



Catch Quota Trials 2012 Interim Report (November 2012)

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Summary and interim results

This interim report provides a summary of the progress of the 2012 trials, to the end of September, of catch quota management using remote monitoring and CCTV.

A total of 22 English-administered vessels are fitted with remote monitoring equipment and CCTV and are engaged in trials for a range of stocks as well as non-catch quota-related trials. The results, to date, are demonstrating that discards have been virtually eliminated for the species under trial.

Table 1: Stocks and discards as percentage of total catch

Stock	Discards as a percentage of total catch
North Sea cod	0.2%
Vlle sole	0.1%
Vlld and e plaice	0.2%
Vll anglerfish	1.1%
Vll megrim	1.3%
Western hake (a)	2.3%

(a) Discards observed from a very low total catch (85 kg)

The trial, at this interim stage, has recorded total landings of 500 tonnes of catch quota species. Analysis of CCTV at a 10 per cent sample rate has estimated an overall total discard rate for all catch quota species at 0.3 per cent. Undersized catch quota species have been landed and disposed of to non-human consumption outlets, and this has amounted to 1 per cent of total landings and includes a small proportion of unmarketable damaged fish.

The scope of the trials has increased in terms of the overall number of participant vessels and the range of stocks subject to catch quota management. Objectives stem from trials in 2011 to follow up development of analysis methodologies and to collect evidence on the impact of discard bans on industry and regulators.

Amendments to the Council regulation on total allowable catches (TACs) and quotas in 2012 provided an opportunity for participation in trials for a wider range of stocks for which additional quota is provided. These stocks include high discard fisheries such as Celtic Sea haddock.

The offer of a gift of North Sea plaice quota by Norway also presented an opportunity to test Common Fisheries Policy (CFP) reform proposals in a fishery where high discards had been observed.

We consider trials in these high discard fisheries a priority and there has been interest in participation from industry. To date, however, potential applicants to the scheme have cited the 30 per cent cap on additional quota opportunity set out in Article 7 2(b) of Council Regulation 43/2012 for "internal" TACs and quotas and in Article 8 2(b) of Council Regulation 44/2012 for "external" TACs and quotas as the key reason for their non-participation. We believe the prospects for examining these fisheries will improve if this restriction is removed by the EU Council for 2013.

Additional quota has been provided to participant vessels in keeping with the EU Council quota regulations and administered to ensure the uptake of extra quota remains within the pool of participant vessels.

Six catch quota stocks have been monitored for discarding from a 10 per cent sample of CCTV footage across four gear types. Results show low levels of discards of catch quota stocks for which all catches must be accounted for and discarding is prohibited. The estimated levels of discarding are considered to be within de minimis levels.

Discussion

The UK Government believes that current high levels of discarding fish are wasteful and unsustainable. It considers alternative methods of fisheries management should continue to be explored to provide the best advice for the reform of the CFP. A fully documented catch quota system is one of a range of innovative measures that can help deliver sustainable fisheries while minimising waste.

Catch quota trials in 2010 and 2011 have shown positive results. However, there is still limited data to provide evidence of the impacts of implementing catch quota management for more than one stock in UK mixed fisheries. The expansion of catch quota trials to a wider variety of fisheries is expected to assist the UK Government's approach in the reform of the CFP.

More evidence is required as to how a catch quota system encourages changes in fishing behaviours, such as improved uptake of more selective gears and spatial or temporal fish avoidance, specifically whether fishermen adapt their fishing practices to avoid capturing fish that might otherwise be discarded. The implications of so called 'choke' species need to be examined further. It is evident from scientific data that certain species, particularly gadoids (including cod and saithe), have high discard rates in some fisheries. Such species may become choke species where available quota under a catch quota system would be exhausted long before quota limits for other target species are reached.

A trial of catch quota management is also required on targeted but high discard fisheries, such as North Sea plaice and VIIIb-k haddock fisheries, to understand what changes are needed to minimise discards in these fisheries and to determine the impact of a landing obligation for these stocks.

The results at the interim stage of the trials with a wider range of stocks have shown very low discard levels. The discard levels have been based on a random 10 per cent audit of CCTV footage, which is considered to be sufficient for the applicable stocks as they are caught in reasonably consistent quantities. Skippers and crew have been briefed in situations where discards have been apparent to ensure these are kept to a minimum and to remind crew of the range of areas and species that are subject to a discard prohibition.

