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CIEM Conseil International pour l'Exploration de la Mer

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Executive summary

The Working Group on Bycatch of Protected Species met in Copenhagen at ICES headquarters between 1st and4th February 2011. The meeting was chaired by Simon Northridge (UK) and was attended by 15 members from ten nations.

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 work of the group was accomplished by working in small groups to address several of the terms of reference, by frequent plenary and by several plenary presentations of specific topics as outlined in the Agenda. The report structure follows the terms of reference, topic by topic.

The Working Group was no longer formally requested to review and comment on EU Member States' reports under council regulation 812/2004, nevertheless in order to review the status of information on recent bycatch estimates and to assess the extent of the implementation of bycatch mitigation measures the reports were reviewed. The WG agreed that in future it would ensure a broader focus on all protected species covered by all discard and bycatch monitoring schemes, and that it would endeavour to evaluate the population level impacts of protected species bycatch by comparing known levels of abundance with known or assumed levels of bycatch based on proximal estimates.

Reports from 15 member states indicated extrapolated estimates of bycatch for 2009 of about 879 striped dolphins, about 1500 common dolphins, about 1100 harbour porpoises and at least ten bottlenose dolphins in a variety of fisheries.

Estimates are still very patchy, and several member states have not fulfilled their monitoring obligations. Bycatch monitoring was judged to be less than optimally directed in many cases.

Implementation of bycatch mitigation measures was also found to be patchy, with few countries able to provide unequivocal confirmation that the obligations under regulation 812/2004 for pinger deployment are being met.

The WG suggested a number of ways in which the implementation of Regulation 812/2004 might be improved, and also noted and brought together related concerns raised by Member States in their reports.

Bycatch estimates from other published and unpublished sources were also collated, and notably the WG was provided with some preliminary estimates of porpoise bycatch in Norwegian waters.

The WG reviewed recent bycatch mitigation trials, including trials of gillnet modifications and experiments that attempt to quantify the effect of pingers on porpoise displacement. Some technical innovations in monitoring bycatch mitigation tools were also described.

The WG 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

The Working Group for Bycatch of Projected Species (SGBYC) met at ICES headquarters in Copenhagen 1–4 February 2011. 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.

2 Adoption of the Agenda

The Draft Agenda was agreed and is also given at Annex 2. The Agenda follows the terms of reference. Much of the work was accomplished in small groups, with plenary sessions for discussion and agreement on major issues.

3 Purview of the Working Group

The WGBYC learned that the European Commission (EC) no longer requires ICES to review the annual reports submitted by Member State (MS) under Council Regulation 812/2004. However, the EC Memorandum of Understanding with ICES requests ICES to "provide any new information regarding the impact of fisheries on marine mammals, seabirds...", and this prompted the WGBYC to consider the future of ToR A. Specifically, how should the WG now utilize the National Reports submitted under regulation 812/2004?

The Head of ICES Advisory Services (Poul Degnbol) informed the WG that it has the liberty to investigate the broader implications of bycatch in European Union (EU) and ICES waters. It appears no other ICES working groups are addressing the question of fisheries impact on protected species' conservation. As a result, advice from WGBYC would be welcome by other working groups with tangential interests (i.e. WGMME, WGSE, SGPIDS and other WGs related to discarding and ecosystem management). It is important for WGBYC to facilitate communication with other working groups to avoid duplication of work or research interests.

The WGBYC generally agreed that attempts to evaluate the 'impact' of small cetacean bycatch mortality on stock sustainability would be beneficial. However, data from MS reports under Reg. 812 serve as the primary data source for evaluating bycatch mortality. Therefore, it was agreed that some level of review of 812 reports (beyond basic collation of data) would continue to be necessary under ToR A to meet the broader objective of the WG to evaluate impacts and continue to provide advice on the effectiveness of Reg. 812.

The Workshop to Evaluate Aspects of EC Regulation 812/2004 (WKREV812) developed some preliminary models for evaluating the impact of bycatch on specific marine mammal stocks. The working group agreed that it would in future include an assessment of the impact of bycatches of protected species for which data were available under ToR F. To this end the WG agreed that it would try to expand and develop the model for bycatch assessment developed by WK812REV for evaluating the impact of fisheries on protected species.

The Working Group agreed that it should aim to provide information on overall bycatch rates for specific areas and métiers to other working groups within ICES to help develop the Ecosystem Approach to fisheries management, so that fish stock assessment groups would be able to incorporate estimates of impacts on protected species attributable to specific métiers within fisheries that are currently being managed solely with the aim of optimizing fish yields.

A broader goal of WGBYC is to provide an overview of current levels of fishery removal and likely impacts on specific populations of cetaceans, birds, etc.

The Working Group also agreed that it also had an important role in providing a means for scientists involved in developing methods to monitor bycatch and methods of minimizing bycatch to share information and collaborate on the further development of such measures.

4 ToR A: National reports on cetacean bycatch under Reg. 812

4.1 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. Several member states reported either that they had not undertaken any activities under 812/2004 or that they were not required to do so. A summary of MS responses is given in Table 1.

The WG discussed how to make best use of the data prepared and elaborated in these Member States Reports. Several of the Reports include tabulated data on fishing effort and monitoring effort in selected métiers; usually broken down to ICES subdivision level (Tables 5.1 and 5.2 of the template proposed by the European Commission) together with observed bycatch rates and bycatch estimates for those same métiers (Table 6 of the same template). The WG considered that these data could be useful in several respects, specifically:

1) To obtain estimates of protected species bycatch from pooled data for wider areas than are addressed under national monitoring schemes.

2) To ascertain how well monitoring at an EU level reflects the distribution of fishing effort and so detect areas that are not well sampled.

3) To track trends in certain key fisheries, both in terms of overall EU level effort and observed bycatch rates.

More generally, the national reports provide (a) calculated estimates of bycatch and of bycatch rates of some cetacean species in some areas, (b) an overview of the extent to which bycatch mitigation measures are being adopted, and also (c) information and assessments on how well Regulation 812/2004 is working in quantifying and where necessary reducing cetacean bycatch. Each of these issues was addressed by WGBYC and summaries are presented below, while collation of the monitoring and fishing effort data and bycatch rates were addressed under ToR D.

4.2 Reported bycatch rates and extrapolated bycatch totals

Information on observed bycatch rates and, where applicable, bycatch estimates by member states for fleets that were observed during 2009 is summarized in Table 2.

Bycatch rate estimates were available for striped dolphins (France), bottlenose dolphins (France), common dolphins (France, Spain, UK) and for harbour porpoises (France, Spain, UK and Denmark). Extrapolated estimates of total bycatch in 2009 were available for striped dolphins (about 870), for common dolphins (around 1500), for bottlenose dolphins (ten) and for harbour porpoises (about 1100).

It is clear that these totals provide only a very patchy overview of total cetacean bycatches within European waters due to low and uneven sampling coverage.

4.3 Pinger use in relation to Reg. 812 requirements

The use of pingers or acoustic deterrent devices is only required under Regulation 812/2004 for certain vessels with an overall length of 12 m or more.

Within this category, pingers are required in certain geographic area and in some cases where specific net types are used, or in certain months.

The areas and nets regulated include the Baltic South Sweden and west Bornholm area and a small part of Swedish coast north Bornholm where all bottom-set-nets must be equipped with pingers.

In the North Sea, Skagerrak and Kattegat it is only nets with meshes of 220 mm or more, and also any nets set in strings of less than 400 m (wreck-net fishery) during the months of August to October that must be equipped with pingers.

To the south and west of the UK (Subdivisions VIId–j) all bottom-set-nets are required to have pingers.

The geographical extent of the regulations is shown in Figure 1(a and b). The adoption and use of pingers within the EU was summarized by the WG.

North Sea: bottom-set-nets with meshes larger than 220 mm; during August to October bottom-set-nets shorter than 400 m (wreck fishery); VIId-j: all bottom-set-nets:

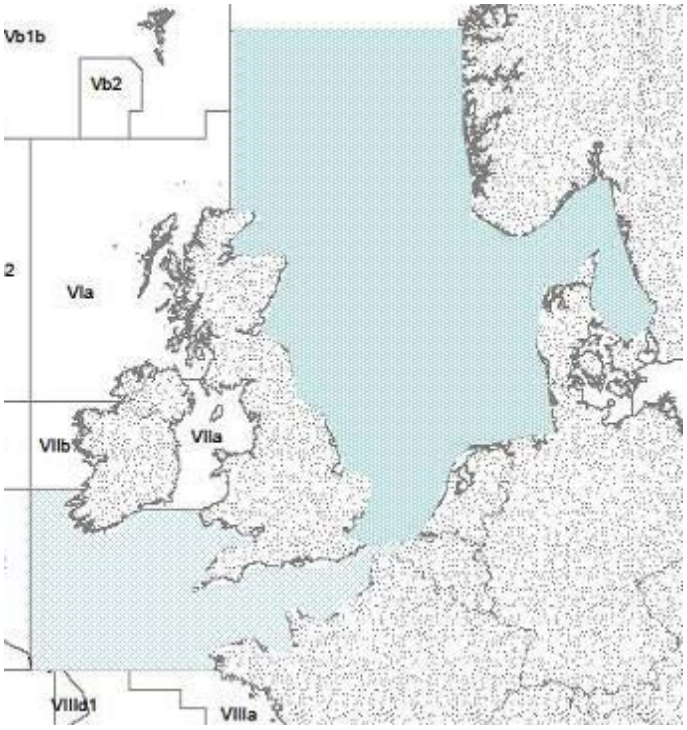

Figure 1a. Pinger use -areas and gears regulated under 812/2004 in the North Sea, Skagerrak and Kattegat, and the Channel and Celtic Sea.

Baltic: All bottom-set-nets:

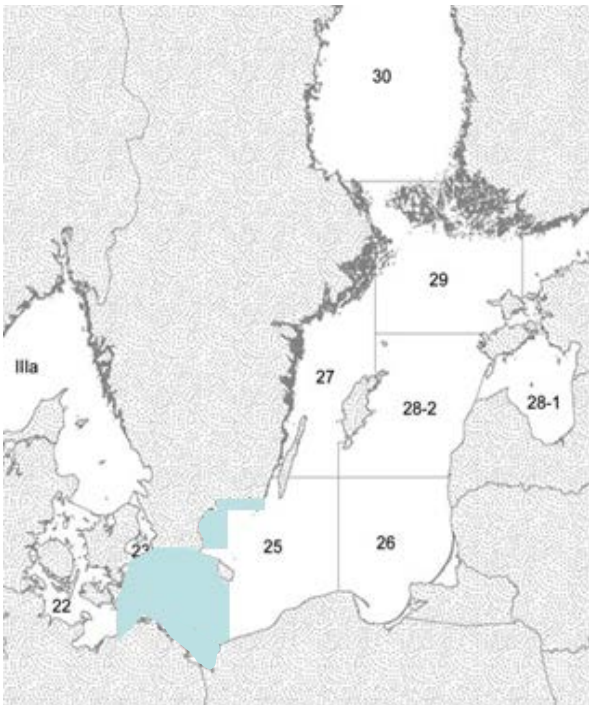

Figure 1b. Pinger use - areas and gears regulated under 812/2004 in the Baltic.

Belgium

Acoustic deterrent devices are not in use in Belgian trammelnet fisheries mainly due to a very small trammelnet fleet where there are very few vessels above 12 m. No legislative steps have nationally been taken to make the use of acoustic deterrent devices compulsory and no specific control measures have been devised for monitoring the characteristics of pingers used. There were 60 days at sea reported by Belgian vessels using set-nets in VIId in 2009 where the use of pingers is required under Regulation 812. The size of these vessels was not reported.

Denmark

Denmark has a derogation from regulation 812/2004 to enable gillnet vessels to use a maximum distance of 455 meters between Aquamark 100 instead of the regulation 200 m. The national report provided no figures on the proportion of vessels affected by Regulation 812/2004 that are actually using pingers. The report referred to devices that are available for regulatory authorities to check that pingers are working.

Estonia

Two Estonian vessels conducted fisheries in areas and during time periods where acoustic deterrent devices should be used (see Figure 1b). According to interviews with skippers of these vessels and "knowledge from previous years" the devices were used as required.

France

Acoustic deterrents are required in some areas fished by French vessels; no violations were found during inspections conducted in these areas and on ships covered by EC Regulation No 812/2004. A pilot study investigated both the efficiency of pingers to

mitigate bycatch of cetaceans and the true cost of well-equipped nets under the commercial conditions of the monkfish fishery. There was no significant difference in the bycatch rate between equipped nets and non-equipped nets probably because of the limited abundance of porpoise in the area of the trial. After a year of checking and replacing pingers, the cost of fully equipped nets was found to be ten times higher than the initial costs due to replacement of materials.

Germany

In Germany both analogue and digital pingers are used. In all nine checks were made on fishing vessels which by virtue of their size and fishing activities were deemed to be required to use pingers, and no infringements were detected.

Greece

Greece has not fishery regulated by 812/2004.

Ireland

No legislative or administrative measures (at national or regional level) were taken to further the use of pingers by fisheries in Ireland during 2009 and no information on the number of vessels using pingers in 2009 was available. During the period June 2007 to end of 2009 the Irish Naval Service had conducted 148 inspections of gillnet vessels and detained ten such vessels for various infringements including the failure to deploy acoustic deterrent devices in their gears. In addition seventeen vessels were issued with written warnings for various offences.

Italy

According to 812/2004 the use of pingers is not mandatory on Italian vessels, given the fact that they do not conduct fishing activities outside the Mediterranean Sea. However a voluntary pilot study on the use of pingers (DDD 02F model) on pair-trawlers was started in 2009. No results are available yet.

Lithuania

Lithuania has no fishery in the regulated areas.

Latvia

Only a very small part of the fishery is carried out in the regulation area. It is assumed that the vessels concerned use pingers however no control measures were conducted.

Netherlands

According to the criteria mentioned in the regulation, the Dutch fishery includes no fleet segments in which pingers are mandatory.

Poland

Use of pingers is consistent with vessels and in areas mentioned in the regulation. Inspectors have made visual observations on the use of pingers both at sea and in ports. In 2009 there was not a single case of infringement of the regulation.

