

Annex J

Report of the Working Group on Non-Deliberate Human-Induced Mortality of Large Whales

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1. CONVENOR’S OPENING REMARKS AND TERMS OF REFERENCE

Leaper welcomed participants noting that this Working Group would continue to work on non-deliberate human induced mortality with emphasis on both bycatch and ship strikes. In addition, the Committee’s agenda identifies closer links with the Commission’s Working Groups. New items on the agenda included collaboration with Commission initiatives on entanglement and the Commission’s Ship Strikes Working Group, including consideration of mitigation measures.

2. ELECTION OF CHAIR

Leaper was elected as Chair.

3. ADOPTION OF AGENDA

The adopted Agenda is given as Appendix 1.

4. APPOINTMENT OF RAPPORTEURS

Mattila offered to serve as rapporteur.

5. AVAILABLE DOCUMENTS

SC/65b/HIM01-09, Fretwell *et al.* (2014), Citta *et al.* (2013), Frantzis *et al.* (2013), Groom and Coughran (2012), and Laist *et al.* (2014).

6. ENTANGLEMENT

6.1 Progress on including information in National Progress Reports

The Secretariat has now developed tools to allow the data entered into National Progress reports to be queried.

This can be done via <http://iwc.int/scprogress>. Queries include summaries by data type including: Non-Direct Anthropogenic Mortality of Large Whales; Fishery Bycatch of Large Whales. These queries provide quick ways in which to check the data. There have been issues with some of the data codes and so those familiar with the data were encouraged to run some of these queries in order to check data entries. Tables 1 and 2 give examples of output from queries regarding fishery bycatch of large whales reported in National Progress reports this year. These tables only list countries that have both submitted data and where these numbers are not zero.

It was noted that not all countries submit entanglement and bycatch data in their National Progress Reports, and it is important to distinguish between ‘no report’ and ‘no

Table 1

Total reported bycatch incidents – outcome may be death, serious injury or unknown.

	Bowhead whale	Common minke whale	Fin whale	Gray whale	Humpback whale	North Atlantic right whale	Southern right whale	Sperm whale	Unid. large whale
Australia	-	-	-	-	37	-	-	-	-
Brazil	-	-	-	-	-	-	1	-	-
Denmark	1	-	-	-	2	-	-	-	-
Japan	-	105	6	-	6	-	-	-	-
Korea, Republic of	-	57	-	-	1	-	-	-	-
UK	-	2	-	-	-	-	-	-	-
USA*	-	10	4	5	17	7	-	2	5

*Incidents from 2010 and 2011.

Table 2

Total reported bycatch incidents resulting in death.

	Bowhead whale	Common minke whale	Fin whale	Gray whale	Humpback whale	North Atlantic right whale	Southern right whale	Sperm whale	Unid. large whale
Japan	-	104	6	-	5	-	-	-	-
Korea, Republic of	-	57	-	-	1	-	-	-	-
UK	-	2	-	-	-	-	-	-	-
USA*	-	4	3	2	2	1	-	1	1

*Incidents from 2010 and 2011.

data'. The Working Group **recommends** that member nations fill out these fields appropriately, in order to be able to determine if the incidence of large whale mortality from entanglement is increasing or decreasing. Relevant to discussions about the possibility of the IWC developing and hosting a global entanglement database, it was noted that at least two entities had entered the existing entanglement data from the National Progress Reports: Simon Northridge at Sea Mammal Research Unit (UK) and Duke University (USA). The Working Group Chair and Secretariat were encouraged to investigate the status and utility of these databases, in order to determine if they would be helpful to the Working Group and if they were a useable foundation if an IWC global database were constructed.

In discussion of both the entanglement data requested in the National Progress Reports, and in any future IWC global entanglement database, the Working Group expressed its concern that the data requested be kept to the minimum needed to answer specific questions endorsed by the Commission, given the increased work load that this could entail. Relevant to this, it was noted that a request had been made in the Environmental Concerns Working Group to better define and report the difference between actively fished gear and marine debris.

In response to a question about similar data on ship strikes reported in this meeting's National Progress Reports, Leaper indicated that it had not been possible to reliably query the database this year, due to difficulties in switching to the electronic format, but that work was underway to rectify this.

6.2 Collaboration with Commission initiatives on entanglement, including consideration of mitigation measures

Rowles presented the report of the IWC Workshop on Euthanasia Protocols to Optimise Welfare Concerns for Stranded Cetaceans, held in London in September 2013. The aim of the Workshop was to bring together international experts to inform guidelines on achieving the best welfare outcome when cetaceans strand. The Workshop compared the various euthanasia methods used worldwide, safety of personnel, and discussed intervention decision making. Recommendations or guidance were made on the following broad topic areas: safety and decision making; methods; data; expertise sharing; and future workshops. Overall the Workshop stressed that human safety is paramount and that decisions on euthanasia methods should consider both human safety and the method's humaneness as the first criteria. Regarding safety, euthanasia should only be attempted by trained personnel (for the particular species and method) and should not be attempted with the current methods for live animals in the surf that have not been stabilised or are above the tide line. New euthanasia methods (or training in methods or new species) should be tested on dead animals first. With regards to chemical euthanasia methods, the Workshop recommended that additional studies or evaluations on the persistence and relay toxicity of chemicals used should be undertaken. In particular, at a minimum the injection site should be removed and disposed of, and when barbiturates are used, the whole carcass must be removed from predation possibilities. In addition the Workshop recognised the effectiveness of penthrate grenades and encourages the development of a darting gun delivery device that may be suitable for use by trained personnel in specific large whale stranding situations. The report also recommended the collection of appropriate data and full documentation

of the event in order to inform further improvements and prevent repeating mistakes. The addition of further fields into the national progress report would allow evaluation of techniques for euthanasia and disposition of live stranded whales. Building on the success of the entanglement response network, the IWC could similarly serve as a forum for the exchange of ideas, methods and rapid response for specific situations through a panel of experts and updated website on these issues. The Workshop recommended euthanasia of injured cetaceans at sea and the issues related to mass strandings be considered for future workshops. Finally the Workshop recommended that IWC member nations refine existing or develop new incident response protocols based on the principles and guidelines found in the Workshop report (IWC, 2014b).

Recognising that the Workshop, and its report, was requested by the Commission's Working Group on Whale Killing Methods and Associate Welfare issues, the Working Group welcomed the report and **endorsed** its recommendations, including those to refine the data requested in National Progress Reports. Some members asked for clarification about some of the technical aspects of the ballistics discussed in the report, including some apparent inconsistencies. Rowles suggested that some apparent inconsistencies may be due to a lack of clarity about the appropriateness of some rapid killing methods for a species up to a certain size, but not for the same species above that size (e.g. humpback whales). In response to questions about euthanasia practices being based on cultural or geographic differences, it was noted that the Workshop's aim was to identify the strength and weaknesses of various current methods and suggest under which conditions each might be most appropriate, but always understanding that each country or region would have to decide which was most culturally appropriate. However, recognising that safety and humanness should be key considerations, the workshop participants all expressed an openness to try new techniques if they were seen to be safer or more humane, and if they were deemed to be culturally acceptable.