A variety of faults with the remote monitoring equipment have occurred and such faults have been reported by skippers for correction in port. Loss of data and resolution of footage has not given rise to undue concern although improvements are

considered possible both in terms of reliability and adherence to the duty of care placed on vessel crews.

It is clear that the correct environment for the control box in terms of reliable and consistent power supply and ambient temperature are important to prevent data loss.

Faults leading to loss of picture quality have included camera lens or visor displacement, water ingress into camera housing, condensation and dirty lens covers. Loss of sensor data has resulted from loss of functionality of winch rotation sensors, usually from dirty or displaced reflectors. A full assessment of the level of data loss and system faults is to be carried out and reported at the end of the trial.

Next steps

For the rest of the 2012 trial we will continue to assess the catch and discard patterns from participating vessels. We will also use this time to develop and test different methods of analysis of CCTV footage to quantify retained catches.

A number of observer voyages have been, and are being, carried out on participant vessels to capture control data on length frequency and weights of catches as a benchmark for assessing the different methodologies for accuracy. The assessment will take account of the resource implications and time taken to carry out various forms of audit. It is evident that different approaches will suit different fisheries and vessel types and it is therefore unlikely that detailed rules could specify the precise methods that must be used.

At the time of writing this report the 2013 Council proposals for fishing opportunities have been published. The draft proposals retain the 30 per cent cap on additional quota incentive and also prevent any transfer of quota between participant and non-participant vessels. Both these elements are likely to impact on participation rates in 2013 unless a workable solution is successfully negotiated.

The transfer of quota between participant and non-participant vessels is allowed under the current scheme. But the uptake of additional quota is controlled in such a way that it can only be used by participant vessels at a ratio to total catch that reflects the discard rate. The Commission's concern is that leasing between participant and non-participant vessels increases discards in the non-participant sector. However recent data for North Sea cod from the Scientific, Technical and Economic Committee for Fisheries (STECF) has shown a significant drop in discard tonnage for non-catch quota vessels, indicating an overall reduction in discards and associated fishing mortality. This would suggest that current flexibility on leasing is not increasing discard levels in the non-participant fleet.

The final report for the 2012 trials is expected to be published in March 2013. The report will provide data on the observed discards and unmarketable catches for each fishery over the full year. It will also assess the merits of various methods of auditing catch records through the use of remote monitoring data and CCTV footage. Further analysis will also be provided on the impacts of a catch quota scheme in terms of compatibility with current technical and control regulations, the use of real time

sensor data transmission and the implications of managing catch quotas in mixed fisheries.

Further information about the operation and performance of the 2012 catch quota scheme up to 30 September is set out in the following annexes:

- [Annex 1: Objectives of the scheme](#)
- [Annex 2: The allocation and management of catch quota](#)
- [Annex 3: Participation](#)
- [Annex 4: Remote monitoring](#)
- [Annex 5: Detailed analysis of interim results](#)

Annex 1: Objectives of 2012 scheme

1. To gain a greater understanding of the implications of a discard ban on multiple and single species for fishing skippers and crews.
2. To undertake trials of catch quota management of an expanded range of stocks in the North Sea and Western Waters.
3. To undertake remote monitoring of high discard fisheries such as Celtic Sea haddock and North Sea plaice to evaluate the implications of a landing obligation for these stocks and the impact of associated selectivity and avoidance measures.
4. To consider the implications of a landing obligation and its compatibility with current technical and control regulations.
5. To monitor CCTV footage and sensor data from participant vessels at a sample rate of 10 per cent to verify compliance with the discard prohibitions for catch quota stocks, correct reporting of area fished and catch estimates.
6. To assess the implications of monitoring CCTV footage for a range of species in mixed fisheries.
7. To carry out CCTV analysis to quantify the level of discards occurring for catch quota stocks.
8. To trial and improve various methods of quantifying retained catches of catch quota stocks from CCTV analysis as a means of auditing catch records.
9. To carry out seagoing observer trips to obtain quality control data on retained catches for the purpose of assessing confidence levels in CCTV analysis.
10. To trial satellite modem technology for the transmission of sensor data and remote monitoring system functionality.
11. To trial improved remote monitoring systems and software which allow for increased numbers of cameras and sensors.
12. To trial remote monitoring equipment on a scallop dredging vessel to estimate and corroborate records of fish by-catches.
13. To report on trials of remote monitoring equipment on small inshore vessels with unsophisticated catch sorting equipment.