Portugal

Portugal has no fishery in any regulated area.

Spain

A few Spanish vessels fish in areas where pingers are required, but no information on the use of pingers was reported.

Sweden

A majority of those few vessels that were affected by the regulation purchased pingers in 2005 and 2007. No control of use or reliability has been done.

UK

The UK is trialling an alternative mitigation device (DDD) in ICES Area VII which is louder than the devices specified under Regulation 812 and which may therefore be effective at much wider spacings. The device was tested on a few vessels in Area VII with apparently positive results. There was no mention of how regulation or enforcement of pingers is conducted. It was not clear from the UK report whether there are any vessels required to use pingers in the North Sea nor whether any are using pingers.

4.4 Regulation 812 implementation, monitoring, and reporting requirements: some issues of concern

The WG noted that ICES had been asked by the European Commission to provide advice on several specific questions regarding the implementation and possible revision of Regulation 812/2004. This advice had been discussed at a special workshop in October 2010 (WKRev812). Nevertheless the WG considered it useful to recall and elaborate some further concerns and suggestions about the implementation of Regulation 812 that had been considered at the present meeting and at previous SGBYC meetings.

4.4.1 Monitoring schemes

The Working Group noted once again that whereas Regulation 812/2004 requires monitoring schemes to be designed to achieve estimates of the bycatch rates of the most frequently caught cetacean species with a CV of no more than 0.3, this target is extremely hard to achieve in reality because of inherently low bycatch rates in many fisheries. SGBYC has already recommended that the EU adopts a more pragmatic approach based on the principle of sufficient sampling, under which monitoring schemes should be designed to provide confidence that bycatch rates are lower than some predefined bycatch reference limit, as suggested by Northridge and Thomas (2003). Such an approach would enable Member States to focus monitoring as and when most needed.

Positive and negative incentives should be explored to ensure that observers are not prevented from sampling representative parts of fleet activities.

Monitoring should be representative for large fleet segments. Concentrating the sampling effort on small segments of the fleet, for example due to limited availability of observer effort or the expert knowledge of persons involved in certain segments, should be avoided. The result of such an approach would be to generate rather precise bycatch rate estimates for a very small part of the (National) fleet, without any

knowledge of the remaining part. The WG suggests that observer effort should rather be spread over the entire fleet in a (quasi) random way, which will lead to less precision in the short term but with greater accuracy in the longer term.

In addition to observer schemes, the development of new monitoring technologies such as CCTV or remote platforms should be encouraged.

4.4.2 Reporting requirements

A major advantage of the 812/2004 regulation has been that it has acted as an incentive for EU Member States to carry out bycatch monitoring and mitigation projects and to report on them. However, any useful integration or overview of European progress in this area has been hampered by the absence of a unified and agreed reporting format. Several formats have been put forward, and the most recent version has been commented on by all involved scientists in the member states and has now been authorized by the EC. If the EC can communicate this format to relevant authorities within Member States as the mandatory reporting format, there should no longer be any reasons for ad hoc national formats and this should help to obtain a more comprehensive overview of levels fishery bycatch for the species concerned.

The WG also noted that national reports suggest that not all fishers are aware of their obligations under Regulation 812/2004, and that better dissemination of information on these obligations should help improve the patchy delivery of the Regulation's objectives.

4.4.3 Areas outside the scope of Reg. 812/2004 where measures would be necessary to be applied to reduce the incidental catches of cetaceans

The workshop to evaluate aspects of EC Regulation 812/2004 (WGRev812) listed several issues of concern that are currently outside the scope of the Regulation (ICES, 2010). The main conclusion was that prescribing areas and fisheries for monitoring can conflict with the dynamic nature of both cetaceans and fisheries that can shift from year to year. Changes in porpoise density in the southern North Sea for example may have contributed to an apparent increase in fishery interactions in this region since the Regulation was drafted. A more flexible approach, rather than *ad hoc* reallocation of effort towards areas outside the current scope of the regulation, should be implemented to ensure member states can react to such shifts in distribution (for examples see report of the workshop).

The objective should be to increase overall bycatch monitoring coverage through collaboration with other monitoring schemes for example with fishery discard data collection schemes carried out under the Data Collection Framework. In reality some of the monitoring schemes under Reg. 812 are already combined with national DCF schemes. In such cases, shifting observer effort to other fleet segments could lead to higher costs, and might also reduce the incentive within the scheme to record cetaceans and other species of conservation concern.

4.4.4 Gears covered by Regulation 812/2004

The workshop to evaluate aspects of EC Regulation 812/2004, October 2010 (ICES, 2010) pointed out that there is confusion regarding gears that are covered by the Regulation. Monitoring and reporting should be more in line with métiers addressed under the Data Collection Framework.

4.4.5 Vessel size

Regulation 812 specifies monitoring requirements for certain gear categories, and for vessels that are vessels larger than 15 m. The set gillnet fleets of most European countries consist predominantly of vessels that are less than 15 m. Under the Regulation, Member States are encouraged monitor these vessels under pilot studies, but no specified level of precision or coverage, nor any other guidance on the level of monitoring is given. As a result, pilot projects for smaller vessels have generally been poorly implemented by member states.

Similarly there is a length criterion for vessels that are required to use pingers. Only vessels bigger than 12 m are required to use pingers. There is good evidence that gillnets from vessel less than 12 m also pose a threat to cetaceans.

4.4.6 Pinger use

Very little thought appears to have been given throughout the EU as to how to ensure that pingers are actually functioning when they are being used. This area of enforcement needs further elaboration. See also Section 6.2.5 below where a similar issue is being addressed in the USA.

4.4.7 Integration of data collection systems to improve implementation and monitoring of Reg. 812

The WG continues to believe that better collaboration with ICES expert groups that are responsible for planning and coordinating discard and biological sampling under the Data Collection framework (e.g. SGPIDS) will improve the ability of the WG to collate information on and assess the impact of fishery bycatch on protected species. Collaboration could make better use of discard sampling surveys in recording protected species bycatch occurrence in a range of other fisheries not covered by Regulation 812. Furthermore if protected species were to be explicitly covered by the Data Collection Framework (DCF), this could provide an unbiased and wide ranging overview of some of the environmental impacts that may be caused by fisheries on the marine environment. Even at present, data collection protocols devised under the DCF could be specific about the recording of bycatches of protected species groups. Any revision of Regulation 812 should include an explicit association with the DCF.

The monitoring of birds, turtles, sharks, rays and other rare or threatened fish should be encouraged under 812 monitoring schemes. The WGBYC noted that some member states (Italy, Poland) provided information on bycatch of other protected species. This is helpful in the context of fisheries eco-system management and the Group encourages this reporting so that such data are included more widely in future reports.

Finally the WGBYC recalled that monitoring of protected species is mandated under the Directive 92/43/EEC (The Habitats Directive: Article 12), but that the reporting requirements under Article 17 of that Directive are not specific enough for any useful synthesis of such work at an EU level. Further detailed guidance to member states is required on how such monitoring should be carried out and reported.

4.4.8 Communicating goals to the fishing community

The WG had some discussion on the broader aspects of the implementation of regulation 812/2004, and on how its objectives might be met. It was recognized that a critical aspect of implementing both monitoring schemes and mitigation practices relates

to how the conservation objectives are seen by and communicated to the fishing community.

It is very apparent that in many interactions that have occurred to ensure that bycatch is assessed properly and where necessary mitigated, success was strongly dependent on having a good working relationship with fishers and the fishing industry. Such relationships need to be built on several levels.

The drive to reduce bycatch is a social choice, which very often has support from fishers (who may both not like catching marine mammals and may find that the quality of catch is reduced or fishing gear is damaged). It is though almost inevitable that fishing gear will have some bycatch; the question then arises as to how much is allowable by society.

This question may be answered in a number of ways, depending on societal values:

- If society is concerned that populations are sustained at some level into the future then modelling can show the effects of various levels of bycatch (extra mortality) on the probability of ensuring that level is reached or maintained. Such modelling underlies the 1.7% "limit" of additional annual mortality agreed by ASCOBANS and others for harbour porpoises in the North Sea and adopted elsewhere in management advice. That limit is underpinned by a further political choice that the overall sustainable target should be 80% of carrying capacity over a long time-horizon.
- If society is concerned to avoid any further loss of an endangered population or species, then it might chose to avoid all bycatch; as applies for several declarations related to harbour porpoises in the Baltic Sea.
- If society is concerned about animal welfare, then strategies to minimize bycatch would be required.
- If society views some marine mammals as pests or problems, then bycatch may not be regarded as an issue.

A key point is that agreement or at least non-opposition to a societal value needs to be obtained. The process of gaining this position needs to be open and inclusive of all views. Without at least a majority of those directly affected at least understanding the societal position, the problem of finding effective ways of achieving the societal objective grows greatly and the likelihood of success is diminished.

If a societal objective is agreed, then involvement of fishers in deciding how to meet that objective is also crucial. Legislation is often a rather inflexible approach and can often lead to perverse and unintended results if not drafted with the specialist inputs that fishers can provide. So called 'goal-setting' approaches, where an outcome is agreed, but the way of achieving that outcome is left open, can avoid these unwanted results (but may be difficult to strictly enforce).

4.5 Further issues raised by Member States reports on the implementation of 812/2004 in 2009

A number of issues relevant to Member States efforts to monitor, and where relevant reduce, bycatch of cetaceans are raised by reports on the implementation of Regulation 812/2004. While such issues are not explicitly requested as advice, WGBYC considered that these issues should usefully be recorded and discussed to help Member States' efforts in future. These are not in a particular order.

4.5.1 Strandings

In several countries, monitoring programmes have not detected any cetacean bycatch (sometimes due to low levels of bycatch monitoring, but also due to the relative rarity of such events). Some countries are already routinely recording stranded cetaceans, which when coupled with a pathological diagnosis of bycatch, can provide a minimum estimate of bycatch in waters off that country. Such minimum estimates are better than nothing, at least indicating a potential bycatch problem warranting further investigation, although such figures cannot be substituted for a properly designed bycatch observation scheme. The results of such stranding schemes were mentioned by several Member States (Belgium, Netherlands, Poland).

4.5.2 Pinger usage and trials

There have been quite a number of trials of particular pingers in specific fisheries throughout the EU. In several cases, such trials have found the same operational difficulties or issues as have been found elsewhere, with consequential loss in confidence in this potentially valuable mitigation technology by fishers. These sometimes predictable results could indicate a waste of valuable resources. We strongly recommend that Member States learn from experience elsewhere prior to commencing pinger trials or implementation of pinger schemes. The reports of SGBYC provide some information; further information has been gathered on the websites: www.bycatch.org and www.neaq.org

There are also a number of legal issues around pinger use. Under Regulation 812/2004, fishers are required to ensure that working pingers are deployed in certain fisheries and in other areas fishers may wish to use these on a voluntary basis. There is as yet no guarantee to the fisher that a certain pinger will work as specified. CE marking on such products if implemented would indicate that the manufacturer has ensured that the product is in conformity with the essential requirements of the regulation.

4.5.3 Vessel size

At present, most of Regulation 812/2004 applies to larger vessels likely to be working for at least part of their time in waters beyond 12 nautical miles from the shore. WGBYC understands that this restriction in the Regulation is due to reluctance by the Commission to put forward measures that would in effect manage fisheries in near-shore waters derogated to Member State control. WGBYC emphasizes that bycatch is responsive to gear in use and not to vessel length. WGBYC recommends that if a full picture of bycatch (and therefore of impact) is required, then Member States/countries need to ensure bycatch caused by gear deployed from vessels smaller than the limits within Regulation 812/2004 is monitored, and if necessary, mitigated. For EU Member States, this would help fulfil obligations under Council Directive 92/43/EEC (The Habitats Directive).

4.5.4 Video and other novel monitoring

Several ICES countries are now conducting trials of video monitoring systems. This is promising technology for gaining information on fisheries that are difficult to monitor using observers (e.g. smaller vessel fisheries). Sample sizes in fisheries monitored by existing observer schemes can also be increased. Germany has equipped a fast inflatable for use in visiting fleets of small vessels in German Baltic

waters-this development looks promising for the monitoring of small vessel fleets-a difficult task that has been repeatedly highlighted.

4.5.5 Monitoring using observers deployed to meet the requirements of the Data Collection Regulation

Many ICES countries/EU Member States are either using observers deployed for Data Collection Regulation (DCR) purposes to fulfil their monitoring obligations under Regulation 812/2004, or are using such observers to augment a dedicated observer scheme. While such observers are undoubtedly providing useful information, some difficulties have also arisen. In fisheries where bycatch is a rare event, and there is much other sampling work to be conducted by the observer, bycatch events may be easily missed due to the priority of other tasks. WGBYC recommends that where such observers are being deployed, then a protocol and training in use of the protocol ought to be established.

4.5.5.1 Port interviews

Several EU Member States appear to be trying to fulfil their responsibilities under Regulation 812/2004 and the Habitats Directive through use of Port or Skipper Interviews. WGBYC recommends against this approach as there is no way of avoiding the risk of misreporting or inattention of skippers to actual bycatch (due to other more important duties being carried out by skippers). One study has shown that skipper reports only note about 50% of the bycatches found through the use of video systems.

4.5.6 Attraction of seals to nets with pingers

Seals are known to depredate or scavenge on fish trapped in nets or other gear. In at least two countries that are using pingers there is reasonable evidence that seals may be locating gear by hearing pingers attached to the gear. Such attraction is a very obvious disincentive for fishers to deploy pingers. WGBYC recommends that the issue of possible seal depredation be considered prior to deployment of pinger schemes in areas known to be frequented by seals. Well-designed studies of this effect would be helpful in providing solutions.

4.5.7 Lack of reports from some countries

WGBYC noted that the lack of report did not necessarily mean a lack of cetacean bycatch. The group noted that all Member States have responsibilities under the Habitats Directive to monitor bycatch of cetaceans and to take mitigation action where appropriate; however the reporting requirements under that Directive are rather imprecise and only every six years, thus providing no way that those reports could be used collectively to assess bycatch. It would be helpful if the reporting requirements under the two pieces of EU legislation could be harmonized (and made specific) and apply to all EU Member States.

