Marine Management Organisation

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Cover photograph courtesy of David Stevens.

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# Contents



# Figures



# Tables

## Executive summary

ICES area VIIb-k haddock has high discard levels and has suffered erratic recruitment in recent years. The scientific advice is for reduced fishing mortality and improved selectivity.

This report looks at landings by size grade into English ports in the south west, which is considered to be indicative of a high level of discarding through quota restriction. It also provides the results of a series of innovative selectivity trials of different trawls designs.

The participants have trialled trawl configurations that dramatically reduce overall haddock catches across all size ranges. They have also taken other avoidance measures which include refitting the vessel when haddock is most abundant and reducing fishing effort during hours of darkness when catches tend to be at their highest levels.

By reducing the cover of the top sheet of the trawl, total haddock catches were reduced by 37%. Total juvenile (those below the minimum landing size of 30cm for the purpose of this report) haddock catches were reduced by up to 90% by inserting a 100mm square mesh panel in the codend coupled with a square mesh panel that conforms to Celtic Sea technical measures further forward in the trawl.

The results suggest that the modifications to the trawl are able to reduce overall fishing mortality of juvenile and mature haddock whilst maintaining a profitable catch of other quota species although further evidence is required to fully assess the commercial impact of such measures.

The vessel is fitted with remote electronic monitoring with CCTV (REM) equipment as a prerequisite of the current catch quota trials. The configuration of the cameras have not been best suited to corroborating the results of the selectivity trials although a further trip has been subsequently carried out with observers on board; the results of this trip is being published by the Centre for Environment, Fisheries and Aquaculture Science (Cefas).

The selectivity trials provide an excellent example of fishing industry initiative, which builds on recent collaboration with fisheries managers and scientists. In order to achieve cost effective means of corroborating the results of such trials it is considered that the remote electronic monitoring system can be configured corroborate self-reported data and to augment data gathered by scientific observers.

## Acknowledgements

The Marine Management Organisation (MMO) is grateful to David and Alec Stevens for their dedication and innovation in carrying out these trials and the provision of the selectivity data.

# Introduction

ICES area VII b-k (Celtic Sea) haddock forms a significant by-catch in mixed demersal trawl fisheries in the South West Approaches. Erratic recruitment to this stock coupled with high fishing mortality has resulted in scientific advice for reduced total allowable catches and improved selectivity to preserve new recruitment cohorts in order to bring fishing mortality within maximum sustainable yield (ICES 2014).

English trawlers have engaged in scientific trials over recent years to improve the selectivity of trawls in relation to gadoid species such as haddock and recent mandatory technical measures have been introduced in part of the stock area (Commission Implementing Regulation (EU) No 737/2012). However, it is considered that further technical measures are necessary to align catches with available quota in the context of the demersal landing obligation.

Article 15 of Council Regulation (EU) No 1380/2013 prohibits the discarding of demersal quota species in a phased approach from 2016 to 2019. At the point when haddock becomes subject to the landing obligation all catches will have to be landed and counted against quota (subject to any flexibilities and exemptions prescribed in discard plans). No longer would fishermen be able to discard to remain within quota limits and continue fishing.

This report analyses the landings by size grade of haddock into ports in the South West of England and compares the data to one vessel participating in catch quota trials under which all catches of haddock must be retained and landed. This data provides a degree of insight into the level of high grading and discarding that is typical of the fleet as a whole.

Gear trials have also been carried out by the participant vessel both on a voluntary basis and as part of the Fisheries Science Partnership between industry and Cefas. The results of the voluntary gear trials have been provided to the MMO and are summarised in this report. The purpose of the gear trials is to explore measures to protect recent recruitment to the stock as well as to reduce total haddock catches whilst maintaining profitable landings in the context of a landing obligation.

The results in this report relate to catches from the western part of ICES area VIIe. In this area the technical measures require 100mm codends for catches exceeding 30% haddock and other whitefish. ICES VIIe is outside the scope of Commission Implementing Regulation (EU) No 737/2012 which requires square mesh panels to be inserted into otter trawls within 9m of the codline; the mesh size of the panel is dependent on the vessel engine power and codend mesh size and must be fitted in accordance with Council Regulation 850/98.

The data provided in this report is partly corroborated through electronic monitoring and CCTV, which is fitted to the vessel as a prerequisite for its simultaneous participation in the MMO catch quota trial. The results of the catch quota trials will be reported separately.

## Analysis of haddock landings by grade

Landed weights of VIIb-k haddock by size grade were taken from the electronic reporting system (ERS). For the purpose of the analysis landings into Plymouth, Brixham, Newlyn and Torquay by otter trawl vessels were used. Benchmark data from the catch quota participant vessel was used to compare to other vessels on the basis that there were no discards of haddock by this vessel.

The ERS landings data uses the European grade structure for fish size. However on some UK markets these grades are split into further grades. This data has been adjusted to fit the ERS requirements. For example in Plymouth the two larger grades used locally are merged together to form the grade 1 haddock on the ERS system (Table 1). This report uses the official European grades converted back into local market grades.

**Table 1: Table showing the grades used on local markets and how they map into the ERS system grade structure**

| Market grades | ERS Equivalent Grades | Weight at grade |
|---|---|---|
| 1 | 1 | >2kg |
| 2 | 1 | 1-2kg |
| 3 | 2 | 0.57-1kg |
| 4 | 3 | 0.3-0.57kg |
| 5 | 4 | 0.17-0.3kg |

Landings by grade for non-catch quota (CQ) vessels and the CQ vessel were examined to determine what percentages of their landings were at the different grades. Table 2 shows the landings for the CQ vessel, a comparative non-CQ vessel and the Cornish Fish Producers' Organisation (CFPO) vessels, split by grade using the percentage contributions at grade.

The comparative non-CQ vessel was selected on the basis that it has a similar fishing pattern (see Figures 1 and 2) to the CQ vessel and because it was also one of the other highest individual catchers of haddock (VIIb-k) in 2013. This vessel is not a member of the CFPO.

