ICES WGBYC REPORT 2013

ICES ADVISORY COMMITTEE

ICES CM 2013/ACOM:27

Report of the Working Group on Bycatch of Protected Species (WGBYC)

4–8 February

Copenhagen, Denmark

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CIEM Conseil International pour l'Exploration de la Mer

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Recommended format for purposes of citation:

ICES. 2013. Report of the Working Group on Bycatch of Protected Species (WGBYC), 4–8 February, Copenhagen, Denmark. ICES CM 2013/ACOM:27. 73 pp.

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Executive summary

The Working Group on Bycatch of Protected Species (WGBYC) met in Copenhagen at ICES headquarters between 4 and 9 February 2013. The meeting was chaired by Bram Couperus (Netherlands) and was attended by 18 members from ten nations. Of these, one member participated by video conferencing and one member by correspondence.

Since the group started as Study Group on Bycatch of Protected Species (SGBYC) in 2008 the broad aim of the meeting is to collate and review recent information on the bycatch of protected species, especially under the requirements of EC Regulation 812/2004, to coordinate bycatch monitoring and bycatch mitigation trials and to disseminate and review information on methodologies associated with these topics. The group recently refocused the aim to work on the incorporation of monitoring requirements into the new Data Collection Framework (DCF) since the EC decided not to amend EU Regulation 812/2004 and to implement monitoring tasks for protected and endangered species in the future in the DCMAP by close cooperation with ICES expert groups (Planning Group on Commercial Catch, Discards and Biological Sampling/ Study Group on Practical Implementation of Discard Sampling Plans; PGCCDBS/SGPIDS and Regional Coordination Meetings (RCMs). This objective is consistent with a move to a wider ecosystem based approach to fisheries monitoring to include bycatch of cetaceans, seals, birds, turtles and non-target fish species.

Abundances of cetaceans, DCF catch and discards monitoring, and monitoring effort under the current Regulation 812/2004 were put together in a database to facilitate an overview of current gaps and overlap in monitoring. This process was hampered by the use of different units or definitions of areas in datasets. However, we believe that identifications of these problem in itself is a valuable preparation for the coming Workshop on Bycatch of Protected Species (WKBYC), designed to address a recent additional "Request from EU concerning monitoring bycatch of cetaceans and other protected species" (DGMARE, 14 December 2012).

The Working Group reviewed and commented on EU Member States' reports under council Regulation 812/2004 to assess the status of information on recent bycatch estimates and evaluate the extent of the implementation of bycatch mitigation measures. It was noted that estimates are still very patchy, and several EU member states have not fulfilled their monitoring obligations. Bycatch monitoring remains less than optimally directed in many cases. Observer effort may not be representative of fleet effort and any extrapolated numbers derived solely in this report are uncertain and should be treated with caution.

WGBYC reviewed recent bycatch mitigation trials, including trials of gillnet modifications and experiments that attempt to quantify the effect of pingers on porpoise displacement. Similar to WGBY previous assessments, implementation of bycatch mitigation measures was also found to be patchy; with few EU member states able to provide unequivocal confirmation that the obligations under Regulation 812/2004 for pinger deployment are being met. WGBYC continued to develop a streamlined and effective database for the collation, storage and analysis of European bycatch monitoring and fishing effort data for those fishing sectors where bycatch monitoring is mandated under Regulations 812/2004.

1 Opening of the meeting and adoption of the agenda

The Working Group for Bycatch of Protected Species (WGBYC) met at ICES headquarters in Copenhagen 4–9 February 2013. Delegates were welcomed by Helle Gjeding Jørgensen. A complete list of participants is given at Annex 1. The Terms of Reference are given at Annex 2.

The Draft Agenda was provisionally agreed but was subsequently revised during the meeting; the final version is given in Annex 2. Much of the work was accomplished in small groups, with plenary sessions for discussion and agreement on major issues.

2 EU approach to bycatch management of protected species and the role of WGBYC

2.1 Background

The European Commission has carried out two reviews of Regulation (EC) No 812/2004 – COM (2009) 268 and COM (2011) 578. These took place respectively after the second and fourth national reports on the implementation of the Regulation; as required under Article 7 of the Regulation. Despite these reviews having identified a number of deficiencies, the Commission has indicated that it has no intention of amending the existing Regulation. This is primarily because continuing to agree on detailed rules for managing the incidental catches of cetaceans under the normal legislative procedure (i.e. co-decision of Council and The European Parliament) runs contrary to the Commission's objective of moving to regionalised decision-making, advocated in the reform of the Common Fisheries Policy (CFP). Tabling amendments would also most probably result in a protracted political debate on the Regulation which could result in a dilution of the measures agreed or measures continuing to be targeted at the wrong fisheries. As indicated in the latest communication, the Commission's intention therefore, is to move away from a central regulation and incorporate the main elements of Regulation (EC) 812/2004 (i.e. monitoring and mitigation) into other regulatory frameworks. Once this has been achieved the Regulation could be repealed. This devolved approach will ensure that monitoring and mitigation are targeted in the areas and for the species most under threat. Improved mitigation measures could be incorporated under the new technical measures framework that will be developed as part of the reform of the CFP. This would set out the scope and management targets to be met in relation to incidental catches of cetaceans, with the possibility for Member States to develop mitigation measures for specific areas and fisheries. The monitoring requirements could be incorporated into the Data Collection Framework (DCF), which is to be replaced by the Data Collection Multi-Annual Programme (DCMAP), in line with a move to a wider ecosystem approach to fisheries monitoring which would include incidental catches of non-target species such as cetaceans, seabirds and benthic organisms.

The Commission recognizes that while this is the most rational approach it does mean that Regulation (EC) 812/2004 will remain in place during this transitional period while the reform of the CFP is concluded and, post-reform, while regionalisation evolves. Therefore, accepting that there are inherent weaknesses in the existing Regulation, there is a need to consider how best to focus monitoring of incidental catches of cetaceans on the right areas and fisheries and also to optimize the existing mitigation measures (i.e. acoustic deterrent devices) in place during this transitional period. At the same time, to improve the management of cetaceans (and other protected species) post-reform, there is a need to better define the magnitude of the problem (protected species bycatch), and strengthening the assessment of bycatch rates.

2.2 Monitoring

Over the last number of years, WGBYC has routinely assessed available data on incidental catches of cetaceans including the national reports submitted to the Commission by Member States and other supplementary information collected nationally. They have also provided advice on problematic fisheries and populations or subpopulations of cetaceans most at risk (ICES, 2010b). This analysis demonstrates observer programmes are the best source of data. However, national reports from Member

States also show a reluctance to continue such programmes specifically for monitoring incidental catches because of the costs involved. Therefore, in order to continue to be able to establish which fisheries pose a threat or potential threat to cetacean populations it is important to collate existing information and identify additional/alternative sources of information to enable assessment of potential fisheries that pose an interaction threat to guide future monitoring requirements, ahead of any possible revision of the monitoring schemes. The most likely source of information, in addition to monitoring under 812/2004, is observer coverage provided under the existing DCF but whether this level of coverage will be at a sufficient resolution or in the right fisheries and areas to allow this is open to question.

2.3 Mitigation

On the acoustic deterrent devices, in 2012 the Commission tabled a proposal; COM (2012) 447 to align Regulation (EC) 812/2004 with the Treaty of the Functioning of the European Union (TFEU). This proposal is currently under discussion with the co-legislators. One of the provisions is to allow for a revision of the technical specifications and conditions of use of acoustic deterrent devices as defined in Annex II of the Regulation. This would allow adaptations to take account of technical and scientific progress since the regulation came into force but requires an analysis of the parameters contained in Annex II to identify the changes that could be made.

2.4 Defining the problem

The information available to identify fisheries with incidental catches of cetaceans and for which measures are needed is currently still limited. Furthermore, it does not necessarily allow accurate and realistic assessments of populations and the impact of incidental catch on these populations. This means defining clear management targets for most fisheries is problematic. Other approaches, as well as the criteria used to define what constitutes an "incidental catch problem" need, therefore, to be developed. ICES is best placed to define these criteria and whether biological indicators (e.g. PBR-Potential Biological Removal) or threshold reference points could or should be used for defining a problem and setting management targets.

In 2009, ICES advised the European Commission '*that a Catch Limit Algorithm approach is the most appropriate method to set limits on the bycatch of harbour porpoises or common dolphins. In order to use this (or any other) approach, specific conservation objectives must first be specified. In both species improved information on bycatch and the biology of the species would improve the procedure*.' In 2010, ICES again advised the European Commission that '*ICES advised in 2009 of the need for explicit conservation and management objectives for managing interactions between fisheries and marine mammal populations. This advice has not been acted upon. Lacking these objectives, ICES is unable to properly consider the impacts of these interactions in its management advice*.'

To address these issues the Directorate-General for Maritime Affairs and Fisheries DGMARE has requested ICES, through WGBYC and other relevant WGs to consider three requests which are dealt with in chapter [ToR H: Preparation of additional request by DGMARE].

3 ToR B: National reports on cetacean bycatch under Reg. 812

3.1 Introduction

The WG had been provided with Member States' reports to the European Commission on observations carried out under Regulation 812. Reports were received from 15 member states. The contents of the reports have been reviewed according to three categories: (1) monitoring of cetaceans, (2) pingers and mitigation and (3) information on bycatch of taxa other than cetaceans. Tables 1(a–c) briefly summarize the contents of the national reports with emphasis on: 1(a) whether applied observer effort is being combined with the DCF sampling schemes; 1(b) pinger usage; and 1(c) whether or not other taxa were included in the monitoring scheme. The 15 countries who provided a report, carried out a total of 3539 observer days under all monitoring combined (Reg. 812 + DCF + voluntary programs) and 300 Remote Electronic Monitoring (REM) days, to which should be added 670 observation hours carried out by Germany. This monitoring resulted in 83 specimens of cetaceans recorded as bycatch, with a total minimum reported estimated bycatch of 1658 specimens (Table 1a, "summed provided estimate" + reported bycatch without extrapolation). The species involved are harbour porpoises (*Phocoena phocoena)*, common dolphin (*Delphinus delphis*), striped dolphin (*Stenella coeruleoalba*) and bottlenose dolphins (*Tursiops truncatus*), pilot whale (*Globicephala melas*) and minke whale (*Balaenoptera acutorostrata*).

3.2 Reported observer effort, cetacean bycatch rates and extrapolated bycatch totals

In the following section information on cetacean bycatch has been summarized from the national reports. In some cases additional information not found in the reports is included:

Belgium

There has been no dedicated monitoring of marine mammal bycatch during fishing operations in 2011, although fishing trips were observed to meet other monitoring requirements.

No bycatch of marine mammals was observed during fishing operations. However, one of the causes of death of stranded marine mammals has been identified as incidental catch in fishing gear (see under point 4.5).

Cyprus

(No report: According to a letter in an earlier report no monitoring required under 812).

Denmark

The relevant Danish fleet totals 59 vessels in ICES Areas IIId24/IIIc24 and 36 vessels in ICES Area IIIa/IV, which used gillnets in the course of 2011.

No specific monitoring programmes for marine mammal bycatch took place in the pelagic trawl fishery nor the gillnet fishery. Instead observer data on marine mammal bycatches from gillnets has been collected under the DCF. On board observations of bycatch of small cetaceans was carried out in Subareas IIIaN, IIIaS and IVb on vessels

below 15 meters, with low coverage in all areas. No bycatch of small cetaceans was observed.

Electronic monitoring systems (REM systems) were installed on six gillnet vessels <15 m in Subdivision 23, in Subarea IIIaN and in Subarea IVb, with close to 100% coverage. A total of 276 days at sea were observed, and seven harbour porpoises were observed bycaught (six in Area IIIaN and one in Subarea 23).

Estonia

Estonia has no gillnetters larger than 15 m. Static gears are used on vessels up to 10 m. No studies have been conducted to assess the incidental catches of cetaceans in this segment. Interviews with fishermen do not suggest, however, that cetacean bycatch occurs, but there are catches of seals (species unidentified; 200–300 specimens per year) and seal damage to nets.

Under a dedicated monitoring scheme for midwater otter trawls (OTM) in Area IIId and Subareas 25–32 for vessels above 16 m, 18 vessels out of 96 were monitored during 234 days at sea for a total of 2830 hours (coverage of 8.3%). Additionally, the cetacean observers collected herring (*Clupea harengus*), sprat (*Sprattus sprattus*) and cod (*Gadus morhua*) samples and recorded the proportion of herring and sprat in the catches. No cetacean bycatch was reported in 2011.

France

Under Regulation 812/2004, the dedicated observer scheme covered 287 days at sea for static gears in ICES Area VIII and 299 days at sea for towed gears in ICES Areas VII and VIII and the Mediterranean area. In addition, some 308 days at sea were dedicated to set-nets in areas concerned with pingers (zones IV and VII). These 894 observation days represented less than the planned monitoring scheme.

Four different species were incidentally caught: Common dolphin (six), Harbour porpoise (four), Bottlenose dolphin (one), and Striped dolphin (one). Bycatch could only be estimated for a few segments of fleets: an estimate of 207 common dolphins for midwater pair trawling in the Western Channel (CV=95%) and a minimum estimate of 94 harbour porpoises for gillnetters >15 m in the Western Channel (CV= 61%). No catches of cetaceans have been observed in other segments well covered by observer monitoring, such as the tuna pelagic trawl in Areas VII and VIII, the demersal fishnets in Area VIIh for all size vessels and the demersal fishnets in Area VIIe for vessels <15 m. No estimate of cetacean bycatch was possible for the Bay of Biscay or the Mediterranean due to inadequate or irregular monitoring.

Other fisheries known to take cetaceans should get better coverage, such as the midwater pair trawl (PTM) for sea bass and set-nets in the Bay of Biscay; the hake (*Merluccius merluccius*) trawl fishery and small pelagic fish trawl fishery in the Mediterranean; and the North Sea/eastern English Channel.

The DCF data from bottom-trawl (OTB) gear in the western Channel which are not covered by the Regulation (But would be covered under the requirements of the Habitats Directive, Article 12) indicate a few catches of common dolphins.

Germany

Monitoring is carried out via the DCF program by applying the methods as stated in Regulation 812/2004. The requirements for monitoring intensity set by the Regulation 812/2004 could not be achieved, due to technical and capacity reasons.

The bycatch of five long-finned pilot whales was observed in the midwater otter trawl fishery targeting mackerel in ICES Area VIIfghj. During all other observed trawl fisheries in the North Atlantic, North Sea and in the Baltic, no bycatch of cetaceans was observed. During a pilot study to test remote electronic monitoring with on-board video systems on three commercial gillnet fishing vessels (<12 m) fishing east of the island of Rügen in Germany, no bycatch was observed.

Greece

The report states that "Since no fishing vessels flying the Greek flag operate in the area of the competence of the Regulation, there is no need to take any legislative or administrative measures according to the provisions of Art. 4 or 5." Hence, no effort and bycatch data were reported.

Ireland

A total of 273 monitoring days at sea were carried out both as part of the dedicated independent observer programme and DCF on pelagic trawlers, with no cetacean bycatch observed. Apart from four common dolphins observed as bycatch by an OTM research vessel targeting small pelagic fish in 2006, no cetacean bycatch incidences have occurred in 703 days of observations on board Irish pelagic trawlers since 2005.

A total of 81 days at sea were observed on Irish set-net vessels involved in gillnetting, tanglenetting and trammelnetting as part of a dedicated observer programme in 2011. Bycatch of three harbour porpoise, two common dolphins and one Northern minke whale was observed in these set-net fisheries.

Italy

Pelagic trawlers only operate in Area GFCM-GSA 17. A dedicated observer scheme is operated to record bycatch of multiple species (protected species and those of conservation concern), but the target level of monitoring (to achieve a bycatch estimate with a 30% CV) is not met.

The total observation coverage of the pelagic/midwater pairtrawler fishery was 3.4% in 2011, corresponding to a total of 380 days at sea on twelve vessels. The coverage for the entire GFCM-GSA 17 (northern and central Adriatic) was 3.4%, with coverage of 4.4% in the northern part of GSA17 (the Veneto/Emilia Romagna region).

In 2011, three bycatch events of bottlenose dolphins were recorded in the Veneto/ Emilia Romagna region, where bycatch events usually occur (possibly related to more shallow waters), although not every year. A 6-year annual average estimate of 35 bottlenose dolphins (CV=0.38; 95% CIs=26–45) was calculated for this specific area, based on data collected since July 2006.

Latvia

According to the report summary, observer monitoring of cetacean bycatch was carried out during 210 days at sea in pelagic trawl fisheries and 60 days at sea in the static gillnet fishery, covering ten vessels. No bycatch was reported in 2011, similar to the findings in 2006–2010.

The data presented in the summary do not, however, correspond to the ones presented in the course of the report, except for the number of vessel observed. Fishing days

observed for pelagic trawl and gillnet fishing, 1096 and 135 respectively in the report tables, vs. 210 and 60 days in the summary.