Annex 2: Allocation and management of catch quota

The additional quota for testing catch quota management has been made available to participant vessels through their producer organisations at or below 75 per cent of expected discard rates set out in the application forms. The individual allocations are based on the vessel's track record in 2011, which excludes any catch quota awarded in that year.

Participant vessels are free to lease quota as their fishing opportunity is made up of leased fish, monthly catch limits set by their producer organisation and individual vessel allocations. For many vessels, the business plan includes the need to meet quota requirements through leasing. Vessels in the UK have habitually sought to have flexibility to swap in or out quota to maximise fishing opportunities from mixed fisheries and have never relied on a fixed quantity of quota to fish in one year.

In the case of North Sea cod STECF data shows an overall reduction in discards from non-catch quota vessels. This indicates a higher degree of selectivity and does not support the theory that quota leasing is increasing the discard rate in the non-catch quota segment.

To ensure that additional quota provided under the scheme is used in proportion to the expected discard rate reduced by 25 per cent, a system is in place where the uptake of additional quota is monitored on a percentage basis for each landing. This system is considered to negate the need for a prohibition on transfers between catch quota and non-catch quota vessels.

A percentage for each landing, based on the discard rate for each stock, is deducted from the vessel's catch quota allocation with the remaining balance being deducted from the vessel's own allocation. Once the catch quota allocation is exhausted the vessel can only continue to fish if it has access to quota. This ensures that the pool of catch quota vessels is operating in a responsible way where the overall catch is discards-free and overall mortality within the pool is reduced.

In the case of North Sea cod there was insufficient catch quota available for all vessels to receive their full additional allocation. As a result, quota shares among the participant vessels were scaled back slightly to allow for maximum participation following agreement with applicants.

Annex 3: Participation

Table 2 summarises the range of gear types and stocks that are currently subject to catch quota trial for 7 vessels from the South West and 12 vessels from the North Sea fleets.

Table 2: Gear types grouped for data analysis

Gear type	Number of vessels	Species subject to catch quota terms
Otter trawl or pair trawl	9	Area IV North Sea cod (targeted and non-targeted fisheries)
Otter trawl	1	Area IV North Sea cod and North Sea plaice (non-targeted fishery)
Fixed gill net	2	Area IV North Sea cod
Beam trawl	1	Area VIIe Western Channel sole, VIId and e Channel plaice, VII western hake, VII anglerfish, VII megrim and VIIhjk sole*
Beam trawl	2	Area VIIe Western Channel sole, VIId and e Channel plaice, VII western hake, VII anglerfish, VII megrim
Beam trawl	1	Area VIIe Western Channel sole, VIId and e Channel plaice, VII anglerfish, VII megrim
Beam trawl	3	Area VIIe sole
Inshore trawlers	2	Non-catch quota technology trial for small inshore vessels
Dredge	1	Non- catch quota (scallop fish by-catch study)

* Voluntary, no incentive quota associated with stock

It is encouraging that more vessels overall have opted to join the scheme in 2012, although the level of participation for high discard fisheries where high-grading is common is less than anticipated. A strong barrier to participation in high-discard fisheries is the 30 per cent cap on additional quota imposed by the Council regulations.

The 2012 trials attracted interest from vessel owners engaged in the North Sea plaice or mixed demersal beam trawl fishery and the Celtic Sea haddock or mixed demersal otter trawl fishery. Both plaice and haddock in these two fisheries are known to have high levels of discards and are considered to be good examples of stocks that should be tested for management under a catch quota system. Owners who expressed an interest in participating in trials in these two fisheries felt that the incentive provided by an additional 30 per cent of quota was much too low to mitigate the risk of having to stop fishing early in the year.