4.5.8 Collective monitoring of fleets

A number of nations have vessels of their flag working out of the ports of another Member State. This can cause logistical problems for observers if a representative part of the nation's fleet is to be monitored. This has been addressed in some Member States by stationing an observer in another Member State, for example the UK has an observer working in north Spain observing UK vessels operating from ports there. It might help to ensure if all parts of the "European" fleet were monitored by a collective of national monitoring schemes – thus, for example, a local Spanish observer

might monitor another State's vessels working from Spanish ports. A certification scheme for observers would help to ensure that observations were compatible between European Member States and reassure Member States of the independence of observers.

4.5.9 Monitoring bycatch of other species

Monitoring schemes under Regulation 812/2004 require Member States to report on cetacean bycatch in certain fisheries. These schemes give Member States the opportunity to monitor other bycaught species and groups. Despite this, only two countries supplied information on the bycatch of other species (turtles and birds). WGBYC recommends that Member States report all bycatch of protected species in order to help develop understanding of bycatch of these other groups.

5 ToR B: Other bycatch estimates

The working group was presented with new information on Norwegian bycatch of porpoises in gillnet fisheries, and was also able to compile other recent estimates of protected species bycatch from the literature.

5.1 Bycatch of porpoises in Norwegian gillnet fisheries

Bjørge presented preliminary results from a programme for monitoring bycatches of harbour porpoises in two coastal gillnet fisheries in Norway. In a pilot study in 2005 a number of coastal fishers were interviewed to identify gear types associated with high incidental mortality of marine mammals. They identified three fisheries: the bottom-set gillnets for anglerfish *Lophius piscatorius,* for cod *Gadus morhua* and for lumpsucker *Cyclopterus lumpus*. Harbour porpoise *Phocoena phocoena*, harbour seal *Phoca vitulina* and grey seals *Halichoerus grypus* were mentioned as the most frequently bycaught mammals. The fishery for lumpsucker has little fishing effort, a short season in February–March and restricted geographical distribution. It was therefore decided to focus on the fisheries for anglerfish and cod.

These coastal gillnet fisheries are carried out by small vessels less than 15 m total length. The vessels are usually not suitable for carrying an extra person as an observer when at sea for multiple days. Therefore, the Institute of Marine Research (IMR) contracted two fishing vessels in each of nine coastal statistical areas to provide detailed information on effort, catch of target and all non-target species, including marine mammals and birds. Each of the contracted vessels has a contact person at IMR. These contact persons visit the vessels regularly and stay on board on day trips at sea. Any discrepancies in statistics between days with and without IMR staff on board may lead to termination of the contract.

The eighteen vessels were contracted to target anglerfish and cod using the same gillnet type as the rest of the coastal fleet (bottom-set gillnets with half mesh of 180 mm for anglerfish and bottom-set gillnets with half mesh of 75–105 mm for cod). The numbers of porpoises bycaught by the contracted fleet were 149, 120 and 113 in 2006, 2007 and 2008, respectively.

A global approach to fleet bycatch estimation was tested, using sum of harbour porpoise catches across both gear types as a response, and catches of both anglerfish and cod as predictors, together with year, month, quarter and various interactions between these variables. Assuming a Poisson process, the models were consistently associated with over dispersion, i.e. scale parameters of about 1.5. This suggested that relevant predictor variables or interactions were missing, despite the fact that the models accounted for about 80% of the deviance.

The data were therefore split by fisheries, and separate models were made for the anglerfish fishery for the relevant time period (May–December), and cod fishery throughout the year. The simpler models were associated with scale factors of approximately 1, showing that the Poisson approximation was good. In these initial, preliminary analyses a set of simple models were formulated, with main effects only. Catches per month, area and year were used as independent units. No effort was made to estimate or account for autocorrelation between observations from e.g. the same area in consecutive months. The best model among a set of competing models was identified using AIC and by assessing the scale parameter.

In the fishery for anglerfish the best model explained 81% of the deviance showing that the majority of the variance is already accounted for. In the cod fishery the proportion of the deviance explained by the model was quite low, 37%, and the scale parameter was 1.26, showing a slight over dispersion. The model could likely be improved by including carefully chosen interactions, such as between area and cod catch.

To extrapolate to entire fisheries by the same vessel category and gear type, the landings statistics from the Directorate of Fisheries were used and the *predict.glm* command in **r** was applied.

Bjørge reported that modelled annual bycatches in the fishery for anglerfish were in the high hundreds, and in the low hundreds for the cod fisheries. However, it is likely that the models are underestimating the bycatch. Simple ratio calculations using the porpoise per kg target species multiplied with the total commercial landings of the target species indicate that the total annual bycatch of porpoises could be in the low thousands in these two fisheries combined. The reasons for these discrepancies are not yet identified. Therefore, the work on these models will be continued to improve the accuracy of the estimates. The precision will be explored, possibly with a bootstrapping approach.

5.2 Review of other published bycatch estimates

US Northwest Atlantic bycatch estimates for cetaceans and pinnipeds in Table 3 are preliminary estimates currently being reviewed by the Atlantic Scientific Review Group (ASRG) and subsequently will be made available for public comment. The final published estimates will be available in early 2012. All estimates were reported for the most recent year available. For estimates from previous years refer to the SGBYC 2010 report (ICES 2010).

Additional information on bycatch rate or estimates of sea turtles, seabirds, cetaceans published in peer-reviewed journals, relevant to the work of this working group is presented in the Table 4.

In particular, concerning seabirds, Zydelis and colleagues (2009) have also summarized the information contained in various papers published on bycatch in several northern European countries (Table 5).

In 2010, the German Federal Agency for Nature Conservation (BfN) received the final report of a study commissioned to investigate bird bycatch in the German part of the Baltic Sea. The 80 page report entitled "Bycatch of Seabirds in Gillnet and Longline Fisheries in the German Baltic Sea" covered set-netting for different target species along the Baltic Sea coast of Mecklenburg–Vorpommern between 2006 and 2009. Recorded bycatch rates varied among target species (fishing gears) and seasons (generally higher in winter) and were as high as 0.6 birds/km of net in a day. The results appear to support the findings of Zydelis *et al*. (2009 in Biol. Cons. 142: 1269–1281) who estimated the annual bycatch in the Baltic Sea to be in excess of 80 000 birds of different species. Christian Pusch (BfN) will present an English-language version of the study at the WGBYC meeting next year.

It is clear that for most European member states bycatch monitoring of birds is very limited or non-existent at present.

6 ToR C: Bycatch mitigation trials

The Working Group was presented with new information on bycatch mitigation trials and associated work. One significant issue has been the exploration of the behavioural responses of porpoises and dolphins to the deployment of acoustic deterrent devices. Although generally effective in reducing bycatch of these species, acoustic deterrents may also have the effect of excluding animals from important foraging areas. This is an area of concern that deserved further attention.

6.1 Effects of pingers on porpoise behaviour

In order to investigate the distances at which pingers (AQUAmark100) affect the behaviour of porpoises and whether they can habituate to these pingers, a trial was initially setup in the Great Belt, Denmark. A single AQUAmark100 programmed to run in cycles of 23 hours was deployed together with a C-pod porpoise click logger (Chelonia Research Ltd). Four other C-pods were placed at distances of 200, 400, 800 and 1600 m from the pinger. Preliminary results showed that the single pinger did affect the porpoise's behaviour significantly all the way out to 1600 m and some degree of habituation behaviour was also reported.

Following these initial results, a new trial was established in St Andrews Bay, UK in order to find out the maximum distances at which these and other devices may affect porpoise echolocation behaviour. Again the same pinger was deployed together with a C-pod. Twelve other pods were deployed at 200, 400, 800, 1600, 2400 and 3200 m distance to the pinger (each at two distances in a triangle array). The results from the UK trial await analysis. A second trial with a DDD is also planned.

6.2 Relevant work in the US

The following activities work completed in 2010 by the protected species branch bycatch reduction programme at the Northeast Fisheries Science Center in Woods Hole, MA USA. Final reports and other information regarding historical, present and future studies are located at http://www.nefsc.noaa.gov/read/protspp/PR_gear_research/.

6.2.1 Gillnet hang-ratio study

A two year study testing the effect of gillnet hang-ratio on the bycatch of harbour porpoise and seals has led to inconclusive results. Gillnets hung on 3:1 and 2:1 ratio's had similar bycatch of both cetaceans and pinnipeds. There are no further plans to continue the study.

6.2.2 Atlantic sturgeon bycatch study

Phase one of a two-phase study has been completed looking at the effect of monkfish gillnet fishing practices on the bycatch of sturgeon. Preliminary results from phase one show a large difference in bycatch rates of sturgeon caught in monkfish nets without (treatment) tie downs (control = tie downs used). However, there were several marine mammals bycaught in the nets without tie downs used. There also appears to be a large difference in the total catch with more monkfish caught in the control nets. Phase two of the trial will compare half nets (i.e. shorter in height) with standard height nets, both net types will be using tie downs.

6.2.3 Workshop review of turtle excluder device (TED) research

In 2010 a workshop was held on 'Mitigating Sea Turtle Bycatch in Mid-Atlantic and Southern New England Trawl Fisheries'. Results from several research studies using different TED designs including a 'topless trawl' design were reviewed. The TEDs were designed for utilization in summer flounder, sea scallop, and loligo squid target fisheries. A final report of the workshop can found at http:/www.nesfsc.noaa.gov/read/protspp/PR_gear_research/Workshop.html.

6.2.4 Mitigation enforcement tool –tow time data logger

A data logger designed to monitor the length of bottom-trawl tow time duration has been manufactured by Onset Computers. Altogether twelve units are currently being tested in the field. The concept of monitoring tow times for enforcement purposes is a concept that was prompted by the commercial fishing industry as alternative to TED requirement to reduce sea turtle bycatch. The device is pressure activated with a pre-set time duration alarm that is triggered when the threshold tow time duration is exceeded.

6.2.5 Pinger tester device

The Northeast Fisheries Observer Programme contracted 'EVO' from Connecticut to design and manufacture 30 devices to test the operational status of pingers used in the Northeast sink gillnet fishery. The hand-held devices are currently being field tested by fisheries observers. The objective of the device and subsequent data collection is to determine whether pingers equipped on gillnet gear are actually 'pinging' and evaluate the overall effectiveness of pinger usage at reducing bycatch of harbour porpoise. Data collected from testing pingers will be used for scientific purposes only (i.e. not an enforcement tool).

6.3 River herring and shad bycatch

The WGBYC also heard that river herring (*Alosa* spp) are thought to be taken in potentially large catches in semi-pelagic and pelagic trawl fisheries in the USA and that this has become a contentious issue. There are also reports from the Baltic recently of high levels of shad (*Alosa* spp) bycatch. The working group was also aware of records of shad bycatch in some other European fisheries, and, as both European species of shads are protected under the Habitats Directive, considered that this issue might form a useful focus for further work of the WG. It was also noted that the Fisheries Innovation Fund (NFWF) in the US has solicited proposals for US based research on the bycatch of shad and river herrings in US fisheries.

6.4 Pinger trials in European fisheries

Trials of DDD pingers in the UK have been continuing in both the pelagic trawl and gill and tanglenet fisheries during 2010. Trials in the bass pair-trawl fishery during winter of 2009–2010 revealed that DDD-02 pingers have a finite lifetime. During observations of 128 tows where DDD-02s were being used, there were five bycatch events involving 17 common dolphins towards the end of the season. The devices being used were four years old, and it was discovered that they were no longer charging properly. Meanwhile a new set of pingers being used on a second pair of boats were deployed during 34 tows from one of the boats without incident. The partner vessel in this second pair team was fishing without DDDs and 23 tows resulted in four incidents involving ten common dolphins. The WG agreed that the

results from this work continue to suggest that DDDs are an effective means of limiting bycatch in this fishery, but also noted that there are continuing technical issues that need to be addressed in a protocol for best practice, and that fishers will need to maintain and monitor the devices adequately if they are expected to continue to work in the longer term.

DDD trials on UK over 12 m gillnet vessels continue. Sixteen UK flagged vessels currently (2010) using gillnets are over 12 m and are therefore required to use pingers. Four of these are based in Spain and only fish sporadically in Area VII. Of the remaining twelve locally based over 12 m vessels, seven have been using DDDs, and two more are due to become involved in February 2011. One of the four Spanish owned vessels has also tested the DDDs during one trip. Overall there have been few operational problems and skippers and crew are generally supportive of the use of DDDs, largely because they can be easily deployed onto the anchor lines at each end of a fleet, rather than being deployed along the headline where they may interfere with fishing and with crew safety. Results of the trials show that during 621 set-net operations using DDDs two porpoises were taken; one was 1.4 km from the nearest pinger and the other was at 2.6 km from the nearest pinger. During 664 control operations eleven porpoises were taken, indicating that the devices are effective, but suggesting efficacy may decline at or around 1.4 km. The results with respect to dolphins are less easy to interpret with two animals taken in control nets and one in a DDD equipped net, where the animal was 3 km from the nearest pinger. The sample size so far prevents any conclusion regarding DDD effects on dolphin bycatch.

Trials of pingers are also underway in the Dutch gillnet sector, including trails of a recently designed new pinger from the UK (the 'banana pinger'). Results of these trials are expected at next year's meeting.

7 ToR D: Development of bycatch database

7.1 Evolution of data management

Since 2005, data has been submitted by EC member states in relation to 812/2004 and collated by ICES. At the inaugural SGBYC meeting in 2008 national reports were received in a wide variety of languages, reporting styles and formats and the Study Group produced a template for a proposed standard reporting format to deal with this issue. Concerns were also raised at this meeting regarding the variety of effort metrics used and the paucity of reporting on total effort data.

Prior to the SGBYC 2009 meeting, ACOM modified the proposed standard reporting format. One Member State (MS) submitted their national report in this format, two provided their reports in the original format proposed by the Study Group and the remaining nine available reports were again received in a variety of formats. Attempts were made in any case at the 2009 meeting to compile the data into the ACOM format and recommendations on modifications to the ACOM format were made. An MS Access database was designed during the 2009 meeting to assist in managing compiled data going forward.

