account the survey design. This provides a standardisation of relative abundance of the stock in a given area, which can further be used in area comparisons and modelling (e.g. Ligas, 2019), as well as for tuning of stock assessment models (e.g. STECF 2017: GFCM, 2018; Ligas, 2019).

*Use of survey data and survey indices in stock assessment*

STECF notes that the decision on which survey abundance indices to use in stock assessment models is to be made by the stock assessment groups, based on the quality and consistency of each index, and it is therefore necessary to provide that index to the assessment groups. This is even more important in the case of data poor situations, where survey indices are the primary source of information on the status of the stock, when the age structure of catches is not available.

So far, the only research survey indices used in picked dogfish and whiting assessments in the Black Sea have been produced on the basis of the Romanian bottom trawl index alone (STECF, 2017; GFCM, 2018). The last evaluation and standardisation of those indices was carried out by the RECFISH project (Ligas, 2019). Both survey indices show oscillating but generally decreasing trends (Figs. 3.4.1 and 3.4.2), as reflected in the reduction of the assessed stock abundance (STECF, 2017; GFCM, 2018; Ligas, 2019).

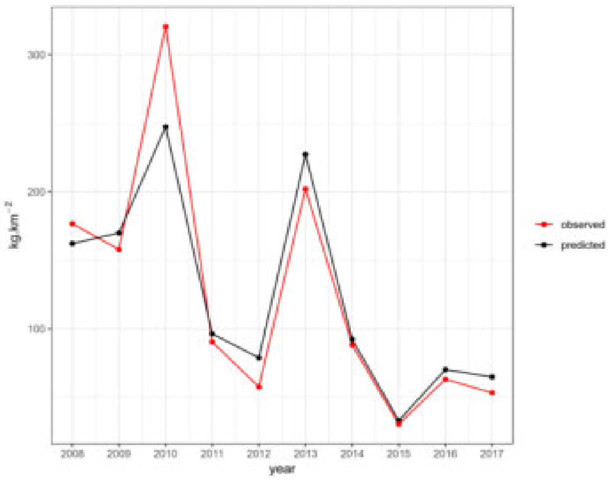


**Figure 3.4.1** - Comparison between original ("observed") and standardized during the stock assessment process ("predicted") biomass indices (kg km$^{-2}$) of picked dogfish, *Squalus acanthias*, in GSA 29 (Romania).

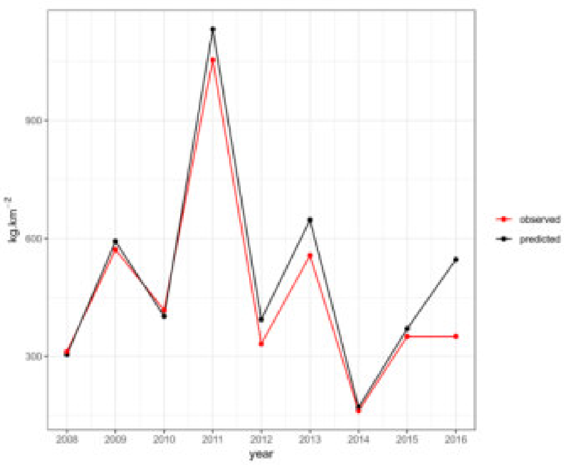


**Figure 3.4.2** - Comparison between original ("observed") and standardized during the stock assessment process ("predicted") biomass indices (kg km$^{-2}$) of whiting, *Merlangius merlangus*, in GSA 29 (Romania).

STECF notes that although these two stocks show decreasing trends, this does not invalidate the use of abundance indices in stock assessment. Rather, there is a crucial need for representative and standardised abundance indices covering the whole area inhabited by the stock (Ligas, 2019), to monitor how the situation evolves over time. In this respect, adding abundance survey data from the Bulgarian BTSBS to the Romanian survey (covering Romanian waters) would clearly improve the basis for stock assessment.

STECF notes that currently, in the Black Sea data calls, no raw data is requested; there is no legal obligation to deliver raw data (contrary to the MEDITS survey) (https://datacollection.jrc.ec.europa.eu/dc/medbs). As a result, the only information provided for the survey is a calculated index. If this index is not to be provided then there will be no survey information that the expert working groups can rely on. STECF is of the opinion that the quality of the survey indices can be evaluated only if the raw data are made available. Submission of raw data in all future data calls will allow for assessing if these (scarce) observations can actually provide reliable tuning indices for stock assessment, and would also allow investigating options for combining raw data into a single standardised index for the entire stock distribution area, as is best practice in stock assessment.

*BTSBS survey design*

It is an obligation of the EU DCF and Bulgarian data collection program to ensure that the BTSBS is designed and performed in an optimal way. Optimisation of the sampling effort and survey design with respect to the target species (dogfish, turbot and whiting) may comprise optimisation of the amount of sampling effort deployed, improving stratification schemes and methods, application robust estimation methods to better account for depleted stocks (see Kimura and Somerton, 2006; Blanchard et al., 2008).

Black Sea authorities have already expressed their interest to participate in the MEDITS coordination meetings so that to establish closer collaboration between Black Sea surveys and Mediterranean groups (RCG Med & Black Sea, 2017). MEDITS group responded favourably and agreed that MEDITS scientists could provide technical support for the accomplishment of MEDITS-compatible surveys, to help analyse and improve the sampling design of trawl surveys in the Black Sea and establish optimized survey protocols. It was decided that collaboration among MEDITS and Black Sea demersal surveys will be enforced through participation of Black Sea scientists to the MEDITS meetings (RCG Med & Black Sea, 2018). Black Sea experts attended the most recent meeting (2019)[14], and presented results on the BTSBS survey; however, no further discussions or initiatives to harmonize the survey with the MEDITS protocol have yet been undertaken. Until then, STECF advises that abundance indices are estimated using the currently applied methodology.

Accordingly, STECF strongly encourages Bulgarian experts to participate in, or contribute to, the upcoming "EWG 20-01 Methods for supporting stock assessment in the Mediterranean” (https://stecf.jrc.ec.europa.eu/ewg2001). It is the purpose of this EWG to define the correct procedures to deal (among others) with missing data and raising procedures (specifically for survey data).

*Other uses of survey indices*

Beyond the use of survey indices in stocks assessment, STECF recalls also that survey data are also useful for a number of other purposes. Among others, the very low occurrence/abundance of the aforementioned target species may have an impact on the implementation of the Marine Strategy Framework Directive (MSFD) monitoring programme (EU Members States’ obligation - http://cdr.eionet.europa.eu/bg/eu/msfd_mp). So far, in the Bulgarian MSFD implementation, picked dogfish and whiting are assessed under “Descriptor 3 – Commercial Fish”. It seems that in the future, at least picked dogfish, will have to be assessed under “Descriptor 1 – Biodiversity” (http://cdr.eionet.europa.eu/bg/eu/msfd_mp/msfd4text/envvibp8w/BLKBG_D014_NonCo

14 REPORT OF THE 2019 MEDITS COORDINATION MEETING not available (as of April 2020)

mmercialFish.pdf) , dealing with non-commercial or rare species. Since data collection under the EU-MAP (former DCF) is the main data source of MSFD assessments in most countries, not collecting such information will not allow for assessing the impact of human activities and the progress towards achieving Good Environmental Status.

In the same way, classifying species at high risk or extinction (IUCN, 2001) will require information on the percentage of mature individuals, rate of decline, population fluctuation, extent of occurrence, and area of occupancy. In the absence of any other data collection scheme, BTSBS survey data are the only data source and absolutely essential in assessing species status and defining conservation measures.

## STECF conclusions

STECF reiterates that picked dogfish and whiting should remain in the target species list of the BTSBS, even if the number of observations is low. STECF confirms that biomass/abundance indices of picked dogfish and whiting should be calculated based on the stratified design of the survey by the Bulgarian scientists and provided to the assessment working groups, based on the stratified design of the survey.

To allow the assessment working groups to evaluate the quality of the survey indices and whether they can be used as tuning indices for stock assessment when observations are too scarce, STECF supports an additional request for the submission of raw data is included in future data calls. DG MARE (in collaboration with GFCM) may further discuss the issue at the RCG-Med and BS.

STECF encourages the participation of Bulgarian and Romanian scientists in the MEDITS Coordination Group to enforce collaboration between Mediterranean and Black Sea countries with regard to the implementation of demersal surveys and alignment with MEDITS.

Finally, STECF recalls that the value of the information gathered by the survey extends beyond stock assessment and provides the basis for assessing human activities impact on the marine biota (MSFD monitoring programmes, IUCN conservation status).

## References

Blanchard J L, Maxwell D L, Jennings S. (2008). Power of monitoring surveys to detect abundance trends in depleted populations: the effects of density-dependent habitat use, patchiness, and climate change. ICES Journal of Marine Science, 65(1): 111–120

GFCM (2018). Final Report of the Sixth meeting of the Subregional Group on Stock Assessment in the Black Sea (SGSABS), Constanta, Romania 26 November – 1 December 2018, 41 p http://www.fao.org/gfcm/technical-meetings/detail/en/c/1207198/

GFCM SGSABS (2018). Stock assessment forms https://gfcm.sharepoint.com/EG/SitePages/Meetings/SGSABS_Yr_.aspx?RefYear=2018

IUCN (2001). IUCN Red List Categories and Criteria: Version 3.1. IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK. ii + 30 pp.

