Report of the Scientific Committee

Bled, Slovenia, 24 April-6 May 2018

Annex M
Report of the Sub-Committee on Small Cetaceans

**This report is presented as it was at SC/67b.
There may be further editorial changes (e.g. updated references, tables, figures)
made before publication.**

International Whaling Commission
Bled, Slovenia, 2018

Annex M

Report of the Sub-Committee on Small Cetaceans

Members: Scheidat, Porter (Convenors), Alfaro-Shigueto, Almeida, Amorocho, Andriolo, Archer, Avila, Baker, Barreto, Bell, Bjørge, Brownell, Caballero, Cañadas, Castro, Charlton, Cipriano, Collins, Cooke, Coscarella, Cosentino, Crespo, Currey, Dalla Rosa, Di Tullio, Diallo, Domit, Elwen, Forestell, Fortuna, Freitas, Frey, Fruet, Gallego, Galletti Vernazzani, Genov, Gushcherov, Hielscher, Hoelzel, Holm, Hubbell, Iñíguez, Jacob, Jaramillo-Legorreta, Jimenez, Kim, Hyun Woo, Lang, Langerock, Lauriano, Leslie, Luna, Lundquist, Mangel, Marcondes, Marmontel, Martin, Minton, Mosquera Guerra, Natoli, Nda, Northridge, Parsons, Phillips, Pierce, Reeves, R., Reeves, S., Reyes Reyes, Ridoux, Ritter, Rodriguez-Fonseca, Rojas Bracho, Rose, Sampaio, Santos, Secchi, Sequeira, Siciliano, Simmonds, Slooten, Stachowitsch, Stimmelmayr, Strasser, Suydam, Tarzia, Thomas, Trejos Lasso, Trujillo, Urban, Van Waerebeek, Vermeulen, Wade, Wambiji, Wang, Williams, Zagrebelnyi, Zerbini, Zharikov.

1. INTRODUCTORY ITEMS

1.1 Convenor's opening remarks

Scheidat and Porter welcomed the participants to the meeting and provided an introduction to the work methods of the IWC Scientific Committee and the focus of the Small Cetacean (SM) sub-committee for this meeting.

1.2 Election of Chair and appointment of rapporteurs

Scheidat and Porter were elected as chairs and R. Reeves, Cipriano, Genov, Jiminez and Thomas appointed as rapporteurs.

1.3 Adoption of Agenda

The adopted agenda is given as Appendix 1.

1.4 Review of documents

The following available documents contained information relevant to the work of the sub-committee: SC/67b/SM01rev1, SC/67b/SM02-10, SC/67b/SM18rev1. SC/67b/SM19, NAMMCO (2018), Martin and Da Silva (2018), Moore *et al.* (2018), Avila *et al.* (2018), Da Silva *et al.* (2018).

2. A REVIEW OF SMALL CETACEANS IN RIVERS AND ESTUARIES IN SOUTH AMERICA

2.1 Overview of taxonomy, distribution and abundance for *Inia* and *Sotalia*

2.1.1 Taxonomy

Family Iniidae:

- *Inia geoffrensis* (Blainville, 1817). Amazon river dolphin.
    - *I. g. boliviensis* (d'Orbigny, 1834). Bolivian bufeo.
    - *I. g. geoffrensis* (Blainville, 1817). Common boto.

Family Delphinidae:

- *Sotalia fluviatilis* (Gervais and Deville in Gervais, 1853). Tucuxi.
- *Sotalia guianensis* (Van Bénedén, 1864). Guiana dolphin. Costero.

Two genera of dolphins occur within the Amazon, Orinoco, Tocantins and Araguaia River basins. Only one species of the boto, *Inia geoffrensis* and two sub-species *I. g. geoffrensis* found within the Amazon basin and *I. g. boliviensis* in the Bolivian Amazon are recognised by the Taxonomy Committee of the Society for Marine Mammalogy. A third putative subspecies (*I. g. humboldtiana)* in the Orinoco basin of Venezuela and Colombia is not recognised.

Species-level divergence of at least some of these forms has also been suggested in several publications (Banguera-Hinestroza *et al.*, 2002, Ruiz-García *et al.*, 2008, Gravena *et al.*, 2015). Gravena *et al.* (2015) reported that *Inia* in the Madeira River possess the unique mtDNA of the putative species *I. boliviensis* (one line of evidence for recognising species-level difference), and argued that even if there is hybridisation in the contact zone just downstream of the Teotônio waterfall, the *Inia* below Teotônio remain distinct and follow an independent evolutionary path. Elevation of *I. g. boliviensis* to species and recognition of *I. g. humboldtiana* await further work and formal taxonomic revision.

Similarly, another new species, *I. araguaiensis*, has been proposed to apply to the dolphins that inhabit the Tocantins and Araguaia basins of central Brazil (Hrbek *et al.*, 2014; Siciliano *et al.*, 2016). The Tocantins basin is considered geologically and hydrologically separate from the Amazon basin, although it discharges into the southern part of the greater Amazon delta. The description of this putative new taxon was based on samples from the extremes of the distribution of *Inia*, and cranial characters from only 2 specimens of '*I. araguaensis*' were included in the morphological analysis. It has therefore been difficult to reach firm conclusions because of the limited number of specimens – e.g.

Araguaian *Inia* are rare in scientific collections with only 14 specimens available for examination in Brazil and abroad – and lack of a comprehensive analysis including morphometrics of sufficient numbers of specimens and use of the same genetic characters across the range and consistently for all putative taxa. A summary of the complicated taxonomic history is given by Siciliano *et al.* (2016).

In the case of *Sotalia*, two species are recognised at present: *Sotalia guianensis* (marine) and *Sotalia fluviatilis,* a freshwater form in the Amazon basin. *S. guianensis* in the Orinoco basin probably represents an independent population unit, isolated from other coastal populations (Caballero *et al.*, 2017).

Attention: CG-R, G

Given the incomplete resolution of Inia *taxonomy, the importance of clarifying and solidifying recognition (or elevation to species) of the* Inia *subspecies found in different river basins, the possibility that in such complex habitats localised specialisation is likely, and the need to focus attention on the conservation of demographically independent populations, the sub-committee:*

Encourages *support for efforts to resolve* Inia *spp. taxonomy in light of the significant and diverse threats affecting the populations inhabiting the Amazon-Orinoco-Tocantins/Araguaia drainages.*

2.1.2 Distribution

SC/67b/SM16 presented a spatial analysis of river dolphins in the Amazon, Orinoco and Tocantins basins, using niche and spatial modeling tools. Representativeness of both protected areas and habitat that have been transformed by hydroelectric dams within the range of the two river dolphin genera (*Inia* and *Sotalia*) was evaluated. The model used the MaxEnt algorithm to integrate 35,594 georeferenced records (satellite tag positions) and 19 environmental variables derived from the Bioclim and Hydroshed databases. This analysis indicated that the distribution of river dolphins is reasonably well represented within the protected area network, although the limited management of the aquatic ecosystems inside the 'protected' areas means that the desired conservation outcomes are not guaranteed. A major threat to river dolphins in South America is the population fragmentation and loss and degradation of habitat as a result of dam construction. SC/67b/SM16 also examined the degree of overlap between the distribution of *Inia* and *Sotalia* and hydroelectric projects in construction, operation and planning phases and provided an initial quantification of this tensor (threat factor). Cumulative impacts (fragmentation, regulation of the flood pulse, upstream retention of nutrients, altered productivity) from this type of infrastructure at the macrobasin scale will exacerbate the threats to river dolphins and their habitat in the Amazon and Orinoco basins.

The sub-committee expressed appreciation for receiving the summary of this study. In discussion, Trujillo clarified what the authors intended by use of the term 'transformed' in contrast to 'protected', i.e. that hydroelectric dams have a major impact on habitat quality both upstream of the dam (more than 50% of nutrients and sediments retained) and downstream (nutrients and sediments depleted), while protected areas with no dams allow natural transport of nutrients and sediments and fish stocks are maintained. Trujillo estimated that more than 50% of the range of Araguaian *Inia* is affected by damming.

2.1.3 Abundance

Some information on abundance of *Inia* and *Sotalia* has been produced by a number of research groups in the region over the last decade. One example is a regional initiative that has surveyed 28 rivers in Brazil, Colombia, Peru, Ecuador, Bolivia and Venezuela (28,600 linear km), producing density and abundance values (Gomez-Salazar *et al.*, 2012, Pavanato *et al.*, 2016, Williams *et al.*, 2016). While there are a few abundance estimates for several rivers, there is very limited information on population trends. In the Upper Amazon River, at the border between Colombia and Peru, Williams *et al.* (2016) estimated a 3.4% reduction of the *Inia* population between 1993 and 2007 in an area of 245 square km. Such results, however limited, provide useful information given the difficulty of implementing systematic surveys in such a complex and logistically challenging environment.

SC/67b/SM09 described an experiment to test the effectiveness of using unmanned aerial vehicles (UAVs) for detecting both *Inia* and *Sotalia* compared to more traditional survey methods. Simultaneous observation from large boats and UAVs showed that in some cases drones were able to detect dolphins missed by observers, but in other cases the observers saw dolphins that the UAV missed. UAV observations more accurately quantified the total number of dolphins in a group, but short battery life, the time required to view and score video records, and legal restrictions on the use of UAVs were disadvantages. In response to questions, Marmontel noted that no negative reactions by the dolphins had been observed, even when UAVs were hovering only 10m above them; wind effects could be significant and limited the utility of the technique; detection in different water types had not been assessed thus far; use of thermal imaging sensors may also be tested as a way to improve detection. Zerbini suggested that use of the UAVs might also allow a more direct estimation of the actual survey area rather than the approximation parameters typically used in line-transect surveys, and that might provide more accurate abundance estimates.

2.2 *Inia*

Trujillo presented a summary of information on the taxonomy of *Inia geoffrensis* (known as boto in Brazil and bufeo in the other range countries) and key aspects of distribution in the Amazon, Orinoco and Tocantins/Araguaia basins. *Inia* occur throughout the Amazon and Orinoco river basins in Brazil, Colombia, Ecuador, Peru, and Venezuela, from the river deltas upstream to where impassable rapids, waterfalls, lack of water, and possibly low temperatures block their movement (Best and da Silva 1989a, b). *Inia* in the Tocantins basin may represent a different species (Hrbek *et al.*, 2014). A range expansion of Araguaian *Inia* into the waters of the Marajó Bay estuarine system may indicate a distribution shift (Siciliano *et al.*, 2016), or may be an extralimital extension by a group of vagrants. Abundance surveys have been conducted in multiple rivers of these basins, but only two studies have had sufficient temporal and geographic coverage to allow inference of population trends: one in the Mamirauá Sustainable Reserve (Brazil) for 22 years and another in the Amazon River (Colombia/Peru) for 19 years. The main threats to *Inia* include interactions with fishing (bycatch), directed capture for piracatinga fishing, deforestation, mercury contamination and loss of connectivity of rivers due to the construction of dams.

SC/67b/SM14 presented information on satellite telemetry tracking of 15 river dolphins (*Inia geoffrensis*) in the rivers Tapajós (Brazil), Amazon and Orinoco (Colombia) and San Martín (Bolivia) using Spot 299A transmitters linked to the Argos satellite system (Wildlife Computers, Redmond, WA, USA). This study was the first to identify patterns of movement and habitat use of *I. g. geoffrensis, I. g. humboldtiana* and *I. g. boliviensis* using this type of technology in the Amazon and Orinoco. The largest displacements were observed for *I. g. boliviensis*, where a male individual moved 333.7 km between the rivers San Martín and Iténez in Bolivia. These results show variable patterns of movement that may be related to water type, system productivity, and prey biomass. Finally, the importance of the confluences, small tributaries and wetland complexes within the protected areas such as the national and departmental natural parks and Ramsar sites was highlighted.

In discussion, Trujillo noted that it was not yet possible to estimate the maximum longevity of the tags used because some are still transmitting. The longest time interval for tracks obtained so far is around two months. The study was designed to include tagging of around 50 individuals but few animals close to dams have been tagged so far; the MaxEnt model was chosen for analysis as it is considered useful for movement trend analysis; and the research team is considering a similar exercise in the Tocantins basin and the Tapajos River. The sub-committee commended Trujillo and his team for initiating this study as it begins to address some of the most important scientific questions concerning *Inia* ecology, habitat use and behaviour (particularly movements).

Martin summarised the results of a study of *Inia* reproduction in the area centred on the Mamirauá Reserve, Brazil, based on 1360 captures and over 66,000 subsequent sightings of 670 individually marked (freeze- branded) dolphins (Martin and Da Silva 2018). This study found that the reproductive characteristics of *Inia* are remarkably similar to those of delphinid dolphins of similar size, despite millions of years of evolutionary separation which have resulted in profound morphological and behavioural adaptation to a freshwater environment. Two results are of particular relevance to the deliberations of this sub-committee. The first is that fewer than half of all established pregnancies result in a calf's reaching one year of age. The second, perhaps linked, is that calving is seasonal and centred on the period of low water in the Brazilian Amazon. As a consequence, most calves are born when their mothers are on the margins of large rivers, and at a time of year when the density of monofilament gillnets is at its highest. Very young botos have neither the experience to avoid gillnets, nor the strength to escape from them after being entangled, so drowning in gillnets is plausibly a major contributor to the low recruitment rate discovered in this study.

Da Silva *et al.* (2018) provided the first long-term population trend of a boto population, using 363 standardised surveys over 22 years. The analysis demonstrated a substantial decline over the entire period, but closer examination revealed that numbers were not significantly diminished until the year 2000, after which they fell at an average annual rate of 6.7%, equivalent to a halving every 10 years. Coincidentally or not, 2000 was the year in which the study team first saw evidence of the harpooning of botos for use as fish bait.

Using data from Martin and da Silva (2018), Moore *et al.* (2018) calculated a generation time for *Inia* of 24.8 years - a measure that is central to IUCN Red List assessments. The rate of population decline shown by da Silva *et al.* (2018) equates to a loss of 82% per generation and in excess of 99% over three generations. Such values are well above the threshold for a Red List assessment of a species, subspecies or subpopulation as Critically Endangered.

In discussion of these studies Martin noted that previous estimates of calf survival had been based on analysis of a small number of carcasses. He recalled that estimates of calf survival in Sarasota bottlenose dolphins were much different – 70-80% of calves survive through their first year. Although it is difficult to determine with certainty the cause(s) of the high rate of mortality of <1 year calves in Mamirauá, most of the carcasses examined by Martin and da Silva have shown evidence of harpooning or net entanglement; moreover, the peak of calving is during the period with lowest water levels so calves are born on the margins of the main river channels when gillnet density is the highest – up to one gillnet every 200 m according to Martin. PCBs and other contaminants were not thought to be contributing to prenatal mortality, as ultrasound examinations showed that most pregnancies persist to term.

In further response to questions, Martin stated that survival rates of >1 year old juveniles and adults appeared much higher, and some juveniles and adults seemed able to extricate themselves from nets when entangled. Individuals with net marks

but otherwise healthy have been encountered in the tagging studies of Martin and da Silva. A very small number of cases of infanticide by adult males has been observed, but this was considered an unlikely explanation of the low overall survival rate. Martin stressed that the 20-year study described in da Silva *et al.* (2018) was intended to address relative rates of decline, not overall abundance; such trends are difficult to detect and must be very dramatic to be detected over shorter observation periods. It was emphasised that the results did not suggest that there had been no decline before 2000, or that the decline prior to 2000 was in any sense 'sustainable'. Dolphins in the Mamirauá Reserve are part of an open system and satellite tracking has shown some very large-scale movements. The Mamirauá dolphins thus represent the dolphin population using a much larger area. Martin also noted that although this study was conducted in the Mamirauá Reserve, where it is illegal to block off channels with gillnets at night, such blocking is routinely observed.

Even though the Martin and da Silva findings were based on direct observations in a very small geographic area of the Amazon and therefore a very small proportion of the total range of *I. geoffrensis*, and, as such, extrapolation to the whole region would be unwarranted, the sub-committee found these results and their implications for population decline alarming.

Attention: CG-A, G

Given the population declines documented in two study areas and the lack of abundance surveys in most parts of the range of genus Inia*, the sub-committee:*

***Encourages** the collection of data, calculation of abundance estimates and analyses to estimate population trends for* Inia *throughout its range, for use in assessments of the status of the species, subspecies, and regionally isolated populations.*

2.3 *Sotalia*

Distribution of *Sotalia fluviatilis* (known in Brazil as tucuxi, in Colombia as delphín gris, in Peru and Ecuador as bufeo negro) is restricted to the Amazon basin in Ecuador, Peru, Colombia and Brazil. This species has a more limited distribution than *Inia*. One of the main limitations to distribution is isolation by rapids and geographical barriers.

The Guiana dolphin (*Sotalia guianensis)* occurs mainly in nearshore and estuarine waters along the Atlantic seaboard of South America from southern Brazil northwards into the Caribbean Sea and along the coast of Central America to northeastern Nicaragua and possibly Honduras. There is a small population in Lake Maracaibo and the lower reaches of the Orinoco River.

Martin summarised the portions of da Silva *et al.* (2018) relating to *Sotalia fluviatilis* distribution and abundance, drawn from a 22-year time series of standardised dolphin surveys in the Mamirauá Reserve, Brazil. This paper showed a precipitous decline in abundance throughout the study period, averaging 7.4% per year. Using the generation time estimate of 15.6 years from Taylor *et al.* (2007), the Mamirauá population trend equates to a 97% reduction over 3 generations, which is substantially in excess of the threshold for Critically Endangered under IUCN Red List criteria.

In discussion, Martin suggested that gillnet entanglement was the most likely primary cause of the loss of *Sotalia* in this region, based on carcass examination by the research team and by Iriarte and Marmontel (2013) in the same region. *Sotalia* have not been subject to directed hunting for fish bait, as have *Inia* since around the year 2000, so it was not surprising that the discontinuity in the rate of *Inia* population decline reported by da Silva *et al.* (2018) was not apparent in the *Sotalia* data. The slightly greater rate of decline of *Sotalia* may be due to the fact that they are smaller and weaker than *Inia*, and far more prone to catatonic stress, so more likely to drown when enmeshed.