Rowles noted that disposal of euthanised carcasses depended on a variety of environmental, logistical and cultural issues, but that if lethal chemicals were used, at a minimum the injection site should be removed and discarded appropriately. The Workshop had agreed with the American Veterinary Association's finding that composting is often the best disposal practice, but recognised that this may not be feasible in many cases.

The Secretariat's technical adviser on entanglement response and ship strike reduction (Mattila) reported on the work that he has conducted for the Commission since IWC SC/65a. Along with other members of the IWC's entanglement expert group, he has provided entanglement response training for 156 individuals from 14 different countries in the past year. The training provides background on the global scope and impact of large whale entanglement and stresses that ultimately prevention is safer and more effective than emergency response to these events. To that end, one of the key consensus principles of entanglement response is the collection of information that will ultimately reduce risk of entanglement. This should include at least basic data on the species, location of report, and description of entangling materials, but can include much more detail (see Appendix 2).

One of the results of two years of this capacity building coordinated by the IWC is that data on large whale entanglements are being brought to the Committee - e.g.

Bellazzi *et al.* (2012) and SC/65b/HIM02. For example, the coordinator of the newly formed Mexican entanglement response network reported that following the IWC training in 2012 the Mexican Disentanglement Network RABEN (Red de Asistencia a Ballenas Enmalladas) has responded to 22 whale entanglement reports and successfully released seven whales in two whale seasons. All the whales were humpback whales, except for two gray whales, but it is important to take into account that the Vizcaino (Biosphere Reserve) teams, which are the most likely to work with gray whales, have only been operating for one year.

The IWC's expert group on entanglement will discuss the development of a global database on whale entanglement at its next meeting, currently planned for December 2014. The Commission has recommended that the expert group develop this database, and consider that it should be hosted by the IWC. The overarching goals of the database would be to identify the species involved, gear type, configuration and origin, whether the entangling materials were in active use or debris, and the geographic region and timing of the entanglement. The ultimate goal would be to use this information to inform mitigation initiatives by the Commission, relevant partner inter-governmental organisations, regional fishery councils or member Nations. The expert group will work closely with the Committee, in order to ensure that the utility of the data collected is maximised. This may be accomplished by Committee participation in the expert group's next meeting and/or through consultation at SC/66a. In addition, the expert advisory group will work with the Committee to advance the Commission's request for a future workshop on the prevention of whale entanglement.

6.3 Estimation of rates of entanglement, risks of entanglement and mortality

The spatial/temporal overlap between Bering Sea pot fisheries and bowhead whale winter distribution was examined in Citta *et al.* (2013). Entanglement injuries have been noted for decades during postmortem examinations of harvested bowheads and there was concern about where, when and how many bowheads might be interacting with pot fisheries. In the winter of 2008-09 and 2009-10 the spatial distribution of 21 satellite tagged bowhead whales partially overlapped areas in which pot fisheries for cod and blue king crab occurred. However, there was no temporal overlap, for this limited number of tagged whales, as the fisheries had ended before bowheads arrived in the area. The snow crab fishery showed a higher potential for bowhead whales to encounter active pot gear but again tagged whales did not enter the area of the fishery during the years of this study. Bowheads generally remained in areas with >90% sea ice concentration, which is too dense for crab boats to operate in. However, pack ice sometimes overruns active fishing areas, resulting in lost gear, which the authors felt was the most likely source of entanglement under the assumption that bowheads moved south with the pack ice. The Bering Chukchi Beaufort Seas stock of bowhead whales is increasing at a relatively high rate (Givens *et al.*, 2013). As such, bowhead mortality from commercial pot fisheries is likely to be low at this time. Regardless, entanglements may increase if these fisheries move further north with retreating sea ice cover. The authors recommend continued monitoring of this issue.

It had not been possible to track the entangling gear back to a specific fisher, fishery type, or time and location of gear loss, but that most of the gear remaining on the entangled whales was consistent with Bering Sea crab pot gear.

There was some discussion of the entanglement scarring results, in particular the fact that young whales showed less scarring than older (those over 17m in length), and whether that might indicate a higher mortality rate for entangled juveniles. But even though there had been a dramatic shift in the fisheries management, which likely decreased the annual accumulation of ghost gear, the authors currently believe that the most parsimonious explanation is that the increased scarring is simply evidence of gradual accumulation as whales grow older. In relation to this it was noted that Robbins has undertaken considerable work recently on entanglement survival and sub-lethal effects (on reproduction) for North Atlantic right whales and humpback whales in the Gulf of Maine. These results should be available at the next meeting.

The Working Group noted that the finding of a spatial but not temporal overlap suggested that this type of analysis might be helpful in determining entanglement risk from debris (lost or abandoned gear) versus actively fished gear. It further noted that this approach may also be valuable to the Environmental Concerns Working Group, as it investigates the scope and impact of marine debris.

Ridoux presented SC/65b/HIM02 on behalf of its authors. The paper reports a sperm whale calf and female pair entangled in a mass of ropes, nets and plastic cans off Guadeloupe, French West Indies in November 2013. The calf was entangled by its tail fluke peduncle in a mass of ropes, nets and plastic cans. A mature female had taken the opposite end of this with her lower jaw. The calf was dead and the female was able to perform foraging dive cycle with other members of the social group with the calf carcass attached to her. The rescue team was able to disintegrate the calf body to reduce drag effect on the female by attaching numerous floats to the carcass. However all attempts to cut the rope from the female's jaw failed. Since then, the female has regularly been observed with apparently normal body condition and activities. The material constituting the mass of rope and nets was suggestive of local artisanal Fish Aggregating Devices (FAD) that are generally constituted of a variety of second use materials, including discard nets and ropes. It is hypothesised that the primary cause of the entanglement was by playing with these local artisanal FADs as already observed in the area. If this was true, the present observation would represent the first data of large whale entanglement in this type of fishing gear.

Two other anecdotal reports of sperm whale mothers entangled together with their putative calves had been found from the Gulf of California. Given the pelagic distribution of sperm whales, it was suggested that entanglements of sperm whales, including those of multiple individuals, may occur much more frequently than reported.

Groom and Coughran (2012) described a review of the 63 baleen whale entanglement records in the Western Australian Cetacean Strandings Database from 1982-2010. Of the four baleen whale species observed entangled in fishing gear in Western Australian waters, humpback whales accounted for 56 (89%) entanglements, followed by southern Right Whale, five (8%) entanglements, and one record each for both Bryde's and minke whales. Almost half of entanglements occurred in rock lobster fishing gear 31 (49%) with the remainder recorded in fisheries targeting octopus and shark as well as aquaculture industries producing abalone, pearls and mussels. There is an upward trend in the number of entanglements reported between 1990 and 2010 in rock lobster fishing gear despite fishing effort reducing over the same period of time. This can, at least partly, be attributed to the increase in humpback whale population

size. Fisheries and conservation agencies have responded by developing cooperative relationships and protocols that reduce entanglement risk and improve outcomes when entanglement does occur.