Data compiled in different formats during 2008 and 2009 study groups were subsequently collated together and used to populate the database prior to the 2010 meeting, the design of which was modified in relation to a new proposed ACOM format issued in July 2009. New data received at the 2010 meeting were added to the database and descriptive tables of the data compiled to date were produced in an efficient manner.

In June 2010 the EC issued a new agreed standard reporting format. In October 2010 ICES hosted a meeting to deal with a special request for information in relation to bycatch of protected species from the European Commission. As the database developer was not present, problems were encountered accessing data in the database and data compiled by SGBYC from national reports to date proved to be of limited use.

The database was subsequently reviewed and it was concluded that continuously changing data formats and attempts to cater for various individual member state requirements made the database overly complex.

7.2 New data format

The data format for the WGBYC database was subsequently modified and simplified in relation to the new agreed EC format. This format requires total effort data in relation to pinger use to be provided in Table 1.1 separate to monitored total fishing and observed effort (Tables 5.1 and 5.2 of the standard EC format). Data are, however, required in the same spatial and temporal resolution in both tables. This may result in duplication of data provided but permits collation of the data into one table which can greatly simplify the entire data handling system.

Data from a floating 'fleet' table previously used by WGBYC has now therefore been incorporated into a single worksheet with total fishing effort and observed fishing effort. Total effort figures can still be derived from this table (if comprehensive data are provided), or from other sources as was carried out at the recent ICES special request meeting. This worksheet compiles data from Tables 1.1, 5.1 and 5.2 in the standard format. Information on mitigation measures as required in Table 2.1 of the standard format can also be placed in this table where métier definitions are the same

(as required by the standard format) or can be entered in to a separate Excel worksheet where métier definitions are different. Data on pinger use and specifications will most likely be analysed separately in any case.

This spreadsheet can be linked by means a single ID to a separate bycatch spreadsheet as provided in Table 6.1 of the standard format. A separate sheet/table is required for cetacean bycatch to facilitate more than one cetacean bycatch record for different species to be linked to a single record of total and observed effort.

These two tables on effort/sampling and on cetacean bycatch, can be pasted directly into MS Access which permits efficient analysis of this 'one too many' record dataset. This new system reduces the number of tables and IDs used in the old system from 4 to 2 and 4 to 1 respectively and greatly simplifies data input and data extraction.

The MS Access database and corresponding Excel data sheets are available on the WGBYC 2010 SharePoint. The main table should be used to analyse total effort data. The bycatch estimates table which only includes records where observed effort is greater than 0 to exclude records where bycatch estimates of 0 are provided with no corresponding observed effort data. This table should be used to analyse bycatch. In the excel version of the bycatch estimates table, bycatch estimates are categorized as 'provided' by Member States, 'estimated' where no bycatch estimate has been provided but total effort, observed effort and a corresponding positive or blank value for bycatch specimens is provided. These estimates make sure that blank values provided by Member States to indicate 0 bycatch are included. The estimates also make best use of available data on positive bycatch events but should be treated with caution as the quality of the estimates has not been approved by Member States and is unknown. A further categorization of 'not calculated' has been used where bycatch incidences are recorded but no corresponding total effort data are available and no bycatch estimate has been provided. These records have been included as total effort or total estimated effort could be provided in future analyses.

7.3 Data issues

7.3.1 Standard format

Agreement and compliance with a standard format, if possible according to the format outlined above, is essential to ensure efficient data entry, extraction and analysis.

7.3.2 Total effort data

It is clear from the main table in the WGBYC database that there are major gaps in total effort data collated to date, specifically in gillnet and pelagic trawl fleet segments that have not been monitored. The WG should agree if this should be pursued in future through National Reports under 812/2004 or if this information should come from separate sources.

7.3.3 Métier definition

Concerns were raised during the WG regarding the métier level 5 requirement in the standard format. In some pelagic trawl fisheries this métier definition was found to be too detailed, as an inappropriately large number of records were required to describe fishing effort to level 5, which were difficult to link with bycatch observations.

On the other hand, for some gillnet fisheries, the métier level was found to be low and certain issues in relation to mesh size or specific target species are not covered at this métier level.

Based on the characteristics of a particular fishery, a flexible requirement to provide data up to métier level 6 (Mesh size and other selective devices), combined with provision of main target species (Maximum specification) adjacent to métier description would assist in dealing with this issue and would comply with Article 5 of Council Regulation 812/2004. It was agreed that members of WGBYC responsible for collating national reports would adopt this flexible approach in reporting on 2010 data to the Commission.

7.3.4 Data outputs

A table of bycatch estimates by species for 2009 is outlined in Table 6. Table 7 outlines bycatch estimates by species since 2005. Work commenced during the meeting on examining the collated data for errors and problems with the format of the data. The fishing area data were also categorized into broader regions e.g. 'North Sea' to permit bycatch rates to be examined in relation to total effort data compiled at the ICES special advice meeting in October 2010.

The database is still far from complete, and the WG agreed to continue working on updating and upgrading the data before the next WG meeting. Specifically it was agreed that members of the WG would try to 'backfill' and update the database in its new format with effort data and monitoring data for the past three years, i.e. 2008 to 2010 inclusive.

8 ToR E: Collaboration with PGCCDBS

A presentation on behalf of WGBYC was given at the PGCCDBS meeting in March 2010 on the work of the SG/WGBYC and the request to cooperate on the collection of data of protected fish species and/or incidental bycatches. The response of PGCCDBS was positive. It was recognized that protocols for discard data collection should include rare species bycatches and the reporting of protected species bycatch. It was proposed to have a contact person from SG/WGBYC.

However since the meeting of PGCCDBS, a new study group has been established that is potentially more relevant to WGBYC: Study Group on Practical Implementation of Discards Sampling Plans (SGPIDS). SGPIDS will takes over part of work of PGCCDBS that is most relevant to WGBYC. Therefore the group agreed to shift its attention to SGPIDS. It was recognized that it is important to have a representative of WGBYC at SGPIDS at every meeting. Bram Couperus will be the contact person. For the next meeting of SGPIDS he will be replaced by Simon Northridge.

In order to test the usability of discards data for DCF schemes, it was agreed that at the 2012 meeting of WGBYC, the members of the group would bring data from their national discards samplings schemes on five marine fish species that are listed in Annex II and IV of the Habitat Directive: Twaite Shad, Allis Shad, River Lamprey, Lamprey and Sturgeon. Members agreed to deliver data in an Excel sheet with species, number of specimens, month, ICES rectangle, Gear type (up to level 6), effort (any: most adequate for the fleets segment at hand) and preferably some notes on target species and sampling protocol. It was noted that even if no records exists for any of these species, sampled effort data by gear type, month and ICES rectangle should be provided to help establish overall bycatch rates. WGBYC will collate these data in 2012 in order to establish which gears, seasons and areas are responsible for the highest levels of bycatch of these protected species. Equivalent data would also be sought from North America by relevant members of the group.

9 ToR F: Improving methods for monitoring and assessment of impact

The working group heard about several ongoing studies that are trialling the use of CCTV monitoring systems on board commercial fishing vessels.

From May 2010 to May 2011, six Danish commercial gillnetters fishing (<15 m) are being equipped with remote Electronic Monitoring (EM) systems. The main aim of this work is to test whether a shift from the landing quota system to a catch quota system (where all catches are counted against the vessels catch quotas) will work on small vessels. A secondary objective is to see if the CCTV video footage can be used to document the bycatch of marine mammals. As an incentive for carrying out this fully documented fishery, the participating vessels get an additional landing opportunity based on the fact that there is complete catch documentation and registrations of, retained and discarded cod (*Gadus morhua*).

The total catch and marine mammal bycatch is monitored by use of a sensor system and four CCTV cameras, each filming different angles of the hauling of the gear and the catch handling. The quality of the video footage has until now showed that bycatch of marine mammals and birds easily can be verified. The trial will continue in 2011 where best practice of analysing the video footage for marine mammals also will be evaluated.

Three commercial fishing vessels (<12 m) fishing east of the island of Rügen in Germany will also soon be equipped with video systems to document potential marine mammal bycatch. Attempts to find fishers fishing further to the west in Kiel Bight and Mecklenburg Bight who are willing to cooperate and to carry video systems to document potential marine mammal bycatch have been unsuccessful so far.

A similar programme was initiated In the Netherlands in January on a set gillnet vessel (<10 m). The main objective here is to collect discard data under the Data Collection Framework (DCF). A secondary objective is the monitoring of incidental bycatch of marine mammals and birds.

Electronic monitoring in Sweden has been stalled due to an initial lack of incentives for the vessels that were targeted for involvement in the trial. Subsequently industry bodies have opposed the use of this technology, making its uptake difficult even on a voluntary basis.

The working group noted that it is important in any such study to have clear incentives for fishers if the scheme is to be taken up, and that these incentives must be planned adequately ahead of time. The working group agreed that on the evidence so far, electronic monitoring appears to be a very cost-effective and reliable way to determine bycatch rates of protected species, provided fishers can be persuaded to adopt the system.

The working group learned of studies in the Netherlands that have linked systematically collected reports of stranded cetaceans and of live cetaceans in the coastal zone, to trends in fishing effort. This work is being conducted as part of a species conservation plan for the harbour porpoise in the Dutch part of the North Sea aiming at achieving favourable conservation status. EC Regulation 812/2004 does not require monitoring in ICES Area IV including the Dutch part of the North Sea. Moreover, the use of pingers is generally not required for vessels smaller than 12 metres, i.e. for most (if not all) of the Dutch set-net fleet. However, a parallel increase in set-net fish-

ing effort and in stranded harbour porpoise numbers, probably bycaught according to necropsies, indicates a need at least for monitoring this area.

From 1900 to 1950 the harbour porpoise was abundant in the Southern North Sea, thereafter the number seriously declined. Between 1970 and 1980 the harbour porpoise was a rare visitor. Since 1990 it increased again to become abundant in 2010. Aerial surveys in 2010 estimated 56 000 (95% CL = 24 000–120 000) animals in the nearshore half of the Dutch EEZ. Nearshore porpoise sightings also showed this increase of harbour porpoise numbers. In the period 1970–2010, 3918 stranded animals have been reported, with numbers over 300 every year since 2005 with a peak of 537 harbour porpoises in 2006 and 478 in 2009.

Necropsy studies on stranded harbour porpoises show probable bycatch evidence in varying proportion. In February 2009, 81% of the necropsied harbour porpoises were (most) probably bycaught.

Since 1999, the number of sea days in the Dutch set-net fisheries has increased. The WG learned that in one as yet unpublished analysis of these data, the number of porpoise strandings had been explained as a function of nearshore abundance and set-net effort with a correlation of 0.98. This does not necessarily prove a causal relationship between set-net fisheries and porpoise strandings, however, these results combined with the bycatch numbers (as shown by necropsies) and the fact that there has also been an increase in the amount of set-net effort in Dutch waters, argue for further investigation. Furthermore, there is an unregistered, legal set-net fishery from the coast as well as illegal set-nets seen in offshore wind parks. Therefore, further analysis of net types, seasonal deployments and spatial patterns of all set-net fleets fishing in the Dutch part (and other areas) of the North Sea is being proposed.

Likely recommendations might be a proper observer scheme based on international protocols, complete statistical analysis of fisheries data, strandings data and sightings data (spatial and temporal patterns). Furthermore, there may be demands for fishing restrictions, gear modification and/or the deployment of acoustic deterrent devices as well as a monitoring programme for strandings with a protocol for necropsies to identify bycatches more accurately.

The WGBYC learned of two upcoming workshops in the US that are of relevance to the working of the group. The first is a workshop the dynamics of large whale entanglements Workshop in Woods Hole from 8th–11th February 2011. The workshop will attempt to model the ways in which whales become entangled in ropes; especially those from static fishing gear. The second workshop is will be convened in order to update the Guidelines for Assessing US Marine Mammal Stocks, and will be held 15–18 February 2010 at the Southwest Fisheries Science Center.

The Working Group looked forward to seeing the reports of these two workshops in 2012.

10 Other business

The working group agreed to amend its terms of reference to ensure that it considers the impacts of estimated bycatch rates at a population level, furthering the approach adopted by WKREV812.

The working group also agreed that it would add an item to its terms of reference for 2012 that it will collate data from national discard sampling surveys on the bycatch of protected fish species, in order to try to assess their vulnerability to different gear types, as well as areas and months of highest bycatch by species. The species of concern in this respect are the European sturgeon, allis and twaite shads, lamprey and river lamprey, all of which are listed in Annex IV of the habitats directive as species of community concern in need of protection.

The date of the next meeting would be set by the incoming chair when other ICES calendar commitments for 2012 have been established.

The group proposed that Bram Couperus should take over as chair of WGBYC in 2012.

11 Issues for the consideration of the Advisory Committee

In the absence of any specific requests for advice, the Working Group chose to couch its suggestions for further work and refinements in policy in the form of bullet points which the ACOM may like to consider as potential unsolicited recommendations on specific issues.

Several of these suggestions were made by the WGBYC without a specific target as recommendations. Instead they represent a list of issues that WGBYC members consider it would be sensible to address, and which taken together encapsulate the set of problems that have been identified as impediments to the development of an adequate system for assessing the conservation implications of bycatch and the implementation of mitigation measures.

- WGBYC concluded from its review of the national reports on the implementation of EC Regulation 812/2004, that EU Member States have still not demonstrated that the cetacean bycatch mitigation measures mandated under this regulation are being implemented. The working group recommended to the relevant ICES Member Countries that (1) more effective means of ensuring the deployment and use of acoustic deterrent devices need to be implemented (2) it may be useful to ensure relevant sectors of the fishing industry are aware of their obligations under Regulation 812/2004 and (3) that member states themselves should also be reminded of their obligations to monitor incidental catch and to mitigate its effects where necessary under Article 12 of the Habitats Directive which appears to be widely ignored.
- WGBYC suggests a more flexible approach to determining which fleet segments should be monitored. At present EU Member States largely restrict any sampling to that specified in Regulation 812, although other fleet segments may be more appropriate to monitoring. Some fleets are therefore probably being monitored too much and others too little. Specifically, for example, not enough monitoring of set-net fisheries in IVc is currently being undertaken as this is not mandated under Regulation 812.
- WGBYC suggests that industry incentives (positive and negative) are explored by Member States to ensure that bycatch monitoring covers all necessary sectors in an effective manner.
- WGBYC repeats its recommendation that bycatch monitoring schemes should have more flexible targets not necessarily with the aim of providing total bycatch estimates with predetermined CVs, but should rather aim to ascertain whether or not bycatch rates in specific fisheries are likely to represent a conservation problem.
- WGBYC suggests that observer programme managers should avoid focusing too much observer effort on specific métiers within a wider fleet segment. Observer effort should be distributed throughout relevant fleets in a representative manner to ensure that complete coverage of fleets is eventually achieved. This will lead to less precision in the estimates for smaller fleet segments in the short term but will lead to higher accuracy in the longer term.
- WGBYC recommends that in addition to observer schemes, the development of new monitoring technologies such as CCTV or remote platforms should be encouraged.