2.4 Threats shared by dolphins in the Amazon and Orinoco River systems and Lake Maracaibo

Trujillo gave an overview of threats to dolphins in the Amazon and Orinoco systems. Both basins are experiencing significant habitat degradation. The human population of the Amazon basin is expanding rapidly, with currently more than 34 million people, of whom only 3.5 million are indigenous. Immigration has been motivated by opportunities for large-scale soybean farming, hydroelectric development, oil development, road construction and the consolidation of large population centres. With regard to contaminants, there is evidence of high levels of mercury in fish, dolphins and even humans in the region. The South American Action Plan for the Conservation of Dolphins, and national action plans endorsed by the governments of Brazil, Colombia, Ecuador, Bolivia, Venezuela and Peru, provide guidelines and priorities for mitigating against threats to dolphins.

Trujillo also presented an update on the situation of the Guiana dolphin (*Sotalia guianensis*) in Venezuela, both along the Caribbean coast and in the Orinoco River. The main anthropogenic threats are habitat degradation, chemical contamination, bycatch, and direct hunting for bait and human consumption. Illegal hunting is a transnational problem (between Colombia and Venezuela), making it even more difficult to create and enforce effective conservation measures. These problems are particularly severe for the dolphin populations in Lake Maracaibo (a large tidal estuary in Venezuela) and the Orinoco River. In the southern part of Lake Maracaibo, takes of 4-5 individuals per week for human consumption have been estimated. For the Orinoco River, there is a report of more than 800 *Inia* deliberately killed for the piracatinga fishery. Lake Maracaibo and the Orinoco are also severely affected by oil spills and heavy metal contamination. The oil industry in the lake has resulted in repeated spills over almost a century. In the Orinoco, an ambitious mining project

called 'Mining Arch' has established a concession area covering >100,000 km^2 for mining gold, diamonds, iron, copper, bauxite and coltan, among other resources. Its main purpose is to bring cash into the country.

Discussion of the many issues in Lake Maracaibo highlighted the dangerous situation facing researchers trying to identify and quantify the threats to river dolphins, including directed takes, because of the activities of criminal bands. It was noted that community involvement and community-based measures have been and remain the only effective approach. Resources to support these communities are badly needed and even modest investments are likely to make a large difference in terms of threat mitigation.

Attention: G

The sub-committee noted with alarm the situation reported for Lake Maracaibo in Venezuela, where both directed takes and oil pollution are thought to be having serious impacts on populations of S. guianensis*, and the sub-committee:*

***Recommends** that NGOs and researchers focus on documenting the threats to* Sotalia *and work with local communities to mitigate the impacts on these dolphin populations.*

2.4.1 Deforestation

The rate of deforestation appeared to be levelling off at the beginning of the century, but has increased markedly in recent years. This has an indirect effect on dolphins, especially in the 'blackwater' (tannic) rivers where productivity is low and the fish dolphins prey upon depend on the seeds and fruits of the flooded forest. It is estimated that one hectare of this ecosystem can produce 20 tons of seeds per year. When the forest is lost, there is no way to sustain fish stocks and this affects the availability of food for the dolphins.

2.4.2 Hydropower development

Existing dams and future dam development are currently among the greatest threats in the Amazon, since they affect the flows regime, the connectivity of rivers, the migrations of fish, and in some cases fragment populations of dolphins as has already occurred in the Tocantins River basin. Approximately 142 large dams are currently operating, and there are proposals for at least 160 more (Anderson *et al.*, 2018).

2.4.3 Mercury

SC/67b/E16 reported on total mercury concentrations in river dolphins (*Inia* and *Sotalia*) in the Amazon and Orinoco river basins. Mercury was analysed in the tissue of animals found floating dead (n=19, 50%), stranded (n=4, 10,5%) and captured for instrumentation with satellite transmitters (n=15, 39,5%) in the Arauca and Orinoco rivers (Colombia and Venezuela border), Amazonas river (Colombia and Peru border) and Itenez or Guapore river in Bolivia. Recorded concentration ranges were: *I. g. humboldtiana* 0,003-3,99mg/kg^{-1} (n=21, sd=1,34), *I. g. geoffrensis* 0,1-0,35mg/kg^{-1} (n=7, sd=0,09), *I. g. boliviensis* 0,03-0,37mg/kg^{-1} (n=8, sd=0,78), and *Sotalia fluviatilis* 0,1-0,87mg/kg^{-1} (n=2, sd=0,55). It is highly probable that mercury biomagnifies in the dolphins, which are top predators, and this might explain the high tissue concentrations observed.

2.4.4 Negative interactions with fisheries

Negative interaction with fisheries is also a major threat to dolphins. In the sixties, with the introduction of electric generators, large fishing nets were first used and, according to the reports of many fishermen and traders in the region (Trujillo *et al.*, 2010), resulted in large bycatch mortality of dolphins. In the eighties, when more regular observations and some systematic studies of dolphins occurred, significant mortality was still being reported. In the nineties, in the Colombian Amazon, dolphins were reported to approach nets without always being caught, and at the beginning of the 2000's the first interactions were observed in which the dolphins removed fish from the nets (Trujillo *et al.*, 2010). This created a conflict with some fisheries, especially those of large catfish, and retaliation against dolphins was reported. Cases of retaliatory dolphin poisoning and other deliberate 'control' killing were reported in several locations in Peru as early as the 1990s (Reeves *et al.*, 1999). Bycatch is still a major threat in much of the range of *Inia* but there are no robust assessments of levels or trends.

2.4.5 Directed takes

This item was discussed at the Workshop on the Poorly Documented Takes of Small Cetaceans in South America: Including in-depth review of the hunting of Boto (*Inia geoffrensis*) for the piracatinga (*Calophysus macropterus*) fishery held in Santos (Brazil) in 19-21th of March 2018.

2.4.6 Channel dredging

SC/67b/SM04 described the planned construction of a commercial waterway (or 'hydrovia') about 2,700km in length, where dredging and other river modifications will take place in the Maranon, Huallaga, Ucayali and Amazon rivers in the Peruvian Amazon. This is part of a larger project to develop hydrovias in several countries in South America (Hidrovias Sudamericanas) and highlights the need for regional work and cooperation to prevent further degradation of river dolphin habitat. Hydrovias Amazonica, a subset of Hidrovias Sudamericanas, will overlap key habitats for both species of South American river dolphins, potentially causing multiple changes to the habitats and populations that may require extensive

and prolonged monitoring and mitigation. Contingent upon completion of the project's Environmental Impact Assessment (EIA), the Chinese company SYNOHIDRO plans to start construction of the hydrovia in Peru in 2019. The authors of SC/67b/SM04 recommended an inclusive and transparent EIA and project development process that includes: (a) input from aquatic mammal experts regarding potential impacts on river dolphins; and (b) the planning and implementation of mitigation plans prior to, during, and after construction for the duration of the project lifetime.

During discussion, it was clarified that dredging had not yet begun, so it was still possible to comment on and possibly influence the scope of the planned hydrovia project in Peru; hydrovia projects are also being considered by other countries in the Amazon region. It was suggested that an evaluation to distinguish which rivers are more or less important to each of the two species may help to prioritise the collection of baseline information and impact assessment.

2.4.7 Multiple threats in the Tocantins Basin

Siciliano provided information on threats to *Inia* in the Tocantins basin (described as the putative species *Inia araguaiaensis* (Hrbek *et al.*, 2014)). Current threats include river damming, water pumping for agriculture, fisheries interactions, intentional killing, high boat traffic, and water contamination by sewage, heavy metals and other chemicals. The limited range of the Araguaian boto, restricted to the Araguaia-Tocantins river basin and adjacent Marajó bay, has implications for its conservation. Its major habitat is surrounded by the Cerrado vegetation of central Brazil, which is heavily modified by human activities. Large-scale agriculture and cattle farming have transformed the landscape in most of the river sections. Side effects of these large-scale activities include massive use of agrotoxins that enter the land and find their way into the river. Large growing cities and agricultural activity require huge amounts of energy. Seven hydroelectric power plants are already operating in the Tocantins River and a large one is projected in the upper part of the river in Marabá. Given its isolation in a separate river basin and a region with high anthropogenic impact, the conservation status of the Araguaian boto is of increasing concern.

2.4.8 Threats overall

A general discussion on the status of *Inia* and *Sotalia* revolved around: (a) the dire situation created by the multiplicity of threats; (b) the need for direct actions to stop or slow the deterioration of the Amazon and Orinoco (particularly Lake Maracaibo); (c) the potential for IWC Scientific Committee recommendations to improve awareness of the issues; and (d) the importance of continued (and in fact, greatly expanded) monitoring and research that focusses on issues of most significance to the river dolphin populations across the region. It was noted that the typical habitat of *Sotalia fluviatilis* – main river channels and lakes – is more limited both geographically and perhaps ecologically than that used by *Inia.* The relative vulnerability to bycatch of the two species is little understood although the smaller size of *Sotalia* suggests that it is less able to escape from entanglement. *Sotalia* dolphins are also much more sensitive to disturbance and to deliberate live-capture, and therefore they are more likely to die even if released from nets, although coastal *S. guianensis* in some areas are reportedly less sensitive and have been successfully tagged and tracked over several months. Entangled *Inia* are more likely to be killed by fishermen and used, especially in those areas where dolphin flesh is in demand as bait. Gillnets of many types and deployed in many ways are common throughout the region. They are most dangerous to dolphins when set close to shore, as the animals can become trapped between the net and riverbank, although entangling gear is a significant threat to dolphins wherever encountered.

Attention: CG-A, G

Given the multiple threats associated with development, habitat degradation and fragmentation, and pollutants facing river dolphins in the Amazon, Orinoco and Tocantins basins, the sub-committee:

Encourages *the Brazilian, Bolivian and Peruvian Governments, as they carry out their reviews of proposed construction of new dams for hydroelectric energy production, to explicitly consider the potential impacts on river dolphins (e.g. isolation, loss of genetic diversity, habitat degradation;*

Discourages *water pumping in the Araguaia-Tocantins river basin for agricultural use as such a practice causes dramatic decreases in water levels in rivers, thereby increasing the probability that dolphin populations will be extirpated;*

Encourages *range states of the Amazon basin and its tributaries to: (a) support and carry out baseline research into the impacts of the development of commercial waterways in the Amazon (hydrovias) and their potential impacts on dolphin populations and habitats, including but not limited to the ecological impacts of dredging, noise pollution, channelisation by embankments, altered sediment suspension and transfer, and changes in turbidity, light, oxygen availability and primary productivity; and (b) work to minimise or at least mitigate these impacts;*

Encourages: *(a) review of the status of dolphins trapped within dammed stretches of the Tocantins and Madeira rivers; and (b) evaluation of possible relocation (translocation) of animals when environmental conditions create a high likelihood that they cannot continue to survive in this severely compromised habitat; and*

Encourages *the review of the effects and the scale of contaminant and heavy metal (e.g. mercury) pollution on river dolphins in key areas of the Amazon (Japura/Caquetá, Içá/Putumayo, in Brazil and Colombia) and Orinoco (Venezuela) basins.*

2.3 *Tursiops* spec. (populations occurring in estuarine areas in southern Brazil)

SC/67b/SM19 summarised information on life history of two populations of Lahille's bottlenose dolphins (*Tursiops truncatus gephyreus*) in southern Brazil – Patos Lagoon Estuary (PLE) and Laguna (LGN) – and on threats faced by these populations. Both have been the focus of long-term ecological studies that provide a good source of information on the conservation status of the subspecies. Monitoring in both areas started more than 30 years ago and has been carried out systematically since the mid 2000s. This monitoring consists of year-round mark-recapture and biopsy sampling, and regular beach surveys along the core area of the populations to collect dolphin carcasses. Mark-recapture studies indicate that a large proportion of the animals in these areas are year-round residents and permanent emigration is unlikely. Population sizes are very small in both areas: only around 85 dolphins in PLE and 60 in Laguna. Genetic studies found moderate mtDNA diversity for PLE (three closely related haplotypes) and very low diversity for Laguna (only one haplotype), while nuclear DNA variation was very low for both populations, with signs of inbreeding for the Laguna population. For Patos Lagoon, adult female survival was estimated at 0.97, higher than that of adult males (0.88). Juvenile and first-year calf survival was 0.83 and 0.84, respectively. A similar pattern was found for the Laguna population, with overall adult survival rates of 0.95 and survival rates to age 1 of around 0.80. Mark-recapture studies supported the notion of birth seasonality, with most births in late spring and summer (Dec-Feb), and mean inter-birth intervals of 3 years for PLE and 2.4 years for Laguna. Pollutant analyses indicated moderate levels of persistent organic pollutants (POPs) and that agricultural and industrial activities are the sources of POPs in LGN and PLE, respectively. Bycatch in coastal artisanal gillnet fisheries is the main threat to both populations, and there is evidence of increasing rates of bycatch-related mortality in LGN in recent years. However, bycatch rates are higher in Patos Lagoon Estuary and surrounding areas, where it is responsible for at least 43% of the overall documented mortality. Of additional concern is a chronic dermal infection in LGN, with evidence of an increasing number of affected animals in recent years (prevalence of 14% recently). Despite evidence of increased anthropogenic mortality, there is no clear evidence of a negative trend in abundance. Nevertheless, there is a high probability of population decline in the near future, given the small population, the high degree of residency and the continuing mortality as a consequence of IUU (illegal, unreported, unregulated) fishing and other human activities in these areas.

In discussion, the sub-committee noted that the occurrence of lobomycosis-like skin disease is highly variable among different areas, and may be related to pollution. Although the two small populations in southern Brazil are likely the highest priority, better abundance estimates and assessment of threats are needed throughout the range of this endemic coastal subspecies. Fruet noted that the POP concentrations analysed thus far are not particularly high, so it is unclear whether and how pollutants are influencing the occurrence of the disease.

Preliminary evidence suggests that a bottlenose dolphin protection area in southern Brazil is failing in regard to the management objective to reduce bycatch (SC/67b/HIM10). Increased mortality of bottlenose dolphins along the beaches of southern Brazil has raised concern about the trends in abundance and conservation status of the population in Patos Lagoon Estuary (PLE) and adjacent coastal areas. Article 8 of a normative that regulates gillnet fisheries in southern and south-eastern Brazil, established by the Brazilian Government in August 2012, bans boat-gillnet fisheries in the core area of the population. Under a scenario of full compliance and effectiveness of the normative, a significant decreasing trend in the stranding rates of bottlenose dolphins around PLE since the normative's implementation in 2013 would be expected, as would a lack of a significant seasonal pattern in mortality. However, as shown by the analysis in SC/67b/HIM10, despite inter-annual variation over the 25 years of data analysed, mortality remained high and seasonal (following the seasonal pattern of fishery effort in the area) after implementation of the normative. In addition, five cases of entanglements of bottlenose dolphins by three different types of fisheries operating within the boundaries of the protected area were reported. These findings suggest that the protected area for bottlenose dolphins in southern Brazil has not been effective. The reasons may include: lack of compliance; failure of the normative to apply to beach seine and stake and cable set nets, which can incidentally catch bottlenose dolphins; and insufficiency of the coverage of the no-take area.

Barreto presented results from beach monitoring in Santa Catarina, Paraná, and São Paulo provinces, north of the area described in SC/67b/HIM10. A total of 119 strandings of bottlenose dolphins and 442 Guiana dolphins were recorded over 2 years. Evidence of entanglement was found in 45% of the bottlenose dolphin carcasses that were fresh enough to show such evidence. There is as yet no evidence on which subspecies of bottlenose dolphin is or are represented in these strandings. Skulls and genetic samples are being analysed, and it is hoped that this work will be completed by the end of 2018.

Luna provided additional information on the Brazilian normative (ordinance) (IN) number 12, which regulates the gillnet fisheries over a wide area in southern and south-eastern Brazil, using a mosaic of measures to monitor its effectiveness. In some places (e.g. the Patos lagoon and adjacent coast) the normative has not reduced the impact of fishing on species that it is intended to protect. The Brazilian government is looking into this subject and seeking ways to improve the normative's effectiveness in protecting dolphins and other threatened species in these locations.

The sub-committee expressed concern that given their relatively small population sizes and constricted ranges, these bottlenose dolphin populations are highly vulnerable to threats. The coastal populations of bottlenose dolphins in the southwest Atlantic were recently recognised as a distinct subspecies (*T. t. gephyreus* Lahille, 1908) by the Society for Marine Mammalogy's Taxonomy Committee. That conclusion was also described as '*well supported by morphological and molecular genetic data, as well as ecological and distributional data'* at this sub-committee's Tursiops Taxonomy

Workshop in 2018. At SC/66b, the Scientific Committee had recommended an updated assessment of population status of the Argentine population of this subspecies, and the two reports provided to this meeting (SC/67b/HIM10 and SC/67b/SM19) indicated that the two small populations in southern Brazil are subject to high levels of bycatch and have a high incidence of individuals with chronic dermatitis.

Attention: SC, CG-R

Given the small sizes of the two known populations of Lahille's bottlenose dolphins (T. t. gephyreus) *in southern Brazil and the conservation concerns surrounding these populations (especially related to bycatch), the sub-committee:*

Draws attention to *range states (Argentina, Brazil, Uruguay) the conservation concerns for this entire subspecies;*

Recommends *immediate action to reduce the level of bycatch in the southern Brazil populations;*

Recommends *continued monitoring and photo-identification work on the populations throughout the subspecies' range to refine survival estimates and to assess trends in abundance and the prevalence and etiology of the chronic skin infections; and*

Recommends *that the conservation status of the subspecies be prioritised for assessment in the future.*

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3. FRANCISCANA CMP

3.1 Preparation for an in-depth review for 2019

The sub-committee noted that the SC first reviewed the status of the franciscana (*Pontoporia blainvillei*) in 2004 and the species has been on the agenda of the Committee for a number of years. A task team for FMA I was established in 2015 and resulted in two documents being presented at this meeting (SC/67b/CMP03 and SC/67b/CMP05). In 2016, the IWC created a Conservation Management Plan (CMP) for the franciscana.