Mattila remarked that the Secretariat had received several enquires about the entanglement risk of aquaculture installations, and noted that the paper listed entanglements in three different types of gear. Upon further discussion it was suggested that the higher number of entanglements in pearl farms (3) may be due to an apparently greater overlap with humpback whale distribution.

In response to a question about recent changes in rock lobster fisheries practices, and continuing trends in entanglements since the years covered in the paper, it was noted that the numbers of entanglements in rock lobster gear, reported in the National Progress Reports, have increased significantly, since the fishery went from a seasonal to a year-round fishery. In discussion of possible mitigation measures, the Working Group noted that other countries have been investigating and attempting to mitigate whale entanglements in similar pot fishery gear. In particular, the USA has convened a 'Take Reduction Team' (TRT) along its Atlantic coast, to try to reduce the numbers of whale entanglements in the lobster and crab pot fisheries. The team consists of scientists, engineers, fishers and managers, and it has met frequently since 1996 to review fisheries, whale distribution and entanglement data in order to advise the relevant fisheries managers about the most feasible and effective gear or fishing practice modifications which might then be mandated. To date some gear modifications have been enacted, but their effectiveness is not yet known. The consensus of the TRT is that, currently, the most certain way to avoid entanglement is to minimise the amount of entangling materials (i.e. rope in the case of pot fisheries) in the water column used by the whales.

In the case of the Western Australian rock lobster fishery, one solution would be for the fishery to return to a seasonal one, avoiding gear in the water during whale migration. If this is not possible, another would be to only allow fishing in waters outside of the whales migratory path (if known), or if gear is used in the migratory path, then all attempts should be made to minimise the rope in the water column used by the whale. One way to do this would be to either eliminate vertical buoy lines, by grappling gear or using remote released buoy lines which are kept coiled on the trap until released for retrieval by the fisherman. Another option is to string traps together so that several traps only require one buoy line. However, if this technique is used, the line between the traps should have a very low profile, preferably by laying along the sea bed.

The Working Group also discussed whether pingers could be an option for reducing entanglement in this fishery. It was noted that, while there had been a lot of research into the efficacy of pingers for mitigating small cetacean entanglement in fishing gear, the group was not aware of any further work with 'alarms' since Lien's work with simple alarms in Newfoundland in the 1980's. In discussion it was recognised that much of the reason for this was concern about the addition of noise to a habitat which is already seeing an increase in anthropogenic noise from other activities. Given that pingers (or some type of acoustic alarm) would be needed on potentially thousands of sets of fishing gear, this would appear to be a 'solution' that might add to another problem. Also, the Working Group noted that the effectiveness of pingers for small cetacean bycatch mitigation appeared to only work for certain species

or populations under certain conditions. One member noted that pingers were currently being used in Alaska in attempt to prevent whale entanglements in gill nets, but it was noted that there has been no study to evaluate the effectiveness for this situation.

In addition, the Working Group recommended that a careful monitoring scheme is enacted prior to any modifications of the fishery, so that the effectiveness of any changes can be determined with some level of confidence. This might include careful consideration of any potential changes in the reporting of whale entanglements, as fisheries begin to see that these may affect regulations, and it might also include a carefully planned scar or wound monitoring program. The annual accumulation of new entanglement wounds has been used effectively in the Gulf of Maine as a way to monitor right and humpback whale entanglements rates on a year to year basis, which is the timeframe needed by managers. The Working Group **recommends** that the relevant authorities in Australia contact Kristy Long (coordinator of the USA TRTs) and Jooke Robbins, who is using monitoring of the annual accumulation of raw wounds on both humpback and right whales in the region affected by the USA lobster fishery, for more information on the USA mitigation and monitoring efforts for its lobster fishery.

The Working Group **recommends** that Australia reports on any potential solutions that it enacts or tests as these could have beneficial global applications to this problem. In addition, recognising the global nature of the problem and the Commission's recommendation to prevent entanglement, the Working Group **strongly encourages** members to bring forward papers on the effectiveness of various mitigation measures to future meetings, and that a dynamic matrix or table of various potential measures and their effectiveness be maintained by the Working Group.

Panigada presented a brief overview of the entanglement situation within the Mediterranean Sea. Entanglements in the area used to be mainly due to drift-net fishing gears, targeting sword fish; after the EU ban these nets are drastically reduced in the Mediterranean and so are entanglements. There is however increase concern regarding ghost nets and the potential impact on cetaceans. The ACCOBAMS Work Program for 2014-16 entrusted the ACCOBAMS Secretariat with the development, in collaboration with MEDPOL (The Programme for the Assessment and Control of Pollution in the Mediterranean) and GFCM (General Fisheries Commission for the Mediterranean), of a project to assess the impact of ghost nets on cetaceans in the ACCOBAMS area. A new European project on this issue was also recently launched in the Adriatic Sea. The project is called DeFishGear (Derelict Fishing Gear Management System in the Adriatic Region) and is addressing the wider marine litter and ghost fishing issues to ultimately provide input on a regional level with suggested actions for the reduction of ghost fishing gear.

7. SHIP STRIKES

7.1 Progress on the global database

The ongoing development of the IWC ship strike database requires data gathering, communication with potential data providers and data management. The objective of the data coordinators is to progress the conservation and management work of the IWC with respect to the issue of vessel collisions with cetaceans. The second year of work carried out by the data coordinators resulted in a variety of outreach actions, with a large number of contacts being established, and the drafting of a series of documents, including guidance documents for sailing and cruise ships. The coordinators

discussed issues related to the Ship Strike Working Group (SSWG) with the IWC Vice-Chair including developing a roadmap for IWC effort to address the issue. This will include synergies with ACCOBAMS, ASCOBANS and other bodies to further collaborations. Effort has also been dedicated to improving the user interface as well as the technical functioning of the database. In May 2014 the data base held a total of 1,221 incidents, both historical and recent. 559 of these were previously classified as being 'definite strikes'. For an estimated 200 additional known incidents the data are expected to be incorporated when the new setup of the data base currently being initiated has been finalised. The Australian Marine Mammal Centre has also been developing a regional ship strike reporting tool which will be compatible with the IWC data base. A general IWC communication strategy is currently being developed by the Secretariat. The coordinators have been working with the new IWC communication officer on this. The new edition of the Belgian leaflet along with the self-standing banner has been displayed and distributed at several occasions including the ASCOBANS AC meeting in Warsaw (August, 2013), the ACCOBAMS Meeting of Parties in Tangier (Morocco) in November 2013, at the Biennial Conference of the Society for Marine Mammalogy, in Dunedin (New Zealand) in December 2013, and at the ECS conference in Liege (Belgium) in March 2014. Contact has been made with a number of national and international maritime organisations and companies including the development of presentation materials.

A number of technical issues have arisen with the database and the Secretariat has decided to re-write much of the underlying code so that it will be easier to adapt and maintain. This should help avoid difficulties for users trying to enter data through the web based system. A number of recent cases are currently being evaluated by the data review group under the guidance of the data coordinators.

The Working Group welcomed the report of the data coordinators and **recommended** that this important work continue, both for its value to the Commission's mitigation efforts, contribution to a better understanding of the factors that relate to risk (such as ship type and speed), as well as estimates of ship strike mortalities. It was noted that continuing this work would require financial support from the IWC and **recommended** the budget item (Appendix 3 for £10,000 a year) be funded.

