Annual Report of the United Kingdom to the European Commission on the implementation of Council Regulation 812/2004 on cetacean bycatch

Results of fishery observations collection during 2007

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Summary

Council Regulation 812/2004 stipulates certain fleet segments requiring dedicated observations to quantify cetacean bycatch. This report summarises the fishing effort deployed by UK registered vessels within those segments during 2007 and summarises the observation levels achieved over the same time period. In summary, more than 7% of all fishing activity within the target fleet segments was monitored by observers with more than 200 days spent at sea. No cetacean bycatch was observed in these fleet segments. The report also summarises cetacean bycatch observations made in other fleet segments that are not designated under Council Regulation 812, but has been undertaken for the purposes of the Habitats Directive.
1. Introduction

Council Regulation 812/2004 requires member states to monitor certain specified fishery sectors ('fleet segments' hereafter) in order to quantify cetacean bycatch. Levels of sampling are laid down under Regulation 812, and are aimed at providing estimates of bycatch with a reasonable level of precision. The following report summarises levels of UK fishing effort and fleet disposition in the relevant fishery segments for 2007 and summarises the levels of monitoring that have been achieved in each segment. Details of monitoring levels required under Council Regulation 812/2004 are given in Articles 4 and 5 and Annex III of that regulation.

In addition to the requirements of Council Regulation 812/2004 and for the purposes of the Habitats Directive, a summary of observations and estimates of cetacean bycatch made in other fleet segments are also tabulated within this report.

The reporting format conforms to that proposed by the ICES Study Group on bycatch of protected species and as advised by ICES to the European Commission (ICES 2008).

2. Description of the fleets

Sixty-four individually-identified UK registered vessels were recorded as fishing with midwater or pelagic trawls during 2007. Of these 64 named vessels, 23 were less than 15m, leaving 41 over-15m trawlers fishing pelagic trawls during 2007. There were an additional 43 days fished by under 10m boats that were not individually identified in the landings records, as under 10m vessels are not legally required to return logbooks and records for such boats are sometimes pooled or held anonymously.

The principal target species were mackerel, herring, blue whiting, horse mackerel, sprats and sardines. Anchovies, bass and sea breams were also targeted by pelagic trawls though on relatively few trips. Most pelagic trawling is carried out by vessels using otter-boards, while about 20% of days absent are by pair trawl teams.

The fleets for which monitoring is required under Regulation 812 are listed below in Table 1. Fleet segments are identified by letter in Table 1.
Table 1: Description of Fleets

<table>
<thead>
<tr>
<th>Code</th>
<th>Fishing Area</th>
<th>Gear Type</th>
<th>Target Species</th>
<th>Number of vessels</th>
<th>Months of Operation</th>
<th>Required Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>VI, VII &amp; VIII</td>
<td>Pelagic trawls</td>
<td>Mackerel, herring, blue whiting, horse mackerel, sardine, sprat, bass, anchovy</td>
<td>30</td>
<td>Dec, Jan to March</td>
<td>10%</td>
</tr>
<tr>
<td>B</td>
<td>VI, VII &amp; VIII</td>
<td>Pelagic trawls</td>
<td>Herring, blue whiting, horse mackerel, mackerel, sardine sprat, anchovy</td>
<td>32</td>
<td>April to November</td>
<td>5%</td>
</tr>
<tr>
<td>C</td>
<td>VIa, VIIab, VIII</td>
<td>Set gillnets</td>
<td>Herring, mackerel, horse mackerel</td>
<td>7</td>
<td>All year</td>
<td>5%</td>
</tr>
<tr>
<td>D</td>
<td>VIIef</td>
<td>Driftnets</td>
<td>Bass</td>
<td>1</td>
<td>Dec, Jan to March</td>
<td>5%</td>
</tr>
<tr>
<td>E</td>
<td>IV</td>
<td>Pelagic trawls</td>
<td>Mackerel</td>
<td>35</td>
<td>All year</td>
<td>5%</td>
</tr>
<tr>
<td>Y</td>
<td>IV</td>
<td>Bottom set gillnets and entangling nets &gt; 12m LOA</td>
<td>Monkfish, cod</td>
<td>8</td>
<td>All year</td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td>VIIdefghj</td>
<td>Bottom set gillnets and entangling nets &gt; 12m LOA</td>
<td>Turbot, cod, Pollock, ling, hake, monkfish</td>
<td>24</td>
<td>All year</td>
<td></td>
</tr>
</tbody>
</table>