A review of the status of the franciscana is timely as substantial new information is available and such a review would be key to refine the research, monitoring, conservation recommendations and management actions specified in the recently established franciscana CMP. A proposed process to conduct the review is presented in Appendix 2.

4. REPORT OF THE 2018 *TURSIOPS* TAXONOMY WORKSHOP

The sub-committee received the report of the 14-16 January 2018 intersessional *Tursiops* Taxonomy Workshop on evaluating taxonomy and population structure of bottlenose dolphins (*Tursiops* spp.) worldwide. This workshop, funded by the small cetaceans (SM) and stock definition/DNA testing (SD) sub-committees followed the three-year review conducted by SM (2015-17). In the IWC/SC context, the issue of 'taxonomy' mainly concerns the potential for unrecognised diversity - distinct species, sub-species and demographically independent populations are fundamental management units, and if they have not been recognised there is the potential for conservation issues, especially in areas with known threats.

Bottlenose dolphins have a cosmopolitan distribution, show morphological and genetic divergence throughout their range, and in some regions show strong population structure, often over a very fine geographic scale. This raises issues about the recognition of discrete units needed for effective conservation and management. These characteristics have historically led to the naming of more than 20 nominal species of *Tursiops*, but only two – *T. truncatus* (Montagu, 1821) and *T. aduncus* (Ehrenberg, 1832) – are currently recognised. Key objectives of the workshop were to determine whether the currently accepted *Tursiops* species and subspecies accurately represent valid taxa, and whether there are more *Tursiops* subspecies and/or species than currently recognised.

The three-year review and workshop brought together researchers and experts from around the world to discuss this topic, motivated focussed research, and promoted new collaborations. Results from studies presented at the SM sub-committee meeting reviews and at the workshop were compiled and formed the basis for evaluation of taxonomic and population distinction issues in each geographic region during the workshop. The SM sub-committee's priority topic review and workshop, in combination, provided a unique opportunity to form a global view of issues related to small cetaceans.

The sub-committee expressed appreciation for the efforts of the workshop participants and their development and testing of a framework for addressing 'taxonomic' issues of interest to the IWC. Discussion of the conclusions and recommendations of the *Tursiops* Taxonomy Workshop focussed first on data deficient areas, and the sub-committee expressed interest in continuing compilation of information on specimens, data, and researchers from those areas to facilitate collaborations and future work and nominated additional areas for inclusion to the list identified by the workshop. There was also interest in the use of high resolution genetic analyses such as ddRAD (double-digest restriction associated DNA) sequencing, as some new results reviewed by the workshop were able to resolve differences not possible previously, even using whole-mitogenome sequencing. Use of such methods can be very effective for addressing some of the remaining questions, such as whether *Tursiops truncatus gephyreus* should be elevated to species status and developing a better understanding of island-associated bottlenose dolphins with use of a consistent set of genetic markers to allow addition of new study sites over time, without the calibration issues associated with microsatellite analysis.

Attention: SC, G

Having reviewed the extensive information included in the 2015-17 review and 2018 Workshop for evaluation of Tursiops *species, subspecies and population distinctions, the sub-committee:*

Draws attention to *the need for* Tursiops *research in the data deficient areas identified in the* Tursiops *Taxonomy Workshop report (the African coast of the eastern Atlantic, southern and eastern Mediterranean Sea, eastern South Pacific, Pacific coast north of California and off the Mexican mainland, Central American coast of the eastern North Pacific, Central American Atlantic and Caribbean Sea and Atlantic coast of northern and north-eastern Brazil, eastern Australia and in the western Pacific the islands of Micronesia, Melanesia, Polynesia, the Philippines and Vietnam);*

Encourages *collection of additional data, including morphometrics, and high-resolution genetic analyses (e.g. ddRAD which may also be useful in other areas where there are similar questions requiring high-resolution analysis), to better characterise divergence between coastal and offshore forms in the western South Atlantic Ocean, to help confirm whether subspecies or species classification is more appropriate for* T. t. gephyreus;

Encourages *the further investigation of* T. aduncus *lineages in the Indian Ocean and western South Pacific to assess potential subspecies recognition, extending the geographic coverage to include eastern Africa, the region between Pakistan and Indonesia, and the region between Australia and China;*

Encourages *the continued study of the genetics and morphology of southern Australia bottlenose dolphins with the '*T. australis*' mtDNA lineage, in the context of both* T. truncatus *and* T. aduncus;

Encourages *examination of the level of male-mediated gene flow between the coastal and offshore forms in the western North Atlantic to determine whether the coastal form should be elevated to species or subspecies status;*

Encourages *more comprehensive morphometric analyses comparing* T. truncatus *in the Mediterranean, Black Sea, and eastern Atlantic to integrate with genetic data and evaluate whether any regions in addition to the Black Sea (*T. t. ponticus*) harbour a taxonomic unit above the level of population;*

Encourages *comprehensive morphometric analyses of coastal and offshore* T. truncatus *in the eastern North Atlantic and comparison to those from the western North Atlantic to better evaluate potential regional differences;*

Encourages *morphometric analyses of Gulf of California coastal and offshore dolphins relative to those from California and the eastern tropical Pacific, with a particular focus on the level of divergence of coastal dolphins in the upper Gulf of California to other areas; and*

Encourages *the collection of additional genetic and morphological data throughout the eastern South Pacific and further studies to investigate coastal versus offshore forms throughout the region, including coastal and offshore waters from Central America to Mexico, and if possible around the southern tip of South America to Argentina.*

Attention: SC, G

After reviewing the development and use of a strategy for objective evaluation of species, subspecies, and population-level distinctions by the 2018 Tursiops *Taxonomy Workshop, the sub-committee:*

Agrees *with the strategy implemented in the workshop for evaluation of species, subspecies, and population level distinctions;*

Encourages *use of the criteria and guidelines in Reeves et al. (2004) for the assessment of species-level taxonomy, in Taylor et al. (2017) for subspecies-level taxonomy, and in Martien et al. (2015) for Demographically Independent Populations; and*

Agrees *to continue compilation of specimen, study, and researcher details, and concentrated effort to improve our understanding of* Tursiops *in data-deficient areas*

After reviewing the 2018 Tursiops *Taxonomy Workshop's evaluation of the support provided for taxonomic (subspecies, species) and population-level distinctions proposed in the publications reviewed, the sub-committee:*

Concludes *that the current taxonomy provided by the Society for Marine Mammalogy's Committee on Taxonomy is well supported by morphological and molecular genetic data, as well as ecological and distributional data. This taxonomy includes the common bottlenose dolphin* T. truncatus *and the Indo-Pacific bottlenose dolphin* T. aduncus*. Three subspecies are recognised within* T. truncatus*: the nominate subspecies,* T. t. truncatus*, the Black Sea bottlenose dolphin,* T. t. ponticus*, and Lahille's bottlenose dolphin,* T. t. gephyreus*; and*

Concludes *that discordance in currently available results from morphometric analyses and across different genetic markers of the recently described '*T. australis*' from southern Australia calls into question its validity at this time; and*

Concludes *that future taxonomic questions should be examined within an appropriately wide and inclusive geographic context and that multiple lines of evidence are necessary when positing taxonomic changes.*

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5. POORLY DOCUMENTED TAKES FOR FOOD, BAIT OR CASH AND CHANGING PATTERN OF USE

The poorly documented take of small cetaceans for use as wildmeat is a priority topic of the SC. An Intersessional Correspondence Group (ICG) was established to ensure progress on this topic between SC meetings. The ICG was tasked with the development of a toolbox of techniques that could guide and co-ordinate research into this topic with the aim of better understanding the issue on regional and global levels. A series of workshops were proposed to fulfil this task, the first of which covered South East Asia and was reported in SC/67a. A second Workshop focused on this issue in South America, and also incorporated a detailed review of the use of Amazon river dolphins as bait in the piracatinga fishery, which is also a wildmeat[1] issue (SC/67b/Rep01).

5.1 Progress on the workplan

Porter summarised the report from the Workshop held in the Santos, Brazil, in March 2018. The Workshop was divided into two separate sessions, one which discussed the issue of wildmeat in South America and one which reviewed the take of Amazon dolphins for bait in the piracatinga fishery. This Workshop fulfilled several goals of the SC; the ongoing work of ICG 30 on the poorly documented take of small cetaceans and the completion of the work of the Amazon Dolphin/Piracatinga Steering Group (SG 21). The Workshop aimed to:

(1) identify threats, past and present, in Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, French Guiana, Guyana, Suriname, Peru, Uruguay and Venezuela with respect to 'wildmeat', and discuss which techniques can be utilised to better understand this issue; and

(2) review current knowledge of the use of Amazon river dolphins as bait in the piracatinga fishery and provide recommendations for future work and action.

Information was summarised for all countries, except Guyana and Suriname. Products from small cetaceans are used throughout South American countries, and Costa Rica, for both food and non-food purposes. This type of use is referred to as 'aquatic wildmeat'. The usefulness of various tools and techniques was discussed, including data gathering techniques and forensic investigation. A database, comprising more than 3,000 references, was used to map existing knowledge and understand data gaps. A framework was established with the intention that future data collection should be collated in such a way as to be standardised and systematic, with a view to gathering sufficient information to better understand regional and global patterns of small cetacean wildmeat use. The workshop participants populated a database from which regional patterns were mapped. Areas that were highlighted as a cause of conservation concern were; Bolivia, Brazil. Colombia, Costa Rica, Ecuador, Peru and Venezuela.

The take of Amazon river dolphins as bait in the piracatinga fishery was reviewed. All range countries of *Inia* and *Sotalia* have laws in place to protect dolphins and prohibit intentional killing. Fishing for piracatinga is banned in Brazil and its trade is prohibited in Colombia, due to its impact on river dolphins and other wildlife. Colombia does not have a piracatinga fishery using dolphins as bait, however, the high demand for this fish in Colombia drives fisheries elsewhere. The practice of using dolphins as bait has recently expanded to Peru, Bolivia and Venezuela, following the imposition of restrictions in Brazil, however, no other range country has developed specific legislative or regulatory action, beyond the general protection of river dolphins, in response to the emergence of this practice.

The workshop concluded that small cetaceans are used throughout South American countries for a variety of wildmeat purposes and that some species and population require urgent attention. The sub-committee **endorses** and **adopts** the recommendations made in the workshop report. The committee noted that some workshop recommendations pertain to management actions and these are highlighted for the attention of the Conservation Committee.

The sub-committee **commends** the Government of Brazil on its swift action in declaring a moratorium on the piracatinga fishery and **urges** the government to maintain this moratorium to allow sufficient time to evaluate the effectiveness of protective measures and continue the necessary protection of river dolphins. The Government of Brazil is respectfully requested to continue to provide progress reports to the SC on its efforts to combat the use of Amazon River dolphins (botos *I. geoffrensis* and tucuxis *S. fluviatilis*) as bait for the piracatinga fishery in the Amazon Basin.

The sub-committee **agrees** that the science-based recommendations of the workshop should be highlighted as there are several issues that require further action.

Attention: CG-R, S

Given continued concern over the use of dolphins as bait in the piracatinga fishery, the sub-committee:

***Recommends** that Government of Brazil maintain the moratorium on the piracatinga fishery to allow sufficient time to evaluate the effectiveness of protective measures and continue the necessary protection of river dolphins;*

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[1]following the formal definition of terminology with other IGO's working in this topic, and as reported in SC67a, the term 'wild meat' will be used for both terrestrial and aquatic wildlife species that are used for food and non-food purposes. As such, the term 'wild meat' is now commonly used in reporting.

Reiterates *previous recommendation of the Scientific Committee of the IWC that range states (Bolivia, Brazil, Colombia, Peru and Venezuela) engage in a co-ordinated effort to strengthen legislative, enforcement, management and scientific efforts to ensure protection of the Amazon River dolphins; and*

Encourages *range state authorities to work together and exchange information on the movement of piracatinga products across international borders.*

In addition, the sub-committee:

Recommends *that a letter be sent, by the secretariat of the IWC to the Buenos Aires Group highlighting the issue of dolphins being used as bait in the piracatinga fishery and requesting joint efforts to enhance enforcement on wildlife and trade laws.*

Attention: SC

To improve regional knowledge and aid conservation research, the sub-committee:

Recommends *that potential divisions within the genus* Inia *are evaluated, and genetic conservation units are established;*

Strongly encourages *an evaluation of historical data on river dolphins to better understand other threats, e.g., from bycatch, to provide further insights into current trends;*

Encourages *the use of new technologies, such as drones and satellite telemetry, to establish trends, habitat use and dispersion patterns of Inia within Amazon River Basin;*

Encourages *new efforts to improve regional research capacity.*

As evidence shows that several small cetacean species and/or populations are being negatively impacted by their use as wildmeat in South America, the sub-committee;

Recommends *that abundance and distribution surveys, in tandem with investigation into the magnitude of aquatic wildmeat use, be conducted on these species. Appropriate survey designs should be implemented that consider the statistical power required to detect trends and the resultant data should then be used to estimate the impact of deliberate take for wildmeat on the following populations:*

Boto (Inia geoffrensis) *in Purus and Japurá rivers, Brazil, and Içá/Putumayo river in both Brazil and Colombia, utilising previously established standardised methods. Also, studies should be expanded into other areas where take for bait may be a cause for concern.*

- *Chilean dolphin (Cephalorhynchus eutropia) in Chile;*
- *Burmeister's porpoise (Phocoena spinipinnis) in both Chile and Peru;*
- *Burmeister's porpoise (Phocoena spinipinnis) in Peru, noting that current evidence suggests that the Peruvian population is distinct;*
- *Dusky dolphin (Lagenorhynchus obscurus) in Peru, noting that evidence shows that landings of this species has decreased and populations may have been heavily impacted;*
- *Guiana dolphin (Sotalia guianensis) and other small cetaceans in Amapá, Pará, Maranhão, Piauí, Ceará, Espírito Santo, São Paulo and Paraná, in Brazil, as there is a documented use of bycatch for wildmeat purposes;*
- *Bottlenose dolphins (Tursiops truncatus) and pantropical spotted dolphins (Stenella attenuata) in Bahia Solano, Colombia, noting that deliberate take for a long line fishery is ongoing;*
- *Tucuxi (Sotalia fluviatilis) throughout its range, in Brazil, Colombia, Ecuador, as it shares most of the same threats as Inia geoffrensis, and may also be used as bait in the piracatinga fishery; and*
- *Guiana dolphin (Sotalia guianensis) in Lake Maracaibo in Venezuela, noting that deliberate take for food is ongoing.*

The sub-committee also ***draws attention to*** *the Boto dolphins that have been isolated within the dam system of the Tocantins and Maderia Rivers in Brazil and, given the confined condition of the dolphins' habitat,*

Recommends *that the status of these dolphins be evaluated, to include abundance, genetic, habitat, prey availability assessments, with a view to developing a translocation protocol, including under what circumstances such a protocol should be enacted.*

Given the concerns over the extensive habitat modification that will result from the Mega Project 'Arco Minero del Orinoco', a large scale mining operation proposed along the river and watershed of Venezuela, the sub-committee:

Recommends *that population sizes and trends of both* Inia geoffrensis *and* Sotalia guianensis*, in the Orinoco River basin, be monitored before and during this project.*

Attention: CC

The Workshop Report on the use of Small Cetaceans for Food and Non-Food Purposes contains several management-based recommendations, as such the sub-committee:

***Draws attention to** the recommendations within this report, in particular, the need to have a regionally co-ordinated fisheries management plan for the Amazon River basin and a regional strategy for the conservation of river dolphins.*

The sub-committee **concludes** that as the magnitude of use of small cetaceans as aquatic wildmeat is a regional cause of concern, all parties, including researchers and management authorities, are **strongly encouraged** to standardise data collection efforts to better understand this issue, and to actively encourage a collaborative and coordinated approach to understand regional patterns and trends. A framework for such an approach was developed during the Workshop.

5.2 Wildmeat databases

At the previous meeting of the Scientific Committee in 2017, it was agreed that the intersessional group would work, with the input of the IWC Global Database Repositories Convenor, to develop an overarching aim for any future cetacean wildmeat database, and to provide specific questions that such a database might address, and present these at the Scientific Committee meeting in 2018. SC/67b/SM12 provided an update on this intersessional work. In response to growing concerns over aquatic wildmeat, a research agenda was developed to better understand the issue and formulate the key questions that could be addressed through the development and analysis of an aquatic wildmeat database. These include the information on which species are taken, where and when the takes occur, by whom they are acquired and what the drivers of the process are. The following list of characteristics should be considered when designing an aquatic wildmeat database: (1) ease of use; and (2) space to record relevant information for data providers. It is hoped that an aquatic wildmeat database would support conservation planning and act as a repository for past, present, and future information on aquatic wildmeat.

SC/67b/SM02 provided an update on 'The Aquatic Wildmeat Database', an online application/interface intended to centralise data on global aquatic mammal use. This database is expected to facilitate identification of understudied areas and those of greatest concern, as well as to provide a basis for detecting and tracking trends in use since 1945. The inclusion of different types of data will make it possible to carry out studies at different geographic and spatial scales. The database was built using the R package *shiny.* The data are displayed as a global interactive map and as trends plotted by country. Data were obtained from researchers as well as from literature and online newspaper articles. The application is also used opportunistically to document events that are rarely published, by allowing users to contribute using a form. The database currently contains 93 data points from 27 countries, pertaining to 24 species. Anticipated future work includes promoting the database among international and regional bodies, such as the IWC and CMS, and continuing to populate it and expand coverage to other taxa. The Aquatic Wildmeat Database is expected to be a useful tool for the scientific community and the public at large, as well as for managers and policy makers, and to inform research and conservation programmes.

In discussion, potential issues of concern were discussed, including mechanisms for data validation and quality control, as well as the historical timeline cut-off point.

The sub-committee welcomed this information and agreed that the database is a useful tool, noting that it is not being built for the specific use of this sub-committee's work. An interessional correspondence group was established to discuss refinements, especially methods for data quality evaluation, with a view to making this database useful for the work of the SC. The sub-committees welcomes Cosentino to report on progress at a future meeting.

