

# **Report of the Scientific Committee**

**Nairobi, Kenya, 10-23 May 2019**

## **Annex M Report of the Sub-Committee on Small Cetaceans**

**This report is presented as it was at SC/68A.  
There may be further editorial changes (e.g. updated references, tables, figures)  
made before publication.**

**International Whaling Commission  
Nairobi, Kenya, 2019**



## Annex M

### Report of the Sub-Committee on Small Cetaceans

**Members:** Porter (Convenor), Trujillo (Co-Convenor): Andrianarivelo, Archer, Atkins, Baker, Bjørge, Braulik, Brownell, Castro, Charlton, Cipriano, Collins, Currey, Debrah, Donovan, Ferriss, Frisch-Nwakanma, Gallego, Genov, Goetz, Gonzalez, Hall, Herr, Hoelzel, Holm, Hubbell, Ingram, Iñíguez, Jimenez, Keith-Diagne, Kitakado, Lang, Lee, Lent, Lundquist, Mallette, Marcondes, Minton, Mora, Mwabili, Naylor, Nelson, Palka, Panigada, Parsons, Plön, Reyes Reyes, Ridoux, Ritter, Rojas-Bracho, Rose, Santos, Scheidat, Sharp, Simmonds, Slooten, Smith, Stachowitsch, Stockin, Suydam, Svoboda, Tarzia, Tiedemann, Trejos Lasso, Urban, van de Water, Vermeulen, Waerebeek, Weller, Willson, Wilson, Yaipen-Llanos, Zerbini.

#### 1. INTRODUCTION

##### 1.1 Opening remarks

Porter and Trujillo welcomed the participants to the meeting and provided an introduction to the work methods of the IWC Scientific Committee and the focus of work of the Small Cetacean (SM) sub-committee. Porter thanked Scheidat for her valuable contributions to SM and noted the excellent progress made on many initiatives during her term as convenor and chair. Porter introduced Trujillo as SM co-convenor and noted his ongoing contributions to several ongoing IWC SC initiatives.

##### 1.2 Election of Chair and appointment of Rapporteurs

Porter and Trujillo were elected as Chairs and Cipriano and Jiménez-Assmus were appointed as rapporteurs.

##### 1.3 Adoption of Agenda

The adopted Agenda is given as Appendix 1.

##### 1.4 Review of available documents

The following available documents contained information relevant to the work of the sub-committee: SC/68A/SM01-03; SC/68A/SM05-06; SC/68A/CMP19-20; Baldwin *et al.*, 2018; Bolaños-Jiménez *et al.*, 2014; Braulik and Stern, 2019; Braulik *et al.*, 2017a; Braulik *et al.*, 2018; Collins *et al.*, 2013; 2017; de Bouer, *et al.*, 2016; Fielding 2018; Filatova *et al.*, 2014; International Whaling Commission, 2015, 2019; Metcalfe *et al.*, 2017; Minton *et al.*, 2017; Nature Tropicale NGO, 2018; Plön *et al.*, 2016; Southall *et al.*, 2013; Taylor *et al.*, 2019; Van Waerebeek *et al.*, 2008; and Vermeulen *et al.*, 2018.

#### 2. A REVIEW OF SMALL CETACEANS OF AFRICA

The years priority topic of was tackled, in part, during the Aquatic Wildmeat Workshop held immediately prior to SC68A. A summary of workshop information for West African countries is summarised under agenda item 3. A significant challenge identified by all West African countries was the paucity of resources, the vast extent of current data gaps and the necessity to rapidly deliver relevant information to management authorities for small cetacean populations that are already in crisis. Several case studies were presented that provided some solutions to this challenge.

##### 2.1 Tackling data gaps through rapid assessment and collaborative efforts

A cetacean rapid assessment was presented as an approach to fill knowledge gaps and target conservation across large data deficient areas (Braulik *et al.*, 2017a). Even basic information on cetacean species presence is unknown for tens of thousands of kilometres of coastline, particularly in Africa, Asia and South America, which is a major hurdle to conservation and management in these areas. A survey approach that can generate broad-scale, quantitative, baseline data on cetacean communities and potential threats, that can be conducted rapidly and cost-effectively across whole countries, or regions, was described. A pilot rapid assessment study in Tanzania was conducted in one year with field costs less than \$50,000, and integrated collection of data on cetaceans from visual, acoustic, and interview surveys with existing information from multiple sources, to provide low resolution data on cetacean community relative abundance, diversity and threats. Four principal threats were evaluated and compared spatially using a qualitative scale: cetacean mortality in fishing gear (particularly gillnets); cetacean hunting, consumption or use by humans; shipping-related collision risk and noise disturbance; and dynamite fishing. The most important area for cetaceans in Tanzania was the Pemba Channel, a deep, high-current waterway between Pemba Island and mainland Africa, where the highest relative cetacean diversity and a high relative abundance were recorded, but which is also subject to threats from fishing activities. This area is now being surveyed regularly for cetaceans and bycatch mitigation and has been proposed as an Important Marine Mammal

Area by the IUCN Cetacean Task Force. A rapid assessment approach can be applied in data deficient areas to quickly provide information on cetaceans that can be used by governments and managers for marine spatial planning, management of developments and to target research activities into the most important locations.

With the Rapid Assessment Framework, Tanzania moved from a situation of having little information in a small area, to having country-wide species information and topics for prioritisation in under two years. It is important to highlight that a rapid assessment is an initial investigation and is not an end point, rather as the first step from which focused studies or actions are applied. The sub-committee **welcomed** this initiative as a useful general framework to be applied in other regions that require broad scale data collection with a reduced budget. During discussion, the sub-committee noted that information obtained from the interviews during this case study was not reliable for species identification, and that the by-catch evaluation can be customised to take into account threats in different areas, particularly so risks to cetaceans associated with fishing activities could be better addressed. Thus, focal areas or action prioritisation can be easily identified. The sub-committee recognised the importance of this study as a case study that can be applied to other areas in Africa, a useful approach to quickly provide broad-scale information on relative occurrence of cetacean species, and the threats they face, across large data-deficient areas. Such data is valuable to management authorities and may provide a catalyst for conservation planning or the development of research priorities.

Boat surveys off Gabon were conducted under a collaborative agreement between the Oil and Gas Industry, the Government of Gabon and two international NGOs (Minton *et al.*, 2017). The survey aimed to support both a Government monitoring and compliance programme as well as gathering information on the distribution of and threats to marine megafauna. The dual-nature of the survey also led to increased collaboration between government agents and local scientists. During 22 days of survey effort over a two-year period, humpback whales (*Megaptera novaeangliae*), bottlenose dolphins (*Tursiops truncatus*), Atlantic humpback dolphins (*Sousa teuszi*) and common dolphins (*Delphinus delphis*) were documented. Bottlenose dolphins were present year-round and photo-identification was able to confirm that at least part of the population was resident. Small open-decked fishing vessels with gillnets were observed concentrated around river mouths within 2 km of shore, while commercial trawlers were at least 10 km offshore; all were confirmed to be registered and legal. This multi-stakeholder collaboration serves as an model by which funding and logistic support from private industry paired with technical expertise from NGOs and academic institutions can benefit marine and coastal conservation. This model can be particularly effective to obtain baseline data on both cetacean distribution and threats where resources, funding and logistics are limited. It may be particularly well suited in many African countries where marine protected areas or coastal parks have rangers in place and surveillance activities are regularly conducted. The sub-committee **noted** the value of a multi stakeholder approach and acknowledged that similar approaches could be applied across other countries, especially where resources are limited.

Vermuelen summarised the formation and activities of the SouSA Consortium, a national South African collaboration for the scientific research and conservation of Indian Ocean humpback dolphins (SC/68A/SM03). It had been previously recognised that there is a general lack of rigorous scientific data and knowledge on the species in South African waters, specifically those data which are not obtainable by individual research groups or from a limited geographical area. Therefore, a nation-wide research collaboration to address these issues was established in May 2016 between 18 partners from 15 different institutions. The consortium established specific recommendations to progress work, including ongoing development of relationships between consortium partners and a continuous effort to improve scientific knowledge on the species in South African waters. Other recommendations related to policy, including the development of a mitigation strategy to reduce bycatch in shark nets, the establishment of multiple-use management areas, and the design and implementation of strategies to reduce noise impact on the species. It was also noted that an improved educational outreach was essential, especially for those groups where improved knowledge might have immediate benefits to the species, such as recreational boaters.

The sub-committee **welcomed** this initiative and **encouraged** its continued efforts for studies of *Sousa plumbea* in South African waters.

The consortium's first publication was summarised (Vermuelen *et al.*, 2017). All existing photo-identification data of humpback dolphins in South Africa was collated in a common database. Results of the matching process indicated movements of individuals between most study areas, with distances ranging between 30 - 500 km. All photo-identification data were organised into a national catalogue. Current available data suggest national abundance may be well below the previous estimate of 1000 individuals, with numbers probably closer to 500. This study clearly indicates the importance of scientific collaboration when studying highly mobile and

endangered species and thus this group effort was able to more easily identify threats across the species range in South Africa. The paper concluded with a series of recommendations which the sub-committee agreed to endorse.

It was further highlighted that there are multiple regional consortia and the sub-committee **acknowledged** the value of the contributions these groups made to research and conservation (Table 1).

Table 1  
Current African and West Indian Ocean Consortia and Organisations.

Name of Consortium	Contact
Indian Ocean Network for Cetaceans Research (IndoCet)	<a href="http://indocet.org/">http://indocet.org/</a> <a href="mailto:info@indocet.org">info@indocet.org</a>
Arabian Sea Whale Network	<a href="https://arabianseawhalenetwork.org/">https://arabianseawhalenetwork.org/</a>
Northern Indian Ocean Killer Whale Alliance	<a href="https://niokillerwhales.wixsite.com/niokwa/about-the-alliance">https://niokillerwhales.wixsite.com/niokwa/about-the-alliance</a>
SouSA Consortium	Els Vermeulen ( <a href="mailto:elsvermeulen5@gmail.com">elsvermeulen5@gmail.com</a> )
Kenya Marine Mammals Network	Michael Mwangombe ( <a href="mailto:michael.mwangombe@watamumarine.co.ke">michael.mwangombe@watamumarine.co.ke</a> )
Tanzania Whale Network	Gill Braulik ( <a href="mailto:gillbraulik@downstream.vg">gillbraulik@downstream.vg</a> )
Western Indian Ocean Marine Science Association (WIOMSA)	Julius Francis ( <a href="mailto:secretary@wiomsa.org">secretary@wiomsa.org</a> )
The Nairobi Convention	Dixon Waruinge, Head of the Secretariat Nairobi Convention; ( <a href="mailto:dixon.waruinge@un.org">dixon.waruinge@un.org</a> )
World Wide Fund for Nature (WWF); the SWIO Regional Fisheries Programme, Regional Fisheries Programme	Edward Kimakwa ( <a href="mailto:ekimakwa@wwfafrica.org">ekimakwa@wwfafrica.org</a> ) Manuel Castiano ( <a href="mailto:mcastiano@wwf.org.mz">mcastiano@wwf.org.mz</a> )
South West Indian Ocean Fisheries Commission (SWIOFC)	Luca Garibaldi ( <a href="mailto:Luca.Garibaldi@fao.org">Luca.Garibaldi@fao.org</a> )
The IUCN Regional Office for Eastern and Southern Africa, Nairobi	<a href="https://www.iucn.org/esaro">https://www.iucn.org/esaro</a> ( <a href="mailto:info.esaro@iucn.org">info.esaro@iucn.org</a> )
TRAFFIC, South Africa and Tanzania Office	Richard Thomas ( <a href="mailto:richard.thomas@traffic.org">richard.thomas@traffic.org</a> )
South African Killer Whale Consortium	<i>A South African Killer Whale Consortium is currently being setup. Research activities have already begun with institutions collaborating on telemetry efforts off the south coast of South Africa</i>

Following positive outcomes from the establishment of SouSA Consortium, and the demonstrated success of other network, the sub-committee discussed the feasibility of extending or replicating the SouSA consortium into other countries specifically to address immediate threats to both Atlantic and Indian Ocean humpback dolphins. The available scientific evidence indicates that populations of humpback dolphins in Africa are facing severe and increasing threats to their conservation. The Atlantic humpback dolphin (*Sousa teuszii*) is listed as Critically Endangered on the IUCN Red List (Collins *et al.*, 2017) and the Indian Ocean humpback dolphin (*Sousa plumbea*) as globally Endangered (Braulik *et al.*, 2017b). This sub-committee has provided recommendations for scientific work and conservation actions for the Genus *Sousa* at several SC meetings since 1993. These included specific recommendations for the Atlantic humpback dolphin and various recommendations for the genus *Sousa* in Africa. Some of these recommendations have led to much needed work, but most current evidence suggests that both Atlantic and Indian Ocean humpback dolphin are in decline and in some areas, populations are at critically low levels. The primary cause of these declines is bycatch in coastal gillnets, although directed hunts and rapid coastal development and habitat loss are also important factors. These threats are increasing and will likely be exacerbated by rapid coastal development with inadequate assessment of threats posed to *Sousa* species.

*Attention: CG, R, CC*

*The Committee reiterates its previous concerns over the status of the genus *Sousa* and its recommendations to improve the situation (IWC, 2019). The Committee stresses the need to identifying high priority areas and populations of *Sousa* in Africa to obtain better information on status and mitigation and to assist in this:*

- 
- (1) **encourages** a wider collaboration among researchers who work on the genus *Sousa*, which include international collaboration for funding and capacity building, the development of regional and sub-regional research projects and co-ordination of data collection;
  - (2) **recommends** the establishment of an Africa focused 'Sousa Task Team' to (a) facilitate and co-ordinate work in response to IWC recommendations, (b) start working towards developing a comprehensive framework of conservation actions and (c) to report back to the SM convenors by September 2019; and
  - (3) **recommends** that South Africa develops a mitigation strategy to (a) reduce bycatch of *Sousa* in shark nets, (b) establish multiple-use management areas, and (c) design and implement strategies to reduce the impacts of noise.
- 

## 2.2 Updates on small cetacean status in Africa

### 2.2.1. Equatorial Guinea, São Tomé and Príncipe, Gabon, the Republic of Congo, the Democratic Republic of Congo and Angola

Collins provided information on cetacean mortality from Central African coasts, including Equatorial Guinea, São Tomé and Príncipe, Gabon, the Republic of Congo, the Democratic Republic of Congo and Angola (SC/68A/SM/05). Data were collected sporadically across an approximately ~17 year period spanning 2002-2019, although the authors also considered previously published records and reports. Most records were not linked to dedicated field effort except those in the Republic of Congo, where beach surveys were conducted over a seven-year period between 2009-2016. A total of 113 records were considered. Although records were sparse, bycatch is highlighted as the most prevalent cause of cetacean mortality in the Central African region; confirmed (n=41) and suspected (n=6) in 47 cases (41.6% of all records), where the cause of death could be attributed. When 'unknown mortality' was removed from the analysis, bycatch represented 64.4% of the total. Of these, many were subsequently utilised or traded by local communities for food and, likely, also as bait in fishing operations. The use of bycaught small cetaceans as food was documented in each of the countries considered herein, where such practises are likely well-established. Datasets for Gabon (n = 46, 40.7%) and the Republic of Congo (n = 48, 42.5%) were the largest and show clear differences in the levels of identified bycatch. This is likely a result of the quality of reporting and the limit scope of surveillance. Inshore gillnet fisheries occur in both countries, except along the coasts of southern Gabon. In Gabon, overt or suspected instances of bycatch are relatively rare, with only six confirmed or suspected instances recorded. In the Republic of Congo, instances of overt or suspected bycatch were much higher, with 34 confirmed (n=31) or suspected (n=3) bycatches. In Gabon, there were four instances of the non-targeted salvage of carcasses for food or bait (4 of 46 carcasses). In the Republic of Congo, there were 30 instances of small cetacean carcasses being used as wildmeat (30 of 34 bycatches, or 88.2% of cases); Atlantic humpback dolphins (n=18) and bottlenose dolphins (n=7). A five-year programme of intensive monitoring, enforcement, and cooperative and incentivised surveys, was conducted in Conkouati-Douli National Park. This resulted in the documentation of 19 bycaught dolphins, across 14 landing sites over a 60-km stretch of protected beach. Of the specimens recorded, 10 were Atlantic humpback dolphins and the testimony of fishermen indicated that all were caught in gillnets, less than 1 km from shore (Collins *et al.*, 2013). Records for São Tomé and Príncipe are relatively few but indicate that dolphin meat is consumed when available and that this is likely a growing trend, as evidenced by new trade specifically for small cetacean wildmeat. In some communities on the north and west coasts of the island of São Tomé, interview surveys suggested that dolphins were occasionally harpooned for food and subsequently traded. The need to engage with local communities for research endeavours was highlighted and a case study was discussed that demonstrated how such trust can quickly lead to useful research outcomes. Fishing effort was reliably collected by installing low cost GPS tracking devices onto fishing vessels on a voluntary basis (Metcalf *et al.*, 2017). It took time to engender trust; once established, the fishermen engaged willingly. This study also revealed that artisanal fishermen disliked catching small cetaceans as net repairs were more costly than any profit made from selling the carcass and that the trawling fleet were responsible for most of the observed bycatch.

---

Attention: R, CG

The Committee **welcomes** the new data from six Central African countries provided in (Collins *et al.*, 2019) and **encourages** further work to improve information from these data poor areas. The high mortality of Atlantic humpback dolphins in the Conkouati-Douli National Park, Republic of Congo, is of **particular concern**, given the likely small population size and restricted range of the population. The Committee **recommends** that the Government initiates high priority research and management actions.

---

### 2.2.2. Liberia

The presence of cetaceans off northwestern Liberia was studied for the first time during a 3D seismic survey from 21 January to 4 May 2009 (SC/68A/SM06). There were 126 sightings of cetaceans reported, of which ten were mixed species assemblages. Eight odontocetes (and two mysticetes) were confirmed. Eight of these identifications were new records for Liberia. The habitat covered included the outer continental shelf, slope and offshore trenches

(depths ranging 100-3,000 m). Two species of small cetaceans were frequently encountered (>5 sightings); pilot whale (*Globicephala macrorhynchus*), spotted dolphin (*Stenella attenuata*) and Indo-Pacific bottlenose dolphin (*Tursiops truncatus*). Occasionally encountered species ( $\leq 4$  sightings) included spinner dolphin (*Stenella longirostris*), rough-toothed dolphin (*Steno bredanensis*), Risso's dolphin (*Grampus griseus*) and *Delphinus* sp. Of the nine sightings of bottlenose dolphins, four were mixed sightings with pilot whales (*G. macrorhynchus*), pointing to an offshore ecotype. Two small groups of sperm whales were mixed with 50 and 100 unidentified dolphins. The absence of sightings of Melon-headed whales (*Peponocephala electra*) and Fraser's dolphin (*Lagenodelphis hosei*), common species in Ghanaian waters, is notable. In discussion, the absence of these species' was hypothetically attributed to a gap in distribution along the coast of Liberia, as these species have both been confirmed from adjacent waters. Those species are more sensitive to noise and may have been avoiding the area, possibly as Liberian waters are subject to intense seismic survey effort. Mass stranding of melon-headed whales (*P. electra*) have subsequently been shown to be associated with seismic survey effort (de Boer *et al.*, 2016; Southall, *et al.*, 2013; Gray and Van Waerebeek, 2011; Van Waerebeek *et al.*, 2008;). With regards to the release of seismic survey data concerning only biological observations, it was noted that some seismic exploration companies do not provide marine mammal data until a decade or more after it was collected.

The sub-committee **noted** that increased liaison between the research community and the companies that conduct such surveys, specifically to facilitate the release of marine mammal, and other biological, data in a more timely manner, would be extremely beneficial. It was highlighted that in South Africa, there is a formal understanding between seismic survey companies and academic institutions to release marine mammal data immediately. This could be used as a precedent in other countries, particularly when no other data are available.

### 2.2.3 Madagascar

Andrianarivelo provided a review of several studies that have assessed cetacean diversity, dolphin hunting and fisheries bycatch in ten villages in the southwest (Toliara) and southeast (Fort Dauphin) regions of Madagascar (SC/68A/SM07). The papers summarises socio-ecological interview data gathered between 1975-1999, and a combination of boat-based surveys and community interviews, conducted between 2000-2018. This study documented 18 cetacean species (5 whales and 13 small cetaceans) in the southwest region of Madagascar. From interview surveys alone, 14 species (6 whales and 8 small cetaceans) were reported in the waters of the southeast region, off Fort Dauphin. Socio-ecological surveys identified several stressors on cetacean populations, including hunting and fisheries bycatch for five species of small cetaceans: bottlenose (*T. truncatus*), spinner (*S. longirostris*), Risso's (*G. griseus*) and Indo-Pacific humpback (*S. plumbea*) dolphins and pilot whales (*G. macrorhynchus*). Two types of fishing gear, harpoon and gill net, as well as opportunistic drive hunts, were recorded in both regions as a means to obtain cetaceans. In the Befandefa/Bevohitse community drive hunts are planned in advance (targeted hunts). Between 2000-18, at least 2750 cetaceans were deliberately taken and 25 strandings were recorded across both regions. The small cetaceans obtained were used locally as food and were also traded outside the community. Conservation efforts involving community engagement in two separate villages in the southwest yielded drastically different outcomes. In the Anakao community, a self-sustaining conservation programme was established, resulting in the near-cessation of hunting, whereas in the Befandefa community, a similar program was launched but then abandoned midway, and resulted in the community returning to large scale drive hunts of small cetaceans. These outcomes underscore the potential success of effective community engagement, the critical importance of sustained conservation efforts and emphasizes the need to comprehensively evaluate the consequences of stopping projects before they are complete.