Of the other fisheries that are listed in Annex 3 of Regulation 812/2004, the UK fleet has no recorded fishing effort using pelagic trawls in the Mediterranean, no pelagic trawl effort recorded for ICES sub-divisions III or IX, nor any gillnetting on ICES sub-areas IIIbcd. The landing statistics do not provide information on the height of trawls, but there are not thought to be any ‘high-opening trawls’ among the UK fleet such as those used by the Spanish fleet. Driftnetting by over-15m boats in sub-division VII was limited to a 9 days fishing, just in VIIe and VIIf.

3. Bycatch mitigation measures

Regulation 812/2004 requires certain vessels (over 12m) to use pingers (acoustic deterrent devices) to minimise the bycatch of harbour porpoises in certain bottom set gillnet and tangle net fisheries. Based on the size and number of registered vessels at least 29 UK vessels should be required to use pingers in specified fisheries in UK waters. Table 2 provides information on the use of bycatch mitigation measures.

Table 2: Bycatch Mitigation Measures

<table>
<thead>
<tr>
<th>Fleet Segment</th>
<th>Pingers mandatory?</th>
<th>% Vessels using pingers</th>
<th>Comments</th>
<th>Other bycatch mitigation measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>For at least 5 vessels</td>
<td>Unknown</td>
<td>Unknown</td>
<td>See text</td>
</tr>
<tr>
<td>Z</td>
<td>Yes</td>
<td>Unknown</td>
<td>Unknown</td>
<td>See text</td>
</tr>
</tbody>
</table>
Requirements for pinger use in the North Sea are less easy to determine. Eight UK registered vessels greater than 12m using gillnets and entangling nets in sub division IV were noted in 2007. Of these five confined their fishing to sub-area IVa and appeared to be targeting monk fish. Logbook records indicated that all of these 5 vessels were using nets with meshes of 280mm. Of the remaining three vessels, logbook records indicated that none was using large mesh nets, two were possibly using wreck nets (to target cod), but it is not known whether such nets are individually more than or less than the stipulated 400m and whether or not these vessels would be required to use pingers. The length of netting used is recorded in the Fishing Activity Database and is the average total length of nets in use per day, not the length of each individual string of nets which is the criterion for pinger use stipulated in the 812 Regulation. Individual net lengths should be available directly from the logbooks.

At present only a few of the vessels in sub division VII are using pingers, due to concerns raised by the industry over the reliability, effectiveness and safety of the acoustic deterrent devices available on the market at present. The UK, together with other member states, is working towards addressing these concerns and the Sea Mammal Research Unit, in collaboration with SeaFish and the Industry, has been testing a newly available device that is louder than existing models. Initial tests suggest that this device is effective in excluding both porpoises and dolphins to a range of more than 1km. Tests have been carried out to determine whether or not cetaceans are excluded from any wider area, which could present problems due to exclusion from foraging habitat, but it appears that the effect is limited to within 1-2 km. It is possible that the use of such devices could limit the number of individual devices that are needed per string of nets, which in turn means that devices may be deployed and removed at each setting and hauling operation. This should minimise damage to the devices, and also minimise risks to crew members from pingers that would otherwise be left attached to floatlines and could cause injury during hauling and setting operations. Further trials will be conducted in 2008. It is anticipated that the first results on the efficacy of these pingers in minimising bycatch of dolphins and porpoises should be available in the Spring of 2009.

The UK Marine and Fisheries Agency (MFA) have commissioned scientific research to investigate the development and possible purchase of ‘Pinger Detectors’. Pingers Detectors are listening devices, which will verify the functionality of the pingers. The practical application of this initiative will assist the UK in the conservation of cetaceans and the enforcement of the EU legislation 812/2004.