- WGBYC recommends that 812 monitoring and fleet effort reporting by fishery sector should be in-line with the sectors being addressed under the Data Collection Framework with the specific addition of very high vertical opening trawls, and so that effort and monitoring data should be supplied by ICES subdivision and not aggregated across subdivisions or areas.
- WGBYC maintains that bycatch monitoring of under-15 m vessels is a requirement of habitats directive. WGBYC emphasizes that bycatch is responsive to gear in use and not to vessel length. WGBYC therefore recommends that if a full picture of bycatch (and therefore of impact) is required, Member States/countries need to ensure bycatch caused boats of less than 15 m is also monitored, and if necessary, mitigated as mandated by the Habitats Directive.
- WGBYC proposes that records of other protected species (mammals, birds, reptiles, fish species of conservation concern) not just small cetaceans, are included in Member States' annual reports under Regulation 812/2004, and that these are addressed in future by WGBYC.
- WGBYC maintains that the assessment required under Article 12 of the Habitats Directive needs to be spelled out by the Commission and that detailed guidance should be given to EU Member States on how such threats can be assessed, catalogued and addressed.
- WGBYC notes that strandings can sometimes provide a useful way of identifying potential bycatch problems and could be used as a spur to develop monitoring programmes to investigate bycatch in specific times or areas and specific fisheries more thoroughly.
- WGBYC suggests that ICES Member Countries should learn from experience elsewhere prior to commencing pinger trials or implementation of pinger schemes. A wide body of experience already exists and it seems pointless and wasteful to repeat well-rehearsed trials.
- WGBYC suggests that pinger certification scheme would help add confidence that fishers might have in the equipment they are using, and identify the fact that the product in question is in conformity with the essential requirements of the Regulation.
- WGBYC suggests that where DCF observers are being deployed, then a protocol appropriate to monitoring protected species bycatch and training in use of that protocol ought to be established.
- WGBYC would also like to see the development of a European wide observer training and certification scheme to ensure compatible standards are used in bycatch monitoring by all European Members States.
- WGBYC recommends against using port interviews as the sole means to assess bycatch as there is no way of avoiding the risk of misreporting or inattention of skippers to actual bycatch.
- WGBYC recommends that the issue of possible seal depredation be considered prior to deployment of pinger schemes in areas known to be frequented by seals.
- WGBYC suggests that it would be helpful if the reporting requirements under Regulation 812/2004, the Habitats Directive and also any future reporting requirements under the Marine Strategy Framework Directive were to be made specific and also harmonized in such a ways as to make pan-European assessments possible.

- WGBYC recommends that in future it should collate and catalogue bycatch rates for other species in order to obtain a more comprehensive picture of fishery impacts to assist in the development of the ecosystem approach to fishery management.
- WGBYC recognized the importance of monitoring of porpoise bycatch in Norwegian fisheries that are not subject to Regulation 812/2004, but which impact the same porpoise populations as those of EU Member States, and for which there is an important gap in our knowledge of this species. WGBYC therefore recommends that porpoise bycatch monitoring in Norway should be continued and extended.
- WGBYC recommends that appropriate métier data are supplied in Member States' annual 812 reports in adequate detail. WGBYC agreed to the adoption of a flexible approach to the level of detail described in the métier, providing more detail where sensible, and less where it is not needed for bycatch assessment. This would mean for example that tanglenet métiers should be disaggregated from other set-net fisheries otherwise lumped at level 5 of the Nantes matrix.
- WGBYC agreed that members of the group would supply effort and monitoring data according to WGGBYC database format for three years (2010, 2009, 2008) by end of June 2011.
- WGBYC recommends continued development of Electronic Monitoring as a potentially very useful tool for bycatch estimation.
- WGBYC proposes close collaboration with the newly formed expert group SGPIDS.

Annex 1: List of participants

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Annex 2: Agenda and Terms of Reference for this meeting

Agenda

Meeting at ICES Headquarters, 1-4 February 2011

Welcoming Remarks

Introductions

1) Justification and Terms of Reference of the Group (Poul Degnbol);

2) Agreement on Workplan.

Tuesday 1st February

3) ToR A. Collate bycatch estimates, bycatch observations and fishing effort provided in Member States reports under Regulation 812/2004 and review other relevant information in the reports;

With

ToR D. Working with the ICES DataCentre, continue to develop a database on bycatch monitoring and relevant fishing effort in European waters.

Wednesday

Morning: Finalize ToR A:

1) Review work of small groups and collate sections for the report;

2) Summary discussion and conclusions and recommendations.

Early afternoon

4) ToR B. Collate other recent estimates of bycatch of protected species (birds, mammals, reptiles, fish) in the ICES region and other EU waters; Small Group to collate information from Internet and

   a) Presentation from Arne on preliminary Norwegian estimates;

   b) Presentation from Marjorie on latest US estimates.

5) ToR D continued. ...simultaneously with Small group work of ToR B above.

Late afternoon

6) ToR C. Review ongoing bycatch mitigation trials, compile recent results and coordinate further work on mitigation; Presentations from:

   a) Lotte: Habituation studies;

   b) Marjorie: Bycatch mitigation devices and latest US trials;

   c) Marije: Dutch pinger trials;

   d) Simon: Update on trials of DDDs in UK.

Thursday:

May need to continue ToR C if not completed on Wednesday.

7) ToR E. Continue to collaborate with PGCCDBS on integrating protected species bycatch data with relevant discard survey data;

a) Will need input from other ICES sources.

8) ToR F. Continue to develop, improve and coordinate methods for bycatch monitoring and assessment.

a) Lotte: Update on camera studies;

b) Bram/Marije: Camera studies in Netherlands;

c) Marije: Correlating Dutch sightings and strandings with fishing effort;

d) Marjorie: Upcoming GAMS workshop in the US;

e) Karl-Herman: German Baltic fleet;

f) Arne: Norwegian Fleet.

9) Revert to ToR D if necessary.

Friday

10) Report;

11) Any other business.

Terms of Reference 2011

2010/2/ACOM27 The Study Group on Bycatch of Protected Species (SGBYC) will be renamed **Working Group on Bycatch of Protected Species** (WGBYC), chaired by Simon Northridge*, UK, and will meet at ICES Headquarters, 1–4 February, 2011 to:

a) Review annual national reports submitted to the European Commission under Regulation 812/2004: collate bycatch estimates and review mandatory and pilot projects and scientific studies carried out under this regulation;

b) Collate other recent estimates of bycatch of protected species (birds, mammals, reptiles, fish) in the ICES region and other EU waters;

c) Review ongoing bycatch mitigation trials, compile recent results and coordinate further work on mitigation;

d) Working with the ICES DataCentre, continue to develop a database on bycatch monitoring and relevant fishing effort in European waters;

e) Continue to collaborate with PGCCDBS on integrating protected species bycatch data with relevant discard survey data;

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

WGBYC will report by 30 April 2011 to the attention of ACOM.

Supporting information

PRIORITY:	High
SCIENTIFIC JUSTIFICATION AND RELATION TO ACTION PLAN:	a) This is required to answer a direct request made under the European Commission MoU in relation to Regulation 812/2004. b) This is required to answer part of the European Commission MoU request to "provide any new information regarding the impact of fisheries on marine mammals, seabirds..." c) ICES Member Countries are required to reduce levels of bycatch under several pieces of legislation, the response to this ToR will help meet that aim. d) An operating database will allow a more efficient response to future advice requests in this area and additional provide an audit trail for information used in the Group's reports. e) Working with PGCCDBS will ensure more effective cross-ICES work. f) Bycatch monitoring and assessment is fundamental to the work of the group; any improvements in methods will help the group and other workers in this field?
RESOURCE REQUIREMENTS:	None beyond usual Secretariat facilities.
PARTICIPANTS:	13–21 members.
SECRETARIAT FACILITIES:	Secretariat support with meeting organization and final editing of report.
FINANCIAL:	No financial implications.
LINKAGE TO ADVISORY COMMITTEE:	ACOM
LINKAGES TO OTHER COMMITTEES OR GROUPS:	WGFTFB, WGMME, WGSE, WGEF, PGCCDBS, SCICOM.
LINKAGES TO OTHER ORGANIZATIONS:	NAMMCO, ASCOBANS, ACCOBAMS, GFCM, EC, IWC

Annex 3: WGBYC draft Terms of Reference for 2012 meeting

The **Working Group on Bycatch of Protected Species** (WGBYC) will meet in 2012 at a place and date to be determined by the incoming chair in consultation with the Secretariat and members of the group. Its terms of reference remain similar to those in previous years:

a) 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);

b) 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;

c) 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;

d) 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;

e) Continue to collaborate with PGCCDBS/SGPIDS on integrating protected species bycatch data with relevant discard survey data; specifically to collate information collected under the DCF on protected fish species for 2012;

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

WGBYC will report by a date to be specified by ACOM.

Supporting information

PRIORITY:	High
SCIENTIFIC JUSTIFICATION AND RELATION TO ACTION PLAN:	a) This is required to answer part of the European Commission MoU request to "provide any new information regarding the impact of fisheries on marine mammals, seabirds..." b) ICES Member Countries are required to reduce levels of bycatch under several pieces of legislation, the response to this ToR will help meet that aim. c) An operating database will allow a more efficient response to future advice requests in this area and additional provide an audit trail for information used in the Group's reports. d) Working with PGCCDBS /SGPIDS will ensure more effective cross-ICES work. e) Bycatch monitoring and assessment is fundamental to the work of the group; any improvements in methods will help the group and other workers in this field.
RESOURCE REQUIREMENTS:	None beyond usual Secretariat facilities.
PARTICIPANTS:	13–21 members.
SECRETARIAT FACILITIES:	Secretariat support with meeting organization and final editing of report.
FINANCIAL:	No financial implications.
LINKAGE TO ADVISORY COMMITTEE:	ACOM
LINKAGES TO OTHER COMMITTEES OR GROUPS:	WGFTFB, WGMME, WGSE, WGEF, PGCCDBS, SGPIDS, SCICOM.
LINKAGES TO OTHER ORGANIZATIONS:	NAMMCO, ASCOBANS, ACCOBAMS, GFCM, EC, IWC

Annex 4: Recommendations

The working group did not formulate specific recommendations to clients or other working groups, but made numerous suggestions and comments on the implementation of Regulation 812/2004 and more generally on how bycatch monitoring and the implementation of bycatch mitigation measures might be improved (see Section 11 above).

12 Tables

Table 1. Summary of reports and data availability for observations under Regulation 812/2004 in the calendar year 2009.

Member State	Report on 2009 submitted 2010 available to WGBYC in 2011	Data provided in approximately standard format	Bycatch data reported for 2009
Belgium	Y	Y	N
Bulgaria	N	-	-
Cyprus	N	-	-
Denmark	Y	Y	Y
Estonia	Y	N	N
Finland	N	-	-
France	Y	Y	Y
Germany	Y	Y	N
Greece	Y	N	-
Ireland	Y	Y	N
Italy	Y	Y	Y
Latvia	Y	Y	N
Lithuania	Y	N	N
Malta	N	-	-
Netherlands	Y	N	N
Poland	Y	N	N
Portugal	Y	N	N
Romania	N	-	-
Slovenia	N	-	-
Spain	Y	Y	Y
Sweden	Y	Y	N
United Kingdom	Y	Y	Y

Table 2. Summary of bycatch rate observations for small cetaceans from Member States annual reports on Regulation 812/2004.