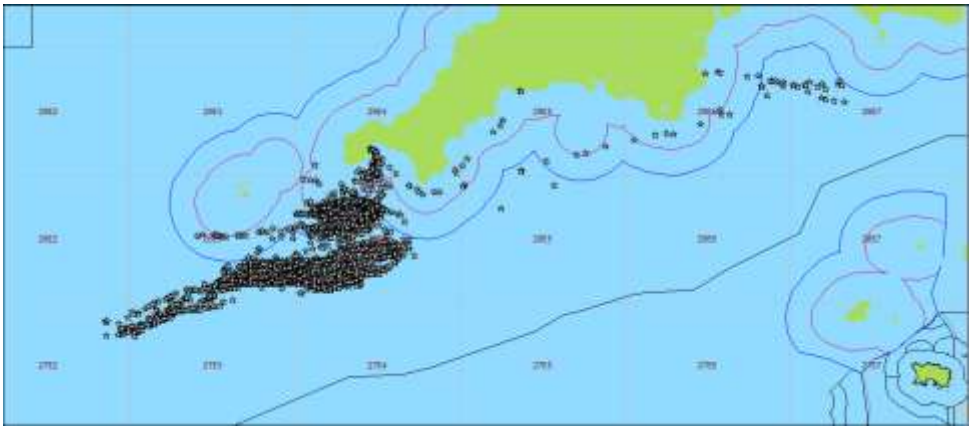


**Figure 1 The VMS plot for the CQ vessel in 2013.**

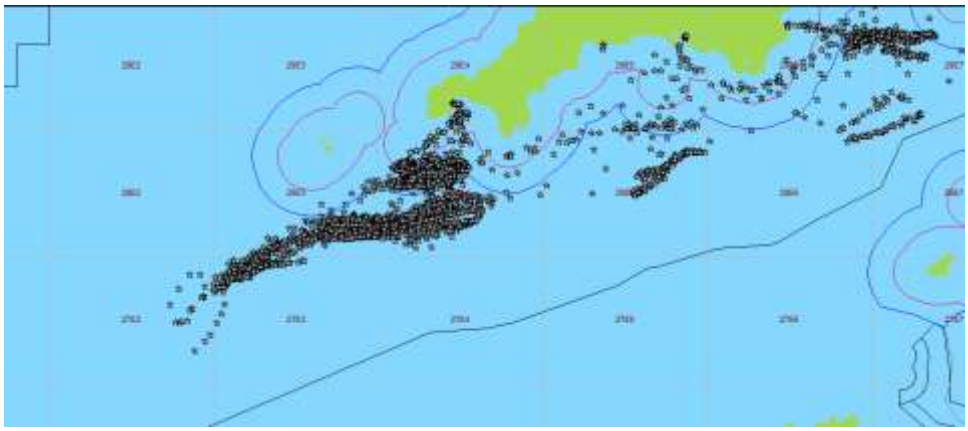


**Figure 2 The VMS plot for the non-CQ comparison vessel in 2013.**

**Table 2: The calculated percentage split across the different size grades for Celtic Sea haddock (VIIb-k).**

Also shown are the weights landed by the CQ vessel, a similar non-CQ vessel and the CFPO (excluding the CQ vessel).

| Market Grade | % by Grade CFPO non-CQ Vessels | % by Grade non-CQ Comparison Vessel | % by Grade CQ Vessel | CFPO Landed Weights (excluding CQ vessel) | Comparison Vessel Landed Weights | CQ Vessel Landed Weight |
|---|---|---|---|---|---|---|
| 1/2 | 32.5 | 21 | 12 | 162,963 | 19,260 | 26,493 |
| 3 | 55 | 61 | 56 | 275,784 | 55,946 | 123,633 |
| 4 | 12 | 18 | 30 | 60,171 | 16,509 | 66,232 |
| 5 | 0.5 | 0 | 2 | 2,507 | 0 | 4,415 |
| **Total** | | | | **501,426** | **91,715** | **220,774** |

Overall, the CQ vessel landed more than twice as much haddock as the non-CQ comparison vessel with approximately 221 tonnes compared to 92 tonnes. This 221 tonnes was also equivalent to 44% of the CFPO's total landed weight of 501 tonnes of haddock.

When these total landed weights are split between the grades there is a difference between how these total landings are made up. For example, the CQ vessel landed 4.4 tonnes of grade 5 and 66.2 tonnes of grade 4 haddock, whereas the whole of the rest of CFPO only landed 2.5 tonnes of grade 5 and 60.2 tonnes of grade 4 haddock, despite having a total landing more than twice the size of the CQ vessel. Grade 3 haddock are very similar across the 3 different vessel groups with about 55-61% of the landings being made up of this grade. However there is a large difference in the percentage contribution made by grade 1/2 haddock to the total landings, with CFPO non-CQ vessels having 32.5%, the non-CQ comparison vessel having 21% and the CQ vessel having only 12% grade 1/2 haddock.

Both individual vessels examined fished in similar areas in 2013. The CQ vessel landed more than twice as much haddock overall than the non-CQ vessel, yet the non-CQ vessel landed catch was 82% grades 1-3, whilst the CQ vessel's catch was 68% grades 1-3. The CFPO non-CQ vessels had 87.5% of their catch as grades 1-3.

Table 2 shows that the main differences between the landings of these vessels is that those which are not on the CQ scheme land a higher percentage of grades 1-2 and considerably less grade 4/5 haddock.

## Selectivity Trials

The data summarised below has been provided by the skippers of the trial vessel who have sought to reduce overall haddock catches as well as ensure catches of juveniles (those below the minimum landing size) are minimised.

The standard twin-rig otter trawl has diamond codend mesh size of 100mm joined to a diamond 100mm extension piece which merges to a 16 foot cover with 200mm diamond mesh. The main purpose of the large meshes in the headline cover is to eliminate small whitefish, which have a tendency to swim upwards to escape. It is thought that the selectivity through the cover is effective for smaller grades of adult fish but less so for juvenile fish. The trawl configurations used in 5 trials are set out schematically in Figure 3.