7.2 Estimating rates of ship strikes, risk of ship strikes and mortality

Vessel strike risk for large cetaceans in the Bering Strait region has been assessed by Robards *et al.* (2014). Reducing risk requires either reducing the probability of a vessel-whale encounter (in time or space), reducing the probability of a lethal strike by slowing vessels down, or a combination of the two. Automatic Identification System (AIS) data was combined with data on habitat use and satellite telemetry data for bowhead and gray whales to provide inferences about when and where bowhead and gray whales are likely to be at risk. As the number of vessels increase, interactions between vessels and cetaceans are likely to increase. The authors also expressed concern about the potential for increased acoustic disturbance associated with the expected increase in shipping in the Bering Strait region.

In discussion it was noted that vessel speeds will likely increase as Arctic ice retreats and more ships use this route, increasing the risk to all species. It was also noted that bowheads appear less likely to avoid a ship while they are

feeding. Currently most feeding is believed to occur in the Northwest Bering Sea, which has less vessel traffic. Another high risk area of bowhead distribution may be the 'cow/calf grounds' near St. Lawrence Island. The recent IWC Workshop on the Arctic discussed the possibility of seeking Particularly Sensitive Sea Area status for some of these areas through the International Maritime Organization (IMO). It was noted that the IMO was now considering known high density whale areas in relationship to voyage planning within the development of a Polar Code. Voyage planning in relation to high density areas will be further discussed at the IWC/SPAW ship strike workshop in Panama, 18-20 June, 2014.

In another example of mapping the co-occurrence of whales and shipping to assess risk, Rosenbaum noted that satellite tagged humpback whale north and south cohorts in the eastern South Atlantic showed considerable potential overlap with shipping (Rosenbaum *et al.*, 2014). Additionally, a number of high Relative Potential Impact scores (overlap) occurred where migrating individuals crossed major shipping lanes on their southbound migration along the Walvis Ridge, and thus could have an increased risk of ship-strike.

Three satellite tagged Arabian Sea humpback whales showed spatial and temporal overlap with available information on shipping traffic, oil and gas activity and planned fast ferry routes along the coast of Oman (SC/65b/SH19). Preliminary findings showed all three whales tracked in this study passed through the main approach channels to major international shipping ports at either Salalah or Duqm. One of the ports has taken on responsibility to look at ship strike response and mitigation measures based on previous identification as a hotspot based on vessel based sightings surveys. Another area of concern is in the south of Oman where a fast ferry route is planned within the Halaniyats Bay which has been identified as a hotspot predominantly frequented by male humpback whales between December and April.

A simulation study was conducted to estimate the impact of ship strikes on the small Magellan Strait population of humpback whales which has not shown signs of increase (SC/65b/SH18). Results of the model demonstrated that a single collision every three years randomly distributed among sexes and age classes results in the median population growth shifting from stable to slightly decreasing. A greater impact would be observed if a collision killed a mature female every two years. The concentrated shipping traffic through the area and the relatively small size and slow growth of the population suggests potentially high vulnerability to ship strikes. While the rate of ship strikes in the Magellan Strait will likely not be known, the uncertainty in risk can be significantly reduced by a directed effort to understand the level of spatial and temporal overlap between the whales and ships. Whales are known to utilise hot spots within the Magellan Strait, but the temporal persistence of these hotspots, and the how many of these hotspots occur within the shipping lanes needs to be investigated. Whales are also known to feed subsurface and thus another important parameter would be to examine how much time is spent in the upper levels of the water column. An obvious step forward is to initiate tagging efforts to quantify movement and dive parameters in habitats overlapping with the ship lanes. Because the model has been constructed to account for this information, the addition of telemetry data will allow more accurate estimation of the risk to the population of humpback whales and perhaps clarify whether mitigation measures, such as speed regulations, should be pursued.

The Working Group commended the authors on their approach to assessing risk. Given the estimated size of the population, its very low estimated survival rate and the restricted nature of the Straits of Magellan, the Working Group **expressed concern** that mitigation measures may be needed sooner than the authors suggest. While the Working Group **agreed** that further studies of shipping and whale density are needed, given that the Straits of Magellan are extremely narrow in some areas, and ships are not allowed to detour from designated routes, there may be a need to consider speed limits, if feasible. Iniguez noted that there were two reports of ship collisions with cetaceans at the Argentine entrance to the Strait. One report was of a Cuvier's beaked whale and the other a Peale's dolphin.

One member noted that a somewhat similar situation exists in New Caledonia, where large ships pass through a very narrow passage frequented by humpback whales. It was also noted that the Australian Government has recently funded an assessment of the risk of ship collisions with whales in the Great Barrier Reef, and it is anticipated that this work would be brought to next year's meeting. The Working Group encouraged such assessments of collision risks.

The AIS is a tool that has been used to assist in defining the occurrence of shipping when looking at assessing risk of ship strikes with whales. Adams (NOAA, USA) provided a brief webinar for the Working Group on the basic function of the system as well as some new capabilities. Recent advances have allowed low orbiting satellites to receive and relay AIS data, and while there are data gaps in time, as orbiting satellites move in and out of range, it is possible that these low orbiting satellites can provide global coverage. Data volumes can be large. For example, along the Atlantic Coast of the USA, NOAA is receiving 20 million AIS data records per month. In addition, there is a cost involved with satellite data since this is currently collected by commercial enterprises. There are some limitations to AIS data since AIS transmitters are not always carried on small vessels, and so do not provide information about many vessels which may collide with whales.

NOAA is using AIS data to determine compliance with speed restrictions, which are in place seasonally in some areas of predictable, high density right whale distribution. However, it has also recently been used to attempt to re-trace a ship's path in order to determine if an abrupt change in speed could indicate when it collided with a whale. Indeed, in several recent cases of known ship strikes (e.g. vessels entering port with a carcass on the bow), the path and speed changes of the vessels have been determined. However, this 'forensic' use of AIS data is still experimental. The Working Group **recommended** that NOAA collaborate with the IWC to further test the 'forensic' capabilities of the system by attempting to retrace the routes and speeds, of relevant ship strikes in the IWC ship strike database, and bring the results to next year's meeting.

SC/65b/HIM01 investigated the probability of whale-vessel collisions in humpback whale Hawaiian breeding grounds by using surprise encounters and near misses with whales as proxies for collisions with vessels. The rate of surprise encounters was found to increase with vessel speed, from 1.5 encounters per hour at 5 knots to 2.1 encounters per hour at 20 knots. The majority of surprise encounters and near misses involved a lone adult and a calf, respectively. This study is still underway and the authors are reporting on data collected from first two years of a five year study. The authors intend to augment the study with land-based observers, in order to investigate the role of whale behaviour in surprise encounters and near misses.