6. SMALL CETACEAN TASK TEAM

6.1 Progress on South Asian river dolphins task team

Simmonds (as Task Team Coordinator) provided an update on Task Teams. This approach was first discussed in the Scientific Committee in 2014 and was intended to enable intersessional 'fast response' action on critical issues. Specifically, Task Teams are created to provide timely advice on situations where a population of cetaceans is known or suspected to be in danger of significant decline that could lead to extirpation or extinction, with the ultimate aim of ensuring that this does not occur. The first Task Team was established for the franciscana in 2015-16 and was deemed a success by the SC.

At SC/66b it was agreed that the situation facing South Asian river dolphins is a matter of grave concern and requires immediate attention, and that a Task Team should be assembled. This has been progressed intersessionally with discussions on membership, geographic coverage, convenors and first actions. At the time of writing, the South Asian River Dolphin Task Team has some 14 members with representation from Bangladesh, India, Nepal and Cambodia. University-associated researchers, WWF and the Wildlife Institute of India are also represented in the team. The nominated co-conveners for the Task Team are Dipani Sutaria and Nachiket Kelkar. Simmonds noted that the Task Team would need some funding to be able to meet, which would certainly help its progress. It was suggested that the IWC website could be used to increase the profile of the Task Team.

The sub-committee thanked Simmonds for his intersessional work. The sub-committee **strongly supports** the Task Team initiative, including the proposed workshop for the South Asian River Dolphin Task Team. The sub-committee encourages the Task Team to work expeditiously and **agreed** that an improved website profile was appropriate.

7. PROGRESS ON PREVIOUS RECOMMENDATIONS

7.1 Vaquita (update on CIRVA Progress)

7.1.1 Dolphin bycatch in totoaba nets

SC/67b/SM15 described the first cetacean bycatch (*Delphinus delphis*) in an illegal totoaba gillnet to be documented in January 2018 in San Felipe, Mexico. While focusing on vaquitas in recent years, researchers and managers have generally neglected the bycatch of other small cetaceans, especially *Tursiops*. During the recent IWC Workshop on Tursiops Taxonomy in La Jolla, CA in March, the participants noted that there is significant genetic differentiation between coastal populations in the Gulf of California and California, raising concern about the conservation status and bycatch of Tursiops in the region. The authors of SC/67b/SM15 encouraged further evaluation of *Tursiops* genetics in the Gulf of California, and specifically also assessment of bycatch to better understand these dolphins' conservation status. They also recommended systematic beach surveys for stranded specimens and subsequent evaluation of human interaction to quantify bycatch rates during the peak totoaba season, January through May.

7.1.2 Vaquita

7.1.2.1 ACOUSTIC MONITORING

Rojas-Bracho and Jaramillo-Legorreta introduced SC/67b/SM01, the report of the Tenth Meeting of the International Recovery Team for Vaquita (CIRVA-10). Jaramillo-Legorreta presented the results of the acoustic monitoring program for vaquitas which has been conducted annually using identical methods since 2011. The 2011-17 data series gathered from the regular 46 C-pod sampling grid, shows a continued decline in vaquita detections with no change in the trend since the last report in 2016.

In 2017 a near-real-time sampling scheme was developed to provide data on vaquita distribution over short timeframes to support the Vaquita Conservation, Protection and Recovery project (VaquitaCPR). This consisted of an enhanced sampling grid of 87 sites, covering the entire Vaquita Refuge and areas around the margins.

The sampling plan for 2018 includes the regular annual sampling period between June and September (46 sites) and other efforts outside this period. A grid of six sites has been in place since February 2018 and will remain in place into May. These six sites account, on average, for 58% of the total clicks detected during the regular annual sampling period and provide an interim window into vaquita presence.

The sampling grid used for the near real-time acoustic monitoring scheme, implemented during the VaquitaCPR field season, included 36 sites covering the areas with most of the acoustic activity during the regular sampling period. C-pods were interchanged, and data were analysed and reported on a daily basis with the goal of reporting on the presence of vaquitas a few hours prior to daily visual searching operations. Reports of the location of acoustic encounters, were usually delivered about 3 hours prior to visual operations, between 2-3 a.m. This near real-time monitoring proved to be reliable in guiding the visual search teams to locations where vaquitas were encountered. The VaquitaCPR team recognised that, without this tool, locating vaquitas on a daily basis would have been considerably harder.

7.1.2.2 VAQUITACPR

Rojas-Bracho provided a brief review of the VaquitaCPR project to capture vaquitas and bring them into human care as described at SC67a. VaquitaCPR was designed to be undertaken in a phased approach, with each step dependent on the success of the previous one. The field program conducted in October and November 2017 included 90 experts from nine countries and was organised into several teams devoted to finding, catching, handling, and care. The first component was dedicated to finding vaquitas, using acoustic (as described above) and visual methods. The visual team employed three vessels. A mother ship (Maria Cleofas) supported an observer team equipped with two deck-mounted 'big-eye' (25-power) binoculars, and a full-time data recorder to document the positions of vessels and vaquitas. Two smaller sport-fishing boats with flying-bridge viewing platforms completed the visual detection fleet. A special computer program was created and used on the Maria Cleofas to track vaquita sightings and the other sighting and catch vessels using Automatic Identification System (AIS) technology. All sighting vessels were crewed by observers experienced in previous vaquita sighting surveys. When vaquitas were sighted, the sighting vessels formed a triangle, with the goal of keeping the vaquitas between them until catch boats could be guided into proximity.

Capture efforts involved an international team of experts, including researchers experienced in the capture and handling of harbor porpoises, animal care professionals, and veterinarians. This team was distributed across three small (~8m) vessels. Once vaquitas were located by the visual survey team, the catch boats were directed towards the animals by those aboard the sighting vessel with the vaquitas in sight. Once in close proximity ahead of or near the vaquitas, lightweight floating gillnets (256-512 m long and 9-18 m deep) were rapidly deployed by the catch boats. The catch boats were then used to herd the vaquitas toward the nets. The nets were deployed three times, and animals were caught 2 of these times. The nets allowed vaquitas to surface easily to breathe and facilitated efforts to remove them. Two vaquitas were successfully captured (a third animal escaped at the time the second animal was caught). The first vaquita, caught on 18 October, was an immature female (V01F). The second, captured on 4 November, was an adult female (V02F).

In both cases, medical and behavioural evaluations were conducted to determine the suitability of the animals for transport to the floating pen or shore-based facility. Through the whole process the animals' health was continuously monitored by a team of experienced marine mammal veterinarians.

The first vaquita caught (V01F) was determined to be in good condition after veterinary assessment. However, after transport to shore, the veterinary and animal care teams determined that the animal was not acclimating to the vaquita care center pool or to the sea-pen facility, and the decision was made to release it. Prior to release blood and skin samples were collected for cell culture and genetic sequencing.

V02F was monitored carefully after capture and before transport and considered to be in good condition for transport to the sea-pen. However, after initially showing signs of adapting to the facility, the animal stopped swimming and an emergency release was initiated. The release was unsuccessful and the vaquita was quickly recaptured for administration of emergency care. Following three hours of emergency response, the animal went into cardiac arrest and did not respond to resuscitation attempts. After necropsy, tissues were collected for histopathology, cell culture, gamete rescue and genetic sequencing. Gamete rescue has been successful at SeaWorld (T. Robeck). Ongoing genetic analyses using mitochondrial DNA sequencing is underway at the Southwest Fisheries Science Center, do not indicate a loss of genetic diversity in this small population. Tissue culture has also been successful; dozens of cell cultures from both specimens have been frozen under the supervision of Dr. O. Ryder at the San Diego Zoo Institute for Conservation Research of the San Diego Zoo.

CIRVA commended SEMARNAT and the numerous partners who made this unprecedented effort possible. It further stressed that the strong on-the-water presence during the VaquitaCPR capture effort appeared to discourage illegal fishing. Moreover, the local, national, and international collaborations forged during VaquitaCPR raised awareness at the local to global levels of the urgent need for forceful action to conserve vaquitas. The effort as a whole also reinforced the strong commitment within Mexico and internationally to do everything possible to prevent the extinction of the vaquita. Efforts are underway to review the overall VaquitaCPR program and compile lessons learned.

7.1.2.3 ENFORCEMENT

Rojas-Bracho reported on advances by the Government of Mexico in enforcement and regulations. The Mexican Navy (SEMAR) reported to CIRVA on the enforcement measures put in place in 2015 and how they have been continued and enhanced to the present. A permanent naval station was established in San Felipe in 2017, both for maritime emergency response and to enhance the Government's capability to take immediate and effective action against illegal activities. On average, two large ships, numerous small boats, as well as airplanes, helicopters, drones, and over 700 individuals are engaged in the enforcement effort.

With regard to removal of entangling gillnets from the range of the vaquita, SEMARNAT is leading an effort involving the Sea Shepherd Conservation Society (SSCS), Museo de la Ballena (MB), the Mexican Navy, and the Ministry of Environment's watchdog agency PROFEPA. SSCS is participating with three large vessels and MB with two. They are receiving small-vessel support from the Navy and enforcement capability has been enhanced with the presence of Navy and Environmental Gendarmeria and enforcement personnel on the net retrieval vessels.

The program to remove both active and derelict fishing gear from the range of the vaquita has removed 518 nets over 166 effective days of effort from 10 October 2016 to 8 December 2017. In 2018, from 2 January to 25 April, a total of 486 nets had been retrieved, 81 of them active: 95% of those were totoaba gillnets. Since the beginning of the program 19 months ago, approximately 1,029 nets or pieces of fishing gear had been removed. The removed nets are destroyed and the remains recycled by 'Parley for the Oceans' which will produce specially labelled products from them.

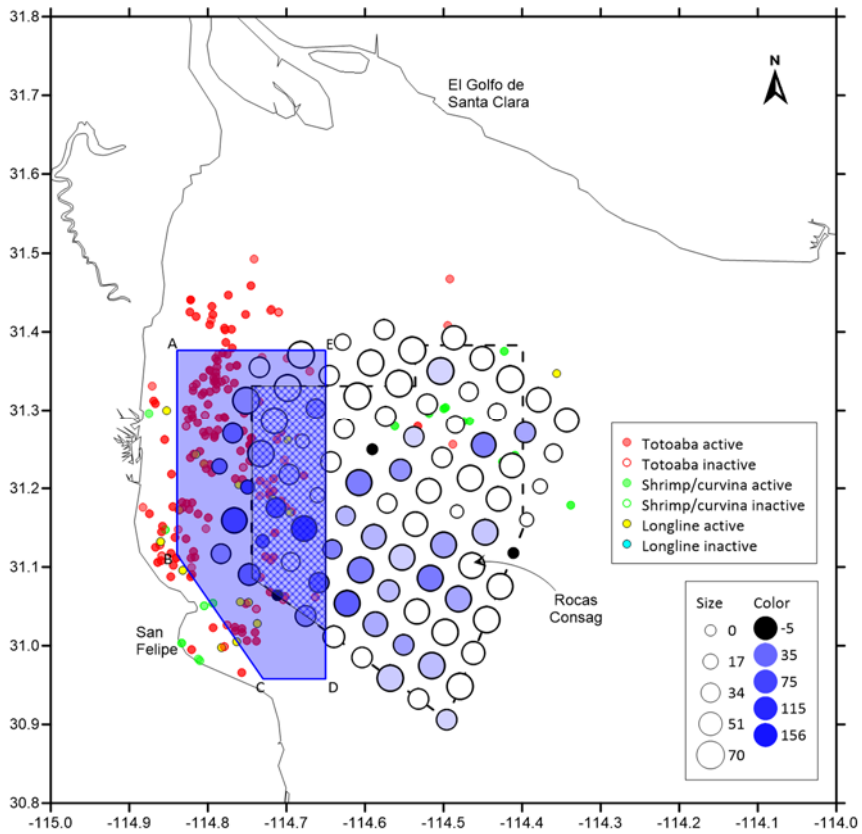
The survival of the vaquita depends on gillnet-free habitat. Both the CIRVA report and reports since then (*http://www.iucn-csg.org/index.php/2018/04/06/first-vaquita-found-dead-in-2018-march-2018-update/*) on the 'success' of the net removal program demonstrate that illegal totoaba gillnets are still routinely set in great numbers in vaquita habitat. Despite enhanced enforcement efforts there is a continued failure to prevent illegal fishing.

Prior to the current seasonal surge of illegal totoaba fishing, CIRVA stated that immediate action was needed to improve the situation through implementation of a series of recommendations. In particular, CIRVA recommended that the Government of Mexico establish an enhanced enforcement area (Fig.1) during the totoaba spawning season (December 2017 through May 2018) when illegal fishermen concentrate in the Upper Gulf. This area has the highest co-occurrence of vaquitas and illegal totoaba nets and is now designated as the 'enhanced enforcement area'.

CIRVA recommended that within the exclusion zone the Government of Mexico:

(1) prohibit all fishing and navigation;
(2) increase enforcement presence to a level that makes it possible to respond to any report of illegal activities within 30 minutes.
(3) increase and focus net removal efforts within the exclusion zone; and
(4) negotiate the appropriate transit corridors to allow legal fishing to continue outside the exclusion zone.

In addition, CIRVA recommended that drones be used to monitor the areas of historical totoaba fishing and vaquita entanglement near El Golfo de Santa Clara to ensure that illegal totoaba fishing effort does not shift to those areas.



Vertex	Longitude	Latitude
A	-114.83908	31.37629
B	-114.83908	31.11555
C	-114.72977	30.95786
D	-114.65015	30.95786
E	-114.65015	31.37629

Fig.1. Enhanced enforcement zone (also called exclusion zone).

Mexico established the enhanced enforcement area through a 24 April 2018 notice in Mexico's Federal Register.

While the illegal totoaba fishery is the major enforcement challenge, work continues through the Expert Committee on Fisheries Technologies (ECOFT) to develop and disseminate alternative gear techniques that could support legal commercial fishing opportunities year-round. CIRVA endorsed ECOFT's recommendations on suitable gear and recommended prohibition of the use of any monofilament or multi-monofilament nylon line in construction of alternative fishing gear.

7.1.2.4 CONCLUSIONS AND RECOMMENDATIONS

As this sub-committee has stressed for years, the vaquita population is at a critically low level, and recent evidence demonstrates that the cause of the decline – use of illegal large-mesh gillnets – continues, making extinction in the wild increasingly likely. It is important to consider the carefully planned, staged attempt by an international team of experts to bring animals into captivity in order to protect them in light of these dire circumstances. Despite a huge investment of resources, time and effort, the attempt sadly failed, but through no fault of the team. The sub-committee commends the SEMARNAT, VaquitaCPR team and its supporters for their valiant efforts.

The sub-committee again expressed its disappointment and frustration that, despite almost two decades of repeated warnings, the vaquita continues to be on a rapid path towards extinction as a result of ineffective conservation measures. As such, the sub-committee **re-emphasised** the concerns it has raised on the status of the vaquita over many years, in particular its recommendations of the past two SC meetings, and **endorsed and adopted the recommendations** in the CIRVA-10 report (SC/67b/SM01).

The sub-committee again **commended** the Government of Mexico for its attention and response to the CIRVA findings and recommendations and respectfully **requested** that reports continue to be provided annually to the IWC Scientific Committee on actions and progress towards saving the vaquita.

Attention: SC, CC, CG-R

The long-term decline in the vaquita reported previously has continued in 2017. As acoustic monitoring is critical for evaluating the effectiveness of conservation actions, the Committee:

***strongly recommends** that the CIRVA10 acoustic monitoring programme be continued as in previous years to provide an annual empirical estimate of population trend;*

*And further **re-iterating** the recommendations made in CIRVA10, the sub-committee **recommends** that:*

(a) all Mexican enforcement agencies increase their efforts on land and in water immediately and continue this enhanced enforcement program for the duration of the period of illegal totoaba fishing (at least until June 2018) to

eliminate all setting of gillnets in the range of the vaquita; (b) emergency regulations be promulgated immediately to strengthen the current gillnet ban and enhance enforcement and prosecution by:

- *eliminating all fishing permits for transient fishermen and limiting fishing access to only those fishermen who can demonstrate residency in the fishing villages;*
- *confiscating any vessel that does not have the appropriate vessel identification, permits, and the required vessel monitoring system;*
- *requiring vessel inspection for each fishing trip at the point of departure and landing;*
- *prohibiting the sale or possession of gillnets on land and at sea within the area of the current gillnet ban and on adjacent lands within a specified distance of the coastline.*
- *requiring that all gillnets be surrendered or confiscated and destroyed; and*
- *eliminating the exemptions for all gillnet fisheries, including the curvina and sierra fisheries.*

The sub-committee further:

***Recommends** that the Mexican enforcement agencies: (a) efforts to remove gillnets from vaquita habitat be continued and enhanced and the numbers and locations of new nets recovered be published monthly; (b) also publish monthly the number of inspections, interdictions, arrests, sentences, and other enforcement actions, together with information on observed levels of illegal activities obtained from intelligence operations, for example from drones; (c) ensure that successful prosecution and subsequent penalties be sufficient to deter illegal fishing; and (d) development of gillnet-free fisheries be enhanced and linkages to incentivise the conversion of the fleet to gillnet-free operations be strengthened.*

7.2 Yangtze finless porpoise

A rangewide survey of Yangtze finless porpoises (*Neophocaena asiaeorientalis asiaeorientalis*, YFP) was conducted between 10 November and 31 December 2017 following the same methodology as surveys in 2006 and 2012 (SC/67b/SM07). The 2017 abundance estimate of total population size was approximately 1,012 individuals, with 445 in the mainstem of the Yangtze River (1,200 in 2006, 505 in 2012), 457 in Poyang Lake (450 in 2006 and 2012) and 110 in Dongting Lake (150 in 2006, 90 in 2012). The overall estimate in 2017 was lower than that in 2006 (~1,800) but very similar to that in 2012 (~1,045). (Note: It was not possible from the information and data provided in the paper to evaluate the quality of these estimates; the 2006 and 2012 estimates, however, are published; Zhao *et al.*, 2008, Mei *et al.*, 2014). The author of SC/67b/SM07 interpreted the results of the 2017 survey as indicating that the rapid decline observed between 2006 and 2012 has now slowed, and that numbers may even be increasing in some areas, e.g. Dongting Lake from 90 in 2012 to 110 in 2017. Nevertheless, the Critically Endangered status of this species remains unchanged (Wang *et al.*, 2013).