Lithuania

In 2010, 270 interviews with fishermen did not indicate cetacean bycatch events. In 2011, under the DCF, observations were conducted on one Midwater Pair Trawl (PTM) vessel fishing in IIId 27 for ten days in March out of a total of 52 days at sea from February–May and December.

No fishing effort with PTM was made in ICES Subdivisions 22–24. Only two days fishing effort with Midwater Otter trawl (OTM) were made in ICES Subdivisions 22–24. All other effort took place in ICES Subdivisions 25–32.

No incidental catches of cetaceans were observed in 2011.

Malta

No report provided.

Netherlands

The Netherlands combine their observer scheme with DCF monitoring. In 2011, during 14 fishing trips, the pelagic freezer-trawler fleet has been observed with coverage of 13.6% and 11.5% in ICES Divisions VI–VIII (January–March and December) and the rest of the fleet, respectively. The targets of the Pilot Monitoring Scheme of 10% and 5% have therefore been fulfilled. No bycatch of cetaceans was recorded, which is in line with findings of no cetacean bycatch for the period 2006–2009.

Within this Dutch programme, nine days and 26 hauls have been observed on pelagic trawlers under French flag. The data collected during these trips have been sent to the institutes carrying out the regulation in their countries.

During a 24-day experimental REM trial on board a small gillnetter (<10 m) using trammelnets and targeting cod, six harbour porpoises were bycaught.

Poland

In 2011, observations were carried out on board 13 fishing vessels, six longer than 15 m, seven between 5 and 8 m in overall length. In total 110 days were observed, 66 days in pelagic trawl fishery and 44 days in set gillnet fishery. No catches of cetaceans or any other marine mammals were reported.

Portugal

According to the national report, there are no pelagic trawlers licensed in Portugal and therefore no monitoring required.

The polyvalent fleet includes 326 vessels above 12 m of which 109 are above 15 m. Observers from the Life+ MarPro Project and the National Biological Sampling Plan (PNAB/EU-DCF) have monitored on board the vessels over twelve meters that use gillnets/trammelnets. Eleven polyvalent boats using only gillnets/trammelnets at the time of observation were observed during 64 days at sea (day trips) and 95 hauls (0.06% coverage trips). The observed bycatch was of common dolphins, with 0.034 and 0.091 dolphins bycaught per fishing trip/haul in nets with and without pingers respectively. Extrapolating to the whole fleet based on daily fishing effort is difficult, since it is a multigear fishery and the gear used is not specified in the logbooks.

Slovenia

Slovenia has monitoring obligations for the pelagic trawl fishery, above 15 m (dedicated observer scheme) and below (experimental monitoring).

The Fisheries Research Institute of Slovenia performed monitoring of incidental catches of cetaceans in 2011 during the course of its regular monitoring activities, such as the sampling of landings. In Slovenia, all commercial fishing vessel irrespective of their size, are obliged to record in their logbook all the species caught, as well as the quantity taken. No incidental catches of cetaceans were reported in 2011.

No fleet effort or effort related data were provided to the group.

Spain

No report provided for the year 2011 (or 2010) while the report of the year 2009 indicated relatively large numbers of bycatch in some Spanish fisheries.

Sweden

No report provided.

UK

The report includes bycatch estimates for 2011 from monitoring programmes under EU Regulation 812. In the annex, however, a more reliable estimate is given, based on data collected since 2005 (as there is no significant interannual variation in bycatch rate since 2005), stratified in a more inclusive way, and also from fishery segments outside EU Regulation 812. According to this estimate 836 porpoises (compared to 540 in 2010) and 327 common dolphins (compared to 290 from 2010) were taken in 2011 with CVs of 0.09 and 0.15 respectively. Most of these bycatches occur in the Western English Channel and Irish and Celtic Seas (ICES Subareas VII a,e,f,g,h,j,i) in set gillnet fisheries. Monitoring of the main herring and mackerel pelagic trawl fisheries in VIa and IVa has been reduced because there is good evidence that cetacean bycatch rates in these fisheries are very low. Pelagic trawl sampling has focused primarily on the bass pair trawl fishery in the Western Channel and on some other smaller pelagic fisheries around the UK that have been subject to limited or no monitoring previously. No bycatch estimate has been generated for the bass pair trawl fishery, because of uncertainties over the total amount of fishing effort in 2011. Nonetheless, observed bycatch for this fishery amounted to 17 common dolphins, and this is likely very close to the true total, as most fishing effort seems to have been observed.

The principal area of concern for cetacean bycatch remains the southwestern waters of the Western Channel and Celtic Sea. The situation in the North Sea remains unclear due to relatively low levels of observer coverage in recent years.

3.3 Information on the bycatch of species other than cetaceans

Information on the bycatch of species other than cetaceans was reported by several member states in their annual reports under the 812 Regulation.

Estonia: The report repeats information from last year's report on 2010 data and provides no new data: 200–300 seals were caught by fishing gears (mainly by trapnets). 80–90% of these were grey seals (*Halichoerus grypus*) and the remainder was ringed seals (*Pusa hispida*).

Belgium: In Belgium information on other protected species refers to stranded animals, ten common seals (*Phoca vitulina*) and five grey seals. Of the seven common seals whose cause of death was identifiable, six had been caught incidentally, as had all five grey seals. One grey seal was also reported by a fisherman, as incidentally captured.

Italy: In Italy observers are trained to collect any additional data on bycatch of other protected species (e.g. loggerhead turtles; *Caretta caretta*) and species of conservation concern (e.g. sharks, pelagic rays and other fish species). In 2011, Italy reported 29 loggerhead turtles incidentally captured, as well as a large number of shads (*Alosa* sp), sharks and rays, all in pelagic midwater trawls. Annual estimates are given for most bycaught species.

UK: Annual seal bycatch estimates are given for UK set-net fishing in VIIa,e,f,g,h,j and VIII. A total of 370 seals (CV 0.1), mostly in tanglenets or trammelnets were caught in 2011. Most likely the seals would be grey seals but observers are sometimes unable to distinguish between grey and harbour seals, especially when animals are not brought onboard.

Poland: The Incidental Catches of Cetaceans Monitoring Programme also monitored incidental catches of seabirds and endangered fish species, such as twaite shad (*Alosa fallax*), or fish from reintroduction programmes, such as Atlantic sturgeon (*Acipenser oxyrhynchus*). The bycatches of six birds were reported during 44 days of observed set gillnet fishing in Area 25–26, including three dead Common Murres (*Uria Aalge*) and one other auk, one Velvet Scoter (*Melanitta fusca*) and one Red-throated Diver (*Gavia stellata*), the latter three released alive from the nets. No protected species of fish were reported in the monitored fishing operations for 2011.

Ireland: A total of 81 days at sea were observed on Irish set-net vessels involved in gillnetting, tanglenetting and trammelnetting in 2011. This work was primarily conducted as part of an ongoing study on interactions between Irish set-net fisheries and seals. The study is due to be completed in 2012 and results will be summarized in the next report to the EC. The study reported nine harbour seals, 34 grey seals and one seal without species-specification, incidentally captured in static gear.

France: Report of two bycaught alive and released loggerhead turtles (*Caretta caretta)* in the Mediterranean trawling OTB in two trips during November and December. No bycatch of seals was observed in 2011.

3.4 Further issues from the reports

3.4.1 Indicators of bycatch based on other data (strandings, interviews)

Estonia: According to interviews with the fishermen using static gear in vessels up to 10 m, there have been no cetacean catches, but interactions with seals (bycatch and depredation) have been reported.

Denmark: A new initiative was launched in spring 2012, with the reporting by inspectors of bycatch of harbour porpoise in recreational fisheries as well as for vessels below 12 meters. Fishery inspectors are now required to report any bycatch in the inspection report/ logbook.

Belgium: The cause of death of 43 stranded harbour porpoises has been investigated. Eleven specimens were suspected to have been caught incidentally in fishing gear. It is not clear whether the animals were caught incidentally in commercial or recreational fishing, more specifically fishing from the shore. A beached white-beaked dol-

phin (*Lagenorhynchus albirostris*) died from severe wounds believed to have been caused by fishing nets.

France: Analyses conducted on stranded animals demonstrate that the incidental catch of harbour porpoise and common dolphin exist on the Bay of Biscay (van Canneyt *et al*., 2012).

Portugal: According to the national report, cetacean stranding records from a stranding network under the project MarPro that covers ¾ of the Portuguese coast and also maritime authorities for the rest of the coast are presented. There were 307 strandings of dead cetaceans registered in the continent, ten in the Azores and three in Madeira. As in previous years, the most commonly stranded species was the common dolphin. Of the 272 animals necropsied (85% of the total and collected under the framework of MarPro), in about 50% of the cases the cause of death is related with incidental capture. Particularly for common dolphins, harbour porpoises and bottlenose dolphins, most evidence suggested interaction with fixed nets fisheries (either gill/trammelnets or illegal coastal driftnets), two harbour porpoise also showed signs of interference with the beach-seine fishery and two common dolphins delivered by maritime authorities were found trapped dead in illegal coastal driftnets on the northwest coast.

Netherlands: Not mentioned in the report, but relevant since ICES Subdivision IVc is not monitored under 812: Between December 2010 and November 2011 under authority of the Ministry of Economics, Agriculture and Innovation(EL&I) post-mortem examinations were carried out on 275 harbour porpoises from Dutch waters by Department of Pathobiology, Faculty of Veterinary Medicine at Utrecht University (Begeman *et al*., 2011). Of these animals the bycatch percentage (animals that showed signs of a fishery interaction) was determined as 10–37%. Subsequently if looked at over 2009–2011 then 12–33% of strandings showed sign of fishery interaction. In January and February a small peak can be seen in the categories with highly probable and certain signs of bycatch (4/28; 14%). The upper limit was set with only the fresh animals, including all categories of bycatch (possible, probable and highly probable, certain signs of fishery interaction). The lower limit was set by including all the submitted animals taking only those with a cause of death probable, highly probable and certain bycatch.

3.4.2 Observer problems and developments

Fishing activities (OTM?) for **Estonia** in SD26 and SD27 was an unusual practice for Estonian fleet and was thus not covered by the observers.

With the **Danish** REM project it is believed that a much more cost-efficient method compared to at-sea observers can be developed. Data can be collected with high coverage rates, and bycatch can be monitored from small-sized gillnet vessels. Comparisons between REM results and fishermen's logbooks showed that the REM system gave more reliable results since fishermen in many cases did not observe the bycatch while working on the deck simply because the bycatch dropped out of the net before coming on board (Kindt-Larsen *et al*., 2012).

No specific monitoring programmes for marine mammal bycatch took place in the **Danish** pelagic trawl fishery in 2011. The reason for not continuing the monitoring programs from 2006–2008 was that the observer schemes, with a coverage up to 7%, had no bycatch detections.

Data compiled by **Ireland** and the **UK** since monitoring commenced in 2005 have demonstrated that cetacean bycatch incidents are very rare in pelagic trawling opera-

tions for small fish (mackerel; *Scomber scombrus*), herring, horse mackerel; *Trachurus trachurus*, etc.) and it is difficult to justify the high costs associated with compliance with legal requirements to continue dedicated observer programmes in these fisheries.

Based on zero observed bycatch in the **Irish** Pelagic trawl fisheries, it is impossible to design a sampling strategy aimed at achieving a co-efficient of variation no higher than 0.30 for the most frequently caught species. Ireland will therefore continue to implement pilot monitoring schemes in accordance with Annex III of 812/2004.

Irish on board observations were also carried out as part of discard and stock surveys carried out under the DCF by the Marine institute, technical trials carried out by the Irish Sea Fisheries Board (BIM) and provision of data on tuna fishing under DCF and the International Commission for the Conservation of Atlantic Tuna's (ICCAT) requirements.

A new legislative measure in **Italy**, in 2011 imposed a longer "temporal biological closure" in the Adriatic, extended to two months (August and September, for the relevant fishing area). This reduced the fishing effort in the area considerably.

In **Italy** other data on fishing effort (e.g. from logbooks) is still publicly unavailable. Official fishery estimates of fishing effort produced by the Institute for Economic Research in Fisheries and Aquaculture (IREPA) are usually available with a one year lag.

Decreased coverage in 2011 for **Italy** was caused by administrative difficulties in renewing observers' contracts for some areas.

In its 2011 report **Italy** reiterates the most critical issues not yet addressed. Particularly, (1) the impossibility to achieve the Regulation objective for total bycatch estimates with CVs lower than 30% with only one species that is common but caught at very low rates; (2) bureaucratic difficulties to receive and manage funding due to public administration rules have an impact on the quality of observation coverage producing cyclic temporal gaps; (3) excessively bureaucratic procedures for obtaining permits of inspecting boats from the Harbour masters, which impaired proper stratifications.

Lithuania ran in to difficulties due to two problems: 1) Observer schemes can't be financed or co-financed under EC 1078/2008 and 2) part of the Lithuanian fleet which operates with pelagic trawls and gillnets is small, and therefore is not suitable to take an observer on board on the basis of lack of space on the vessel and for safety reasons. Execution of the Lithuanian obligations on observer schemes fully depends on cooperation with one fishing company.

France has encountered difficulties with some administrative rules for allowing observers on board of vessels. These difficulties are linked with safety on board some vessels. It is also difficult to have a representative sampling scheme on set-nets because of the difficulties of placing observers on board small sized vessels.

In the **Dutch** observer programme cooperation with the four big fishing companies in the pelagic freeze trawler fishery is sometimes hampered by disagreement between the companies involved about who is going bear the burden of taking observers on trips where (a lot of) discards are expected. For these trips companies may claim that they are not able to accommodate an observer, hoping that vessels of the other companies will take an observer instead. This may lead to certain periods with less ob-

server effort, meaning that the coverage is biased towards trips where less discards are to be expected.

The **UK** has identified those fisheries that are thought to have highest bycatch rates of cetaceans, and has refocused a majority of observer effort into these segments. Monitoring of pelagic trawlers has been somewhat limited during 2011, in part because discard monitoring by Marine Science Scotland, which in previous years provided a substantial proportion of the cetacean bycatch monitoring, has been discontinued, and partly in recognition that the two major fisheries, for herring and for mackerel in IVa and VIa have very low cetacean bycatch rates. Monitoring of pelagic trawling has been redirected to some smaller fisheries, but monitoring levels in the bass pair trawl fishery remain high. The smaller fisheries for boarfish (*Capros aper*), blue whiting (*Micromesistius poutassou*) and other species tend to operate in an unpredictable and sporadic fashion, and this can make planning observer trips somewhat more difficult. The polyvalent nature of many of the UK's smaller vessels also presents challenges both in the interpretation of logbook and landings data to plan sampling levels, and also in terms of extrapolating observed bycatch rates to the fleet level.

In **Portugal** a problem concerning the present monitoring programme is related to the process of planning the observer schemes so as to achieve observer coverage on a significant proportion of total fleet effort. This is very difficult to estimate accurately because the total fleet effort is uncertain for certain fisheries, and can vary substantially from year to year (e.g. polyvalent vessels are authorized to use gillnets and trammelnets, but in some years or seasons some may use only traps or longlines). Simultaneously, especially for the polyvalent fleet, it is logistically very difficult to extrapolate estimates to the fleet level when the basic unit of sampling is a trip because it varies significantly between areas (in some regions a trip lasts five hours, while in other regions trips can go up to 24 hours or more). It is also very difficult to estimate a weighted total bycatch taking into consideration fish landings or km of nets used during a fishing trip. Fish landings per gear are easy to estimate when observers are on board, but low coverage affects extrapolation to fleet level. Although, the recording of landings per species is mandatory at all ports, the capture is landed as a whole with no discrimination of the gears used in each trip thus making it difficult to accurately ascertain the landings of gillnets and trammelnets separated from the rest (e.g. fishpots).

Combined ongoing monitoring efforts from the project Life + MarPro and PNAB/EU-DCF at sea observer programmes expect to increase observer effort rates. Also, increments of the monitoring efforts of the different fleets are being achieved with the implementation of other monitoring schemes such as voluntary declaration ("project logbooks" recording incidental catch of protected species) and Electronic Monitoring. These two different monitoring schemes are already being applied on a few polyvalent and purse-seine vessels on an experimental basis, but will be implemented in more fishing vessels for the same fisheries and also in bottom trawlers and longliners in the upcoming months.

3.4.3 Other problems

The implementation by **Poland** of pilot projects to assess the effectiveness of pinger use was not possible due to very small porpoise population in the central region of the Baltic Sea. At the same time, monitoring of incidental catches of porpoise in the Baltic Sea should be continued, taking into account the fishing area, fishing gear and fleet segment, so that the data on incidental catches could serve as a basis for future actions aimed at more effective protection of the Baltic Sea porpoise population e.g.

by introducing the mandatory use of pingers during fishing also by smaller vessels, i.e. vessels of over 10 m but less than 12 m in overall length, or by imposing an obligation to use pingers on all vessels using set gillnets in the Natura 2000 sites established to protect small cetaceans.

The result of observations by **Latvia** shows that monitoring of cetacean bycatch has no practical significance and added value and therefore is an unnecessary expenditure of financial and human resources. Therefore Latvia proposes stopping such observations in future and instead of dedicated monitoring for cetaceans they would collect and use information from National fisheries data collection programmes or from other available data sources.