Kimura, D. K., and Somerton, D. A. (2006). Review of statistical aspects of survey sampling for marine fisheries. Reviews in Fisheries Science, 14: 245–283.

Ligas A. (coordinator) (2019). Recovery of fisheries historical time series for Mediterranean and Black Sea stock assessment (RECFISH). SC01 FRAMEWORK CONTRACT EASME/EMFF/2016/032. Final Report. 95 pp.

MEDITS (2017). MEDITS-Handbook. Version n. 9, 2017, MEDITS Working Group: 106 pp. http://dcf-italia.cnr.it/assets/lineeguida/lin1/2018/Manuale%20MEDITS%202017.pdf

RCG, Med & Black Sea (2017). Report of the Regional Co-ordination Group meeting for the Mediterranean and Black Sea 2017. Larnaka, Cyprus 18-22/09/2017. Available at: https://datacollection.jrc.ec.europa.eu/documents/10213/1239599/2017_RCG+MED-BS_24.1.2018.pdf/fd64e82a-44cb-43f7-ae2b-afc782bdb3d1

RCG, Med & Black Sea (2018). Final Report of the Regional Co-ordination Group Meeting for the Mediterranean and Black Sea 2018 17/09/2018 - 21/09/2018 Kavala, Greece. Available at: https://datacollection.jrc.ec.europa.eu/documents/10213/1239599/2018_RCG+MED.pdf/50aa0aef-36dc-4d49-afd6-4889e143889b

STECF (2017). Scientific, Technical and Economic Committee for Fisheries (STECF)–Stock assessments in the Black Sea (STECF-17-14). Publications Office of the European Union, Luxembourg, 2017, ISSN 2467-0715 (online),1831-9424 (online), ISBN 978-92-79-67486-0, doi: 10.2760/881421, PUBSY No. JRC108835.

STECF (2019). Preparation for the evaluation of the list of mandatory research surveys at sea (STECF-19-05). Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-09516-3, doi:10.2760/2860, JRC117485 https://stecf.jrc.ec.europa.eu/documents/43805/2457962/STECF+19-05+-+Ev+mandatory+surveys+DCF.pdf/91d1b337-7336-4269-b1bf-0124fe46504e

## 3.5 Closure area under western Med demersal fisheries multiannual plan

### Background information provided by the Commission

- Under Article 11 of Regulation (EU) 2019/1022, paragraph 1 states that the use of trawls in the western Mediterranean Sea shall be prohibited within six nautical miles from the coast except in areas deeper than the 100 m isobath during three months each year and, where appropriate, consecutively, on the basis of the best available scientific advice. Those three months of annual closure shall be determined by each Member State and shall apply during the most relevant period determined on the basis of the best available scientific advice. That period shall be communicated to the Commission and other Member States concerned without delay.
- By way of derogation from paragraph 1, and provided that it is justified by particular geographical constraints, such as the limited size of the continental shelf or the long distances to fishing grounds, Member States may establish, on the basis of the best available scientific advice, other closure areas, provided that a reduction of at least 20 % of catches of juvenile hake in each geographical subarea is achieved. Such derogation shall be communicated to the Commission and other Member States concerned without delay.
- France, Italy and Spain were expected to provide scientific and technical documentation supporting the implementation of the closure area set in Article 11(1) or, where appropriate, requesting the derogation foreseen in Article 11(2).

### Request to the STECF

The STECF was asked to review the Member States suggestions for closure areas designs (placement and period) and consider the following:

- when the closure area set in Article 11, paragraph 1, applies: review the supporting documentation provided to identify the most relevant period, taking into account the aim of protecting demersal resources, in particular juveniles, and sensitive habitats.
- when the derogation foreseen in Article 11, paragraph 2, is requested: evaluate if the following conditions are fulfilled:

  (i) there are particular geographical constraints, such as the limited size of the continental shelf or the long distances to fishing grounds; and

  (ii) there are sound scientific basis indicating that the proposed closure areas would lead to a reduction of at least 20% of catches of juvenile hake in each GSA.

### Summary of the information provided to STECF

STECF was provided with a scientific work and a note from Italy made on request of the Italian Ministry of Food and Agriculture, and with several supporting documents by the Spanish Ministry of Agriculture, Fisheries and Food that tasked different Spanish scientific bodies, as follows:

***ITALY***

1. A document from Italy ("*Additional information sent by italy.docx*")

The document is a brief note from the Italian authorities informing the European Commission that:

- the document presents 6 scenarios, and the STECF is requested to evaluate all of them.
- 'SCENARIO 0' refers to the implementation of closures in force plus the closure provided for under Article 11.1 of the MAP (6 nm / 100 m, whichever is reached first).
- Italy favours 'SCENARIO 3' implementing several small (9 zones of 100 to 619 km$^2$) permanent fishing restriction areas.

2. A document from Italy ("*Report closure areas reg1022_2020_ITALY_final.pdf*")

The document is the supporting scientific study of the above, to support a derogation to Art. 11.1 of Regulation (EU) 2019/1022[15]. It was carried out by independent researchers from IRBIM, CONISMA and CIBIM and designed to compare the effect of simulated alternative closures. The simulated alternative closures are contrasted with the adoption of trawl closures for three months of the coastal strip within 6 nautical miles or 100 m depth, as provided for by art. 11 paragraph 1. The study also assesses whether some of these settings would be able to reduce the juvenile hake catches in weight by 20% in GSAs 9, 10 and 11. The study defines two body sizes limits for juvenile hake, 16 cm TL based on Bartolino et al. (2008), or <20 cm TL based on the regulated MCRS (Minimum Conservation Reference Size) in the Mediterranean (Regulation (EU) 2019/1241[16]) arguing this threshold could also provide useful indications related to the Art. 14 on mitigation of discarding and Art. 15 of Landing Obligation, Regulation (EU) 1380/2013[17]. The study is based on:

15 Regulation (EU) 2019/1022 of the European Parliament and of the Council of 20 June 2019 establishing a multiannual plan for the fisheries exploiting demersal stocks in the western Mediterranean Sea and amending Regulation (EU) No 508/2014. OJ L 172, 26.6.2019, p. 1–17.

16 Regulation (EU) 2019/1241 of the European Parliament and of the Council of 20 June 2019 on the conservation of fisheries resources and the protection of marine ecosystems through technical measures, amending Council Regulations (EC) No 1967/2006, (EC) No 1224/2009 and Regulations (EU) No 1380/2013, (EU) 2016/1139, (EU) 2018/973, (EU) 2019/472 and (EU) 2019/1022 of the European Parliament and of the Council, and repealing Council Regulations (EC) No 894/97, (EC) No 850/98, (EC) No 2549/2000, (EC) No 254/2002, (EC) No 812/2004 and (EC) No 2187/2005. OJ L 198, 25.07.2019, p105.

17 Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009 and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004 and Council Decision 2004/585/EC. OJ L 354, 28.12.2013, p. 22.

1) Fisheries data (i.e. landings.csv and discards.csv) submitted by EU Member States in response to the FDI data calls over the period 2016-2018, to provide length-frequency data, plus the 3 x 3 km squared grid fishing effort distribution from national Italian vessel monitoring;
2) Scientific MEDITS survey data (2005-2018) describing the past spatial and temporal distribution of the hake including persistence areas;
3) Stock assessment outcomes for the hake stock in GSAs 9-10-11 (STECF EWG 19-10 Report).

From the MEDITS survey data, the spatial distribution of juvenile hake is deduced. The part that is possibly available for fishing is further computed using a selectivity ogive that would correspond to commercial trawl selectivity applied back to the survey trawl catches. The selectivity for hake size groups of 50 mm diamond codend mesh size trawl net described in Bethke (2004) is used for this back calculation. This procedure is necessary to circumvent the lack of catch data for juvenile hake in commercial data. The average number of MEDITS hauls used were: GSA 9 = 120; GSA 10 = 70; GSA 11 = 99. The study used an interpolation procedure with sea bottom temperature as a covariate to deduce the spatial distribution of juveniles over the period. Expected displacement of fishing effort from closed areas to open ones was estimated by re-assigning the effort removed from closed areas based on specific cell weights assigned to the observed patterns.

In the study, data 1), 2) and 3) are combined to condition the model simulations with juvenile hake numbers per size class and catch rates. Alternative closure scenarios are tested for the 20% juvenile hake catch reduction in the simulated Italian fleet.

The current mean values of the catches for hake juveniles are deduced from the catches reported over the period 2016-2018 in the GSAs 9, 10 and 11 and account for a total of 158.3 t if juveniles defined as <16 cm TL, and 343.5 t annually if juveniles are defined as < 20 cm TL, representing 8.2% and 18.3% of the total catch in weight of the commercial fisheries, respectively.

The document compares closure to bottom trawling scenarios accounting for the documented areas of the highest presence of juveniles of European hake as a combination of the following:

- Scenario 0 considering the status quo (e.g. the management measures in force at Dec 31$^{st}$ 2019) plus the application of the Article 11(1) of the Regulation (EU) 2019/1022 (e.g. trawling prohibited within 6 nautical miles from the coast except in areas deeper than 100 m depth during three months each year) was also considered. The period from May 1st to July 31$^{st}$ was chosen (without any justification).