Country	Métier	Subdivision	Species	Bycatch rate (animals per unit effort)	effort unit	Bycatch estimate	Notes
Belgium	GNS	IV		0		0	
Denmark	All gillnets	IIIa	all species	0		0	
Denmark	All gillnets	IVb + IIIa (south)	*Phocoena phocoena*	0.02381	Trip	-	2 HP +1 seal in 84 trips. Video- 1 vessel
Estonia							no observer programme
France	GNS&GTR >15m	VIII	*Stenella coeruleoalba*	0.033	Day at sea	(800)	
France	GNS&GTR < 15m	VIII	*Phocoena phocoena*	0.0195	Day at sea	300	
France	PTM, winter all sizes	VII	*Delphinus delphis*	0.0458	Trip	20	
France	PTM, winter all sizes	VIII	*Delphinus delphis*	0.4773	Trip	300–400	
France	PTM, summer	VII	*Delphinus delphis*	0.0253	Trip	20	
France	PTM, summer	VIII	*Delphinus delphis*	0.4934	Trip	900	
France	OTM, summer, <15	VIII	*Delphinus delphis*	0.0294	Haul	13	
France	OTM, all year, all vessels	Med	*Stenella coeruleoalba*	0.0073	Haul	70	
France	OTM, all year, all vessels	Med	*Tursiops truncatus*	0.0014	Haul	10	
Germany							no observer programme
Greece							No 812 obligations

Country	Métier	Subdivision	Species	Bycatch rate (animals per unit effort)	effort unit	Bycatch estimate	Notes
Ireland	OTM	VIa,b, VIIa,g,j	-	0		0	
Ireland	PTM small pelagic fish	IVa, VIa, VIIb,g,j	-	0		0	
Ireland	PTM large pelagic fish	VIIj, k	-	0		0	
Italy	PTM	GSA 16	All species	0	haul	0	
Italy	PTM	GSA 17	All species	0	haul	0	
Netherlands	OTM	VI, VII, VIII	All species	0		-	
Netherlands	OTM	All areas except VI, VII, VIII	All species	0		-	
Netherlands	PTM	VI, VII, VIII	All species	0		-	
Netherlands	PTM	all areas except VI, VII, VIII	All species	0		-	
Latvia	PTM	25-32		0		0	
Latvia	PTM > 15	28.1		0		0	
Latvia	Netters?	22 - 32		0		0	
Lithuania							No observer programme
Poland	GNS	25	-	0		-	
Poland	GNS	26	-	0		-	
Poland	OTM	24	-	0		-	
Poland	OTM	25	-	0		-	
Poland	OTM	26	-	0		-	

Country	Métier	Subdivision	Species	Bycatch rate (animals per unit effort)	effort unit	Bycatch estimate	Notes
Portugal							No observer programme
Spain	GNS	VIIIa	*Delphinus delphis*	0.28	Day at sea	-	
Spain	GNS	VIIIa	Unidentified dolphin	0.01	Day at sea	-	
Spain	GNS	VIIIa	*Phocoena phocoena*	0.11	Day at sea	-	
Spain	GNS	VIIIb	*Phocoena phocoena*	0.15	Day at sea	-	
Sweden							No observer programme
United Kingdom	PTB < 15 (without pingers)	VIIe	*Delphinus delphis*	0.6	Day at sea	-	Very limited fleet coverage; Released alive.
United Kingdom	PTB < 15(with pingers)	VIIe	*Delphinus delphis*	0			
United Kingdom	PTM < 15 (with pingers)	VIIe	*Delphinus delphis*	0.1	Day at sea	4	Census not estimate
United Kingdom	PTM < 15 (without pingers)	VIIe	*Delphinus delphis*	n.a.			
United Kingdom	GNS (with pingers)	VIId, e, f, g, h	*Delphinus delphis*	0	Haul	237	
United Kingdom	GNS (without pingers)	VIId, e, f, g, h	*Delphinus delphis*	0.0046			
United Kingdom	GNS (with pingers)	VIId, e, f, g, h	*Phocoena phocoena*	0	Haul	791	
United Kingdom	GNS (without pingers)	VIId, e, f, g, h	*Phocoena phocoena*	0.0152			

Table 3. Other published bycatch estimates: Northwest Atlantic Region–US and Canada.

Country	Region	Gear/Fishery	Year	Coverage %	Species	Observed	Estimate (CV)	Source
USA	Atlantic	Northeast Gillnet	2009	4.00	Harbour Porpoise	45	591 (0.23)	
					Short-beaked Common Dolphin	3	43 (0.77)	
					White-sided Dolphin	0	0 (0.00)	
					Harbour Seal	21	516 (0.28)	
					Gray Seal	52	1063 (0.26)	
					Harp Seal	32	415 (0.27)	
USA	Atlantic	Northeast Gillnet	1996–2007	5.10a	Common Loon	31[a]	75 (0.51)a	
USA	Atlantic	Mid-Atlantic Gillnet	2009	3.00	Harbour Porpoise	7	201 (0.55)	
					Harbour Seal	2	47 (0.68)	
					Harp Seal	3	70 (0.67)	
			1995–2006	2.20	Loggerhead Sea Turtle	41	350 (0.20)[a]	
			1996–2007	2.60a	Common Loon	148[a]	477 (0.13)[a]	
					Red Throated Loons	199[a]	897 (0.19)[a]	
USA	Atlantic	Northeast Midwater Trawl	2009	42.00	White-sided Dolphin	0	0 (0.00)	
					Pilot Whale spp.	0	0 (0.00)	
					Harbour Seal	1	3 (0.81)	
USA	Atlantic	Mid-Atlantic Midwater Trawl	2009	13.00	White-sided Dolphin	1	4 (0.92)	
					Pilot Whale spp.	0	0 (0.00)	

USA	Atlantic	Northeast Bottom Trawl	2009	9.00	Harbour Porpoise	0[b]	5 (0.50)
					Pilot Whale spp.	3	9 (0.35)
					Short-beaked Common Dolphin	5	19 (0.30)
					White-sided Dolphin	31	131 (0.26)
					Gray Seal	8	Unk[c]
					Harbour Seal	1	Unk[c]
					Harp Seal	1	Unk[c]
USA	Atlantic	Mid-Atlantic Bottom Trawl	2009	5.00	Pilot Whale spp.	0[b]	23 (0.36)
					Short-beaked Common Dolphin	12	104 (0.29)
					White-sided Dolphin	0[b]	16 (0.16)
USA	Atlantic	Pelagic Longline	2009	10.00	Short-beaked Common Dolphin	1	8.5 (1.00)
					Pilot Whale Spp.	2	17 (0.70)
					Risso's Dolphin	2	11 (0.71)
Cananda	Atlantic	Bay of Fundy Sink Gillnet	1997–2001	0.00f	Harbour Porpoise	71	43 (Unk)[e]
Canada	Atlantic	Herring Weir	2005–2009	Unkd	Harbour Porpoise	5	1 (Unk)[f]

[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 method used to estimate bycatch mortality of cetaceans in bottom and midwater 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. 2009), this does not imply that there was no bycatch during that year (Rossman, 2009).

[c] Estimation of total bycatch mortality of pinniped species attributed to the Northeast bottom-trawl fishery have not been generated.

[d] Canada has not reported coverage level for the Herring Weir Fishery; Unk=unknown

[e] The Canadian gillnet has not been observed during. However, the fishery is still active; thus, the bycatch estimate is estimated using past averages.

[f] **The mortality estimate is an average over the 2005–2009 time period.**

Table 4. Additional recent information on bycatch rates or estimates of bycatch totals for protected species or species of conservation concern from published sources.

Country	Region	Gear/Fishery	Year	Coverage %	Species	Observed no of animals	Bycatch estimate (CV; 95% CIs)	Bycatch rate (individual per …)	Source
DK	Waters around Ærø	Gillnets	2001–2003	66	Seabirds-total	426	598	0.39 ind/1000 NDM	Degel *et al.*, 2010.
					Eider ducks	308		0.27 ind/1000 NDM	
					other seabirds	118		0.12 ind/1000 NDM	
Spain	NW Spain (Eastern Atlantic)	Pair trawling	2001–2002	NA	*Delphinus delphis*	29	394 (230–632)	0.03255 ind/FT**	Fernández Contreras *et al.*, 2010
US	Mid-Atlantic (east of Cape Code and Gulf of Maine)	Sink gillnets	1995–2006	1–5	*Caretta caretta*	41	350 (0.20; 234–504)	0.00124 ind/haul	Murray, 2009
					Chelonia mydas	5	-	0.00015 ind/haul	
					Lepidochelys kempii	8	-	0.00024 ind/haul	
					Dermochelys coriacea	5	-	0.00015 ind/haul	

Country	Region	Gear/Fishery	Year	Coverage %	Species	Observed no of animals	Bycatch estimate (CV; 95% CIs)	Bycatch rate (individual per …)	Source
					Undefined species of turtle	13	-	0.00039 ind/haul	
US	US Mid-Atlantic se	Scallop dredge fishery without chain mats	2001–2006	2–4	Sea turtles (mostly caretta)		288 (0.14; 209–363)		Murray, 2011
		Scallop dredge fishery without chain mats			*Caretta caretta*		218 (0.16; 149–282)		
		scallop dredge fishery with chain mats	2006–2008	2–6	Sea turtles (mostly caretta)		20 (0.48; 3–42)		
		scallop dredge fishery with chain mats			*Caretta caretta*		19 (0.52; 2–41)		
US	Northeast	Gillnets	1996–2007	5.1 (2.7–8.7)	Common loon (*Gavia immer*)	31	74 (0.51; 29–189)	0.00583 ind/tonne	Warden, 2010
	Mid Atlantic			2.6 (1.5–4.4)	Common loon (*Gavia immer*)	148	477 (0.13; 370–615)	0.03583 ind/tonne	
					Red-throated loons (*Gavia stelleta*)	199	897 (0.19; 620–1297)	0.04818 ind/tonne	

***NDM = the catch of one meter net in one day**

***FT=fishing trip**

Table 5. Bycatch rates or estimates of birds contained in Zydelis *et al*. (2009).

Country	Region	Gear/Fishery	Year	Coverage %	Species	Observed number of animals	Bycatch estimate (CV; 95% CIs)	Bycatch rate (individual per …)	Source
	Baltic Sea (and North Sea)	Fishing nets			Diving birds	90 000	100–200 000 pa		Zydelis *et al*. (2009)
Sweden	South Sweden		1982/83–1987/88		90% guillemots	Approx. 750	500–6500 pa		Olden *et al*. (1988) as cited in Zydelis *et al*. (2009)
Sweden	Swedish waters		2002		54% great cormorants, 14% common eiders, 11% common guillemots	2650	18,000 pa		Lunneryd *et al*. (2004) as cited in Zydelis *et al*. (2009)
Sweden	Birds ringed in Sweden		1972–1999		Common guillemots, black guillemots		1500 common guillemots pa		Fransson and Pettersson (2001), Österblom *et al*. (2002), Fransson *et al*. (2008) as cited in Zydelis *et al*. (2009)
Finland	Birds ringed in Finland		1926–1993		razorbill				Hario (1998) as cited in Zydelis *et al*. (2009)
Finland, Estonia	Gulf of Finland, Estonian coast		2005–2008		78% long-tailed ducks	110	Approx. 5000 pa	0.59 birds/1000 netmeters*day	M. Vetemaa, unpublished data as cited in Zydelis *et al*. (2009)
Latvia	Latvian coastal waters		1995–1999		38% long-tailed ducks, 16% divers	576	2500–6500 pa		Urtans and Priednieks (2000) as cited in Zydelis *et al*. (2009)

Country	Region	Gear/Fishery	Year	Coverage %	Species	Observed number of animals	Bycatch estimate (CV; 95% CIs)	Bycatch rate (individual per …)	Source
Latvia	Latvian coastal waters		2000/01–2001/03, 2006/07–2007/08		65% long-tailed ducks, 18% divers	1224		0.37–0.66 birds/1000 netmeters*days	A. Stipniece and E. Urtans, Stipniece and A. Vaiders, unpublished data as cited in Zydelis *et al*. (2009)
Lithuania	Lithuanian coastal waters		1997/98–2001/03		56% long-tailed ducks, 16% velvet scoters, 7% divers, 6% Steller's eiders	1004	About 10% of all birds present (2500–5000) pa	0.97 birds/1000 netmeters*day	Dagys and Zydelis (2002) and unpublished data, Zydelis (2002) as cited in Zydelis *et al*. (2009)
Poland	Gulf of Gdańsk		1972–1976, 1986–1990		48% long-tailed ducks, 23% velvet scoter, 8% greater scaup	1254	17 500 pa or 10–20% of all birds present	8–81 birds/boat*winter	Stempniewicz (1994) as cited in Zydelis *et al*. (2009)
Poland	Puck Bay		1987–1990		41% long-tailed ducks, 22% velvet scoter, 21% common guillemots	860	3750 pa	3.7 birds/1000 netmeters*day OR 250 birds/boat*year	Kies and Tomek (1990) as cited in Zydelis *et al*. (2009)

Country	Region	Gear/Fishery	Year	Coverage %	Species	Observed number of animals	Bycatch estimate (CV; 95% CIs)	Bycatch rate (individual per …)	Source
Poland	Dziwnów Port, Pomeranian Bay		1977/78		41% long-tailed ducks, 22% velvet scoters, 21% common guillemots	581		2.4 birds/boat*day	Kowalski and Manikowski (1982)
Germany	Usedom Island		1989–2005		74% long-tailed ducks, 7% common scoters, 7% red-throated divers	11 258	3000 pa	38.4 (8–186) birds/fisherman*winter	
Germany	Mecklenburg-Western Pommeranian coast and lagoons		2006–2009		14% common eiders, 14% tufted ducks, 12% pochards, 11% greater scaup, 10% red-breasted merganser	352			Bellebaum *et al*., unpublished data as cited in Zydelis *et al*. (2009)
Germany	Baltic Sea coast of Schleswig-Holstein		1977/78–1980/81		64% common eiders, 18% common scoters	2839	15,800 pa or 17% of all birds present	5.2 birds/study site * day	Kirchhoff (1982) as cited in Zydelis *et al*. (2009)

Country	Region	Gear/Fishery	Year	Coverage %	Species	Observed number of animals	Bycatch estimate (CV; 95% CIs)	Bycatch rate (individual per …)	Source
Germany	Wismar Bay		1982–1985		Greater scaup, common eider		2800 scaup pa or 8% of the birds present		Grimm (1985) as cited in Zydelis *et al*. (2009)
Germany	Baltic coast around Fehmarn		1996/97–1997/98		Common eider			1.2 birds/1000 netmeters*day	Mentjes and Gabriel (1999) as cited in Zydelis *et al*. (2009)
	South Central Baltic		1994–1995		Common guillemot	52			Christensen (1995) as cited in Zydelis *et al*. (2009)
Denmark	Ringed birds recovered in Denmark		1921–1993		Common guillemot, razorbill				Lyngs and Kampp (1996) as cited in Zydelis *et al*. (2009)
Germany	Birds ringed on Helgoland		1912–1994		Common guillemot				Hüppop (1996) as cited in Zydelis *et al*. (2009)
Netherlands	Ijsselmeer and Markermeer		1978–1990		25% tufted duck, 23% greater scaup, 17% red-breasted mergansers, 14%great-crested grebe	10 097	50 000 pa	0.64 birds/1000 netmeters*day (November–March)	Van Eerden *et al*. (1999) as cited in Zydelis *et al*. (2009)

Country	Region	Gear/Fishery	Year	Coverage %	Species	Observed number of animals	Bycatch estimate (CV; 95% CIs)	Bycatch rate (individual per ...)	Source
Netherlands	Ijsselmeer and Markermeer		2002–2003		53% tufted ducks, 17% greater scaups, 14% great-crested grebes, 11% goldeneyes	512	12 000 pa	0.64 birds/1000 netmeters*day	Witteveen and Bos (2003) as cited in Zydelis *et al*. (2009)
United Kingdom	NE Scotland		1992		71% common guillemots, 29% razorbills	323	2400 pa	1.4 birds (net.day)	Murray *et al*. (1994) as cited in Zydelis *et al*. (2009)
Norway	Birds ringed in Norway				Great cormorant, European shag, common eider, common guillemot, black guillemot				Follestad and Runde (1995) as cited in Zydelis *et al*. (2009)
Germany	Mecklenburg-Western Pommeranian coast		2006		Great cormorant, long-tailed duck, greater scaup, goos-ander		25% of beached birds with signs of bycatch		Bellebaum and Schulz (2006) as cited in Zydelis *et al*. (2009)

Country	Region	Gear/Fishery	Year	Coverage %	Species	Observed number of animals	Bycatch estimate (CV; 95% CIs)	Bycatch rate (individual per …)	Source
Lithuania	Coastline of Lithuania		1992/93–2002/03		Long-tailed ducks, divers		32% of beached birds died due to bycatch		Zydelis *et al*. (2006) as cited in Zydelis *et al*. (2009)
Poland	Coastline of Poland		1998–1999		Long-tailed ducks, velvet scoters, common scoters		77% of beached birds died in fishing nets		Meissner *et al*. (2001) as cited in Zydelis *et al*. (2009)
Denmark	North Sea, W Denmark		1987		Common scoters, velvet scoters	340			Durinck *et al*. (1993) as cited in Zydelis *et al*. (2009)
Germany	SW Baltic		1981		Common guillemots				Berndt and Busche (1983) as cited in Zydelis *et al*. (2009)
Sweden	Hoburgs Bank, Central Bank		1996/97–2003/04		Long-tailed ducks	998			Larsson and Tyden (2005) as cited in Zydelis *et al*. (2009)

Table 6. Cetacean bycatch estimates collated under 812/2004 by EU member states for 2009.