Similar to last year, **Portugal** mentions that it is particularly difficult to estimate the fishing effort and bycatches with any precision in the polyvalent fleet. Thus, for the polyvalent fleet at this stage, bycatch estimates were not delivered because there remains difficulty in estimating fishing effort that is attributed only to set-nets that are used in this multigear fishing fleet. The gear types of interest (e.g. gillnets and trammelnets) are only two of the several types of gear used on a single polyvalent vessel, since these vessels may switch gears on a daily/season basis, meaning that it is problematic to use fleet effort data to estimate effort within a specific métier.

3.4.4 Recommendations from the National reports

Denmark recommends for the coming 2012 annual report that Member States indicate infringements in relation to national fishing vessels as well as other member states fishing vessels. Thereby, all infringement cases will be reported to the Commission.

Denmark also recommends that indicators such as area, season, mesh size, or net type be used when assessing the need for the use of pingers rather than vessel size.

France recommends improving the monitoring scheme to get enough samples in portions of the fleet that are potential contributors to incidental bycatch of cetaceans. Extension of the monitoring schemes is recommended for the Bay of Biscay (PTM bass trawling, set-nets in the Bay of Biscay), the Mediterranean area (hake fishery and small pelagic fish trawl fishery).

The **UK** again suggests that a more productive means of setting bycatch monitoring goals would be to limit the amount of sampling in any one fishery to a level that is sufficient to determine whether or not bycatch levels exceed a prespecified threshold or reference limit.

Estonia suggests modifying the regulation so monitoring is only mandatory south of 56º30', i.e. south of their fishing zone.

Latvia questioned the value of continuing dedicated cetacean bycatch monitoring programme, suggesting that this dedicated programme should cease, and cetacean observations be incorporated in other existing national fisheries programmes, when dedicated observer programme have not revealed any bycatch for several consecutive years.

4 ToR c: Impact of bycatch on population level

4.1 An approach for assessing impact of bycatch; WKREV812

There are a number of stages in assessing impact of fisheries on protected species at the 'population' level: i) assessing the abundance of the protected species within a predefined area ii) quantifying the amount of bycatch within the fisheries operating in the same geographical area and iii) determining whether the level of bycatch represents a cause for concern as assessed against an agreed management objective (WGBYC, 2012).

The approach taken during Workshop to Evaluate Aspects of EC Regulation 812/2004 (WKREV812) was to define areas ('Management Areas') over which it was possible to aggregate fisheries effort and bycatch data in a way that could be compared with the abundance of animals (in this case harbour porpoise) in the same area. The source of the fisheries and bycatch data are those collated annually by WGBYC into a central database. The abundance of animals was derived from published abundance estimates from the SCANS-II survey (Small Cetaceans in the European Atlantic and North Sea; Hammond *et al*., in press). By looking at the number of animals bycaught as a percentage of the abundance in the defined 'Management Area', it could be compared directly with the 1.7% threshold; an IWC-ASCOBANS workshop (International Whaling Commission – Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas) determined that a total anthropogenic removal beyond 1.7% of the best estimate of population abundance should be considered unlikely to meet the management objective of maintaining porpoise abundance at 80% of their carrying capacity.

The WKREV812 approach is a means of quantifying the amount of bycatch as a portion of the abundance of animals in a predefined area. The portion (as a percentage or number) can then be compared against an agreed threshold; there are other approaches to using the 1.7% threshold, such as the Potential Biological Removal or a Catch Limit Algorithm that can derive the threshold level of bycatch beyond which would cause population decline. Generating the thresholds is outside the scope of work for WGBYC.

In the future, an alternative threshold to the 1.7% of the population may be agreed upon (see ToR H). Dependent on the approach, bycatch limits could be generated for Management areas/Units and presented to WGBYC as a total number of animals allowed for in the respective area (and fishery?). This would remove the need for WGBYC to spatially process abundance estimates of animals and focus efforts on generating the estimates of bycatch. However, until such time that a new approach to setting bycatch limits is agreed, WGBYC have used the 1.7% in this year's assessment of population level impacts of monitored fisheries on cetaceans.

The WKREV812 approach could not be applied to other taxa (turtles, fish, seabirds). The status of information for such an assessment is briefly discussed below.

4.1.1 Species and areas

The WKREV812 approach was applied only to the following cetaceans; harbour porpoise, common dolphin, whitebeaked dolphins and minke whales. The abundance of each of these species within ICES subdivisions was generated from the SCANS-II (Hammond *et al*., in press) and CODA survey estimates (Cetacean Offshore Distribution and Abundance; Macleod *et al*., 2009). Data manipulation was carried out in a

GIS and ICES subdivisions were overlayed with the survey strata. Abundance in a survey stratum was apportioned to the ICES subarea in accordance with the percentage of its area within the subarea.

An assessment on a higher resolution than WKREV812 was not possible, because the data on effort (landings, days-at-sea) was only available in the National Programs from the DCF. These effort data are provided by groups of ICES subdivisions which are different per country. Although countries within the Regional Coordination Meetings (RCMs) are said to agree about the common used area-units - "Fishing Grounds" – for effort. For the purposes of this year's WKREV812 assessment the areas considered were defined as: East Arctic (ICES Subdivisions I, II), North Atlantic (ICES Subdivisions V–XII), Baltic (ICES Subdivisions IIIb, 23–30), North Sea (IIIa, IV).

4.1.2 Assessment

Assessing the likely conservation threat to species of concern from fishery bycatch fundamentally requires: 1) abundance estimates of the species of concern in the area of concern, 2) bycatch limits associated with those abundance estimates, 3) an estimate of the amount of fishing effort for the fishery of concern in the same area, and 4) an estimate of the bycatch rate for that species in the fishery of concern in the same area.

It should be noted that a prerequisite to any such analysis is the designation of appropriate 'areas of concern'. Ideally each such area would encompass the geographical range of the species or population of concern, and fisheries would then be examined within that population range. In reality, it is usually (a) impossible to adequately delimit areas that enclose a biologically meaningful cetacean population that are not at the ocean basin scale (and as such too large for practical management) and (b) impracticable to analyse fishing effort at any other scale than the statistical divisions by which nations report fishing activities.

In the ICES region this means that areas of concern, the geographical areas for which bycatch is assessed, need to be based upon ICES statistical subdivisions. In this way, cetacean populations can be stratified into broad fishery management regions in order to make management of bycatch a more feasible proposition.

The Working Group attempted to assess the likely conservation threat to the four most frequently sighted cetacean species with the specific aim of identifying fisheries and areas of highest potential risk rather than providing an assessment of bycatch levels. The aim was not to generate rigorous bycatch estimates but simply to try to identify and highlight those areas of most probable concern and those of least probable concern, based on population density, threshold of bycatch removal limits, fishing density and possible bycatch rate.

Numerical density data for four cetacean species were drawn from the SCANS and CODA data by survey block, and were then used to generate pro-rated estimates of abundance for each ICES subdivision by overlaying the survey blocks onto ICES subdivisions using GIS software. This task was undertaken by the Secretariat. The abundance estimates for each ICES subdivision were then pooled into putative management areas including one of the North Sea (IVabc and IIIa) and one for Atlantic waters (VI,VII, VIII). The derived pooled abundance estimates for these regions are shown in Table 2 for the four species under consideration.

The working group agreed to use the default bycatch reference level of 1.7% of the best estimate of abundance as a yardstick against which to compare likely or possible

total bycatch levels, notwithstanding that this reference level (derived for harbour porpoises) is probably not appropriate to minke whales at least.

Fishing effort for the EU fleet within these management areas has always proved to be difficult to collate by WGBYC, both because effort is often collated (for example by STECF; Scientific, Technical and Economic Committee for Fisheries) in terms of KWdays, which are not a useful metric for static gears, and because effort collations often ignore all or part of the under 10 m sector. Data on national fleet effort, however, have been collated nationally at the EU level under the DCF process in order to provide reference effort against which to plan discard sampling. The Working Group had access to most member states national plans, which include data on the number of days fished by each defined métier for a specified reference year. The working group attempted to collate these data into a single database in order to obtain an estimate of the total amount of fishing within each of the RCM discard sampling areas.

Several problems with these data became apparent. First, the data provided on fleet effort by some (at least two) member states were clearly not given in days at seas as the unit of effort. Second, it was not clear that for some other member states the total number of days at sea was consistent with other estimates of total effort, and third, the data from Member States National Plans were allocated to geographical areas that did not coincide wither with ICES subdivisions, nor with the much larger RCM discard sampling areas, but with some other intermediate scale regions which were apparently inconsistent between Member States.

This made it impossible for the Working Group to continue to match up animal density with fishing effort density by any common sampling unit of area. It was agreed instead to defer further work on this topic to the upcoming WKBYC.

The working group was able to collate data on the fourth element of the procedure for assessing bycatch risk, in collating bycatch rate estimates from the 812 monitoring schemes, as maintained in the WGBYC database. Estimates of bycatch rates were available for some 85 species/métier (level 3)/discard region combinations. In addition there were eight species/gear/region combinations with several estimates that enabled the group to determine a range of bycatch rates that might be applied to effort data once these have been collated adequately. In the absence of usable effort data collated by region, this task was deferred until next year's meeting when progress in applying WKREV218 to other PETS (Protected, Endangered and/or Threatened Species) should be available.

4.1.3 Fish

Under Article 12 of the EU Habitats Directive all species in Annex IV are given strict protection from deliberate capture. Member States are required to establish a system to monitor incidental captures and to ensure that such captures do not have a significant negative impact on the species concerned. The Annex IV species of relevance to the ToR of WGBYC are *Acipenser naccarii (*Adriatic Sturgeon) and Atlantic sturgeon. Additionally, all sturgeon species other than those on Annex IV, lamprey (*Lampetra fluviatilis* and *Lethenteron zanandrai*) and shads are listed on Annex V of the Directive as species whose taking in the wild and exploitation may be subject to management measures. Last year WGBYC reviewed five marine fish species that are listed in at least one of the Annexes of the Habitats Directive: Twaite Shad (*Alosa fallax*), Allis Shad (*Alosa alosa*), River Lamprey (*Petromyzon marinus*), Lamprey and Sturgeon.

Last year's meeting asked for data, including exact locations, the number of sampled hauls by gear type, rectangle, and month, also without catch, and numbers of Habitat

Directive Species by gear, rectangle, year, and month; and landings data by year, month and gear. However, only one country (UK) came to the meeting with the requested data. It was decided to postpone this topic again to the next meeting (WGBYC 2014). Chris Glass is going to coordinate working group members in advance of the meeting to organize national data submissions in a standardized Excel format.

4.1.4 Turtles

To assess population level impacts of bycatch on turtles using the WKREV812 approach it is necessary to put the estimate of total bycatch in the context of population size. Bycatch rates have been collated for fisheries within the Northeast Atlantic and Mediterranean from published literature Table 3. Currently, there is a lack of data being reported to WGBYC though EC Reg. 812/2004 national reports; only Italy and France consistently record and report turtle bycatch. Table 3 shows that current data suggest highest bycatch in the Portuguese polyvalent fleet, pelagic longline off the Azores region, Spanish pelagic longline in the Northern Mediterranean, French setnets in the Mediterranean, Greek pelagic longlines and bottom trawls, and Italian bottom trawls in the Mediterranean, particularly the Adriatic.

Throughout the range of the loggerhead turtle in the North Atlantic (including the Mediterranean), nest counts are used to estimate the minimum number of females and to assess trends in nesting populations. The abundance of annually nesting females in the Mediterranean has been estimated by Broderick *et al*. (2002) as 2280–2787 loggerhead sea turtles. However, mature females do not nest annually and immature females and males are not accounted for by this approach.

Estimates of turtles on foraging grounds are incomplete. Within the Mediterranean, there are estimates for some areas: central Spanish Mediterranean 18 954 turtles (95% CI: 6679–53 786) (Gomez de Segura *et al*., 2005); and uncorrected and therefore **minimum** abundance estimates for the Adriatic of 25 000, Ligurian and Tyrrhenian seas of 60 000 and Ionian Sea of 39 000[1]. These estimates are not corrected for availability or perception bias and absolute abundance is likely to be at least twice these estimates. These estimates are from regions that represent less than half of the species' pelagic summer range (Figure 1). On the Atlantic coasts, Portugal has a year-round presence of loggerhead turtles but with numbers peaking in spring and summer. Aerial surveys performed annually under the framework of the project Life+ MarPro primarily for cetacean and marine bird counts, have also been used to count turtles off the Portuguese continental coast. The data obtained from these surveys will provide a good source of information on abundance and distribution estimates around the area (ICES Area IXa) in the upcoming years.

The issues of trying to quantify the impact of bycatch on the population are further complicated by unknowns in relation to population structure. In the Adriatic for example, turtles are from at least five different nesting sites which may represent fine-scale population structuring. These turtles are bycaught by multiple gears. Also, not all nesting sites are known, especially on the African and Middle Eastern coasts of the Mediterranean. Whereas turtles off the south coast of Portugal are likely to originate

[1] Final Report of the Italian Initial Assessment for the Marine Strategy Framework Directive, 2012.

in the NW Atlantic nesting population, animals that nest on the Cape Verde archipelago may also move into these waters.

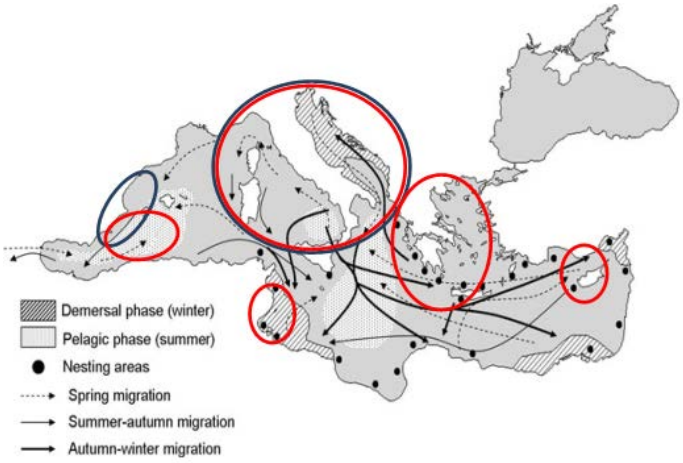

Figure 1. Is a copy of Figure 1 in Alessandro and Antonella (2010): Loggerhead migrations in the Mediterranean Sea; the main routes, nesting beaches, pelagic and demersal areas are shown (Bentivegna 2002; Broderick *et al*., 2007; Caminãs 2004; Maffucci *et al*., 2006). Ellipses have been added to show where we have abundance estimates (blue) and bycatch estimates (red).

5 ToR D: Bycatch mitigation trials

5.1 Pinger trials in European fisheries

(Cyprus, Malta, Greece, Bulgaria, Italy and Slovenia are not required to use pingers.)

The information that follows is summarized in Table 1b.

Belgium: The report states that no Belgian vessels were required to use pingers in 2011. The report from Belgium states that pingers are not very user-friendly, that nets equipped with pingers become tangled more easily and must be handled with the necessary care, and that the equipment is also generally less durable. There was no scientific monitoring of the use of pingers on vessels in 2011. (The group noted that Belgium has at least one vessel that has fished in Area VIId in the recent past, and that it would be, according to 812, required to use pingers there. Personal communication Jan Haelters).

Denmark: In ICES Divisions IIIb–d only two gillnet vessels were above 12 m and in ICES Divisions IIIa–IV there were 22 gillnet vessels above 12 m. There is no information on whether these vessels were required to use pingers, or information on actual pinger use. Also, there is no information in the report on the level of enforcement. The report notes that the pingers used were generally AQUAmark100. The presence of active pingers is monitored from Danish inspection vessels which are equipped with hydrophones. No infringements of pinger use were reported by the Danish inspection vessels in 2011. The report states that the differentiation of vessels under or above 12 m in relation to the use of pingers can be questioned because it is not the vessel size but the gear that causes the entanglement of small cetaceans. The differentiation appears to be illogical to most fishermen, and some fishermen question the obligation to spend money on pingers if a similar vessel below 12 m fishing with the same gear in the same area is exempted from the obligation to use pingers. Indicators such as area, season, mesh size or net type seems to be more logical when assessing the need for the use of pingers rather than vessel size. DTU Aqua, Technical University of Denmark conducted a project to study if use of pingers could cause habituation and habitat exclusion over time. Preliminary results suggest that habituation is happening to some extent, but it is not known if this habituation will result in reduced efficiency of the pingers used in Danish commercial fisheries.

Estonia: Reported that there was no fishing effort in 2011 by Estonian vessels using static nets in areas where pingers are required.