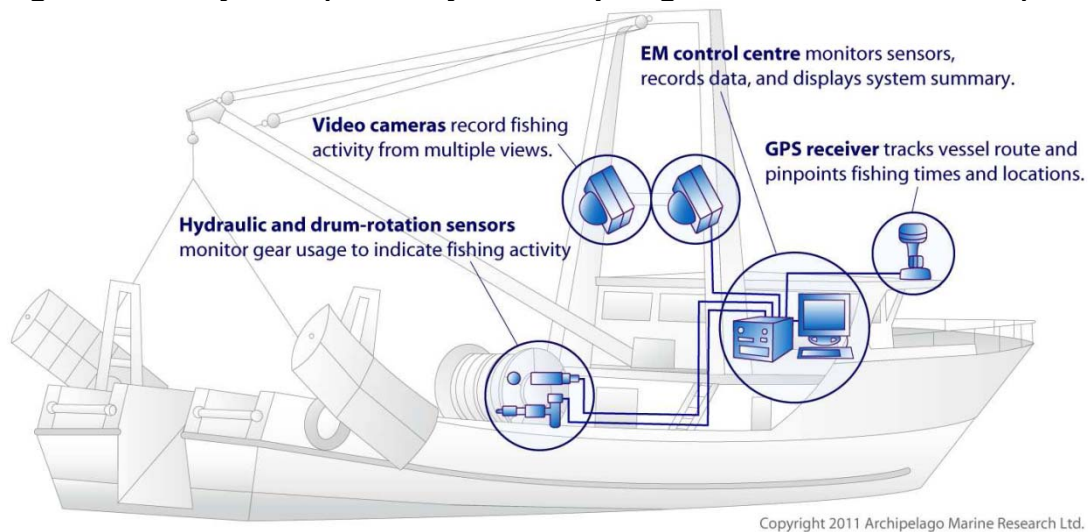
We believe that removing the 30 per cent cap will allow evidence to be gathered through trials in high discard fisheries in 2013. These trials should be coupled with an analysis of the selectivity measures being used to reduce capture of smaller size grades in these fisheries.

Annex 4: Remote monitoring

The 2012 trials have continued to use the Archipelago Marine Research Ltd electronic monitoring (EM) system (Figure 1) with four cameras. Updated versions of both the EM Record software and EM Observe hardware, which can support up to eight cameras, is currently being trialled on one beam trawler and it is expected that this will be fitted to other vessels.

A satellite modem that is compatible with the EM Record system is also being trialled to examine the potential for real-time transmission of summarised sensor data and system status data.

Figure 1: EM system (courtesy of Archipelago Marine Research Ltd)



Audit methods

The 2011 trials showed the ability to quantify catches from CCTV footage varied greatly depending on the nature of the fishery and the volume and method of handling and sorting catches. One of the key aims of the 2012 trials is to develop effective audit methods that provide sufficient confidence in quantifying discards and retained catches. It is assumed for the purpose of this trial that the term 'fully documented fishery' includes sufficiently accurate catch reporting on board the vessel and that the accuracy of self-reported catches can be verified.

The methods of auditing catch records and discards being developed in 2012 trials are summarised below.

1. Discards counted by species and increased to trip level and weight based on 10 per cent audit.
2. Full retention monitoring. As above but with further monitoring for discards to the point of landing the catch.
3. Screen calliper measurements to determine length frequency of catch based on random 10 per cent of hauls compared to length frequency of catch on landing.
4. Weight estimate based on length measurements increased to weight for haul catch record or 24 hour catch record.

5. Volumetric assessment for small quantities based on incremental weight bands and cumulative estimates over 24 hour periods compared with 24 hour logbook estimate.
6. Volumetric assessment of bulk catches.
7. Volumetric assessment of multiple containers, such as simple audit of basket or box count against catch record.
8. Verification of weight displayed on weighing systems.

A series of seagoing observer voyages are being carried out to provide necessary control data to test the various methodologies making use of accurate motion compensated scales. There is insufficient data at the interim stage to present findings from the various methodologies being tested. The full results will be contained within the final report.

Annex 5: Analysis of interim results

Audit levels

Table 3 provides provisional data showing the level of audit of CCTV footage across the range of vessels. The target audit level has been set at 10 per cent of fishing operations. Where vessels are engaged in catch quota trials for a range of different species the analysts need to be aware of the relevant stock area. Where vessels have operated in more than one stock area the trip has been split for audit purposes, so the number of trips outlined in the table is higher than the actual number of trips carried out. Any trips in areas that were outside the scope of the catch quota stocks were not analysed, other than to verify that the logged area of fishing was accurate.