- Scenarios 1, 2, 3 concern measures based on spatial and temporal closure of specific areas,

- Scenarios 4 and 5 represent a combination of measures based on the expansion of existing closures to broader areas, affecting all the GSAs 9, 10 and 11.

Finally, the document mentions that, in the evaluation, the possible effects produced by the closure areas on the reduction of the catch of juvenile hake are cumulated to the effects of 10% reduction of the fishing activity (fishing days) implemented by the Italian National Management Plans in 2019 and by an additional 7% reduction in 2020, compared to the baseline effort 2015-2017[18].

The study is looking at whether juvenile catches are likely to be reduced by more than 20% based on the simulations. The study concludes that among the scenarios tested, Scenario 5 performs the best giving a reduction of catches of juvenile hake of slightly more than 20%. Scenario 5 is based on a network of existing and new spatial closures, and a 3-months closure between 150 and 250 m depth. Scenario 3 (based on the establishment of a network of existing and new Fishing Restriction Areas, FRAs) also performs well, achieving a reduction of around 19.5%, close to exceeding the 20% limit. The study emphasizes the fact that Scenario 0 based on the application of Art.11.1 (i.e. including the 6 nm / 100 m restriction to trawling) does not reach the target of 20% reduction of catches of juvenile hake in their simulations.

***SPAIN***

**3.** <u>A document from Spain ("Spain proposal summary.docx")</u>

The document aims to support a derogation to Art. 11.1 of Regulation (EU) 2019/1022 and attempts to summarize the pieces of evidence provided to the Ministry of Agriculture, Fisheries and Food obtained from the Spanish scientific agencies. The supporting studies that were provided to the Spanish Ministry are described in the documents listed below at points 4-7 of this summary.

For GSAs 1, 5, and 6 the Ministry expresses the opinion that any of the temporary 3-months closure periods initially suggested to STECF PLEN-19-03 will fail to reduce the juvenile hake catches by 20%.

The Spanish Ministry claims that technical measures such as a codend square mesh size of 50mm combined with small permanent spatial closures are more effective for reducing juvenile hake catches than a temporary closure. It is also argued that permanent closures must include several depth zones to be effective in recovering the ecosystem for different species

**4.** <u>A document from Spain ("*2020 02 28 ITA P2 HKE Med GSA6 COURTESY TRANSLATION.docx*") prepared by Spanish Institute of Oceanography at the request of the Spanish General Directorate of Fisheries.</u>

The document aims to support a derogation to Art. 11.1 of Regulation (EU) 2019/1022 based on a scientific study to determine the percentage of catch reduction of juvenile hake that would result from time-area closures proposed by Spain in GSA 6.

The study defines juvenile hake as individuals below 20 cm in total length (LT) with the rationale that 20 cm corresponds to the minimum conservation reference size as stated in Article 11(3) of Regulation (EU) 2019/1022.

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18 https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/13693

The study refers to Tugores et al. (2019) describing maps of the "essential habitats" for the species based on individuals smaller than 20 cm TL. Additionally, the study refers to density estimates of hake abundances deduced from the MEDITS survey, from inside and outside the proposed closed areas. The study further calculates the available density that would be available for fishing if applying a selectivity that corresponds to the selectivity ogive of typical commercial trawl gear.

The study used the information from on-board observers to deduce the seasonal change in catch rates (discards + landings), including during months of the year outside the MEDITS survey period. It appears that the study may further use these monthly catch rates to raise the anticipated yield outside the proposed closure periods, but the methodology is not fully described.

The study provides and uses maps of fishing effort built from the vessel monitoring system (VMS) to simulate historic commercial catches. Hence, the overlay of the historical 2016-2018 averaged fishing effort (with an assumption on 1 $km^2$ swept area per day of a standard boat) to the MEDITS hake densities (individual hake/$km^2$) is used to deduce the possible juvenile hake catches inside and outside the proposed closed areas.

The simulation of the historic catches is also assuming that the fishing activity that would have been within the proposed closed area will redistribute to adjacent areas on the continental shelf or the edge of the upper slope which are open to fishing, and where their target would still be hake.

The study tests zones for restrictions corresponding to areas which Tugores et al. (2019) identified as the main recruitment grounds for hake. The study concludes that none of the proposed closed areas by Spain initially proposed in STECF PLEN-19-03 for GSA 6 and assessed here will be likely to achieve the target of 20% reduction in juvenile hake. The best achieves a 6% reduction in weight. Secondly, the new proposal for closing the 80-260m strip to trawling in GSA 6 and during the period May to September is predicted to reduce juvenile hake catches by more than 20% (ca. 33 to 38%).

**5.** <u>A document from Spain ("*2020_02_28 ITA_P2_HKE_Med_GSA5 COURTESY_TRANSLATION.docx*") by Spanish Institute of Oceanography at the request of the Spanish General Directorate of Fisheries.</u>

The document aims to support a derogation to Art. 11.1 of Regulation (EU) 2019/1022 based on a scientific study to determine the percentage catch reduction of juvenile hake that would result from time-area closure proposed by Spain in GSA 5 – Balearic Islands.

The study applies the same methodology already described for the document related to GSA 6. The data types used are of the same nature, but data are specific to the GSA 5.

The study concludes that the proposed areas and seasons for closure that have initially been proposed to STECF PLEN-19-03 in GSA5 (closing several boxes to trawling during the period May to July) is predicted to reduce the catches of juvenile hake by more than 20 % (ca. 20 to 27% in number and ca. 18 to 25% in weight).

**6.** <u>A document from Spain ("*2020_02_28 ITA_P2_HKE_Med_GSA1 COURTESY_TRANSLATION.docx*")</u>

The document aims to support a derogation to Art. 11.1 of Regulation (EU) No 2019/1022 based on a scientific study by Spanish Institute of Oceanography at the request of the Spanish General Directorate of Fisheries to determine the percentage catch reduction of juvenile hake that would result from time-area closure proposed by Spain in GSA 1 – North of the Alboran Sea.

The study applies the same methodology already described for the document related to GSA 5 and 6. The data types used are of the same nature, but data are specific to the GSA 1.

The study concludes that none of the proposed closed areas by Spain initially proposed in STECF PLEN-19-03 for GSA 1 will achieve the target of 20% reduction in juvenile hake, given the reduction will be negligible. Alternatively, a new proposal for closing the 100-200m strip to trawling during the periods February to April and October to December) is predicted to reduce the catches of juvenile hake by more than 20% (ca. 26 to 32% in number and ca. 23 to 28% in weight).

**7.** A document from Spain ("TechnicalReportManagementBottomTrawling_ Text-Figs_EnglishVersion_ICM-CSIC_sent-020320.pdf") prepared by the Renewable Marine Resources Department, Institut de Ciències del Mar (ICM-CSIC) at the request of the Spanish General Directorate of Fisheries.

The document aims to support a derogation to Art. 11.1 of Regulation (EU) 2019/1022 based on previous work.

No-take zones were calculated in GSA 1, GSA 5 and GSA 6 based on the proportions of catches of juvenile hake in the northern area of the GSA6 (years 2018-2019). Size-frequency distributions of hake were obtained from fisheries monitoring sampling. The preliminary results have been calculated linking data on spatio-temporal fishing effort (VMS) and landings (2015-2017) (Bastardie et al., 2010). The document reports that no-take polygons should be located within the 100 - 200 m bathymetric range, where the highest concentration of juvenile (TL <20 cm) hake occur. The document provides two tables showing the effects on hake juveniles of the polygons:

* Table 1: a six months closure might reduce the juvenile hake catches by 25% in GSA 1, a three months closure in Balearic and a twelve months closure in Alicante might reduce the juvenile hake catches by 37% in GSA 5, and a twelve months closure might reduce the juvenile hake catches by 23% in GSA 6.

* Table 2 (initially proposed to STECF PLEN-19-03): a four months closure might reduce the juvenile hake catches by 14% in GSA 1, and a three months closure might reduce the juvenile hake catches by 17% in GSA 5, and a five months closure might reduce the juvenile hake catches by 8% in GSA 6.

The document concludes that all closure options will not achieve the 20% reduction in catches of juvenile hake. This is because the closures are not restrictive enough and fail to reduce catches (Table 2), or, the 20% limit will be exceeded so significantly, (Table 1) the fishing sector will not comply with the closure because the economic impact will be too severe. For this reason, the document continues by suggesting additional technical measures, such as improving trawl gear selectivity to reduce unwanted catches and small permanent closures for enabling the recovery of coastal habitats.

**STECF general comments on the interpretation of the terms of the Regulation (EU) 2019/1022**

The rationale for the 6 nm / 100 m protection is defined in the Preamble (26) of Reg 2019/1022 as: "*In order to protect nursery areas and sensitive habitats, and safeguard small-scale fisheries, the coastal zone should be regularly reserved for more selective fisheries. Therefore, the plan should establish a closure for trawls operating within six* *nautical miles from the coast except in areas deeper than the 100 m isobath during three months each year. It should be possible for other closure areas to be established, where this can ensure at least a 20 % reduction of catches of juvenile hake*."