France: Similar to previous years, the requirement to use pingers under 812/2004 remains a problem for the French fleet. Concerns listed again include the reported unreliability of the models on the market, the difficulty in maintaining a working complement of devices and the actual costs of using pingers, which would be ten times the initial estimate because of failures. The requirement to use pingers every 100–200 metres along the net, implying interference with the hydraulic systems, is problematic, and it is proposed to use them at each end of the net. Pingers are also considered a safety hazard to fishermen. The possible "dinner-bell" effect for seals is again mentioned. The report refers to a study conducted in Area VIId for comparing deterrent devices, but where bycatch rates were too low for getting significant results. Some gillnetters from Dunkerque were voluntarily using pingers delivered by the project Filmancet. No statistical results were provided but a harbour porpoise (in March) and a seal (in April) were said bycaught in nets equipped with Aquamark pingers on the bank of Flanders off Dunkerque. The report of France again notes the

unfounded discrimination between vessel over 12 m and below, which is not sustained by a difference in bycatch rate in these two categories.

Germany: German fishing companies have been informed through official notices about their obligations under Regulation 812/2004. The report states that German fishing vessels are using commercial pingers, and that inspections have not revealed any infringements. Six inspections were made in 2011. No operational or other problems were noted with respect to pinger use. According to the German report, the legal framework should be improved, as currently it is only required that pingers do function at the moment of the deployment of the nets. However, once gillnets are in the water, any infringements regarding malfunctioning pingers would be unable to be punished, thus any controls of deployed pingers in gillnets would be meaningless.

Ireland: The report has no information on the number of Irish gillnet vessels required to use pingers, nor information on actual use, except that uptake by fishermen has remained sporadic despite regulation. There is also no information on enforcement of pinger use. Dolphin Dissuasive Devices (DDDs), which have worked well in reducing bycatch in the UK pair pelagic trawl fishery for bass, have been provided to twelve vessels involved in the Irish pair pelagic trawl fishery for albacore tuna with six more due to receive these devices in 2012. No cetacean bycatch occurred in the tuna fishery by vessels with or without DDDs in 2011 so the effectiveness of these devices in reducing cetacean bycatch in this specific fishery remains unknown.

Italy: There was no requirement for Italian vessels to use pingers in 2011, but three pairs of pelagic trawlers (two from Ancona and one from Porto Garibaldi) were voluntarily and opportunistically deploying pingers (models: DDD 02F and DDD 03H) during their fishing activities. Observers monitored 18 of their fishing trips, for a total of 33 hauls. No bycatch of cetacean was observed.

Latvia: The report includes no information on how many vessels were required to use pingers in 2011, or how many vessels were equipped with pingers in 2011. The report says that the monitoring of the effect of pinger use was not performed because it is not applicable on waters covered by requirements of the Latvian national legislation.

Lithuania: Reported that there were no fishing operations by Lithuanian vessels in areas where the use of acoustic deterrent devices is mandatory.

The Netherlands: According to the criteria mentioned in the regulation, the Dutch fishery includes no fleet segments in 2011 in which pingers were mandatory. However, in a small-scale study in trammelnet fishery for cod, some fishermen were using DDD02 and Banana pingers. One vessel in fleet segment NLD008 used DDD02 pingers on the buoys of a net, approximately 500 m long. Another vessel used Banana pingers on a net of 1500 m length. A small-scale study in which TPODs and CPODs were operated to measure click activity in the vicinity of net segments with DDD02 and Banana pingers and nets without pingers did not produce enough data to draw conclusions with any accuracy on possible effects of pingers.

Poland: Reported that 16 vessels were equipped with pingers in 2011, but not all of them fished in areas where pingers are required. A total of nine gillnet vessels fished in ICES Subdivision 24 where pingers are required, and four of these vessels were using pingers. All pingers used were AQUAmark100. Inspection of pinger use was either by hydrophone or by inspection of pingers onboard the vessels, but there is no information on enforcement level or on infringements.

Portugal: Reported that the Portuguese fleet in 2011 did not fish in areas using the gear referred to in Annex I of Council Resolution 812/2004, so there was no require-

ment to use pingers. However, 14 vessels using trammelnets and 14 vessels using purse-seine were participating in trials of pingers (Fumunda F10 and F70).

Spain: (no recent report) The last report available from Spain was concerning the reference period of year 2009. According to that report provided in July 2010, eight vessels were required to use acoustic devices in the Area VIIe, f, g, h, j.

UK: In ICES Division IVa there were 17 UK gillnet vessels above 12 m in 2011 and nine of these fished with mesh sizes above 220 mm and were thus required to use pingers. In ICES Divisions VIIe–j there were 24 UK gillnet vessels above 12 m in 2011 and a number of these were using pingers (see Table 1). The UK has tested two forms of the same device (DDD-02 and DDD-03L) over a three year period, and has shown that bycatch rates of porpoises can be reduced by 95% when the DDD-03L is deployed at each end of a fleet of nets, provided the fleet is less than 4 km long. Longer net fleets (up to 8 km) showed a non-significant difference in porpoise bycatch rate when compared with unpingered fleets. A full description of trials with these devices can be found in Kingston and Northridge (2011) and in Northridge *et al*. (2011). There are currently insufficient data to say how effective DDDs might be in reducing common dolphin bycatch in fleets of static nets. The data collected to date do not suggest any increase in seal depredation associated with the use of DDDs.

The main UK vessels taking part in the bass midwater pair trawl fishery (two pair teams during early 2011) in the English Channel used a version of the DDD designed for trawl use (DDD-03F); another pair team is reported to have conducted a very limited amount of midwater trawl fishing for bass (*Dicentrarchus labrax*) in 2011, and this team is not known to have used DDDs. Dolphin bycatch remains greatly reduced (about 17 animals in 2011) compared with years prior to 2006 when trials with DDDs began in this fishery. The exact effectiveness of DDDs in this fishery remains unclear because paired control tows with and without pingers have not been made, with pingers deployed on most tows, which obscures the current underlying bycatch rate without pingers. It is therefore unclear whether the observed low bycatch rate at present is due to the mitigation measures being used or due to an overall decreased risk of dolphin bycatch in this fishery. It is not known how many of the vessels required to use pingers in Division IVa actually used pingers and there is no information on infringements or enforcement levels.

6 ToR E: Development of bycatch database

6.1 State of the WGBYC database

A request was issued to WG members before the meeting to provide effort and bycatch data in a common data format to facilitate input in the database. Data were received in this format from Denmark, France, Germany, Ireland, Italy, Netherlands, Poland, Portugal and UK. Data provided by Spain were in a disaggregated format and could not be used. Days at sea is the common effort metric used by the group and data were not received in this format from Spain or Germany. Data were also obtained from annual reports from Estonia and Latvia, while no data were available for Belgium, Greece, Lithuania, Romania or Slovenia.

A summary of bycatch estimates for 2011 is presented in Table 4. In addition to provided estimates, extrapolated bycatch estimates based on number of animals divided by total observed days at sea multiplied by total effort in days at sea for a given stratum are outlined. A number of bycatch events with and without pingers were observed so these figures were combined to provide the total bycatch figure for each stratum.

Bycatch estimates provided for 2011 include 7210 Eagle rays *(Myliobatis aquila*), 2273 pelagic stingrays *(Pteroplatytrygon violacea*), 358 loggerhead sea turtles in a Mediterranean pelagic trawl fishery for anchovies, 207 common dolphins in midwater trawl fishery for demersal fish in the English Channel, and 110 harbour porpoise in a trammelnet fishery for demersal fish also in the English Channel.

Extrapolated figures produced some relatively high bycatch figures. The representativeness of these figures is uncertain however. For example an extrapolated figure of 9263 common dolphins could be produced for the Portuguese polyvalent fleet targeting hake, sea bream (*Sparidae* sp.), sea bass, pouting (*Gadidae* sp.), monkfish (*Lophius* sp.), and cuttlefish (*Sepia* sp.) in IXa. However, low observer coverage of just 0.06% of the estimated total trips of the fleet was achieved in this fishery and sampling focused on vessels primarily using set-nets rather than other gears because of problems with bycatch associated with this gear type. As a result, available observer data are not considered representative of total fishing effort, since total effort attributed to the use of set-nets is not possible to attain. This highlights the importance of effort data being available by gear type and use of other methods such as extrapolating bycatch from total landings of target species figures in order to derive more accurate bycatch estimates for polyvalent fleets. Other notable extrapolated bycatch estimates include 1003 striped dolphins) in a gillnet fishery in the Bay of Biscay, 362 and 258 harbour porpoise in <15 and >15 m set-net gillnet vessels, respectively, in specific areas in the Celtic Sea fishery. Differences between provided and extrapolated bycatch estimates can generally be explained by differences in the methods applied such as use of hauls instead of days at sea. Moreover, the representativeness of the samples is not always very clear with low coverage levels and some potential gaps in the sampling schemes (the number 1003 of striped dolphins in set-nets in the Bay of Biscay is a figure which is inconsistent with stranding records).

The majority of data collection programmes related to the WGBYC database have predominantly focused on cetacean bycatch in accordance with requirements under EC 812/2004. Available information on bycatch of all species of interest is presented but bycatch estimates for species other than cetaceans are sporadic and not considered to be comprehensive.

6.2 Estimation of bycatch rates from the database

Bycatch rates from the WGBYC database were required to facilitate tasks in relation to the usefulness of the DCF for monitoring bycatch of protected species and assessing the impact of bycatch on cetacean populations. The method for extracting appropriate bycatch rates from the dataset was discussed. It was agreed that the most accurate way of extracting bycatch rates for a given stratum was to divide the total number of bycatch specimens for a specific species by the total number of observer days carried out in relation to that stratum. This method was considered to be more accurate than simply taking the average bycatch rate for a given stratum as the total number of days observed would not be taken into account in the latter approach.

6.3 US bycatch estimates

US Northwest Atlantic bycatch estimates (2010) for small cetaceans and pinnipeds have undergone review by the US Atlantic Scientific Review Group (ASRG) and are currently available in the US Atlantic and Gulf of Mexico Marine Mammal Stock Assessment Report (SAR; Waring *et al.*, 2013). For estimates from previous years refer to the SGBYC 2010 report (ICES, 2010) and earlier SAR publications. Reported seabird and sea turtle bycatch estimates were extracted from the referenced literature (Table 5).

7 ToR A: Collaboration with PGCCDBS/SGPIDS

Back reporting of work at SGPIDS

WGBYC was presented by Bram Couperus in the last meeting of SGPIDS 18–22 June 2012. At the meeting a table on running schemes was updated with information on whether protocols used are recording PETS.

SGPIDS agreed that collection of additional data on PETS may result in more efficient use of resources. Protocols can be adjusted in some cases to make the routine discards sampling more usable for the monitoring of (incidental) bycatch. It was noted that if the protocol has to be amended to include large specimens, like dolphins and seals, these should be recorded at the haul level: the observer should observe the hauling of the net and the opening of the codend rather than relying on a subsample (sample level).

Issues that have to be addressed for future successful implementation of PETS monitoring into the DCF/DCMAP were divided into major vs. minor issues.

Major issues

1) The DCF sampling is not designed to estimate PETS. Implementation is not just a matter of adjusting protocols. In order to estimate bycatch rates by ICES areas, sampling schemes have to be changed on a higher level (métier or fleet segment).

2) Present bycatch data should be treated with care. Raising numbers to larger areas is often not possible. Third parties may use the data inappropriately.

3) In some sampling schemes the recording of incidental bycatches may result in the crew becoming less cooperative, because the bycatch of some PETS, in particular harbour porpoises and dolphin species, draw attention of the public and add to a negative image of the fishery.

4) Adequate sampling of comparatively rare fish species of small size (for example shads) is difficult to implement, possibly it involves sampling of the whole catch instead of taking a subsample. It requires flexible sampling, depending on the catch, which is hard to achieve on commercial vessels.

Minor issues

1) Protocols should include a list of rare species that should be recorded during trips. **These species should have a code in the institute database and code lists should be available to the observer who enters the data in the database. Currently PETS data are lost due to the fact that there is no reference code for the national database!**

2) Following the above, it is also important to have reference codes for international databases.

3) Identification of rare bycatch is often a problem, because observers are not familiar with all the species involved. This can be dealt with by limiting the number of species, acceptance of identification by group (for example both shad species are difficult to distinguish), collection of specimens for further investigation ashore, provision of identification guides and taking pictures.

An extensive manual with clear instructions including a section for the identification of rare species is very important.

4) Rare species are often considered to have been dead already prior to the time they were bycaught. This seems to happen often in sampling on board beam trawlers where observers assume that it is impossible to catch a large, fast swimming animal, like a harbour porpoise, because of the low vertical opening of the trawl.

5) SGPIDS emphasized that a clear list of PETS is required. In situations where it is possible to sample more than a (few) basket(s), this may give the observer a clue to which species the catch should be scanned for. A list is also required in a number of sampling schemes where only a selection of (commercial) species is recorded. It was suggested to sample cetaceans, seals, birds, turtles (identification by species); shads (two species: *Alosa alosa*, *Alosa fallax*); Lampreys (two species*: Lampetra fluviatilis*, *Petromyzon marinus*) and sturgeon (one species: *Acipenser oxyrinchus*).

Additional issues from WGBYC

The group generally agreed with the issues brought up by SGPIDS. The major issue that the DCF sampling is not designed to estimate PETS is true but this should not be a reason not to collect data on PETS: these are rare by definition and are being caught incidentally. Taking into account the current approaches to implement an Ecosystem Based Management to Fisheries and the EU Marine Strategy Framework Directive that seeks to achieve a Good Environmental Status for the marine areas within the EU by 2020, every effort should be made to collect as much information as possible about PETS bycatch in commercial fisheries. One instrument to achieve this could be the DCF. However, once a discard ban for commercial fish species might be fully implemented (potentially by 2016), PETS may be the only groups to be sampled.

It was noted that in some métiers a single observer, responsible for collecting data on commercial fish species, may become overloaded with too many tasks at the same time. This emphasizes the need for strict protocols (limiting the tasks for an observer), proper training and a manual. In the US, National Oceanographic Atmospheric Administration (NOAA) has a lot of experience with training of observers in the Northeast Fisheries Observer Program (NEFOP). NOAA provides an extensive observer manual which is updated periodically (every 2–3 years depending on demand) and may be used as an example in Europe (Anonymous, 2010).

8 ToR F: Develop, improve, and coordinate methods for bycatch monitoring and assessment

8.1 Projects related to Remote Electronic Monitoring (REM)

Germany

Since March 2011 the Thünen-Institute for Baltic Sea Fisheries has carried out a pilot study to verify bycatch events in a gillnet fishery by Remote Electronic Monitoring (REM). The results of an intermediate report covering 2011 were presented at WGBYC. Reliable data on bycatch rates of seabirds are necessary for a potential sustainability certification being sought by the herring fishery with gillnets in the Greifswalder Bodden, a shallow bay on the German Baltic Coast. As vessels of this fishery are small and bycatch events seldom, conventional monitoring with observers would not be efficient. In the first year, emphasis was dedicated to technical implementation, as this was the first time that REM was implemented on small vessels. In 2011, more than 200 fishing trips were recorded on tape. During those trips, a total of 80 bycaught seabirds in 16 events were documented, and no bycatch of marine mammals. The distribution of documented bycatches is very skewed, as in one event 41 seabirds and in another event 18 seabirds were bycaught. In the vast majority of set gillnets, no seabirds were bycaught. These first results prove the potential of REM for documenting seabird bycatches. The results also revealed that bycatch of seabirds are highly variable. As a result, the documented seabird bycatch are not likely to be statistically reliable when documented by conventional monitoring with on board observers.

Netherlands

In December 2012 a REM project was commissioned by the Ministry of Economic Affairs. The aim of this project is to monitor the incidental bycatch of harbour porpoises off the Dutch coast in commercial set-net fishery (where, when and in which types of nets) and to investigate a way to reduce bycatch in an efficient way if necessary for a Favourable Conservation Status (FCS). Over three years a representative sample of the Dutch set-net fisheries fleet of the Dutch Coast will be equipped with REM. Twelve Dutch set-net vessels of the Dutch Coast take part voluntarily. Of the twelve vessels, two different vessels per year will be equipped with pingers. Data will be analysed, reporting harbour porpoise bycatches and deleted after analysis. No other bycaught taxa (e.g. birds, seals, fish) will be reported. The reason for setting up this observer programme is that there is no regular monitoring in set-net fisheries (not required under EC 812/2004), yet there is a concern based on suspected bycaught stranded animals. It is also one of the highest prioritized recommendations in the Conservation plan for the harbour porpoise in Dutch waters aiming to achieve a Favourable Conservation Status (Camphuysen and Siemensma, 2011). The study is coordinated by the Institute for Marine Resources and Ecosystem Studies (IMARES) and Marine Science & Communication (MS&C).

Portugal

In Portugal, the main difficulties in implementing articles 4 and 5 from Regulation 812/2004 refer to logistics, and neither the research frameworks nor the Portuguese state have enough funds to monitor the fleets in order to achieve the predefined level of 5% of fishing effort using observers only. In order to achieve better observer effort

levels other monitoring schemes have been implemented since 2010, such as voluntary logbooks in some polyvalent and purse-seine vessels and REM systems have been acquired. Three boats (one purse-seiner and two polyvalent) have been using EM since 2011 and a total of 17 boats (three polyvalent, three trawlers, eight purse-seiners and three offshore longliners) will be equipped in upcoming months.