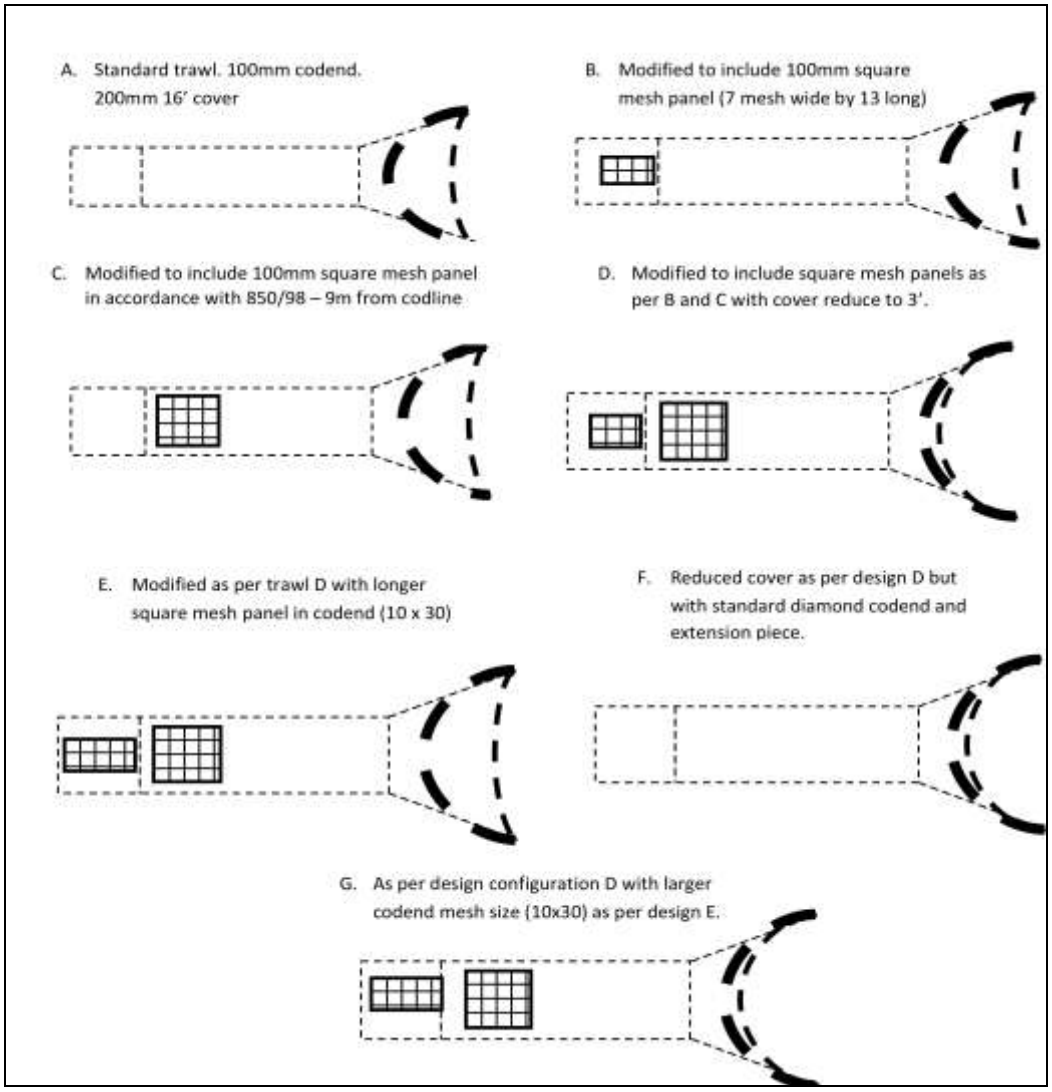



**Figure 3 Schematic of gear configurations**

The different net configurations were trialled as set out in Table 3.

### Table 3: Gear configurations trialled across 12 trips

| | e-log trip serial number | Gear comparison |
|---|---|---|
| Trial 1 | B1065420140161<br>B1065420140162<br>B1065420140163<br>B1065420140164<br>B1065420140165<br>(hauls 1-3) | Port side codend 100mm diamond mesh. TYPE A<br><br>Starboard side codend 100mm diamond with 100mm square meshes (7x15 meshes) in codend top sheet. TYPE B |
| Trial 2 | B1065420140165<br>(hauls 4 onwards)<br>B1065420140166<br>B1065420140167 | Port side codend 100mm diamond with 3.1m x 1.1m 100mm square mesh panel 9m from the codline. TYPE C<br><br>Starboard side codend 100mm diamond with 100mm square meshes (7x15 meshes) in codend top sheet. TYPE B |
| Trial 3 | B1065420140168 | Starboard side – reduced cover (3') trawl with square mesh panels in codend and further SMP 9m from codline (as per 737/2012). TYPE D<br><br>Port side – original net with diamond mesh and 200mm 10' cover. TYPE A |
| Trial 4 | B1065420140169<br>B1065420140170 | Port side codend 100mm diamond mesh. TYPE A<br><br>Starboard side codend 100mm diamond with 100mm square meshes (10 x30 meshes) in codend top sheet and further SMP 9m from codline. TYPE E |
| Trial 5 | B1065420140171<br>B1065420140172 | Starboard side – reduced cover (3') trawl with square mesh panels in codend (10x30) and further SMP 9m from codline (as per 737/2012). TYPE G<br><br>Port side reduced cover (3') trawl with standard diamond meshes. TYPE F |

**Figure 4 square mesh panel (7x15 meshes) inserted in codend**

**Figure 5 Codend square mesh panel (10x30 meshes)**

In each of the comparison trials the crew processed the catch from each codend separately and weighed the catch components on motion compensated scales. The different weights of undersize haddock caught from each codend were recorded on paper log sheets that were submitted to MMO.

Records were maintained throughout each fishing trip to take account of any diurnal influence on catches and selectivity although this effect is not analysed in this report.

## Results from trial 1

Figure 6 shows the catches by weight of juvenile haddock from an unmodified diamond mesh codend compared with that from a modified codend with a square mesh panel inserted into the top sheet. The results show a consistent reduction in retained juvenile haddock catch with the modified gear.

Across all 61 hauls in this comparison trial there was a total of 358kg (average 6kg per haul) of juvenile haddock caught with the modified gear compared to 1451kg (average 24kg per haul) caught by the modified gear which gives a reduction of juvenile haddock catch in the modified gear of 75%.