The Working Group welcomed the study and looked forward to further results as it progresses. In discussion it was noted that there is not currently a standard definition of a 'near miss', which will depend on the size and manoeuvrability of the vessel involved. In Hawaii, where the study was conducted, vessels involved were less than 65ft in length and quite manoeuvrable. For these and smaller vessels, a distance of 80m was chosen to determine a near miss. The Working Group **encouraged** the authors and other members to develop definitions of a 'near miss' which could be considered at next year's meeting. Ritter volunteered to lead the effort.

Although the study had indicated a significant decrease in surprise encounters and near misses at speeds below 15 knots the author noted that the lower speeds recommended by other studies (e.g. 10-12 knots) were determined for larger and less manoeuvrable vessels and that different recommended speeds are therefore not inconsistent. The Working Group **agreed** that the size and type of vessel associated with any speed recommendations needs to be explicit; otherwise the speed recommendations might be used inappropriately.

The available literature for ship strike records around Japan was reviewed in SC/65b/HIM03 to identify possible cases that could be included in the IWC database. Twelve incidents between 1978 and 2012 were identified. All the documented cases of confirmed or possible ship strikes with whales around Japan involved jetfoil vessels. Very few shipping companies published records of cetacean sightings or appear to record collisions with cetaceans unless the collision caused injury to passengers or crew. Other types of vessel may well have been involved in collisions with cetaceans but are less likely to have suffered damage than high speed jetfoils. Even when a collision took place that was believed to be with a cetacean there was often no information on the species involved. In two thirds of the incidents reviewed pieces of meat or blubber were found suggesting potential for DNA analysis to identify species in future cases if samples are collected and appropriately preserved.

Noting that most of the responses to questions about whale and vessel collisions came from one company, the author noted that there was otherwise little incentive for vessels or companies to report. When asked if the IWC ship strike data coordinators might be able to assist, the author suggested that the companies might be even less likely to respond to foreign inquiries, and that they were more likely to respond to requests by the relevant authorities in Japan.

The Committee has previously noted that there are no population estimates for blue whales in the northern Indian Ocean but there have been a number of reported ship strikes of blue whales off Sri Lanka. This highlighted the urgent need for long-term monitoring of the blue whales in Sri Lankan waters and elsewhere in the northern Indian Ocean. In 2013, the Secretariat wrote to the government of Sri Lanka drawing their attention to the Committee's discussions of this topic and ways in which the IWC might assist. SC/65b/HIM06 describes surveys off the southern coast of Sri Lanka during February to April 2014 in order to investigate the distribution patterns of blue whales in relation to current shipping lanes and further offshore. A total of 1,413km of visual survey effort was conducted on 16 survey days along north south transects between 5°28'N and 5°53'N. The highest densities of blue whales were observed in the current shipping lanes, peaking at an average of 0.12 individuals km⁻² in the westbound shipping lane. These

high densities of whales combined with one of the busiest shipping routes in the world suggest a severe risk of ship strikes. Previous data on blue whale distribution and coastal upwellings indicate consistent and predictable patterns of whale distribution, suggesting there is considerable potential for effective measures to keep ships and whales apart.

The Working Group welcomed the paper and noting that ship strikes with blues whales in this same area had been reported to the Committee last year, discussed possible mitigation measures that might be recommended. Realising that historical whale watch data from the area would likely be biased toward sightings near shore, the study had extended the survey effort further offshore. The results appear to suggest that the blue whale distribution is related to bathymetry suggesting that observed distribution patterns may be consistent over time. Hence moving the current Traffic Separation Scheme further offshore would likely substantially reduce risk of collisions with blue whales. In response to a question about the possibility of higher sperm whale concentrations further offshore, Leaper indicated that their study had conducted acoustic monitoring for sperm whales. No sperm whales had been seen but the acoustic data had not yet been fully analysed. The Working Group **agreed** that further surveys of blue whale distribution in the area at different times of year would provide important data. One member suggested that satellite tagging of the blue whales, in combination with acquiring AIS data from the region, would be very helpful in assessing spatial and temporal risk.

Given that Sri Lanka is not a member of the IWC, but there has been a dialogue between IWC and the on the issue, the Working Group **recommended** that the IWC should begin to discuss possible mitigation measures with the relevant authorities and stakeholders in the area. The Working Group requested that the Secretariat send a letter to the Sri Lankan Government, with an update on the information from its discussion of this topic and ways in which the Committee or Ship Strikes Working Group may assist. In addition, it was **recommended** that a representative from Sri Lanka be invited to relevant IWC meetings and workshops.

A dead male blue whale stranded in Puerto Montt, southern Chile in February 2014, with its right flipper and left mandible broken and the bone exposed (SC/65b/HIM08). This evidence strongly suggests that this whale was hit by a large vessel. Two tourist cruise ships arrived to Puerto Montt when the whale was found. These vessels travel at approximately 20 knots and were in transit from Puerto Chacabuco to Puerto Montt. It is most likely that the blue whale was hit by a vessel crossing a known feeding ground for this species that occurs in the area. This is the second baleen whale reported killed by a large vessel in the Inland Passage of southern Chile. The first case was a sei whale that was found on the bow of a vessel and was a confirmed case of a fatal ship strike. This raises concerns about the probability of ship strikes and the conservation of whale populations in their feeding grounds. These ship strike data, along with the known areas used by baleen whales, can be used to start developing the outline for a conservation management plan for Chilean baleen whales.

The Working Group agreed that the evidence was most consistent with the authors' conclusions that one of the two recently arrived cruise ships had likely brought the carcass into the harbour on its bow. It was suggested that, given the information brought to this year's meeting about re-tracing specific ship tracks with AIS data to identify where a collision may have taken place, this could be a case study for using that technique. The draft guidance for cruise ships (SC/65b/

O4) which will also be considered by the Commission's Ship Strike Working Group may help in providing advice on mitigation measures. The Chilean Navy does provide information about whales and collision risk to vessels in the area but an IWC guidance document for cruise ships would be very useful support to these outreach efforts. The Working Group **endorsed** the suggestion that the reporting system needs to be expanded to collect additional details on vessel strikes in Chile, especially in the inland passage region, and that mitigation measures may be needed.

Ship strikes are a recognised problem for the Mediterranean sperm whale population which is classified as Endangered by IUCN. The Hellenic Trench southwest of Greece is a known area of high sperm whale density which coincides with major shipping routes. This area had been identified as potentially high risk during the IWC/ACCOBAMS Workshop in 2010 (IWC, 2011). Frantzis *et al.* (2013) found that whale distribution is closely related to bathymetry with highest densities close to the 1,000m contour. SC/65b/HIM07 describes an analysis of twelve seasons of visual and acoustic observations of sperm whales which were compared with shipping density derived from Automatic Identification System (AIS) data. This analysis identified high risk areas where whales were exposed to very high shipping densities, particularly west of the island of Zakynthos where shipping routes run along the 1,000m contour. The level of risk and the potential for small changes in shipping routes to dramatically reduce risk in these high risk areas suggest considerable scope to establish a dialogue with shipping regulators and the shipping industry to discuss routing options.