The MFA has conducted training courses for the Fisheries Protection Squadron who conduct boarding at sea on behalf of the MFA. This has raised awareness of cetacean and bird by-catch issues. The UK’s Monitoring, Control and Surveillance System (MCSS) is now in place for boarding officers to record the number of cetaceans that have been captured as part of a fishing operation (as witnessed during a boarding) or any information given by
the Master of the vessel regarding bycatch of cetacean and wild birds. To-date, MCSS has not generated any reports on cetacean by-catch. At-sea observer schemes

4. Observer Effort

Monitoring was done by four separate observer teams: the Sea Mammal Research Unit at the University of St Andrews (SMRU), the Centre for Environment, Fisheries and Aquaculture Science (Cefas), the Agri-Food and Biosciences Institute of Northern Ireland (AFBINI) and the Fisheries Research Services at Aberdeen (FRS). Most observations were carried out by SMRU observers under contract to the Department for Environment Food and Rural Affairs (Defra). Observations carried out under subcontract to CEFAS and by AFBINI were as an extension to work currently being undertaken to meet the requirements of the Data Collection Regulations in relation to discards.

Data made available by Fisheries Research Services (FRS), Aberdeen, related to observations made on the Scottish pelagic trawl fleet under the discard regulations. Data collected by Cefas and AFBINI were collated in a similar format to those carried out by SMRU observers, however observations made by FRS were available only in summary format. Refer to Table 2 for fishing effort and observer coverage. Each fleet segment is described according to the Fleet Segment codes given in Table 1. Cefas and AFBINI observations were only relevant to scientific studies of the under 15m sector of the fleet segments described in Table 1 or to monitoring under the requirements of the Habitats Directive (Annex 1).

SMRU observers are instructed to maintain a watch on deck or from the wheelhouse if advised by the skipper and that a clear view of the net pumping operation is maintained. FRS staff may not always be on deck as they have other duties in quantifying the catch and discards, but previous experience suggests that marine mammal bycatch is usually associated with a pause in the pumping operations while the ‘obstruction’ is removed from the pumping mechanism. It should therefore be noticeable even to observers below deck.

SMRU observers sampled 11 pelagic trawl vessels of more than 15m in length. FRS sampled an unknown number of additional vessels and contributed observations from 30 trips from a total of 49 in the mackerel and herring fisheries in sub-divisions VIa and IVa. SMRU made 19 trips in the herring and mackerel fisheries in the same areas, and a further 14 trips on over-15m pelagic trawlers working in sub-divisions VIIcde mainly targeting blue whiting, mackerel and horse-mackerel.

The observations during 2007 amounted to 215 days at sea among the identified fleets, monitoring approximately 7.84% of the 2731 recorded fishing days at sea.
### Table 3a: Fishing Effort and Observer Effort in Static Gear

<table>
<thead>
<tr>
<th>Fleet segment</th>
<th>ICES Subarea</th>
<th>No of vessels</th>
<th>No of landings</th>
<th>Days at sea</th>
<th>No of hauls</th>
<th>No of vessels</th>
<th>No of trips</th>
<th>Days at sea</th>
<th>No of hauls</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>C VIA</td>
<td>3</td>
<td>7</td>
<td>55</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>C VIIA</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>C VIIB</td>
<td>3</td>
<td>7</td>
<td>47</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>C VIII</td>
<td>5</td>
<td>88</td>
<td>262</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>365</td>
<td></td>
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<td></td>
<td>0.00%</td>
</tr>
<tr>
<td>D VIIE</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>D VIIF</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.00%</td>
</tr>
</tbody>
</table>