It was noted that the stranding data differences between the two study areas might be due to misreporting and/or difference in interview effort. Although hunters were asked to report direct take separately from strandings, the interpretation of 'strandings' the distinction was not always clear. It was noted that no direct takes were recorded from Southwest Madagascar. In Madagascar, small cetaceans are legally protected, however, fishermen are either ignorant of these regulations, or choose to ignore them, but do adhere to and respect community decreed rules – Dina, or local, laws.

The sub-committee **welcomed** this update and **commended** the good progress this programme had achieved, albeit partially, by reducing hunting pressure on small cetaceans in a specific area.

---

*Attention: CG, R, CC*

*The Committee notes the large-scale (ca 3000 animals in 18 years) hunting of small cetaceans in southwest Madagascar although they are formally protected. The sustainability of these hunts is doubtful. Effective community engagement has been shown to be successful in markedly reducing hunting in one community (Anakao) and the Committee **encourages** similar efforts to be resumed in the community of Befandefa, along with efforts to monitor catches and abundance of the affected populations.*

---

#### 2.2.4. Kenya

A summary of the Kenya Marine Mammal Network (KMMN) was presented (SC/68A/CMP20). The network is coordinated by the Watamu Marine Association in partnership with Kenyan government agencies, including the Kenya Wildlife Service, Kenya Marine and Fisheries Research Institute, and other coastal stakeholders. Prior to 2011, research on Kenyan marine mammals was mostly limited to a coastal aerial survey, conducted in 1996, by the Kenya Wildlife Service. This survey reported eight species of cetaceans. From 2011 – 2018, KMMN efforts have compiled data on 24 species of marine mammals, both inshore and offshore, that total a database of 1,406 sightings. This has enabled KMMN to determine ‘hotspots’ for inshore cetacean populations. This information has also assisted in increasing public awareness of marine mammals in Kenya and the growth and popularity of dolphin and whale watching. This has resulted in economic benefits to both the tourism industry and to impoverished coastal communities. KMMN has succeeded in developing national conservation management strategies for marine mammals, boosting eco-tourism activities and addressing the increase of anthropological threats in Kenya waters and the Western Indian Ocean. It also highlights the value of data collected through citizen science which brings diverse communities closer together and promotes marine mammal research and effective conservation efforts in Kenya. It was noted that the IWC would hold an Entanglement Training Program in May, 2019, for boat operators, fishermen and government staff.

The sub-committee **commended** the authors for initiating this new work **encouraged** the programme to be both continued and expanded to other areas in Kenya. It was noted that this might include a programme to train a broader network of cetacean observers, the implementation of a strandings network (using standardised protocols) to improve the understanding of cetacean mortality and the regulation of whale and dolphin watching guidelines. It was also highlighted that an in-depth investigation of threats to small cetaceans would be beneficial, particularly with regards to stressors associated with ports, shipping and offshore exploration. The sub-committee concluded that updates on the work of the KMMN would be welcomed at future SC meetings.

#### 2.2.5. Adjacent Indian Ocean Areas

A report on recent surveys for cetaceans off the coast of Fujairah in the United Arab Emirates (UAE) was presented (Baldwin *et al.*, 2018). Although not strictly Africa, the report provides new information from a data-poor region and some populations of small cetaceans may be shared by African states. The Fujairah Whale Research Project began in February 2017 and has incorporated dedicated vessel and aerial surveys. The majority of sightings were recorded in relatively deep water (500m+) and a concentration of small cetacean sightings is noted in the southeast UAE waters. Species recorded so far include pantropical spotted dolphin (*Stenella attenuata*), striped dolphin (*S. coeruleoalba*), rough-toothed dolphin (*Steno bredanensis*), common bottlenose dolphin (*Tursiops truncatus*), Indo-Pacific common dolphin (*Delphinus delphis tropicalis*), Risso’s dolphin (*Grampus griseus*) and spinner dolphin (*Stenella longirostris*).

The subcommittee **welcomed** this new information from a UAE state and **encouraged** further updates on the activities and results of the research coalition that produced this paper.

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

A priority topic of the Scientific Committee (SC) is to better document the take of small cetaceans for consumptive and non-consumptive purposes. The products from small cetaceans are referred to as ‘aquatic wildmeat’ and this defined as;

*‘the products derived from aquatic mammals and reptiles that are used for subsistence food and traditional uses, including shells, bones and organs and also bait for fisheries. Aquatic wildmeat is obtained through unregulated, and sometimes illegal, hunts as well as from stranded (dead or alive) and/or by caught animals.’*

Three types of acquisition have been defined:

‘Non-Targeted-Salvage’ acquisition is neither planned nor intentional but is the utilisation of an aquatic mammal which is already dead and usually found (a) stranded, or (b) accidentally drowned in a net, trap, or line (by catch).

‘Non-Targeted-Deliberate’ acquisition is the intentional killing of an aquatic mammal when it is (a) found live-stranded on a beach, (b) caught alive in fishing gear, or (c) entrapped by natural phenomena (e.g. sea ice in high latitudes, changing water levels in rivers and channels).

‘Targeted’ acquisition is the deliberate killing of free ranging aquatic mammals that are either encountered during the course of other activities (opportunistic) or are the main target and purpose of an expedition (directed).



In 2015, the SC established an Intersessional Correspondence Group (ICG) which was tasked with developing a toolbox of techniques that could guide and co-ordinate research into this topic, at both regional and global levels. A series of workshops were funded by the Government of the Netherlands, which aimed to gather existing information on this issue from three key areas; Asia; South America and Africa. The multiple different methods with which existing data are gathered were discussed and potential new tools were also introduced, e.g., standardised questionnaire surveys, smartphone applications, forensic testing kits. The potential for analysing data at a regional and global scale were also debated. The first workshop took place in Thailand in 2016, covering South East Asia and this workshop also incorporated the first IWC Large Whale Entanglement Training Programme in Asia. A second workshop, that integrated both the issue of aquatic wildmeat in South America and a detailed analysis of the use of the Amazon River Dolphins as bait in the piracatinga fishery, was held in Brazil in 2018. And the third and final workshop in this series was held immediately prior to this meeting (SC68A) in Nairobi, Kenya.

The workshop series aimed to:

- (1) identify threats, past and present, with respect to ‘wildmeat’, and discuss which techniques can be utilised to better understand this issue;
- (2) gain a better understanding of the magnitude of small cetacean use as aquatic wildmeat, both nationally and regionally in the three areas, and to determine how aquatic wildmeat is usually acquired; and
- (3) increase co-ordination and co-operation between countries as well as unify efforts with the Aquatic Wildmeat Working Group of the Convention on Migratory Species (CMS) who also work on this issue.

### 3.1 Summary of the Workshop of Poorly Documented Take of Small Cetaceans: West Africa

During the workshop conducted immediately prior to SC68A, information was presented by experts both from the region and by those who worked in it. Information was presented from eight countries: Benin, Cameroon, Ghana, Republic of Guinea, Mauritania, Nigeria, Senegal and Togo. The information provided focused on the species of cetaceans that were at risk, the other threats these species faced and the status of available data. The challenges of gathering data in remote and often hostile environments were highlighted. In general, information is scarce and in many countries was collected some decades ago. Consumption of cetaceans is reported in all countries, with some variations between countries in the way the cetaceans are obtained (i.e. bycatch, stranding, deliberate killing). In some countries, it is unusual for coastal communities to consume aquatic wildmeat themselves, and the majority of wildmeat smoked or cured and distributed via the same marketing channels as terrestrial wildmeat to the interior of the African continent. In Africa, all wildmeat, be it of an aquatic or terrestrial origin, is referred to as ‘bushmeat’ when its primary purpose is for consumption.

The workshop recognised that the existing ambiguity in the wildlife legislation of all countries but one is a major stumbling block to proper reporting and documentation of the magnitude of small cetacean use as aquatic wildmeat. Benin is an exception where the law specifies that it is illegal to ‘possess’ cetaceans, however, a comprehensive review of the relevant Laws of all countries has not yet been conducted.

Discussion on how new commercial whale watching operations, in Benin in particular, took place within a joint session of WW/SM with particular reference to accelerate data collection on the occurrence and distribution of small cetaceans (Annex N, section 3).

#### 3.1.1. Overarching Recommendations

There is a growing number of reports of small cetaceans being deliberately hunted and utilised for food and non-food purposes throughout West Africa. As a result of this and other pressures, populations of small cetaceans, particularly those restricted to coastal areas, are either diminished or may have already disappeared. The workshop also made seven (7) overarching recommendations that can only be achieved in the longer term and with the active and dedicated participation of management authorities and government. The recommendations as agreed by the workshop participants were circulated and are provided below. The sub-committee **agrees** to complete its review at next year’s meeting when the full report is available for consideration.

---

*Attention: CG*

*The workshop **expresses grave concern** over the use of small cetaceans as aquatic wildmeat – or ‘bushmeat’ – in West Africa. Given the high mortality of small cetaceans in western African waters, through both by-catch and deliberate take, the workshop:*

- (1) **recommends** that the contracting governments of Benin, Cameroon, Cote d’Ivoire, Gabon, the Gambia, the Republic of Ghana, the Republic of Guinea, Guinea-Bissau, Mauritania, Senegal and Togo formally recognise the utilisation of small cetaceans, either from bycatch or deliberate take, as a serious, ongoing and potentially escalating issue in their respective countries and, in addition,
-

- (2) **urges** that monitoring programmes already in place that gather fisheries data, also collate information on the occurrence of cetacean bycatch and availability in markets and that such information is incorporated into the National Progress Reports to International Whaling Commission SC.

Further, the workshop **encourages** these Contracting Governments to establish a regional mechanism which is able to co-ordinate scientific efforts and to ensure effective cooperation among them. This may include utilising existing frameworks, such as the CMS Memorandum of Understanding concerning the Conservation of the Manatee and Small Cetaceans of Western Africa and Macaronesia.

---

Attention: CG; S

Given the grave consequences of the current mortality levels noted for several West African small cetacean populations, the workshop **recommends** that the Executive Secretary writes to the countries of Equatorial Guinea, Liberia, Nigeria and Sierra Leone, **to draw attention to** the workshop report and the concerns and recommendations expressed therein, and to consider escalating efforts in their countries to fully investigate this issue.

---

Attention: SC; IWC Strandings Expert Panel

Given the general lack of capacity in West African countries with regards to marine mammal specific knowledge and expertise, the workshop:

- (1) **requests** the Secretariat communicate with CITES and enquire if marine mammal species identification training programmes can be made available to fisheries observers, scientists, and NGO's in Benin, Cameroon, Cote d'Ivoire, Gabon, the Gambia, the Republic of Ghana, the Republic of Guinea, Guinea-Bissau, Mauritania, Morocco, Senegal, Togo, Equatorial Guinea, Liberia, Nigeria and Sierra Leone; and
  - (2) **requests** the IWC Strandings Expert Panel Working Group include scientists and government officials from West Africa in the current IWC Strandings network initiative, starting with the workshop participants listed in this report.
- 

Attention: CG; G; SC; CC

There were common issues identified which, if addressed, would greatly increase the level of regional knowledge of aquatic wildmeat incidence and assist in identifying species or populations of small cetaceans at risk. The workshop **recommends** that the contracting governments of Benin, Cameroon, Cote d'Ivoire, Gabon, the Gambia, the Republic of Ghana, the Republic of Guinea, Guinea-Bissau, Mauritania, Morocco, Senegal and Togo and the range states of Equatorial Guinea, Liberia, Nigeria and Sierra Leone:

- (1) Review and strengthen national legislation pertaining to marine mammals to address the legality of, specifically, the use of any bycaught or beach-cast carcasses and, subsequently, undertake outreach and awareness campaigns to widely publicise updated legislation, concomitant with an increase in compliance and enforcement activities.
  - (2) Create a national platform for researchers, NGO's and industry so as to provide a co-ordinated national approach to research, education, public awareness, anthropogenic impacts and conservation, highlighting as a priority the issue of non-sustainable use of small cetacean for aquatic wildmeat.
  - (3) Recognise the potential adverse implications to human health of consuming aquatic wildmeat and, where possible, analyse aquatic wildmeat for pathogens and contaminants.
  - (4) Consider the negative impacts on Africa marine life by distant water fishing fleets and take all appropriate steps with the foreign fleet governments to ameliorate destructive and unsustainable fishing activities in national waters.
  - (5) Develop a priority list of regional, sub regional and national projects which address small cetacean issues, including specific issues, such as their use as aquatic wildmeat, species of most concern and populations that are at high risk of extirpation.
  - (6) Conduct Environmental Impact Assessments/Environmental Statements in line with international best practices, e.g., IUCN Guidelines, and include, as a matter of standard practise, local scientists and experts as an integral part of these assessments so that marine mammal impacts are properly and fully incorporated.
  - (7) Incorporate marine wildlife and habitat sections into national education curriculums to inform and engage students in marine awareness and conservation issues
  - (8) Support public awareness campaigns that highlight the diversity and importance of regional and national marine wildlife and resources
-

### 3.1.2. Country specific recommendations

The workshop also developed a series of recommendations aimed at specific countries or high priority species or areas. Given the grave nature and the decline of small cetacean populations in all of west Africa waters, this workshop urges that the following recommendations be acted upon in as timely a manner as possible by the named states.

#### 3.1.2.1 MAURITANIA

---

*Attention: CG*

*Given the reported high mortality of small cetaceans in Mauritania, particularly harbour porpoise (Phocoena phocoena) the workshop **encourages** the government of Mauritania to conduct an in-depth investigation of small cetacean mortality, particularly with regards to anthropogenic activities, such as seismic exploration and fisheries. If useful, this workshop will provide expert assistance in developing such an investigation.*

---

#### 3.1.2.2 BENIN

---

*Attention: CG*

*The workshop understood that few dedicated surveys for marine mammals had been conducted in Benin waters. As whale watching tours have recently commenced in Benin and particularly as these activities are conducted by Benin Naval vessels, the workshop **encourages** the Government of Benin to initiate a year-round research program in collaboration with the Benin Navy so that comprehensive data sets on marine mammal occurrence in Benin waters can be collected from whale watching vessels.*

---

#### 3.1.2.3 GHANA

---

*Attention: CG; R*

*As fishing communities may be unaware of the importance of the scientific study of cetaceans, and the work of scientists in the field may be hindered by the misunderstanding of these communities, the workshop **encourages** the Government of Ghana to consider implementing a personal accreditation scheme, such as an ID card endorsed with government permission and contact details, similar to the system in place in neighbouring countries, so that scientists may more easily collect critical scientific data.*

---

#### 3.1.2.4 SENEGAL

---

*Attention: CG*

*Given the reported high mortality of small cetaceans in Senegal, particularly harbour porpoise (Phocoena phocoena) in northern waters, the workshop **encourages** the government of Senegal to conduct an in-depth investigation of small cetacean mortality, particularly with regards to anthropogenic activities, such as seismic exploration and fisheries. If useful, this workshop will provide expert assistance in developing such an investigation.*

---

#### 3.1.2.5 GUINEA

---

*Attention: CG*

*Given the growing number of coastal infrastructure projects (particularly ports developed for mineral exportation), the workshop **encourages** the Government of Guinea to fully address the importance of critical habitat and travel corridors for cetaceans in Environmental Impact Assessments and to follow international best practices, e.g., IUCN, to mitigate negative impacts to these species.*

*In addition, the workshop **draws attention to** the northern waters of Guinea, specifically the Tristao Islands Marine Protected Area, as a critical habitat for a transboundary population of endangered Atlantic humpback dolphin (Sousa teuszii) and **recommends** that this habitat is effectively protected from encroachment, as it is in Guinea-Bissau, and that research be conducted into the humpback dolphin population as a priority.*

*In addition, the workshop **recognises** the important work already being conducted by Guinean authorities and **encourages** the Government of Guinea to continue the observer program of artisanal and commercial fisheries.*

---

#### 3.1.2.6 CAMEROON

---

*Attention: CG; CMS; IUCN*

*The workshop **commends** the Government of Cameroon for its existing and ongoing engagement with the Convention for Migratory Species (CMS) and **urges** the Government to sign the CMS Memorandum of Understanding Concerning the Conservation of the Manatee and Small Cetaceans of Western Africa and Macaronesia as soon as possible.*

---

*Further, the workshop notes that the existing national legislation pertinent to marine mammals does not reflect the recently upgraded international status of several species and **requests** that the Government of Cameroon review existing legislation and harmonise it with species' status in accordance with the IUCN Red List.*

---

### **3.1.2.7 CAMEROON AND NIGERIA**

*Attention: CG; G; S*

*The workshop discussed the importance of the transboundary area between Cameroon and Nigeria for Atlantic humpback dolphins (*Sousa teuszii*) and **recommends** that the Government of Cameroon develops a comprehensive monitoring and habitat management plan at the border area of Cameroon and Nigeria, in consultation with regional and national scientists, and **requests** that the Secretariat communicates with the Government of Nigeria and highlights the importance of the Nigeria-Cameroon border area for Atlantic humpback dolphins and the desperate need for habitat protection and monitoring.*

---

### **3.1.2.8 TOGO AND BENIN**

*Attention: CG; R*

*The workshop discussed the importance of the transboundary area of Togo and Benin for Atlantic humpback dolphins (*Sousa teuszii*) and inshore bottlenose dolphins (*Tursiops truncatus*) and **recommends** that a comprehensive monitoring and habitat management plan is developed at the border between Togo and Benin, in consultation with regional and national scientists.*

---

### **3.1.2.9 NIGERIA**

*Attention: G; S*

*The workshop recognised the paucity of legislative protection for the marine mammals of Nigeria and **requests** that the Secretariat communicates with the Government of Nigeria, through the National Institute for Ocean and Marine Research (NIOMR), to establish appropriate legislation that allows for the establishment of national marine protected areas, noting that collaboration with national marine mammal experts and Nigerian NGOs will be beneficial as these groups can provide critical information on the marine mammal species and habitats that require urgent protection.*

*The workshop also noted that ongoing oil and gas exploration and extraction surveys within the waters of Nigeria gather extensive information on marine mammal occurrence and distribution. The workshop **requests** that the Secretariat include in communication with the Government of Nigeria the value of these data for marine mammal research and management a suggest that the immediate release of these data from the Oil Companies conducting the surveys would rapidly improve knowledge of marine mammals within Nigerian waters and will allow more timely management and protective measures to be put in place.*

---

## **3.2 Summary of Aquatic Wildmeat Workshop Series**

*Attention: SC*

*The Committee **thanked** the organisers and participants of the successful third workshop on poorly documented takes for food, bait or cash and changing pattern of use that covered West Africa. It **agrees**:*

*(1) that it will review the final report of the workshop and discuss endorsement of the recommendations at the 2020 annual meeting; and*

*(2) that a synthesis of the results of the three workshops should be developed for discussion at the 2020 Annual Meeting.*

---

## **4. UPDATES FROM INTERSESSIONAL GROUPS**

Progress on intersessional work was received from four groups.

### **4.1. Small Cetacean Task Team: South Asian River Dolphin (AG44)**

The Ganges and Indus river dolphins (South Asian river dolphins: *Platanista*) are categorised as 'Endangered' by the IUCN Red List, and continue to face numerous threats across their range countries; mortality from fisheries interactions, habitat loss from altered river flows by dams and barrages, and water pollution, at multiple spatial scales. Even with increased scientific understanding of these threats, relatively limited mitigation efforts mean that the prognosis for these species' remains poor. Large-scale threats related to water control are strongly linked with the geo-politically complex, contested, and volatile relationships between the South Asian range countries of *Platanista*: India, Pakistan, Bangladesh and Nepal. To deal with these challenges, it is also important for scientists from all range countries to coordinate their efforts and learn from each other's experiences. Indeed, threats which are perceived as localised, such as hunting or bycatch in fisheries, may have similar cultural and behavioural foundations and thus may benefit from a co-ordinated conservation effort. Diverse perceptions of

these threats and impact on river dolphin populations, may provide a deeper understanding of effective solutions to reduce such threats, improved coordination between management authorities and facilitate knowledge exchange among scientists working to conserve Platanista.

In view of these needs, in 2017, this sub-committee **agreed** to establish a Task Team to coordinate research and conservation efforts for South Asian river dolphins across all range countries. Towards this goal, it is proposed to organise a workshop in July 2019, in Kuala Lumpur, Malaysia. The workshop will in part attempt to fill the information gaps identified during by inter-sessional correspondence group in 2017-18. Primary information gaps are related to: (1) identifying conservation strategies and effective actionable plans, and finding ways for their wider implementation; and (2) sharing insights from methodological and conceptual approaches for science and conservation practice across range states.

Anticipated workshop outcomes include: (1) A report to this sub-committee at SC68b on workshop finding and conclusions; (2) Provision of new information and population status updates for future IUCN Red List Assessments; (3) Collaborative research projects proposals tackling trans-boundary issues regions (especially related to water sharing and flow management); and (4) Co-ordinated proposals aimed at tackling conservation issues that may be similar across range countries (e.g. bycatch risk, compliance with environmental legislation, improved enforcement, entrapped dolphins in canals, pro-active management of isolated sub-populations).

#### **4.2. Franciscana (ICG23)**

Progress on this initiative was presented at the Conservation Management Plan sub-committee (Sc68A/CMP/19).