Species	Métier Level 3	Country	Target Species	Fishing Area	Season	Total effort Days	Observed Effort Days	% coverage	No of specimens bycaught	Total Bycatch Estimate	Bycatch estimate status	CV (%)
None	Nets	Denmark		IIIaN		3780	24	0.63	0	0	Provided	
None	Nets	Denmark		IIIaS		1414	6	0.42	0	0	Provided	
None	Pelagic trawl	Ireland	HER, JAX, MAC	VIIj	10–12	81	3	3.70	0	0	Estimated	
None	Pelagic trawl	Ireland	JAX, MAC, WHB	VIa	4–6	27	17	62.96	0	0	Estimated	
None	Pelagic trawl	Ireland	ALB	VIIk	7–9	374	3	0.80	0	0	Estimated	
None	Pelagic trawl	Ireland	ALB	VIIk	10–12	126	1	0.79	0	0	Estimated	
None	Pelagic trawl	Ireland	HER, JAX	VIIj	7–9	10	3	30.00	0	0	Estimated	
None	Pelagic trawl	Ireland	HER, JAX, MAC	VIIg	10–12	146	3	2.05	0	0	Estimated	
None	Pelagic trawl	Ireland	HER, JAX, MAC	VIIb	10–12	319	3	0.94	0	0	Estimated	
None	Pelagic trawl	Ireland	HER, JAX, MAC	VIa	10–12	367	8	2.18	0	0	Estimated	
None	Pelagic trawl	Ireland	HER, JAX, MAC	IVa	10–12	99	2	2.02	0	0	Estimated	
None	Pelagic trawl	Ireland	HER, JAX, MAC,WHB	VIIj	1–3	77	3	3.90	0	0	Estimated	

Species	Métier Level 3	Country	Target Species	Fishing Area	Season	Total effort Days	Observed Effort Days	% coverage	No of specimens bycaught	Total Bycatch Estimate	Bycatch estimate status	CV (%)
None	Pelagic trawl	Ireland	HER, JAX, MAC	VIIg	10–12	9	13	144.44	0	0	Estimated	
None	Pelagic trawl	Ireland	HER, JAX, MAC	VIIa	10–12	6	2	33.33	0	0	Estimated	
None	Pelagic trawl	Ireland	JAX, MAC, WHB	VIb	4–6	1	1	100.00	0	0	Estimated	
None	Pelagic trawl	Ireland	HER, JAX, MAC,WHB	VIb	1–3	2	2	100.00	0	0	Estimated	
None	Pelagic trawl	Ireland	ALB	VIIj	10–12	75	1	1.33	0	0	Estimated	
None	Pelagic trawl	Ireland	HER, JAX, MAC,WHB	VIa	1–3	92	1	1.09	0	0	Estimated	
None	Pelagic trawl	Ireland	HER, JAX, MAC	VIa	7–9	3	2	66.67	0	0	Estimated	
None	Pelagic trawl	Poland		24		592	3	0.51	0	0	Provided	
None	Nets	Poland		26		204	61	29.90	0	0	Provided	
None	Nets	Poland		25		421	69	16.39	0	0	Provided	
None	Pelagic trawl	Poland		26		2621	66	2.52	0	0	Provided	
None	Pelagic trawl	Netherlands	hor, mac, bw, her	VIId	January–March & December	116	15	12.93	0	0	Provided	

Species	Métier Level 3	Country	Target Species	Fishing Area	Season	Total effort Days	Observed Effort Days	% coverage	No of specimens bycaught	Total Bycatch Estimate	Bycatch estimate status	CV (%)
None	Pelagic trawl	Netherlands	hor, mac, bw, her	VIIc	January–March & December	104	14	13.46	0	0	Provided	
None	Pelagic trawl	Netherlands	hor, mac, bw, her	VIIb	January–March & December	48	5	10.42	0	0	Provided	
None	Pelagic trawl	LATVIA	sprat	25-32	01–06,08–12	5380	10	0.19	0	0	Provided	
None	Nets	LATVIA	cod	22-32	01–5, 08–12	2149	36	1.68	0	0	Provided	
None	Pelagic trawl	Estoa	herring, sprat	4S1	1–8		154		0	0	Provided	
cetaceans	Nets	Spain	Merluccius merluccius	27. VIIIa	Jan–Dec	2721	81	2.98	1	34	Estimated	
cetaceans	Pelagic trawl	Italy	Anchovy (about 70%) sardines (20%)	GSA 16	1–8, 10–12	900	55	6.11	0	0	Provided	
Delphinus delphis	Nets	Spain	Merluccius merluccius	27. VIIIa	Jan–Dec	2721	81	2.98	23	773	Estimated	
Delphinus delphis	Pelagic trawl	France	Various species	VIII	Vii–IX	94	16	17.02	1	13	Provided	80
Delphinus delphis	Pelagic trawl	France	sea bass	VII	Vii–IX	748	124	16.58	2	20	Provided	97
Delphinus delphis	Pelagic trawl	France	sea bass	VII	I–III	700	81	11.57	6	20	Provided	62

Species	Métier Level 3	Country	Target Species	Fishing Area	Season	Total effort Days	Observed Effort Days	% coverage	No of specimens bycaught	Total Bycatch Estimate	Bycatch estimate status	CV (%)
Delphinus delphis	Nets	UK		VIIEFGHJ	Jan–Dec	14 095	261	1.85	3	237	Provided	58
Delphinus delphis	Pelagic trawl	France	sea bass	VIII	I–III	553	32	5.79	21	400	Provided	89
Delphinus delphis	Pelagic trawl	France	sea bass	VIII	Vii–IX	2887	251	8.69	115	900	Provided	66
Phocoena phocoena	Nets	Spain	Merluccius merluccius	27. VIIIb	Jan–Dec	481	20	4.16	3	72	Estimated	
Phocoena phocoena	Nets	Spain	Merluccius merluccius	27. VIIIa	Jan–Dec	2721	81	2.98	9	302	Estimated	
Phocoena phocoena	Nets	France	sole, angler	VIII	i–XII	18 478	233	1.26	4	300	Provided	64
Phocoena phocoena	Nets	UK		VIIEFGHJ	Jan–Dec	14 095	261	1.85	10	791	Provided	31
Stenella coeruleoalba	Nets	France	hake	VIII	I–XII	7924	91	1.15	3	800	Provided	68
Stenella coeruleoalba	Pelagic trawl	France	anchovies, sardines, whiting	Mediterranean (zone 37.1.2 / GSA 7)	I–XII		199		5	70	Provided	53
Tursiops truncatus	Pelagic trawl	France	anchovies, sardines, whiting	Mediterranean (zone 37.1.2 / GSA 7)	I–XII		199		1	10	Provided	97

Species	Métier Level 3	Country	Target Species	Fishing Area	Season	Total effort Days	Observed Effort Days	% coverage	No of specimens bycaught	Total Bycatch Estimate	Bycatch estimate status	CV (%)
Tursiops truncatus	Pelagic trawl	Italy	Anchovy (about 70%) sardines (20%)	GSA 17	1–7, 9–12	8050	164	2.04		0	Provided	

Table 7. Summary of all bycatch estimates collated under 812/2004 from the WGBYC database.

Species	Métier Level 3	Country	Fishing Area	2004/2005	2005	2006	2007	2008	2009
None	Nets	Denmark	IIIaN						0
None	Nets	Denmark	IIIaS						0
None	Nets	Netherlands	IVc					0	
None	Nets	Poland	IIId				0	0	
None	Nets	Sweden	IIId				0	0	
None	Pelagic trawl	Denmark	IIIa				0	0	
None	Pelagic trawl	Denmark	IIIbcd				0	0	
None	Pelagic trawl	Denmark	IVb				0		
None	Pelagic trawl	Finland	IIId North				0		
None	Pelagic trawl	Finland	IIId south				0		
None	Pelagic trawl	France	VI, VII & VIII				0		
None	Pelagic trawl	Netherlands	IIa				0		
None	Pelagic trawl	Netherlands	IVa				0		
None	Pelagic trawl	Netherlands	IVb				0		
None	Pelagic trawl	Netherlands	VIa				0		
None	Pelagic trawl	Netherlands	VIb				0		
None	Pelagic trawl	Netherlands	VIIb				0		
None	Pelagic trawl	Netherlands	VIIb					0	
None	Pelagic trawl	Netherlands	VIIc					0	
None	Pelagic trawl	Netherlands	VIId					0	
None	Pelagic trawl	Netherlands	VIIe					0	

Species	Métier Level 3	Country	Fishing Area	2004/2005	2005	2006	2007	2008	2009
None	Pelagic trawl	Netherlands	VIIj					0	
None	Pelagic trawl	Netherlands	IIa					0	
None	Pelagic trawl	Netherlands	IVa					0	
None	Pelagic trawl	Netherlands	IVc					0	
None	Pelagic trawl	Netherlands	Vb					0	
None	Pelagic trawl	Netherlands	VIa					0	
None	Pelagic trawl	Netherlands	VIId					0	
None	Pelagic trawl	Netherlands	VIIe					0	
None	Pelagic trawl	Netherlands	VIIIa					0	
None	Pelagic trawl	Netherlands	VIIId					0	
None	Pelagic trawl	Netherlands	VIIj					0	
None	Pelagic trawl	Netherlands	VIa				0		
None	Pelagic trawl	Netherlands	VIb				0		
None	Pelagic trawl	Netherlands	VIIb				0		
None	Pelagic trawl	Netherlands	VIId				0		
None	Pelagic trawl	Netherlands	VIIe				0		
None	Pelagic trawl	Netherlands	VIIh				0		
None	Pelagic trawl	Netherlands	VIIj				0		
None	Pelagic trawl	Poland	IIId				0	0	
None	Pelagic trawl	Sweden	IIIa			0	0	0	
None	Pelagic trawl	Sweden	IIId			0	0	0	
None	Pelagic trawl	Sweden	IVa			0	0	0	
None	Pelagic trawl	UK	VIa				0		
None	Pelagic trawl	UK	VIId				0		

Species	Métier Level 3	Country	Fishing Area	2004/2005	2005	2006	2007	2008	2009
None	Pelagic trawl	UK	VIIe				0		
None	Pelagic trawl	UK	VIa				0		
None	Pelagic trawl	UK	VIIc				0		
None	Pelagic trawl	UK	IVa				0		
None	Nets	France	IVc, VII bdehgj, VIIIabce			0			
None	Nets	LATVIA	22–32						0
None	Nets	Poland	25						0
None	Nets	Poland	26						0
None	Nets	Poland	IIId			0			
None	Pelagic trawl	Estoa	4S1						0
None	Pelagic trawl	Ireland	VIIc				0		
None	Pelagic trawl	Ireland	VIIj		0	0			0
None	Pelagic trawl	Ireland	VIIk						0
None	Pelagic trawl	Ireland	VIIj						0
None	Pelagic trawl	Ireland	IVa					0	0
None	Pelagic trawl	Ireland	VIa				0	0	0
None	Pelagic trawl	Ireland	VIIa				0		0
None	Pelagic trawl	Ireland	VIIb					0	0
None	Pelagic trawl	Ireland	VIIg					0	0
None	Pelagic trawl	Ireland	VIIj				0	0	0
None	Pelagic trawl	Ireland	VIIk		0				
None	Pelagic trawl	Ireland	VIa					0	
None	Pelagic trawl	Ireland	VIIa					0	

Species	Métier Level 3	Country	Fishing Area	2004/2005	2005	2006	2007	2008	2009
None	Pelagic trawl	Ireland	VIIb		0		0	0	
None	Pelagic trawl	Ireland	VIa		0	0		0	0
None	Pelagic trawl	Ireland	VIb						0
None	Pelagic trawl	Ireland	VIIb				0	0	
None	Pelagic trawl	Ireland	VIIc					0	
None	Pelagic trawl	Ireland	VIIj				0		0
None	Pelagic trawl	Ireland	VIa			0	0	0	0
None	Pelagic trawl	Ireland	VIb					0	0
None	Pelagic trawl	LATVIA	25-32						0
None	Pelagic trawl	Netherlands	VIIb						0
None	Pelagic trawl	Netherlands	VIIc						0
None	Pelagic trawl	Netherlands	VIId						0
None	Pelagic trawl	Poland	24						0
None	Pelagic trawl	Poland	26						0
cetaceans	Nets	Spain	VIIIa						34
cetaceans	Pelagic trawl	Italy	GSA 16						0
cetaceans	Pelagic trawl	Italy	GSA 17				0		
Delphinus delphis	Nets	France	VIa, VIIa,b,						
VIII a, b, c, IXa					100				
Delphinus delphis	Nets	Ireland	VIIc			19			
Delphinus delphis	Nets	Spain	VIIIa						773
Delphinus delphis	Nets	Spain	VIIIa,b					23	
Delphinus delphis	Nets	UK	VIIEFGHJ						237