As stated in STECF PLEN 19-03, STECF infers from the above that the primary objectives of the closure are focused towards protecting i) nursery areas, ii) sensitive habitats, and iii) small-scale fisheries, and the Member States' proposals should be evaluated according to these objectives. As such, STECF notes that the aims of Art. 11.1 are not limited to a specific species, and are thus wider than the aims of Art. 11.2, which is solely focused on juvenile hake. STECF notes that this is leading Member States to only evaluate closures in relation to hake, while the effects on the other objectives of Art. 11 have not been not evaluated.

Derogations from the 6 nm / 100 m closure should be based on geographical constraints, such as the limited size of the continental shelf or the long-distance to fishing grounds. However, STECF notes that no clear criteria have been identified to define and evaluate these geographical constraints, and the justification of these remain open to interpretation. In addition, the definition of the "continental shelf" itself is not provided. STECF-PLEN-1903 interprets that the "continental shelf" refers to the 100 m isobath.

Finally, STECF notes that the regulation does not specify whether the effects of alternative closure should be analysed including or excluding the effect of the effort reduction foreseen in the plan. As described below in further details, STECF highlights that in the absence of clear terms on this question, different options have *de facto* been used by different Member States. In the present evaluation, Italy combined the closures with a 17% effort reduction, while Spain evaluated closures without effort reduction. In STECF PLEN 19-03, France had included a 10% effort reduction in its evaluation. This obviously leads to different outcomes in terms of likely success of the closure scenarios to achieve 20% reduction in hake juvenile catches. In the absence of specifications in the plan, STECF can only highlight these differences but STECF is not in a position to assess whether these different effort assumptions are in line with the management plan or not.

## STECF specific comments

STECF has previously evaluated similar requests for area closures in the Western Mediterranean (STECF PLEN 19-03) and formulated a number of suggestions on how to best conduct studies of alternative closures scenarios on the basis of standard scientific and commercial data. The evaluation conducted here by STECF is thus based on the same considerations and assesses also whether the previous STECF-PLEN-19-03 suggestions have been considered.

### *ITALY GSAS 9, 10 AND 11*

*STECF notes that the request relates to the closure of an area according to Article 11, paragraph 2, and therefore STECF evaluates whether the following conditions are fulfilled:*

- *There are particular geographical constraints, such as the limited size of the continental shelf or the long distances to fishing grounds;*

STECF notes that no justification is provided by Italy for GSAs 9, 10 and 11 to support the request of a derogation to the 6 nm strip closure or 100 m isobaths based on geographical constraints. Instead, the justification provided in the supporting document is the expression of considerable doubts about the real effects that such a coastal closure might have. In particular, the document states that, except for red mullet, a species with well-defined coastal nursery areas and therefore already protected by the existing regulations (trawling forbidden inside the 3 nautical miles / 50 m depth, Regulation (EU) 1967/2006), the nursery areas of the other species are located in offshore waters, often well beyond 100 m isobaths. The document provides several GIS maps and references to background studies showing that the central nurseries of both hake and deep-water rose shrimp are below the 100 m isobaths. Therefore, it is stated that the measures of Art. 11(1) could lead to an increase in fishing mortality on juveniles of thes two species, given that this measure may lead to a reallocation of fishing effort with an increase of fishing pressure on grounds deeper than 100 m.

The document argues that the conditions for applying paragraph 2 of Art. 11 should be based on available scientific knowledge, and suggests therefore, as an alternative, the closure of specific areas in GSAs 9, 10 and 11.

- *There is a sound scientific basis indicating that the proposed closure areas would lead to a reduction of at least 20% of catches of juvenile hake in each GSA.*

STECF notes that Italy followed a comprehensive methodology for conducting a scientific study to test the effect of alternative closure plan that aim at reducing the juvenile hake catches by 20% in 2020. STECF acknowledges the work done to account for the co-occurrence of areas with the high fishing effort (in days at sea) and the areas with the high concentration of juveniles to identify the areas in which the impact of trawling on juvenile hake is the strongest.

Hence, based on the suggestions formulated by STECF PLEN 19-03, STECF acknowledges that the necessary method for evaluating spatial plans for documenting a derogation to Art 11.1 is provided. This includes i) mapping persistence areas for juvenile hake based on a scientific survey (MEDITS) over a 10 yr period, ii) predicting catches and possible 20% reduction of juvenile hake from the simulated commercial effort and catches and accounting for the selectivity of the trawl gear currently in use in the fishery, and iii) accounting for possible effort displacement from the closed areas to the surroundings. By accounting for the displacement of the fishing effort toward the surrounding areas, the method correctly avoids assuming that the net reduction in catches from closure will fully correspond to the past catches made within the closure area proposal. Besides, since the differences in hake density between inside and outside the closed areas is accounted for, the method avoids inferring catches (juveniles and adults) within the opened area using constant averaged catch rates.

STECF notes that a baseline scenario (Scenario 0), assuming the status quo (i.e. existing national closures) plus the 6nm strip ban/100m closed during 3 months as stipulated by Art. 11.1, is used to contrast the alternative proposals. STECF observes however that the choice of the 3-months closure (May 1$^{st}$ to July 31$^{st}$) in Scenario 0 is not justified or based on any rationale explaining why this period would be more beneficial for reducing catches of juvenile hake compared to any other period.

STECF observes that the analyses cumulate the possible effect of the closure alternatives with a 17% reduction in the effort (fishing days) compared to the 2015-2017 baseline.

STECF notes that Italy provided the outcomes of a range of simulations for six scenarios tested and the final reduction that is likely to be obtained in 2020. Italy suggests that Scenario 5 gives the best outcome, scenario 3 gives an acceptable outcome and Scenario 0, the status quo with the 6 nm / 100 m closure for three months, is likely to fail to reduce the juvenile catches by more than 20%.

STECF observes that almost all the simulated scenarios can achieve a substantial reduction, albeit within a very narrow range (16% to 22% reduction in juvenile hake catches). Meanwhile, the spatial plans are quite different across scenarios, with wide differences in in the overall spatial extent restricted to trawling (from ca. 1,000 $km^2$ in scenario 1 to more than 10,000 $km^2$ in scenario 6). Given the small differences in scenario outcomes and their average results distributed in the vicinity of a 17% reduction in juvenile hake catches, STECF wonders whether these predicted reduction in juvenile hake catches does not primarily result from the assumed overall effort reduction rather than from the closures themselves.

STECF observes that Italy provided a final figure for reduction of juvenile hake per scenario merging all the three GSAs (i.e. 9, 10 and 11), therefore not per each GSA. STECF observes that the Regulation requires a closure to be defined in every GSA based on a 20% reduction in each of them individually.

In summary, STECF observes that in GSAs 9, 10, 11, merged, Italy concluded that the scenario performing the highest juvenile hake reduction is scenario 5, which is based on the network of existing FRAs and trawling prohibited between 150 and 250 m isobaths from the 1st May to the 31st July.

***Spain GSAs 1, 2, 5 and 6***

*STECF notes that the request relates to the closure of an area according to Article 11, paragraph 2, and therefore STECF evaluates whether the following conditions are fulfilled:*

- *There are particular geographical constraints, such as the limited size of the continental shelf or the long distances to fishing grounds;*

In the Spanish proposal submitted to STECF PLEN-19-03, the "geographical constraints" criteria were argued on the basis that for GSAs 1, 5 and 6, a large part of the 6nm strip from the coast is in areas deeper than 100m area and therefore, is not relevant to the protection of juveniles.

STECF notes that the closure within the 6nm should aim at protecting nursery areas as well as protecting sensitive habitats. STECF PLEN-19-03 concluded that the geographical constraints might be interpreted as the constraint created by a small proportion of the area of 0-100 m being left outside the 6nm strip. Further, STECF PLEN-19-03 observed that there are only very limited areas with geographical constraints (i.e. if interpreted as a small proportion of area 0-100m depth left out the 6nm strip). The current Spanish re-submission does not discuss this point.

STECF re-iterates STECF PLEN 19-03 conclusions that no proper justification is provided by Spain that would justify a derogation to Art 11.1.

- *There is sound scientific basis indicating that the proposed closure areas would lead to a reduction of at least 20% of catches of juvenile hake in each GSA.*

STECF acknowledges the effort made to submit comprehensive documentation addressing to some extent suggestions and considerations made by STECF PLEN 19-03.

*Methodology for the simulations of area closures*

STECF notes that, as per the objective of Art 11.2, the reduction of 10% of the fishing effort to be applied from 1 January 2020 in compliance with Regulation (EU) 2019/1022, has not been taken into account in the analyses of the outcomes of spatial closures.

Spain provided documents describing a scientific evaluation of the effect of alternative plans for closure related to Art 11.2, asking for a derogation in each of the GSA 1, 5, and 6.

STECF observes that one Spanish documentation (document 7) concludes that closing the 100-200 m isobaths strip to trawling in each of the GSAs would be efficient in achieving the Art 11.2 20% reduction. STECF is not able to fully judge the quality of the study, given that the details on the method used to deduce these numbers have not been provided to STECF.

STECF observes that no justification is provided for the definition of alternative closure areas in the supporting documents. STECF PLEN-19-03 made a number of comments and suggestions on how to best select alternative closure areas based on juvenile hake distributions. The assessment of the best location and timing for closures should compare and overlay a) where the fisheries are taking place and the likely catch composition and b) where juveniles are most likely to be distributed, to assess the expected impact of the fisheries on the juvenile stock component. On the basis of the information provided, STECF observes however that it is not clear whether the analysis flow suggested by STECF PLEN-19-03 has been fully followed.