#### **4.3 Sotalia workshop (SG45)**

Trujillo presented an update on activities of the Guiana dolphin (*Sotalia guianensis*) Intersessional Correspondence Group. The group held an informal workshop in Lima, Peru in October of 2018, during the SOLAMAC meeting. Unfortunately, the attendance was limited and only nine researchers were present, mostly from southeastern Brazil and one from Colombia. During the workshop, records of the occurrence and distribution of various populations of *Sotalia guianensis* were scored as: (i) resident population; (ii) frequent sightings but not enough effort to estimate occurrence patterns; and (iii) occasional sightings. In addition, the group compiled a list of institutes involved in research efforts. The group also discussed anthropogenic activities, stressors and potential threats that might affect the species and its habitat. The participants agreed that continued efforts to compile available knowledge on the Guiana dolphin and the threats it faces, would be useful for future assessment, however, the effort would benefit from increased participation. The group **agreed** to develop an online data gathering form, to be disseminated to all institutes working on this species, with the aim of improving understanding of available ecological and demographic data as well as identifying potential threats to different populations.

It was noted that that ongoing and large-scale coastal development is widespread within the regions that Guiana inhabit. The sub-committee **agreed** to explore the establishment of a task team to more quickly address the multiple pressures that this species faces.

#### **4.4 Aquatic Wildmeat Database (ICG43)**

The Aquatic Wildmeat Database Intersessional Correspondence Group presented a summary of its activities (SC/68A/SM02). The group was initiated in 2018, following presentations at both SC67a and SC67b on an online data entry platform intended to collate information on Aquatic Wildmeat. The primary aims of the correspondence group were to address questions raised during discussion on the applicability of the resultant database to the work of this sub-committee and to assess the best approach to data validation and quality control.

The 'Aquatic Wildmeat Database' is an independently developed online data entry platform (<https://aquaticbushmeat.shinyapps.io/wildmeat/>) that aims to centralise available data on small cetacean use, collating data from both standard research methods and from other sources. The data is displayed via an online application, where users can view summaries of data per country and per species in the form of interactive maps, graphs and tables. Although the database is not freely downloadable, requests can be made to the database managers who may facilitate collaborations. The target audience for the database includes researchers, non-governmental organisations (NGO's), policy makers and members of the public. Given the nature of the data, especially coming from third party, online or anecdotal sources, the correspondence group determined that the best approach to data validation is by manual checking by one of the project managers. The group welcomed any comments from the sub-committee and inquired if the database might be useful to the work of other sub-committees, e.g., the Working Group on Non-Deliberate Human-Induced Mortality of Cetaceans (HIM). The group also wished to encourage IWC member countries to contribute to the database.

---

*The Committee thanked the Aquatic Wildmeat Database Intersessional Correspondence Group and **agrees** that it should continue its work and the final report should be discussed at the 2020 Annual Meeting.*

---

## **5. PROGRESS ON PREVIOUS RECOMMENDATIONS**

### **5.1 Vaquita: update on CIRVA progress**

Rojas-Bracho introduced the report of the eleventh meeting of the Comité Internacional para la Recuperación de la Vaquita (CIRVA-11), which was held at the Southwest Fisheries Science Center in La Jolla, CA from February 19-21, 2019 (see Appendix 3). Because of a recent change in the government of Mexico, the CIRVA-11 reports begins with an executive summary letter to the new officials in charge - Mtra. Josefa González Blanco, Secretaria de Medio Ambiente y Recursos Naturales (SEMARNAT) and Dr. Víctor Manuel Villalobos Arámbula, Secretario de Agricultura y Desarrollo Rural (SADER). The letter explains that no more than 22 vaquitas remained alive during the summer of 2018, that each year, half of the remaining vaquitas are killed in illegal fishing nets set for another endangered species, the totoaba, and that the only remaining hope for the vaquita is to eliminate all gillnet fishing in the area where the last few vaquitas remain. CIRVA calls on the Mexican government to mobilize assets to ensure that nets are removed from this zero-tolerance area within hours of deployment, to prosecute violators, and that every effort be made to develop alternative livelihoods, as sustainable fisheries are the key to maintain support from local communities for the protection of the vaquita (SC/68A/SM01, fig. 1).

Between Nov.-Dec. 2018 32 CPODS were lost to theft and damage at a cost close to \$32,500 dollars. Despite these setbacks, the acoustic survey results combined with the 2017 photo-id study show that the catastrophic decline of 50% per year continues, with only 6 photographed in 2018, so that it is clear that the vaquita population has continued to decline and its range has contracted into a small area near the southwestern border of the Vaquita Refuge. CIRVA recommendations include: that the acoustic monitoring program continue with the regular 46-site acoustic monitoring grid be sampled again in 2019, as in previous years, to continue the data series on population trend and provide information on distribution and occurrence, that the opportunistic use of smaller CPOD arrays be continued to assess vaquita presence and to support possible periodic photo-identification and visual monitoring efforts outside the regular summer sampling period; that the photo-id. program be properly equipped with enough boats and equipment to obtain information on the minimum number of animals alive and to use capture-recapture analysis for abundance estimation; and train local scientists so they can participate in that effort so that rapid deployment of the photo-id. team is possible when weather conditions are suitable.

The key and critical component to save the vaquita from extinction is the effort to locate and remove active and derelict totoaba nets and reduce the threat this fishing gear represents to vaquitas, other marine mammals, birds, fish and invertebrates in the upper Gulf of California. These efforts are led by the Secretariat of Environment and Natural Resources (SEMARNAT), in collaboration with the National Institute of Ecology and Climate Change (INECC), the Mexican Navy (SEMAR), other government agencies, fishers' organizations and Museo de la Ballena y Ciencias del Mar, Sea Shepherd Conservation Society and other Mexican and international NGOs. In total, 659 pieces of fishing gear were removed in 2018, most (67%) were active illegal totoaba gear, with a very high overlap between the locations where gear was found and the habitat of vaquitas. Monthly reports of net removal activities during the totoaba spawning season (December through May) are available on the IUCN Cetacean Specialist Group website: [iucn-csg.org](http://iucn-csg.org). These data clearly demonstrate an increase in illegal fishing for totoaba, which constitutes an ongoing threat to the existence of the vaquita. Given the continued high level of setting of illegal totoaba gillnets, as evidenced by the large numbers of nets removed in 2018, there is no question that illegal totoaba fishing and the risk it poses to the survival of vaquitas continued unabated during 2018. This illegal totoaba fishing continues at high levels in 2019. Enforcement efforts have been completely ineffective in reducing the illegal totoaba fishery in the Upper Gulf of California. Violent attacks on 19 January and 31 January 2019 by large numbers of individuals in dozens of pangas disrupted net removal efforts being conducted in the presence of Mexican Navy vessels, one of which also came under attack.

Continue and accelerate alternative efforts to develop and implement the use of alternative fishing gear, as part of the effort to encourage alternative livelihoods for the fishing communities of the Upper Gulf. An important part of this is finding markets for shrimp and fish obtained using vaquita-safe methods. CIRVA-11 also recommended that every method be used to strengthen and incentivise involvement and conversion to alternative gear, and development of vaquita-safe markets - this includes 'culinary conservation' efforts aimed at ensuring better prices for fishery operators who adopt best practices for fishery bycatch reduction, by linking them to retailers who are willing to pay a premium for this 'marine mammal friendly' product. Such incentivizing approaches can enhance efforts to modify fishing gear and/or deployment by adding to the probability of uptake and adoption of the new measures – including compliance if there are regulatory measures. On the legal side, on December 21, 2017 a group of conservation NGO petitioners filed a suit under the U.S. Marine Mammal Protection Act, in the U.S.

District Court and on March 21, 2018, the petitioners filed suit before the U.S. Court of International Trade (CIT). Pending final adjudication of the merits, the United States accordingly implemented an embargo on curvina, sierra, chano, and shrimp caught with gillnets within the vaquita's range.

The sub-committee welcomes the new Initiative for Sustainability of the Northern Gulf of California launched by the Ministry of the Environment and Natural Resources (SEMARNAT) and the Ministry of Agriculture and Rural Development (SADER), which recognises that improved governance, sustainability, and responsible fishing using alternative gear, are all essential components to ensure the involvement of the communities in the conservation of the vaquita and the health of the Upper Gulf of California. This sub-committee **encourages** the Government of Mexico to fully develop and implement this programme and to provide periodic progress reports to CIRVA and the IWC Scientific Committee.

In 1975, the IWC Scientific Committee first expressed its concerns about incidental mortality of vaquita in the totoaba fishery and in 1991, recognised that 'considering the low population size and relatively high rate of incidental take in fisheries... the vaquita is in immediate danger of extinction' (IWC, 1991, p.182). Recent evidence conclusively demonstrates that the cause of the last five years catastrophic decline – increasing use of large-mesh gillnets in the illegal totoaba fishery – continues, making extinction even more likely. The sub-committee **expressed grave concern** over the continued decline and the reports of escalating violence of illegal fishermen directed at net removal vessels and crews, legal fishermen, and even the Mexican Navy. The widespread removal of research equipment and the blatant disregard for the laws and restrictions currently in place to protect the vaquita, underscores the continued failure of enforcement efforts and the lack of respect for Mexican law by illegal fishermen. The Scientific Committee is deeply concerned about reports of the escalation of violence related to the situation of the vaquita and respectfully requests that the Mexican government does all in its power to expeditiously protect all concerned, including vessel crew and fishermen.

The sub-committee again expressed its disappointment and frustration that, despite almost three decades of repeated warnings, the vaquita's rapid decline to extinction continues because of ineffective management measures. As such, the sub-committee **re-emphasised** the concerns it has raised on the status of the vaquita over many years, **reiterated the urgent recommendations** of the past three SC meetings, and **endorsed and adopted the recommendations** in the CIRVA-11 report (SC/68A/SM01).

The sub-committee **encourages** the Government of Mexico to fully consider the CIRVA-11 findings and adopt the recommendations therein, and respectfully **requests** that reports continue to be provided annually to the IWC Scientific Committee on actions and progress towards preventing the vaquita from becoming extinct.

---

*Attention: CG*

*The Committee **expresses grave concern** at the violence directed towards scientists, legal fishermen, NGOs and law enforcement agencies from those involved in the illegal totoaba fishery, which is responsible for the continued bycatch of the vaquita.*

*The Committee also **commends** the considerable contributions made by Rojas-Brachos and his Mexican colleagues on the vaquita issue and their regular expert updates to this Committee and other key fora across many years. Independent advice is of fundamental importance to the work of the Committee. Given the escalating violence in the Gulf of California, Mexico, The Committee **requests** that the Government of Mexico and all in appropriate positions of power ensure that independent scientists are able to provide data, advice and their expertise free from the threat of violence and other intimidation or retribution.*

---

---

*Attention: SC, CC, CG-R*

*The Committee yet again **expresses its disappointment and frustration** that, despite almost three decades of repeated warnings, the vaquita's rapid decline to extinction continues because of ineffective management measures. As such, it **re-emphasises the concerns** it has raised on the status of the vaquita over many years, **reiterates the urgent recommendations** of the past three Committee meetings, and endorses and adopted the recommendations in the CIRVA-11 report (SC/68A/SM01).*

*The precipitous decline of the vaquita reported previously has continued in 2018. As monitoring is critical for evaluating the effectiveness of conservation actions, the Committee **strongly recommends** that:*  
*(1) the CIRVA-11 acoustic monitoring programme be continued as in previous years to provide an annual empirical estimate of population trend, and that opportunistic use of smaller CPOD acoustic arrays be*

---

continued to assess vaquita presence and to support possible periodic photo-identification and visual monitoring efforts outside the regular summer sampling period; and  
(2) photo-identification efforts proposed in CIRVA-11 be conducted as soon as possible, to obtain information on the minimum number of animals alive, [and to refine understanding of life history parameters including survival rates].

In addition, the Committee **recommends** that the CIRVA-11 proposal to use photographic capture-recapture techniques to obtain an estimate of minimum abundance be explored (which is preferable to relying on simple single day counts of different individuals) and that (a) local marine mammal scientists, and naturalists with training and experience in photo-identification techniques, organize rapid-response teams to take advantage of weather conditions suitable for such monitoring work and (b) more local personnel be trained and equipped to maximize the number of opportunities to obtain photographs and potentially biopsies.

The Committee also **strongly endorses** the recommendations made in CIRVA-11 and:

(1) **advises / recommends** that the Government of Mexico fully mobilise its enforcement assets to eliminate illegal fishing in the area where the last few vaquitas survive, a small area henceforth referred to as the 'Zero Tolerance Area' (where the goal will be to remove any illegal net within hours of its deployment). In this Zero Tolerance Area, particularly during the totoaba season;

(2) **urges** the Government of Mexico to:

- Fully fund and expand net-removal efforts to maintain the area as a net-free zone;
- Provide 24-hour surveillance and monitoring;
- Take all necessary measures to protect net-removal teams from harm or intimidation; and
- Arrest and prosecute illegal fishermen, for example, by placing an FGR agent on net removal ships and Navy vessels to facilitate arrests.

With regards to the advice of the Expert Committee on Fishing Technology (ECOFT) reported in previous CIRVA reports, the Committee **reiterates** previous recommendations (e.g. IWC, 2018 etc.) to

- develop a transparent, multi-year work plan;
- require INAPESCA to consult and inform ECOFT before conducting new field tests or proposing the approval of new gear;
- implement the use of Electronic Monitoring Systems (EMSs) with video in all gear-testing and fishing operations in the Upper Gulf of California (UGC);
- issue fishing permits (from CONAPESCA) for small trawls by commercial vessels equipped with EMSs; and
- prohibit the use of monofilament or multimonomofilament nylon line in the construction of alternative gear, including purse seines and suriperas.

While recognising that the commitments embodied in the 'Plan for the Comprehensive Care of the Upper Gulf of California and the Comprehensive Program for the Protection and Recovery of the Vaquita' were made by the previous administration, the Committee;

(1) **urges** the present Government of Mexico to implement, fully and expeditiously, the commitments made in the Plan; and

(2) **strongly approves** the continued role of CIRVA with regards to their assistance in:

- reviewing monthly reports of enforcement efforts;
- participating in an enforcement contact group; and
- providing advice on implementation of the plan for alternative gear.

With regards to strengthening direct linkages between the fishermen using alternative gears and the seafood buyers as a way of incentivizing the conversion of the fleet to gillnet-free operations, this sub-committee (3) **reiterates** its previous recommendation that Mexico work with gear-testing partners to conduct rigorous cost-benefit analyses on the new gears and to test markets for the vaquita-safe products and that Mexico work with producers and buyers to develop and implement a comprehensive chain of custody and traceability system for vaquita-safe products from the Upper Gulf of California, noting that it is critical that this system be in place before legal shrimp fishing resumes in September 2019 and that information is accessible to producers, buyers, and consumers.

Finally the Committee **reiterates** its previous recommendations 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.*

---

## 5.2 Maui's and Hector's Dolphins

The government of New Zealand presented a technical document on a newly developed Spatial Risk Assessment of Threats to Hector's and Māui dolphins (*Cephalorhynchus hectori*) (Roberts *et al.*, 2019). These issues were tackled in joint sessions of SM/ASI/HIM and is reported on by the Working Group on Non-Deliberate Human-Induced Mortality of Cetaceans (HIM) (Annex J).

## 5.3 International Workshop on the Status of Harbour Porpoises in the North Atlantic

Bjorge presented a brief summary of the report of workshop on the status of North Atlantic harbour porpoise, that took place in Tromsø, Norway in December (NAMMCO/IMR, 2018). The workshop was funded by the Institute of Marine Research and organised by NAMMCO. The workshop was well attended by experts from USA, Canada, UK, Continental Europe and the NAMMCO countries. The workshop discussed population structure, assessment units, abundance and bycatch estimates. Threats other than bycatch were also discussed but the workshop concluded that the available information was insufficient for inclusion of other threats in the assessment.

The workshop divided the North Atlantic harbour porpoises into eighteen 'assessment units' (shown in fig. 2 of the report). Input data for the assessment were time series of abundance, bycatch estimates, median estimates of  $r_{\max}$ , and the posterior distribution of  $K$  ( $K$  is the abundance at the beginning of the time series). The outcome of the assessments were the current depletion level and the depletion level in 2025 relative to  $K$  given that the current bycatch level continues.

The workshop did not have equal good data from all assessment units but were able to conduct assessment for ten of the eighteen assessment units.

The workshop also discussed harbour porpoise ecology and life history. Good life history data are important for future refinement of  $r_{\max}$ .

The report provides several recommendations and Bjorge highlighted the main message from the workshop was that bycatch is currently the most severe threat to harbour porpoises in the North Atlantic. The workshop therefore, recommended that it is imperative to: construct more reliable time series of bycatch data from different fisheries in the different areas; modify the database on fishing effort in such a way that the data are consistent and reliable; include bycatch data from small vessels in reporting; and conduct more reporting of bycatch by different types of gear.

The subcommittee **expressed thanks** to Bjorge for bringing forward such a significant and complete piece of work and noted that other SC members (including Palka and Tiedemann) had also played a large role in the workshop and completion of the North Atlantic harbour porpoise assessments. Tiedemann noted that a complete analysis of harbour porpoise stock delimitation across the entire North Atlantic was valuable in itself, although some regions (Faeros and East Greenland) had little supporting data. The distinctiveness of the East Greenland and Baltic proper subpopulations was confirmed.

---

*Attention: SC; R; ICES; CG (range state governments in the North Atlantic)*

*The Committee **welcomes** and **draws attention** to the report of the International Workshop on the Status of Harbour Porpoises in the North Atlantic (NAMMCO/IMR, 2018). The Committee **endorses** its recommendations. In particular, it highlights one of the recommendations regarding bycatch made by the NAAMCO workshop and notes that given the challenges that exist for accessing reliable bycatch data and estimates, and the importance of this information for generating scientifically sound assessments, the Committee **recommends** that it is imperative to:*

- (1) construct more reliable time series of bycatch data for the different fisheries in the different areas;*
  - (2) modify the fishing effort database in such a way that the data is consistent and reliable;*
  - (3) include by-catch data from small vessels in reporting; and*
  - (4) conduct more reporting of by-catch by different types of gear.*
- 

The Committee has previously expressed serious concerns regarding the status of the harbour porpoise subpopulation of the Baltic Proper (IWC, 2019). The Workshop **confirmed** that the East Greenland and Baltic

proper subpopulations are distinct. The Baltic Proper population is estimated at under 500 individuals and high levels of bycatch continue. Recent evidence suggests that bycatch remains the primary threat to this population (as well as the species as a whole).

The Committee was informed that the ASCOBANS Advisory Committee (ASCOBANS, 2018) had supported listing the Critically Endangered Baltic harbour porpoise sub-population in Appendix I of the Convention on the Conservation of Migratory Species of Wild Animals (CMS). It was noted that the German authorities announced that they will not propose listing the Baltic Sea harbour porpoise since it believed that harbour porpoise populations are increasing, the Baltic harbour porpoise is not a species and thus not threatened by extinction; and that an inclusion of the Baltic harbour porpoise population in Appendix I of CMS could make a closure of set net fisheries necessary.

In discussion, it was noted that: (a) there are no data supporting an increase in either the North Sea or the Baltic Sea populations; (b) this Committee and Commission has always considered conservation and management at the level of populations as well as species; and (c) assignment of conservation status should be independent of the feasibility of mitigation.

---

*Attention: CG, I*

*The Committee **reiterates** its previous serious concern about the status of the population (IWC, 2019) and **agrees that** listing the harbor porpoise population of the Baltic Proper in Appendix I of CMS can greatly assist in conservation efforts. The Committee therefore:*

*(1) **encourages** a member state of CMS consider submitting a listing proposal for the upcoming COP of CMS in early 2020, noting that such proposals must be submitted by 19 September 2019; and*

*(2) **recommends** that the Executive Secretary convey the Committee's views on this issue to the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and the Federal Ministry for Food and Agriculture (BMEL) encouraging a reconsideration of their decision not to submit a proposal.*

---

## **6. REVIEW OF TAKES OF SMALL CETACEANS**

### **6.1 New Information on directed catches**

Information presented at SC/68A on the takes of small cetaceans was updated based on data compiled from online sources and data presented in the progress report on small cetacean research (Appendix 2). It summarises data on small cetacean fisheries in calendar year 2017, as well as research conducted during April 2017 to March 2018 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/67b 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 calendar 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 is 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.

The sub-committee thanked Jimenez and Japanese participants at SC68A for compiling these data. It was **agreed** that an assessment of takes of small cetaceans would be conducted intersessionally.

Rose presented information from a recent book (Fielding, 2018) detailing the history and practice of small cetacean hunts in St. Vincent and the Grenadines. Fielding (2018) represents a new compilation of catch data from 1949-2017 based on five separate datasets, including personal records maintained by a current whaler. The data show the predominant target species changed from the short-finned pilot whale (*Globicephala macrorhynchus*) to other dolphin species, including killer whales (*Orcinus orca*), of which 60 have been killed since 2007. Takes of dolphin average 210.6 a year but exceeded 1,000 in 2009. This high number of removals has potentially severe implications for the killer whale, as populations are generally small, have strong social bonds and it is not known what impact removals may have on demographic structure.