The Working Group welcomed the research presented in the paper. In particular, the analysis of co-occurrence of whales and shipping through surveys and AIS data has produced informative analyses of risk and ways it could be reduced by different routing options. Given the high overlap of sperm whale sightings with primary shipping tracks, and the high incidence of evidence of ship strikes from stranded sperm whales (61%), the Working Group **recommended** that a dialogue should be initiated with shipping regulators and interests in the area, perhaps in conjunction with ACCOBAMS. However, given the possibility of fin whales occurring further offshore of the current shipping routes, it was suggested that there should be further study of those deeper waters prior to recommending that shipping move offshore.

The efficacy of reduced vessel speed in high risk areas has been evaluated by Laist *et al.* (2014). Mandatory 10 knot speed restrictions for ships over 65ft have been imposed in several high use right whale Seasonal Management Areas (SMAs) along the Atlantic coast of the USA. Stranding records for the 18 years prior to the enactment of the speed limits indicated that 13 of 15 right whales and 12 of 26 humpback whales killed by ships were found inside later SMA boundaries or within 45n.miles of their boundaries. In the five years after the enactment of a speed limit, there were no right whale mortalities attributed to ship strikes either in, or within 45n.miles of the SMAs. These results indicate a statistically significant reduction in right whale ship strikes in these areas suggesting that the rule has been effective. The Working Group also **endorsed** the recommendations in the paper for extension to the SMAs to cover a greater portion of vessel tracks across core migratory areas.

For areas with difficult access for surveys by vessel or plane high resolution satellite imaging offers the potential to detect whales at or close to the surface. This could provide information on areas of suspected high shipping risk where

other survey data are lacking. Fretwell *et al.* (2014) used images from the WorldView2 satellite to successfully detect southern right whales off Península Valdes, Argentina. Current satellite technology can provide images with a resolution of 50cm per pixel in a water penetrating, far-blue part of the spectrum that allows it to see into the water column. This technology does rely on clear skies and calm seas. Leaper noted that images had been gathered for the high density area for blue whales south of Sri Lanka and results would be reported to next year's meeting.

7.3 Collaboration with the Commission's ship strikes Working Group including consideration of mitigation measures and plans for future workshops

Collisions between sailing vessels and cetaceans have been reported for a number of species, and this appears to be an increasing problem (Ritter, 2012). Many of these collisions have caused serious damage to the vessel or even vessel loss, as well as and serious or fatal injury to the whale. SC/65b/O4 was developed so as to provide information on the ship strike issue to sailors and regatta/offshore race organisers as well as to highlight mitigation options. The document sets out some general information on the issue and highlights that in the absence of sufficient information on effective technological solutions, current options for reducing risk are limited to avoiding action by the vessel and routing vessels away from areas with large numbers of whales. Routing advice always has to consider what data are available regarding whales, which species present the greatest collision risk, what their behavioural characteristics and movement patterns are. The guidance covers four main subject areas, collating baseline data, route planning, informing sailors and reporting.

Collisions between cruise ships and cetaceans have been reported for a number of species, with large whales being the most commonly reported hit. Many of these collisions have caused serious or fatal injury to the whale. Only a very small proportion of collisions are likely to result in the whale becoming stuck, but these are the ones that get noticed. The ship strike data coordinators established a number of contacts with the cruise ship industry and felt that producing a guidance document would be welcome, not the least because whales struck by cruise ships receive a considerable media attention, thus having a potential negative impact on the cruise company. SC/65b/O05 was developed to provide information on the issue for cruise line operators as well as to highlight mitigation options. The document sets out some general information on the issue and highlights that in the absence of sufficient information on effective technological solutions, current options for reducing risk are limited to avoiding action by the vessel, reducing cruising speeds, and routing vessels away from areas with large numbers of whales. The document follows a similar format to the guidance for off-shore recreational boating events with information on seven main subject areas: (1) collating baseline data before voyage planning, to identify potential cetacean hot spots; (2) route planning to avoid such areas and to comply with speed restrictions; (3) informing captains, crew and staff about species most likely to be encountered, providing briefing materials on what to do and look for in the event of a collision; (4) operational measures including reducing speed, avoidance manoeuvres, and advice on what to do if a collision has occurred; (5) operational guidelines during whale watching activities; (6) technological solutions; and (7) reporting, with an emphasis on making use of the IWC global database.

Both guidance documents contain information on relevant mitigation measures currently in place, as well

as educational resources and existing reporting tools. It is foreseen that these documents will be discussed at the upcoming Commission workshop on ship strikes in June and then be brought to the attention of the IMO.

The Working Group welcomed these two documents and commended the authors. In response to a question about the somewhat restricted geographic coverage of the listed mitigation measures that had been implemented the authors indicated that these included all the measures that they were aware of but they would be amended as new information is received. Several possible additions were discussed, including suggestions for timber carrying vessels that travel through Abrolhos Bank in Brazil. The Working Group **recommended** that similar guidance be developed for other classes of vessels where there may be specific issues to that type of vessel not covered by the general IMO guidelines on reducing ship strikes.

The Working Group noted that several members including the ship strike data coordinators have been actively involved in the preparation of, and will participate in, the June 2014 ship strike Workshop which the Commission will be jointly sponsoring with UNEP-CEP-SPAW in Panama.

8. OTHER ISSUES, INCLUDING ASSESSING MORTALITY FROM ACOUSTIC SOURCES AND DEBRIS

Impacts of underwater sound and debris were discussed by the Environmental Standing Working Group. Linkages were noted between the entanglement interests of the Working Group and the work of the Environmental Standing Working Group on marine debris, described in the marine debris Workshop report (IWC, 2014a).

9. WORK PLAN AND BUDGET REQUESTS

The focus of the group will remain on estimating and addressing mortality of large whales due to entanglement and ship strikes. The work plan includes a planned review of mitigation measures for both ship strikes and entanglements (see 2b(i) and 3b(i)). This should lead to a simple summary table that would provide a useful communication tool. Such a table might be of particular value to the Secretariat in reaching out to other organisations. In progressing the review of mitigation measures and ensuring that relevant information is available at next year's meeting, the Working Group identified the following action points.

- (1) Collate research papers and reports on entanglement and ship strike mitigation for large whales – create bibliographic database (September 2014).
- (2) Identify ongoing entanglement and ship strike mitigation projects and obtain reports or new information where possible (November 2014).
- (3) Identify potential Invited Participants for the review of large whale entanglement and ship strike mitigation methods (November 2014).
- (4) Review the simple mitigation advice/summary tables prepared by other organisations (ACCOBAMS, ACAP, Take Reduction Team) and draft a table for HIM (November 2014).
- (5) Explore the drafting of a review on the actions and outcomes from the US Atlantic Large Whale Take Reduction Plan (November 2014).

The Secretariat reported that it had accepted an invitation to make a presentation to the upcoming meeting of the Regional Secretariats Network of the 40 Regional Fisheries Management Organisations (RSN-5) in Rome

in June 2014. They requested the IWC's expertise with regard to the impacts of Abandoned, Discarded or Lost Fishing Gear. Brockington will present on the IWC's work with entanglement and marine debris. This meeting of the RMFOs is in preparation for COFI's annual meeting, which follows immediately afterward. The Secretariat anticipates this may allow the start of a more active engagement with these IGOs with regard to overlapping mandates. This may include providing expertise and participation relevant meetings and initiatives, and could include developing joint initiatives, such as technical workshops and the development of outreach materials and 'best practices'.