Table 3: Analysis coverage for each gear group, valid trips only

Gear type	Number of trips	Number of hauls fished	Number of hauls sampled	Percentage of hauls analysed
Beam trawl	52	3,141	245	7.8
Beam trawl (4 species)	8	527	49	9.3
Beam trawl (5 or more species)	49	1,771	136	7.7
Gill net	8	53	7	13.2
Otter trawl	73	832	101	12.1
Pair trawl	24	216	25	11.6
Totals	214	6,540	563	

Table 4 provides a summary of the analysis time and average time taken to analyse trips across the range of vessels. The audit carried out in each analysis first checks for and quantifies any discards of catch quota stocks and secondly aims to quantify catches and compare against the master's catch records.

The method of audit is variable as a number of options are being tested. A more comprehensive summary of the efficacy and longevity of audit methods will be provided in the final report. A number of factors influence the time taken to audit a trip apart from the method and sample size of audit. These include trip length, catch sorting time, number of hauls and number of species being examined.

For example the gill net fishing operation (haul) is typically an 18 to 24 hour activity so a longer period is required to analyse one operation. In this case, the analysis time for one trip is less than for one hauling operation as 1 day in 10 is analysed, which can span two or more trips.

Table 4: Time taken to analyse all hauls and trips, valid trips only

Gear type	Number of trips	Number of hauls sampled	Total analysis time (hours)	Average analysis time per haul (hours)	Average analysis time per trip (hours)
Beam trawl (VIIe sole only)	52	245	160.25	0.7	3.1
Beam trawl (4 species)	8	49	52.5	1.1	6.6
Beam trawl (5 or more species)	49	136	153	1.1	3.1
Gill net	8	7	47	6.7	5.9
Otter trawl	73	101	262.25	2.6	3.6
Pair trawl	24	25	100.5	4.0	4.2
Totals	214	563	775.5		

A number of trips were not analysed for the reasons provided in Table 5. In most cases this was because the vessel was operating outside relevant stock areas or engaged in non-fishing activities. However, for two trips the hard drive data was lost because of data corruption.

Table 5: Trips excluded from analysis

Gear type	Number of trips	Number of hauls fished	Total analysis time (hours)	Reasons for exclusion from analysis
Beam trawl	3	96	0	Two trips in non-catch quota area. One trip the control box failed at sea and lost hard drive data.
Beam trawl (5 or more species)	2	117	4.5	One trip skipper electronic data records missing. One trip the hard drive failed.
Gill net	13	13	2	One fishing trip in non-catch quota area. Five trips transiting between ports. Seven trips guard work.
Otter trawl	49	49	5.5	Five trips in non-catch quota area. 24 trips guard work. Six trips transiting. 14 research trips.
Pair trawl	6	0	0	Two guard work trips. Four 4 transit trips.
Totals	73	275	12	

Observed discards

The Council regulations require all catches of catch quota stocks to be retained, landed and counted against quota. Therefore, the basic compliance audit for CCTV analysis is to check for and quantify discards of catch quota stocks during the sorting operation.

CCTV analysts view footage for 10 per cent of fish sorting operations and count the number of discard-prohibited fish, which are not removed from the sorting conveyor and enter the discard chute.

To raise the number of discarded fish to weight, standard weight estimates are applied (Table 6). This methodology generally gives rise to an over-estimation of the weight of discarded fish as many discarded fish are well below these standard weights.

Table 6: Conversion factors for estimating weights of discarded or undersize fish observed during analysis

Stock	Minimum landing Size (MLS)	Conversion to kg (using MLS – 1cm)	Estimated weight to use for discarded or undersize fish (kg)
Cod (Area IV)	35 cm	0.374	0.35
Plaice (all areas)	27 cm	0.189	0.17
Sole (all areas)	24 cm	0.12	0.1
Hake (Area VII)	26 cm	0.121	0.15
Megrim (Area VII)	25 cm	0.092	0.08
Anglerfish (all areas)	None	Not applicable	Observer estimated. Small at 0.2 to 0.5 kg and medium at 0.5 to 1 kg

Table 7 provides the interim data on total discards of catch quota stocks increased from sample level to a percentage of total landed weight. The results are encouraging at the interim stage and show minimal discards for most stocks at around 0.1 per cent. Incidents of higher than expected discard rates have been communicated to skippers and crew to ensure it is kept to a minimum.