---

*Attention: CG*

*Given the lack of regulation of the hunt and the poorly known status of short-finned pilot and killer whale in the waters of St. Vincent and the Grenadines, available information (Fielding, 2018) raises concern that current takes are unsustainable and underscores an urgent need for research into the status of these species in national and adjacent waters. The Committee **reiterates its concern** and over-arching recommendation (IWC, 2019) that no small cetacean removals (live capture or directed harvest) should be authorised until a full assessment of status has been made.*

---

---

*In addition, given the paucity of information on tropical killer whales, it **reiterates** (IWC, 2019) that additional research is required, particularly as takes of these species regularly occur.*

---

Rose and Brownell provided an update on live captures in the Russian Federation. At SC/67b, it was reported that, after a 2-year hiatus (2016 and 2017) in live captures for killer whale (*Orcinus orca*) and white whale (*Delphinapterus leucas*) in the Okhotsk Sea, Russian authorities proposed a total allowable catch (TAC) of 13 live killer whales for summer 2018 (IWC, 2019); this TAC and one for white whales were issued. From July to September 2018, at least 11 killer whales and 90 white whales were live-captured for trade to dolphinariums, primarily in China. The captures took place in the Shantar (killer whales) and Sakhalin Bay-Amur River (white whales) areas and the whales were moved to a holding facility in Srednyaya Bay in Nakhodka, Russia. Based on the physical characteristics of some of the white whales, it appears that several were very young and still dependent on their mothers for nutrition. Due to at least two violations of the permit conditions, involving both species, Russian authorities determined in December 2018 that the captures were illegal. Russian authorities halted exports; as of early April 2019, 87 white whales and 10 killer whales remained (it appears that four whales either escaped or died over the winter).

It was noted that at SC/65a, Shpak and Glazov (2013) presented potential biological removal (PBR) levels ranging from 29 to 42 (depending on the recovery factor used) for the Sakhalin Bay-Amur River feeding aggregation of white whales (IWC, 2014, p. 351). Given these data, it was noted that removing 90 individuals in a single summer season is unsustainable.

The sub-committee further discussed that for the Okhotsk Sea population of killer whales, where takes do not consider stock structure and ecotype differences between populations, it is unknown what the impacts of these removals have demographic structure.

---

*Attention: CG*

*In light of the live capture of at least 11 killer whales between July to September 2018 in the Shantar region of the Okhotsk Sea, and information received at this meeting that Russian authorities may consider future live takes of killer whales from this region, the Committee **strongly reiterates** its long-standing recommendation (e.g. IWC, 2019) that no small cetacean takes (live captures or hunts) should be authorised until a full assessment of the sustainability of these takes has been conducted.*

*The Committee also expressed **grave concern** regarding the removal of 90 juvenile white whales, some with potentially poor survival prospects, from the Sakhalin Bay-Amur River feeding aggregation in summer 2018; this level of removal is unsustainable. The Committee **recommends** that no more removals are authorised from the Sakhalin Bay-Amur River feeding aggregation.*

*Furthermore, given the stated intention of the Russian Federation to reintroduce into the wild both the killer and white whales that were captured during the summer of 2018, the Committee **recommends** that reintroductions should only be carried out with appropriate caution and with the advice of international experts on rehabilitation, so as to maximise the likelihood of individual animal survival.*

*The Committee requests that the Executive Secretary contact Government of the Russian Federation drawing attention to the concerns of the Committee on these matters and requesting that the Government provide an update to the 2020 Annual Meeting.*

---

## **7. STATUS OF THE VOLUNTARY FUND FOR SMALL CETACEAN CONSERVATION RESEARCH**

### **7.1 Status of funds and review progress of funded projects**

In 2018, donations for the Voluntary Fund for Small Cetacean Conservation Research totalling GBP 30, 869.00 were received from the Government of Italy, the Government of Netherlands, the Government of the United Kingdom, Campaign Whale, Centro de Conservacion de Cetacea, Cetacean Society International, Dolphin Connection, Environmental Investigation Agency, Humane Society International, IFAW, OceanCare, ProWildlife and the Whaleman Foundation. At the end of the financial year 2018, this brought the total of the fund to GBP 72, 123.00.

The sub-committee **expressed** its sincere gratitude for all of the contributions and noted that these funds support critical conservation research projects of direct relevance to the work of this sub-committee, including supporting Invited Participants to attend the SC. Of the five projects funded from the 2016 call for proposals, all have been

completed, except one which is due for completion in August 2019. Full reports shall be posted on the IWC website in due course ([https://iwc.int/sm\\_fund](https://iwc.int/sm_fund)).

It was noted that, at this time, the fund was insufficient to make a call for new proposals through the usual processes of the ‘Small Cetacean Conservation Research’, however, it would be desirable to use the existing funds within the next year. It was noted that the funding process maintains its current transparency but that the development of a ‘priority list’ might assist in guiding applicants as well as focusing the work of this sub-committee. The subcommittee **agreed** to discuss a process, with the SC Chair and the Head of Science, that is more strategic and targeted to utilise available funds more immediately, with the intention of identifying projects to fund this year.

## 8. WORK PLAN

The sub-committee discussed ongoing priorities and **agreed** to continue the development of new priority topics interessionally. The work plan for period 2018-20 is shown in Table 2 and other intersessional work shown in Table 3.

Table 2  
Work plan for Small Cetacean (SM) Sub-committee.

Topic	Intersessional 2018/19	2019 Annual Meeting (SC/68A)	Intersessional 2019/20	2020 Annual meeting	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 workshop and liaise with Simmonds (Task Team) to explore the possible development of a Sotalia Task Team	Report to sub-committee	

Table 3  
Overview of intersessional working groups.

Items 17.7.2 SM/CMP	ICG-23	Franciscana	Co-ordinate presentation of CMP projects across sub-committees	<i>E-mail: franciscana@groups.iwc.int</i> Iníguez (Convenor), Brito-Junior Santos, Cremer, Crespo, Cunha, Di Tullio, Domit, la Marcondes, Secchi, Siciliano, Trujillo, Ott, Zerbini.
Item 17.7.2 SM	ICG-42	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.	<i>E-mail: pdtsc@groups.iwc.int</i> Porter (Convenor), Baker, Brownell, Collins, Cosentino, Donovan, Fortuna, Frey, Jiminez, Parsons, R. Reeves, Simmonds, Trujillo.
Item 17.7.2 SM	AG-44	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.	<i>E-mail: smallcetaceantaskteam@groups.iwc.int</i> Simmonds (Convenor), Bjørge, Donovan, Genov, Parsons, Porter, R. Reeves, Trujillo.
Item 17.7.2 SM	SG-45	Sotalia Workshop	Organisation of two workshops focusing on <i>Sotalia</i> .	<i>Email: sotalia@groups.iwc.int</i> Domit (Convenor), Caballero, Porter, Trujillo, Zerbini.

## 9. BUDGET REQUESTS FOR 2019-20

There are no new budget request following on from 2018 and the budget request for 2018-20 stands as shown in Table 4.

Table 4  
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	6,283	
Small Cetacean Workshop	Guiana dolphin pre-assessment ( <i>Sotalia guianensis</i> ) by the IWC Scientific Committee		6,993
Modelling/Computing			
Research			
Database/Catalogues			
Total request			13,276

## 10. ADOPTION OF THE REPORT

The report was adopted at 10:20 on 18th May 2019.

### REFERENCES

- ASCOBANS. 2018. Report of the 24th meeting of the ASCOBANS Advisory Committee, 25-27 September 2018, Vilnius, Lithuania. 64pp. [Available at: <https://www.ascobans.org/en/document/report-24th-meeting-ascobans-advisory-committee>].
- Baldwin, R., Willson, A., Looker, E. and Buzás, B. 2018. Growing knowledge of cetacean fauna in the Emirate of Fujairah, UAE. *Tribulus* 26: 32-41.
- Bolaños-Jiménez, J., Mignucci-Giannoni, A.A., Blumenthal, J., Bogomolni, A., J.J., C., Henríquez, A., Iñíguez Bessega, M., Khan, J., Landrau-Giovanetti, N. and Rinaldi, C. 2014. Distribution, feeding habits and morphology of killer whales *Orcinus orca* in the Caribbean Sea. *Mammal Rev.* 44: 177-89.
- Braulik, G. and Stern, D. 2019. Tanzania Whale Network January 2019 Newsletter. 2pp. [Available at: <http://www.iucn-csg.org/wp-content/uploads/2019/01/Tanzanian-Whale-Network-Report-Jan-19-final.pdf>].
- Braulik, G., Wittich, A., Macaulay, J., Kasuga, M., Gordon, J., Davenport, T.R.B. and Gillespie, D. 2017a. Acoustic monitoring to document the spatial distribution and hotspots of blast fishing in Tanzania. *Mar. Pollut. Bull.* 125: 360-66.
- Braulik, G.T., Findlay, K., Cerchio, S., Baldwin, R. and Perrin, W. 2017b. *Sousa plumbea*. The IUCN Red List of Threatened Species 2017: e.T82031633A82031644. [Available at: <http://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T82031633A82031644.en>].
- Braulik, G.T., Kasuga, M., Wittich, A., Kiszka, J.J., MacCaulay, J., Gillespie, D., Gordon, J., Said, S.S. and Hammond, P.S. 2018. Cetacean rapid assessment: An approach to fill knowledge gaps and target conservation across large data deficient areas. *Aquatic Conserv.: Mar. Freshw. Ecosyst.* 28(1): 216-30.
- Collins, T., Braulik, G.T. and Perrin, W. 2017. *Sousa teuszii* (errata version published in 2018). The IUCN Red List of Threatened Species 2017: e.T20425A123792572. [Available at: <http://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T20425A50372734.en>].
- Collins, T., Strindberg, S., Mboumba, R., Dilambaka, E., Thonio, J., Mouissou, C., Boukaka, R., Saffou, G.K., Buckland, L., Leeney, R., Antunes, R. and Rosenbaum, H.C. 2013. Progress on Atlantic humpback dolphin conservation and research efforts in Congo and Gabon. Paper SC/65a/SM16rev presented to the IWC Scientific Committee, June 2013, Jeju Island, Republic of Korea (unpublished). 23pp. [Paper available from the Office of this Journal].
- de Boer, M.N., Saulino, J.T., Van Waerebeek, K. and Aarts, G. 2016. Under pressure: Cetaceans and fisheries co-occurrence off the coasts of Ghana and Côte d'Ivoire (Gulf of Guinea). *Front. Mar. Sci.* 3(178). [Available at: <https://doi.org/10.3389/fmars.2016.00178>].
- Fielding, R. 2018. *The Wake of the Whale: Hunter Societies in the Caribbean and North Atlantic*. Harvard University Press, Boston.
- Filatova, O.A., Shpak, O.V., Ivkovich, T.V., Borisova, E.A., Burdin, A.M. and Hoyt, E. 2014. Killer whale status and live-captures in the waters of the Russian Far East. Paper SC/65b/SM07 presented to the IWC Scientific Committee, May 2014, Bled, Slovenia (unpublished). 5pp. [Paper available from the Office of this Journal].
- Gray, H. and Van Waerebeek, K. 2011. Postural instability and akinesia in a pantropical spotted dolphin, *Stenella attenuata*, in proximity to operating airguns of a geophysical seismic vessel. *J. Nat. Conserv.* 19: 363-67.
- International Whaling Commission. 1991. Report of the Scientific Committee, Annex G. Report of the sub-committee on small cetaceans. *Rep. Int. Whal. Comm* 41:172-90.

- International Whaling Commission. 2014. Report of the Scientific Committee. Annex L. Report of the Sub-Committee on Small Cetaceans. *J. Cetacean Res. Manage. (Suppl.)* 15:345-79.
- International Whaling Commission. 2015. Report of the Scientific Committee. Annex L. Report of the Sub-Committee on Small Cetaceans. *J. Cetacean Res. Manage. (Suppl.)* 16:291-319.
- International Whaling Commission. 2019. Report of the Scientific Committee. Annex M. Report of the Sub-Committee on Small Cetaceans. *J. Cetacean Res. Manage. (Suppl.)* 20:320-45.
- Metcalf, K., Collins, t., Abernethy, K.E., Boumba, R., Dengui, J.C., Miyalou, R. and Parnell, R.J. 2017. Addressing uncertainty in marine resource management; combining community engagement and tracking technology to characterize human behavior. *Conserv. Lett.* 10(4): 460-69.
- Minton, G., Kema Kema, J.R., Todd, A., Korte, L., Maganga, P.B., Migoungui Mouelet, J.R., Nguema, A.M., Moussavou, E. and Nguélé, G.K. 2017. Multi-stakeholder collaboration yields valuable data for cetacean conservation in Gamba, Gabon. *Afr. J. Mar. Sci.* 39(4): 423-33.
- Nature Tropicale NGO. 2018. Whale watching 2018: Plaidoyer pour la sauvegarde des cétacés au Bénin. Technical Report, Nature Tropicale and IUCN. 22pp. [In French].
- Plön, S., Atkins, S., Conry, D., Pistorius, P., Cockcroft, V. and Child, M.F. 2016. A conservation assessment of *Sousa plumbea*. In: Child, M.F., Roxburgh, L., Do Linh San, E., Raimondo, D. and Davies-Mostert, H.T. (eds). *The red list of mammals of South Africa, Swaziland and Lesotho*. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.
- North Atlantic Marine Mammal Commission and the Norwegian Institute of Marine Research (NAMCO/IMR). 2019. Report of Joint IMR/NAMMCO International Workshop on the Status of Harbour Porpoises in the North Atlantic. 3-7 December 2018, Tromsø, Norway. 236pp. [Available at: [https://nammco.no/wp-content/uploads/2019/02/final-report\\_hpws\\_2019.pdf](https://nammco.no/wp-content/uploads/2019/02/final-report_hpws_2019.pdf)].
- Roberts, J.O., Webber, D.N., Goetz, K.T., Edwards, C.T.T., Roe, W.D. and Doonan, I.J. 2019. Spatial risk assessment of threats to Hector's and Maui dolphins (*Cephalorhynchus hectori*). Fisheries New Zealand, Wellington, New Zealand. 169pp.
- Shpak, O.V. and Glazov, D. 2014. Review of the recent scientific data on the Okhotsk Sea white whale (*Delphinapterus leucas*) population structure and its application to management. Paper SC/65a/SM23 presented to the IWC Scientific Committee, June 2013, Jeju Island, Republic of Korea (unpublished). 19pp. [Paper available from the Office of this Journal].
- Southall, B.L., Rowles, T., Gulland, F., Baird, R.W. and Jepson, P.D. 2013. Final report of the Independent Scientific Review Panel investigating potential contributing factors to a 2008 mass stranding of melon-headed whales (*Peponocephala electra*) in Antsohihy, Madagascar. 74pp.
- Taylor, B.L., Wells, R.S., Olson, P.A., Brownell Jr, R.L., Gulland, F.M.D., Read, A.J., Valverde-Esparza, F.J., Ortiz-García, O.H., Ruiz-Sabio, D., Jaramillo-Legorreta, A.M., Nieto-García, E., G., C.H. and Rojas-Bracho, L. 2019. Likely annual calving in the vaquita, *Phocoena sinus*: A new hope? *Mar. Mam. Sci.* Early view. [Available at: <https://doi.org/10.1111/mms.12595>].
- van Waerebeek, K., Hazevoet, C.J., Lopez-Suarez, P., Simao Delgado Rodriguez, M. and Gatt, G. 2008. Preliminary findings on the mass strandings of melon-headed whales *Peponocephala electra* in Boavista Island in November 2007, with notes on other cetaceans from the Cape Verde Islands. Technical Report to the Fondation Internationale du Banc d'Arguin (FIBA). 9pp. [Unpublished, obtainable from [www.lafiba.com](http://www.lafiba.com)].
- Vermeulen, E., Bouveroux, T., Plön, S., Atkins, S., Chivell, W., Cockcroft, V., Conry, D., Gennari, E., Hörbst, S., James, B.S., Kirkman, S., Penry, G., Pistorius, P., Thornton, M., Vargas-Fonseca, O.A. and Elwen, S.H. 2018. Indian Ocean humpback dolphin (*Sousa plumbea*) movement patterns along the South African coast. *Aquatic Conserv.: Mar. Freshw. Ecosyst.* 28(1): 231-40.

## Appendix 1

### AGENDA

1. Introduction
  - 1.1 Opening remarks
  - 1.2 Election of Chair and Appointment of Rapporteurs
  - 1.3 Adoption of Agenda
  - 1.4 Review of available documents
2. A review of small cetaceans of Africa
  - 2.1. Tackling data gaps through rapid assessment and collaborative efforts
  - 2..2. Updates on small cetacean status in Africa
    - 2.2.1. *Equatorial Guinea, São Tomé and Príncipe, Gabon, the Republic of Congo, the Democratic Republic of Congo and Angola*
    - 2.2.2. *Liberia*
    - 2.2.3. *Madagascar*
    - 2.2.4. *Kenya*
    - 2.2.5. *Adjacent Indian Ocean Areas*
3. Poorly documented takes for food, bait or cash and changing pattern of use
  - 3.1 Summary of the Main Outcomes of the Workshop of Poorly documented take of Small Cetaceans: West Africa
    - 3.1.1. *Overarching Recommendations*
    - 3.1.2. *Country Specific Recommendations*
  - 3.2 Summary of Aquatic Wildmeat Workshop Series
4. Updates from intersessional groups
  - 4.1 Small Cetacean Task Team: South Asian River Dolphin (AG44)
  - 4.2 Franciscana (ICG23)
  - 4.3 Sotalia Workshop (SG45)
  - 4.4 Aquatic Wildmeat Database (ICG43)
5. Progress on previous recommendations
  - 5.1. Vaquita: Update on CIRVA Progress
  - 5.2 Maui's and Hector's Dolphins
  - 5.3 International Workshop on the Status of Harbour Porpoises in the North Atlantic
6. Review of takes of small cetaceans
  - 6.1. New Information on directed catches
7. Status of the voluntary fund for small cetacean conservation research
  - 7.1 Status of funds and review progress of funded projects
8. Work plan
9. Budget requests
10. Adoption of the report

## **Appendix 2**

### **DATA ON SMALL CETACEANS FROM PROGRESS REPORTS**

**[To come]**



# Report of the Eleventh meeting of the Comité Internacional para la Recuperación de la Vaquita (CIRVA)

Southwest Fisheries Science Center (SWFSC) in La Jolla, CA, USA  
February 19-21, 2019.



*Vaquita mother “Ana” with her 2018 calf demonstrating that vaquitas are healthy and can give birth annually. Photo by Oscar Ortiz, 26 September 2018.*

## EXECUTIVE SUMMARY

Letter to Mtra. Josefa González Blanco, Secretaria de Medio Ambiente y Recursos Naturales and Dr. Víctor Manuel Villalobos Arámbula, Secretario de Agricultura y Desarrollo Rural

Dear Secretaries:

The members of the International Committee for the Recovery of the Vaquita (CIRVA), a group that has advised the Government of Mexico on the conservation of this species since 1997, welcome the opportunity to continue in your service. We have just concluded the eleventh meeting of CIRVA, held at the Southwest Fisheries Science Center in La Jolla, California from February 19-21, 2019; a full report from the meeting is given below. Given the gravity of the current situation, we are writing to request you take immediate action to save the vaquita species from extinction.

As you know, the vaquita is on the edge of extinction and, unless action is taken now, the species will be lost within a few months or years during your administration. No more than 22 vaquitas remained alive during the summer of 2018, prior to the current fishing season. Each year, half of the remaining vaquitas are killed in illegal fishing nets set for another endangered species, the totoaba. Poachers prize totoaba for their swim bladders, which are dried and smuggled by organized crime cartels to China, where they are sold on the black market for prices that can reach \$46,000 USD per kg. The acoustic monitoring program indicates that the few remaining vaquitas inhabit a very small area, approximately 24 x 12 km, most of which lies within the Vaquita Refuge. However, high levels of illegal fishing for totoaba occur in this area.

This precipitous population decline has continued despite the actions taken by the Government of Mexico. We emphasize that the only remaining hope for the vaquita is to eliminate all gillnet fishing in the area where the last few vaquitas remain. This is not an impossible task, as the area to be protected is not large. However, reports from the region suggest that the illegal fishery is growing, and there have been several recent episodes of violence by illegal fishermen directed at net removal vessels and their crews, legal fishermen, and even the Mexican Navy. These events illustrate the continued failure of enforcement efforts and the lack of respect for Mexican law by illegal fishermen.