EM can also be used as a way to obtain better fishing effort for fleets such as the polyvalent fleet which is multi-gear and problematic when trying to separate the fishing effort by gear type and apply the bycatch assessment approach. Another aim is to test if EM can be used to reliably document bycatch of marine mammals and birds.

Denmark

A new REM trial collecting data on marine mammal bycatch in the inner Danish waters has started up in May 2012 by the Danish Technical University. The study focuses on Area 22 and 23. Until now nine gillnet vessels have been equipped with the REM system and are currently collecting data. No results from the trial are available yet.

General points on REM discussed by WGBYC

- According to the WGBYC there is no need for a technical international workshop on REM data collection and data analysis at this point. However bilateral exchange of expertise is useful to optimize this kind of monitoring;
- (Trained) Students are used in several REM projects for the analysis of the video data;
- The WG discussed the legal status of REM monitoring. How could this be incorporated at EU level compared to current monitoring schemes; who should pay for the monitoring, who will analyse the data (fisheries, students, …);
- REM should provide higher coverage than the on board observer method for a steady cost. Then it should be a way to increase the CV of the estimates. Such method should be encouraged by the new regulation through pilot studies especially for set-nets.

8.2 Pingers

Denmark

Habituation and displacement effects are some of the biggest concerns when using traditional pingers in commercial gillnet fisheries. It has therefore been tested if harbour porpoises would habituate to pingers by monitoring their acoustic behaviour in relation to a single pinger (AQUAmark100). Two setups were compared. In Denmark, the setup contained one pinger running in cycles of 23 hours and an array of five C-pods placed 0, 200, 400, 800, 1600 meters from the pinger. In Scotland the same pinger was deployed except in a triangular array having two C-pods at 0, 200, 400, 800, 1600, 2400, and 3600 meters distance from the pinger. The results from DK and UK showed that the pinger had a significant effect on the detections of porpoises out until 400 m.

Germany

Work was presented on alternative pingers. The pingers, called PAL (Porpoise Alarm), are based on the most recent knowledge of the behaviour of these small cetaceans regarding communication and orientation. PALs are emitting synthetic communication sounds that simulate natural porpoise communication sounds and function with source levels within natural porpoise range. Thus, potential negative effects of conventional pinger types that are currently in use, like habituation, habitat exclusion or noise pollution, should be minimized or avoided. PALs are designed to have low energy consumption, operating at low costs, having a robust housing that is optimized for the use in commercial gillnet fisheries. First results of field tests carried out in 2012 revealed that harbour porpoises were neither attracted nor repelled by sound emitting PALs. Also, there are indications that harbour porpoises seem to increase their click activities when PALs started to emit sound. The next step in 2013 is testing of PALs in commercial gillnet fisheries to prove their function and efficiency. Part of this work including field tests in 2012 and planned tests in commercial fisheries in 2013, are carried out in a cooperative project together with the Thünen-Institute for Baltic Sea Fisheries. This project is financially supported by the German Federal Ministry of Food, Agriculture and Consumer Protection (BMELV).

8.3 Work done in relations to turtles

Northwest Atlantic Loggerhead Turtle Working Group presentation

The NW Atlantic loggerhead turtle nesting population is the largest in the world and represents about 40% of the global population. This population nests primarily within Cuba, Bahamas, US and Mexico. Laws in all of these countries protect sea turtles. The US accounts for about 95% of the NW nesting population; Mexico about 4%; and Cuba and Bahamas less than 1% combined. Within the US 90% of all loggerhead nesting occurs within the State of Florida. Standardized surveys on index beaches began within the Peninsular Florida Recovery Unit in 1989. A 10-year decline of 40% was recorded within this nesting unit 1998–2008. However, nest counts have recently been high, culminating in an estimated 57 000 nests in 2012, which is comparable to the highest previous nesting recorded since 1989. These recent nesting numbers are encouraging but it is too early to determine whether this represents a permanent improvement in the nesting status of this population.

A point of concern of the decadal decline and/or uncertainty of recovery is that two species that nest on the same beaches, leatherbacks and green turtles, have shown dramatic increases in nest counts over this same period. This evidence strongly suggesting that the impediments for loggerhead nesting recovery have to do with factors in the marine environment such as cumulative sea turtle bycatch from fisheries.

The main threats to nesting turtles are from coastal development, light pollution, direct harvests and predation. In the oceanic and neritic environments, threats include ship strikes, pollution (chemical and marine debris) and bycatch. An analysis for the 2009 US Northwest Atlantic Loggerhead Recovery Plan indicated that for juveniles found in the oceanic and neritic environment, as well as adults in the neritic zone fisheries bycatch represented some of the highest threats. When broken down by gear, the rank of the gears from worst to least threat was trawl, longline, demersal large mesh gillnets, dredge, demersal small-mesh gillnet, pot/trap, drift gillnet, poundnets/weirs, and other hook and line (commercial and recreational) based on available data at the time. In addition, more recent papers such as Wallace *et al*., 2010,

Wallace *et al*., 2013 and Casale *et al*., 2011 have found that fisheries are a significant source of mortality for loggerhead sea turtles. Therefore, fisheries management actions to reduce sea turtle bycatch such as development of gear modifications and time/area closures are needed to conserve and recover these species.

Various mitigation measures have been trialled but few are legally required to be used; Turtle Excluder Devices (TEDs) were developed and required for use for shrimp trawling vessels in the US and Mexico beginning in the early 1990s. TEDs are effective at excluding over 95% of captured turtles. In the Spanish longline fleet, the use of mackerel bait instead of squid and deeper setting of line has been effective at reducing turtle bycatch by over 95% for the last three years. Mitigation of bycatch in gillnets is more problematic and options are exclusively based on modifications of fishing practices, including reduction of soak time and night-time setting (the latter would also be effective for longlining). So called *chain mats* in the US Northwest Atlantic scallop dredge fishery have been required for several years now with much success (Murray, 2011).

There is an overlap in range of the Northwest Atlantic breeding population with ICES Areas XII, VIIIe, X, IXb, and IXa. These areas and the Mediterranean, which has a distinct loggerhead turtle population, have fisheries/turtle interactions that need to be monitored under the provisions of EC Regulation 812/2004 and/or EU Habitats Directive. With regards to the leatherback turtle, more northern ICES areas of the Atlantic are also relevant. Reporting of protected species bycatch under the requirements of EC Regulation 812/2004 are insufficient for turtles as evident in the annual National Reports submitted for review to ICES WGBYC. There is a need for monitoring requirements and reporting to be strengthened in relation to turtles in order that impacts are properly assessed.

In 2012 ICCAT initiated a Sea Turtle Risk Assessment for its fisheries in the context of the ICCAT Subcommittee on Ecosystems. This process is expected to be complete in June 2013. The NW Atlantic Loggerhead Turtle Working Group has committed to supporting this initiative by providing expertise on the loggerhead turtle stock necessary for the development of the risk analysis. This sea turtle risk assessment exercise should in turn be useful in the context of the Working Group on Bycatch of ICES.

Contribution of Portugal on turtle issues

Until recently information on sea turtles along the Portuguese continental coast had been overlooked. However, for the last three years, efforts have been made to improve knowledge of the subject, mostly within the framework of several projects that primarily have interest on studying interactions of cetaceans and seabirds with fisheries (FAME, SafeSea-EEA Grants, Life + MarPro). Methods of assessing fisheries interactions through harbour interviews/inquiries, necropsies of strandings, voluntary delivery of alive or dead animals by fishermen and observer schemes are used to detect problems and obtain preliminary information on species, area, season and fisheries of most concern. Spatial and temporal/annual trends of loggerhead turtle strandings along the Portuguese continental coast using a 33 year database (from 1978 to 2011) were presented, looking for evidence of spatial differences in stranding patterns, temporal and seasonal trends, animal´s size/maturity (carapace length) and causes of death. Larger numbers of loggerhead strandings were observed on the southern Algarve coast during spring and summer. Stranded animals along the coast were mainly immature individuals. Seasonal and geographical differences were found in the size of stranded loggerheads with larger loggerhead turtles occurring on the southern Algarve coast and the smallest individuals found in winter. Bycatch due

to interaction with set-nets (gillnets or trammelnets) was the main cause of death. Fishermen interviews and voluntary delivery also confirm that set-nets seem to be the most problematic gear for loggerhead incidental capture along the Portuguese mainland coast.

9 ToR G: Collaboration with WGMME to develop management procedures

WGMME recommended this ToR at their 2012 meeting. At that time it was expected that a contract to further develop the Catch Limit Algorithm approach to setting bycatch limits developed during the SCANS II (2005) and CODA (2007) projects for harbour porpoise and common dolphin, respectively, would be completed by February 2013. Unfortunately, due to administrative delays, the work is now due to be completed by September 2013. Consequently, the joint meeting between WGMME and WGBYC has had to be postponed.

Due to the impact on marine mammals, MSFD indicators and targets for cetacean and seal bycatch have been submitted to the European Commission by many Member States as part of the implementation of the EC Marine Strategy Framework Directive (2008/56/EC). The indicators and targets proposed were largely based on internationally agreed obligations such as those of the Oslo and Paris Conventions (OSPAR), ASCOBANS and, most recently, the European Commission through Fisheries Regulation 812/2004 concerning cetacean bycatch. Additionally, under the Habitats Directive (92/43/EEC), Member States are required to establish a system to monitor the incidental capture and killing of the animal species listed in Annex IV (which includes all cetaceans) and, where necessary, implement conservation measures to ensure that incidental capture and killing does not have a significant negative impact on the species concerned.

The indictor for cetaceans currently proposed by the OSPAR's Intersessional Correspondence Group on the Coordination of Biodiversity Assessment and Monitoring (ICG-COBAM) expert group for Marine Mammals and Reptiles for development under the Marine Strategy Framework Directive (MSFD) is "*mortality rate due to bycatch*". The parameter or metric to be measured is '*numbers of individuals being bycaught in relation to population estimate set for each population range or Management Unit (MU)*' with the target of '"*The annual bycatch rate of [marine mammal species] is reduced to below levels that are expected to allow conservation objectives to be met*". The ICG-COBAM expert group recognizes that this may require different approaches for different species. They note that there is an explicit need to move away from use a simple fraction of the best population estimate type approach which is based on incorrect assumptions (i.e. that the species have different population dynamics). There is a very real danger that if this simplistic percentage approach continues to be utilized and is adopted to determine MSFD bycatch limits, the conservation status of some species could be negatively impacted in the long term.

This work undertaken by the Sea Mammal Research Unit during the SCANS-II and CODA projects to develop management frameworks for determining the bycatch limits for harbour porpoise and common dolphin is now being further developed. The project aims to define robust bycatch limits and conservation objectives with which to assess and manage the impact of bycatch in commercial fisheries on marine mammals. The results will help enable Member States to assess whether or not Good Environmental Status has been achieved under the Marine Strategy Framework Directive, as well as meeting other international obligations such as those of ASCOBANS.

10 ToR H: Preparation of additional request by DGMARE

A start was made addressing the additional requests from DGMARE (EC) from 14 December 2012:

1) Assess the extent to which current fishery monitoring schemes, including *inter alia* those conducted under the DCF and Regulation (EC) 812/2004, provide an acceptable means of assessing the nature and scale of incidental catches of cetaceans and other protected species. Consider alternative means and other sources of data that could be used to improve our understanding of the conservation threat posed to cetaceans and other protected species by incidental catches in EU fisheries.

2) Advise on how Annex II of Regulation (EC) 812/2004, defining technical specifications and conditions of use for Acoustic Deterrent Devices could be best revised in light of technical and scientific progress in this field.

3) Based on the methodology used and the estimates of bycatch limits (take limits) generated by region at WKREV812 and other relevant analyses, propose effective ways to define limits or threshold reference points to incidental catch that could be incorporated into management targets under the reformed CFP. Limits or threshold reference points should take account of uncertainty in existing incidental catch estimates, should allow current conservation goals to be met and should enable managers to identify fisheries that require further monitoring and/or those where mitigation measures are most urgently required.

The group discussed how to approach the three requests and these are summarized below:

Request 1

Prerequisites to "provide an acceptable means of assessing the nature and scale of cetaceans and other protected species bycatch" are clear conservation and management objectives. Consensus on *Good Environmental Status* and acceptable anthropometric takes of PETS need to be translated in subsequent threshold levels by area, species (group) and fisheries. Neither of these are fall within the scope of this group.

This means that the group can only roughly indicate métiers where there is possibly a bycatch problem and cross check these with the observer effort under the DCF or other observer schemes.

Monitoring schemes

The first task is to make an inventory of the existing monitoring schemes. Monitoring effort under the DCF is put down in the National Programs which are prepared every year by the member states for the EC. The inventory of these schemes is therefore considered a relatively easy task.

Monitoring under 812 is defined in the Regulation itself. The actual observer effort is reported every year in the National Reports, which are reviewed by WGBYC (ToR B). Most of the countries that attend WGBYC deliver the effort and catch data to the WGBYC database (ToR E).

It was considered that most countries have ongoing monitoring observer schemes which are not running under either 812 or DCF. For example: catch quota monitoring

schemes with REM (Kindt-Larsen *et al*., 2011; Van Helmond and Couperus, 2012) and observer schemes performed as an obligation for the MSC label. In addition countries may have other fishery observer schemes.

Problems with the current 812 observer monitoring schemes have been described in previous WGBYC reports in EC Communication (2011) 578. In cooperation with SGPIDS (2012) issues with PETS sampling in DCF observer schemes have been identified (see ToR A). The advantages and problems of REM sampling programmes (including catch-quota schemes) have been described by WGBYC (2012). Advantages and problems with Marine Stewardship Council observer schemes need to be investigated.

The question was raised to what extent bycatch of PETS can be monitored by alternative means; such as monitoring from external platforms, monitoring of landings, strandings (only qualitative), interviews, voluntary logbook schemes, assessing scars of live animals (cf. large whales; Knowlton, 2012) and monitoring of a local population as index for bycatch. Although the usability for monitoring of bycatch of cetaceans seems limited and has been addressed in numerous publications, some of these alternative means may be worth reassessing for the sampling of specific species (groups).

Priority fisheries

A quick review based on the expert judgement in the group, showed which fisheries are potentially dangerous for different PETS groups:

- Cetaceans: set-nets; pelagic trawls (locally); purse-seine (locally); bottom trawls targeting pelagic species (locally)…;
- Turtles: set-nets, madragues (tuna traps), longlining (dem & pel);
- Birds: set-nets, driftnets and longlines (info in e.g. WGSE 2008, SGBYC 2010);
- Endangered fish species (SGBYC 2010);
    - Habitat Directive fish species: ????
    - Elasmobranchs: (also species from CMS appendices) (info in e.g. WGEF 2008, 2009, overview in SGBYC 2010).
- Seals: large-mesh set-nets and traps; (otter trawling?).

Cross check of DCF National Programs with WGBYC database

In an attempt to identify métiers in areas with possible high bycatch rates more detailed and systematically, the group cross checked DCF effort with bycatch rates and cetacean abundance. See paragraph [WKREV812 assessment for cetaceans].

Second request

It was decided to address this item by writing a letter to manufacturers and pinger scientist on their view of how to address this request. Based on these views, a strategy of approach for the working group will be worked out by e-mail by the members of the group.

Third request

The focus of this request is to provide advice on appropriate principles and methodologies that could be used in framing legislation in the future. In particular ICES should look at approaches for generating indicators or thresholds (such as the Catch

Limit Algorithm or CRR) that could be used for impact assessment of bycatch and examine the pros and cons of these different approaches.

The evaluation carried out during WKREV812 utilized the existing threshold of 1.7% (IWC-ASCOBANS, 2000) developed for harbour porpoises. The WKREV812 approach is primarily a means of handling the fisheries and cetacean abundance data in such a way as to make them spatially compatible for assessment. The way in which these stages is carried out needs to be reviewed. The outputs from these stages (area based bycatch estimates) can then be compared against a threshold (1.7% or other) so that the impact can be assessed.

WGBYC had an initial discussion on this and concluded that to respond to this request required input from a wider range of expertise and that this should form part of the work of the workshop. Notwithstanding the outputs from the planned the workshop, it was agreed that in order for any threshold on bycatch to be agreed, there needed to be agreement on European-wide conservation objectives for cetaceans in relation to bycatch in order for such thresholds to be implemented. See also paragraph "EU approach to bycatch management of protected species and the role of WGBYC".

11 Specific tasks for next year's meeting

Protected fish species: The members of the group are asked to bring data from the DCF sampling scheme and, if available, other sampled fisheries to the meeting in 2013 in the following format:

- Exact locations of allis shad, twaite shad, lamprey, river lamprey and sturgeon in the DCF scheme;
- Number of sampled hauls by gear type, rectangle, year, and month ("sampled hauls" should also include those without catch);
- Number of Habitat Directive specimens of each species by gear type, rectangle, year, and month.

In addition members are asked to bring data on landings:

- Landings of Habitat Directive species by ICES rectangle, year, month, and gear.