1. ICES format requests Average soak time and total length of nets – this information was not available

### Table 3b: Fishing Effort and Observer Effort in Towed Gear

<table>
<thead>
<tr>
<th>Fleet segment</th>
<th>ICES Subarea</th>
<th>No of vessels</th>
<th>No of landings</th>
<th>Days at sea</th>
<th>No of hauls</th>
<th>No of vessels</th>
<th>No of trips</th>
<th>Days at sea</th>
<th>No of hauls</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A VIA</td>
<td>26</td>
<td>128</td>
<td>449</td>
<td>416</td>
<td>&gt;4</td>
<td>15</td>
<td>84</td>
<td>66</td>
<td></td>
<td>15.85%</td>
</tr>
<tr>
<td>A VIB</td>
<td>6</td>
<td>8</td>
<td>38</td>
<td>36</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>A VIIB</td>
<td>7</td>
<td>11</td>
<td>35</td>
<td>32</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>A VIIC</td>
<td>12</td>
<td>24</td>
<td>184</td>
<td>171</td>
<td>1</td>
<td>1</td>
<td>7</td>
<td>7</td>
<td></td>
<td>4.10%</td>
</tr>
<tr>
<td>A VIID</td>
<td>4</td>
<td>28</td>
<td>71</td>
<td>66</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>A VIIE</td>
<td>6</td>
<td>77</td>
<td>80</td>
<td>74</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>A VIII</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>A VIJJ</td>
<td>9</td>
<td>23</td>
<td>119</td>
<td>111</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>984</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9.25%</td>
</tr>
<tr>
<td>B VIA</td>
<td>29</td>
<td>98</td>
<td>269</td>
<td>196</td>
<td>&gt;1</td>
<td>11</td>
<td>26</td>
<td>19</td>
<td></td>
<td>9.54%</td>
</tr>
<tr>
<td>B VIB</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>B VIIA</td>
<td>2</td>
<td>45</td>
<td>53</td>
<td>39</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>B VIID</td>
<td>2</td>
<td>14</td>
<td>40</td>
<td>92</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>7</td>
<td></td>
<td>7.58%</td>
</tr>
<tr>
<td>B VIIE</td>
<td>3</td>
<td>117</td>
<td>124</td>
<td>183</td>
<td>3</td>
<td>10</td>
<td>19</td>
<td>28</td>
<td></td>
<td>15.32%</td>
</tr>
<tr>
<td>B VIJJ</td>
<td>3</td>
<td>8</td>
<td>21</td>
<td>32</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>512</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9.30%</td>
</tr>
<tr>
<td>E IVA</td>
<td>34</td>
<td>299</td>
<td>777</td>
<td>406</td>
<td>&gt;2</td>
<td>23</td>
<td>76</td>
<td>39</td>
<td></td>
<td>9.72%</td>
</tr>
<tr>
<td>E IVB</td>
<td>6</td>
<td>14</td>
<td>33</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>E IVC</td>
<td>3</td>
<td>28</td>
<td>51</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>861</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.77%</td>
</tr>
<tr>
<td></td>
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<td>2357</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9.09%</td>
</tr>
</tbody>
</table>

1. ICES format requests Average soak time and total length of nets – only haul data was available

### 4.1 Recording of bycatch

No cetacean bycatches were recorded in any of the observed fleet segments requiring observation under Council Regulation 812/2004. The best estimate of bycatch in these fleet segments is therefore zero.
5. Discussion

For the third year running no cetacean bycatches was observed in any of the fleet segments listed for monitoring under Council Regulation 812/2004. This is not to suggest that UK fisheries do not have a bycatch of any cetaceans, but rather that the segments being observed under this regulation have very low bycatch rates and unlikely to be observed and thus considered to be at levels which are a conservation threat.

The observations during 2007 amounted to 215 days at sea among the identified fleets, monitoring approximately 7.84% of the 2731 recorded fishing days at sea. This suggests that overall bycatch events occur less than once every 72 days assuming an equal likelihood of capture in all sectors, which is the same as saying that the observations made during 2007 suggest that there were less than 38 fishing days on which any cetacean bycatch occurred\(^1\). If observations from previous years were also included in such a calculation, then the estimate of overall long term fleet bycatch (number of cetacean bycatch events per day at sea) would be even lower, as FRS and SMRU have been monitoring these fleets for several years with no record of any cetacean bycatches.

These calculations assume that all of the fleet segments observed under the 812 Regulation have an equal probability of cetacean bycatch. This is unlikely to be true. The coverage in Fleet Segment A, for example, is heavily weighted toward sampling in the mackerel fishery in sub area VIa, as that is where most UK effort is located. Coverage in other winter fisheries in VIIbc and VIIij was relatively low and could be increased, as even though UK effort is low in these areas, records from Dutch vessels fishing in these areas suggest that bycatch events are not as rare there as they would appear to be in VIa.

Targeting observer coverage as a proportion of total fleet effort is difficult as the total fleet effort is not known prior to the season, and can vary substantially from year to year. Logistically it is also difficult to ‘tune’ the levels of sampling when the basic unit of sampling is a trip, which may consist of 5 or 10 days at sea.