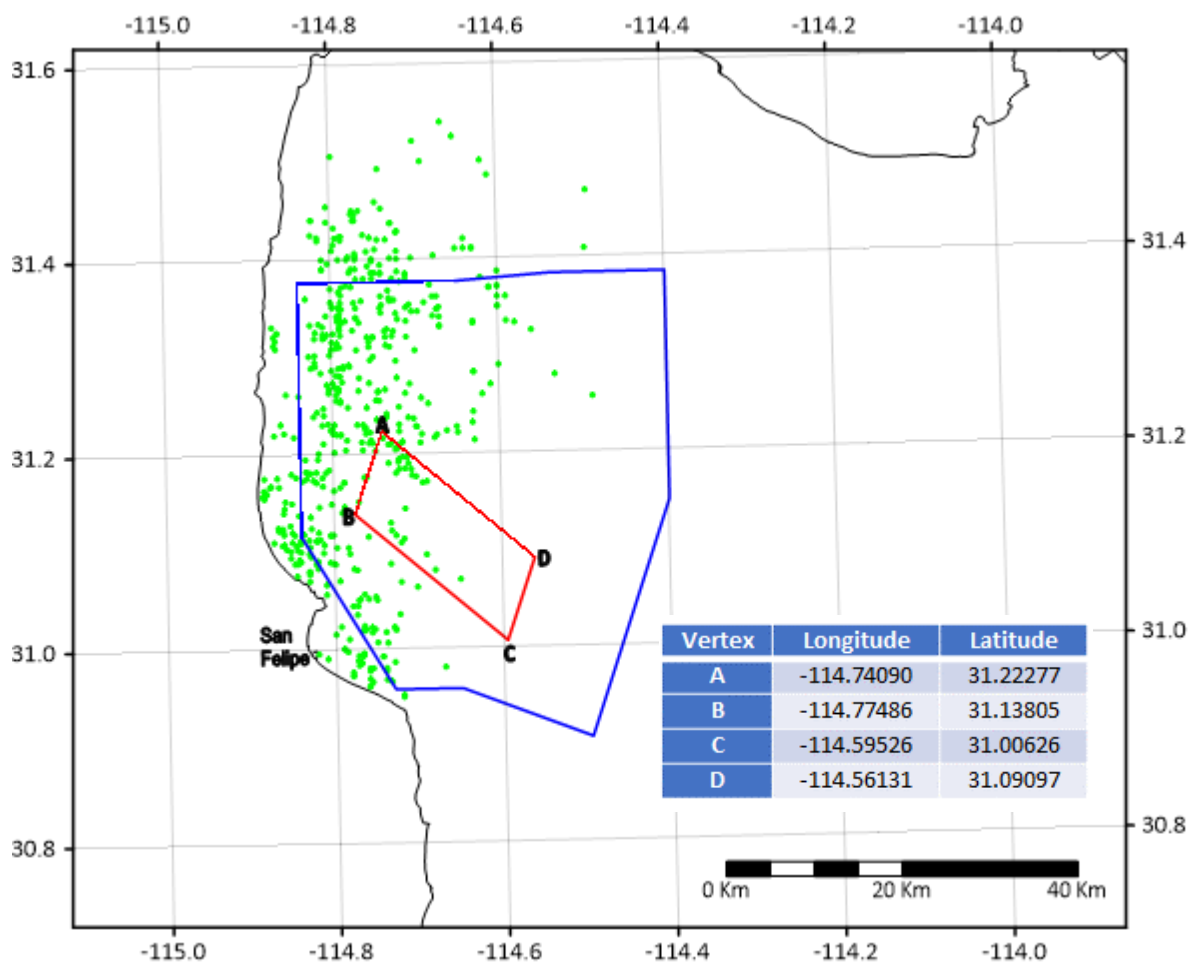
We call on the Government of Mexico to fully mobilize its enforcement assets to eliminate illegal fishing in the area where the last few vaquitas remain (please see attached Figure). In this Zero Tolerance Area, where the goal is to remove any illegal net within hours of its deployment, particularly during the totoaba season, we request that the Government of Mexico:

1. Fully fund and expand net removal efforts to maintain the area as a net-free zone;
2. Provide 24-hour surveillance and monitoring;
3. Take all necessary measures to protect net removal teams; and
4. Arrest and prosecute illegal fishermen by, for example, placing an FGR agent on net removal ships and Navy vessels to facilitate arrests.

These actions must be taken immediately, as we are currently in the peak of the illegal totoaba fishing season, which extends throughout March and April. It is important to strengthen enforcement throughout the entire protected area, but CIRVA requests that net removal effort be focused on the Zero Tolerance Area at this critical time.

There is still hope. Vaquitas are still producing calves, and the remaining animals are healthy – their population decline is caused by entanglement in illegal fishing nets, not a result of issues with their habitat, disease, or a lack of food. But, without immediate, effective action on the part of the Government, the vaquita is doomed to extinction. Furthermore, continued illegal fishing will cause irreparable harm to other species in the Upper Gulf of California, to Mexico’s biodiversity heritage, and to the human communities that depend on this ecosystem.

We respectfully offer to provide any assistance that will be useful in implementing these recommendations and in conserving the vaquita.



*Map: The blue polygon is the 2018 Vaquita Protection Refuge. The red polygon is the recommended ZERO TOLERANCE AREA where nets must be removed within hours of being set. Green dots are active totoaba nets removed since 2016. Boundary coordinates for the Zero Tolerance Area are shown.*

## RECOMMENDATIONS – CIRVA 11

CIRVA recommends the following actions to prevent extinction of the vaquita

### **Immediate - now through the end of May**

*We call on the Government of Mexico to fully mobilize its enforcement assets to eliminate illegal fishing in the area where the last few vaquitas remain (see attached Figure). In this area of zero tolerance, particularly during the totoaba season, we request that the Government of Mexico:*

1. *Fully fund and expand net removal efforts to maintain the area as a net-free zone.*
2. *Provide 24-hour surveillance and monitoring.*
3. *Take all necessary measures to protect net removal teams.*
4. *Arrest and prosecute illegal fishermen, for example, by placing an FGR agent on net removal ships and Navy vessels to facilitate arrests.*

### **Near term - April through August**

1. Fund and support photographic identification field efforts to take advantage of good-weather “windows” in spring.
2. Fund and continue acoustic monitoring during summer.
3. Continue and accelerate alternative efforts to develop and implement the use of alternative fishing gear.
4. Implement the “*Plan for the Comprehensive Care of the Upper Gulf of California and the Comprehensive Program for the Protection and Recovery of the Vaquita*”.

### **Medium term - June 2019 through the following shrimp season (September -February 2020)**

1. Strengthen direct linkages between alternative gear fishermen and seafood buyers.
2. Conduct cost-earnings analyses on new gears and test markets for vaquita-safe seafood.
3. Work with producers and buyers to develop and implement comprehensive chain-of-custody and traceability methods and practices.

### **Long term (starting in 2019 but lasting at least several years)**

CIRVA reiterates its long-standing recommendation that every effort be made to support vaquita-safe fisheries and to develop viable alternative livelihoods in the Upper Gulf of California. Ultimately, successful vaquita conservation will depend on well-managed, sustainable fisheries that support, *and are supported by*, the local communities.

# REPORT- CIRVA 11

The Eleventh meeting of the Comité Internacional para la Recuperación de la Vaquita (CIRVA) was held at the Southwest Fisheries Science Center in La Jolla, CA from February 19-21, 2019. CIRVA members in attendance included: Lorenzo Rojas-Bracho (chair), Armando Jaramillo-Legorreta, Barbara Taylor, Tim Gerrodette, Peter Thomas, Andrew Read, Robert Brownell, Sarah Mesnick, Frances Gulland, Nina Young, Jorge Urbán, Victor Camacho, Gustavo Cardenas-Hinojosa, Jay Barlow and Randall Reeves. CIRVA member Greg Donovan participated remotely via video. The committee's work was supported by a number of invited experts who provided presentations and contributed to plenary discussions. Rojas-Bracho chaired the meeting and Read, Thomas, Reeves, and Gerrodette acted as rapporteurs. Meeting participants are listed in Annex A. The agenda is given as Annex B.

## 1. Welcome

Rojas-Bracho welcomed CIRVA members and invited experts to the meeting. The agenda was reviewed and adopted.

## 2. Acoustic Monitoring Program and Other Scientific Efforts

### 2.1 Acoustic Monitoring Program

Jaramillo-Legorreta presented results from the 2018 Acoustic Monitoring Program. This included the regular summer program, underway since 2011, which is used to determine abundance trends, plus additional sampling, including a program to support the biopsy sampling field effort during September 2018 (see below). Throughout the year, but particularly during November and December, the program was hampered by the loss of acoustic monitoring instruments (CPODs) due to illegal fishing activity and intentional theft. During these two months, a total of 32 CPODs were lost at a cost close to \$32,500 dollars. Despite these setbacks, it is clear that the vaquita population has continued to decline and its range has contracted into a small area near the southwestern border of the Vaquita Refuge.

The results of the annual summer acoustic monitoring effort have been analyzed and submitted for publication (Jaramillo-Legorreta *et al.*, In Review). In this analysis, acoustic detections were combined with information on the minimum number of vaquitas known to be alive, from photographs of distinctively marked individuals taken during Vaquita CPR (hereafter VCPR) in 2017 (7) and from photographs taken during the biopsy and photo-identification survey (see below) in September 2018 (6). The total population decline since 2011 was estimated to be 98%. The catastrophic rate of decline since 2011 continues with the rate in the last three years estimated at around 50%. The analysis indicated that only about 10 vaquitas remained alive in 2018 (with a 95% chance of the true value being between 6 and 22).





*Figure 1. Dead adult female vaquita found floating and recovered by the Navy, 28 March 2018 in the northwest of the refuge (31°70.00N, 114°43.00W). Cause of death was entanglement in an illegal gillnet. The carcass has circular holes on the left flank, intestines protruding, eyes and all skin missing except for one piece near melon. It was stored in ice and freezer until necropsy.*



*Figure 2. Dead totoabas from a single net in March 2018. A total of 36 fish were removed; three were released alive and 33 were cut into pieces. This photograph was within a few kilometers of the area where vaquitas are most frequently recorded and where vaquitas were photographed in September 2018.*

In discussion, it was considered that some vaquitas could still exist outside the area monitored by the annual acoustic program. In response, Jaramillo-Legorreta noted that one of the primary assumptions of the program was that the trend of acoustic detections inside the monitored area reflects that of the entire population. It might be possible to use platforms of opportunity, such as one of the Sea Shepherd Conservation Society vessels, to explore this question after the current totoaba season ends.

Taylor noted that previous reviews of the acoustic monitoring program had concluded that most, if not all, potential sources of bias would lead to under-estimates of abundance (negative bias). This is confirmed by the effect of incorporating the minimum numbers known to be alive in 2017 and 2018, as described above.

CIRVA **strongly recommends** that the regular 46-site acoustic monitoring grid be sampled again in 2019, as in previous years, to continue the data series on population trend and provide information on distribution and occurrence. CIRVA **expresses grave concern** that CPODs are being removed or vandalized and notes that unless the acoustic equipment is adequately protected (which seems unlikely given recent experience), it will be necessary to discontinue the use of surface markers (buoys), which will increase the cost of the program.

CIRVA **further recommends** that the opportunistic use of smaller CPOD arrays be continued to assess vaquita presence and to support possible periodic photo-identification and visual monitoring efforts outside the regular summer sampling period (see below). Because of the recent loss of CPODs, CIRVA also **recommends** purchasing an additional 50 units to ensure a sufficient number are available to support the photo-identification effort and other research and monitoring programs.

## 2.2 Biopsy and Photo-identification Survey

Taylor described a field effort to obtain vaquita photographs and biopsies, which occurred from September 22 to 28, 2018. A full report on this field work is included as Annex C. The effort employed the Museo de la Ballena's research vessel, the *Narval*, three rigid-hulled inflatable boats (RHIBs), and a panga. The *Narval's* flying bridge was modified for visual operations and equipped with big-eye (25x) binoculars provided by the SWFSC.

On September 26, photos were obtained of a vaquita mother and calf (see the Executive Summary). At one point the pair came within 20m of the panga but at an orientation that precluded a biopsy sampling attempt. The mature female was photographically matched to the likely mother of V01F, the young animal captured and released in the VCPR effort in 2017.

Several vaquita sightings were made on September 27. One group of 4 individuals, including a small calf, was tracked for 1 hour and 42 minutes. It is very likely this was a second mother-calf pair, because the calf was reported to be smaller than the September 26 calf, but this pair was not photographed. The group of 4 approached to within 50m of the small boats but never came within biopsy range. Overall, given the locations and timing of these September 27 sightings, it was concluded that a minimum of 6 vaquitas were seen on this day.

Even though it was not possible to obtain biopsies, the field effort provided information on the minimum number of vaquitas alive in September 2018 and on aspects of the life history of several individuals. In particular, the re-sighting of the mother of V01F, this time with a new calf, indicates the potential for annual reproduction in vaquitas, which we interpret as a positive sign for the ability of the species to recover if the mortality in totoaba nets is eliminated. This observation is described in detail in a note that will be published in *Marine Mammal Science* (Taylor et al. *In Press*).

CIRVA commended the field team and thanked Diego Ruiz Sabio for his support, without which this effort would not have been possible and thanked NOAA's Southwest Fisheries Science Center for equipment loans.

CIRVA **acknowledged** that efforts to find and photograph vaquitas are most likely to be successful if four conditions are met, as follows: (i) weather is favorable (calm sea state, good visibility), (ii) an acoustic program is in place to determine the general location of vaquitas, (iii) a ship with experienced observers equipped with 25x binoculars is used to find and track the vaquitas visually; and (iv) several pangas are available, each with experienced marine mammal photographers using cameras equipped with at least 400-mm lenses to obtain photographs. CIRVA **recommends** that photo-identification efforts be conducted as soon as favorable weather conditions are expected. The purpose of such efforts is to obtain information on the minimum number of animals alive, and to refine understanding of life history including survival rates. In addition, CIRVA **recommends** exploring the possibility of using photographic capture-recapture techniques to obtain an estimate of minimum abundance (which is preferable to relying on simple single day counts of different individuals). Finally, CIRVA **recommends** that (a) local marine mammal scientists, and naturalists with training and experience in photo-identification techniques, organize rapid-response teams to take advantage of weather conditions suitable for such monitoring work and (b) more local personnel be trained and equipped to maximize the number of opportunities to obtain photographs and potentially biopsies.

### 3. Net Removal Program and Assessment of Enforcement

Efforts to locate and remove active and derelict totoaba nets and reduce the threat this fishing gear represents to vaquitas continued in two phases in 2018. These efforts are led by the Secretariat of Environment and Natural Resources (SEMARNAT), in collaboration with the National Institute of Ecology and Climate Change (INECC), the National Commission for the Knowledge and Use of Biodiversity (CONABIO), the Mexican Navy (SEMAR), the Federal Attorney for Environmental Protection (PROFEPA), the National Commission of Natural Protected Areas (CONANP), the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA), and the Secretariat of National Defense (SEDENA).

NGO partners in this work include the Sea Shepherd Conservation Society (SSCS), the World Wildlife Fund (WWF-Mexico), Museo de la Ballena y Ciencias del Mar, PRONATURA, and Alternative Fishing of Baja California (PESCA ABC, a local NGO that collaborates with 40 fishermen to find illegal fishing gear). Additional support is provided by World Animal Protection, Parley for the Oceans, the Marine Mammal Center and the National Marine Mammal Foundation (USA).



In total, 659 pieces of fishing gear were removed in 2018, most (67%) were active illegal totoaba gear, with a very high overlap between the locations where gear was found and the habitat of vaquitas. Efforts and results for specific periods of 2018 are discussed in more detail below. Monthly reports of net removal activities during the totoaba spawning season (December through May) are available on the IUCN Cetacean Specialist Group website: [iucn-csg.org](http://iucn-csg.org).

### 3.1 January to May 2018

From January to May 2018, 208 ship days of effort were spent finding and removing fishing gear, involving vessels from the SSCS and the Museo de La Ballena, in collaboration with PROFEPA and the Mexican Navy. Five hundred and seventy (570) pieces of gear were removed in the January to May phase, 91% of these were gillnets and longlines used to fish illegally for totoaba and, 77% of these nets and longlines were in active use, including 382 totoaba gillnets (Table 1 and Figure 3). As in previous years, a wide variety of vertebrate (finfish, sharks, rays, birds, sea turtles and marine mammals) and invertebrate animal species were recorded as by-catch in the removed gear – 1,362 dead and 863 live individuals were documented.

Table 1. Active totoaba gillnets removed by SSCS and Museo de la Ballena vessels, January-May 2018.

Vessel	Jan	Feb	Mar	April	May	Total
<i>El Narval y Narvalito</i>	2	36	20	19	1	78
<i>Sharpie</i>			35	51	3	89
<i>John Paul DeJoria</i>	27	51	5			83
<i>Farley Mowat</i>		9	44	69	10	132
<b>Total</b>						<b>382</b>

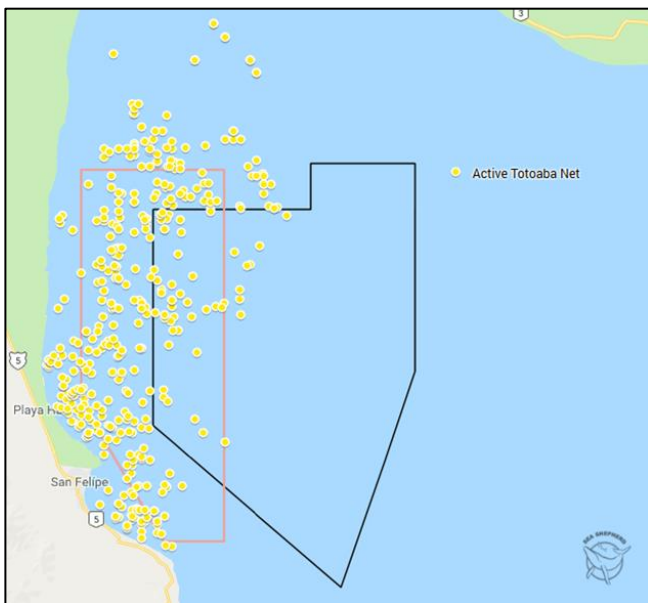


Figure 3. Locations of the 382 active totoaba gillnets removed during January-May 2018.

All nets removed during this phase were securely packed in 189 silo bags and placed in containers. In March 2018, 136 of these bags were exported to the US for recycling. Lead weights taken from some of the fishing nets were re-cast for use as diving weights.

### 3.2 June to November 2018

From June to November 2018, fishermen in 20 pangas spent each of 56 vessel days finding fishing gear, working with an SSCS ship and a Museo de la Ballena ship that were removing the nets. Effort between June-November 2018, which falls outside the main season for illegal totoaba fishing, was reduced because of: (i) lack of fuel for small boats (pangas) and El Narval (Museo de la Ballena), (ii) administrative issues related to the management of program funding, (iii) lack of a new fuel donation from PEMEX, and (iv) rough weather. Nevertheless, a total of 89 pieces of gear were removed, 72.5% of them totoaba gillnets and longlines. All but two of these were inactive. The locations of the totoaba gillnets removed during this period are shown in Figure 4. Vertebrate and invertebrate by-catch continued to be high with 229 dead and 1,179 live individual animals recorded during this period.

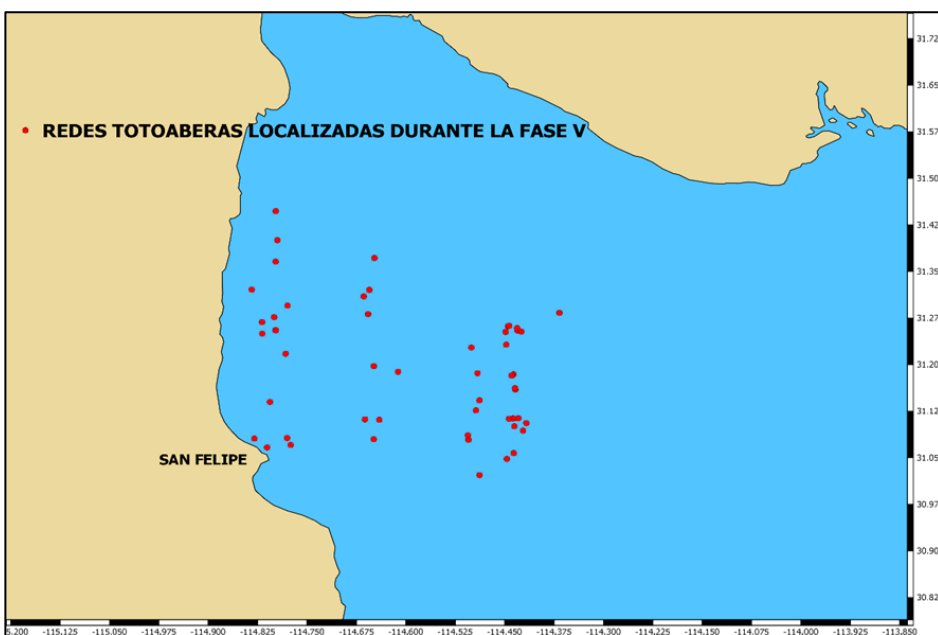


Figure 4. Locations of totoaba gillnets removed during June-November 2018.

### 3.3 December 2018 – February 2019

Illegal fishing resumed at high levels toward the end of 2018 and into 2019 as evidenced by the number of nets removed despite hindrances (see below) to removal efforts. SSCS removed 41 pieces of gear in 15 ship days of effort in December 2018 and SSCS and Museo de la Ballena 22 pieces in 7 ship days from January 2019 to the 15<sup>th</sup> of February 2019.

### 3.4 Cumulative net removals since 2016

Figure 5 shows the cumulative numbers of active totoaba nets removed by SSCS during its Operación Milagro from January 2016 to February 2019. Figure 6 shows the cumulative numbers of nets removed by SSCS, Museo de la Ballena and by all cooperating groups from January 2016 to February 2019. These data clearly demonstrate an increase in illegal fishing for totoaba, which constitutes an ongoing threat to the existence of the vaquita.