This engagement with the Regional Secretariat's network will expand upon the ongoing work on entanglement and ship strike science, capacity building and mitigation that the Secretariat is currently undertaking with UNEP (SPREP and CEP-SPAW), the CPPS, IMO and ACCOBAMS. Members also commended the Secretariat's collaboration with non-Governmental Organisations such as WSPA, with regard to topics of interest to this working group.

The Working Group considered a proposal for a Workshop on preventing the entanglement of large whales in fishing gear to be held in 2016 (see Appendix 3). The primary focus for the Workshop will be to reduce the incidents of entanglement of whales in fishing gear. This will be achieved through consideration of technical measures which adapt fishing gear, and practical measures to change the way fishing gear is deployed. The Working Group welcomed this proposal noting that advice for preventing entanglements would be relevant to many countries and that this would best be achieved by collaboration with fishers, managers, gear manufacturers and scientists. Noting that the recommendation for this workshop had already been endorsed by the Commission the Working Group agreed to include this in the budget.

The Working Group therefore made two budget requests. One for £10,000 a year to continue the work of the database coordinators (see Item 7.1 with work plan in Appendix 2) and one for a single amount of £10,000 in 2016 for the proposed Workshop on Preventing the Entanglement of Whales in Fishing Gear outlined in Appendix 3. It was agreed that priority should be given to the work of the database coordinators.

The work plan will include the following.

- (1) Reviewing progress in including information in National Progress Reports.
- (2) Entanglement:
 - (a) estimation of rates of entanglement, risks of entanglement and mortality; and
 - (b) collaboration with Commission initiatives on entanglement, including:
 - (i) consideration of mitigation measures including review of mitigation measures that have been implemented, tested and reviewed for their effectiveness;
 - (ii) assist with communication of key scientific issues related to entanglement;
 - (iii) review entanglement issues related to Conservation Management Plans; and
 - (iv) review relevant output of the proposed December meeting of the entanglement expert group including suggestions for an entanglement database.
 - (c) Involvement with other international organisations which have complementary or overlapping mandates with respect to entanglement.
- (3) Ship strikes:
 - (a) estimation of risks and mortality from ship strikes; and

- (b) collaboration with the Commission's Ship Strikes Working Group including:
 - (i) consideration of mitigation measures including review of mitigation measures that have been implemented, tested and reviewed for their effectiveness;
 - (ii) assist with communication of key scientific issues related to ship strikes; and
 - (iii) review ship strike issues related to Conservation Management Plans.
- (c) Continuing development and use of the international database of ship strikes:
 - (i) review progress by database coordinators on work programme in Appendix 3; and
 - (ii) review progress with reviewing new reports and application of new criteria.
- (d) Review scientific information from forthcoming workshop organised by the Commission.

10. ADOPTION OF THE REPORT

The report was adopted at 09:50 on 20/05/2014. Leaper thanked Mattila for his work as rapporteur.

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Appendix 1**AGENDA**

1. Convenor's opening remarks and Terms of Reference
2. Election of Chair
3. Adoption of Agenda
4. Appointment of rapporteurs
5. Available documents
6. Entanglement
 - 6.1 Progress on including information in National Progress Reports
 - 6.2 Collaboration with Commission initiatives on entanglement, including consideration of mitigation measures
 - 6.2.1 Report of the IWC Workshop on Euthanasia Protocols to Optimise Welfare Concerns for Stranded Cetaceans
- 6.3 Estimation of rates of entanglement, risks of entanglement and mortality
7. Ship strikes
 - 7.1 Progress on the global database
 - 7.2 Estimating rates of ship strikes, risk of ship strikes and mortality
 - 7.3 Collaboration with the Commission's ship strikes working group including consideration of mitigation measures and plans for future workshops
8. Other issues, including assessing mortality from acoustic sources and debris
9. Work plan and budget requests
10. Adoption of the Report

Appendix 2**ENTANGLEMENT RESPONSE DATA FORM****ENTANGLEMENT RESPONSE DATA FORM**Date: DD/MM/YY Event#: Species: Individual ID: Arrival at scene: Departure from scene:

Team details	Role					
	Initials					

Event timeline	Event	Time	Latitude	Longitude
	Whale located			
	Whale engaged			
	Whale released/lost			

Gear and wound details	Mouth	Head	Body	Left Flipper	Right Flipper	Peduncle	Tail
Gear wrapping (Yes, No, Unk)							
Rope colour/size							
Gear constricting (Yes, No, Unk)							
Tissue penetration (Epidermis only, Blubber, Muscle, Bone, Other, Unknown. For flippers and tail, also indicate percentage penetration)				____%	____%		____%
Wound profile (Flat, Depressed, Raised, Unknown)							
Wound colour (1=white/yellow, 2=pink/red, 3=green/blue/black, 4=unk)							

INSERT WHALE BODY DIAGRAM

Draw entanglement configuration, wound sites and disentanglement cuts

Gear trailing: ft or m Trailing profile: floating/sinking Visible components: Gear type/parts (if known): Anchored? yes/no/unkGear type in area: Whale movement: stationary/circling/travel Whale posture: normal/hunched/head raised/tail raised/otherEstimated whale length: ft or m Class: calf/juvenile/mature Role (if applicable): none/mother/other Body condition: normal/thin/emaciated Odor detected? breath/wound/gear Description:

Skin condition (for species): normal/pale/sloughing/pitted Cyamid proliferation: normal/at wounds/at blowholes/widespread

Other condition details (note species-specific indicators):

Whale activity time line	None	Low	Average	High	Evasive	Aggressive
Pre-approach						
At first approach						
During disentanglement						
At release						
Post release						

Bio samples obtained: none/biopsy/sloughed skin/skin from gear/scat/other

Other data collected: photos/video/ventilation rates/detailed ethology/veterinary procedures

Appendix 3

TASKS FOR SHIP STRIKE DATA COORDINATORS

The ongoing development of the IWC ship strike database requires data gathering, communication with potential data providers and data management.

Data gathering

- (1) Liaise with regional databases in order to facilitate their submission to the global database – this will involve addressing issues of data confidentiality and classification, as well as facilitating easy submission to the database
- (2) Identify national contact points, organisations and groups that hold data on ship strikes that have not been contributed to the global database and encourage them to submit their data to the global database – this will involve use of mail lists (e.g. Marmam, ECS-talk) and will involve addressing issues of data confidentiality and classification, as well as facilitating easy submission to the database. Telephone interviews with identified contributors should be investigated to facilitate submission of data.
- (3) Disseminate new criteria for ship strikes developed at SC/65a.
- (4) Regularly contact national co-ordinators or stranding networks (from IWC list) providing them with any new updates relevant to ship strikes and helping to facilitate data entry of any new records to IWC database.
- (5) Regularly review scientific journals for ship strike information and contact authors to collate data for entry into the database.
- (6) Use search engines and other internet news monitoring tools for reports of ship strikes and follow up on reports of new incidents in order to gather information as soon as possible after the incident took place and facilitate its incorporation into the database – this will include informing national coordinators promptly of reported incidents within their area.
- (7) Prioritise populations identified in CMPs for data gathering outreach efforts.

