

**Report of the Workshop on  
the Poorly Documented Takes  
of Small Cetaceans in South  
America: Including In-Depth  
Review of the Hunting of  
the Amazon River Dolphin  
(*Inia geoffrensis*) for the  
Piracatinga (*Calophysus  
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# Report of the Workshop on the Poorly Documented Takes of Small Cetaceans in South America: Including In-Depth Review of the Hunting of the Amazon River Dolphin (*Inia geoffrensis*) for the Piracatinga (*Calophrysus macropterus*) Fishery<sup>1</sup>

## CHAIR'S SUMMARY

The poorly documented take of small cetaceans for use as wildmeat is a priority topic of the Scientific Committee (SC). An Intersessional Correspondence Group (ICG) was established to ensure progress on this topic between SC meetings. The ICG was tasked with the development of a toolbox of techniques that could guide and coordinate research into this topic with the aim of better understanding the issue on regional and global levels. A series of workshops were proposed to fulfill this task, the first of which took place in Thailand in 2016 and covered South East Asia. A second Workshop focused on South America and also incorporated a detailed review of the use of Amazon river dolphins as bait in the piracatinga fishery, which is also a wildmeat issue. The Workshop held in South America aimed to:

- (1) identify threats, past and present, in Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, French Guiana, Guyana, Suriname, Peru, Uruguay and Venezuela with respect to 'wildmeat' and discuss which techniques can be utilised to better understand this issue; and
- (2) review current knowledge of the use of Amazon river dolphins as bait in the piracatinga fishery and provide recommendations for future work and action.

The Workshop was divided into two separate sessions, one which discussed the issue of wildmeat in South America and one which reviewed the take of Amazon dolphins for bait in the piracatinga fishery. This Workshop fulfilled several goals of the SC; the ongoing work of the Intersessional Correspondence Group (ICG 30) on the poorly documented take of small cetaceans and the completion of the work of the Amazon Dolphin/Piracatinga Steering Group (SG 21).

Information was summarised for all countries, except Guyana and Suriname. Products from small cetaceans are used throughout South American countries and Costa Rica, for both food and non-food purposes. This type of use is referred to as 'aquatic wildmeat'. The usefulness of various tools and techniques was discussed, including data gathering techniques and forensic investigation. A database, comprising more than 3000 references, was used to map existing knowledge and understand data gaps. A framework was established with the intention that future data collection should be collated in such a way as to be standardised and systematic, with a view to gathering sufficient information to better understand regional and global patterns of small cetacean wildmeat use. The Workshop participants populated a database from which regional patterns were mapped. Areas that were highlighted as a cause of conservation concern were; Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Peru and Venezuela.

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

Small cetaceans are used throughout South American countries for a variety of purposes, e.g. food, bait, love charms, talismans, medicine, boat maintenance etc. Areas of the greatest concern are reflected in the specific recommendations provided in the Workshop text. A consolidation of science-related recommendations is provided in the summary.

## Recommendations

With regards to the piracatinga fishery, Brazil is **commended** on its swift action of declaring a moratorium and is **urged** to maintain this moratorium to allow sufficient time to evaluate the effectiveness of protective measures and continue the necessary protection of river dolphins. The Workshop, therefore, **recommends** that the moratorium on the piracatinga fishery in Brazil continues after 2019.

With specific reference to the river dolphin populations that are impacted by the piracatinga fishery, the Workshop **recommends** that surveys designed to monitor trends in abundance should be conducted for the:

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

To improve regional knowledge and aid conservation research, the Workshop **recommends** that divisions within the genus *Inia* are evaluated and genetic conservation units are established. The Workshop also **encourages** the use of new technologies, such as drones and telemetry, to establish trends, habitat use and dispersion patterns. Further, the Workshop **urges** new efforts to improve regional research capacity. The Workshop also strongly **encourages** an evaluation of historical data on river dolphins to better understand other threats, e.g. from bycatch, to provide further insights into current trends. The Workshop **reiterates** the previous recommendation of the Scientific Committee of the IWC that range states engage in bilateral and multilateral discussions of legislative, enforcement, management and scientific efforts to ensure effective cooperation among them. Such

<sup>1</sup> Presented to the meeting as SC/67b/Rep01.

collaboration includes the Amazon range-wide review of existing fishery management plans to promote sustainable and legal fisheries and avoid the emergence of negative interactions against cetaceans in the future. A single and coordinated, regional sustainable fisheries management plan for the Amazon should be considered as a goal for all range states. The Workshop further **encourages** range state authorities to work together to exchange information on the movement of piracatinga products across international borders.