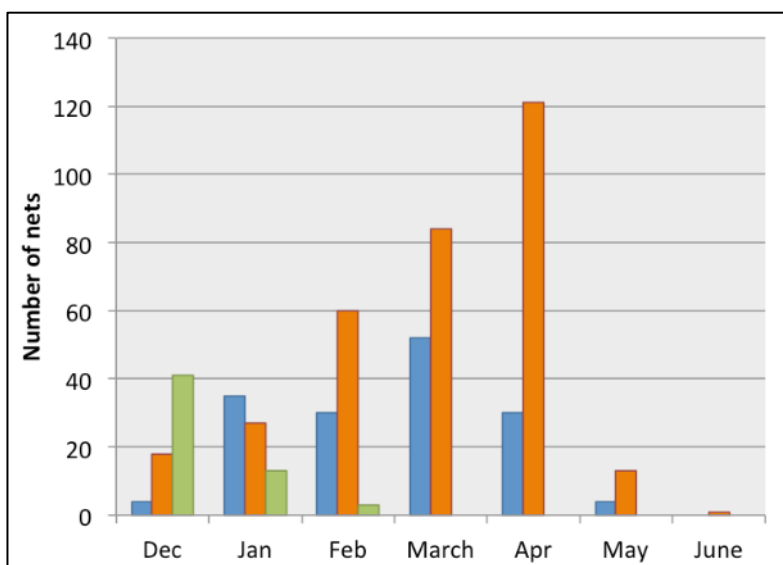


Figure 5. Active totoaba nets removed from 2016-2019 by Operación Milagro. Net removals from December 2018 – February 2019 were reduced compared to previous years due to less removal effort in January and February 2019 than in the previous two years because of to the attacks on the SSCS vessel, that left the area for repairs for over a month, and the absence of the *Narval* from the Upper Gulf in early 2019. Blue: OPM3 2016-17; Orange: OPM4 2017-18; and Green OPM5 2018-19

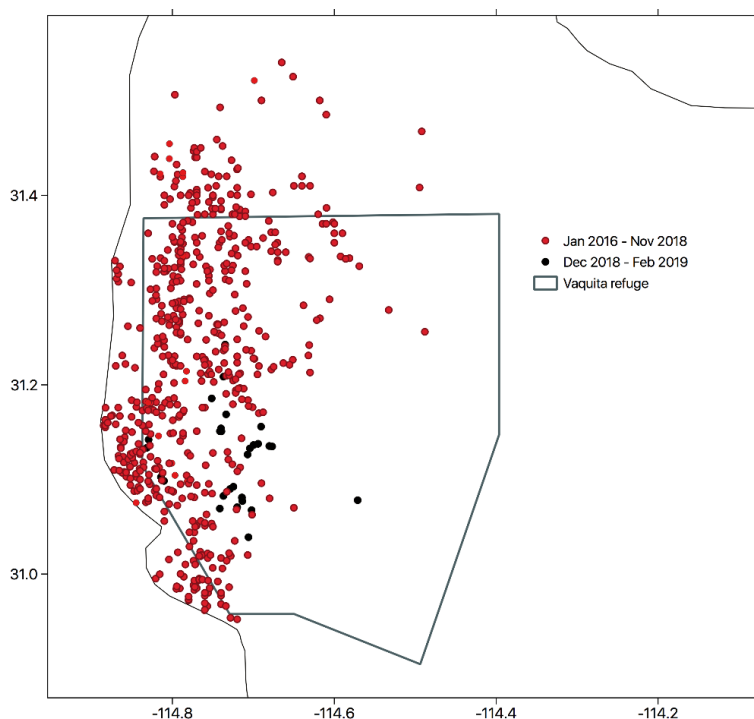


Figure 6. Nets removed by the inter-institutional gillnet removal program, from January 2016 to February 2019.

Red: January 2016 – November 2018; Black: December 2018 – February 2019. Black line shows the Vaquita Refuge

### 3.5 Violent attacks on net removal operations

Violent, brazen attacks on an SSCS Se ship on 19 January and 31 January 2019 by large numbers of individuals in dozens of pangas disrupted net removal efforts being conducted in the presence of Mexican Navy vessels, one of which also came under attack. As of the date of the CIRVA meeting, no person had been charged in these attacks although investigations are ongoing. The attacks hindered net removal operations for a period of time, but SSCS vessels had resumed operations in the region by mid-February 2019, and three large ships will be deployed for the peak of the illegal totoaba fishing season.

### 3.6 CIRVA recommendations on net removal and enforcement

Given the continued high level of setting of illegal totoaba gillnets, as evidenced by the large numbers of nets removed in 2018, there is no question that illegal totoaba fishing and the risk it poses to the survival of vaquitas continued unabated during 2018. This illegal totoaba fishing continues at high levels in 2019.

Enforcement efforts have been completely ineffective in reducing the illegal totoaba fishery in the Upper Gulf of California. The failure of the Navy or other governmental representatives to respond forcefully to the violent direct attacks on net-removal vessels and persons operating legally in government-sanctioned net-removal programs is indicative of the erosion of respect for the rule of law in the region.

CIRVA **commends** the valiant work of agencies, organizations and individuals involved in the net-removal operations in the Upper Gulf of California throughout 2018 and early 2019.

CIRVA is **alarmed** by the unlawful violent attacks on net-removal vessels and their crews and is extremely concerned for the safety of those individuals who are directly involved in the efforts, authorized and led by the Mexican Government, to find and remove illegal fishing gear from the range of the vaquita.

Thus, CIRVA **calls on** the Government of Mexico to fully mobilize its enforcement assets to eliminate illegal fishing in the area where the last few vaquitas survive, a small area henceforth referred to as the “Zero Tolerance Area” where the goal will be to remove any illegal net within hours of its deployment (see Figure 7). In this Zero Tolerance Area, particularly during the totoaba season, we **recommend** that the Government of Mexico:

1. Fully fund and expand net-removal efforts to maintain the area as a net-free zone;
2. Provide 24-hour surveillance and monitoring;
3. Take all necessary measures to protect net-removal teams from harm or intimidation; and
4. Arrest and prosecute illegal fishermen, for example, by placing an FGR agent on net-removal ships and Navy vessels to facilitate arrests.

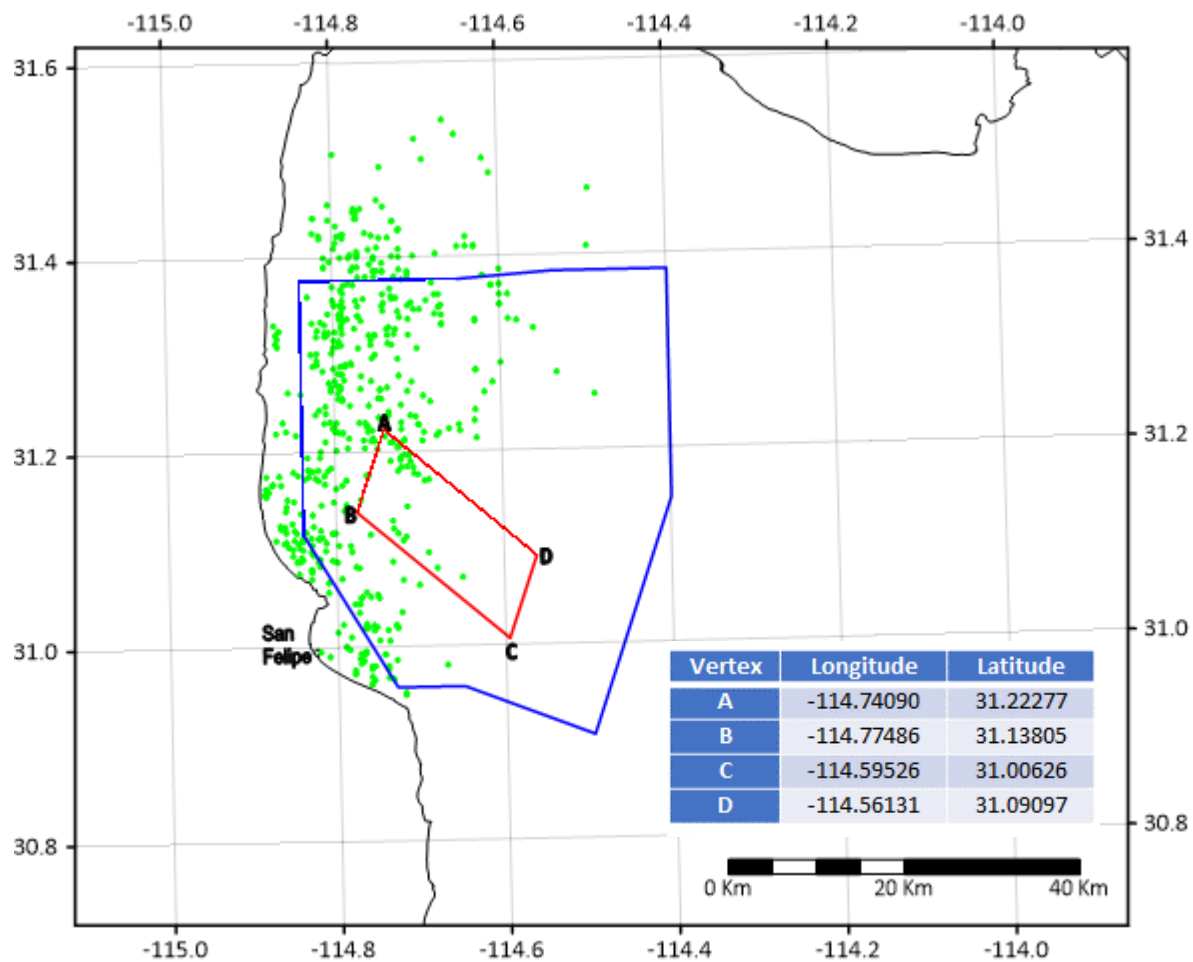


Figure 7. The blue polygon is the 2018 Vaquita Protection Refuge. The red polygon is the recommended ZERO TOLERANCE AREA where nets will be removed within hours. Green dots represent active totoaba nets removed since 2016. The boundary coordinates for the Zero Tolerance Area are shown.

### 3. 7 Historical perspective on illegal fishing in the Upper Gulf of California

Although illegality escalated with the resumption of the lucrative totoaba market in the early 2010s, illegal fisheries have been a serious challenge to vaquita conservation since CIRVA's inception (1997). An early finding of the committee was that the amount of shrimp gillnet deployed by individual pangas was routinely ten times longer than allowed. Fishermen have complained for many years about unmarked pangas fishing illegally in the Upper Gulf. In 2011 fishermen advised the Presidential Commission on Vaquitas that even though all pangas were supposed to be registered under a unique number, they routinely observed multiple pangas displaying the same number. Some fishermen have pleaded for enforcement of the laws, but the complete lack of consequences for illegal behavior has made the resumption of totoaba fishing an easy choice for many others. The resurgence of the totoaba fishery began prior to the previous

presidential administration. According to the Environmental Investigation Agency<sup>1</sup>, the Chinese market for totoaba *buches* (swim bladders) was already flooded by 2012 and the catastrophic decline in vaquita numbers was reported by CIRVA in 2014 – prior to announcement of the Presidential four-part plan in 2015. The lack of enforcement of fishery regulations and other laws intended to protect wildlife is systemic, long-standing, and deeply entrenched. Changing this situation will require political courage and leadership, as well as strong public support. CIRVA reiterates its recommendation from its 9<sup>th</sup> meeting (April 25-26, 2017) that the Mexican Government use the information provided by the gear removal efforts, the past and ongoing recovery of vaquita carcasses, and Sea Shepherd Conservation Society’s observations of illegal fishing to launch – with the utmost urgency – intelligence-led enforcement operations to dismantle illegal fishing operations as well as the organized criminal syndicates driving the international illegal trade in totoaba.

#### 4. Update on Alternative Gear Development and Deployment

In its last report (CIRVA-10), CIRVA acknowledged and applauded the efforts of the Expert Committee on Fishing Technology (ECOFT) and **endorsed** that ECOFT’s recommendations concerning, among other things:

1. a transparent, multi-year workplan;
2. the need for INAPESCA to consult and inform ECOFT before conducting new field tests or proposing the approval of new gear;
3. the use of Electronic Monitoring Systems (EMSs) with video in all gear-testing and fishing operations in the Upper Gulf of California (UGC); and
4. the issuance by CONAPESCA of fishing permits for use of small trawls by commercial vessels equipped with EMSs.

In addition, CIRVA recommended that Mexico prohibit the use of monofilament or multi-monofilament nylon line in the construction of alternative gear, including purse seines and suriperas.

CIRVA-11 **reiterates** its strong support for these recommendations.

At this meeting, Chris Glass again briefed CIRVA on key activities of ECOFT since the CIRVA-10 meeting. Emilia Marin (WWF-Mexico) also gave an update on gear trials.

##### 4.1 Joint Working Group (JWG) meeting

On May 8, 2018 some members of ECOFT and CIRVA met in Ensenada, MX, to develop guidelines for establishing vaquita-safe fisheries in the UGC, which are badly needed by the local fishing

---

<sup>1</sup> <https://eia-international.org/report/collateral-damage/>

communities. The most critical features identified by the ECOFT-CIRVA Joint Working Group (JWG) are as follows:

1. The possession, manufacture, and sale of gillnets (any nets that are capable of entangling non-target animals) or their net components must be outlawed.
2. Any gear that is deployed must pose no risk to vaquitas.
3. All experimental trials must be conducted by manageable numbers of appropriately trained fishermen.
4. Permits must be granted by CONAPESCA in a timely manner.
5. Poaching and illegal fishing must be eliminated.
6. The transition period for phasing out the compensation program (for not fishing) should be as short as possible.

New gear options for starting the transition to gillnet-free fisheries in the UGC are available, and there is no technical reason for this transition not to proceed.

The JWG reached the following conclusions regarding alternative gear, on the assumption that all pangas in the UGC have a VMS aboard:

1. Gears that are available and ready to use –
  - a. Small trawl (50ft and 35ft)
  - b. Pot (baited for finfish)
  - c. Longline
  - d. Handline
  - e. Trolling
2. Gears that are available but that require additional field testing –
  - a. Suripera
  - b. Purse seine
  - c. Danish Seine
3. Other gears that may be effective but have yet to be tested –
  - a. Unbaited trap for octopus
  - b. Beach seine
  - c. Small trawl for finfish
  - d. Beam trawl

Other feasible alternatives for the fishing sector that could be implemented immediately include the use of pots for crabs and snails and the use of diving techniques to obtain conch species.

The JWG report (which was provided as a background document for CIRVA-11) includes timelines, tasks, and responsible parties for developing and implementing the transition to non-gillnet fisheries.

#### 4.2 Research on alternative fishing strategies and the results of experimental trials

Experimental trials took place between July 23-25, 2018 at the flume tank facility, Center for Sustainable Aquatic Resources, Marine and Fisheries Institute, Memorial University, St. John's, Newfoundland, Canada. Three sets of trials were conducted in response to the request to develop alternative fishing gears for the UGC. Two of these trials (35ft small trawl and suripera) were a continuation of research previously conducted in the flume tank by ECOFT. The third set of trials, which involved gillnet configurations proposed by fishermen and fishing federations in the UGC, was conducted at the request of the then Mexican Environment Secretary, Rafael Pacchiano.

##### Monofilament Gillnets:

All of the monofilament gillnets provided by the fishermen's federations and tested in the flume tank would entangle and kill vaquitas and other large marine animals. After assessing the research conducted on these nets, and having undertaken, in good faith, appropriate research to address the ideas and questions raised by the fishermen, ECOFT stressed that it does not approve any of the gillnets that were tested for use in the UGC.

##### 35ft Shrimp Trawl:

Additional trials were conducted with an enhanced version of the 35ft trawl that removes the need for trawl doors by using a beam to hold the net open. This enhanced trawl reduces drag, is therefore more fuel efficient, requires a single towing rope, and, therefore, is easier to operate than the 50ft trawl. ECOFT strongly recommended that the 35ft net be deployed on a trial basis during the autumn 2018 shrimp fishing season and that basic training in its use be conducted as a matter of urgency.

##### Suripera:

These and previous tank tests identified simple modifications that would make the net suited to use in the UGC and these can begin immediately. ECOFT recommended that lightweight PE twine be used in place of monofilament nylon and that minor modifications be made to the edges of the net to remove loose panels. The length of the front skirt should be extended with regard to the rear skirt to ensure the rear skirt is held at a minimum of 2m above the seabed. ECOFT recommended use of the suripera as a viable, fuel-efficient fishing method in the UGC. Basic training in its use should begin as a matter of urgency.

#### 4.3 Gear trials

After delays caused by the recent attacks on net-removal teams and vessels (see above) and the need for INAPESCA to complete the above-mentioned modifications to the suripera, the long-planned gear trials were expected to finally get underway in mid-February 2019. Three pangas were available for these trials.



#### 4.4. CIRVA conclusions and recommendations

CIRVA notes that alternative gear development is one of the most important means of developing sustainable fisheries (which includes consideration of effects on other non-target organisms) in the Upper Gulf region. CIRVA thanked Glass and Marin for the information and expressed appreciation for their work and that of others involved. It was noted that at least some local fishermen have attempted to discredit the validity of the flume tank testing of the gillnet samples they provided, arguing that the only way to test effectiveness and determine whether these nets do or do not represent a threat to vaquitas is to conduct field trials in the UGC.

CIRVA **encourages** Glass, as chair of ECOFT, to continue his efforts to communicate regularly with relevant agencies in the new administration (e.g. INAPESCA and SEMARNAT) and **recommends** that those agencies review, support, and follow ECOFT's recommendations.

CIRVA accepts the findings of ECOFT and **repeats its earlier recommendations** that:

1. Mexico prohibit the use of monofilament or multi-monofilament nylon line in the construction of alternative gear, including purse seines and suriperas and
2. Take to heart and implement the findings, advice, and recommendations of ECOFT expeditiously.

In addition, CIRVA **encourages** WWF, in consultation with ECOFT, to continue working with INAPESCA and willing fishermen to use gear and practices that have been shown to be vaquita-safe, widely available, and affordable to communities in the UGC.

CIRVA **notes** that the trials now underway provide an opportunity to help fishing communities become familiar with and accept alternative fishing methods as well as to collect data on the economics of using different gear types.

## 5. Status of Emergency Petition and Court Actions Related to the Vaquita and Agreements between the USA and the Government of Mexico

CIRVA received an overview provided by Young on actions that have been taken by the environmental community in U.S. courts and on agreements between the governments of Mexico and the United States. Those actions and agreements are summarized here.

On May 18, 2017 Natural Resources Defense Council (NRDC), Center for Biological Diversity (CBD), and Animal Welfare Institute (AWI) petitioned the U.S. Secretaries of Homeland Security, the Treasury, and Commerce ("Plaintiffs") to "ban the importation of commercial fish or products from fish" sourced using fishing activities that "result in the incidental mortality or incidental serious injury" of vaquitas "in excess of United States standards." The petitioners requested that the secretaries immediately ban imports of all fish and fish products from Mexico that do not satisfy the MMPA seafood import provisions, claiming that emergency action banning such imports is necessary to avoid immediate, ongoing, and "unacceptable risks" to the vaquita.

On December 21, 2017 the petitioners filed suit in the U.S. District Court for the District of Columbia, which among other things challenges the failure of NMFS, the U.S. Department of Commerce, the U.S. Department of the Treasury, and the U.S. Department of Homeland Security (“Defendants”) to respond to the petition without unreasonable delay pursuant to the Administrative Procedure Act (“APA”) 5 U.S.C. §§ 551-559; 701-706. On March 21, 2018, the petitioners filed suit before the U.S. Court of International Trade (CIT) seeking an injunction requiring the Government to ban the importation of fish or fish products from any Mexican commercial fishery that uses gillnets within the vaquita’s range. On April 16, 2018, Petitioners filed a motion for a preliminary injunction at the CIT, and the U.S. Government responded with a motion to dismiss. The CIT held oral arguments on the preliminary injunction on July 10, 2018.

On July 26, 2018, the CIT denied the Government’s motion to dismiss the case brought by NRDC, CBD, and AWI and granted the Plaintiffs’ request for a preliminary injunction requiring the U.S. Government, pending final adjudication of the merits, to ban the importation of all fish and fish products from Mexican commercial fisheries that use gillnets within the vaquita’s range. The United States accordingly implemented an embargo on curvina, sierra, chano, and shrimp caught with gillnets within the vaquita’s range.

### 5.1 Consultation and commitment by the Government of Mexico to enhance vaquita conservation

In response to the emergency petition, the USA and the Government of Mexico (GOM) engaged in consultations throughout 2017 and 2018 to evaluate the GOM’s regulatory program and enforcement actions and to identify additional actions that the GOM could take to enhance vaquita conservation and enforcement.

On November 9, 2018 the GOM transmitted to the USA (NMFS) a “*Plan for the Comprehensive Care of the Upper Gulf of California and the Comprehensive Program for the Protection and Recovery of the Vaquita*” (hereafter “the Plan”) that describes regulatory actions and commitments to strengthen enforcement, promote transparency, and facilitate trilateral cooperation among the governments of Mexico, the USA and China, especially as it pertains to the trafficking of totoaba swim bladders. The Plan represents the revised regulatory program intended to govern the incidental mortality of vaquitas in UGC export fisheries. The GOM also requested a comparability finding for the following “vaquita-safe” fisheries: Upper Gulf of California shrimp trawl fishery, for both small and large vessels; Upper Gulf of California shrimp suripera fishery; Upper Gulf of California sierra purse seine fishery; Upper Gulf of California sierra hook and line fishery; Upper Gulf of California chano trawl fishery, for small vessels; Upper Gulf of California curvina purse seine fishery; Upper Gulf of California sardine/curvina purse seine fishery, for both small and large vessels; El Golfo de Santa Clara curvina rodeo-style gillnet fishery.