Chris Glass will prepare a request for the data in standard format approximately one month before the meeting.

Impact of bycatch on populations - cetaceans: As a specific objective within ToR c) in 2013, it was agreed to assess sustainability of harbour porpoise bycatch in the North Sea and adjacent waters (Skagerrak–Inner Danish waters). More specifically:

- Repeat and refine the WKREV812 approach for harbour porpoise bycatch in the North Sea gillnet fishery;
- Tabulate available bycatch rates within a range of fisheries so that the most appropriate rate can be applied; and
- Assess spatial variation in bycatch rates.

The chair will send a reminder approximately one month before the meeting.

Impact of bycatch on populations - turtles: Tentative efforts will be made to assess the impact of bycatch on turtles, in particular loggerhead turtles. Spain and Portugal agreed to prepare the necessary information for future WGBYC meetings.

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Annex 2: Terms of Reference for this meeting and agenda

Terms of Reference

2012/2/ACOM27 The **Working Group on Bycatch of Protected Species** (WGBYC) chaired by Bram Couperus (The Netherlands) will meet in 2013 at 4–8 February 2013 in Copenhagen at ICES to:

a) Work on the incorporation of monitoring requirements into the new DCF, in line with a move to a wider ecosystem approach to fisheries monitoring to include bycatch of cetaceans, seals, birds, turtles and non-target fish species. This includes collaboration with PGCCDBS/SGPIDS and Regional Coordination Meetings;

b) Review annual national reports submitted to the European Commission under Regulation 812/2004 and other published documents to collate bycatch estimates of protected species (birds, mammals, reptiles, fish);

c) Evaluate the impacts of bycatch on each relevant species and where possible at a population level, furthering the approach adopted by WKREV812 to assess likely conservation level threats;

d) Collate and review information from National 812 reports and elsewhere relating to the implementation of bycatch mitigation measures and ongoing bycatch mitigation trials, compile recent results and coordinate further work on protected species bycatch mitigation;

e) Working with the ICES DataCentre, continue to develop a database on bycatch monitoring and relevant fishing effort in European waters; review attempts made intersessionally to populate the existing database with monitoring and effort data for the relevant fleets for 2008–2010;

f) Continue to develop, improve and coordinate methods for bycatch monitoring and assessment;

g) Collaborate with WGMME to develop bycatch management procedures (based on the SCANS-II and CODA projects) for assessing bycatch at a European level. This work should include harbour porpoise (SCANS II), common dolphin (CODA) and consideration of additional species for which bycatch estimates have been made or suggested as a potential MSFD indicator. Such species include bottlenose dolphin, striped dolphin, harbour seal and grey seal;

h) Start addressing the special request from DGMARE regarding bycatch of cetaceans and other protected species.

WGBYC will report by 25 February 2013 for to the attention of the Advisory Committee.

WGBYC agenda 4–9 February 2013, Copenhagen

Monday 4 February

10:00 Installing your laptop and getting connected with the network, etc.

11:00 Welcome and routine business/household rules.

11:30 Introduction, changes to the agenda and assigning tasks to the participants.

11:00 ToR e) and back filling the WGBYC database.

12:00 Lunch

13:00 ToR e) time to prepare datasets 2011 and fill gaps in the database.

Intro Bram Couperus and report from SGPIDS attendance

16:00 ToR a) and relating additional requests from the Commission.

17:00 End of the first day.

Tuesday 5 February

9:00 Plenary with back reporting on progress and ToR e)

[work sessions].

12:00 Lunch

13:00 ToR c) Evaluate impacts of bycatch "WKREV812 approach".

13:30 [Work sessions].

17:00 End of the second day.

Wednesday 6 February

9:00 ToR b: Review annual national reports.

Review texts Ana Marcalo and Marije Siemensma

[discussion]

[Work sessions].

12:00 Lunch

13:00 ToR f): Develop, improve and coordinate methods for bycatch monitoring and assessment.

- EM project Netherlands (Marije Siemensma)
- Progress pinger studies Netherlands (Marije Siemensma)
- Turtle bycatch work Portugal and Spain (Ana Marcalo)
- Ongoing REM work Denmark (Lotte Kindt-Larsen)
- EM in German Baltic (Christian von Dorrien)

16:00 Discussion on "strategy of approach" coming workshop.

17:00 End of the third day.

Thursday 7 February

9:00 ToR c) Evaluate impacts of bycatch: problem resolving session.

10:30 ToR a) and requests from the Commission.

12:00 Lunch

13:00 Presentation Boris Culik on alternative pinger (PAL).

13:45 ToR d).

Intro Finn Larsen on information on mitigation from the National reports

15:45 Writing and reviewing texts/draft recommendations.

18:00 End of the day.

Friday 8 February

9:00 ToR c) What do we have and how are we going to present it?

Intro Simon Northridge

10:00 Further discussion on coming workshop (request 1).

10:30 Review of texts.

12:30 End of meeting.

Annex 3: WGBYC draft Terms of Reference for the 2014 meeting

The **Working Group on Bycatch of Protected Species** (WGBYC) will meet 4–7 February 2014 in Copenhagen, Denmark at ICES Headquarters. Its terms of reference remain similar to those in previous years:

a) Work on the incorporation of monitoring requirements into the new DCF, in line with a move to a wider ecosystem approach to fisheries monitoring to include bycatch of cetaceans, seals, birds, turtles and non-target fish species. This includes collaboration with PGCCDBS/SGPIDS and Regional Coordination Meetings;

b) Review annual national reports submitted to the European Commission under Regulation 812/2004 and other published documents to collate bycatch estimates of protected species (birds, mammals, reptiles, fish);

c) Evaluate the impacts of bycatch on each relevant species and where possible at a population level, furthering the approach adopted by WKREV812 to assess likely conservation level threats;

d) Collate and review information from National 812 reports and elsewhere relating to the implementation of bycatch mitigation measures and ongoing bycatch mitigation trials, compile recent results and coordinate further work on protected species bycatch mitigation;

e) Working with the ICES DataCentre, continue to develop a database on bycatch monitoring and relevant fishing effort in European waters; review attempts made intersessionally to populate the existing database with monitoring and effort data for the relevant fleets for 2008–2010;

f) Continue to develop, improve and coordinate methods for bycatch monitoring and assessment.

WGBYC will report by 24 February 2014 for to the attention of the Advisory Committee.

Annex 4: Tables

Table 1a–c. Summary of 2012 Annual National Reports on the implementation of EU Regulation 812/2004 covering the calendar year 2011. Supplementary information brought up at the meeting has been added.

1a. Checklist/summary of 2012 Annual Reports by Member State with respective obligations under regulation 812/2004 for the calendar year 2011 with regards to pinger use and monitoring. Req = required under EU Regulation 812/2004, EM, electronic monitoring. Species: pp, *Phocoena phocoena*; dd, *Delphinus delphis*; tt, *Tursiops truncatus*; sc, *Stenella ceruleoalba*; gm, *Globicephala melas*; ba, *Balaenoptera acutorostrata*.

Coastal member state of EU	Report submitted? (Langage if not English)	Pingers required	Monitoring required	Dedicated observer/EM days, incl. DCF and other monitoring	No of bycaught cetaceans	Summed provided estimate
Belgium	Y	Y (1 vessel)	No (only GNS and OTB)	0	-	-
Bulgaria	N*	-	-	-	-	-
Cyprus	N	-	-	-	-	-
Denmark	Y	Y	Y	0 req + 288 (GNS) + 276 (REM-GNS)	7 pp	N/A
Estonia	Y	N	Y	234	0	0
Finland	N	?		-	-	-
France	Y Fr. + Eng. Abstr.	Y	Y	586 req + 308	6 dd, 4 pp,1 tt, 1 sc	207 dd + 94 pp#
Germany	N only short Eng. Abstr.	Y	Y	670 hrs	5 gm (Atlantic)	N/A
Greece	Y	N	N	-	-	-
Ireland	Y	Y	Y	273 req + 81 (GNS)	3pp, 2dd,1ba	N/A
Italy	Y	N	-	380 req	3 tt (Veneto & Emilia Romagna	72 tt (39-104; 0.55)
Latvia	Y	?	Y	210 (PTM) + 60 (GNS)	0	0
Lithuania	Y	N		10	0	-
Malta	N	-		-	-	-
Netherlands	Y	N	Y	149 req + 24 EM Target reached	6 pp (one vessel with EM)	93 pp (cv= 0.38)
Poland	Y	Y	Y	66 PTM +44 GNS	0	0
Portugal	Y	N	Y	64	6 dd	Not estimated, polyvalent fisheries
Romania	N*	-	-	-	-	-

Coastal member state of EU	Report submitted? (Langage if not English)	Pingers required	Monitoring required	Dedicated observer/EM days, incl. DCF and other monitoring	No of bycaught cetaceans	Summed provided estimate
Slovenia	Y	N	Y	-	-	-
Spain	N	-	-	-	-	-
Sweden	N	-	-	-	-	-
UK	Y	Y	Y	186 O/PTM + 324 GNS	24pp, 11dd	836pp (cv=.09) + 327dd (cv=.148)

*** Bulgaria and Romania are not covered by Regulation 812/2004, but have supplied information in the past.**

 # France provided estimate only for a part of the fishery segments as other estimates were considered not reliable.

Table 1b. summary of information from member states report on pinger use and requirement in the calendar year 2011.

EU COASTAL MEMBER STATE	ICES or GFCM area	Fishery	No of boats requiring pingers	% using them	Enforcement reported?	Using current regulation specs?	Other mitigation being tested	Type of pinger used
Belgium	IVc, VIId	GNS	0	0	-	-	No	-
Cyprus			No report					
Denmark	IIIa-d, IV	GNS	24	100%	Yes	No - 455 m spacing under derogation	No	Aquamark 100
Estonia			0	-	-	-	-	-
Finland			No report submitted					
France			116	0	-	No - concerns about safety, cost, durability	None	-
Germany			N/A	N/A	Yes	N/A	An alternative pinger was tested	N/A
Greece								
Ireland		GNS	18	60%	Yes	No-500 m spacing under derogation	ADDs for set-nets	Airmar, AquaMark, Fumunda, Savewave, DDDs
Ireland		OTM-PTM	0		Voluntary use (12 vessels)			
Italy	GSA17	PTM	0	-	Voluntary use	-	-	DDD 02F & DDD 03H
Latvia	24-26, 28	GNS	N/A	N/A (2012: 100%)	No	N/A	none	N/A
Lithuania			0	-	-	-	-	-
Netherlands		GNS-GTR	0	-	Voluntary use (2 vessels)	-		DDD-02 & Banana
Poland			9	54%	Yes	Yes	No	AquaMark,
Portugal		GTR-PS	0	-	Voluntary use (14 vessels)	-		Fumunda F10 and F70
Slovenia			0	-				
Spain			No report	-	-	-		
Sweden			No report	-	-	-		
UK	IVa	GNS	9	N.I.	No	No - using DDDs		DDD-03
UK	VIIe	GNS	3	N.I.	No	No - using DDDs		DDD-03
UK	VIIe	GNS	13	>23%	No	No - using DDDs		DDD-03
UK	VIIe	GNS	2	N.I.	No	No - using DDDs		DDD-03
UK	VIIf	GNS	1	N.I.	No	No - using DDDs		DDD-03

EU COASTAL MEMBER STATE	ICES or GFCM area	Fishery	No of boats requiring pingers	% using them	Enforcement reported?	Using current regulation specs?	Other mitigation being tested	Type of pinger used
UK	VIIf	GNS	13	>8%	No	No - using DDDs		DDD-03
UK	VIIf	GNS	3	N.I.	No	No - using DDDs		DDD-03
UK	VIIg	GNS	13	>15%	No	No - using DDDs		DDD-03
UK	VIIh	GNS	10	>10%	No	No - using DDDs		DDD-03
UK	VIIh	GNS	1	N.I.	No	No - using DDDs		DDD-03
UK	VIIj	GNS	6	>17%	No	No - using DDDs		DDD-03
UK	VIIe	PTM	0	-	Voluntary use (4 vessels)	No - using DDDs	Pairtrawlers using pingers voluntarily	DDD-03

Table 1c. Summary of information on observer schemes during the calendar year 2011.

	OBSERVER COVERAGE OF TAXA OTHER THAN CETACEAN	DEDICATED CETACEAN OBSERVER SCHEME	CETACEAN OBSERVER SCHEME AS PART OF DCF	OTHER CETACEAN MONITORING PROGRAMME	
Belgium	N/A	No	?	Yes	Monitoring for stock survey and other monitoring requirement
Cyprus	No report	-	-	-	
Denmark	N/A	No	Yes	Yes	REM on 6 gillnetters
Estonia	N/A	Yes	N/A	N/A	
Finland	No report	-	-	-	
France	N/A	Yes	Yes	Yes	Dedicated observer programme on vessel < to 15 m: 5% for trawlers and 1% for set-netters.
Germany	N/A	No	Yes	No	
Greece	N/A	N/A	N/A	N/A	
Ireland	Yes	Yes (for all protected species)	Yes	Yes	Technical trials carried out by BIM and provision of data on tuna fishing under ICCAT requirements.
Italy	Yes	Yes	No	No	Monitoring for all protected species (HD) and species of conservation concern.
Latvia	N/A	Yes	Yes	?	DCF on bottom trawls?
Lithuania	N/A	Yes	N/A	N/A	
Malta	No report	-	-	-	
Netherlands	Unknown	No	Yes	No	
Poland	N/A	Yes	No	Yes	Obligation of reporting any catch of protected species in logbook
Portugal	Yes	Yes	Yes	Yes	MarPro project, protected species logbooks, REM (2 polyvalent boats, 1 purse-seiner)
Slovenia	N/A	No	N/A	Yes	Pelagic trawl to be monitored under 812
Spain	No report	-	-	-	
Sweden	No report	-	-	-	
UK	Yes	Yes	Yes	Yes	Protected species monitoring

Table 2. Abundances by Regional Coordination Meeting (RCM) discard sampling areas, with 1.7% bycatch limits for each sampling area in parentheses.

RCM	Common/Striped dolphins	White beaked dolphins	Minke whales	Harbour porpoises
Baltic (ICES IIIb/ 23–30)	0 (-)	0 (-)	0 (-)	8896 (151)
East Arctic (I and II)	1 (0)	20 (0)	22 (0)	259 (4)
North Atlantic (V–XII)	274 440 (4665)	5546 (94)	14 263 (242)	150 556 (2559)
North Sea (IV and IIIa)	1788 (30)	10 972 (187)	11 437 (194)	215 647 (3666)

Table 3. Summary of known bycatch of turtles from studies conducted in countries fleets in the Northeast Atlantic and Mediterranean.

COUNTRY	COUNTRY	TYPE OF GEAR	CATCH RATE	TOTAL CAPTURES PER YR	METHOD	SOURCE
Portugal	Portugal	Bottom trawl	0 per vessel/yr	0	Interview	pers.comm
		Demersal longline	0.0 per vessel/yr	0	Interview	pers.comm
		Polyvalent (GN, TR, Small longline, Traps and Ports)	0.359 per vessel/yr	838	Interview	pers.comm
		Purse-seine	0.167 per vessel/yr	24	Interview	pers.comm
		Beach-seine	0.143 per vessel/yr	6	Interview	pers.comm
	Azores	Pelagic longline	0,04–0,79 per 1000 hooks/month	4190 (May–December)	onboard observation/experiment	Ferreira *et al*., 2001
		Pelagic longline	0,5–3,6 per 1000 hooks/month	N/A	onboard observation	Ferreira *et al*., 2010
	Madeira	N/A				
Spain	Mediterranean North	Bottom trawl	0,7 per vessel/yr	265	Onboard observation/Logbook	Alvarez de Quevedo, 2006
		Pelagic longline	3,6 per vessel/yr	130	Onboard observation/Interview	Alvarez de Quevedo, 2006

Country	Country	Type of gear	Catch rate	Total captures per yr	Method	Source
		Demersal longline	0,09 per vessel/yr	8	Onboard observation/Interview	Alvarez de Quevedo, 2006
		Set-net	0,2 per vessel/yr	564	Onboard observation/Interview	Alvarez de Quevedo, 2006
		Pelagic longline	214,8 per vessel/yr	22 124	Onboard observation	Caminãs, 2006
	Balearic Island	Bottom trawl	0,18 per vessel/yr	13	Interview	Carreras, 2004
		Pelagic longline	14 per vessel/yr	70	Interview	Carreras, 2004
		Demersal longline	0,09 per vessel/yr	8	Interview	Carreras, 2004
		Set-net	1,7 per vessel/yr	196	Onboard observation/Interview	Carreras, 2004
France	Mediterranean	Bottom trawl	1,5 per vessel/yr	33	Interview	Laurent, 1991
		Set-net	1,22 per vessel/yr	3307	Interview	Laurent, 1991
Italy	Mediterranean	Bottom trawl	38–161 per vessel/yr	3040–12 880	Logbook	Casale, 2007
		Pelagic longline	7,707 (west); 27,2 (central)	5572 (west); 2148 (central)	Onboard observation/Logbook/Interview	Casale, 2007

Country	Country	Type of gear	Catch rate	Total captures per yr	Method	Source
		Demersal longline	N/A	N/A		
		Bottom longline	N/A	N/A		
		Set-net	N/A	N/A		
	Adriatic	Bottom trawl	7,28–61,32 per vessel/yr	5878–49 508	Onboard observation/Logbook	Casale, 2004; Vallini, 2003
	Lampedusa	Bottom trawl	62,41 per vessel/yr	1014	Logbook	Casale, 2007
		Demersal longline	42,4 per vessel/yr	514	Logbook	Casale, 2007
Greece	Ionian Sea	Pelagic longline	8,6 per vessel/yr	6157	Onboard observation	Kapantagakis, 2001
	Thracian Sea	Bottom trawl	9,375 per vessel/yr	2878	Onboard observation	Margaritoulis, 2003
Cyprus	Mediterranean	Demersal longline	4 per vessel/yr	N/A	Interview	Godley, 1998
		Set-net	4 per vessel/yr	7124	Interview	Godley, 1998
Malta	Mediterranean	Bottom trawl	N/A	N/A		
		Pelagic longline	N/A	N/A		
		Demersal longline	N/A	N/A		
		Set-net	N/A	N/A		

Table 4. Bycatch estimates collated under 812/2004 by EU Member States for 2011.