YFP distribution within the mainstem of the river remains fragmented, as observed previously in the 2006 and 2012 surveys. The porpoises tend to concentrate in better-quality habitat, therefore leading to more fragmentation. Overall, habitat quality and habitat connectivity are very poor. Most habitat areas are degraded and continue to deteriorate, although some small parts of the mainstem and some lake areas show improvement. Overall, water quality appears acceptable for YFP survival.

The Government of China has been highlighting environmental issues in recent years, which includes improved law enforcement, stricter fisheries management (e.g. a seasonal fishing ban), better management of sand mining, and habitat restoration (e.g. removal of derelict jetties). In the view of the author of SC/67b/SM07, those measures are responsible at least in part for the observed increase in porpoise abundance in some sections of the river and in Dongting Lake. The sub-committee considered this news encouraging and regarded it as a possible indication that *in situ* conservation of YFP is feasible.

The sub-committee welcomed the information on measures taken by the Government of China to improve conditions in the Yangtze for porpoises and other aquatic wildlife. The sub-committee **concluded**, however, that for the porpoise population to make a sustained recovery in both numbers and range, it would be necessary for the trend of introducing measures to improve habitat in the Yangtze River and Dongting and Poyang Lakes to continue and expand.

Needed further measures include but are not limited to: (1) protection and restoration of aquatic habitat in the Yangtze River and the lakes, maintaining a network of *in situ* reserves; (2) strengthening the capacity of bodies responsible for managing the reserves to enforce the fishing ban; (3) maintaining and where necessary restoring the natural connectivity between the lakes and the mainstem of the river; (4) strengthening the *ex situ* conservation management programs and moving towards releasing animals from the semi-natural reserves into the Yangtze River and adjoining lakes as part of a step-wise restocking plan; (5) ensuring that the volume, speed, and routing of ship traffic in the Yangtze River are managed in a way that incorporates protection of the porpoises; and (6) implementing a year-round fishery ban throughout the entire Yangtze River basin, although concerns on the feasibility of such a plan remain.

In discussion, the sub-committee noted progress and **commended** the efforts undertaken by the Chinese government, Wang Ding and colleagues and local NGOs. Nevertheless, the sub-committee also expressed concern over several threats to YFP, which include vessel strikes, bycatch and underwater noise. In particular, vessel traffic is most intense alongshore

due to favourable currents, which is where much prime porpoise habitat occurs. There is substantial concern over the planned construction of new bridges in YFP habitat, as there is evidence that these bridges inhibit the animals' movements. More research is needed to corroborate this. Planned construction of a dam across the channel connecting Poyang Lake to the river is an additional concern. Based on the construction plans, the widest possible gate for porpoise movement would be 60m across, which could be too narrow to allow porpoises to move freely into and out of the lake.

The sub-committee highlighted the need for post-release monitoring in order to document the fate of animals that are released back into natural habitat in the Yangtze system and more generally to assess the effectiveness of a restocking program. It was acknowledged that following YFP post-release is extremely challenging. Nevertheless, Wang Ding noted that one animal was released into a semi-natural reserve following 7 years in captivity. The animal was retrained to forage in the wild before being released. Subsequently, this individual has produced several offspring, some of which produced offspring of their own, with documented records up to 4 generations.

The sub-committee **re-iterated its previous recommendation** that primary conservation actions should focus on restoring and maintaining suitable habitat for porpoises throughout the Yangtze River and associated lakes. This includes maintaining a network of *in situ* reserves, making efforts to ensure that genetic diversity is preserved and limiting harmful human activities.

Attention: SC, CG-R

Given the extensive and pervasive nature of the threats that the Yangtze Finless Porpoise population faces, primary conservation actions should focus on restoring and maintaining suitable habitat throughout the Yangtze River and associated lakes, the sub-committee:

Re-iterates its previous recommendation *that a network of in situ reserves is maintained and efforts are made to ensure that genetic diversity is preserved and that harmful human activities are limited.*

7.3 Māui dolphin

New Zealand's annual update on its research and management approach for Māui dolphin provided data on sightings, necropsies and fisheries observer coverage as well as information on current research projects to inform a review of management measures scheduled for later this year (SM08). Observer coverage of the set net fishery in Taranaki was 95.5%, and coverage of the trawl fisheries adjacent to existing closure areas was 88.3%. Outside of this target coverage area, an additional 114 trawl fishing days were observed. No captures of Māui dolphins were reported by observers or fishermen in commercial fisheries in the 12-month reporting period to 31 March 2018. A necropsy on the only beachcast dead dolphin reported in this period determined that the animal had suffered multiple shark bites prior to death. Preliminary analysis of acoustic data collected in Māui dolphin habitat showed that dolphins were detected at 8, 10, and 12 km offshore, but not 14, 16, or 18 km offshore.

A species-specific, spatially explicit, multi-threat risk assessment is being developed for Māui and Hector's dolphins. A workshop is scheduled for July 2018, where the risk associated with fishing and non-fishing threats, including threats to health, will be evaluated for various management scenarios. The results of this assessment will inform consultation on an updated Threat Management Plan later in 2018. Full details and results of the Hector's and Māui dolphin-specific risk assessment will be submitted to the Scientific Committee in 2019.

The Committee **welcomes** the update on Maui dolphins provided and looks forward to receiving the species-specific, spatially explicit, multi-threat risk assessment in 2019.

Attention: SC, CG-R, CC

The sub-committee ***notes*** *that no new management action regarding the Māui dolphin has been enacted since 2013. It therefore* ***concludes****, as it has repeatedly in the past, that existing management measures in relation to bycatch mitigation fall short of what has been recommended previously and* ***expresses continued grave concern*** *over the status of this small, severely depleted subspecies. The human-caused death of even one individual would increase the extinction risk. In addition, the sub-committee:*

Re-emphasises *that the critically endangered status of this subspecies and the inherent and irresolvable uncertainty surrounding information on most small populations point to the need for precautionary management; (2)* ***reiterates*** *its previous recommendation that highest priority should be assigned to immediate management actions to eliminate bycatch of Māui dolphins including closures of any fisheries within the range of Māui dolphins that are known to pose a risk of bycatch to dolphins (i.e. set net and trawl fisheries);*

Notes *that the confirmed current range extends from Maunganui Bluff in the north to Whanganui in the south, offshore to 20 n.miles, and it includes harbours - within this defined area, fishing methods other than set nets and trawling should be used;*

Respectfully encourages *the New Zealand Government to commit to specific population increase targets and timelines for Māui dolphin conservation; and*

Respectfully requests *that reports be provided on progress towards the conservation and recovery goals as updates become available.*

7.4 Cruise report from North Western Africa

SC/67b/ASI01 reported on the 3rd cetacean sighting survey in the coastal waters of Guinea, Sierra Leone and Liberia from 6-12 March 2018. The purpose was to obtain information on distribution and abundance of cetaceans in the EEZ's of member countries of the Ministerial Conference on Fisheries Cooperation Among African States Bordering the Atlantic (COMHAFAT/ATLAFCO). The survey was carried out by the Centre National des Sciences Halieutiques de Boussoura of Guinea (CNSHB) under the auspices of COMHAFAT, with the collaboration of African fisheries institutions and fisheries research centres such as the University of Abidjan in Côte d'Ivoire, the IMROP of Nouadhibou in Mauritania, the Direction des Pêches Maritimes in Congo Brazzaville, the National Fisheries and Aquaculture Authority in Monrovia, Liberia, and the Ministry of Fisheries and Marine Resources in Freetown, Sierra Leone.

The survey used line transect methods authorised by the SC. Searching was carried out from the N/O General Lansana Conte (29.93m Guinean research vessel) according to the procedure and protocol used in the IWC/SOWER cruise (Matsuoka *et al.* 2003, Diallo *et al.* 2013), covering 558.1 n.miles of transects. Fourteen schools of 5 species for a total of 433 individual cetaceans were sighted as follows: 8 schools and 204 individuals of bottlenose dolphins, one school of 5 pantropical spotted dolphins, 3 schools of 34 individuals of Atlantic spotted dolphins, one school of 40 of unidentified dolphins, and one school of 150 spinner dolphins.

The sub-committee thanked Diallo for this report on this poorly surveyed area. The absence of sightings of common dolphins, which are present just north of the survey area, was noted. A more substantive analysis and mapping of species presence might be achieved by combining the results of this survey with those of two previous surveys reported to the Committee. It was also noted that if the SC were given ample notice of future cruises, this would allow members to provide methodological, equipment, training and even personnel support.

In discussion, attention was also drawn to a recent publication that reported on cetacean surveys in 2013-14 and on issues affecting cetaceans somewhat further north off the coasts of Ghana and Côte d'Ivoire (de Boer *et al.*, 2016).

7.5 Monodontids (report on workshop)

Suydam presented the Global Review of Monodontids Report from a workshop 13-16 March 2017 in Hellerød, Denmark (NAMMCO, 2018). He noted that the SC last reviewed the monodontids (with emphasis on white whales and little attention given to narwhals) in 1999 (IWC, 2000). That review suffered from a lack of full participation by scientists from Canada, Greenland and Russia. Also, because of limited time the review was relatively cursory. Since 1999, the sub-committee has recommended an updated monodontid review several times and a steering committee was formed to investigate how best to proceed.

The steering committee concluded that involving researchers from all range states including Canada (not an IWC member) was necessary for a quality and thorough review. In discussions with the North Atlantic Marine Mammal Commission (NAMMCO) and other potential sponsors, it was concluded that a four-day workshop would be needed to conduct a thorough global review of the status of both monodontid species. NAMMCO assumed primary responsibility for organising and hosting the workshop and for preparing and publishing the report. Researchers and subsistence hunters from across the Arctic and subarctic participated. Several IWC scientists also participated, including Litovka, Reeves, and Suydam. Researchers were asked to provide status reviews prior to the workshop for each of the stocks and those detailed reviews were made available as supplements to the main report. All materials are available on NAMMCO's website (*https://nammco.no*).

The main report from the workshop summarises what is known about the status of narwhal and white whale populations/stocks. It provides information, including maps, for 12 stocks of narwhals and 22 stocks of white whales. There may be more stocks than this as information on stock structure is incomplete for some areas. Table 2 on page 66 of the report summarises information about each stock. Since the 1999 IWC review, a great deal of new information has become available regarding population abundance, movements, removals, and threats. Some of the abundance estimates are outdated and trend data are lacking for many of the stocks. The summary information and identification of threats and concerns will be helpful in prioritising future research. Some stocks are doing well but conservation actions are desperately needed for some others.

Reeves noted that the IUCN Red List status and documentation for both species was updated (to Least Concern) in December 2017 and that the information summarised in the NAMMCO review was very useful for those assessments (*http://www.iucnredlist.org/*).

Wade expressed appreciation for the review and acknowledged the value of summarising relevant information for each stock, but pointed out that some terminology used in the report was incorrect. Specifically, for many of the stocks a threshold for evaluating hunting catches was calculated and referred to as the 'Potential Biological Removal' (PBR). Although calculations were made that were similar to the PBR formula (e.g., Taylor *et al.*, 2000), a point estimate of abundance (N_{best}) was used instead of a minimum population estimate (N_{min}). The thresholds calculated are therefore more closely related to Maximum Sustainable Yield (MSY) (it actually represents the MSY rate multiplied by the current abundance, therefore, under the assumption of a logistic population dynamics model, it will equal MSY when the population is at the MSY level). The sub-committee agreed and recommended that the terminology and method be used correctly in future assessments.

Suydam commented that the main objectives of the review were to identify stocks, and then for each stock to summarise the available information on status and trends, removals, threats and levels of conservation concern. The report will be useful for recommendations regarding future research and monitoring and management actions. Wade noted that the assessment appeared to consider 'sustainability' to be the main conservation objective, though this was not explicitly stated, nor was the term specifically defined. The sub-committee concluded that the assessment could have benefited from a more clearly defined objective but the summary information was nevertheless of considerable value. In particular, the highlighting of specific stocks of the highest conservation concern was one of the most important outputs. Those stocks are listed in Table 1.

The sub-committee thanked NAMMCO for completing this valuable review of monodontids.

Also, the sub-committee **drew attention** to the recommendations contained in the NAMMCO report and **encouraged** their implementation, particularly those pertaining to the stocks of greatest concern.

Table 1

Types and levels of concern for the 8 stocks identified and reviewed by NAMMCO and considered of greatest concern.

Stock	Concern
White whales	
Ungava Bay	Possibly extirpated
Cook Inlet	Very small stock, decreasing trend, multiple threats
St. Lawrence Estuary	Small stock, likely decreasing trend, multiple threats
Cumberland Sound	Small stock, likely decreasing trend, possible overharvest
Eastern Hudson Bay	Limited knowledge about abundance, stock structure, threats
Barents-Kara-Laptev Sea	Data deficient, high past removals, rapidly changing habitat
Narwhals	
Melville Bay	Small stock, overharvest
East Greenland	Low abundance, data deficient, overharvest, habitat concerns

8. REVIEW TAKES OF SMALL CETACEANS

8.1 New Information on directed catches

Information presented at SC/67a on the takes of small cetaceans was updated based on data compiled from online sources[2] and data presented in the progress report on small cetacean research (see Appendix 3). It summarises data on small cetacean fisheries in calendar year 2016, as well as research conducted during April 2016 to March 2017 by the National Research Institute of Far Seas Fisheries. The data and information on small cetaceans from online sources are not included in the 'National Progress Report' submitted by Japan to the SC/67a meeting. Direct catches of small cetaceans are given in the table by prefecture and type of fisheries. These data have been collected by the International Affairs Division of the Fisheries Agency of the Ministry of Agriculture, Forestry and Fisheries of the Government of Japan (FAJ), based on reports from prefectural governments. It was noted that catch statistics in the Japan Progress Report on small cetacean cover catches in the calender year, that is, from 1 January to 31 December, following the guidelines for IWC National Progress Report, while the catch quota of small cetacean fisheries are set seasonally. Thus, in some cases, the calendar yearly catch may exceed the seasonal (yearly) catch in appearance, but in such cases, the actual seasonal catch is aligned with the allocated catch quota.

In discussion, it was noted that the catch of 1,057 Dall's porpoises in the hand harpoon hunt was significantly lower than previously recorded reported and below the quota. It was opined that this is a result of the destruction of the community that conduct this hunt, rather than a change in the cetacean population, following the earthquake and tsunami of 2011.

The sub-committee thanked Jimenez in compiling these data and noted the absence of Funahashi at this year's meeting. Funahashi has assisted with the compilation and interpretation of Japan catch statistics for many years and her contribution to this sub-committee is much appreciated.

8.2 Live captures

SC/67b/SM10 reported on new guidelines on national legislation regarding live capture of cetaceans for commercial purposes developed by the Convention on Migratory Species (CMS). At its 11th meeting in 2014, the Conference of the Parties to the Convention on the Conservation of Migratory Species of Wild Animals (CMS) adopted Resolution 11.22 on Live Capture of Cetaceans for Commercial Purposes. Amongst other things, it called upon Parties to develop and/or implement national legislation prohibiting the live capture of cetaceans from the wild for commercial purposes, and also urged Parties to consider taking stricter domestic measures in line with CITES Article XIV with regard to the import and international transit of live cetaceans. In order to assist Parties to implement this Resolution, the CMS Secretariat developed Best Practice Guidelines which were endorsed at the 12th Meeting of the Conference of the Parties (COP12) in October 2017 through Resolution 11.22 (Rev.COP12). These Guidelines include two sets of recommendations:

- Recommendations for Developing National Legislation for Prohibiting the Live Capture of Cetaceans for Commercial Purposes; and

[2] *http://www.jfa.maff.go.jp/j/whale/w_document/attach/pdf/index-9.pdf.*

- Recommendations for Implementing Stricter Domestic Measures Relating to Import and Transit of Live Cetaceans for Commercial Purposes.

A questionnaire survey was conducted that asked CMS Parties to review to what degree relevant legislation was already in place to implement Resolution 11.22. Thirty-eight responded that existing legislation allowed for full implementation of the resolution; twenty responded that existing legislation allows partial implementation; one Parties response was inconsistent; and three responded that no relevant legislation was in place. Sixty Parties did not respond.

As IWC and CMS aim to work together on relevant common issues across conventions, this sub-committee agreed to continue liaising with CMS over the issue of live capture of cetaceans for commercial purposes.

Rose reported that Pacific Scientific Research Institute of Fisheries and Oceanography (TINRO) will consider a quota of 13 killer whales for 2018 and is holding a public hearing in Vladivostok on 3 May 2018 to take comments on this plan. This proposed new quota still considers killer whales in the Sea of Okhotsk as one population.

Zharikov informed the sub-committee that the proposal for killer whale catch quotas in the Sea of Okhotsk is based on the latest abundance assessment of over 3,000 individuals. This number is considered minimal since only 50% of the sea had been surveyed in 2010. According to Zharikov, there are too many uncertainties in the information on Okhotsk Sea killer whales to recognise the existence of separate stocks within the basin, and therefore to describe their distribution and estimate their abundance individually. Color and fin patterns, observed feeding behaviour and what is known about movements of killer whales in the region do not allow clear identification of different ecotypes, while all genetic samples analysed to date having, according to Zharikov, belong to a single population. Consequently, the Okhotsk Sea killer whales are managed by Russia as a single stock. Based on a 'PBR' approach, the total take recommended by the Russian authorities is 13 killer whales in various parts of the basin. This proposed take limit will be subject to a public hearing, and consultations with government and independent experts, after which a quota may be issued.

In discussion, it was noted that most published information on Okhotsk Sea killer whale abundance and stock structure is in the Russian-language literature, or as part of internal documents. It was also noted that with regard to killer whales in Russia, the sub-committee has previously recommended that the two ecotypes of killer whales should be recognised and managed as distinct units.