The amounts of sampling achieved did not fulfil all of the objectives set by the 812 Regulation, but exceeded the proposed levels in other cases. Specifically, winter sampling observations of pelagic trawlers in Sub Divisions VI, VII and VIII (Segment A) was estimated at 9.25%, against a target of 10%, a shortfall of around 8 days at sea. Given the absence of any bycatch observations it is unlikely to be important in improving accuracy of the bycatch estimate. In contrast, sampling of the same fleet segments during the months of April to

\(^1\) Assuming a binomial distribution of bycatch positive days, the 95% Upper Confidence Limit (UCL) of the Bycatch Event per Day at Sea is 0.0139 which suggests that we can be 95% sure that fewer than 1 in 72 days at sea is associated with a bycatch event, or that there were in all fewer than 38 bycatch positive days for the whole fleet in 2007. The binomial UCL was calculated using the BINOMDIST function in Microsoft Excel.
November (Segment B) achieved coverage of 9.3% compared with a target of 5%. Sampling of the pelagic sector in Sub Division IVa (Segment E) also exceeded the target in 2007 (8.77% cf 5%).

Sampling of set gillnets in the over 15m fleet in ICES subdivisions VIII and VIa and VIIlab (Segment C) fell short by 18 days. This fleet Segment is logistically hard to sample for several reasons. Most UK set gillnet fleet activity is concentrated in sub areas VIIdefghj. The sub areas specified in Regulation 812 are at the periphery of the main UK set gillnet fishing areas, and dedicated fishing in these sub areas is very hard to predict. Furthermore most of the vessels engaged in set gillnet fishing in these sub areas are based in Spain and may make trips of a month or more fishing in a very wide area from Spain to Sub Area Ila and beyond the continental shelf edge. It is logistically difficult to place an observer on such boats, but it is also very hard to know in advance (even for the boat owners) which specific sub-areas these boats will fish in during any given trip.

UK-based set gillnet fisheries in adjacent areas were sampled during 2007, specifically in VIIdefgh (247 days at sea sampled from about 32000 in total-0.8% – see Annex A below). Under 15m netters working in VIIa were also sampled (5 days from about 840 in total (0.6%)). These portions of the fleet were sampled for the purposes of the Habitats Directive, or in the case of Regulation 812 if they fell under the Scientific Studies requirement. A summary of results is given in Annex A.

Prior to 2007 no driftnetting by over-15m vessels in the UK since the closure of the albacore tuna driftnet fishery in the late 1990s had been observed. A single boat made three experimental trips to try to catch sea bass using a driftnet in 2007 in Sub Areas VIIe and VIIf (Fleet Segment D). Sampling was not undertaken, as the effort amounted to only 9 days at sea, equating to 0.45 days sampling. The vessels’ owner has subsequently sold the nets and it is assumed that this Fleet Segment will not require sampling in 2008.

Regulation 812 requires that sampling should be geared to achieve a bycatch estimate with a coefficient of variation (CV) of less than 0.3. This is a fairly standard requirement for such estimates but can only be achieved if there is one or more observed bycatch events. With no observed bycatch the CV is undefined. Furthermore it is now clear that bycatch rates in these fisheries are low enough that any positive bycatch will require a disproportionately large amount of sampling to achieve a target CV of 0.3. An alternative approach to setting sensible levels of sampling has been suggested by Northridge and Thomas (2003). Such an approach would involve determining a threshold level of bycatch above which we should be concerned, and then determining how much sampling would be required to show that actual bycatch levels were either lower than or greater than such a threshold. This would avoid high levels of sampling in large fisheries where the overall bycatch rate is clearly too low to be of any practical concern. This approach is being considered by the ICES study group (ICES 2008). In the absence of any observed bycatch, and assuming continued monitoring is needed, retaining the ‘pilot study’ levels
of 10% and 5% for the various fishery segments seems the most appropriate approach to setting monitoring requirement levels.

6. References


Annex A: Scientific Studies, Observations under the obligations of the Habitats Directive and bycatch mitigation measures

A.1 Summary of observations outside the requirements of Regulation 812

A further 444 days at sea have been achieved monitoring various other gillnet and pelagic trawl fisheries during 2007. The results of these observations are summarised below in Table 3.