### 5.2 Summary of the Plan

Young provided the following as a summary of the Plan. The Plan establishes that the GOM will no longer authorize gillnet fisheries (except the fishery for curvina using rodeo-style gillnet gear)

in the Upper Gulf of California, in accordance with the permanent ban on passive gillnet fishing within the restricted area contained in the Regulatory Agreement of June 30, 2017. Therefore, with the exception of the El Golfo de Santa Clara curvina rodeo-style gillnet fishery, the GOM will permanently ban all gillnet fishing in the UGC and eliminate the exemption to the gillnet ban for sierra (gillnets are no longer authorized for use in the sierra fishery).

The GOM will move to a system where fishermen can only fish with fishing gear that is specifically authorized. The GOM will not authorize passive gillnets and will only authorize specific vaquita-safe gear types for use in fisheries operating in the UGC. Specifically, for shrimp, chano, and sierra the GOM will only authorize small-scale trawl, suripera, purse seine, and hook and line gear, none of which have any documented bycatch of vaquita. The GOM intends to revise this regulatory agreement following the 2019 curvina fishing season and the successful testing and approval of an alternative gear to rodeo-style gillnet gear. The GOM would then extend the permanent gillnet ban to all monofilament and multifilament nylon gillnets/entangling nets or modifications thereof regardless of their mode of operation (e.g. passive or active), thereby eliminating all exemptions.

Additionally, the GOM will significantly strengthen its regulatory and enforcement regime by: prohibiting night-time transit of fishing vessels; banning the possession, sale, or manufacture of mono- or multi-filament nylon gillnets of mesh size greater than 5.75 inches throughout the UGC (e.g the size of all illegal totoaba gillnets); banning the possession, sale, or manufacture of mono- or multi-filament nylon gillnets of all mesh sizes in El Golfo de Santa Clara (while allowing small gillnets used south of San Felipe outside vaquita habitat); reducing the number of landing and departure sites in El Golfo de Santa Clara; requiring the marking of fishing gear to identify owner and area of operation; requiring that all authorized gillnet gear used outside the restricted area be registered with local fisheries authorities; and requiring the surrender to fisheries authorities of all unauthorized gear.

To strengthen its fisheries and illegal wildlife trafficking enforcement and to improve the transparency of its enforcement efforts, the GOM will:

- Implement camera surveillance north and south of San Felipe;
- Amend Federal criminal procedures to include individuals engaging in totoaba trafficking under the penalties in the Federal Penal Code;
- Achieve real-time reporting and enforcement of vessel monitoring system information;
- Provide monthly reports to NMFS and CIRVA on enforcement efforts;
- Provide quarterly notifications to the U.S. Department of Justice Environmental Crimes Section; and
- Improve international collaboration on enforcement and interdiction by convening an enforcement contact group, which included representation from CIRVA.

In the Plan, the GOM committed to providing full implementation of vaquita-safe fishing gear in UGC fisheries. The Plan includes: an alternative gear research plan; a commitment to

develop an implementation plan for this alternative gear research plan in consultation with the ECOFT; and a commitment to develop a plan for the transparent review of data and information on alternative gear development and testing.

These regulatory improvements directly respond to, and will implement, recommendations made by CIRVA and NMFS.

### 5.3 Status of the Plan with the new administration

The USA and the GOM are continuing their consultations. However, the new administration in Mexico has not clearly committed to implement the Plan fully and, to date, has missed key deadlines.

### 5.4 CIRVA Recommendations

CIRVA **welcomes** the “Plan for the Comprehensive Care of the Upper Gulf of California and the Comprehensive Program for the Protection and Recovery of the Vaquita.” Recognizing that the commitments embodied in the Plan were made by the previous administration, CIRVA strongly **urges** the present Government of Mexico to implement, fully and expeditiously, the commitments made in the Plan. CIRVA **stands ready** to assist the Government of Mexico in the roles identified for CIRVA in the Plan including:

- reviewing monthly reports of enforcement efforts;
- participating in an enforcement contact group; and
- providing advice on implementation of the plan for alternative gear.

## 6. Socio-economics and markets

Since its inception, CIRVA has considered the need to preserve the fishing economies of local communities as a key element of its advice on conserving the vaquita. Mesnick provided updates on multi-institutional efforts to apply market-based approaches to vaquita conservation and on recommendations of an expert panel of economists initially convened in a special session at the North American Association of Fisheries Economists conference in April 2017. The efforts focus on tools to incentivize the transition to gillnet-free fisheries and on opportunities for alternative livelihoods.

Members of the expert panel met in January 2019 to refine advice for short- and long-term actions (initially reported at CIRVA-9, see section 3.2 and Appendix 5 of the CIRVA-9 report). In the short term, effective enforcement remains critical. The continued presence of illegal fishing undermines efforts to incentivize the transition to new gears and hampers development of legal fisheries. In the long term, the lack of formal and informal institutions

that would provide a structure of incentives, viable legal alternatives, and the necessary compliance hinders efforts to protect vaquitas and support legal fisheries. Such institutions are essential for combating the lucrative illegal trade in totoaba swim bladders, which enforcement alone cannot abate.

### 6.1 Lack of availability of products

Efforts to engage markets continue to be hampered by a lack of seafood product captured without gillnets, including failure of government programs to further the development, testing, and permitting of new gears (see above). A multiple-year study of retail seafood markets in San Diego by Oriana Poindexter *et al.* provided data on retail prices showing that traceable, certified shrimp products from Mexico can garner a price-premium. The economic case for substituting gillnets with alternative gears was analyzed by WWF, recognizing heterogeneity in fishing trips. The study found that small-trawl gear for shrimp could be a viable option for a limited number of fishermen, yet the data were insufficient for a thorough cost-earnings analysis. Market strategies, technological improvements (reduction of fuel costs), training (increase in skills of fishermen), and regulatory changes are all part of the discussion on how to increase the number of fishermen who are achieving profitable catches with the new gear.

### 6.2 Supply chain meeting

On June 18, 2018, Ocean Garden Products in San Diego hosted a supply chain meeting, organized by SEMARNAT and some CIRVA members. Participants included major US shrimp importers, San Felipe fishing cooperatives, Pesca ABC, SEMARNAT, CONAPESCA, NGOs (WWF, NRDC), Scripps Institution of Oceanography, and SWFSC. Discussion focused on the challenges of a volatile U.S. shrimp market with increasing competition from aquaculture and low-cost imports and of substituting gillnets for alternative gears. The following actions were identified as necessary by United States buyers: (a) establish fishing methods and gear to be used in capturing wild Mexican shrimp in the Upper Gulf of California; (b) provide panga fishermen with gear and tracking devices; (c) develop a processing model – and control documents – to ensure full traceability of all production; (d) create a branded, commercially viable product to be sold in the United States retail market; and (e) communicate the value and “sustainability” message to customers and consumers via a marketing campaign.

### 6.3 Meetings of the Committee for Economic and Community Development of the Upper Gulf of California (CEDO) on development of alternative livelihoods

The development of alternative livelihoods shows little progress. A second meeting of CEDO was held on April 23-24, 2018 as part of the MOU between the Mexican government and the Carlos Slim and Leonardo di Caprio foundations. Proposals for new businesses and social development projects were presented by members of local communities but these remain unfunded. Private funders appear disillusioned with the region and the status of the MOU is unclear. CIRVA reiterated the importance of providing alternatives for fishers and discussed expanding participation among women in future efforts to develop alternative livelihoods.

### 6.4 Reports of “laundering” of gillnet-caught shrimp

CIRVA received a report from the Sustainable Fisheries Partnership (SFP) that illegal gillnet-caught shrimp was being “laundered” (mixed with catch from bottom trawlers) and exported

to the United States as legal trawl-caught product. Evidence of illegal shrimp gillnetting is also abundant on social networking sites in the Upper Gulf of California. This issue has led SFP to draft new procurement advice for all seafood from the Upper Gulf of California and to engage importers of Mexican shrimp to commit to implementing control documents throughout their supply chains, including processing plants, to discourage illegal fishing. Mexico and the United States, and the shrimp supply chain on both sides of the border, must work cooperatively to eliminate illegal fishing and the importation of illegally-sourced product into the US.

## 6.5 Recommendations

CIRVA **reiterates its previous recommendation** that every effort be made to strengthen direct linkages between the fishermen using alternative gears and the seafood buyers as a way of incentivizing the conversion of the fleet to gillnet-free operations.

CIRVA **recommends** that Mexico work with gear-testing partners to conduct rigorous cost-benefit analyses on the new gears and to test markets for the vaquita-safe products.

CIRVA **recommends** that Mexico work with producers and buyers to develop and implement a comprehensive chain of custody and traceability system for vaquita-safe products from the Upper Gulf of California. It is critical that this system be in place before legal shrimp fishing resumes in September 2019 and that information is accessible to producers, buyers, and consumers.

## 7. Post-Vaquita CPR (VCPR) efforts

### 7.1. Lessons Learned from “Ex-situ Conservation Options” Workshop

Taylor summarized the “*Ex Situ* Options for Cetacean Conservation” workshop held in December 2018 in Nuremberg, Germany. This workshop was intended to draw lessons learned from experience with the vaquita and baiji and inform discussions regarding *ex situ* options with other threatened small cetaceans. The primary lessons learned from VCPR that should be applicable to other small cetaceans were as follows:

- Catastrophic declines can occur with threatened populations
- To be prepared for such crisis situations, gaps in the information needed to make decisions about whether, when, and how to implement *ex situ* options must be identified and filled
- Filling those gaps will take considerable time
- *Ex situ* options should be pursued when there are still at least hundreds instead of only tens of animals in the wild population.

Many of the information gaps need to be filled for effective conservation action, whether it is *in situ* or *ex situ*. For example, it is essential to learn as much as possible about the distribution of both the animals and the threats they face, animal movements (and hence exposure to threats), basic population demography, and biology, including diet. Other information gaps may be

specifically related to translocating or taking animals into captivity (for example, determining a species' vulnerability to capture myopathy and to mitigate this risk factor). For several species, the workshop assigned a high priority to filling gaps in taxonomy. For example, cases have been made for recognizing three species or subspecies of Amazon river dolphins (*Inia geoffrensis*) and two species of South Asian river dolphins (*Platanista gangetica*). Dealing with the taxonomy of the Irrawaddy dolphin (*Orcaella brevirostris*), of which several subpopulations are red-listed as Critically Endangered, is also a challenge.

Workshop participants included species specialists for seven representative species as well as veterinarians, and animal husbandry experts. The workshop concluded that the One Plan Approach developed by the IUCN Species Survival Commission's Conservation Planning Specialist Group, which attempts to integrate in situ and ex situ options to minimize extinction risk, is a good model for all species. Although none of the seven species considered at the workshop was judged to be in immediate need of *ex situ* actions similar to those taken with the vaquita, it was agreed that preparatory work to fill information gaps was an urgent need for all of the species so that a One Plan Approach could be pursued to allow timely, well-informed decision-making. The workshop also pointed out that semi-natural situations, similar to the ox-bow lakes used to establish and maintain insurance populations of Yangtze finless porpoises in China, could be available for many of the species and such options should be actively explored.

The vaquita example provides motivation to change fundamentally how we view the conservation of the seven species of small cetaceans considered at the workshop. Nearly all of them are red-listed as threatened because of declining abundance due to unsustainable mortality in gillnets. The absence of good examples of small-scale fisheries transitioning from gillnets to cetacean-safe gear makes it clear that more conservation options will be needed to prevent future cetacean extinctions. The report of the workshop will likely be published as an IUCN document within the next year.

## 7.2 Vaquita Tissue Culture and Genomic Sequencing

Phillip Morin, Marine Mammal Genetics Group, SFWSC, presented an update on culturing vaquita cells acquired from animals during VCPR. This work is being carried out in collaboration with Marlys Houck, Curator of the Frozen Zoo, San Diego Zoo Institute for Conservation Research.

The Biodiversity Banking Team successfully cultured vaquita cells from both vaquitas captured during VCPR and were able to freeze 136 vials of viable cells (Table 2). The cells have been karyotyped, and samples were sent to the Vertebrate Genome Lab at Rockefeller University in August 2018 for genome sequencing.

The Reference genome has been sequenced as part of the Vertebrate Genome Project (VGP) (funded by NMFS), surpassing all the quality criteria set for VGP genomes. Genome scaffolding (ordering of completed sequences into chromosomes) is in progress and will be followed by annotation of genes later this year. Publication of the genome and some comparative analysis is planned for mid-year. Additional partial genome sequences (funded by The Marine Mammal Center) from 21 vaquita samples held in the SFWSC MMASTR collection have been generated and will be assembled based on the reference genome for further demography, diversity, and conservation genomics analyses.



Table 2. Frozen Vaquita Tissue Cultures

ID	KB	Sampling Site	Number of Freezes	Number of Vials	Number of Tissue pieces	Samples given to Molecular Genetics
V01F	21961	Skin	2	20		Small piece of skin
V02F	21983	Mesovarium	9	68	3	Liver
		Kidney	3	24		
		Trachea	2	14		
		Liver				
		Skin	1	10		

### 7.3 Disposition of VCPR assets

Smith explained that VCPR assets specific to the land-based facility for vaquitas were donated to the Museo de la Ballena y Ciencias del Mar to open the first facility for housing stranded marine animals in Baja, Mexico, the “Centro de Rescate de Mamíferos y Tortugas Marinas”, jointly with the Universidad Autónoma de Baja California Sur (Autonomous University of Southern Baja California). VCPR San Felipe Site Manager Ricky Rebolledo and Logistics Manager Kerry Coughlin inventoried all equipment, labeled all parts for ease of rebuilding, hired locals for all stages of break-down, and transported equipment from San Felipe to La Paz, BCS, by truck. The Centro de Rescate site was prepared and built up during the fall of 2018 and is now operational and accepting stranded marine animals in need of rehabilitation. The center has hired Rebolledo to be the facility manager and stranding coordinator. Rebolledo is training local partners and volunteers on marine mammal stranding response protocols and is engaged in education and outreach efforts throughout the region. The first patients were three sea turtles and a Guadalupe fur seal. Rebolledo remains on call for San Felipe in case of a vaquita entanglement or stranding, and some emergency response and necropsy equipment have been staged at Campo Uno.

### 7.4 VCPR Second Phase

A second phase of VCPR is being launched, separate and distinct from the previous rescue mission. This second phase will continue those activities being conducted before and/or during VCPR that are critical to vaquita conservation. Specifically, VCPR aims to raise funds and awareness for net pulling operations in Vaquita Refuge, or the area that CIRVA recommends, to remove illegal and ghost fishing gear. Funds to support the efforts of Museo de la Ballena and Ciencias del Mar in net pulling, as well as to support the fishing communities by employing fishers to participate in activities that are central to the health of the Upper Gulf ecosystem.

The second phase will also raise funds and awareness for ongoing acoustic detection efforts that direct authorities to key protection areas for proper enforcement efforts and monitor vaquita status. These acoustic detection efforts also employ fishers to participate in this key effort.

Finally, given the success and potential to promote vaquita conservation, it is of utmost importance to support the photo ID efforts as a way to monitor vaquita population and support the tissue culture efforts by attempting to obtain fresh vaquita biopsies, as recommended by CIRVA during this meeting.



### 7.5 Impact campaign

Smith presented the impact campaign centered around the recently released documentary *Sea of Shadows*. This film has already increased awareness of the vaquita's plight in the global conservation consciousness. The film has been purchased by National Geographic and is expected to reach a wide audience. Ru Mahoney, impact producer, developed an impact campaign with support and assistance from members of Malaikai Pictures, Terra Mater, Jackson Hole WILD, NMMF, CONABIO, Elephant Action League, and Sea Shepherd Conservation Society. The impact campaign is built on research-based strategies to build coalitions, empower communities, and engage with public audiences. Such campaigns serve to increase the capacity of stakeholders, insuring that when the campaign team moves to another project, the campaign achievements are carried further by the stakeholders.

From the perspective of VCPR, the primary goal of the impact campaign is to leverage the international attention that the documentary film is receiving to build global support for vaquita conservation actions. We hope to take full advantage of this unique opportunity by linking VCPR to the *Sea of Shadows* film on the VCPR's active website and by encouraging fundraising for the second phase of VCPR.

## 8. Mexico's Application to Register to Captive-breed Totoaba for Commercial Purposes under CITES

On May 30, 2018 the Secretariat of the Convention on Endangered Species of Wild Fauna and Flora (CITES) issued Notification 2018/054 to inform CITES Parties of the request from Mexico for the Secretariat to include "Earth Ocean Farms" in the *Register of Operations that Breed Appendix-I Animal Species in Captivity for Commercial Purposes* (Register) for the purposes of breeding totoaba (*Totoaba macdonaldi*) for international commercial trade.

Under Article VII, paragraph 4 of the Convention, specimens of Appendix-I animal species bred in captivity for commercial purposes shall be deemed to be specimens of species included in Appendix II. In accordance with Resolution Conf. 12.10 (Rev. CoP15), the exemption of Article VII, paragraph 4 of the Convention is implemented through the registration by the Secretariat of operations that breed specimens of Appendix-I species in captivity for commercial purposes.

The CITES Notification referenced above stated that "Earth Ocean Farms" would be included in the Secretariat's Register 90 days after the date of the Notification (August 28, 2018) unless the Secretariat received an objection from a Party that is fully documented and includes the supporting evidence that has given rise to concerns. Prior to the deadline, the Secretariat received objections from Israel and the United States of America about the proposed registration.

### 8.1 Concerns with the proposal

The overarching concern outlined by the United States is that allowing a mechanism for the legal trade of captive-bred specimens of totoaba, while there is an ongoing, uncontrolled illegal harvest and trade of totoaba, will undermine the survival of the species in the wild. This situation is unique because the illegal harvest and trade of totoaba has severe impacts not only the totoaba, but also on the vaquita, another Appendix-1 listed species, which is at grave risk of

extinction due to entanglement in illegal totoaba gillnets. The United States also expressed concern that commercial trade in captive-bred totoaba would perpetuate the demand for totoaba swim bladders and increase incentives for illegal harvest and trade of wild-caught fish to meet the demand for the largest, most valuable bladders that come from fish that are 10-15 years old. Also, a legal trade could provide a means for laundering illegally caught wild totoaba swim bladders. The United States indicated its belief that the registration of this breeding operation would undermine efforts to conserve both the totoaba and the vaquita.

## 8.2 CITES Process Forward

In accordance with Resolution Conf. 12.10 (Rev. CoP15), Annex 2, paragraph 3, the CITES Secretariat referred the relevant documentation related to the registration of “Earth Ocean Farms” to the CITES Animals Committee and invited it to comment on the objections within 60 days. After consultations between Mexico and the Parties raising objections, the issue will likely be referred to the CITES Standing Committee at its 71st meeting (Colombo, Sri Lanka, May 23, 2019).

In this regard, CIRVA **advises** that it remains seriously concerned about the lack of control over the illegal fishing for totoaba and the illicit trade of totoaba swim bladders given the significant threat these activities pose to the vaquita.

In the absence of sufficient controls on the illegal harvest and trafficking of totoaba, CIRVA **also advises** that it is particularly concerned that the development of a legal trade in captive-bred totoaba will undermine the efforts that have been made toward the conservation of vaquitas by providing a means to launder the swim bladders of illegally caught wild totoaba.

## 9. Acknowledgements and Adoption of report

In closing the meeting, the Chair thanked all the participants for their hard work and for maintaining hope despite the huge challenges remaining. The dedication of so many people was truly inspiring.

CIRVA thanked WWF-Mexico for its constant support to bring these meetings to life. Also to Lisa Balance and Barb Taylor for hosting the meeting at the Southwest Fisheries Science Center/NOAA Fisheries and to Brittany Hancock-Hanser and Annette Henry for their support during the meeting.

The report was adopted by correspondence on 6 March 2019.