Participants have been advised that where discards are observed at low but significant rates quota adjustments may be made to ensure the total fishing mortality is accounted for. Three stocks show higher discard percentages however.

Area VII hake shows a discard rate of 2.3 per cent but was a result of a single fish discard observed from a total catch of 85 kg. Anglerfish and megrim discards were estimated at just over 1 per cent and consisted of very small specimens that may have gone unobserved by crew sorting from the conveyor.

Discards of gill net cod are also relatively high at 0.9 per cent although this results from discards of fish which have parasitic infestation to avoid contamination of uninfected catch. Crew have ensured that fish with infestation are held in view of a camera before discarding.

Some discarding is due to a severe sea lice infestation, which has been observed in gill net-caught cod. The degree of infestation can be made worse when nets are subject to longer than intended soak times. Mortality through extended soak times is not desirable but can be a result of force majeure situations. In the interests of preserving the retained catch in good condition, discarding of infested catch has been allowed. There are likely to be other fisheries where similar issues arise, such

as where longer soak times are required, resulting in higher levels of predator-related damage and decay.

The level of confidence in differentiation between certain species such as common sole or sand sole and megrim or scald fish presents a potential challenge in monitoring discard-prohibited species through the use of CCTV footage. Catches of sand sole are generally retained where fish are of a marketable size. In which case the problem can be overcome by a requirement to prohibit discards of sand sole as well as common sole. Scald fish are caught in lesser quantities and are not marketed. In this case it may be necessary to monitor overall discards of these two species and to compare findings with discard observer data to ensure megrim is not being discarded at a significant level.

Where a fish has been damaged but is in good condition it has been retained and landed with the undersized component of the catch. Overall the quantity of undersized and damaged fish has been variable. This component of the catch has been accounted for through documentation to ensure that it is counted against quota uptake. Where very small quantities of undersized fish have been landed there has not always been a suitable disposal method available other than to waste.

Megrim has shown a relatively high proportion of undersized or damaged quantities at 9 per cent of the total catch, which is consistent with observed discard data. The landings of undersized or damaged megrim and other species such as plaice will require onshore sampling so that the undersized component can be split from the damaged component. More detailed data on the unmarketable component of the catch is to be obtained as part of the ongoing trial. Discards of non-catch quota vessels should also be compared with participant vessels to assess any difference in selectivity and spatial avoidance of juvenile fish.

Table 7: Percentage of fish discarded by catch quota vessels

Gear group	ICES area	Species	Weight of observed discards from sampled analysis (kg)	Total discard weight* (kg)	Total catch in live weight (kg)	Percentage discarded (percentage of landed weight)
Beam trawl	VIIe	Sole	3.1	39.5	32,920	0.1
Beam trawl	VII	Anglerfish	63.4	811.5	72,867	1.1
Beam trawl	VII	Hake	0.2	2.0	85	2.3
Beam trawl	VII	Megrim	4.2	55.1	4,331	1.3
Beam trawl	VIIId and e	Plaice	2.3	29.7	17,793	0.2
Beam trawl	VIIhjk	Sole	0	0.0	69	0.0
Gill net	IV	Cod	62.8	475.1	51,558	0.9
Otter trawl	IV	Cod	14.2	116.9	230,603	0.1
Pair trawl	IV	Cod	6.2	53.1	89,420	0.1

* Sampled estimates increased to total weight by multiplying by 100/analysis rate for each category.

Undersized and damaged fish

Across all fisheries and gear types the quantities of undersized and damaged fish have been at levels of between 0 and 9 per cent as shown in Table 8.

The quantities of undersized fish include a small component of damaged fish which is unmarketable. For the most part this component consists of cod from the gill net fishery. Small quantities of damaged plaice and sole above the minimum size have also been landed from beam trawlers. Megrin is the largest component of undersized and unmarketable fish from the beam trawl fishery at 9 per cent. Undersized plaice is also present in beam trawl catches at a rate of 3 per cent. Cod from the two vessels engaged in the North Sea mixed demersal trawl fishery continues to represent the highest level of undersized component of total catch.

Undersized and unmarketable catches have been disposed to fishmeal outlets or for use as bait.