Table 4: Observations of fisheries not covered by 812, or covered by Scientific Studies (DN=Drift net; GN = gill or tangle net; PT = Pelagic Pair Trawl)

<table>
<thead>
<tr>
<th>GEAR GROUP</th>
<th>ICES DIVISION</th>
<th>Target species</th>
<th>Trips</th>
<th>Days Absent</th>
<th>Hauls</th>
<th>Porpoises</th>
<th>Common dolphins</th>
<th>Bottlenose dolphins</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN</td>
<td>IVC</td>
<td>Dover sole</td>
<td>4</td>
<td>4</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>DN</td>
<td>IVC</td>
<td>Thornback Ray</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>DN</td>
<td>VIIA</td>
<td>Bass</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>DN</td>
<td>VIID</td>
<td>Bass</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GEN</td>
<td>IVB</td>
<td>Cod</td>
<td>2</td>
<td>2</td>
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<td>Bass</td>
<td>2</td>
<td>2</td>
<td>14</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GEN</td>
<td>IVC</td>
<td>Dover sole</td>
<td>22</td>
<td>24</td>
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<td>0</td>
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<td>0</td>
</tr>
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<td>VIIA</td>
<td>Ray</td>
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<td>2</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GEN</td>
<td>VIIA</td>
<td>Bass</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
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<td>GEN</td>
<td>VIIA</td>
<td>Flounder</td>
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<td>2</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GEN</td>
<td>VIIA</td>
<td>Plaice</td>
<td>6</td>
<td>6</td>
<td>21</td>
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<td>Dover sole</td>
<td>14</td>
<td>15</td>
<td>53</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GEN</td>
<td>VIIID</td>
<td>Ray</td>
<td>4</td>
<td>4</td>
<td>23</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GEN</td>
<td>VIIIE</td>
<td>Bass</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<td>Brill</td>
<td>2</td>
<td>7</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
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<td>VIIIE</td>
<td>Cod</td>
<td>2</td>
<td>2</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GEN</td>
<td>VIIIE</td>
<td>Dover sole</td>
<td>16</td>
<td>19</td>
<td>92</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GEN</td>
<td>VIIIE</td>
<td>Hake</td>
<td>2</td>
<td>15</td>
<td>23</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GEN</td>
<td>VIIIE</td>
<td>Lobster</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GEN</td>
<td>VIIIE</td>
<td>Monkfish</td>
<td>35</td>
<td>55</td>
<td>124</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>GEN</td>
<td>VIIIE</td>
<td>Plaice</td>
<td>1</td>
<td>2</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GEN</td>
<td>VIIIE</td>
<td>Pollack</td>
<td>14</td>
<td>14</td>
<td>138</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>GEN</td>
<td>VIIIE</td>
<td>Ray</td>
<td>3</td>
<td>7</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GEN</td>
<td>VIIIE</td>
<td>Red Mullet</td>
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<td>1</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GEN</td>
<td>VIIIE</td>
<td>Spider Crab</td>
<td>4</td>
<td>4</td>
<td>24</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>VIIIE</td>
<td>Turbot</td>
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<td>21</td>
<td>78</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
A.2 Common dolphin bycatch in the bass pair trawl fishery and bycatch mitigation.

Common dolphin bycatch in the under-15m winter bass pair trawl fishery in VIIe has been subject to intensive study and significant efforts to minimise bycatch of common dolphins since 2001. During the 2006/2007 winter season a new acoustic deterrent device was tested in this fishery and this appears to have achieved some useful results in reduction of dolphin bycatch.\(^2\)

Pelagic trawling for bass has dwindled in recent years to a few local boats and one Scottish pair team as fishing has become less profitable. It is not easy from the landings statistics to identify trips that were definitely targeting bass using a pelagic trawl. However, by assuming all pelagic pair trawl trips for which bass was the most valuable landing were bass pair trawl trips, it would appear that in 2007 there were about 54 days at sea; assuming the mean observed number of hauls per day at sea of 1.6, this implies that there were about 89 tows during 2007. About 54 of these were carried out by one pair team using new acoustic deterrent devices, and an unknown number of the remaining 35 tows were also carried out by one pair team using the same devices. A summary of the observed tows, which includes an additional 11 tows observed in December 2006, shows that the use of acoustic deterrent devices is associated with a zero bycatch rate, while bycatches in tows in which the devices were not working or were absent had a very high bycatch rate.