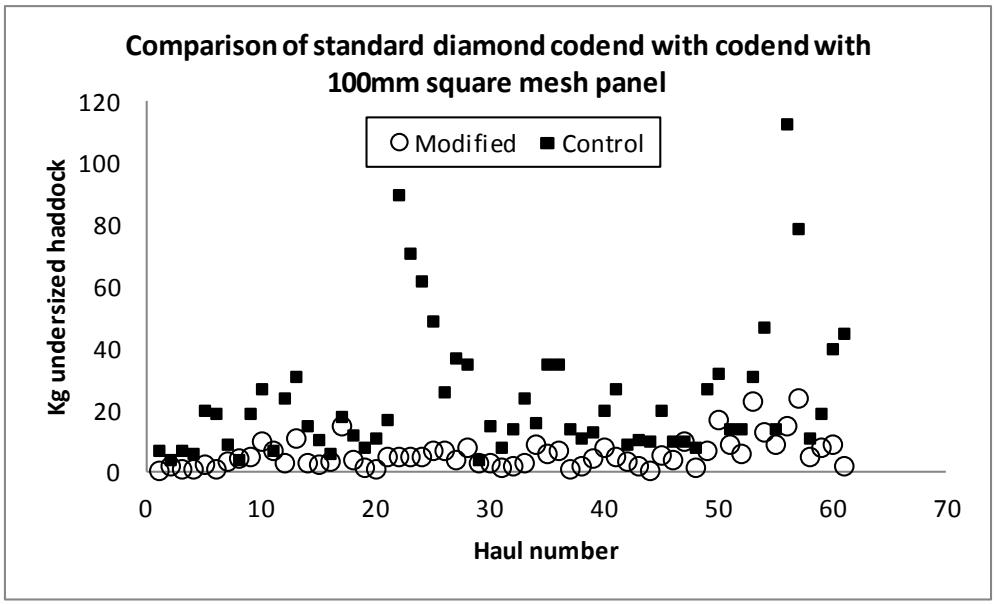



**Figure 6 Comparison of standard diamond mesh codend with a codend fitted with 100mm square mesh panel**

## Results from trial 2

Figure 7 shows the catches by weight of juvenile haddock from a diamond mesh codend and square mesh panel in the extension piece compared with that from a modified codend with a square mesh panel inserted into the top sheet. The results show a consistent increase in selectivity by the codend square mesh panel in comparison to the square mesh panel sited 9m from the codline.

Across all 47 hauls in this comparison trial there was a total of 451kg (average 10kg per haul) of juvenile haddock caught with the square mesh panel mounted in the codend compared to 1044kg (average 22kg per haul) in the gear with the square mesh panel sited 9m from the codline.

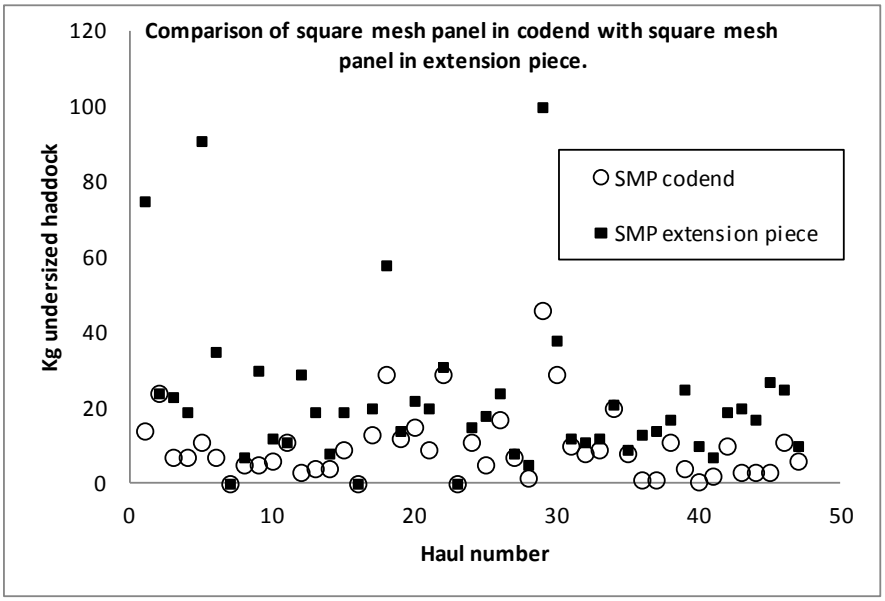



**Figure 7 Comparison of square mesh panel in the codend with square mesh panel in the extension piece**

The average catch rate in the unmodified gear in trial 1 was 24kg compared to 22kg using the square mesh panel sited in the extension piece in trials 2 with a very similar distribution range. The results do not show a comparison between a standard net and one with a square mesh panel in the extension piece although the indirect comparison across trials 1 and 2 suggest this configuration is not effective at selecting out juvenile haddock.

Trials 1 and 2 shows consistently high selectivity where the square mesh panel is sited in the codend with an average catch rate per haul of 6kg in trial 1 and 10kg in trial 2.

## Results from trial 3

Trial 3 used an unmodified net compared to a trawl with the headline cover reduced to 3 feet ahead of the footrope together with square mesh panels in the codend and 9m from the codline.

Figure 8 shows the comparison in relation to catch of juvenile haddock. The unmodified gear shows a similar range of catches of juveniles to that in trial 1with an average catch rate of 20kg (24kg in trial 1).

The coverless trawl gave a catch rate of 4kg per haul which is lower than the modified gear in trials 1 and 2 which may suggest selectivity is improved again by the reduced cover which selection of small haddock occurring from the cover and the square mesh panels.

The overall reduction of catch of juvenile haddock in the modified gear in trial 3 was 82%.