Attention: C-A, CG-A

The sub-committee ***reiterates*** *its long-standing recommendation that no small cetacean removals (live capture or directed harvest) should be authorised until a full assessment has been made of their sustainability. This is especially important for killer whales because populations are generally small and have strong social bonds and removals have unknown effects on their demographic structure.*

The sub-committee:

Reiterates *its concern that removals of killer whales are occurring from the Okhotsk Sea population.*

In light of the verbal report received at this meeting that Russian authorities intend to proceed to consider limits of allowable live-capture removals of killer whales in the Sea of Okhotsk on the basis that there is no stock structure and there are no ecotype differences between the populations in this region, the sub-committee:

Encourages *more extensive effort to examine these issues and* ***requests*** *that relevant analyses be provided for the Scientific Committee's consideration at its next meeting.*

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9. STATUS OF THE VOLUNTARY FUND FOR SMALL CETACEAN CONSERVATION RESEARCH

9.2 Status of funds and review progress of funded projects

In 2017, donations for the Voluntary Fund for Small Cetacean Conservation Research totalling £13,122 were received from the Government of Italy. At the end of the financial year 2017, this brought the total of the fund to £81,077.

The sub-committee expressed its sincere gratitude for Italy's contributions and noted that these funds support critical conservation research projects of direct relevance to the work of this sub-committee. It was noted in discussion that a previously funded project, the study of Irrawaddy dolphins in Sarawak, Malaysia, had recently contributed to the Important Marine Mammal Areas (IMMAs) process of the IUCN.

Five projects were offered funding following the 2016 call for proposals (*Table*). The Chair informed the committee that the project proposed by Weir was no longer being funded as the application had been withdrawn. It was noted that the Indus river dolphin abundance survey had been completed in 2017 and was reported at SC/67a. Short summaries of the active projects were provided by the Principal Investigators Sanjurjo, Heinrich and Lai.

The main objective of Sanjurjo's project is to develop a business model for fishermen in the Upper Gulf of California, Mexico, using vaquita friendly fishing gear. Sanjurjo reported good progress on this project, with positive feedback from participating fishermen with constructive suggestions on fishing gear modification and the fine tuning of the season that the new gear was suitable for. Sanjurjo has requested an extension of this project for a new completion date in June 2018.

The main objective of Heinrich's project is to estimate the population size of the Chilean dolphin in six areas of known and predicted occurrence in the Ecoregion Chiloense. Between December 2017 and April 2018, several areas were successfully surveyed, including a new area far to the south of the initially proposed study boundaries. The additional survey was funded from the small cetacean fund, following review of a modified proposal submitted by Heinrich. A total of 1,198km was surveyed and 98 groups of Chilean dolphins, 70 groups of Peale's dolphins, five groups of Burmeister's porpoise, four groups of bottlenose dolphins, one sei whale and one blue whale were encountered (including sightings in transit areas). Surprisingly, some 1,000km outside its normal range, a Commerson's dolphin was encountered, in addition to multiple purported hybrids. Three biopsy samples were obtained from these possible hybrids for detailed genetic analyses.

The main objectives of Lai's project are to search relevant information posted on Chinese social media platforms and visit a sample of the fish markets identified during this search to obtain additional data on marine mammals in markets in southern China. A total of 75 hours of online searching resulted in 250 reports, of which 146 were unique incidents. Of these 122 reports contained sufficient information to establish a date and location to provincial or specific locations. Eight species were identified, of which six were small cetaceans. By far, the majority of unique reports recorded were of finless porpoise (88% of identified species). The individuals reported were obtained from strandings, bycatch and deliberately from encounters at seas/in the river. Some individuals were obtained from intermediary buyers, so the circumstances of their capture/death are not known.

Full reports shall be posted on the IWC website (*https://iwc.int/sm_fund*) when projects are completed.

The Chair noted that at this time the fund was insufficient to make a call for new proposals, however, it was anticipated that new funds may be obtained following the 2018 Commission meeting. Material on the fund projects and a presentation on the fund will be given at the 2018 Commission meeting to encourage parties to donate to the fund so that a new call for projects may be possible in 2019.

Table 2

Projects proposed for funding after the 2016 Call for Proposals.

PI	**Project Title**
Heinrich	First region-wide estimates of population size and status of endemic Chilean dolphins (*Cephalorhynchus eutropia*) in southern Chile.
Lai	Assessment of online information as a tool to improve the documentation of the availability of marine mammals for consumption and other uses in southern China.
Weir	Assessing the conservation status of the Atlantic humpback dolphin (*Sousa teuszii*) in the Saloum Delta, Senegal.
Sanjurjo	Business model to save vaquita from extinction while improving fishermen livelihoods in the Upper Gulf of California.
Khan	Abundance survey for Indus River dolphin

Depending on available funds, it is planned to spend the remaining balance of the Fund on IP support for SC/68a, Task Team initiatives and other such work that might facilitate the work of this sub-committee. In the meantime, effort to build up the fund will continue intersessionally so that a new call for proposals can be announced after the 2018 Commission Meeting.

10. WORK PLAN AND BUDGET REQUESTS

10.1 Priority topics for 2019 to 2024

The sub-committee discussed ongoing priorities and agreed to continue the development of these intersessionally.

10.2 Work plan for 2019-20

Table 3

Work plan for Small Cetacean (SM) Sub-committee.

Topic	Intersessional 2018/19	2019 Annual Meeting (SC/68a)	Intersessional 2019/20	2020 Annual meeting
Franciscana CMP	ICG to co-ordinate outcomes of CMP across sub-committees	Report to scientific committee	ICG to synthesis actions from 2019 SC report and develop a work plan	Report to sub-committee
Wildmeat	ICG to plan and conduct African Workshop.	Report to sub-committee	Email group to summarise workshop series and develop future work plan.	Report to sub-committee
Small Cetacean Task Team	Intersessional Workshop on South Asian river dolphins.	Report to sub-committee	Act on recommendations from 2018/19 River dolphin workshop.	Report to sub-committee
Sotalia	ICG to plan and conduct workshop #1 (at SOLOMAC)	Report to sub-committee	ICG to plan and conduct final	Report to sub-committee

Table 4

Overview of intersessional working groups.

SC Agenda Item/ Sub-Committee	Type	Group (short name)	Terms of Reference	Members
Item 17.3 SM	ICG-30	Poorly documented takes of small cetaceans	Develop a draft 'toolbox' of investigative techniques to assist in documenting more clearly takes of small cetaceans; and organise a workshop comprising a multi-disciplinary group of biologists, social scientists, managers and NGOs with a global scope. Increase formal liaison with other MEA.	Porter (Convenor), Baker, Brownell, Collins, Cosentino, Donovan, Fortuna, Frey, Jiminez, Parsons, R. Reeves, Scheidat, Simmonds. *wildmeatSG@dist.iwc.int*
Item 17 SM	SG-22	Small Cetacean Task Team	Assist the Scientific Committee in providing timely and effective advice on situations where a population of cetaceans is or suspected to be in danger of a significant decline that may eventually lead to its extinction; the ultimate aim being to ensure that extinction does not occur.	Simmonds (Convenor), Bjørge, Donovan, Fortuna, Genov, Parsons, Porter, R. Reeves, Scheidat. *taskteamSG@dist.iwc.int*
Item XX.XX SM/CMP	ICG-xx	Franciscana	Co-ordinate presentation of CMP projects across sub-committees at SC/68a.	Iñiguez (Convenor), Cunha, Zerbini, Ia Marcondes, Siciliano, Domit, Secchi, Crespo, Cremer, Brito-Junior, Santos, Ott, Di Tullio
Item XX-XX SM	ICG-xx	Aquatic Wildmeat Database	Discuss: (1) which research questions the 'Aquatic Wildmeat Database' could help answer and to assess the best approach for data validation and quality control for data obtained other than from the SM sub-committee; and (2) an overarching aim for any future IWC cetacean wildmeat database, and to identify specific questions that such a database might address.	Cosentino (Convenor), Avila, Collins, Double, Gallego, Ingram, Reeves, R., Simmonds, Slooten, Suydam, Trujillo.

10.3 Budget requests for 2019-20

Table 5

Summary of the 2-year budget request for Small Cetacean Sub-Committee.

RP no.	Title	2019 (£)	2020 (£)
Meetings/Workshop			
Task Team - Workshop	Inter-sessional Workshop of the task team on South Asian River dolphins	8,958	
Small Cetacean Workshop	Guiana dolphin pre-assessement (*Sotalia guianensis*) by the IWC Scientific Committee	9,990	
Modelling/Computing			
Research			
Database/Catalogues			
Total request		**18,948**	

11. ADOPTION OF THE REPORT

The report was adopted at 15:21 on 2nd May 2018.

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Appendix 1

AGENDA

1. INTRODUCTORY ITEMS

    1.1 Convenor's opening remarks

    1.2 Election of Chair and appointment of rapporteurs

    1.3 Adoption of agenda

    1.4 Review of documents

2. A REVIEW OF SMALL CETACEANS IN RIVERS AND ESTUARIES IN SOUTH AMERICA

    2.1 *Inia* spec.

    2.2 *Sotalia* spec. (all riverine populations plus lake Maracaibo)

    2.3 *Tursiops* spec. (populations occurring in estuarine areas in southern Brazil)

3. FRANCISCANA CMP

    3.1 Preparation for an in-depth review for 2019

4. REPORTING ON PROGRESS OF TURSIOPS TAXONOMY

5. POORLY DOCUMENTED TAKES FOR FOOD, BAIT OR CASH AND CHANGING PATTERN OF USE

    5.1 Results of workshops

    5.2 Update on wild meat database

6. SMALL CETACEAN TASK TEAM

    6.1 Progress on South Asian river dolphins task team

7. PROGRESS ON PREVIOUS RECOMMENDATIONS

    7.1 Vaquita (update on CIRVA Progress)

        7.1.1 Dolphin bycatch in totoaba nets

        7.1.2 Vaquita

    7.2 Yangtze finless porpoise

    7.3 Māui dolphin

    7.4 Cruise report from North Western Africa

    7.5 Monodontids (report on workshop)

8. REVIEW TAKES OF SMALL CETACEANS

    8.1 Directed catches

    8.2 Live captures

9. STATUS OF THE VOLUNTARY FUND FOR SMALL CETACEAN CONSERVATION RESEARCH

    9.1 Status of funds and review progress of funded projects

10. WORK PLAN AND BUDGET REQUESTS

    10.1 Priority topics for 2019 to 2024

    10.2 Work plan for 2019-20

    10.3 Budget requests for 2019-20

11. ADOPTION OF THE REPORT

Appendix 2

PROPOSED PROCESS FOR THE REVIEW OF THE STATUS OF THE FRANCISCANA (*PONTOPORIA BLAINVILLEI*) BY THE IWC SCIENTIFIC COMMITTEE

Almeida, Andriolo, Barreto, Crespo, Dalla-Rosa, Di Tullio, Domit, Fruet, Iñíguez, Luna, Marcondes, Secchi, Siciliano, Suarez, Zerbini

The franciscana (*Pontoporia blainvillei*) is a small cetacean endemic to southwestern Atlantic coastal waters between central Brazil and central Argentina (Fig. 1, Crespo *et al.* 1998, Siciliano *et al.* 2002). It is considered the most threatened marine cetacean species in South America (Secchi *et al.* 2003a) and is listed as 'Vulnerable' by the IUCN (Zerbini *et al.*, 2017). Incidental mortality in gillnet fisheries has been a major conservation concern for franciscanas but the species is also exposed to other threats of potential concern throughout its range (such as coastal development, marine debris, diseases and vessel traffic; e.g. Denuncio *et al.*, 2011; Di Beneditto and Ramos, 2014).

In 2003 the range of the franciscana was divided into four 'Franciscana Management Areas', or FMAs, numbered I to IV (Secchi *et al.*, 2003b). Subsequently, FMA I was divided into two separate management units: FMA Ia and FMA Ib (Cunha *et al.*, 2014; Anonymous, 2015). These areas are illustrated in Fig. 1.

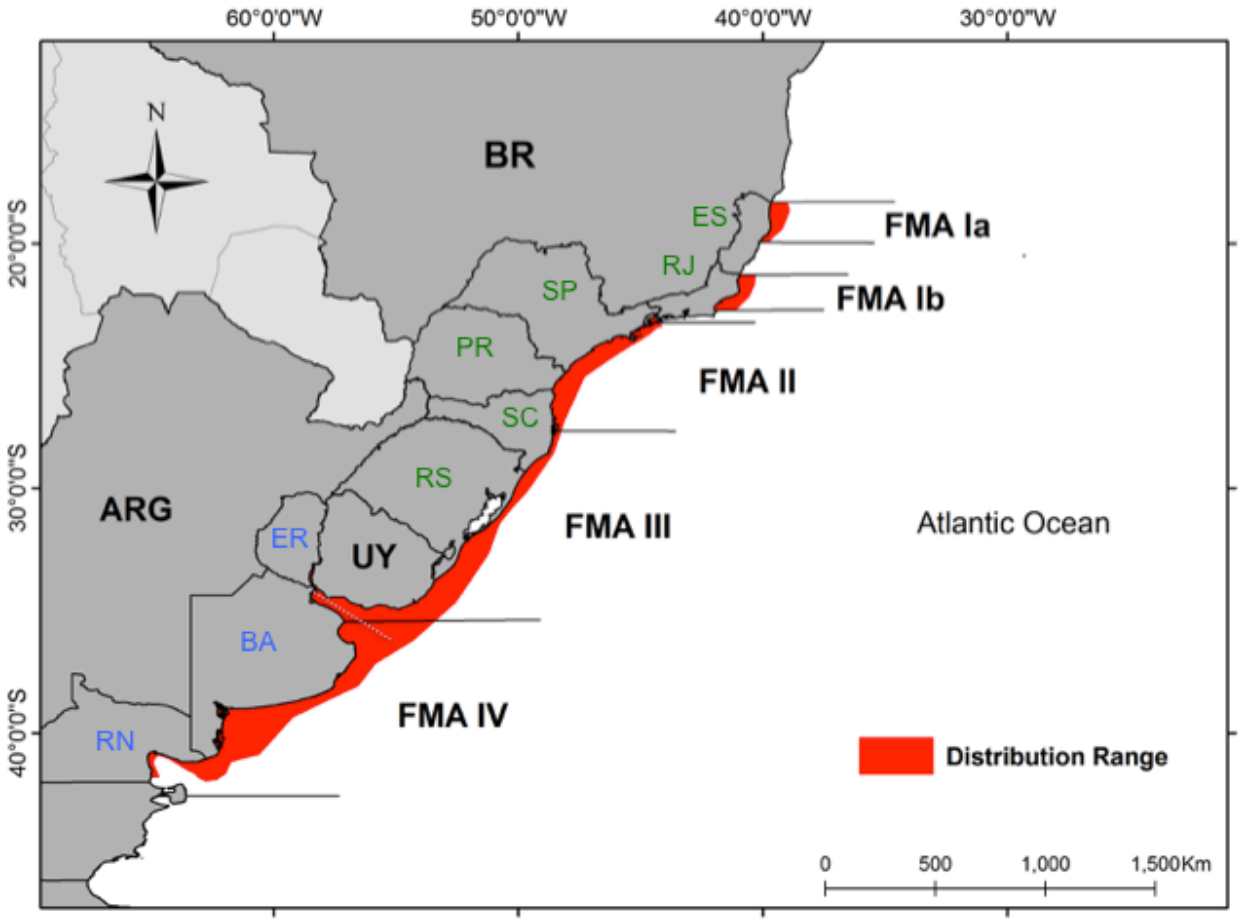

Fig. 1. Map indicative of the franciscana distribution and the boundaries of the Franciscana Management Areas along the coast of Brazil (BR), Uruguay (UY) and Argentina (ARG). Acronyms for states in Brazil and provinces in Argentina are indicated in green and blue, respectively (ES = Espírito Santo, RJ = Rio de Janeiro, SP = São Paulo, PR = Paraná, SC = Santa Catarina, RS = Rio Grande do Sul, ER = Entre Ríos, BA = Buenos Aires and RN = Río Negro).

The SC first reviewed the status of the franciscana in 2004 and the species has been on the agenda of the Committee for a number of years now. A task team for FMA I was established in 2015 and resulted in two documents being presented at this meeting (CMP 03 and CMP 05). In 2016, the IWC created a Conservation Management Plan (CMP) for the franciscana. A review of the status of the franciscana by the SC is timely because substantial new information has been produced since the last review. In addition, and perhaps most important, a review of the status of the species will be key to refine research, monitoring and conservation/management recommendations and actions specified in the recently established Franciscana CMP. This document proposes a review process to be initiated at SC67b, continuing intersessionally and ending with the completion of the review in 2019 (SC/68a).

The review process suggested here includes the intersessional preparation of review papers on stock structure, abundance and trends, threats, biological parameters and conservation/management actions. These papers would be prepared by

collaborating scientists working on the various FMAs as specified in Table 1 (note that additional collaborators can be added during the development of the review if applicable). The review papers listed in this table are linked to actions identified in the Franciscana CMP. The review papers (and potentially supporting documentation) shall be submitted to next year's meeting for review by the relevant sub-committees/working groups as illustrated in Fig. 2.

An intersessional email group will be established to coordinate the review. The email group would be composed of at least the Franciscana CMP coordinator and the point of contact (POC) for each review topic identified in Table 1.

Table 1

Review topics (by Franciscana Management Area (FMA) when applicable) and initially suggested potential collaborators to perform the reviews.