Species	Métier Level 3	Country	Fishing Area	2004/2005	2005	2006	2007	2008	2009
Delphinus delphis	Nets	UK	VIIf						
Delphinus delphis	Nets	UK	VIIg						
Delphinus delphis	Nets	UK	VIIe						
Delphinus delphis	Pelagic trawl	France	IVc, VII bdehgj, VIIIabce			57			
Delphinus delphis	Pelagic trawl	France	VI, VII & VIII				226	300	
Delphinus delphis	Pelagic trawl	France	VII						40
Delphinus delphis	Pelagic trawl	France	VIII						1300
Delphinus delphis	Pelagic trawl	France	VI, VII &VIII				13	120	
Delphinus delphis	Pelagic trawl	France	VIII						13
Delphinus delphis	Pelagic trawl	Ireland	VIIj,VIIg,VIIaS			4			
Delphinus delphis	Pelagic trawl	Netherlands	VI, VII & VIII	26					
Delphinus delphis	Pelagic trawl	Spain	VIIIa,b,d						
Delphinus delphis	Pelagic trawl	UK	VIIe						
Lagenorhynchus acutus	Pelagic trawl	Netherlands	VI, VII & VIII			8			
Phocoena phocoena	Nets	Denmark	IIIa					1	
Phocoena phocoena	Nets	France	VIa, VIIa,b,						
VIII abc, IXa				100	250				
Phocoena phocoena	Nets	France	VIII						300
Phocoena phocoena	Nets	France	VIa, VIIa,b,						

Species	Métier Level 3	Country	Fishing Area	2004/2005	2005	2006	2007	2008	2009
VIII-a, b, c, IXa				500	100				
Phocoena phocoena	Nets	Ireland	VIIc			14			
Phocoena phocoena	Nets	Ireland	VIIg		21		31		
Phocoena phocoena	Nets	Spain	VIIIa						302
Phocoena phocoena	Nets	Spain	VIIIb						72
Phocoena phocoena	Nets	UK	VIIEFGHJ						791
Phocoena phocoena	Nets	UK	VIId						
Phocoena phocoena	Nets	UK	VIIf						
Phocoena phocoena	Nets	UK	VIIj						
Phocoena phocoena	Nets	UK	VIIe						
Phocoena phocoena	Nets	UK	VIIe						
Phocoena phocoena	Nets	UK	VIIg						
Phocoena phocoena	Pelagic trawl	Netherlands	VIa					33	
Stenella coeruleoalba	Nets	France	VIII						800

Species	Métier Level 3	Country	Fishing Area	2004/2005	2005	2006	2007	2008	2009
Stenella coeruleoalba	Nets	France	VIa, VIIa,b,						
VIII a, b, c, IXa					50				
Stenella coeruleoalba	Pelagic trawl	France	Mediterranean (zone 37.1.2 / GSA 7)						70
Stenella coeruleoalba	Pelagic trawl	France	Mediterranean					70	
Stenella coeruleoalba	Pelagic trawl	France	VI, VII &VIII				40		
Tursiops truncatus	Nets	UK	VIIe						
Tursiops truncatus	Pelagic trawl	France	Mediterranean (zone 37.1.2 / GSA 7)						10
Tursiops truncatus	Pelagic trawl	France	Mediterranean					35	
Tursiops truncatus	Pelagic trawl	France	VI, VII &VIII				54		
Tursiops truncatus	Pelagic trawl	Italy	GSA 17					24	0

Annex 5: Technical minutes from the Vulnerable Marine Ecosystems Review Group (RGVME)

- RGVME
- By correspondence, 10 May, 2011
- Participants: Margaret M. McBride, Norway (Chair); Nicole LeBoeuf, USA; Pascal Lorance, France; Lance Morgan, USA; Francis O'Beirn, Ireland, Simon Northridge, UK (WGBYC Chair); Claus Hagebro (ICES Secretariat).
- Working Group: WGBYC Report 2011 (ICES CM 2011/ACOM:26).

EC and NEAFC Request

Continue to update cold-water coral and sponge maps and the information underpinning such maps. This should include any new information pertinent to the boundaries of existing fisheries closures for sensitive habitats/vulnerable marine ecosystems.

Provide advice to update records of deep-water vulnerable marine ecosystems (VMEs) in the North Atlantic and, where appropriate, advise on new or revised areas to be closed to bottom fisheries for the purposes of conservation of VMEs.

NEAFC Request

Provide advice on appropriateness of current closure boundaries on Hatton and Rockall banks. The advice should be based on all available information on distribution of vulnerable habitats in those areas including from research vessel surveys, observer programmes, and fisheries as well as data on the size of catches and condition (live/dead) of corals and sponges.

EC Request

Provide any new information regarding the impact of fisheries on other components of the ecosystem including small cetaceans and other marine mammals, seabirds and habitats. This should include any new information on the location of habitats sensitive to particular fishing activities.

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

The Reviewer examined the list of Issues for Consideration of the Advisory Committee found within the Report of the Working Group on Bycatch of Protected Species (WGBYC) and concurs with most all of the WGBYC's findings and recommendations. Only where the Reviewer would recommend additional specificity and/or has some clarifying request, are comments provided below following each associated bullet item.

Issue(s) for consideration

- WGBYC concluded from its review of the national reports on the implementation of EC Regulation 812/2004 that EU Member States have still not demonstrated that the cetacean bycatch mitigation measures mandated under this regulation are being implemented. The working group recommended to the relevant ICES Member Countries that (1) more effective

means of ensuring the deployment and use of acoustic deterrent devices need to be implemented (2) it may be useful to ensure relevant sectors of the fishing industry are aware of their obligations under Regulation 812/2004 and (3) that Member States themselves should also be reminded of their obligations to monitor incidental catch and to mitigate its effects where necessary under Article 12 of the Habitats Directive which appears to be widely ignored.

Reviewer comment

Based upon a review of this document, the Reviewer concurs with the WGBYC's conclusion that EU Member States are still not demonstrating compliance with EC Regulation 812/2004. The Reviewer concurs with the WGBYC's recommendations and would go on to suggest that broadly and in specific provisions, ICES should recommend proposed any specific changes to EC Regulation 812/2004 where ICES believes that such proposed changes would improve Member States' understanding of their obligations and/or would increase compliance overall. Perhaps most importantly, the Reviewer would strongly recommend that ICES provide the EU with a suggested template for its members' reporting requirements. At this time, there is little way of knowing which members are complying with which portions of the regulations if at all, or whether some members or at least some portions of their fleets are not required to comply. It is the view of the Reviewer that this is the most fundamental improvement that must be made if ICES is to be able to provide the EU with sound and useful advice on how other portions of the Regulations might need to be revised, not to mention whether the Regulation has been effective over time.

- WGBYC suggests a more flexible approach to determining which fleet segments should be monitored. At present EU Member States largely restrict any sampling to that specified in Regulation 812, although other fleet segments may be more appropriate to monitoring. Some fleets are therefore probably being monitored too much and others too little. Specifically, for example, not enough monitoring of set-net fisheries in IVc is currently being undertaken as this is not mandated under Regulation 812.

Reviewer comment

With regard to the term "flexible" here and in the comment below, the Reviewer would recommend choosing another word to more clearly articulate the intent of the WGBYC. The word flexible could be misinterpreted by EU members to mean less stringent. What the Reviewer believes that the WGBYC is wishing to convey is that approaches to determining which fleet segments should be monitored should be chosen based upon more informed criteria than those currently included within EC regulation 812//2004. This does not necessarily represent flexibility in compliance, but rather a broadening and/or clarifying of why a particular segment of the fleet should be monitored. Clarifying such rational might, however, require more study and/or elucidation by the EU.

- WGBYC suggests that industry incentives (positive and negative) are explored by Member States to ensure that bycatch monitoring covers all necessary sectors in an effective manner.
- WGBYC repeats its recommendation that bycatch monitoring schemes should have more flexible targets not necessarily with the aim of providing total bycatch estimates with predetermined CVs, but should rather aim to

ascertain whether or not bycatch rates in specific fisheries are likely to represent a conservation problem.

Reviewer comment

See above with respect to the use of the term "flexible". The Reviewer would recommend choosing another word to more clearly articulate the intent of the WGBYC.

- WGBYC suggests that observer programme managers should avoid focusing too much observer effort on specific métiers within a wider fleet segment. Observer effort should be distributed throughout relevant fleets in a representative manner to ensure that complete coverage of fleets is eventually achieved. This will lead to less precision in the estimates for smaller fleet segments in the short term but will lead to higher accuracy in the longer term.
- WGBYC recommends that in addition to observer schemes, the development of new monitoring technologies such as CCTV or remote platforms should be encouraged.

Reviewer comment

More than "should be encouraged", the Reviewer believes that it would be useful to the EU and its members if specific suggested changes linking the use of monitoring technologies to the Regulations are provided. That is, to demonstrate direct relevance to carrying out the spirit and intent of the Regulations with even voluntary activities.

- WGBYC recommends that 812 monitoring and fleet effort reporting by fishery sector should be in line with the sectors being addressed under the Data Collection Framework with the specific addition of very high vertical opening trawls, and so that effort and monitoring data should be supplied by ICES subdivision and not aggregated across subdivisions or areas.
- WGBYC maintains that bycatch monitoring of under-15 m vessels is a requirement of habitats directive. WGBYC emphasizes that bycatch is responsive to gear in use and not to vessel length. WGBYC therefore recommends that if a full picture of bycatch (and therefore of impact) is required, Member States/countries need to ensure bycatch caused boats of less than 15 m is also monitored, and if necessary, mitigated as mandated by the Habitats Directive.
- WGBYC proposes that records of other protected species (mammals, birds, reptiles, fish species of conservation concern) not just small cetaceans, are included in Member States' annual reports under Regulation 812/2004, and that these are addressed in future by WGBYC.

Reviewer comment

The Reviewer agrees and would recommend that any standardization of data collection, observer training, and/or member reporting requirements include the option of reporting on all key bycatch species regardless of whether such reporting is currently required by EC regulation. Having the choice within the reporting schemes is the first step via familiarization.

- WGBYC maintains that the assessment required under Article 12 of the Habitats Directive needs to be spelled out by the Commission and that de-

tailed guidance should be given to EU Member States on how such threats can be assessed, catalogued and addressed.

- WGBYC notes that strandings can sometimes provide a useful way of identifying potential bycatch problems and could be used as a spur to develop monitoring programmes to investigate bycatch in specific times or areas and specific fisheries more thoroughly.

Reviewer comment

The Reviewer agrees, but if strandings are to be explicitly used in the calculation of bycatch rates and/or even as a way of identifying new areas for monitoring, the Reviewer would recommend that applicability of strandings for this purpose be explained to EU members and their fishermen and that any methods and/or criteria used to identify fisheries interactions in stranded animals be clearly convey to EU members and their fishermen.

- WGBYC suggests that ICES Member Countries should learn from experience elsewhere prior to commencing pinger trials or implementation of pinger schemes. A wide body of experience already exists and it seems pointless and wasteful to repeat well-rehearsed trials.
- WGBYC suggests that pinger certification scheme would help add confidence that fishers might have in the equipment they are using, and identify the fact that the product in question is in conformity with the essential requirements of the Regulation.
- WGBYC suggests that where DCF observers are being deployed, then a protocol appropriate to monitoring protected species bycatch and training in use of that protocol ought to be established.

Reviewer comment

The Reviewer agrees and would suggest also emphasizing that such training be developed with a view toward standardization across EU members.

- WGBYC would also like to see the development of a European wide observer training and certification scheme to ensure compatible standards are used in bycatch monitoring by all European members states.
- WGBYC recommends against using port interviews as the sole means to assess bycatch as there is no way of avoiding the risk of misreporting or inattention of skippers to actual bycatch.

Reviewer comment

The Reviewer agrees and suggests that this would be a good opportunity for ICES to make a specific recommendation regarding proposing a change to the EC Regulation 814/2004 to ensure that this activity cannot be used to satisfy the monitoring requirements alone.

- WGBYC recommends that the issue of possible seal depredation be considered prior to deployment of pinger schemes in areas known to be frequented by seals.

Reviewer comment

The Reviewer agrees, but notes that additional analyses regarding whether seal areas overlap with areas of high bycatch of small cetaceans should be conducted before

changing any current practice. Not having this well-understood could confound compliance issues further if fishers don't know which marine mammal to protect in space and time.

- WGBYC suggests that it would be helpful if the reporting requirements under Regulation 812/2004, the Habitats Directive and also any future reporting requirements under the Marine Strategy Framework Directive were to be made specific and also harmonized in such a ways as to make pan-European assessments possible.
- WGBYC recommends that in future it should collate and catalogue bycatch rates for other species in order to obtain a more comprehensive picture of fishery impacts to assist in the development of the ecosystem approach to fishery management.
- WGBYC recognized the importance of monitoring of porpoise bycatch in Norwegian fisheries that are not subject to Regulation 812/2004, but which impact the same porpoise populations as those of EU Member States, and for which there is an important gap in our knowledge of this species. WGBYC therefore recommends that porpoise bycatch monitoring in Norway should be continued and extended.
- WGBYC recommends that appropriate métier data are supplied in Member States' annual 812 reports in adequate detail. WGBYC agreed to the adoption of a flexible approach to the level of detail described in the métier, providing more detail where sensible, and less where it is not needed for bycatch assessment. This would mean for example that tanglenet métiers should be disaggregated from other set-net fisheries otherwise lumped at level 5 of the Nantes matrix.
- WGBYC agreed that members of the group would supply effort and monitoring data according to WGGBYC database format for three years (2010, 2009, 2008) by the end of June 2011.
- WGBYC recommends continued development of Electronic Monitoring as a potentially very useful tool for bycatch estimation.
- WGBYC proposes close collaboration with the newly formed expert group SGPIDS.