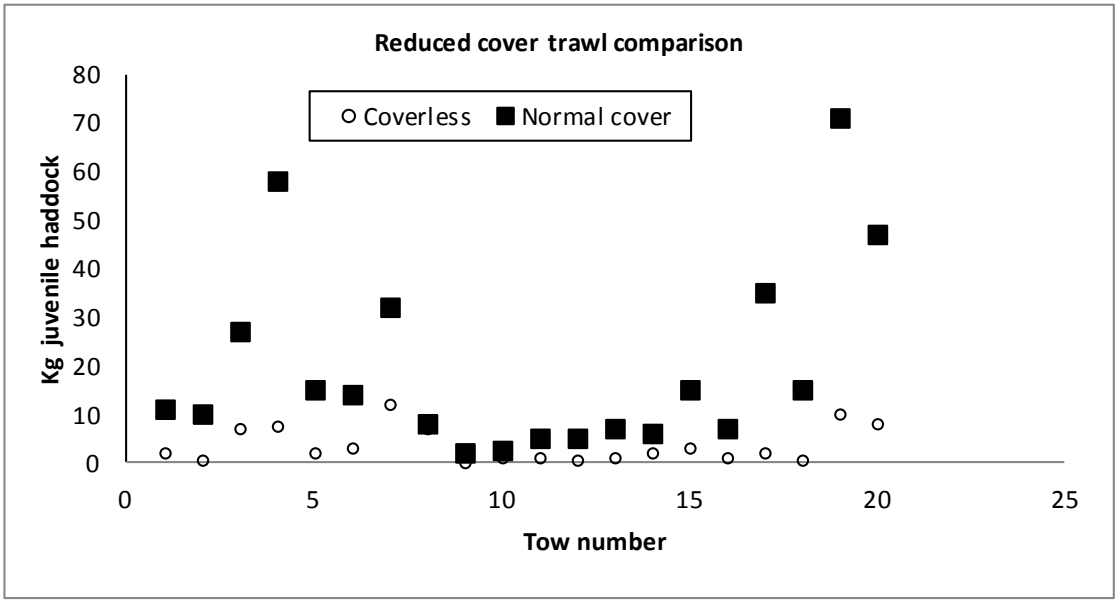



**Figure 8 Comparison with reduced cover trawl with standard cover trawl**

Figure 9 shows the data from trial 3 incorporating 20 hauls over 5 days comparing the coverless trawl with square mesh panels to the full cover trawl shows a marked reduction of total whitefish catch and a negligible reduction in the catch of john dory. Total catch of haddock was reduced by 37%, whiting by 30%, hake by 58%. The John Dory catch was higher overall in the coverless trawl by 7% and is indicative that the gear modification does not impact on the selectivity for this species which is a high value component of the catch.

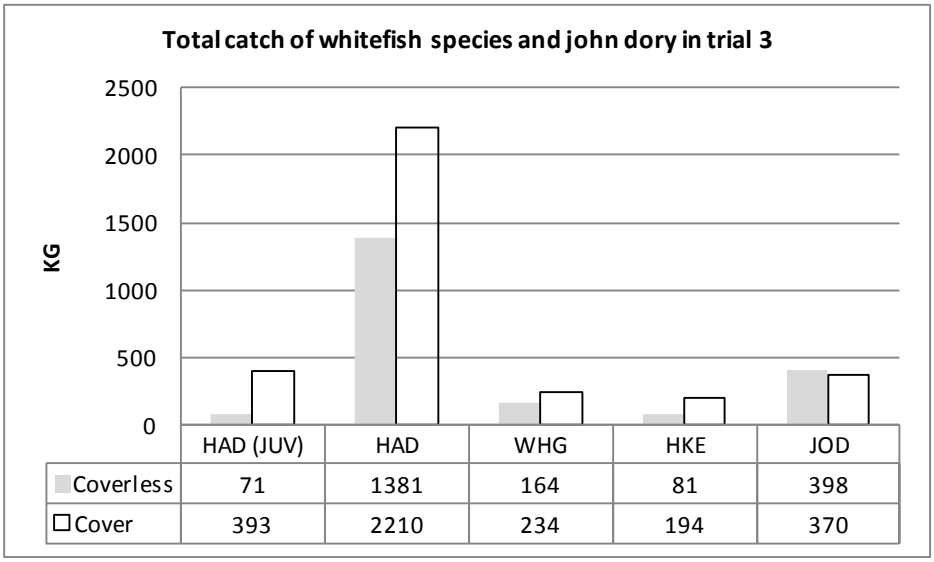
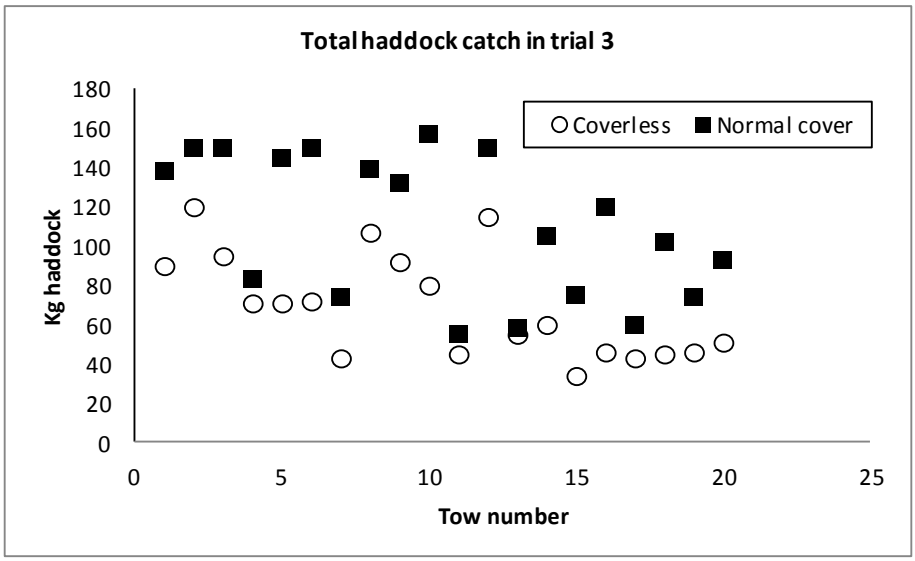
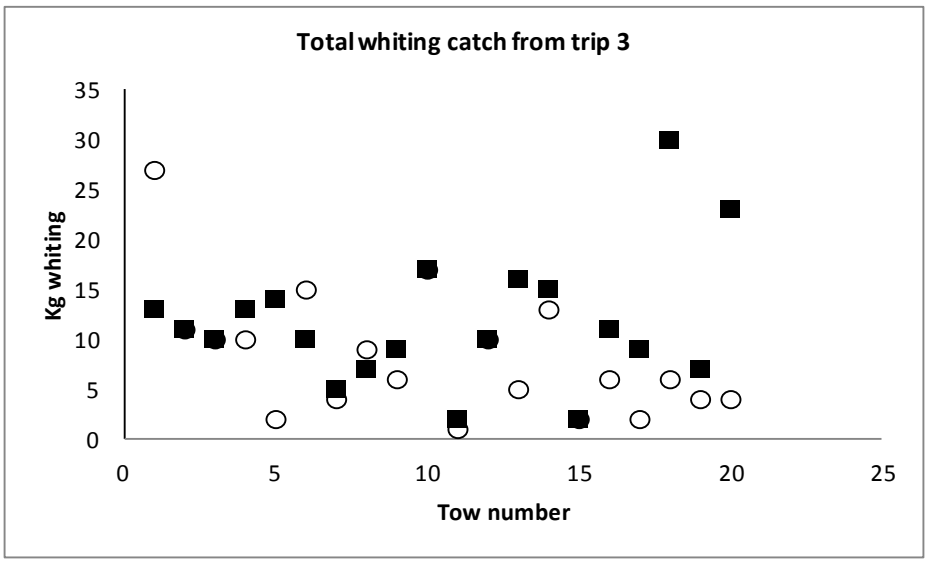
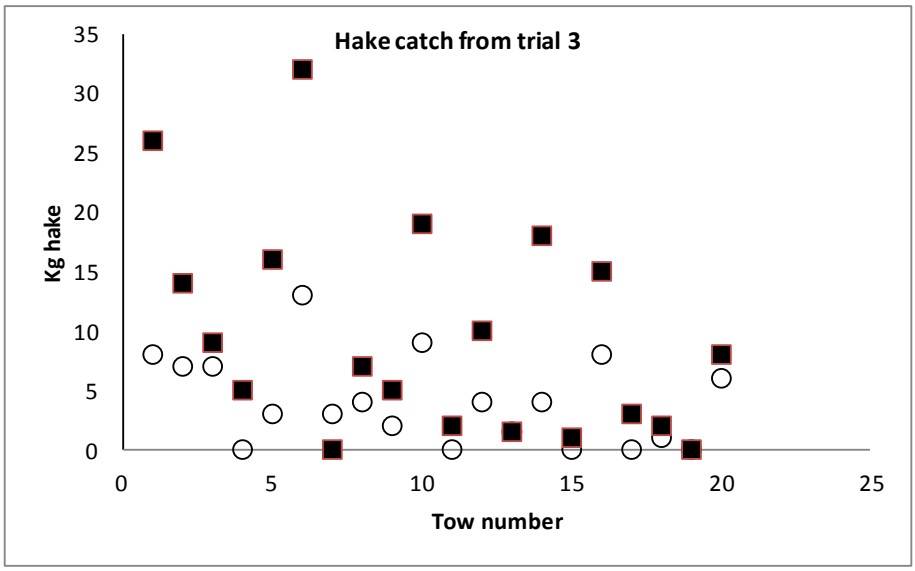