							Effort (Days at Sea)			Bycatch estimates	
Species	Country	Fishing Area	Vessel size (m)	Métier Level 3	Métier Level 4	Métier Level 5	Total	Observed	Number of specimens	Provided	Extrap–olated
Myliobatis aquila	Italy	GSA 17	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	9979	380	302	7210	7931
Pteroplatytrygon violacea	Italy	GSA 17	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	9979	380	99	2273	2600
Alosa fallax	Italy	GSA 17	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	9979	380	90		2363
Stenella coeruleoalba	France	VIIIa	>15	Nets	Set gillnet	Demersal Fish	3008	3	1		1003
Delphinus delphis	France	VIIe	>15	Bottom Trawl	Bottom otter trawl	Demersal Fish	8868	35	3		760
Caretta caretta	Italy	GSA 17	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	9979	380	14	358	368
Phocoena phocoena	UK	VIIF	<15	Nets	Set gillnet	Demersal Fish	2749	38	5		362
Pteromylaeus bovinus	Italy	GSA 17	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	9979	380	13	396	341
Phocoena phocoena	UK	VIIG	>15	Nets	Set gillnet	Demersal Fish	310	12	10		258
Delphinus delphis	France	VIIe	all sizes	Pelagic trawl	Midwater pair trawl	Demersal Fish	827	23	6	207	216
Delphinus delphis	Portugal	Ixa	>15	Purse-seine	Nets, longline, traps		11 320	110	2	122	206
Tursiops truncatus	France	GSA7	>15	Bottom Trawl	Bottom otter trawl	Demersal Fish	8900	45	1		198
Phocoena phocoena	UK	VIIe	<15	Nets	Set gillnet	Demersal Fish	5777	61	2		189
Alopias vulpinus	Italy	GSA 17	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	9979	380	6	143	158
Halichoerus grypus	Ireland	VIIb	>15	Nets	Set gillnet	Demersal Fish	89	13	21		144
Phocoena phocoena	France	VIIe	>15	Nets	Trammelnet	Demersal Fish	1012	36	4	110	112
Phocoena phocoena	Portugal	Ixa	>15	Purse-seine	Nets, longline, traps		11 320	110	1		103
Tursiops truncatus	Portugal	Ixa	>15	Purse-seine	Nets, longline, traps		11 320	110	1		103
Common Murre (Uria aalge)	Poland	IIId 25	>15	Nets	Set gillnet	Demersal Fish	701	22	3		96
Phocoena phocoena	UK	VIIJ	>15	Nets	Set gillnet	Demersal Fish	67	10	12		80
Tursiops truncatus	Italy	GSA 17	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	9979	380	3	72	79

							Effort (Days at Sea)			Bycatch estimates	
Species	Country	Fishing Area	Vessel size (m)	Métier Level 3	Métier Level 4	Métier Level 5	Total	Observed	Number of specimens	Provided	Extrap-olated
Phocoena phocoena	Denmark	IIIa	<15	Nets	Set gillnet	Demersal Fish	2415	201	6	72	72
Phocoena phocoena	Netherlands	IVc	<15	Nets	Trammelnet	Demersal Fish	212	3	1	71	71
Common Skate	Ireland	VIIb	>15	Nets	Set gillnet	Demersal Fish	89	13	10		68
Halichoerus grypus	Ireland	VIIb	>15	Nets	Set gillnet	Demersal Fish	62	10	8		50
Common Skate	Ireland	VIIb	<15	Nets	Set gillnet	Demersal Fish	42	4	4		42
Phocoena phocoena	UK	VIIG	>15	Nets	Trammelnet	Demersal Fish	59	18	12		39
razorbill (Alca torda)	Poland	IIId 25	>15	Nets	Set gillnet	Demersal Fish	701	22	1		32
red-throated Loon	Poland	IIId 25	>15	Nets	Set gillnet	Demersal Fish	701	22	1		32
Velvet Scooter (Melanitta fusca)	Poland	IIId 25	>15	Nets	Set gillnet	Demersal Fish	701	22	1		32
Phocoena phocoena	Ireland	VIIJ	>15	Nets	Set gillnet	Demersal Fish	67	13	6		31
Phoca vitulina	Ireland	VIIb	>15	Nets	Set gillnet	Demersal Fish	89	13	4		27
Phoca vitulina	Ireland	VIIb	<15	Nets	Set gillnet	Demersal Fish	42	4	2		21
Phocoena phocoena	Ireland	VIIb	>15	Nets	Set gillnet	Demersal Fish	89	13	3		21
Phocoena phocoena	Denmark	IIIb	<15	Nets	Set gillnet	Demersal Fish	2516	135	1	19	19
Common Skate	Ireland	VIIb	>15	Nets	Set gillnet	Demersal Fish	62	10	3		19
Halichoerus grypus	Ireland	VIIb	<15	Nets	Set gillnet	Demersal Fish	18	2	2		18
Six Gill Shark	Ireland	VIIb	<15	Nets	Set gillnet	Demersal Fish	18	2	2		18
Halichoerus grypus	Ireland	VIIb	>15	Nets	Set gillnet	Demersal Fish	110	7	1		16
Phoca vitulina	Ireland	VIIb	>15	Nets	Set gillnet	Demersal Fish	110	7	1		16
Phoca vitulina	Ireland	VIIb	>15	Nets	Set gillnet	Demersal Fish	62	10	2		12
Balaenoptera acutorostrata	Ireland	VIIb	<15	Nets	Set gillnet	Demersal Fish	42	4	1		11
Delphinus delphis	Ireland	VIIb	<15	Nets	Set gillnet	Demersal Fish	42	4	1		11
Halichoerus grypus	Ireland	VIIb	<15	Nets	Set gillnet	Demersal Fish	42	4	1		11

							Effort (Days at Sea)			Bycatch estimates	
Species	Country	Fishing Area	Vessel size (m)	Métier Level 3	Métier Level 4	Métier Level 5	Total	Observed	Number of specimens	Provided	Extrap-olated
Common Skate	Ireland	VIIb	<15	Nets	Set gillnet	Demersal Fish	18	2	1		9
Delphinus delphis	Ireland	VIIb	<15	Nets	Set gillnet	Demersal Fish	18	2	1		9
Tope	Ireland	VIIb	<15	Nets	Set gillnet	Demersal Fish	18	2	1		9
Phocoena phocoena	UK	VIIF	>15	Nets	Set gillnet	Demersal Fish	179	21	1		9
Spurdog	Ireland	VIIb	>15	Nets	Set gillnet	Demersal Fish	89	13	1		7
Sunfish	Ireland	VIIb	>15	Nets	Set gillnet	Demersal Fish	89	13	1		7
Seal	Ireland	VIIb	>15	Nets	Set gillnet	Demersal Fish	62	10	1		6
Delphinus delphis	UK	VIIe	>15	Pelagic trawl	Midwater pair trawl	Demersal Fish	47	106	12		5
Phocoena phocoena	UK	VIIe	>15	Nets	Trammelnet	Demersal Fish	78	19	1		4
Delphinus delphis	UK	VIIG	>15	Nets	Trammelnet	Demersal Fish	59	18	1		3
Delphinus delphis	UK	VIIH	>15	Nets	Trammelnet	Demersal Fish	16	25	1		1
Phocoena phocoena	UK	VIIH	>15	Nets	Trammelnet	Demersal Fish	16	25	2		1
	Denmark	IIId	<15	Longlines	Drifting longlines	Anadromous	306	4	0		0
	Denmark	IIIa	>15	Bottom trawls	Bottom otter trawl	Crustaceans	1942	14	0		0
	Denmark	IV	>15	Bottom trawls	Beam trawl	Crustaceans	2431	10	0		0
	France	VIId	<15	Nets	Set gillnet	Crustaceans	76	1	0		0
	France	VIIe	<15	Nets	Set gillnet	Crustaceans	1779	3	0		0
	France	VIIIa	<15	Nets	Set gillnet	Crustaceans	903	2	0		0
	UK	VIIA	<15	Nets	Set gillnet	Crustaceans	40	3	0		0
	Denmark	IIIa	<15	Nets	Set gillnet	Demersal Fish	146	1	0		0
	Denmark	IIIa	<15	Nets	Set gillnet	Demersal Fish	444	7	0		0
	Denmark	IIIa	>15	Seines	Anchored seine	Demersal Fish	44	2	0		0
	Denmark	IIIa	<15	Seines	Anchored seine	Demersal Fish	65	3	0		0
	Denmark	IIIa	<15	Seines	Anchored seine	Demersal Fish	590	1	0		0

							Effort (Days at Sea)			Bycatch estimates	
Species	Country	Fishing Area	Vessel size (m)	Métier Level 3	Métier Level 4	Métier Level 5	Total	Observed	Number of specimens	Provided	Extrap-olated
	Denmark	IIIa	>15	Seines	Anchored seine	Demersal Fish	926	2	0		0
	Denmark	IIIa	>15	Seines	Fly shooting seine	Demersal Fish	105	2	0		0
	Denmark	IIIb	<15	Nets	Set gillnet	Demersal Fish	82	23	0		0
	Denmark	IIIc	>15	Bottom trawls	Bottom otter trawl	Demersal Fish	848	10	0		0
	Denmark	IIIc	<15	Bottom trawls	Bottom otter trawl	Demersal Fish	2133	17	0		0
	Denmark	IIId	>15	Bottom trawls	Bottom otter trawl	Demersal Fish	2729	13	0		0
	Denmark	IIId	<15	Bottom trawls	Bottom otter trawl	Demersal Fish	3103	21	0		0
	Denmark	IV	<15	Nets	Set gillnet	Demersal Fish	2180	18	0		0
	Denmark	IV	>15	Nets	Set gillnet	Demersal Fish	2309	3	0		0
	Denmark	IV	<15	Seines	Anchored seine	Demersal Fish	52	1	0		0
	Denmark	IV	>15	Seines	Anchored seine	Demersal Fish	1053	19	0		0
	France	GSA8	<15	Nets	Set gillnet	Demersal Fish	23 423	164	0		0
	France	IVc	>15	Nets	Trammelnet	Demersal Fish	481	2	0		0
	France	IVc	<15	Nets	Trammelnet	Demersal Fish	2952	8	0		0
	France	VIA	>15	Nets	Set gillnet	Demersal Fish	403	14	0		0
	France	VIId	<15	Nets	Set gillnet	Demersal Fish	1311	3	0		0
	France	VIId	>15	Nets	Trammelnet	Demersal Fish	665	5	0		0
	France	VIId	<15	Nets	Trammelnet	Demersal Fish	11 817	44	0		0
	France	VIId	>15	Pelagic trawl	Midwater Otter trawl	Demersal Fish	142	4	0		0
	France	VIId	all sizes	Pelagic trawl	Midwater pair trawl	Demersal Fish	212	8	0		0
	France	VIIe	>15	Nets	Set gillnet	Demersal Fish	224	12	0		0
	France	VIIe	<15	Nets	Set gillnet	Demersal Fish	4140	10	0		0
	France	VIIe	<15	Nets	Trammelnet	Demersal Fish	3730	34	0		0
	France	VIIH	>15	Nets	Set gillnet	Demersal Fish	28	2	0		0

							Effort (Days at Sea)			Bycatch estimates	
Species	Country	Fishing Area	Vessel size (m)	Métier Level 3	Métier Level 4	Métier Level 5	Total	Observed	Number of specimens	Provided	Extrap-olated
	France	VIIH	<15	Nets	Set gillnet	Demersal Fish	389	3	0		0
	France	VIIH	>15	Nets	Trammelnet	Demersal Fish	391	8	0		0
	France	VIIH	<15	Nets	Trammelnet	Demersal Fish	650	12	0		0
	France	VIIH	all sizes	Pelagic trawl	Midwater pair trawl	Demersal Fish	30	5	0		0
	France	VIIIa	<15	Nets	Set gillnet	Demersal Fish	11 084	16	0		0
	France	VIIIa	>15	Nets	Trammelnet	Demersal Fish	2631	7	0		0
	France	VIIIa	<15	Nets	Trammelnet	Demersal Fish	8708	14	0		0
	France	VIIIa	all sizes	Pelagic trawl	Midwater pair trawl	Demersal Fish	541	2	0		0
	France	VIIIb	>15	Nets	Set gillnet	Demersal Fish	674	1	0		0
	France	VIIIb	<15	Nets	Set gillnet	Demersal Fish	4266	56	0		0
	France	VIIIb	>15	Nets	Trammelnet	Demersal Fish	3963	36	0		0
	France	VIIIb	<15	Nets	Trammelnet	Demersal Fish	5673	41	0		0
	France	VIIIb	all sizes	Pelagic trawl	Midwater pair trawl	Demersal Fish	181	1	0		0
	France	VIIIc	>15	Nets	Set gillnet	Demersal Fish	105	4	0		0
	France	VIIJ	>15	Nets	Set gillnet	Demersal Fish	1081	3	0		0
	France	VIIk	>15	Nets	Set gillnet	Demersal Fish	389	14	0		0
	Ireland	VIIb	<15	Nets	Set gillnet	Demersal Fish	18	2	0		0
	Ireland	VIIb	<15	Nets	Set gillnet	Demersal Fish	42	4	0		0
	Ireland	VIIb	>15	Nets	Set gillnet	Demersal Fish	62	10	0		0
	Ireland	VIIb	>15	Nets	Set gillnet	Demersal Fish	89	13	0		0
	Ireland	VIIb	>15	Nets	Set gillnet	Demersal Fish	110	7	0		0
	Ireland	VIIG	>15	Nets	Set gillnet	Demersal Fish	76	2	0		0
	Ireland	VIIG	>15	Nets	Set gillnet	Demersal Fish	76	5	0		0
	Ireland	VIIJ	>15	Nets	Set gillnet	Demersal Fish	67	13	0		0

							Effort (Days at Sea)			Bycatch estimates	
Species	Country	Fishing Area	Vessel size (m)	Métier Level 3	Métier Level 4	Métier Level 5	Total	Observed	Number of specimens	Provided	Extrap-olated
	Ireland	VIIJ	>15	Nets	Set gillnet	Demersal Fish	101	9	0		0
	Ireland	VIIJ	>15	Nets	Set gillnet	Demersal Fish	122	6	0		0
	Ireland	VIIJ	>15	Nets	Set gillnet	Demersal Fish	126	11	0		0
	Latvia	24, 26, 28		Nets	Set gillnet	Demersal Fish	1388	135	0		0
	UK	IVb	<15	Nets	Set gillnet	Demersal Fish	615	12	0		0
	UK	IVb	<15	Nets	Trammelnet	Demersal Fish	281	12	0		0
	UK	VIB	>15	Nets	Set gillnet	Demersal Fish	87	45	0		0
	UK	VIIA	<15	Nets	Set gillnet	Demersal Fish	436	4	0		0
	UK	VIId	<15	Nets	Trammelnet	Demersal Fish	2358	1	0		0
	UK	VIIe	<15	Nets	Trammelnet	Demersal Fish	30	4	0		0
	UK	VIIe	>15	Pelagic trawl	Midwater Otter trawl	Demersal Fish	3	22	0		0
	UK	VIIF	<15	Nets	Trammelnet	Demersal Fish	6	12	0		0
	Denmark	IV	<15	Longlines	Set longlines	Finfish	176	1	0		0
	Portugal	Ixa	>15	Bottom Trawl	Demersal	Fish and crust	11 618	78	0		0
	France	VIIIb	<15	Nets	Set gillnet	Large Pelagic Fish	212	2	0		0
	France	VIIIb	all sizes	Pelagic trawl	Midwater pair trawl	Large Pelagic Fish	33	2	0		0
	France	VIIId	all sizes	Pelagic trawl	Midwater pair trawl	Large Pelagic Fish	63	6	0		0
	France	VIIIe	all sizes	Pelagic trawl	Midwater pair trawl	Large Pelagic Fish	103	6	0		0
	France	VIIJ	all sizes	Pelagic trawl	Midwater pair trawl	Large Pelagic Fish	207	21	0		0
	France	VIIk	all sizes	Pelagic trawl	Midwater pair trawl	Large Pelagic Fish	360	37	0		0
	Ireland	VIIIe	>15	Pelagic trawl	Midwater pair trawl	Large Pelagic Fish	14	4	0		0
	Ireland	VIIk	>15	Pelagic trawl	Midwater pair trawl	Large Pelagic Fish	151	44	0		0
	Denmark	IIIa	>15	Bottom trawls	Bottom otter trawl	Mixed dem & Crus	356	1	0		0
	Denmark	IIIa	<15	Bottom trawls	Bottom otter trawl	Mixed dem & Crus	2715	7	0		0