STECF further observes that not all the materials for visualizing the choices in methods and the evaluation outcomes are made available so that a full assessment cannot be completed. For GSA 1, 5 and 6, no map is shown on the density of juvenile hake over months, nor are the polygons of the boxes, and the past distribution of the fishing. This prevents any judgement on the various periods and zones chosen for the closures. STECF cannot judge whether the proposals correspond to the hotspot areas for juvenile hake, neither whether the closure targets the highest level of co-occurrence between the juvenile densities and the distribution of the fishing. For example, STECF PLEN-19-03 noted that the best period for a time closure should be based on growth modelling to backtrack in time when spawning occurs. No documentation is provided on this element.

*Results by GSA*

STECF observes that, as requested by Art 11.2, the evaluation has been conducted per GSA.

In GSA 1, the Spanish scientific study suggests a new proposal for closing the 100-200m strip to trawling during the periods February to April and October to December, which is predicted to reduce the catches of juvenile hake by more than 20%.

In GSA 2, STECF observes that Spain did not provide any documentation, but notes that a 12-months closure to trawling has been proposed in areas deeper than the 100 m isobaths.

In GSA 5, the Spanish scientific study suggests the proposed areas and seasons for closure that have been initially proposed to STECF PLEN-1903, i.e. two boxes to trawling during the period May to July, which is predicted to reduce the juveniles hake catches by more than 20%.

In GSA 6, the Spanish suggestions had been assessed by STECF PLEN 19-03. Spain suggested some best periods for the closure of several small boxes in areas deeper than 100m. Spain also suggested some boxes (e.g. suggested box in the Alicante area) that did not seem to correspond to any hotspot areas for juvenile hake. STECF observes that the updated evaluation provided by Spain confirms that these initially proposed areas are insufficient to exceed the 20% reduction in juvenile hake catches. On the other hand, STECF observes that the new proposal for closing the 80-260 m strip during the period May to September is predicted to exceed 20%.

STECF observes that some new scenarios tested by Spain (i.e., extended time closures associated with wide spatial closures) would thus allow reaching the 20% juvenile hake target reduction in all the three GSAs.

*Technical measures*

However, these scenarios have not been brought forward by the Spanish authorities, who propose instead

STECF observes that the Spanish authorities did not bring forward the closure scenarios in their summary document (Document 3). Instead, they propose to implement the previously suggested boxes (submitted to STECF PLEN-1903) with the adoption of new additional technical measures (i.e., 50 mm codend mesh size). STECF remarks that there is no justification provided in the documents, apart the possible complain of the fishing sector facing the closures, to suggest alternative technical measures based on mesh sizes rather than such closures.

STECF observes however that derogations to Art.11.1 mention only alternative spatial plans for closures. Possible new technical measures to improve selectivity, as suggested by Spain, are not proposed as an alternative option in the regulation. While STECF recognizes that these additional measures could help achieve the target, these might not necessarily substitute to spatial closures. STECF has not evaluated this suggestion for gear selectivity.

## STECF conclusions

*Italy*

STECF concludes that the proposed derogations to the 3-month, 6 Nm /100 m isobath closure prescribed under Article 11 of Regulation (EU) 2019/1022 paragraph 1 are not justified by the arguments based on geographical constraints and/or high costs to reach the fishing grounds.

STECF concludes that the Italian scientific study is appropriate and follows the methodological suggestions formulated by STECF PLEN 19-03.

STECF concludes that the anticipated reductions in juvenile hake catch arising from alternative scenarios for trawling closures by way of derogation to Article 11.1, depend to a greater of lesser extent on whether the anticipated WestMed MAP background effort reductions are taken into account in the simulated scenarios.

STECF concludes that the performance of the closures cannot be fully assessed against the Art 11.2 requirement, because the results were presented merged for the three GSAs. Hence it is not possible to assess the expected change in catches of juvenile hake for each GSA separately.

*Spain*

STECF concludes that the proposed derogations to the 3-month, 6 nm / 100 m isobath closure prescribed under Article 11 of Regulation (EU) 2019/1022 paragraph 1 are not justified by arguments outlining any geographical constraints and/or high costs to reach the fishing grounds.

STECF concludes that one of the supporting studies for Art 11.2 (Doc. 7) has shortcomings and does not appear to make the full use of standardised data and methods which could have been used (i.e. involving both fisheries-dependent and fisheries-independent information to assess the expected impact of the closures). For the other studies, STECF concludes that the methodology followed seems appropriate but is generally not detailed enough to fully assess whether it complies with the suggestions formulated by STECF PLEN-19-03.

STECF PLEN-19-03 had concluded that the derogation to Art 11.1 requested by Spain did not comply with the regulation because the documents did not demonstrate a 20% reduction of juvenile hake catches, as stated in Art 11.2 of the regulation. STECF concludes that such a reduction is now supported for the new set of closed areas submitted for GSAs 1, 5, and 6.

## STECF general conclusions

STECF concludes that in the absence of clear specifications in the regulation, different options have been used by different Member States regarding the inclusion or not of effort reduction in the analyses of spatial closures. This likely influences the outcomes in terms of the expected success of the closure scenarios to achieve 20% reduction in hake juvenile catches. STECF is not in a position to assess which assumptions on effort reduction are appropriate with regards to the management plan.

STECF acknowledges that the studies presented by both Italy and Spain rightly tried to handle displacement effects in their estimates. STECF reiterates indeed its warning that spatial and temporal closures may not contribute to achieving the objectives of the plan since they likely lead to effort displacement towards other components including other gears, other species and other habitats. Such displacement may lead to an increase in fishing pressure on hake sub-adults and adults.

STECF concludes that the 6nm/100m as defined in Art. 11.1 is not aimed at reducing only the catches of juvenile hake but also protecting juvenile fish, sensitive habitats, and small-scale fisheries. Therefore, the 6nm/100m strip should not be used only to contrast alternative plans that countries would suggest when using Art. 11.2 for the derogation request.

Finally, STECF reiterates a number of conclusions of STECF PLEN-19-03:

- Concerning the best component to protect in order for hake and other fish to recover in the West Mediterranean region, STECF PLEN-19-03 noted that small juvenile hake tend to aggregate at depths ranging from 100 to 200 m, while sub-adults tend to disperse in both shallower and deeper waters. In this case, the protection of the 6 nm from the coast stipulated in Art 11.1 would be beneficial mainly to protect sub-adults, along with sensitive habitats (i.e. seagrass meadows and coralligenous habitats). STECF concludes that it might be preferable to protect sub-adults (age 1) more than age-0 hake in order to improve the status of the stock and reduce fishing mortality because, for recruiting fish, ~~the~~ natural mortality is higher than fishing mortality.

- STECF concludes that the expected effects of closures are better distinguished between the nurseries and the sub-adults areas. It is indeed required to fully assess whether the proposed closures could reduce fishing mortality or, conversely, lead to increases in fishing mortality on sub-adults and adults, for example due to effort reallocation effects.
- Given the changes over time in resource distribution and fishing effort allocation, STECF concludes that fishing closures should be evaluated in an integrated manner and be re-assessed periodically to adapt to such changes.

## References

Bastardie, F., Nielsen, J. R., Ulrich, C., Egekvist, J., & Degel, H. (2010). Detailed mapping of fishing effort and landings by coupling fishing logbooks with satellite-recorded vessel geo-location. *Fisheries Research*, *106*(1), 41-53.

Bartolino, V., Ottavi, A., Colloca, F., Ardizzone, G. D., and Stefansson, G. (2008). Bathymetric preferences of juvenile European hake (*Merluccius merluccius*). – ICES Journal of Marine Science, 65.

Colloca F., Garofalo G., Bitetto I., Facchini M. T., Grati F., Martiradonna A., Mastrantonio G., Nikolioudakis N., Ordinas F., Scarcella G., et al. (2015). The seascape of demersal fish nursery areas in the north mediterranean sea, a first step towards the implementation of spatial planning for trawl fisheries. PloS one 10 (3), e0119590.

Druon J.N., F. Fiorentino, M. Murenu, L. Knittweis, F. Colloca, C. Osio, B. Mérigot, G. Garofalo, A. Mannini, A. Jadaud, M. Sbrana, G. Scarcella, G. Tserpes, P. Peristeraki, R. Carlucci, J. Hikkonen. (2015). Modelling of European hake nurseries in the Mediterranean Sea: An ecological niche approach. Progress in Oceanography 130: 188-204.

Tugores M.P., F. Ordines, B. Guijarro, C. García-Ruiz, A. Esteban, E. Massutí. (2018). Essential fish hábitats and hotspots of nekto-benthic diversity and density in the western Mediterranean. Aquatic Conservation Marine and Freshwater Ecosystems, 1-11.

## 3.6 Management plan for boat seines in the Balearic Islands, Spain

### Background

The STECF assessed the Spanish management plan for boat seines in the Balearic Islands during STECF PLEN 19-03, under item 6.3 on pages 92-104. The background information provided in pages 92-93 would also apply to the present request.