Topic for Review	Area	Possible Collaborators	CMP actions
Stock structure	All FMAs	Cunha (POC), Gariboldi, Mendez, Oliveira, Ott, Secchi	RES1
Abundance estimates	All FMAs	Zerbini (POC), Andriolo, Crespo, Danilewicz, Sucunza,	MON1
Threats	FMA Ia	Marcondes (POC), Azevedo, Brito-Junior, Cremer	MON1
	FMA Ib	Siciliano (POC), Brito-Junior, Hauser Davis,	
	FMA II	Domit (POC), Barreto, Bertozzi, Cremer, Santos, Trevisani, Zerbini	
	FMA III	Secchi (POC), Castilho, Danilewicz, Ott, Prado	
	FMA IV	Crespo (POC), Bordino	
Biological parameters	FMA Ia	Cremer (POC), Marcondes, Bisi, Brito-Junior	MTI1, MTI2, MTI3
	FMA Ib	Brito-Junior (POC), Bisi, Siciliano	
	FMA II	Santos (POC), Barreto, Bertozzi, Cremer, Domit, Zerbini	
	FMA III	Ott (POC), Botta, Castilho, Danilewicz, Secchi	
	FMA IV	Crespo (POC), Bordino	
Management and Conservation actions	Brazil	Di Tullio (POC), Domit, Fruet, Monteiro, Ott, Prado, Siciliano, Secchi, Zerbini	
	Argentina	Iñiguez (POC), Bordino, Crespo	
	Uruguay	To be determined	

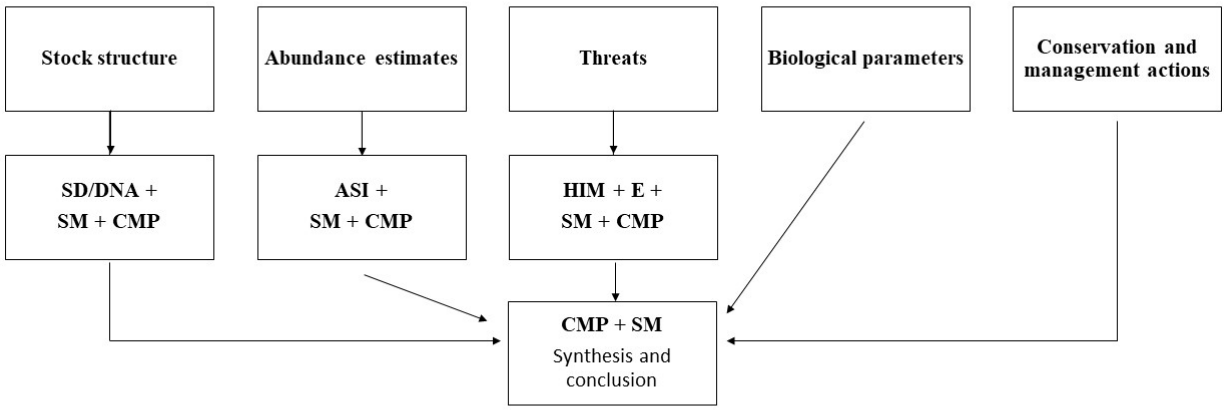

Fig. 2. Diagram showing how the different topics reviewed will be presented to the sub-committees of the SC.

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Appendix 3

DIRECT TAKES OF SMALL CETACEAN IN JAPAN BY TYPE OF FISHERY AND PREFECTURE OF DEPARTURE PORT, 2002 TO 2016

		Quota																				
	Prefecture	2007/08	2009/10	2011/12	2013/14	2014/15	2015/16	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Baird's beaked whale																						
SW	Hokkaido	14	14	14	14	14	14	10	10	10	14	12	14	13	14	14	30	14	14	14	12	12
SW	Miyagi+Chiba	52	52	52	52	52+4*1	52	26/26	26/26	26/26	26/26	25/26	27/26	25/26	27/26	26/26	May-26	31/26	26/22	26/30	21/24	25/24
Short-finned pilot whale (northern form)																						
SW	Miyagi	36	36	36	36	36	36	47	42	13	22	7	-	-	-	-	-	-	-	-	-	-
Short-finned pilot whale (southern form)																						
SW	Chiba+Wakayama	36	36	36	36	36	36	Jan-35	27	29	24	-/10	-/16	-/20	-/22	-/10	-/-	Jan-15	-/10	01-Feb	May-15	3 / 2
D	Wakayama	277/254	230/207	184/161	196	185	151	55	55	62	40 (2)	198 (8)	243 (5)	99 (1)	219 (1)	-	74 (6)	172 (7)	88 (1)	41 (2)	80	41
H	Okinawa	92/85	77/69	61/53				38	36	72	90	56	79	62	54	34	46	25	47	18	9	21
Risso's dolphin					**487**	**478**	**469**															
SW	Wakayama	20/-	-	-	-	-	-	12	19	7	8	7	20	-	-		-	-	-	-	-	-
D	Wakayama	295/290	285/280	275/270	-	-	-	221 (1)	191 (5)	444 (7)	340	232	312 (8)	216 (8)	336 (8)	271 (10)	273 (17)	188 (24)	298 (12)	260 (7)	211	232
H	Wakayama	246/242	238/234	230/226	-	-	-	154	168	60	46	105	185	122	94	126	104	52	38	103	13	1
False killer whale																						
SW	Wakayama	-/20	20	20	20	20	20		-	-	-	-	-	-	-	-	-	-	1	3	-	-
D	Shizuoka	10	10	10	100	100	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D	Wakayama	70	70	70	-	-	-	7	17 (5)	-	-	30 (24)	-	-	-	-	17 (10)	-	-	-	-	-
H	Okinawa	20	20	20	-	-	-	-	4	3	1	5	4	5	1	-	3	-	-	-	1	-
Striped dolphin					**595**	**580**	**565**															
D	Shizuoka	63/56	49/42	35/28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D	Wakayama	450	450	450	-	-	-	565	382	554	397 (2)	479	384	535 (5)	321	458 (2)	406 (8)	508 (2)	498 (1)	367	353	625
H	Chiba	72/64	56/48	40/32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H	Wakayama	100	100	100	-	-	-	77	68	83	60	36	86	65	98	100	96	94	67	63	22	10
Bottlenose dolphin					**673**	**615**	**558**															
D	Shizuoka	71/67	63/59	55/51	-	-	-	-	-	24(15)	-	-	-	-	-	-	-	-	-	-	-	-
D	Wakayama	842/795	747/700	652/604	-	-	-	760 (72)	121 (16)	570 (95)	285 (36)	285 (80)	300 (77)	297 (57)	352 (98)	395 (168)	76 (25)	186 (131)	190 (84)	172 (78)	181	147
H	Wakayama	95/89	84/79	73/68	-	-	-	38	52	43	66	75	97	93	77	38	40	73	68	35	43	11
H	Okinawa	9	8	7	-	-	-	3	7	10	10	12	4	1	4	1	3	3	3	-	-	5
Pantropical spotted dolphin					**606**	**560**	**515**															
D	Shizuoka	409/365	318/272	227/181				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D	Wakayama	400	400	400				400	102	-	-	400 (13)	-	329 (6)	-	125 (16)	106 (2)	98	126 (45)	145 (35)	59	20
H	Wakayama	70	70	70				18	30	2	13	5	16	-	3	7	2	12	4	18	-	2
Pacific white-sided dolphin					**360**	**360**	**360**															
D	Shizuoka	36	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D	Wakayama	134	134	134	-	-	-	-	-	-	-	-	-	21 (16)	14 (13)	27 (17)	24 (21)	2 (2)	39 (29)	5 (4)	7	6
H	Iwate	154	154	154	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H	Wakayama	36	36	36	-	-	-	-	-	-	-	-	-	-	7	-	-	2	-	-	-	-
Dall's porpoise (Dalli type) *2					**6.837**	**6.524**	**6.212**															
H	Hokkaido	1,451/1,399	1,348/1,296	1,244/1,192				1.328	1.655	647	1.24	719	841	467	308	116	-	-	-	-	-	-
H	Aomori	18/16	14/12	10/8				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H	Iwate	6,969/6,721	6,472/6,224	5,975/5,726				6.057	6.427	3.796	5.394	3.312	2.975	1.947	1.362	1.14	89	29	77	14	11	1
H	Miyagi	269/260	250/241	231/221				229	226	171	246	181	254	180	103	-	-	-	18	2	4	-
Dall's porpoise (Truei type) *2					**6.656**	**6.404**	**6.152**															
H	Hokkaido	98/95	92/89	86/83				89	84	66	51	44	44	66	-	2	-	-	-	-	-	-
H	Iwate	8,054/7,805	7,557/7,308	6,860/6,611				8.243	7.325	9.109	7.733	7.758	7.243	4.566	7.767	3.532	1.855	376	1.198	1.588	1.549	1057
H	Miyagi	16	15	214				3	3	-	-	-	-	-	-	129	8	-	-	32	28	1

Key: (N) shows number sold alive within all catch, and including research use. SW=small type whaling; D=drive fishery; H=hand harpoon fishery. Year for quota is for each season, actual catch is for calendar year. *1For Baird's beaked whale, carryover is permitted. *2The great east Japan earthquake and tsunami on 11th March 2011 affected the Dall's porpoise fishery area and caused a drop in the catch to well below pre-earthquake levels.

Sources: Japan. Progress reports on small cetacean research, Japan Fisheries Agency*: http://www.jfa.maff.go.jp/j/whale/w_document/pdf/h14_progress_report.pdf; http://www.jfa.maff.go.jp/j/whale/w_document/pdf/h15_progress_report.pdf; http://www.jfa.maff.go.jp/j/whale/w_document/pdf/h16_progress_report.pdf; http://www.jfa.maff.go.jp/j/whale/w_document/pdf/h17_progress_report.pdf; http://www.jfa.maff.go.jp/j/whale/w_document/pdf/h18_progress_report.pdf; http://www.jfa.maff.go.jp/j/whale/w_document/pdf/h19_progress_report.pdf; http://www.jfa.maff.go.jp/j/whale/w_document/pdf/h20_progress_report.pdf; http://www.jfa.maff.go.jp/j/whale/w_document/pdf/110425_progress_report.pdf; http://www.jfa.maff.go.jp/j/whale/w_document/pdf/120516_progress_report.pdf; http://www.jfa.maff.go.jp/j/whale/w_document/pdf/130531_progress_report.pdf; http://www.jfa.maff.go.jp/j/whale/w_document/pdf/h25.pdf; http://www.jfa.maff.go.jp/j/whale/w_document/pdf/h26.pdf; http://www.jfa.maff.go.jp/j/whale/w_document/attach/pdf/index-4.pdf; http://www.jfa.maff.go.jp/j/whale/w_document/attach/pdf/index-9.pdf;* Small cetacean fisheries and resource study (in Japanese), Fisheries Research Agency: *http://kokushi.job.affrc.go.jp/H20/H20_45.pdf; http://kokushi.job.affrc.go.jp/H22/H22_45.pdf; http://kokushi.job.affrc.go.jp/H24/H24_45.pdf; http://kokushi.job.affrc.go.jp/H25/H25_45.pdf*

Appendix 4

FISHERY BYCATCH AND VESSEL STRIKES OF SMALL CETACEANS REPORTED IN THE 2018 PROGRESS REPORT DATABASE

Complied by Marion Hughes

Table 1

Fishery bycatch of small cetaceans.

Argentina

Large Area	Local Area	Species	Year	Indivi-duals*	Targeted species	Gear Type
Atlantic Ocean - South	Coastal Buenos Aires province	Franciscana (Pontoporia blainvillei)	2018	9	-	-
Atlantic Ocean - North	Coastal Buenos Aires province	Burmeister's porpoise (Phocoena spinipinnis)	2018	1	-	-

Australia

Large Area	Local Area	Species	Year	Indivi-duals*	Targeted species	Gear Type
Southern Ocean	Spencer Gulf	Common dolphin (Delphinus delphis)	2017	12	Sardine	[PS1] SURROUNDING NETS - One-boat operated purse seines, [PS2] SURROUNDING NETS - Two-boat operated purse seines
Southern Ocean	Investigator Strait/Backstairs Passage	Common dolphin (Delphinus delphis)	2017	7	Unknown	[NK] GEAR NOT KNOWN OR NOT SPECIFIED
Pacific Ocean – Tasman Sea	Terrigal, NSW	Common dolphin (Delphinus delphis)	2017	1	-	[NSC] SHARK CONTROL NETS
Atlantic Ocean - North	The Entrance	Andrews' beaked whale (Mesoplodon bowdoini)	2017	1	-	[NSC] SHARK CONTROL NETS
Atlantic Ocean – North	Caves Beach, NSW	Indo-Pacific bottlenose dolphin (Tursiops aduncus)	2017	1	-	[NSC] SHARK CONTROL NETS
Atlantic Ocean – North	Manly, NSW	Common dolphin (Delphinus delphis)	2017	1	-	[NSC] SHARK CONTROL NETS
Atlantic Ocean - North	North Avoca, NSW	Common dolphin (Delphinus delphis)	2017	1	-	[NSC] SHARK CONTROL NETS
Pacific Ocean – South	-	Common bottlenose dolphin (Tursiops truncatus)	2017	1	-	[PTB] TRAWLS - Otter trawls (side or stern)
Pacific Ocean – South	Queensland	Common dolphin (Delphinus delphis)	2017	8	White, tiger, bull sharks	[NSC] SHARK CONTROL NETS
Pacific Ocean – South	Queensland East Coast	Australian snubfin dolphin (Orcaella heinsohni)	2017	2	-	[GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified)
Pacific Ocean – South	Queensland	Common bottlenose dolphin (Tursiops truncatus)	2017	3	White, tiger, bull sharks	[NSC] SHARK CONTROL NETS
Pacific Ocean - South	Queensland	Indo-Pacific humpback dolphin (Sousa chinensis)	2017	1	White, tiger, bull sharks	[NSC] SHARK CONTROL NETS
Pacific Ocean - South	Gulf of Carpentaria	Indo-Pacific bottlenose dolphin (Tursiops aduncus)	2017	1	-	[GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified)
Indian Ocean	Western Australia	Common bottlenose dolphin (Tursiops truncatus)	2017	2	-	MIS] MISCELLANEOUS GEAR
Pacific Ocean – South	-	Common bottlenose dolphin (Tursiops truncatus)	2017	1	-	[TBB] TRAWLS - Bottom trawls
Pacific Ocean – South	-	Common bottlenose dolphin (Tursiops truncatus)	2017	4	-	[OT] MIDWATER TRAWLS - Otter trawls (not specified)
Pacific Ocean – South	-	Common bottlenose dolphin (Tursiops truncatus)	2017	4	-	[GNS] GILLNETS AND ENTANGLING GEAR - Set gillnets (anchored)
Pacific Ocean – South	-	Common bottlenose dolphin (Tursiops truncatus)	2017	1	-	[LLD] HOOKS AND LINES - Drifting longlines
Pacific Ocean – South	-	Common dolphin (Delphinus delphis)	2017	19	-	[GNS] GILLNETS AND ENTANGLING GEAR - Set gillnets (anchored)
Pacific Ocean – South	-	Common dolphin (Delphinus delphis)	2017	3	-	[TBB] TRAWLS - Bottom trawls
Pacific Ocean – South	-	Unidentified dolphin	2017	9	-	[LLD] HOOKS AND LINES - Drifting longlines
Pacific Ocean – South	-	Unidentified dolphin	2017	3	-	[TBB] TRAWLS - Bottom trawls
Pacific Ocean – South	-	Unidentified dolphin	2017	41	-	[GNS] GILLNETS AND ENTANGLING GEAR - Set gillnets (anchored)
Pacific Ocean – South	-	Unidentified dolphin	2017	1	-	[TBB] TRAWLS - Bottom trawls
Pacific Ocean – South	Terrigal, Central Coast NSW AUS	Common dolphin (Delphinus delphis	2017	1	-	[NSC] SHARK CONTROL NETS
Pacific Ocean – South	-	Common bottlenose dolphin (Tursiops truncates)	2017	4	-	[OT] MIDWATER TRAWLS - Otter trawls (not specified)

Large Area	Local Area	Species	Year	Indivi-duals*	Targeted species	Gear Type
Pacific Ocean – South	The Entrance NSW AUS	Common dolphin (Delphinus delphis)	2017	1	-	[NSC] SHARK CONTROL NETS
Pacific Ocean – South	-	Common dolphin (Delphinus delphis)	2017	4	-	[GNS] GILLNETS AND ENTANGLING GEAR - Set gillnets (anchored)
Pacific Ocean – South	Lighthouse beach, Ballina, NSW	Indo-Pacific bottlenose dolphin (Tursiops aduncus)	2017	1	-	[NSC] SHARK CONTROL NETS
Pacific Ocean – South	Caves Beach, NSW, AUS	Common bottlenose dolphin (Tursiops truncatus	2017	1	-	[NSC] SHARK CONTROL NETS
Pacific Ocean – South	Shelly Beach, Ballina, NSW, AUS	Indo-Pacific bottlenose dolphin (Tursiops aduncus)	2017	1	-	[NSC] SHARK CONTROL NETS
Pacific Ocean – South	Manly	Common dolphin (Delphinus delphis)	2017	1	-	[NSC] SHARK CONTROL NETS
Pacific Ocean – South	Soldiers Beach, Central Coast North	Common bottlenose dolphin (Tursiops truncatus)	2017	1	-	[NSC] SHARK CONTROL NETS
Pacific Ocean – South	Jervis Bay	Indo-Pacific bottlenose dolphin (Tursiops aduncus)	2017	1	-	[LX] HOOKS AND LINES - Hooks and lines (not specified)

Croatia

Large Area	Local Area	Species	Year	Indivi-duals*	Targeted species	Gear Type
Atlantic Ocean - Adriatic Sea	Eastern Adriatic Sea	Common bottlenose dolphin (Tursiops truncatus)	2016	4	-	-
Atlantic Ocean - North	Eastern Adriatic Sea	Common bottlenose dolphin (Tursiops truncatus)	2017	6	-	[NK] GEAR NOT KNOWN OR NOT SPECIFIED

France

Large Area	Local Area	Species	Year*	Indivi-duals*	Targeted species	Gear Type
Atlantic Ocean - Bay of Biscay	-	Common dolphin (Delphinus delphis)	2015	4	RAJ/MNZ/ SOX	GTR] GILLNETS AND ENTANGLING GEAR - Trammel nets
Atlantic Ocean - Bay of Biscay	-	Common dolphin (Delphinus delphis)	2015	3	HKE/MNZ/ POL	[GNS] GILLNETS AND ENTANGLING GEAR - Set gillnets (anchored)
Atlantic Ocean - Bay of Biscay	-	Common dolphin (Delphinus delphis)	2015	2	SBX	[PTM] MIDWATER TRAWLS - Pair trawls
Atlantic Ocean - Bay of Biscay	-	Harbour porpoise (Phocoena phocoena)	2015	2	MNZ/JOD	[GTR] GILLNETS AND ENTANGLING GEAR - Trammel nets