							Effort (Days at Sea)			Bycatch estimates	
Species	Country	Fishing Area	Vessel size (m)	Métier Level 3	Métier Level 4	Métier Level 5	Total	Observed	Number of specimens	Provided	Extrap-olated
	Denmark	IIIa	<15	Bottom trawls	Bottom otter trawl	Mixed dem & Crus	3754	16	0		0
	Denmark	IIIa	>15	Bottom trawls	Bottom otter trawl	Mixed dem & Crus	4365	33	0		0
	Denmark	IIIa	>15	Bottom trawls	Bottom otter trawl	Mixed dem & Crus	8054	49	0		0
	Denmark	IV	>15	Bottom trawls	Bottom otter trawl	Mixed dem & Crus	960	13	0		0
	Denmark	IV	>15	Bottom trawls	Bottom otter trawl	Mixed dem & Crus	5318	36	0		0
	Denmark	IV	>15	Bottom trawls	Bottom pair trawl	Mixed dem & Crus	76	4	0		0
	Estonia	IIId	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	1411	117	0		0
	Estonia	IIId.25	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	189	37	0		0
	Estonia	IIId.28	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	691	31	0		0
	Estonia	IIId.29	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	408	34	0		0
	Estonia	IIId.32	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	117	15	0		0
	France	IVa	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	34	8	0		0
	France	IVb	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	18	1	0		0
	France	VIId	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	415	10	0		0
	France	VIId	all sizes	Pelagic trawl	Midwater pair trawl	Small pelagic fish	101	1	0		0
	France	VIIIa	<15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	31	2	0		0
	France	VIIIa	all sizes	Pelagic trawl	Midwater pair trawl	Small pelagic fish	851	16	0		0
	France	VIIIb	<15	Nets	Set gillnet	Small pelagic fish	38	1	0		0
	France	VIIId	all sizes	Pelagic trawl	Midwater pair trawl	Small pelagic fish	4	1	0		0
	France	VIIId	all sizes	Pelagic trawl	Midwater pair trawl	Small pelagic fish	101	1	0		0
	Ireland	IIa	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	24	24	0		0
	Ireland	IIa	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	17	6	0		0
	Ireland	IVa	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	182	7	0		0
	Ireland	lXa	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	1	1	0		0

							Effort (Days at Sea)			Bycatch estimates	
Species	Country	Fishing Area	Vessel size (m)	Métier Level 3	Métier Level 4	Métier Level 5	Total	Observed	Number of specimens	Provided	Extrap-olated
	Ireland	VIA	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	3	3	0		0
	Ireland	VIA	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	166	6	0		0
	Ireland	VIA	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	178	15	0		0
	Ireland	VIA	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	282	42	0		0
	Ireland	VIA	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	534	47	0		0
	Ireland	VIIA	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	1	1	0		0
	Ireland	VIIA	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	2	4	0		0
	Ireland	VIIA	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	3	6	0		0
	Ireland	VIIb	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	11	4	0		0
	Ireland	VIIb	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	70	3	0		0
	Ireland	VIIb	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	158	8	0		0
	Ireland	VIIc	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	6	1	0		0
	Ireland	VIIc	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	15	5	0		0
	Ireland	VIIc	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	2	3	0		0
	Ireland	VIIG	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	17	1	0		0
	Ireland	VIIG	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	64	11	0		0
	Ireland	VIIG	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	3	2	0		0
	Ireland	VIIG	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	38	2	0		0
	Ireland	VIIG	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	220	14	0		0
	Ireland	VIIH	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	20	2	0		0
	Ireland	VIIJ	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	5	5	0		0
	Ireland	VIIJ	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	50	2	0		0
	Ireland	VIIJ	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	22	1	0		0
	Ireland	VIIJ	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	66	8	0		0

							Effort (Days at Sea)			Bycatch estimates	
Species	Country	Fishing Area	Vessel size (m)	Métier Level 3	Métier Level 4	Métier Level 5	Total	Observed	Number of specimens	Provided	Extrap-olated
	Ireland	VIIJ	>15	Pelagic trawl	Midwater pair trawl	Small pelagic fish	81	11	0		0
	Ireland	VIIk	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	0	4	0		0
	Latvia	24-28, 28R		Pelagic trawl	Midwater Otter trawl	Small pelagic fish	3371	430	0		0
	Latvia	28R		Pelagic trawl	Midwater Otter trawl	Small pelagic fish	2663	666	0		0
	Netherlands	IIa	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	47	19	0		0
	Netherlands	IVa	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	41	1	0		0
	Netherlands	IVa	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	164	32	0		0
	Netherlands	IVb	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	47	19	0		0
	Netherlands	IVc	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	15	1	0		0
	Netherlands	IVc	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	51	5	0		0
	Netherlands	VIA	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	10	2	0		0
	Netherlands	VIA	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	57	3	0		0
	Netherlands	VIA	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	156	15	0		0
	Netherlands	VIIb	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	67	12	0		0
	Netherlands	VIIc	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	37	8	0		0
	Netherlands	VIId	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	5	1	0		0
	Netherlands	VIId	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	57	5	0		0
	Netherlands	VIId	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	67	8	0		0
	Netherlands	VIId	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	114	1	0		0
	Netherlands	VIIe	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	2	4	0		0
	Netherlands	VIIe	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	19	9	0		0
	Netherlands	VIIe	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	78	18	0		0
	Netherlands	VIIH	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	8	2	0		0

							Effort (Days at Sea)			Bycatch estimates	
Species	Country	Fishing Area	Vessel size (m)	Métier Level 3	Métier Level 4	Métier Level 5	Total	Observed	Number of specimens	Provided	Extrap-olated
	Netherlands	VIIH	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	29	4	0		0
	Netherlands	VIIJ	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	122	18	0		0
	Netherlands	VIIJ	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	183	4	0		0
	Netherlands	VIIk	>15	Pelagic trawl	Midwater Otter trawl	Small pelagic fish	1	1	0		0

Table 5. Reported commercial fishery bycatch estimates for the Northwest Atlantic Region, US and Canada.

Country	Region	Gear/Fishery	Year	Coverage %	Species	Observed	Estimate (CV)
USA	Atlantic	Northeast gillnet	2010	17.00	Harbour Porpoise	50	387 (0.30)
					Short-beaked Common Dolphin	4	54 (0.71)
					White-sided Dolphin	6	66 (1.00)
					Harbour Seal	71	488 (0.25)
					Grey Seal	107	11142 (0.32)
					Harp Seal	8	259 (0.60)
			1996–2007	5.10	Common Loon	31[a]	74 (0.51)
USA	Atlantic	Mid-Atlantic gillnet	2010	4.00	Harbour Porpoise	18	257 (0.89)
					Harbour Seal	9	89 (0.41)
					Grey Seal	9	267 (0.76)
					Harp Seal	1	32 (0.93)
					Short-beaked Common Dolphin	10	31 (0.65)
			1995–2006	2.20	Loggerhead Sea Turtle	41[b]	350 (0.20)
			1996–2007	2.60	Common Loon	148[a]	477 (0.13)
					Red Throated Loons	199[a]	897 (0.19)
USA	Atlantic	Northeast Midwater Trawl	2010	53.00	Harbour Seal	2	Unk[d]
					Short-beaked Common Dolphin	1	Unk[c]
USA	Atlantic	Mid-Atlantic Midwater Trawl	2010	25.00	Harbour Seal	1	Unk[d]
					Grey Seal	1	Unk[d]
USA	Atlantic	Northeast Bottom Trawl	2010	16.00	Pilot Whale spp.	6	Unk[c]
					Short-beaked Common Dolphin	9	17 (0.28)[c]
					White-sided Dolphin	5	119 (0.39)
					Bottlenose Dolphin	5	Tbd[d]
					Grey Seal	9	Unk[d]
USA	Atlantic	Mid-Atlantic Bottom Trawl	2010	6.00	Short-beaked Common Dolphin	2	104 (0.29)[c]
					White-sided Dolphin	0[c]	22 (0.14)[c]
					Risso's Dolphin	15	Tbd[d]
					Bottlenose Dolphin	5	Tbd[d]
					Harbour Seal	1	Unk[d]

			2005–2008	3.40	Loggerhead Sea Turtle	112	292 (0.13)[g]
Canada	Atlantic	Bay of Fundy Sink Gillnet	1997–2001	unk[f]	Harbour Porpoise	14.2	43 (Unk)
Canada	Atlantic	Herring Weir	2010	Unk[e]	Harbour Porpoise	1	1 (Unk)

[a] The mortality estimate is an average over the 1996–2007 time period; the observed number of takes and coverage are totals over the time period (Warden, 2010).

[b] The mortality estimate is an average over the 1995–2006 time period; the observed number of takes and coverage are totals over the time period (Murray, 2009).

[c]The method used to estimate bycatch mortality of cetaceans in bottom-trawl gear includes data pooled over years and a bycatch rate is predicted using a generalized linear model. The pooled data are treated as one dataset and assumed to represent average fishing practices during the pooled time period Therefore, if there was no observed bycatch reported for any subsequent years (e.g. 2010), this does not imply that there was no bycatch during that year (Rossman, 2009). Predictive models estimating bycatch rates and mortality for white-sided and common dolphins, and pilot whales are currently being updated. As a result, bycatch estimates reported for 2010 are subject to change. In addition, pilot whale stock identification research delineating abundance and mortality of short-fin vs. long-fin pilot whales is currently underway. As a result, future bycatch estimates will no longer be pooled at the Genus level. Total estimated bycatch for midwater trawl gear has not been estimated.

[d] Estimation of total bycatch mortality of pinniped species attributed to the Northeast bottom-trawl fishery are not currently available. Bycatch estimates for Risso's dolphin and offshore Bottlenose dolphin will be reported in the 2013 SAR.

[e] Canada has not reported Coverage of the Herring Weir Fishery; Unk=unknown.

[f] The Canadian gillnet has not been observed during since 2001. However, the fishery is still active; thus, the observed and total bycatch is estimated using past averages.

[g] The mortality estimate and percent observer coverage are annual averages over the 2005–2008 time period (Warden, 2011).

Annex 5: ICES request form

REQUEST FROM (ORGANIZATION)	EUROPEAN COMMISSION, DGMARE
Contact within organization: Name/ E-mail/ Telephone	Gilles Doignon, gilles.doignon@ec.europa.eu, Tel: +3222999368
Content contact person: Name/ E-mail/ Telephone	Dominic Rihan, dominic.rihan@ec.europa.eu, Tel: +3222958435
Request announced	14 December 2012
Request received	14 December 2012
Answer deadline client	26 April 2013
Request code (client)	
Request code (ICES)	
Request	Background The European Commission has carried out two separate reviews of Regulation (EC) 812/2004 (COM (2009) 368; COM(2011) 578) as required under Article 7 of the Regulation. In the latest review the Commission reached the following conclusions: • Despite the Regulation being in place for six years, and despite notable improvements with regard to reporting and observer coverage it is still not fully meeting its objective of reducing the accidental capture of cetaceans in fishing gears. • There has been insufficient sampling in the right fisheries or areas to enable sound management decisions to be made with respect to cetacean bycatch. • Information on cetacean populations is fragmented and population status remains unclear so the actual impact of fishing on populations is poorly understood. • Article 2 (Acoustic Deterrent Devices) of the Regulation has been ineffective. There is still a general reluctance by fishermen to use the devices currently available for practical and economic reasons. • Many Member States have made a considerable effort to meet the reporting requirements of the Regulation. However, the quality and content of the reports from some Member States submitted remains inconsistent, making analysis at the EU level difficult. • Monitoring targets specified in the Regulation appear over ambitious and these targets could be rethought. A more general approach whereby Member States would be required to demonstrate their fisheries were not exceeding some agreed level of cetacean bycatch would be more appropriate. • Greater flexibility and coordination is required in allocating monitoring effort. • Data collection under the Habitats Directive and also the linkage with Regulation (EC) 812/2004 needs to be clarified so the utility of the data collected is maximized and duplication is eliminated. • For fishing activities and for geographical areas outside the scope of the Regulation where incidental catches are problematic, Member States have the responsibility under the Habitats Directive to take appropriate measures to safeguard cetacean populations.

Justification

In the Communication, the Commission has also indicated that it has no intention of amending Regulation (EC) 812/2004. Continuing to have detailed rules for managing cetacean bycatch agreed under a co-decision regulation runs contrary to the Commission's objective, under the reform of the CFP, of moving to regionalised decision-making, where measures are tailored to different fisheries and agreed at regional level.

On this basis it is the Commission's intention to incorporate mitigation measures for protected species under the new approach to technical measures regulations under the CFP reform that will reflect this regionalised approach. The monitoring of cetaceans and other protected species will be potentially covered under the new DCF (DCMAP). Once this is achieved, Regulation (EC) 812/2004 could be repealed.

The Commission recognizes that while this is the most rational approach it does mean that Regulation (EC) 812/2004 will continue to remain in place during this transitional period while the reform of the CFP is being negotiated and, post-reform, while regionalisation evolves. Therefore, accepting that there are inherent weaknesses in the existing regulation, there is a need to consider how best to focus monitoring of cetacean bycatch in the right areas and fisheries using the resources available to Member States and also to optimize the existing mitigation measures (i.e. acoustic deterrent devices) in place under the regulation during this transitional period.

On the monitoring side, ICES has already carried out an assessment of cetacean bycatch based on all available data including an indication of problematic fisheries and areas. Observer programmes are the best source of data but it is not realistic to expect Member States to continue to operate specific cetacean bycatch monitoring programmes. Therefore it is important to establish which of the problematic or potentially problematic fisheries in terms of cetacean bycatch are subject to observer coverage under the existing DCF or other monitoring programmes and whether the level of coverage is at a sufficient resolution to allow assessment of the problem. In the first instance ICES may have to develop a methodology to carry out this analysis given cetacean bycatch is a "rare event" and does not necessarily fit in with normal sampling protocols for fish.

On the acoustic deterrent devices, in 2012 the Commission tabled a proposal to align Regulation (EC) No 812/2004 with the TFEU. This proposal is currently under discussion with the co-legislators and one of the provisions of this proposal is to allow for a revision of the technical specifications and conditions of use acoustic deterrent devices as defined in Annex II. This would allow the Annex to be adapted to take account of technical and scientific progress since the regulation came into force. Assuming this proposal is adopted the Commission wishes to seek advice on the appropriate amendments to make to this Annex.

Post-reform of the CFP, one of the biggest challenges in implementing effective management measures for cetaceans and other protected species is to define the existence of an incidental bycatch problem in the first place. Current information sources to identify fisheries where measures are needed urgently are still limited and do not allow accurate and realistic assessments of populations and the impact of bycatch on these populations. This means defining clear management targets is problematic in

	most fisheries. Therefore other approaches as well the criteria used to define what constitutes a 'problem' need to be developed. ICES should define these criteria and whether biological indicators (e.g. PBR or BPUE) or threshold reference points could or should be used for defining a problem and setting management targets. Requests To address these issues DGMARE requests ICES to consider the following: 1) Assess the extent to which current fishery monitoring schemes, including inter alia those conducted under the DCF and Regulation 812/2004, provide an acceptable means of assessing the nature and scale of cetaceans and other protected species bycatch. Consider alternative means and other sources of data that could be used to improve our understanding of the conservation threat posed to cetaceans and protected species by bycatch in European fisheries. 2) Advise on how Annex II of Regulation 812/2004 defining technical specifications and conditions of use Acoustic Deterrent Devices could be best revised in light of technical and scientific progress in this field. 3) Based on the methodology used and the estimates of bycatch limits (take limits) generated by region at WKREV812 and other relevant analyses, propose effective ways to define limits or threshold reference points to bycatch that could be incorporated into management targets under the reformed CFP. Limits or threshold reference points should take account of uncertainty in existing bycatch estimates, should allow current conservation goals to be met, and should enable managers to identify fisheries that require further monitoring, and those where mitigation measures are most urgently required.
Planning ICES	
Request (budget) accepted	Date:
ICES contact person Name/ E-mail/ Telephone	
WG(s) involved	
Preparation timing	
Review group	
Advice drafting group	
ACOM Webex	
Release date	

Grey cells to be filled by ICES.