Report of STECF PLEN 19-03:

https://stecf.jrc.ec.europa.eu/documents/43805/2620849/STECF-PLEN+19-03.pdf/3b331f34-5dee-48d7-b9dc-97d00b5f1f16

### Request to the STECF

The STECF is requested to review the additional documents Spain provided and assess whether these documents address the conclusions of STECF PLEN 19-03.

### Summarized conclusions of PLEN 19-03 evaluation

The main comments and conclusions of PLEN 19-03 evaluation of the management plan (MP) are summarized below:

*Effects on Posidonia*

The Jonquiller fishery targeting gobies interact with *Posidonia* beds and the information provided in the MP is not sufficient to conclude that it has no significant impact on them.

Maps of the transparent goby fishery in the Balearic Islands were created by IMEDEA-CSIC in order to display the overlap between the Jonquiller boat seine fishing grounds and the areas of *Posidonia oceanica* beds. The maps show that most hauls in the Alcudia are deployed in grid cells in which the *Posidonia oceanica* beds habitat is present. However, there is no quantitative estimation on the effect of the fishing gear on benthic habitats, especially on the size of the Posidonia area impacted by this fishing activity as requested by Article 4(5) of the Mediterranean Regulation No 1967/2006 (MEDREG). The studies referred in the MP could have been used to quantify this, as also requested in the previous STECF evaluation (PLEN 16-03).

For the Jonquiller boat seines, during the 2015/2016 sampling year of the MP, the number of rhizomes and *Posidonia oceanica* remains hoisted aboard during each haul were counted. These data are still being processed, but it has been verified that live rhizomes were found in 78% of the hauls, with an average of 11.95 rhizomes per haul (range: 0 to 66). Although the rhizomes in question were alive, the MP mentioned that they are not uprooted by the gear, but these had already been deposited on the seabed and are collected by the fishing gear. STECF 19-03 had no elements to verify the validity of this statement.

Concerning the Garretera (picarel) boat seines, observation over *Posidonia oceanica* sea meadows made by scuba diving in Mallorca during the implementation of the first MP, pointed out that the gear never snags the seagrass meadow, but rather glides smoothly over the shoots of *Posidonia oceanica*.

In conclusion, STECF 19-03 considered that the information provided was not sufficient to conclude whether boat seine fishery impacts the *Posidonia oceanica* meadows or not. It would be necessary to better understand the origin of the live rhizomes encountered in the hauls of the Jonquiller boat seines.

*Reference points*

The management thresholds (minimum daily catch quotas and maximum annual catches) set by MP for the 2016-2019 fishing period were not reached. Accordingly, their effectiveness as a tool for the management of the fishery and conservation of the resource is questionable.

*Bycatches and discards*

The MP does not provide any quantitative evidence to ensure that catches of species mentioned in Annex IX of the MEDREG are minimal.

The MP did not provide any information on discard quantities.

*Mesh size*

The MP did not provide any information on the minimum mesh size used on Gerretera gear, which is critical for the derogation on minimum mesh size for that gear type.

## Summary of the additional information provided to STECF

Two additional documents were provided by the Spanish authorities to address the comments of the PLEN 19-03 evaluation:

(a) “Report about interaction between “jonquillera” and seagrass beds of *Posidonia oceanica*”

and

(b) “Second report on the interaction between boat seines and *Posidonia oceanica* meadows”

The report (a) provides estimates of the degree of spatial overlap between the Jonquiller boat seine fishing grounds and areas covered by *Posidonia oceanica.* These data are derived from a study carried out by IMEDEA-CSIC in 2017 ("GIS analysis of the distribution of the jonquillo capture in the Balearic Islands. Interaction with seagrass beds of Posidonia"). According to the information provided (study period: 2016-2019, spatial resolution 1 $km^2$) overlapping areas of fishing activity with beds of *P. oceanica* only occur north of Mallorca, specifically in the bays of Pollença and Alcúdia. Overall, a 10% overlap (64 $km^2$) was estimated between the boat seine fishing grounds and the total area of distribution of seagrass beds in the Balearic Islands (regional level). The overlap between Posidonia beds and "jonquillera" fishing sites was 5.5% at the country level (Spanish territorial waters).

The report (a) refers to an older study ("The environmental state of the coastal water bodies of the Balearic Islands using the biological element of quality: *Posidonia oceanica*" - Government of the Balearic Islands-IMEDEA (2011)) that demonstrates a good conservation status of *Posidonia* beds in the areas where the gear has traditionally been used, implying that the effect of "jonquillera" fishery on seagrass meadows is limited.

The report (b) provides specific explanations for the absence of interaction between the "jonquillera" fishery and *Posidonia oceanica*. It includes figures of a series of echograms from a published study (Iglesias & Miquel, 1998) claiming that these figures show that the “jonquillo” grounds (transects with presence of transparent goby schools) are located on “smooth and continuous bottoms that can be attributed to sand or detritic areas”. Fishermen involved in the metier also use echo-sounders to identify the type of substrate over which the gear is deployed. The fishing activities are said to be limited to waters <30 m on sand substrates, often in proximity to seagrass beds but not over them.

The report (b) also argues that the target species (*Aphia minuta* and *Pseudaphya ferreri*) do not live in seagrass meadows but prefer sandy bottoms. It is stated that the probability of capturing non-target species above seagrass beds would be high, decreasing the quality of the catch and greatly increasing the time required to separate the target species from by-catch. Most importantly, the quantity of targeted gobies would be negligible, as the seagrass beds are not their preferred habitat. Additionally, the seine gear (“jonquillera”) is very thin and fragile and it is not designed to be used over *Posidonia* meadows.

The report (b) further argues that in the Balearic Islands, the phanerogam meadows, especially those of *Posidonia oceanica*, are the predominant habitat in coastal waters, and the patches of sand over which the schools of gobies are located, are usually surrounded by *Posidonia* meadows. Due to the proximity of fishing sites to *Posidonia* meadows, it is very common to collect leaves and rhizomes during the fishing hauls. These are remains of *Posidonia* accumulated on the sandy bottoms and do not originate from the actual fishing operations. Such remains can easily be dragged and displaced by the complex water movements in shallow waters. Natural (e.g. bad sea conditions) and other human disturbances (e.g. anchoring) can result in torn leaves and rhizomes which can subsequently be scattered into surrounding habitats.

**STECF comments**

STECF notes that the two additional documents provided by the Spanish authorities only address the comments of PLEN 19-03 concerning the effects of the Jonquiller boat seines fisheries on *Posidonia*. The other STECF comments summarized above (i.e., on reference points, bycatch and discards, and mesh size) have not been addressed.

As a general comment, STECF acknowledges the difficulty to ascertain the exact habitat of transparent goby schools and the origin of *Posidonia* rhizomes found in the hauls. The available scientific literature on this topic is scarce, and there is not much information collected at the fine spatial scale required. In its review, STECF has therefore investigated a number of other sources to evaluate the evidence and explanations provided in the two documents.

STECF further notes that, in the literature, transparent goby schools are reported to occur both on sand and seaweed areas. For example, in the review of La Mesa et al. (2005), it is reported that in the Balearic islands: “The species, locally named ‘‘jonquillo’’, is captured with a particular gear (‘‘jonquillero’’) which is a boat seine net hauled over the bottom. The schools of *A. minuta* are generally found inside the bays of the islands, on sand and seaweed areas (*Posidonia oceanica*)…".

STECF further refers to two videos are available on the internet (http://www.ba.ieo.es/es/multimedia/recursos-multimedia/904-un-video-sobre-la-pesca-del-jonquillo-aphia-minuta- and https://www.youtube.com/watch?v=K8QLVKgk-nY) showing a vessel involved in the jonquillo fishery towing its gear over *Posidonia* meadows (first video in 1':50''-1':59''), and the presence of *Posidonia* leaves mixed with the transparent goby catch inside the net (second video in 0':12''-0':14'').

STECF notes that in report (b), pictures of echograms are provided to show that the sites with the presence of transparent goby schools are located on "smooth and continuous bottoms that can be attributed to sand or detritic areas". STECF considers however that the type of bottom (sand or *Posidonia* beds) cannot be inferred by the simple visual examination of these echograms (from a 38 kHz paper echo-sounder). The discrimination of seagrass beds requires the use of more advanced acoustic devices such as side scan sonars, ground discriminating single-beam echo-sounders (e.g. RoxAnn), multi-beam echosounders (MBES), multispectral MBES etc. (Gumusay et al., 2019). Furthermore, reliable discrimination of seagrass areas requires the post processing of backscatter data and development of suitable classification algorithms, combined with ground truth data, such as *in situ* ROV observations (Gumusay et al., 2019).

The documents provided by the Spanish authorities claim that the *Posidonia* leaves and rhizomes found in the ''jonquillero'' hauls (live rhizomes were found in 78% of the hauls) may not be the result of gear deployment, but such material may have been accumulated and deposited on the sandy fishing grounds from adjacent *Posidonia* beds (e.g., *Posidonia* rhizomes may be torn and scattered by waves due to storms). STECF acknowledges indeed that *Posidonia* rhizomes have a slow decomposition rate (Pergent et al., 1994; Garcia et al., 2002) and thus, uprooted rhizomes deposited on the seabed can appear alive for a long period of time.