It is clear that tows without functional pingers – which includes tows where no pingers were applied as well as three tows in which the pingers were found to have malfunctioned, had very high dolphin bycatch rates. The recorded 2007 average bycatch rate was 2.5 dolphins per tow. Applying this rate to the 35 tows that we know little about could suggest an annual bycatch of around 87 +

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\(^2\) Work carried out under contract to DEFRA MF0736 and the EU Project ‘Necessity’
25 = 112 animals. The total is unlikely to have been this high for two reasons. Firstly the tows with observed bycatches (and most of the observed pingered tows) occurred in January and February when bycatch rates are typically at their highest seasonal level, while the fishery operates from December to late March. Secondly, we know that two of the local boats began using pingers in late February after they had learned of their apparent success. It is not possible to estimate the number of common dolphins killed in the bass pair trawl fishery during 2007 but in round numbers it is probably reasonable to suppose it was between 50 and 100 animals.

Table 5: Mitigation Trials using the Dolphin Dissuasive Device 2006-2007. (DDD-02F - STM Products)

<table>
<thead>
<tr>
<th>Observations:</th>
<th>Number of Recorded tows</th>
<th>Number of tows with bycatch</th>
<th>Number of dolphins bycaught</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tows recorded by on board observers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tows using pingers:</td>
<td>18</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tows without functional pingers:</td>
<td>9</td>
<td>5</td>
<td>22</td>
</tr>
<tr>
<td>Tows reported by Skipper</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tows using pingers:</td>
<td>12</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tows without functional pingers:</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>All recorded tows whether independently observed or not</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tows using pingers:</td>
<td>30</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tows without functional pingers:</td>
<td>10</td>
<td>6</td>
<td>25</td>
</tr>
</tbody>
</table>

A.3 Common Dolphin and Porpoise Bycatch in Gillnet and Tangle Net Fisheries in Sub Areas VIIa and d through VIIh and j

Bycatches of dolphins (3 common dolphins and one bottlenose dolphin) and harbour porpoises (7 individuals) were recorded during 2007 in a sole trammel net fishery in the eastern Channel (1 porpoise) and in hake, turbot, monkfish and pollock fisheries in VIIe, VIIf, VIIg and VIIh. In all cases bycatches were recorded as single individuals. Overall, we observed 1184 static net fishing operations, so that the mean bycatch rate over all gillnet fisheries observed is 0.00253 common dolphins per haul and 0.00591 porpoises per haul – or 1 dolphin in every 395 hauls and 1 porpoise in every 169 hauls.
We have only ever observed one bottlenose dolphin bycatch in several years of monitoring static net fisheries in this area, so we do not consider the single observation in 2007 to warrant any further assessment in terms of extrapolating to an overall annual rate. We simply note that bottlenose dolphins can get entangled in gillnets in this region, but that such events remain rare.

We cannot provide properly stratified estimates of bycatch for the other two species by geographical area because we do not have sufficiently detailed geographical coverage. Although we monitored 1184 gillnet hauls during 434 days at sea, landings records suggest that there are over 1000 UK registered vessels using gillnets in sub-Division VII with over 32000 days at sea in 2007, which, based on the observed number of hauls per day by target species, suggests an overall total of 131,000 net hauls in 2007.

A crude ratio estimate would suggest that the observed bycatch rates for common dolphins and for porpoises would be around 332 common dolphins and 774 porpoises, but given the relatively low sampling levels, the variety of gears used and the broad geographical zone covered by these fisheries and by our sampling, any such estimate is liable to be subject to unpredictable biases. A more rigorous approach would be to estimate cetacean bycatches only for those fishery strata for which we have adequate sampling.

To place these fisheries in context, in Table 5 we have tabulated the estimated fishing effort for UK gillnet and tanglenet fisheries in all of sub-Division VII excluding VIIbc&k, west of Ireland. These data are derived from logbook and landings data, and are based on the recorded days at sea for each reported trip, while target species are determined from the most valuable single species in the whole catch, though many infrequent species have been aggregated into arbitrary groupings such as ‘other flatfish’.