**Figure 9 Comparison of total catches of key species in trial 3**

Figure 10 shows the results of total catches at individual haul level for haddock, whiting, hake and John Dory. The catches of haddock and hake are consistently lower in the modified gear across all hauls. Catches of whiting suggest a similar pattern although with less difference on some hauls while the catch of John Dory does not appear to be impacted by the gear modification.





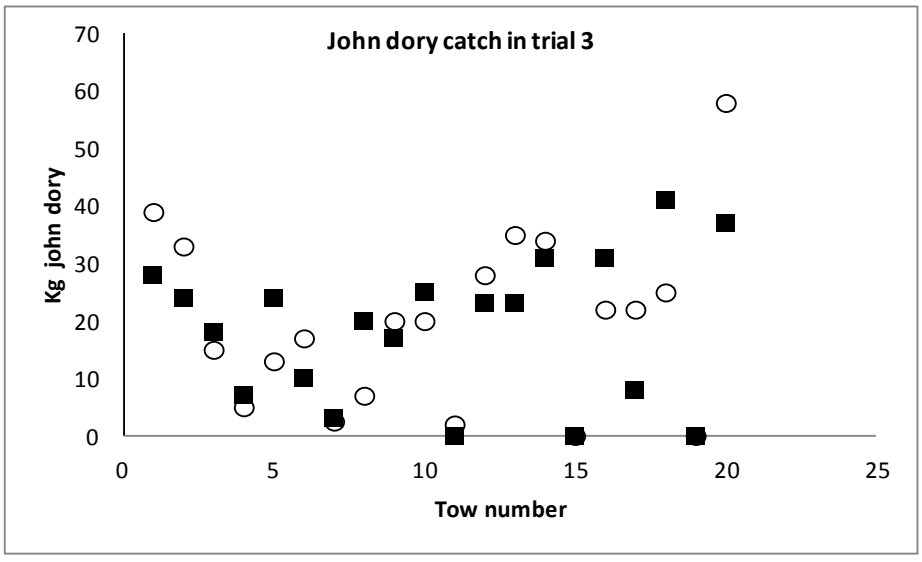




**Figure 10 Comparison of catches at individual haul level in trial 3**

## Results from trial 4

Figure 11 shows the results of a comparison of a standard net with one fitted with a larger square mesh panel in the codend coupled with a square mesh panel 9m from the codline. Over a total of 38 hauls the average catch of juvenile haddock in the modified trawl was 9kg compared to 59kg in the standard trawl giving an overall reduction of 85%.In comparison to trial 2 this gives a further 10% increase in selectivity over the design with a smaller 100mm square mesh panel in the codend with no panel higher in the trawl.

In trial 4 the average catch rate of juvenile haddock in the standard gear (59kg per haul) was considerably higher than in trials 1 (24 kg) and 3 (20kg) where a standard trawl was also used. This suggests that there was a higher abundance of small haddock on the grounds during trial 4.

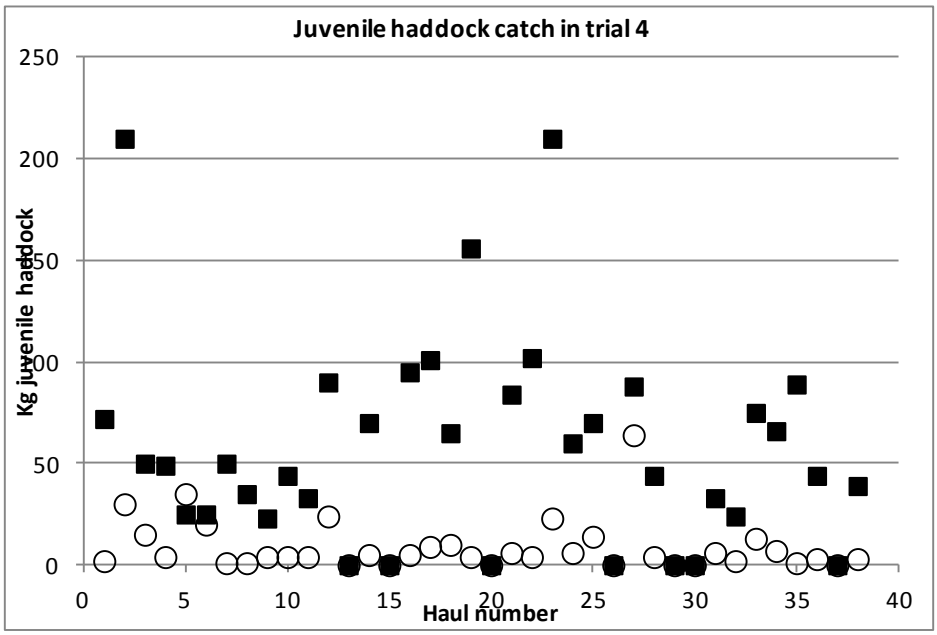



**Figure 11 Comparison of juvenile haddock catch in a standard trawl (black squares) with one fitted with square mesh panels in the codend and extension piece**