Finally, STECF also notes that boat anchoring has a negative effect on *Posidonia* (Francour et al., 1999). If boats involved in the fishery are occasionally anchored above *Posidonia* (to deploy and tow the gear) this might cause damage to the meadows (Francour et al., 1999). The damage caused to *Posidonia* meadows in boat anchoring simulations (Milazzo et al., 2004) ranged on average between 0 and 4.5 number of uprooted shoots/rhizomes (SE = 0.9) per boat anchoring, with the rhizomes being uprooted due to a break in the branching point of the plant.

## STECF conclusions

STECF concludes that the two additional documents provided by the Spanish authorities only addressed the comments of PLEN 19-03 concerning the effects of the Jonquiller boat seines fisheries on *Posidonia*. Other previous comments have not been addressed.

STECF concludes that the estimated overlap between areas with *P. oceanica* coverage and "jonquillera" fishing grounds is lower than the upper limit permitted by article 4.5 of MEDREG, both at regional (33%) and country-level (10%). Using a GIS analysis with resolution of 1 $Km^2$, the spatial overlap between fishing grounds and seagrass beds was estimated 10% and 5.5%, at regional (Balearic islands) and national (Spanish waters) level, respectively.

STECF concludes that the explanations provided to demonstrate that the transparent goby fishery is taking place entirely on sandy bottoms, thus not affecting the *Posidonia* meadows, is not completely supported by the evidence provided.

More precise information, for example using multi-beam sonar in conjunction with ground truth sea bed sampling (e.g. from cameras fixed on the gear, diving survey etc.) are needed to truly assess the potential effects on *Posidonia* and to better understand the origin of leaves and rhizomes collected by the transparent goby fishery.

## References


Francour, P., Ganteaume, A., Poulain, M. (1999). Effects of boat anchoring in *Posidonia oceanica* seagrass beds in the Port-Cros National Park (north-western Mediterranean Sea). Aquatic Conservation: Marine and Freshwater Ecosystems 9: 391–400.

Gacia, E., Duarte, C.M., Middelburg, J.J. (2002). Carbon and nutrient deposition in a Mediterranean seagrass (Posidonia oceanica) meadow. Limnology and Oceanography 47: 23-32.

Gumusay, M.U., Bakirman, T., Kizilkaya, I.T., Aykut, N.O. (2019). A review of seagrass detection, mapping and monitoring applications using acoustic systems, European Journal of Remote Sensing, 52(1): 1-29.

Iglesias, M., Miquel, J. (1998). Assessment of the *Aphia minuta* stock (Pisces: Gobiidae) by acoustic methods from the Bay of Alcudia (Mallorca, Western Mediterranean). Scientia Marina, 62 (1-2): 19-25.

La Mesa, M. Arneri, E., Caputo, V., Iglesias, M. (2005). The Transparent Goby, *Aphia minuta*. Review of biology and fisheries of a paedomorphic European fish. Reviews in Fish Biology and Fisheries 15: 89–109.

Milazzo, M., Badalamenti, F., Ceccherelli, G., Chemello, R. (2004). Boat anchoring on *Posidonia oceanica* beds in a marine protected area (Italy, western Mediterranean): effect of anchor types in different anchoring stages. Journal of Experimental Marine Biology and Ecology 299: 51– 62.

Pergent, G., Romero, J., Pergent-Martini, C., Mateo, M.-A., Boudouresque, C.-F. (1994). Primary production, stocks and fluxes in the Mediterranean seagrass *Posidonia oceanica*.

# 4. OTHER ACTIONS IN CONTEXT OF THE WRITTEN PROCEDURE COMMISSION

## 4.1. CFP MONITORING

**Background provided by the Commission**

Article 50 of the Common Fisheries Policy (CFP; Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013) stipulates: "The Commission shall report annually to the European Parliament and to the Council on the progress on achieving maximum sustainable yield and on the situation of fish stocks, as early as possible following the adoption of the yearly Council Regulation fixing the fishing opportunities available in Union waters and, in certain non-Union waters, to Union vessels."

**Request to the STECF**

The annually recurring report of the progress on achieving MSY and related observations is prepared by the JRC scientists. There is no specific legal need for STECF conclusions. In this situation, the Chair, in the overall conclusive report on the written procedure, could acknowledge receipt and confirm that the report is structured and elaborated in the same way as in earlier years.).

**STECF observations**

STECF has not reviewed and commented this ad-hoc study in plenary. However, the Chair of the STECF acknowledges receipt of it and confirms that the report is structured and elaborated in the same way as in 2019 (STECF, 2019a).

Nonetheless, STECF has updated the summary figures described and explained in the 2019 report, providing an overview of what is currently known regarding the achievement of the MSY objectives, drawing together the results from the different sea areas to provide a comparative picture. "Northeast Atlantic" refers to all stocks inside EU waters in the FAO Area 27, and "Mediterranean & Black Seas" refers to all stocks inside EU waters in the FAO Area 37. The comments and explanations detailed in the 2019 report still stand.

**Stock status in the NE Atlantic**

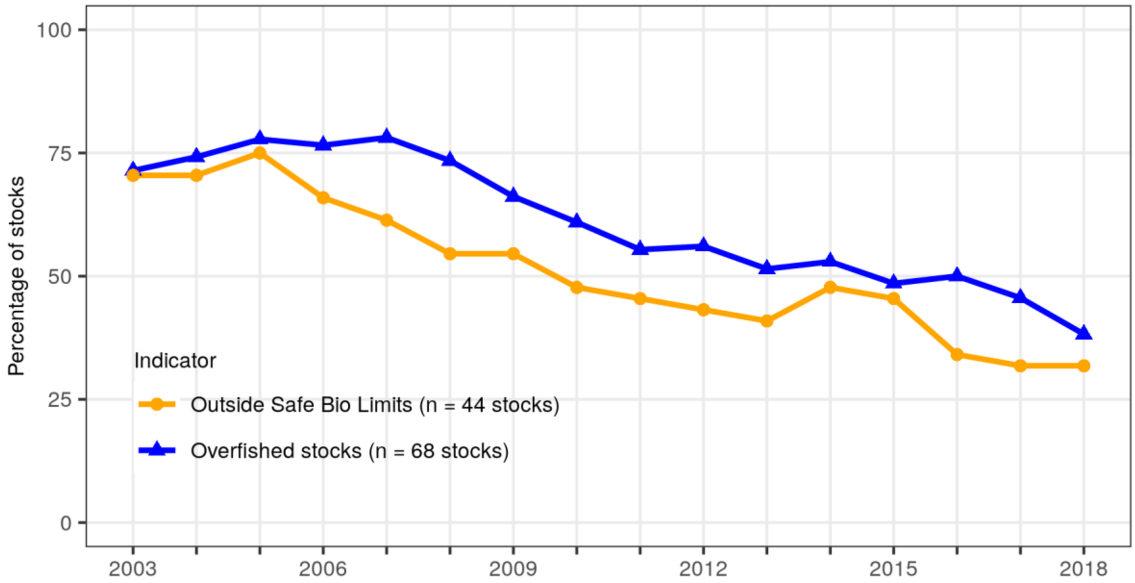


**Figure 4.1.1** Trends in stock status in the Northeast Atlantic 2003-2018. Two indicators are presented: blue line: the proportion of overexploited stocks ($F>F_{MSY}$) within the sampling frame (62 to 68 stocks fully assessed, depending on year) and orange line: the proportion of stocks outside safe biological limits ($F>F_{pa}$ or $B<B_{pa}$) (out of a total of 44 stocks).

**Table 4.1.1** Number of stocks overfished ($F>F_{MSY}$), or not overfished ($F\leq F_{MSY}$), and inside ($F\leq F_{pa}$ and $B\geq B_{pa}$) and outside ($F>F_{pa}$ or $B<B_{pa}$) safe biological limits (SBL) in 2018 in the NE Atlantic.

| | **Below $F_{MSY}$** | **Above $F_{MSY}$** |
|---|---|---|
| **Inside SBL** | 20 | 11 |
| **Outside SBL** | 2 | 12 |
| **Unknown** | 20 | 3 |

**Trends in the fishing pressure (Ratio of F/F$_{MSY}$)**

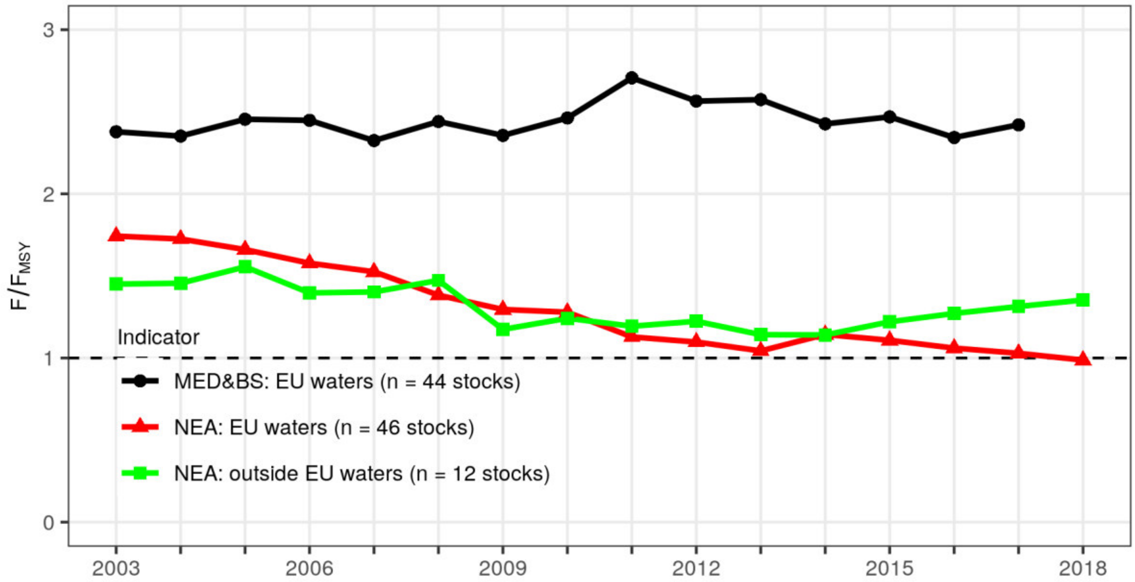


**Figure 4.1.2.** Trends in fishing pressure 2003-2018. Three model based indicators F/FMSY are presented (all referring to the median value of the model): one for 46 EU stocks with appropriate information in the NE Atlantic (red line); one for an additional set of 12 stocks also located in the NE Atlantic but outside EU waters (green line), and one for the 44 assessed stocks from the Mediterranean & Black Seas (black line).