The Workshop also identified additional threats to river dolphins, other than use as bait in the piracatinga fishery. In particular, the Workshop draws attention to the dolphins that have been isolated by the Tocantins dam system. Given the confined condition of the dolphins' habitat, the Workshop recommends that the status of these dolphins be evaluated, to include abundance, genetic, habitat quality, prey availability, with a view to developing a translocation protocol, including under what circumstances such a protocol should be enacted.

The Workshop also noted with concern the extensive habitat modification that will result from the Mega Project 'Arco Minero del Orinoco', a massive mining operation proposed along the Orinoco River and watershed of Venezuela. The Workshop **recommends** that population sizes and trends of both *I. geoffrensis* and *S. guianensis*, in the Orinoco River basin, be monitored before and during this project.

The Workshop concluded that the network of academic institutes, non-government organisations and management and regulatory authorities currently working on river dolphins and their habitat should design a regional strategy so that data collection is coordinated and comparable.

The Workshop identified several other small cetacean species and/or populations that are likely being impacted by their use as wildmeat. The Workshop therefore, **recommends** that abundance and distribution surveys, in tandem with investigation into the magnitude of aquatic wildmeat use, be conducted on these species. Appropriate survey designs should be implemented that consider the statistical power required to detect trends and the resultant data should then be used to estimate the impact of deliberate take for wildmeat on the following populations:

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

Further, this Workshop **recommends** that:

- An investigation be made of the magnitude of by-catch of Guiana dolphins (*Sotalia guianensis*) in the gillnet fishery operating off Maranhão, Pará and Amapá, north Brazil, noting that by catch is being used commercially for shark bait, human consumption and cultural use.
- A forensic investigation of the cetacean products for sale in the north and northeastern Brazilian markets be conducted coupled with better enforcement of wildlife trade legislation.
- Separate assessments for (a) directed take for bait and (b) for other uses be made in the small-scale fisheries of Peru.
- The use of dolphins for bait in the long-line fishery in Bahia Solano, Choco in the Colombian Pacific, is evaluated using dedicated interview surveys and the use of alternative bait evaluated.
- Heavy metals levels of *Sotalia guianensis* and *Inia geoffrensis* in the Orinoco river basin and Maracaibo Lake be estimated and the impact on of consumption of dolphin meat on human health be evaluated.
- The governments that are part of the Eastern Pacific Corridor (CMAR), Colombia, Costa Rica, Panama and Ecuador assess the current practice of using marine mammals in Fish Aggregating Devices (FADs) and enforce the existing legislation which prohibits the use of cetaceans as attractors of these gears.
- The Inter American Tropical Tuna Commission RFMO documents and registers the capture and incidence of cetaceans (or pinnipeds) during their fishing operations along the Eastern Pacific through the appropriate onboard observers programme.

As all countries in South America, and Costa Rica, have laws in place to protect small cetaceans, it was **highlighted** that existing legislation pertaining to wildlife trade should be strictly enforced and all seizures and prosecutions should be openly reported. All countries are requested to consider, where necessary, increasing penalties for engaging in activities that result in the killing of dolphins to provide stronger deterrence against these illegal activities.

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

## 1. INTRODUCTION

The Workshop was held from 19-21 March 2018, in the Novotel, Santos, Brazil. The Workshop was divided into two separate sessions, one which discussed the issue of wildmeat in South America, chaired by Porter and Scheidat, and one which reviewed the take of Amazon dolphins for bait in the piracatinga fishery, chaired by Fruet and Zerbini. This Workshop fulfilled several aims; the ongoing work of the Intersessional Correspondence Group (ICG 30) on the poorly documented take of small cetaceans and the completion of the work of the Amazon Dolphin/Piracatinga Steering Group (SG 21).

Participants were identified in consultation with the Scientific Committee (SC) Chair, Head of Science and members of both the ICG and SG. In addition, support was provided to Jimenez to attend the International Congress for Conservation Biology (ICCB), Colombia, 2017, which had several sessions dedicated to cetacean research in South America. Jimenez was thus able to identify emerging research that was directly relevant to the topics of wildmeat and the Amazon dolphin issue. From this process, a list of experts was compiled and co-ordinators from each country were requested to compile a summary of information relevant to the aims of the Workshop. There were 36 participants from 14 countries and written contributions from two countries. The list of participants is given as Annex A and the agenda is given as Annex B.