## Results from trial 5

Results from trial 3 demonstrate a large reduction in total haddock catch in a modified trawl in which the headline cover is reduced further back towards the footrope. This modification including two square mesh panels also shows a large reduction in juvenile haddock catch. In order to determine the point at which juvenile haddock escapes the trawl a further trial was carried out with two reduced cover trawls, with and without square mesh panels.

The results are shown in Figure 12; in total the reduced cover trawl with square mesh panels retained 157kg of juvenile haddock compared with 1609kg in the trawl without square mesh panels. The square mesh panels therefore account for a 90% reduction in the retention of juveniles. Results from trials 1 and 2 would suggest that

the selectivity for juvenile haddock is achieved mainly by the square mesh panel sited in the codend.

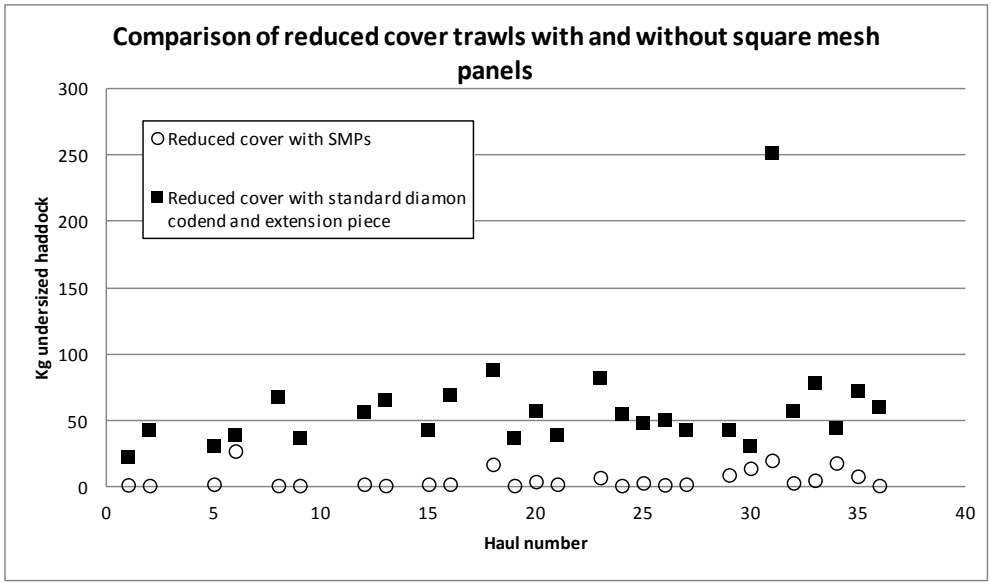



**Figure 12 Comparison of reduced cover trawls, one fitted with square mesh panels in the codend and extension piece**

## Impact of the modified gear on other target species

The results do not provide for an economic assessment of the viability of the modified gears other than the evidence that catches of John Dory are not impacted. The vessel owner has reported that there may be little impact on catches of angler and megrim or possibly a slight improvement in catches. The trial has not coincided with significant squid catches and further evidence would be required to assess the impact for this species.

An alternative low headline trawl could reduce catches of whitefish species even further although this design is likely to reduce catches of a range of target species including John Dory.

## Corroboration using REM

The selectivity results are those reported by the Master during the trips and all trips are subject to REM CCTV and sensor data recording, which is currently archived. Catches from each codend were separated in the hopper to allow comparisons on catch to be made (Figure 13). The skipper obtained his estimate by weighing the catch at sea on motion compensated scales, whilst the analyst obtained theirs by viewing the volume of catch in a basket and assigning an estimated weight to this volume (see example CCTV camera views in Figure 14).

**Figure 13 Catch from port and starboard codends separated in the hopper (photo courtesy of David Stevens)**

The CCTV footage from small number of hauls from were analysed including two trips in which trial results are not covered in this report. The analysis is limited to estimating the catch of juvenile haddock from modified gear. The results of the comparison between the skipper reported weights and the analyst observed weights is shown in Table 4. It can be seen that on all hauls sampled the amount of undersize haddock caught was low, generally less than 7kg, with the exception of Haul 15 on trip B1065420140164, where 23kg were reported. The percentage difference the analyst's estimate and the skipper's reported estimate was calculated. This produced a range between 80% under reported and 33% over reported (-80% to +33%). The high variance in estimates is considered to be a result of the very small quantities observed although the cumulative comparison amounts to only 2%.

**Table 4: Comparison between the skipper's and the analyst's estimate of undersize haddock caught**

| Elogbook number | Haul | Skipper estimate (kg) | Analyst estimate (kg) | % difference from analyst | Confidence rating |
|---|---|---|---|---|---|
| B1065420140159 | 2 | 2 | 2 | 0 | MEDIUM |
| B1065420140160 | 6 | 4 | 3 | 33 | POOR |
| B1065420140160 | 18 | 1 | 5 | -80 | POOR |
| B1065420140161 | 9 | 5 | 5 | 0 | MEDIUM |
| B1065420140161 | 11 | 7 | 7 | 0 | GOOD |
| B1065420140162 | 4 | 7 | 7.5 | -7 | GOOD |
| B1065420140163 | 3 | 1.5 | 2 | -25 | POOR |
| B1065420140164 | 10 | 1.5 | 1.5 | 0 | MEDIUM |
| B1065420140164 | 15 | 23 | 20 | 15 | GOOD |
| B1065420140165 | 3 | 2 | 2 | 0 | GOOD |
| B1065420140165 | 9 | 7 | 7 | 0 | MEDIUM |
| | **Total** | **61** | **62** | **-2** | |

The analyst's view of the undersize catch was often difficult because of the way that it was handled and because the camera positions were not optimal (the configuration is primarily aimed at monitoring discards). Estimates on hauls were given a "confidence rating" depending on how well the analyst could see the catch and how confident they felt their estimate was. "Good" and "Medium" confidence was only selected on eight of these hauls and on seven the catch estimates matched, with only one haul having a 15% difference. "Poor" was selected on 3 occasions and on all hauls there was a large percentage difference.