Table 8: Undersize and/or damaged fish retained and landed

Gear group	ICES area	Species	Total undersize and damaged weight (kg)	Total landed live weight (kg)	Percentage undersize and damaged in catch
Beam trawl	VIIe	Sole	52.5	32,920	0.2
Beam trawl	VII	Anglerfish	4.2	72,867	0
Beam trawl	VII	Megrin	388.2	4,331	9.0
Beam trawl	VII	Hake	7.6	85	9.0
Beam trawl	VIIId and e	Plaice	571.3	17,793	3.2
Beam trawl	VIIhjk	Sole	0.1	69	0.1
Gill net	IV	Cod	398.5	51,558	0.8
Otter trawl	IV	Cod	3430.8	230,603	1.5
Pair trawl	IV	Cod	263.0	89,420	0.3

Species identification

The 2011 trials identified certain closely-related species that can be difficult to differentiate from CCTV footage. These generally relate to flatfish species such as common sole or sand sole. The introduction of Area VII megrim as a catch quota stock has shown that megrim and scald fish can also be difficult to distinguish.

Identification can be further hampered by specimens that are partially obscured by debris, benthos and other fish species. A library of images is being developed to assist in differentiating such species, although the by-catch of species such as sand sole and scald fish are generally small.

Transmission of real time sensor data and system health check

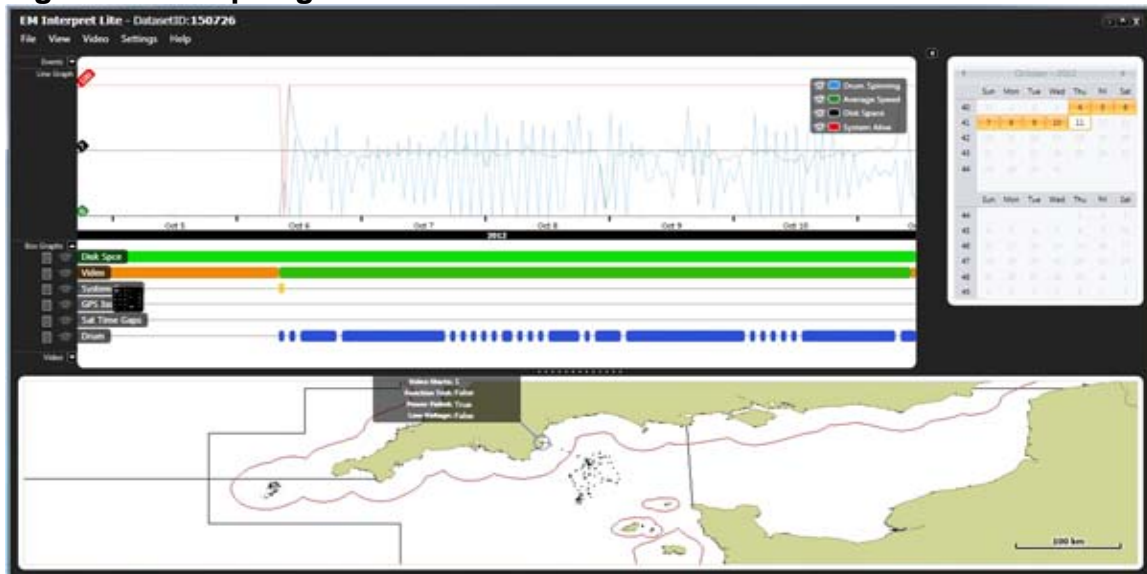
One participant vessel is fitted with a satellite modem to test the ability to transmit hourly system health check data and summary of sensor data. The data is viewed on

a web-based geographical user interface provided by Archipelago Marine Research Ltd (EM Interpret Lite).

Figure 2 shows a screenshot of the EM Lite software. This software provides hourly summaries of winch rotation speed, position, average speed, hard drive data storage remaining capacity as well as any outages of system functionality.

Trials are ongoing to evaluate the full potential of this system.

Figure 2: Archipelago Marine Research Ltd. EM Lite software screenshot



System functionality

Table 9 summarises system faults that have been recorded at the interim stage of 2012.

Table 9: Summary of faults

Control box failures	Camera failures	Rotation sensor failures	Pressure sensor or GPS failures	Lost fishing days	Man hours to rectify (including travel)
7	9	6	1	0	45