Table 6: Overview of fishing effort by gillnet fisheries in VIIadefghj by target species

<table>
<thead>
<tr>
<th>Main Target Species group</th>
<th>No of trips</th>
<th>No of days at sea</th>
<th>Estimated Hauls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchovy</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Bass</td>
<td>3448</td>
<td>4791</td>
<td>6850</td>
</tr>
<tr>
<td>Cod</td>
<td>878</td>
<td>1066</td>
<td>6396</td>
</tr>
<tr>
<td>Cray</td>
<td>106</td>
<td>486</td>
<td>1754</td>
</tr>
<tr>
<td>Crust</td>
<td>1041</td>
<td>3977</td>
<td>18394</td>
</tr>
<tr>
<td>Deep</td>
<td>2</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Dog</td>
<td>135</td>
<td>211</td>
<td>762</td>
</tr>
<tr>
<td>Gadoid</td>
<td>1128</td>
<td>2074</td>
<td>12547</td>
</tr>
<tr>
<td>Hake</td>
<td>147</td>
<td>956</td>
<td>1960</td>
</tr>
<tr>
<td>Herring</td>
<td>210</td>
<td>227</td>
<td>819</td>
</tr>
<tr>
<td>Mackerel</td>
<td>681</td>
<td>851</td>
<td>3072</td>
</tr>
<tr>
<td>Monk</td>
<td>1442</td>
<td>1994</td>
<td>5165</td>
</tr>
<tr>
<td>Mullet</td>
<td>3</td>
<td>3</td>
<td>11</td>
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<tr>
<td>Other</td>
<td>980</td>
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<td>8280</td>
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<tr>
<td>Other flatfish</td>
<td>153</td>
<td>164</td>
<td>492</td>
</tr>
<tr>
<td>Plaice</td>
<td>571</td>
<td>715</td>
<td>3215</td>
</tr>
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</table>
Estimates of bycatch of porpoises in trammel net fisheries for sole and gillnet fisheries for cod, pollock and other gadoids, and for porpoises and common dolphins in gillnet fisheries for hake and tangle net fisheries (for turbot, monkfish, crayfish, spider crabs, skates and rays) in Divisions VIIadefghj are given in Table 7.

These fishery strata are based on similarities of gear type, but it should be pointed out that sampling has been far from even across all fisheries contained within these expedient groupings, while bycatch estimates are made on the assumption that all areas and sectors of the fisheries described above are equally likely to have been sampled. There is therefore likely to be some unquantifiable level of bias in the estimates that we have produced below.

Table 7: Bycatch estimates stratified by fishery.

<table>
<thead>
<tr>
<th>Fishery</th>
<th>Obs Hauls</th>
<th>Obs kill</th>
<th>Bycatch rate</th>
<th>Days out</th>
<th>Hauls / day</th>
<th>All hauls</th>
<th>Estim kill</th>
<th>CV</th>
<th>Lower 95% CL</th>
<th>Upper 95% CL</th>
</tr>
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<tbody>
<tr>
<td>Porpoises</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Sole</td>
<td>145</td>
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<td>0.0068966</td>
<td>9942</td>
<td>4.56</td>
<td>45336</td>
<td>313</td>
<td>1.00</td>
<td>61</td>
<td>1599</td>
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<tr>
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<td>145</td>
<td>3</td>
<td>0.0206897</td>
<td>956</td>
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<td>1960</td>
<td>41</td>
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<tr>
<td>Tangle nets</td>
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<td>8624</td>
<td>3.884</td>
<td>33495</td>
<td>174</td>
<td>0.71</td>
<td>50</td>
<td>604</td>
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<td>Gadoids</td>
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<td>3140</td>
<td>6.025</td>
<td>18918</td>
<td>65</td>
<td>1.00</td>
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<tr>
<td>Total</td>
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<td>592</td>
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<td>Common dolphins</td>
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<td></td>
<td></td>
<td>114</td>
<td>0.78</td>
<td>29</td>
</tr>
</tbody>
</table>

These estimates are based on very few individual observations of bycatch and from a relatively low proportion of the total fishing effort in the region. For porpoises we have provided estimates of bycatch for fisheries that account for about 100,000 hauls per year from a total of 131,000, while for dolphins the bycatch estimates are made for just two fisheries that account for about 35,000 hauls or fishing operations per year. At present our best estimates of cetacean bycatches in the remaining fisheries is zero, but this must be viewed in the context of very low sampling levels in these other fisheries.
The CVs of the bycatch estimates are very large and the confidence intervals very wide. More reliable estimates might be obtained by combining bycatch data over several recent years to obtain an estimate of the underlying bycatch rate, and applying this to an individual year’s (2007 in this case) fishing effort data, but clearly more sampling