Korea

Large Area	Local Area	Species	Year	Indivi-duals*	Targeted species	Gear Type
Pacific Ocean - Yellow Sea	-	Finless porpoise (Neophocaena phocaenoides)	2017	436	-	[FPO] TRAPS - Pots, [FSN] TRAPS - Stow nets, [GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified), [TM] MIDWATER TRAWLS - Midwater trawls (not specified)
Pacific Ocean - Yellow Sea	-	Common dolphin (Delphinus delphis)	2017	1	-	[GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified)
Pacific Ocean - Sea of Japan/East Sea	-	Pacific white-sided dolphin (Lagenorhynchus obliquidens)	2017	140	-	[FIX] TRAPS - Traps (not specified), [FPO] TRAPS - Pots, [GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified), [TM] MIDWATER TRAWLS - Midwater trawls (not specified)
Pacific Ocean - Sea of Japan/East Sea	-	Finless porpoise (Neophocaena Phocaenoides)	2017	28	-	[GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified), [FIX] TRAPS - Traps (not specified)
Pacific Ocean - Sea of Japan/East Sea	-	Common dolphin (Delphinus delphis)	2017	651	-	[LL] HOOKS AND LINES - Longlines (not specified), [FIX] TRAPS - Traps (not specified), [FPO] TRAPS - Pots, [GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified), [TM] MIDWATER TRAWLS - Midwater trawls (not specified)
Pacific Ocean - Sea of Japan/East Sea	-	Common bottlenose dolphin (Tursiops truncatus)	2017	13	-	[TM] MIDWATER TRAWLS - Midwater trawls (not specified), [FIX] TRAPS - Traps (not specified)
Pacific Ocean - Sea of Japan/East Sea	-	Risso's dolphin (Grampus griseus)	2017	1	-	[GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified)
Pacific Ocean - Sea of Japan/East Sea	-	False killer whale (Pseudorca crassidens)	2017	8	-	[FIX] TRAPS - Traps (not specified), [TM] MIDWATER TRAWLS - Midwater trawls (not specified)
Pacific Ocean - Yellow Sea	-	Killer whale (Orcinus orca)	2017	1	-	[FIX] TRAPS - Traps (not specified)

Mexico

Large Area	Local Area	Species	Year	Individuals*	Targeted species	Gear Type
Pacific Ocean - North	Zihuatanejo, Guerrero	Spinner dolphin (Stenella longirostris)	2017	2	-	[SX] SEINE NETS - Seine nets (not specified)
Pacific Ocean - Gulf of California (Sea of Cortés)	Upper Gulf of California	Vaquita (Phocoena sinus)	2018	4	-	[GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified)

Netherlands

Large Area	Local Area	Species	Year	Individuals*	Targeted species	Gear Type
Atlantic Ocean - North	North Sea	Harbour porpoise (Phocoena phocoena)	2016	0	-	[GEN] GILLNETS AND ENTANGLING GEAR - Gillnets and entangling gillnets (not specified)
Atlantic Ocean - North	Dutch North Sea	Harbour porpoise (Phocoena phocoena)	2017	11	-	[GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified)

New Zealand

Large Area	Local Area	Species	Year	Individuals*	Targeted species	Gear Type
Pacific Ocean - New Zealand	Cannibal Bay, Catlins	Gray's beaked whale (Mesoplodon grayi)	2017	1	Unknown	[TBB] TRAWLS - Bottom trawls
Pacific Ocean - New Zealand	West Coast	Hector's dolphin (Cephalorhynchus hectori)	2017	1	Unknown	[GNS] GILLNETS AND ENTANGLING GEAR - Set gillnets (anchored)
Pacific Ocean - New Zealand	South Timaru	Hector's dolphin (Cephalorhynchus hectori)	2017	1	SPO: Rig	[GNS] GILLNETS AND ENTANGLING GEAR - Set gillnets (anchored)
Pacific Ocean - New Zealand	Pegasus Bay, Canterbury	Hector's dolphin (Cephalorhynchus hectori)	2017	1	SPO: Rig	[GNS] GILLNETS AND ENTANGLING GEAR - Set gillnets (anchored)
Pacific Ocean - New Zealand	Northland	Common dolphin (Delphinus delphis)	2017	10	SKJ: Skipjack tuna	[PS] SURROUNDING NETS - With purse lines
Pacific Ocean - New Zealand	North Taranaki	Common dolphin (Delphinus delphis)	2017	1	TRE:Trevally	[GNS] GILLNETS AND ENTANGLING GEAR - Set gillnets (anchored)
Pacific Ocean - New Zealand	East Cape	Common dolphin (Delphinus delphis)	2017	1	TAR:Tarakihi	[TBB] TRAWLS - Bottom trawls
Pacific Ocean - New Zealand	Bay of Plenty	Common dolphin (Delphinus delphis)	2017	1	TAR:Tarakihi	[TBB] TRAWLS - Bottom trawls
Pacific Ocean - New Zealand	Bay of Plenty	Common dolphin (Delphinus delphis)	2017	1	TAR:Tarakihi	[TBB] TRAWLS - Bottom trawls
Pacific Ocean - New Zealand	West Coast	Unidentified beaked whale (Unid. Ziphiid)	2017	1	SWO:Swordfish	[LLD] HOOKS AND LINES - Drifting longlines
Pacific Ocean - New Zealand	Bay of Plenty	Common dolphin (Delphinus delphis)	2017	1	TAR: Tarakihi	[TBB] TRAWLS - Bottom trawls
Pacific Ocean - New Zealand	East Cape	Common dolphin (Delphinus delphis)	2017	2	TAR: Tarakihi	[TBB] TRAWLS - Bottom trawls
Pacific Ocean - New Zealand	Kaikoura	Dusky dolphin (Lagenorhynchus obscurus)	2017	2	HPB: Hapuku and bass	[GNS] GILLNETS AND ENTANGLING GEAR - Set gillnets (anchored)
Pacific Ocean - New Zealand	Taranaki	Common dolphin (Delphinus delphis)	2017	1	WAR: Common warehou	[GNS] GILLNETS AND ENTANGLING GEAR - Set gillnets (anchored)
Pacific Ocean - New Zealand	Bay of Plenty	Common dolphin (Delphinus delphis)	2017	1	TAR: Tarakihi	[TBB] TRAWLS - Bottom trawls
Pacific Ocean - New Zealand	Unknown	Common dolphin (Delphinus delphis)	2017	1	Unknown	-
Pacific Ocean - New Zealand	Bay of Plenty	Common dolphin (Delphinus delphis)	2017	1	EMA: Blue mackerel	[PS1] SURROUNDING NETS - One-boat operated purse seines
Pacific Ocean - New Zealand	Unknown	Dusky dolphin (Lagenorhynchus obscurus)	2017	1	Unknown	-
Pacific Ocean - New Zealand	Banks Peninsula	Hector's dolphin (Cephalorhynchus hectori)	2017	1	SPO: Rig	[GNS] GILLNETS AND ENTANGLING GEAR - Set gillnets (anchored)
Pacific Ocean - New Zealand	Banks Peninsula	Killer whale (Orcinus orca)	2017	1	SWA: Silver warehou	[TM] MIDWATER TRAWLS - Midwater trawls (not specified)
Pacific Ocean - New Zealand	East Cape	Common bottlenose dolphin (Tursiops truncatus)	2017	1	TAR: Tarakihi	[TBB] TRAWLS - Bottom trawls
Pacific Ocean - New Zealand	East Cape	Common bottlenose dolphin (Tursiops truncatus)	2017	1	STN: Southern bluefin tuna	[LLD] HOOKS AND LINES - Drifting longlines
Pacific Ocean - New Zealand		Common dolphin (Delphinus delphis)	2017	1	BIG: Bigeye tuna	LLD] HOOKS AND LINES - Drifting longlines
Pacific Ocean - New Zealand	Cook Strait	Common dolphin (Delphinus delphis)	2017	1	HOK: Hoki	[TM] MIDWATER TRAWLS - Midwater trawls (not specified)
Pacific Ocean - New Zealand	Cook Strait	Common dolphin (Delphinus delphis)	2017	1	HOK: Hoki	[TM] MIDWATER TRAWLS - Midwater trawls (not specified)
Pacific Ocean - New Zealand	Hawkes Bay	Common dolphin (Delphinus delphis)	2017	1	SNA: Snapper	[TBB] TRAWLS - Bottom trawls
Pacific Ocean - New Zealand	Hauraki Gulf	Common bottlenose dolphin (Tursiops truncatus)	2017	1	SNA: Snapper	[TBB] TRAWLS - Bottom trawls
Pacific Ocean - New Zealand	East Cape	Long- or short-finned pilot whale (Globicephala sp.)	2017	1	TAR: Tarakihi	[TBB] TRAWLS - Bottom trawls
Pacific Ocean - New Zealand	Bay of Plenty	Unidentified beaked whale (Unid. Ziphiid)	2017	1	STN: Southern bluefin tuna	[LLD] HOOKS AND LINES - Drifting longlines

Norway

Large Area	Local Area	Species	Year	Indivi-duals*	Targeted species	Gear Type
Atlantic Ocean - North	Kvænangen, Reisa	Killer whale (Orcinus orca)	2017	2	-	[PS1] SURROUNDING NETS - One-boat operated purse seines
Atlantic Ocean - North	Møkkalasset fyr, Tvedestrand	Harbour porpoise (Phocoena phocoena)	2017	1	-	[GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified)

Spain

Large Area	Local Area	Species	Year	Indivi-duals*	Targeted species	Gear Type
Atlantic Ocean - North	Tenerife, Canary Islands. Adeje	Atlantic spotted dolphin (Stenella frontalis)	2017	1	-	[LX] HOOKS AND LINES - Hooks and lines (not specified)
Atlantic Ocean – North	Tenerife, Canary Islands- Mont-aña Pelada. Granadilla de Abona	Atlantic spotted dolphin (Stenella frontalis)	2017	1	-	[LX] HOOKS AND LINES - Hooks and lines (not specified)
Atlantic Ocean – North	Tenerife, Canary Islands. Los Gigantes. Santiago del Teide	Atlantic spotted dolphin (Stenella frontalis)	2017	1	-	[HAR] GRAPPLING AND WOUNDING - Harpoons
Atlantic Ocean – North	La Gomera, Canary Islands. San Sebastian	Atlantic spotted dolphin (Stenella frontalis)	2017	1	-	[HAR] GRAPPLING AND WOUNDING - Harpoons
Atlantic Ocean - Mediterranean Sea	Gulf of Valencia	Striped dolphin (Stenella coeruleoalba)	2017	3	-	[TBB] TRAWLS - Bottom trawls
Atlantic Ocean - North	Canary Islands	Atlantic spotted dolphin (Stenella frontalis)	2017	3	-	-
Atlantic Ocean – North	Pte. da Toxa Illa Da Toxa-O Grove PO5	Common bottlenose dolphin (Tursiops truncatus)	2017	2	-	[NK] GEAR NOT KNOWN OR NOT SPECIFIED
Atlantic Ocean – North	I. Ons (Illa de Ons-Bueu) PO5	Common bottlenose dolphin (Tursiops truncatus)	2017	1	-	-
Atlantic Ocean - North	Ría Aldán (Cangas) PO5	Common dolphin (Delphinus delphis)	2017	1	-	-
Atlantic Ocean – North	B. Mexilloeira (O Grove) PO5	Common dolphin (Delphinus delphis)	2017	1	-	-
Atlantic Ocean – North	P. Congorza (Cangas) PO6	Andrews' beaked whale (Mesoplodon bowdoini)	2017	1	-	-
Atlantic Ocean – North	P. Raeiros (O Grove) PO5	Risso's dolphin (Grampus griseus)	2017	1	-	-
Atlantic Ocean – North	P. Raeiros (O Grove) PO5	Risso's dolphin (Grampus griseus)	2017	1	-	-
Atlantic Ocean – North	-	Andrews' beaked whale (Mesoplodon bowdoini)	2018	0	-	-

UK

Large Area	Local Area	Species	Year	Indivi-duals*	Targeted species	Gear Type
Atlantic Ocean – North	-	Common dolphin (Delphinus delphis)	2017	12	Unknown	[NK] GEAR NOT KNOWN OR NOT SPECIFIED
Atlantic Ocean – North	-	Harbour porpoise (Phocoena phocoena)	2017	7	Unknown	[NK] GEAR NOT KNOWN OR NOT SPECIFIED
Atlantic Ocean – North	-	Northern bottlenose whale (Hyperoodon ampullatus)	2017	1	Unknown	[NK] GEAR NOT KNOWN OR NOT SPECIFIED

USA

Large Area	Local Area	Species	Year	Indivi-duals*	Targeted species	Gear Type
Atlantic Ocean – North	-	Risso's dolphin (Grampus griseus)	2015	2	Pelagic swordfish, tuna, billfish	[LL] HOOKS AND LINES - Longlines (not specified)
Atlantic Ocean – North	-	Long- or short-finned pilot whale (Globicephala sp.)	2015	32	As above	[LL] HOOKS AND LINES - Longlines (not specified)
Atlantic Ocean – North	-	Common dolphin (Delphinus delphis)	2015	1	As above	[LL] HOOKS AND LINES - Longlines (not specified)
Atlantic Ocean – North		Unidentified beaked whale (Unid. Ziphiid)	2015	1	As above	[LL] HOOKS AND LINES - Longlines (not specified)
Atlantic Ocean - Gulf of Mexico	-	Sperm whale (Physeter macrocephalus)	2015	1	As above	[LL] HOOKS AND LINES - Longlines (not specified)
Atlantic Ocean - North	-	Atlantic white-sided dolphin (Lagenorhynchus Acutus)	2015	3	-	[TBB] TRAWLS - Bottom trawls
Atlantic Ocean – North	-	Common dolphin (Delphinus delphis)	2015	6	-	[GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified)
Atlantic Ocean – North	-	Andrews' beaked whale (Mesoplodon bowdoini)	2015	30	-	[TBB] TRAWLS - Bottom trawls
Atlantic Ocean – North	-	Harbour porpoise (Phocoena phocoena)	2015	25	-	[GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified)
Atlantic Ocean - North	-	Andrews' beaked whale (Mesoplodon bowdoini)	2015	4	-	[TBB] TRAWLS - Bottom trawls
Atlantic Ocean – North	-	Risso's dolphin (Grampus griseus)	2015	1	-	[TBB] TRAWLS - Bottom trawls

Large Area	Local Area	Species	Year	Indivi-duals*	Targeted species	Gear Type
Atlantic Ocean - North	-	Common bottlenose dolphin (Tursiops truncatus)	2015	2	-	[TBB] TRAWLS - Bottom trawls
Pacific Ocean – North	Clallam, WA	Blainville's beaked whale (Mesoplodon densirostris)	2016	1	-	[GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified)
Pacific Ocean – North	CA	Long-beaked common dolphin (Delphinus capensis)	2016	4	-	[NK] GEAR NOT KNOWN OR NOT SPECIFIED, [LX] HOOKS AND LINES - Hooks and lines (not specified), [GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified)
Pacific Ocean – North	San Juan, WA	Dall's porpoise (Phocoenoides dalli)	2016	1	-	[GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified)
Pacific Ocean – North	OR-WA	Harbour porpoise (Phocoena phocoena)	2016	7	-	[NK] GEAR NOT KNOWN OR NOT SPECIFIED, [GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified)
Pacific Ocean – North	OR	Northern right whale dolphin (Lissodelphis borealis)	2016	2	-	[NK] GEAR NOT KNOWN OR NOT SPECIFIED, [TM] MIDWATER TRAWLS - Midwater trawls (not specified)
Pacific Ocean – North	CA and WA	Pacific white-sided dolphin (Lagenorhynchus Obliquidens)	2016	9	-	[NK] GEAR NOT KNOWN OR NOT SPECIFIED, [TM] MIDWATER TRAWLS - Midwater trawls (not specified)
Pacific Ocean - North	San Diego, CA	Risso's dolphin (Grampus griseus)	2016	1	-	[GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified)
Pacific Ocean – North	OR	Striped dolphin (Stenella coeruleoalba)	2016	3	-	[GN] GILLNETS AND ENTANGLING GEAR - Gillnets (not specified)
Pacific Ocean - North	OR	Unidentified dolphin	2016	1	-	[TM] MIDWATER TRAWLS - Midwater trawls (not specified)

** This column has been aggregated.*

Table 2

Vessel strikes of small cetaceans.

Argentina

Large Area	Local Area	Species	Year	Indivi-duals	Submitted to IWC or National Ship Strike Database	Source of Information
Atlantic Ocean - South	Bahia San Julian	Commerson's dolphin (Cephalorhynchus commersonii)	2017	0	Unknown	National Collator

Australia

Large Area	Local Area	Species	Year	Indivi-duals*	Submitted to IWC or National Ship Strike Database	Source of Information
Southern Ocean	Spencer Gulf/ Investigator Strait	Pygmy sperm whale (Kogia breviceps)	2017	0	No	South Australian Museum
Indian Ocean	Western Australia	Common bottlenose dolphin (Tursiops truncatus)	2017	0	Unknown	Department of Parks and Wildlife WA

UK

Large Area	Local Area	Species	Year	Indivi-duals	Submitted to IWC or National Ship Strike Database	Source of Information
Atlantic Ocean – North		Common dolphin (Delphinus delphis)	2017	0	Unknown	UK_CSIP

USA

Large Area	Local Area	Species	Year	Indivi-duals	Submitted to IWC or National Ship Strike Database	Source of Information
Atlantic Ocean - Gulf of Mexico		Common bottlenose dolphin (Tursiops truncatus)	2016	0	Unknown	NMFS Southeast Fisheries Science Center
Pacific Ocean - North	Marin, CA	Baird's beaked whale (Berardius bairdii)	2016	0	Unknown	NMFS Southeast Fisheries Science Center

** This column has been aggregated*