## ANNEX A: LIST OF PARTICIPANTS

### **CIRVA Members**

#### **Barlow, Jay**

Southwest Fisheries Science Center-NOAA  
La Jolla, CA. USA  
[jay.barlow@noaa.gov](mailto:jay.barlow@noaa.gov)

#### **Brownell, Robert Jr.**

Southwest Fisheries Science Center-NOAA  
Monterey, CA. USA  
[robert.brownell@noaa.gov](mailto:robert.brownell@noaa.gov)

#### **Camacho, Victor**

Universidad Autónoma de Baja California  
Ensenada, BC. Mexico  
[vcamacho@uabc.edu.mx](mailto:vcamacho@uabc.edu.mx)

#### **Donovan, Greg (by video link)**

International Whaling Commission  
Cambridge, UK  
[greg.donovan@iwc.int](mailto:greg.donovan@iwc.int)

#### **Gerrodette, Tim**

Southwest Fisheries Science Center-NOAA  
La Jolla, CA. USA  
[tim.gerrodette@noaa.gov](mailto:tim.gerrodette@noaa.gov)

#### **Gulland, Frances**

US Marine Mammal Commission  
Sausalito, CA. USA  
[francesgulland@gmail.com](mailto:francesgulland@gmail.com)

#### **Jaramillo Legorreta, Armando**

CONABIO  
Ensenada, BC. Mexico  
[ajaramil@cicese.mx](mailto:ajaramil@cicese.mx)

#### **Mesnick, Sarah**

Southwest Fisheries Science Center-NOAA  
La Jolla, CA. USA  
[Sarah.mesnick@noaa.gov](mailto:Sarah.mesnick@noaa.gov)

#### **Read, Andrew**

Duke University Marine Laboratory  
Beaufort, NC. USA  
[aread@duke.edu](mailto:aread@duke.edu)

#### **Reeves, Randall**

IUCN SSC Cetacean Specialist Group

Hudson, QC. Canada

[rrreeves@okapis.ca](mailto:rrreeves@okapis.ca)

#### **Rojas Bracho, Lorenzo**

CONABIO  
Ensenada, BC. Mexico  
[lrojasbracho@gmail.com](mailto:lrojasbracho@gmail.com)

#### **Taylor, Barbara**

Southwest Fisheries Science Center-NOAA.  
La Jolla, CA. USA  
[barbara.taylor@noaa.gov](mailto:barbara.taylor@noaa.gov)

#### **Thomas, Peter**

US Marine Mammal Commission  
Bethesda, Maryland. USA  
[pthomas@mmc.gov](mailto:pthomas@mmc.gov)

#### **Urbán, Jorge**

Universidad Autónoma de Baja California Sur  
La Paz, BCS. Mexico  
[jurban@uabcs.mx](mailto:jurban@uabcs.mx)

#### **Young, Nina M**

Office of International Affairs and Seafood  
Inspection  
National Marine Fisheries Service  
Silver Spring, Maryland. USA  
[nina.young@noaa.gov](mailto:nina.young@noaa.gov)

### **Expert Attendees**

#### **Cardenas Hinojosa, Gustavo**

CONABIO - CICESE.  
Ensenada, BC. México.  
[gcardenas03@gmail.com](mailto:gcardenas03@gmail.com)

#### **Hidalgo, Eva**

Sea Shepherd  
[science@seashepherd.com](mailto:science@seashepherd.com)

#### **Lockart MacLean**

Sea Shepherd  
[locky@seashepherd.org](mailto:locky@seashepherd.org)

#### **Marin, Emilia**

WWF – La Paz, BCS. Mexico  
[emarin@wwfmex.org](mailto:emarin@wwfmex.org)

**Moore, Jeff**

Southwest Fisheries Science Center-NOAA.

La Jolla, CA. USA

[Jeff.e.moore@noaa.gov](mailto:Jeff.e.moore@noaa.gov)

**Nieto Garcia, Edwyna**

CONABIO - CICESE

Ensenada, BC. México

[enieto@cicese.mx](mailto:enieto@cicese.mx)

**Morin, Philip**

Southwest Fisheries Science Center-NOAA.

La Jolla, CA. USA

[phillip.morin@noaa.gov](mailto:phillip.morin@noaa.gov)

**Smith, Cynthia**

National Marine Mammal Foundation

San Diego, CA. USA

[cynthia.smith@nmmf.org](mailto:cynthia.smith@nmmf.org)

## ANNEX B: AGENDA

TUESDAY, 19

### 1. Welcome

- Introduction of participants
- Confirm chair and rapporteurs
- Review and adopt the Agenda
- Documents available

### 2. Acoustic monitoring program and other science efforts

- 2017 – 2018 results update (Jaramillo-Legorreta and Cárdenas-Hinojos)
- Biopsy and photo ID September survey (Taylor and Rojas-Bracho)
- Discussion and recommendations

### 3. Review of CIRVA 10 recommendations

### 4. Review of Developments in the Upper Gulf (Fishing activity, enforcement, and net removal efforts)

- Review of the effectiveness of the enhanced enforcement zone during 2018 – February 2019 (period of illegal totoaba fishing. Shrimp and finfish seasons)
- December 2017- February 2019: Net Removal efforts and attacks to Sea Shepherd and Museo de la Ballena (Locky-Sea Shepherd and Diego-Museo de la Ballena)
- Report of meetings with the new authorities (Lorenzo, Diego and Locky)
- Conclusions regarding these items

5. Update on alternative gear development and deployment

- Report of the joint ECOFT/CIRVA meeting and gear testing in 2018 (Chris)
- Socio-economics and market developments (Sarah, Enrique and Emilia, WWF)
- Discussion and recommendations

WEDNESDAY, 21

### 6. Status of US Embargo on seafood produced by Upper Gulf fisheries and Review of Agreements between the United States and Mexico to strengthen vaquita conservation and enforcement efforts. (Nina).

### 7. Post-Vaquita CPR efforts

- 7.1 Lessons learned Ex-situ workshop (Taylor)
- 7.2 Update on genetics work (Morin)
- 7.3 Disposition of CPR assets (Smith)
- 7.4 VCPR Second Phase (Smith)
- 7.5 Impact campaign (Smith)

Discussion and recommendations

### 8. Mexico's Application to Register to Captive-breed Totoaba for Commercial Purposes under CITES (Young)

### 9. Next steps – Discussion of new or revised recommendations

### 10. Any other business

THURSDAY, 22

09:00 – 13:00

### 11. Review of the report

### 13. Press release/statement

## ANNEX C:

### Summary: Vaquita biopsy and photo ID field efforts, September 22-29, 2018

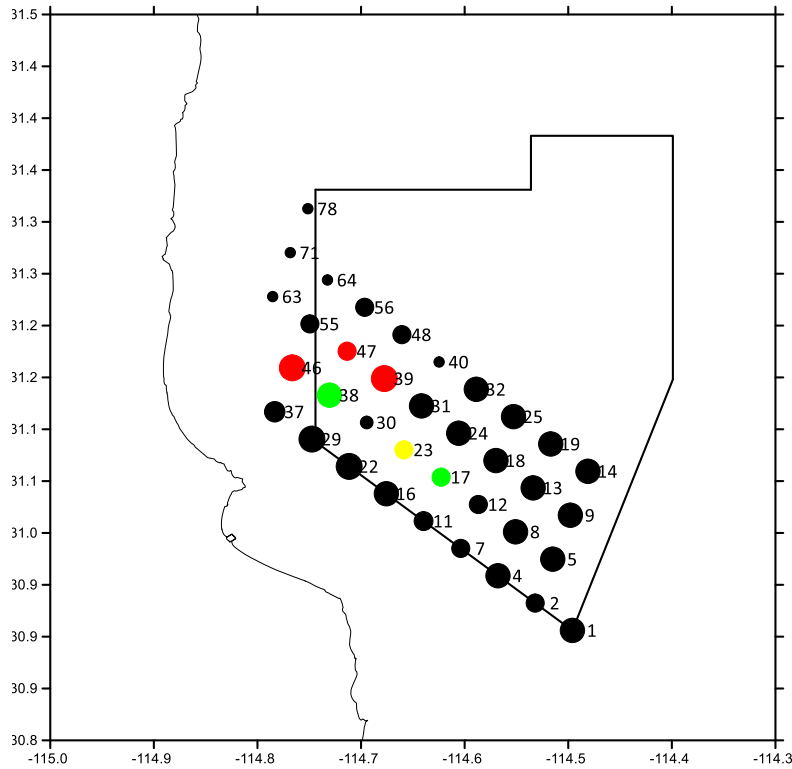
Lorenzo Rojas-Bracho<sup>1</sup>, Armando Jaramillo Legorreta<sup>2</sup>, Gustavo Cárdenas Hinojosa<sup>2</sup>, Edwyna Nieto García<sup>2</sup>, Diego Ruiz Sabio<sup>3</sup>, Annette Henry<sup>4</sup>, Barbara L. Taylor<sup>4</sup>.

1. Comisión Nacional de Áreas Naturales Protegidas, Ensenada, BC, México
2. Instituto Nacional de Ecología y Cambio Climático, Ensenada, BC, México
3. Museo de la Ballena y Ciencias del Mar, La Paz, BCS
4. Southwest Fisheries Science Center, NOAA, La Jolla, CA.

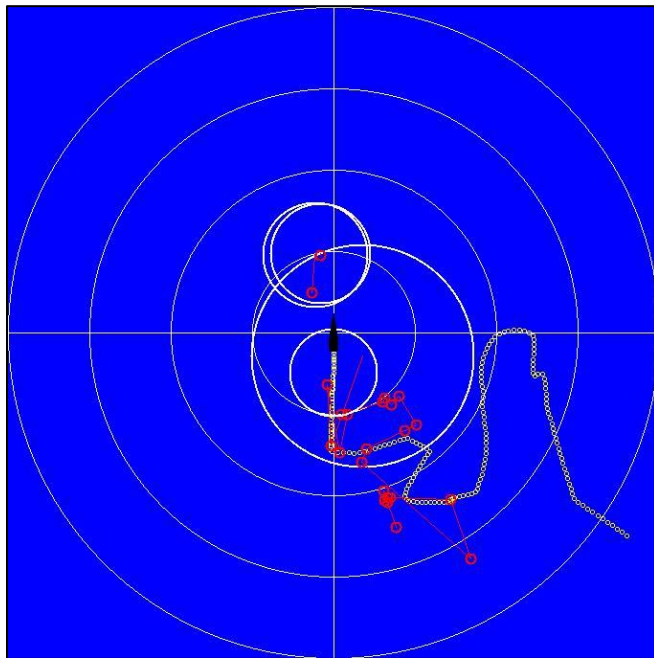
A field effort to obtain photographs and biopsies from vaquita was held between September 22 and 28, 2018. Preparations and setup were conducted on the 22nd and 23<sup>rd</sup> to prepare the ship (the Museo de la Ballena's Narval) and the small boats (3 belonging to Museo de la Ballena RHIBs and a panga belonging to a fishermen). Cell culture was supplied by the San Diego Zoo and small field coolers specially set up for field use in hot temperatures were supplied by Southwest Fisheries Science Center (SWFSC). SWFSC also loaned much of the equipment needed for the visual search (25x big eye binoculars with stands, handheld binoculars, computers and VHF radios). The visual team tracked vaquitas using a computer program specially modified for use with vaquitas (WinCruz Vaquita) that was developed for VaquitaCPR. Acoustic equipment (C-PODs) were supplied by SEMARNAT. The Narval was modified for visual operations on the flying bridge and all vessels were shaded.

The effort was timed to take advantage of the availability of several key vaquita observers and a good weather window. C-POD data were analyzed to give us the highest chance of locating vaquitas. Although the number of detections were low, the data allowed us to focus in a small area between sampling sites 12, 18, 46 and 55(see map below). Winds less than 7 knots are needed to spot vaquita. Conditions were not optimal on September 24-25 but were sufficient to allow the team to practice making a sighting, assembling the 'tracking team' on the flying bridge and quickly getting the biopsy/photo teams to the small vessels with all the needed equipment.

Vaquita sightings were made on September 26 and photos were obtained. Sighting #003 was a mother and calf that were photographed. The pair was observed surfacing within a body length of one another over 30 times. At one point the pair came close (about 20m) to the panga but they were coming directly towards the vessel and so no biopsies could be taken. The mother was photographically matched to the likely mother of V01F from 2017. This pair was tracked from 9:10 until 10:09 (59 minutes). A second pair (#004) was sighted at 10:03 and tracked until 10:26 (23 minutes). Observers thought the second pair were different and of roughly equal size to one another, which was confirmed in photos.



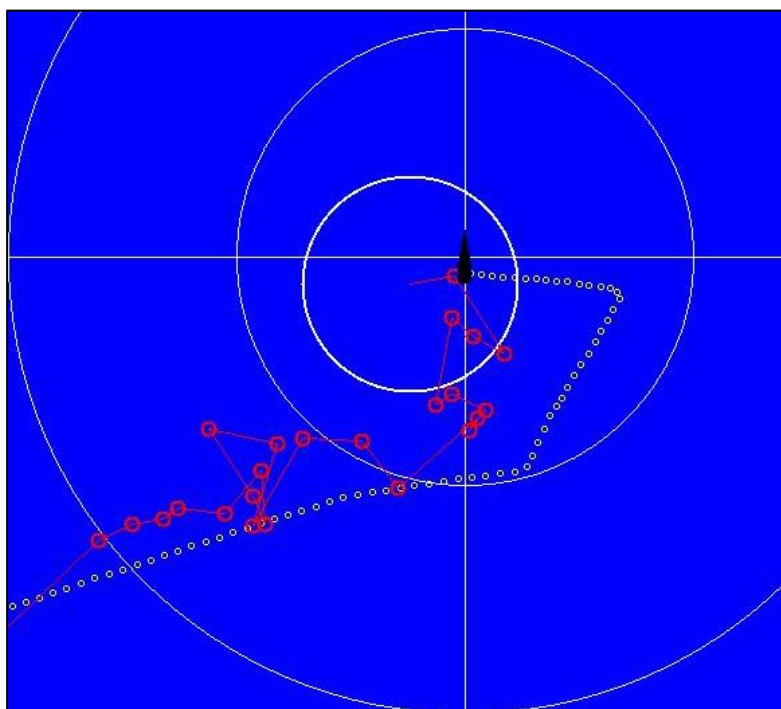
Map showing the sampling sites used to obtain acoustic monitoring data to determine the zones with presence of vaquitas few hours previous to the visual effort to locate them. Circle sizes represent sampling effort. Black circles are sites with no detections. Colored circles indicate sites with acoustic detection of vaquitas, where red is lowest and green largest detection rates.



Screen image of sighting #003. The Narval is in the center with its path indicated by yellow circles. Each concentric white circle is 1 nautical mile. The linked red squares show the path of the mother/calf pair showing the meandering and unpredictable pattern that made placement of the small boats difficult.

Vaquita sightings were also made on September 27 and both, photos and videos were obtained. Sighting #012 was a pair seen between 06:39 and 06:51. Small boats were launched but we were

unable to track or photograph this pair. Sighting #013 was also a pair where boats were launched but we were unable to track or photograph. Sizes of the individuals of both #012 and #013 were too distant to determine relative sizes. Sighting #015 was a group of 4 individuals that included a small calf and was tracked for 1 hour and 42 minutes (from 11:06 until 12:48). During this time, they got within 50m of various small boats but never within biopsy range. The four vaquitas evidently then split into two pairs (which is consistent with photographs reviewed later). One of the pairs was last sighted at 13:41 for a total tracking period of 2 hours and 35 minutes. Given the locations and timing of sighting #013 and #015 it was felt these were separate groups and that a minimum of 6 vaquitas were seen.



*The track of the four vaquitas recorded from the visual team on the Narval shows the meandering path. Given the experience on the previous day, we opted for a Y formation of the 4 small vessels so that one stayed behind where we thought the vaquitas would go and could catch the animals if they reversed their path. This reversal happened and the rear boat picked up surfacing we may have missed. The Y formation seems like a good strategy.*

September 28<sup>th</sup> and 29<sup>th</sup> had marginal conditions for vaquita sightings and there were no further opportunities for either photographs or biopsies.

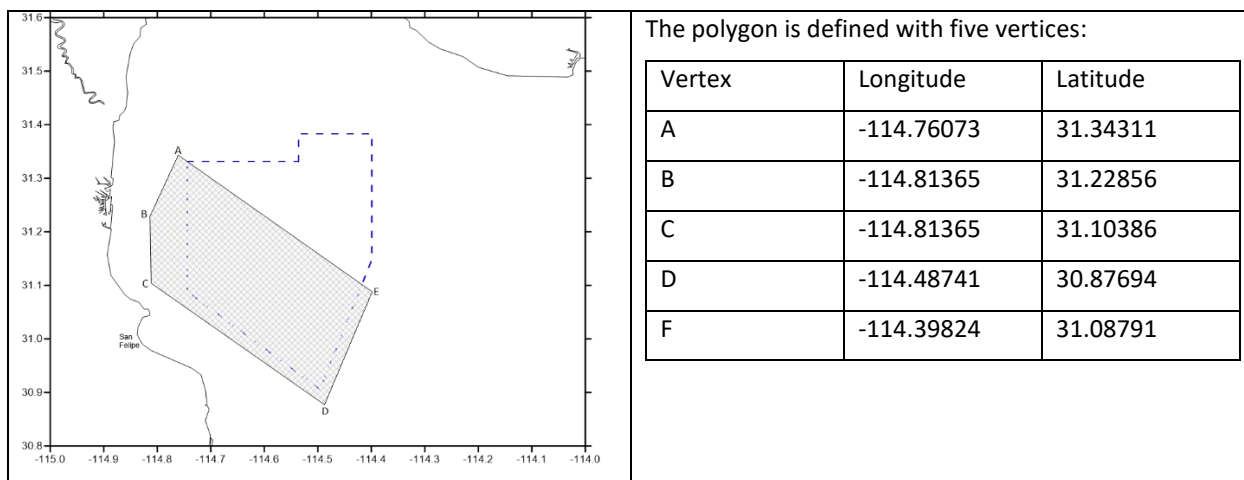
Overall, the field session was very successful. Key elements were: 1) having the acoustic 'intelligence' to tell the visual team the area to search, 2) having an experienced visual team with the full big-eye and computer set up and the specialized computer software, 3) having a small boat system that could be deployed rapidly and could follow directions from the ship. Lessons learned are that the biopsiers (who are often the best observers and photographers as well) should be equipped with cameras with 400mm lenses. If there are 2 biopsiers per boat, the procedure could be that only one do photography until the animals approach closely enough for biopsy. The number of scientists left on the Narval flying bridge (4) was a bare minimum. There were 2 observers on the big-eyes that had very long shifts (up to 7 hours). It is needed to have both, a full-time recorder and a full-time radio person to direct the vessels. It may be possible to use 3 rather than 4 small boats, but it does reduce the chances of vaquitas coming too close by

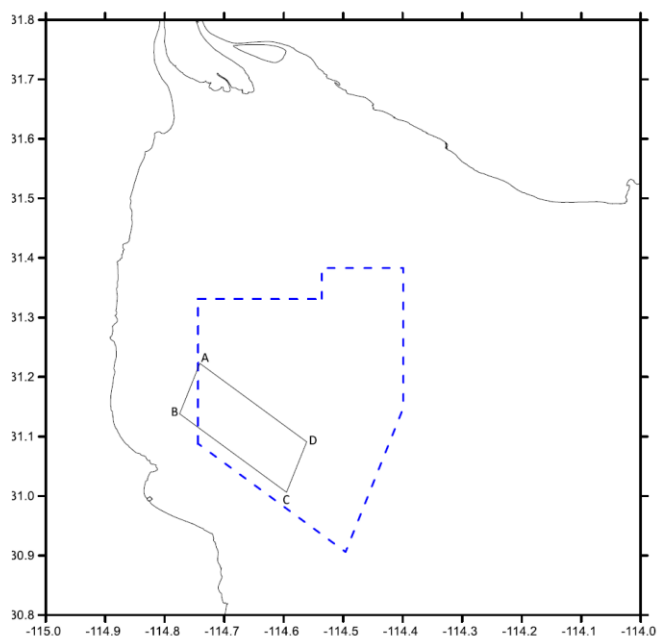


chance. The animals seemed disturbed (changed behavior to move rapidly away from vessels) on a few occasions. Each time, those on the boats saw the change and either came to a stop or slowed. The kayak was considered but not deployed as once the decision was made there were no further good opportunities. It is not clear whether the kayak could be used successfully. While the vaquitas clearly knew where the boats were and avoided being approached, they were also too fast to expect the kayak to keep up given their meandering (unpredictable) paths. There were a few occasions when the mother/calf pair were seen to be traveling down visible calm slicks. It may be possible if a kayak were being towed and such a behavior was observed to position the kayak in the slick ahead of the vaquitas.

Altogether, it is more likely that a mark/recapture estimate could be made of the number of remaining vaquitas than obtaining a biopsy. However, both efforts can be done simultaneously and there is definitely merit in showing that vaquitas not only exist but are fat and having healthy calves. If the Narval was set up with its own big-eyes, computers and software, similar efforts could be mounted very quickly to take advantage of good weather windows with a relatively small cost to pay key observers and their airfare. This assumes that the acoustic monitoring effort would continue through the totoaba season in the area of high vaquita use. Of course, the Narval would need support and to be diverted from net removal operations.

To further increase the chances of success, a polygon was designed to concentrate field activities, based on the distribution of recent acoustic detections and on the experience gained during the VaquitaCPR project. The map is shown below.





Core area of acoustic activity during the survey

Vértice	Longitud	Latitud	Longitud	Latitud
A	-114.74090	31.22277	-115° 44.454'	31° 13.366'
B	-114.77486	31.13805	-115° 46.492'	31° 08.283'
C	-114.59526	31.00626	-115° 35.716'	31° 00.375'
D	-114.56131	31.09097	-115° 33.678'	31° 05.458'

## Personnel

Adam U  
 Nick Kellar  
 Jay Barlow  
 Armando Jaramillo Legorreta  
 Lorenzo Rojas-Bracho  
 Juan Carlos Salinas  
 Diego Ruiz Sabio  
 Hiram Rosales  
 Sarah Mesnick  
 Janitzio Carranza  
 Oscar Ortiz  
 Henocho Rizo

Zach Swaim  
 Bob Pitman  
 Barb Taylor  
 Edwyna Nieto García  
 Ernesto Vázquez  
 Ricky Rebolledo  
 M en C. Gustavo Cárdenas Hinojosa  
 M.Sc. Paula Olson  
 Equipo Filmación Joel  
 Joel Ortiz  
 Armando Castro (Muelas)  
 Carlos Ortiz

## Acknowledgements

Special thanks to Vicealmirante Héctor Capetillo, comandante del Sector Naval at San Felipe, B.C., to Martín Sau, Director of the Reserva de la Biósfera Alto Golfo de California y Delta del Río Colorado, to all our personnel, particularly Capitán Francisco Melchor López, and the crew of the Narval: Henocho Rizo, Joaquin Orantes, Ulises Omar Higuera, Aurelio Guevara, Rafael Sanchez y Rebeca Vaquerizo. Our most special gratitude to Museo de la Ballena y Ciencias del Mar. Without their support this field work would have been impossible.