**Figure 14 REM CCTV image of catch from each codend sorted with juvenile haddock separated from the marketable catch (orange basket at far right)**

## Discussion

The UK fishing industry reported high catches of haddock in the first half of 2014, which were problematic because of the restrictive quota which did not cover bycatch for many vessels (ICES 2014).

Whilst there are many variables to take into account such as local fishing practices, areas and seasonality, this analysis is consistent with the official STECF 2012 discard rates of 58% for TR1 gears (100mm + codends) and 76% for TR2 gears (<100mm codends).

Against this backdrop there is clearly a need for major improvements to selectivity and catch avoidance both to support harvesting within maximum sustainable yield and reduce the potential for quota exhaustion to effect an early fishery closure under the landing obligation.

Despite the potential to improve selectivity, the MMO suggests that in the absence of total avoidance measures, marketable haddock is likely to continue to form a significant proportion of the catch in this fishery (MMO interim report 2013). There have been anecdotal reports of vessels discarding very large volumes of haddock because of a lack of quota, often catches constituting large grades of haddock, particularly in the hours of darkness. The larger catches of small grade 4/5 haddock appear to be taken in the more offshore areas where angler and megrim are targeted along with important quota and non-quota commercial species.

We understand that some smaller vessels have stopped fishing at night to avoid high haddock discards. Larger vessels have more limited scope to reduce fishing at night although the trial vessel has done this during the summer of 2014. Increased avoidance measures may be viable to a point by using more selective trawl configurations such as the reduction of top sheet cover and/or reducing headline lift, although it is not clear what impact this might have on the reduction of catch of other species.

Further analysis of the grades of marketed haddock bears out the fact that through 2013, the SW otter trawl fleet were discarding marketable haddock whilst retaining the larger more valuable grades as a means obtaining best value for money for the available quota. Significantly the trial vessel landed the same quantity of small grade 4/5 haddock as the entire remaining CFPO fleet. A comparative vessel to the trial vessel not in CFPO membership landed approximately half the grade 4/5 haddock compared to the trial vessel.

The vessel in the trial uses standard gear that is relatively selective (as demonstrated by a very small percentage of juvenile catch in catch quota trials in 2013) whilst remaining viable in terms of catches of other species. This has been achieved through the use of large (200mm) meshes in the headline panel. Recent trials by CEFAS (Smith and Catchpole 2013) have shown that nets incorporating a 400 mm diamond mesh square section and 200 mm diamond mesh in part of the back net section yielded a reduction in haddock below 46 cm; equating to a reduction of 41% by number overall.

Other selectivity studies have focussed on the use of square mesh panels to reduce the catch of whitefish below the minimum landing size. Kynoch R J et al (2008) found that 120mm square mesh panels were effective at reducing juvenile haddock catch in Nephrops trawls when placed up to 18m from the codline although the results are confined to fish above 20cm in length.

In these selectivity trials the lowest catch rates of juvenile haddock were seen in the Type B, D, E and G trawls, which incorporate a square-mesh panel in the codend. The Type E and G trawls are most effective overall as a result of the larger square mesh panel in the codend compared to the Type B and D trawls. The type E and G trawls reduced juvenile haddock catches by 85-90%.

The selectivity for juvenile haddock by the square mesh panel situated 9m from the codline and in accordance with technical rules for the Celtic Sea (Type C) appears to be less effective. A direct comparison between Types B and C confirm this although there was no comparison between the Type C and a standard Type A trawl.
Based on the catch rates alone the Type C trawl does not appear to be more selective than the standard Type A trawl but this remains inconclusive as there were varying quantities of small haddock across different trips.

The Type D and G trawls with the reduced cover appear to be effective at reducing the total catch of haddock, whiting and hake and therefore represents a possible method of reducing quota usage for these stocks under a landing obligation. Further work is required to assess the potential loss of other key species when using this gear and whether this might be influenced by the type and power of vessels. The loss of hake and potentially other species such as squid may be significant and further analysis of catches from the reduced cover trawls may provide a means of assessing this.

The gear modifications are effective at reducing juvenile haddock cohorts as they appear on the grounds. The vessel owner considers that the abundance of juveniles reduces east of $5^{o}$ West and the introduction of further technical measures may therefore only be relevant west of this line.

The square mesh panels in the codend, although effective in terms of selectivity, do not comply with Article 7 of Council Regulation 850/98, which sets out the basic requirements for fitting such panels. Article 7 requires no more than 5 open diamond meshes between the selvedge and the square mesh panel (to ensure a reasonable width of panel) whereas the trial configuration has up to 10. The skipper has reported that extending the size of the panel from 10x30 meshes to cover more of the codend would result in unacceptable loss of other commercial species.

The vessel has operated under a dispensation from Article 7 of 850/98 for the purpose of the trials. This does highlight an example of where technical rules can reduce the flexibility of operators to fish more selectively. The proposed overhaul of the EU technical measures would need to take account of this type of scenario whilst maintaining clarity for inspecting officers. Where a vessel is engaged in fully documented fishing and where monitoring allows for confidence that all catches of key species are being retained and counted against quota, it is considered that operators should be afforded flexibility in gear design to suit their particular fishery.

Innovations such as gear type approval and tagging may assist with a more flexible system.

## Forward Look

The participant vessel operators are continuing with catch quota trials in 2014 in relation to three key species: haddock, megrim and angler. The operators are seeking to adapt their fishing practices and to continually assess the ability to operate under the landing obligation from 2016 in terms of catch avoidance where necessary and maximising profit under a catch quota system.

It is considered that expanded participation in schemes such as this should be encouraged as a means of maximising evidence prior to the implementation of the demersal landing obligation.

The use of REM has shown potential to provide a means of corroborating industry-sourced data and to augment scientific observer studies. There is also a need to ensure that such trials are able to feed in to revision of regional technical measures and the compilation of discard plans.

## References

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