**Trends in Biomass**

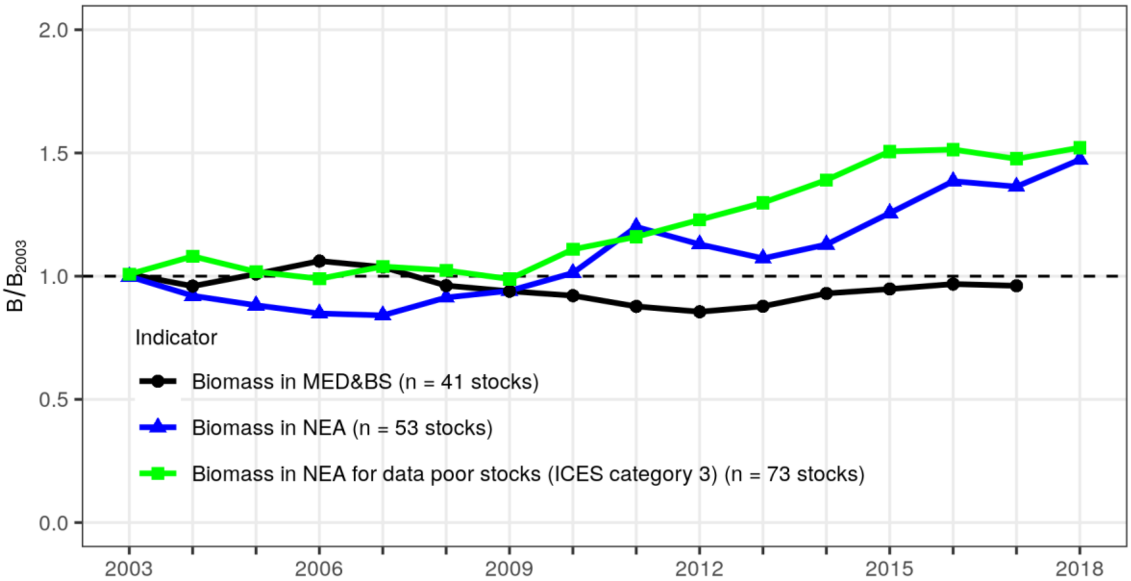


**Figure 4.1.3**. Trends in the indicators of stock biomass (median values of the model-based estimates relative to 2003). Three indicators are presented: one for the NE Atlantic (53 stocks considered, blue line); one for the Mediterranean & Black Seas (41 stocks, black line); and one for data limited stocks (ICES category 3, 73 stocks, green line).

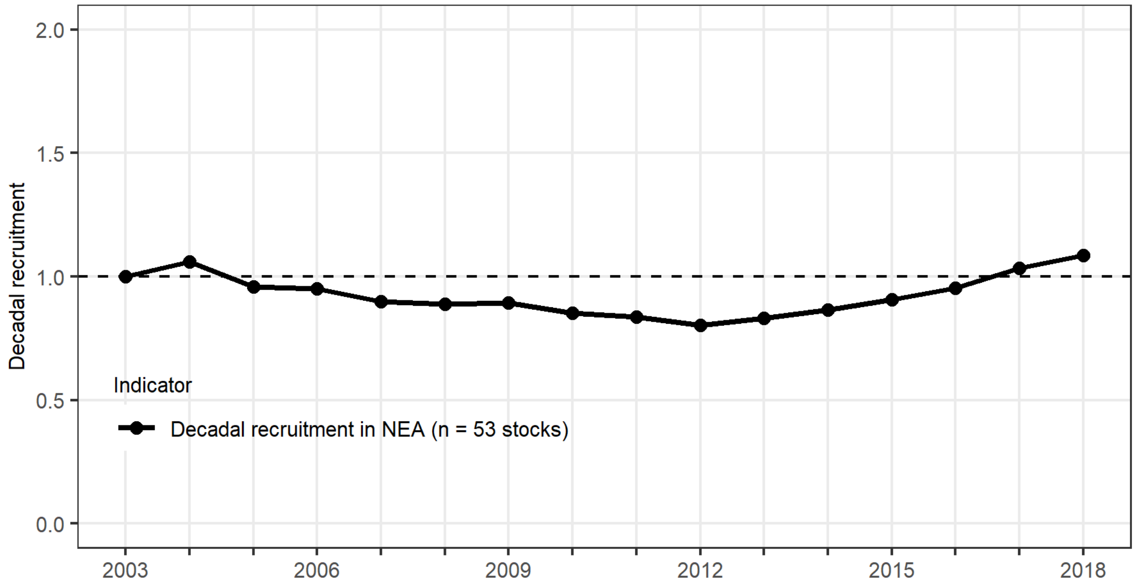


**Figure 4.1.4**. Trend in decadal recruitment scaled to 2003 in the Northeast Atlantic area (based on 53 stocks).

**Coverage of biological stocks by the CFP monitoring**

**Table 4.1.2.**. Numbers of stocks assessed by ICES for different stock categories in different areas. Note that not all of these stocks are managed by TACs, and as such, numbers are higher than those used in the CFP monitoring analysis.

| | ICES Stock Category | | | | | | Total |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | |
| Arctic Ocean | 13 | 0 | 9 | 0 | 3 | 8 | 33 |
| Azores | 0 | 0 | 2 | 0 | 1 | 1 | 4 |
| Baltic Sea | 8 | 0 | 9 | 1 | 0 | 0 | 18 |
| BoBiscay & Iberia | 13 | 0 | 20 | 0 | 8 | 4 | 45 |
| Celtic Seas | 25 | 0 | 21 | 1 | 13 | 11 | 71 |
| Faroes | 3 | 0 | 1 | 0 | 0 | 0 | 4 |
| Greater North Sea | 23 | 0 | 15 | 5 | 5 | 2 | 50 |
| Greenland Sea | 5 | 0 | 3 | 0 | 0 | 1 | 9 |
| Iceland Sea | 1 | 0 | 0 | 0 | 1 | 0 | 2 |
| NE Atlantic widely distributed stocks | 7 | 1 | 7 | 0 | 1 | 0 | 16 |
| | | | | | | | |
| Total | 98 | 1 | 87 | 7 | 32 | 27 | 252 |

## 4.2 Monitoring of the Landing Obligation

### Background provided by the Commission

DG MARE would like to be able to make reference to the work done by ad-hoc experts. A possible approach is that the Chair acknowledges receipt of the report in the conclusive written procedure report, and that it may be reviewed for conclusion during a future Plenary.

### STECF observations and response

The STECF Chair acknowledges receipt of the adhoc report report.

The contract report has not been fully reviewed and commented by the STECF plenum, but based on a provisional review by committee members, the STECF observes that in the ad hoc report the terms "Remote Electronic Monitoring" (REM) and CCTV are linked together. However, STECF points out that in fact the REM systems tested have not always incorporated CCTV. There are also instances of CCTV being used as a standalone tool not linked to a REM system. STECF stresses it is important to differentiate and properly define what is meant when referring to REM systems as there are differences between the systems being tested, noting that this is not always clear in the reports provided by the Member States.

## 5. CONTACT DETAILS OF STECF MEMBERS AND OTHER PARTICIPANTS

1 - Information on STECF members and invited experts' affiliations is displayed for information only. In any case, Members of the STECF, invited experts, and JRC experts shall act independently. In the context of the STECF work, the committee members and other experts do not represent the institutions/bodies they are affiliated to in their daily jobs. STECF members and experts also declare at each meeting of the STECF and of its Expert Working Groups any specific interest which might be considered prejudicial to their independence in relation to specific items on the agenda. These declarations are displayed on the public meeting's website if experts explicitly authorized the JRC to do so in accordance with EU legislation on the protection of personnel data. For more information: http://stecf.jrc.ec.europa.eu/adm-declarations

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## STECF

The Scientific, Technical and Economic Committee for Fisheries (STECF) has been established by the European Commission. The STECF is being consulted at regular intervals on matters pertaining to the conservation and management of living aquatic resources, including biological, economic, environmental, social and technical considerations.

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