Outreach and communication

- (1) Work with the Secretariat to ensure that the IWC ship strike website pages are kept up to date including:
 - updating publicly available summaries from the database;
 - providing links to other sources of information material e.g. that produced by international organisations such as ACCOBAMS, ASCOBANS, CMS, IMO as well as national groups; and
 - consider whether there is value in highlighting recent cases/reports on the web page in a positive manner to encourage further reporting.
- (2) Monitor and respond to emails addressed to the *shipstrikes@iwc.int* email address, including reports of new incidents, giving feedback to data providers and dealing with requests for summary information from the database.

- (3) Work with the Secretariat to develop a communications strategy. This may include:
 - developing approaches to ensure that the current leaflet on ship strikes prepared by Belgium with assistance from *inter alia* IFAW is as widely distributed as possible within shipping industry (direct to vessels), shipping management companies, and maritime academies;
 - exploring ways of raising the profile of the database by contacting other organisations including ECS, ACS, SMM, ACCOBAMS, ASCOBANS), NGOs, recreational boating associations, maritime organisations; and
 - considering the need to update the leaflet.
- (4) Liaise with national Port Authorities and Coast Guards for gathering information on ship strikes, to distribute awareness material and eventually access AIS data.
- (5) Assist Secretariat with maintaining links with IMO, ASCOBANS, ACCOBAMS etc.
- (6) Provide an annual update to Scientific Committee.
- (7) Consider developing PowerPoint presentations/posters for use at workshops, symposia, conferences, etc.
- (8) Consider presenting information at specific conferences (e.g. ECS, SMM etc.).
- (9) Explore funding options for future IWC ship strike work.

Database management

- (1) Work with the Secretariat to improve the user friendliness of the database (requires technical assistance) including in response to user problems and suggestions.
- (2) Data entry of new records including data presented in meeting papers and National Progress Reports at annual meetings of Scientific Committee, including sailing vessel cases from Ritter (2012) – priorities for entry to be established with the steering group
- (3) Further development of database handbook, ensuring that the database documentation remains up to date, is widely distributed and that any changes are notified to all actual/potential collaborators.
- (4) Work with data review group to ensure that all new records are appropriately reviewed including identification of potential duplicate reports.

Timetable

Work throughout the intersessional period.

Researchers' names

Ritter and Panigada.

Estimated total cost with breakdown as needed (e.g. salary, equipment)

£10,000 for coordinator salary per year (£20,000 over two years).

Appendix 4

WORKSHOP PROPOSAL: PREVENTING THE ENTANGLEMENT OF WHALES IN FISHING GEAR

David Mattila and Simon Brockington

Background

In 2007 the Government of Norway drew the IWC's attention to the global problem of entanglement of large whales in fishing gear or marine debris. Norway suggested this was an increasing problem with serious animal welfare implications.

In response the Commission convened a Workshop on the Welfare Issues Associated with the Entanglement of Large Whales. This was held in Maui in 2010 and delivered several important products including an analysis of the global extent of the issue, the types of fishing gear causing entanglement and a decision tree for responding to entanglements.

Importantly, one of the Workshop conclusions was that while disentangling whales may mitigate to some extent it does not prevent whales becoming entangled in the first place. Therefore the Workshop recommended that IWC initiate a process to prevent entanglement of cetaceans in debris and fishing gear (IWC, 2012).

To begin this process the Workshop recommended that the IWC sponsor a Workshop on current efforts to prevent entanglement. The Workshop further recognised that a deeper analysis of the gear involved in entanglement events could ultimately lead to prevention.

In 2011 a second IWC Workshop was held in Provincetown which focussed on addressing the welfare concerns of entangled whales. This Workshop developed more detailed practices for entanglement response and agreed a capacity building curricula and strategy to increase the coverage of teams around the world. However this Workshop also reiterated the statement made at the 2010 Workshop that prevention, not disentanglement is the ultimate solution to the entanglement issue (IWC, 2013).

The 2011 Workshop compiled an outline list of current methods for entanglement prevention and noted the work of the US large whale take reduction team.

Relationship to the Scientific Committee's work programme

The work plan proposed by the HIM group for the next year includes a review of mitigation measures for reducing entanglement risk. This review aims to describe techniques that have been tried and evaluated including those that have not been successful. Papers will be encouraged for SC/66a in 2015. This review should facilitate the entanglement prevention workshop which will assist stakeholders and managers by providing an update on the scientific aspects. The proposed workshop would continue the Committee's collaboration with Commission initiatives on entanglement.

At the level of the overall Scientific Committee this work will contribute to one of its overall duties which is to 'study, appraise, and disseminate information concerning methods of maintaining and increasing the population of whale stocks'. In fact, evidence is starting to suggest that entanglement in fishing gear could be one of the main factors affecting the recovery (and therefore the increase) of whale populations (Hofman, 1995; Moore, 2014; Read *et al.*, 2006).

Workshop objective

The primary focus for the Workshop will be to reduce the incidents of entanglement of whales in fishing gear. This will be achieved through consideration of technical measures which adapt fishing gear, and practical measures to change the way fishing gear is deployed.

Partnership working

Real reduction in entanglement events can only be achieved through partnership working, and this will start by ensuring active links with other scientific committee work programmes. Although the Workshop will focus mainly on large whale entanglements the objectives are relevant to work being undertaken within the Small Cetaceans Sub-committee on bycatch reduction. The Environmental Concerns Working Group is progressing work on the overall effects of marine debris on cetaceans and the planning for the entanglement prevention workshop will build upon the outcomes of the forthcoming debris Workshop in August 2014.

At the Commission level partnership working will be necessary with a range of other IGOs involved in cetaceans and migratory species. The Workshop will strengthen links with the Convention for Migratory Species, and especially its daughter agreements. In this respect ACCOBAMS' work with the Mediterranean General Fisheries Council to understand the risk posed by ghost fishing gear will be an important aspect. The Workshop will also establish links with other fishery management organisations including COFI and regional fishery organisations.

Partnership with industry, both in the fishing sector and the gear manufacturing sector will form a crucial component of the Workshop planning. In this respect it will build on discussions with industry representatives from the two recent marine debris Workshops.

Timeline for development of a prevention Workshop:

Jan.-May 2015: Development of Terms of Reference building from 2011 Workshop.

May 2015: Approval of Terms of Reference by SC/66a.

Jan. 2016: Funding released.

Apr. 2016: Workshop held.

May 2016: Report received by SC/66b.

Sep. 2016: Report presented to Commission at IWC/66.

Funding requested

Around 20 participants are likely required for a successful Workshop, this being the number that participated in both the 2010 and 2011 Workshops. Costs estimated at around £1,000 per person to cover flights, accommodation and subsistence. Venue costs are expected to be donated (for free) or covered by an alternative source.

Therefore total cost of Workshop=£20,000.

Total requested from Research Budget for 2016 period only=£10,000. Based on previous experience there is reasonable expectation that the other £10,000, including the room hire costs, can be found from other sources.

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