## 2. MEETING OPENING

### 2.1 Opening remarks

Scheidat, Porter, Fruet and Zerbini opened the meeting. Mr. Rodrigo Mendes Carlos de Almeida, the Head of the Brazilian Delegation to the IWC Scientific Committee, welcomed Workshop participants and noted that this is an important year for Brazil, which will host the IWC plenary in Florianópolis, in September 2018. Dr. Fábila Luna, Chief of the Centro Nacional de Pesquisa e Conservação de Mamíferos Aquáticos (CMA) of the Brazilian government, welcomed the meeting to Santos and remarked on the region's importance to marine mammal research and conservation efforts in Brazil. The convenors commended Jimenez on her preparation for the Workshop which included the identification of appropriate researchers, liaison with the Workshop participants during Workshop document preparation and her continued support throughout the Workshop itself.

### 2.2 Appointment of Rapporteurs

Thomas and Jimenez were appointed as rapporteurs.

### 2.3 Documents available

The documents available to the Workshop are listed in Annex C.

## 3. WORKSHOP AIMS AND OBJECTIVES

### 3.1 Overview

A priority topic of the Scientific Committee is the issue of the poorly documented take of small cetaceans. An Intersessional Correspondence Group (ICG) was established to ensure progress on this topic between SC meetings and with the aim of better understanding the issue globally. The ICG is tasked with the development of a toolbox of techniques that will guide and coordinate research into this topic with the aim of better understanding the issue on regional and global levels. A series of workshops were

proposed to fulfill this aim, the first of which took place in Thailand in 2016 and covered South East Asia. This second Workshop focuses on South America and also aims to assess, in detail, the use of Amazon river dolphins as bait for the piracatinga fishery. Assessment of this problem will also inform the review of the status of the Amazon river dolphins to be conducted by the SC during the 2018 annual meeting (SC67B).

The Workshop aims to:

- (1) identify threats, past and present, in Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, French Guinea, Guyana, Paraguay, Peru, Uruguay and Venezuela with respect to 'wildmeat', and discuss which techniques can be utilised to better understand this issue; and
- (2) review current knowledge of the use of Amazon river dolphins as bait in the piracatinga fishery and provide recommendations for future work and action.

### 3.2 Defining the issue and establishing common terms

There had been much discussion on the appropriate terminology to use when discussing the use of small cetaceans, and other aquatic megafauna, for food and non-food purposes. For terrestrial animals, the term 'bushmeat' has been used, but the term poses problems in understanding and translation for use of this in the aquatic realm. Thus, a major outcome from the first IWC workshop on this issue was to propose the term 'aquatic wildmeat'. This term has now been adopted by the IWC SC and the Convention on Migratory Species (CMS), which work closely on this issue, and has been embedded into various resolutions and working documents (CMS 2017). To facilitate regional and global discussion and review, it was also necessary to establish common terminology to describe how aquatic wildmeat is obtained or sourced and the terms 'non-targeted salvage', 'non-targeted deliberate' and 'targeted' were defined, following the descriptions in Robards and Reeves (2011). These terms were discussed, and appropriate translations made into Portuguese and Spanish, the working languages of South America.

#### 3.2.1 Aquatic wildmeat and its derivation (English)

**Aquatic wildmeat** refers to the products derived from aquatic megafauna (e.g. mammals, sea turtles and crocodiles) that are used for food and non-food purposes.

**Aquatic wildmeat** is 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. This definition may need to be broadened to include seabirds, sharks and rays.

**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 a 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).

### 3.2.2 Aquatic wildmeat and its derivation (Portuguese)

**Carne de fauna aquática** refere-se a produtos de megafauna aquática (e.g. mamíferos, tartarugas aquáticas e jacarés) que são utilizados como alimento e para outros fins não alimentícios.

**Carne de fauna aquática** refere-se a produtos originados de mamíferos aquáticos e répteis que são utilizados para subsistência e usos tradicionais, incluindo carapaças, ossos e órgãos, mas também como iscas para a pesca. Carne de fauna aquática é obtida por meio de formas não regulamentadas, e algumas vezes ilegais, pela caça, assim como de animais encalhados (vivos ou mortos) e/ou capturados acidentalmente. Esta definição precisa ser estendida para incluir aves marinhas, tubarões e raias.

O termo '**Aproveitamento Não Direcionado**' refere-se à utilização não planejada nem intencional de um mamífero aquático morto e geralmente encontrado (a) encalhado; ou (b) preso incidentalmente em uma rede, armadilha ou linha (captura incidental).

O termo '**Uso Não Premeditado**' se refere a matança de um mamífero aquático quando (a) encontrado vivo encalhado em praia; (b) capturado vivo em equipamentos de pesca ou; (c) aprisionado por fenômenos naturais (e.g. gelo marinho em altas latitudes, mudanças no nível da água em rios e canais).

O termo '**Uso Intencional**' se refere a matança de mamíferos aquáticos em vida livre que são encontrados de maneira oportunística (ex. durante o curso de outras atividades), ou quando estes são o principal alvo e propósito de uma expedição (dirigida).

### 3.2.3 Aquatic wildmeat and its derivation (Spanish)

**Carne silvestre acuática** se define como los productos derivados de la megafauna acuática (ej. mamíferos, tortugas marinas y cocodrilos) que son utilizados como alimento y con otros propósitos.

**Carne silvestre acuática** se define como aquellos productos derivados de mamíferos y reptiles acuáticos, utilizados como alimento de subsistencia y usos tradicionales. Incluye caparazones, placas, órganos, huesos, y como carnada para pesquerías. Esta carne es obtenida de forma no regulada, e ilegal en algunas circunstancias. Asimismo, puede provenir de animales varados y/o capturados incidentalmente (vivos o muertos). Esta definición podría incluir a aves marinas, tiburones y rayas.

El término '**Blanco de Aprovechamiento No Intencional**' se refiere a la utilización no planificada ni intencional de un mamífero acuático que ya está muerto y generalmente se encuentra (a) varado, o (b) atrapado incidentalmente en una red, trampa, o línea (captura incidental).

El término '**Utilización No Premeditada**' se refiere a la matanza de un mamífero acuático cuando (a) encontrado vivo en la playa, (b) capturado vivo en equipos de pesca o (c) atrapado por fenómenos naturales (por ejemplo, hielo marino en altas latitudes, cambios del nivel del agua en ríos y canales).

El término '**Utilización Intencional**' se refiere a la matanza de mamíferos acuáticos en vida libre que se encuentran de manera oportunista (por ejemplo durante el curso de otras actividades), o cuando éstos son el principal objetivo y propósito de una expedición (dirigida).

## 4. NATIONAL PERSPECTIVES ON THE WILDMeat ISSUE IN SOUTH AMERICA

### 4.1 Argentina

Crespo provided information on past and present small cetacean use as wildmeat in Argentina (SC/M18/SAW03). In the artisanal gillnet fisheries of Buenos Aires Province, franciscanas (*Pontoporia blainvillei*) were often found dead in nets when fishermen retrieved their catch. In the 1940s, by-caught franciscanas were used for meat and oil in Buenos Aires. Meat that had been sun dried and salted and known as 'mushame' was consumed by local communities. The blubber and oil were used for maintenance of wooden masts in small vessels used in shark gillnet fisheries, for waterproofing fishermen's jackets, for home-remedy medical treatments and for treatment of saddle leather. All of these uses have now disappeared, but the by-catch in gillnets still occurs. Carcasses are normally discarded but some fishermen have reported that franciscana dolphin and Burmeister's porpoise (*Phocoena spinipinnis*) meat is sometimes still used for feeding their dogs, but not for human consumption. Franciscanas are currently protected by National Laws, but law enforcement is poor in addressing bycatch issues.

At the southern tip of South America, from the 1970s and until the late 1990s, various species of small cetaceans, mainly Commerson's dolphins (*Cephalorhynchus commersonii*) and Peale's dolphins (*Lagenorhynchus australis*), were harpooned and used as bait in the fisheries for Southern King Crab (Centolla; *Lithodes santolla*) and False King Crab (Centollón; *Paralomis granulosa*). These fisheries operated in both Argentina and Chile but the fishing effort was primarily on the Chilean side of the region. The scale of this killing was great enough to cause reduced abundance of dolphins by the late 1980s. However, according to Lescrauwaet and Gibbons (1994), there was some evidence that the scale of this exploitation had declined, due in part to the fact that legal bait was more readily available and in part to measures taken by Chilean government agencies. Commerson's dolphins were generally not found in Chile but were relatively abundant in the eastern part of the Strait. In Argentina, the crab fishery operated in the Beagle Channel, where there are relatively few Commerson's dolphins. Small numbers of Commerson's dolphins were live-captured in Argentina and Chile and exported to Japan, Germany and the US during the late 1970s and 1980s.

Among the species affected by the Patagonian trawling fleet are the dusky dolphin (*Lagenorhynchus obscurus*), the common dolphin (*Delphinus delphis*) and the Commerson's dolphin. The most damaging trawl gear for small cetaceans is the mid-water trawling net, especially for dolphins that feed on anchovy (*Engraulis anchoita*). In southern Santa Cruz and Tierra del Fuego, incidental mortality has been recorded in coastal gillnets and trammel nets. The species involved include Peale's and Commerson's dolphins, Burmeister's porpoise and spectacled porpoise (*Phocoena dioptrica*). In the past, high levels of incidental mortality recorded in Patagonia have seriously impacted the population of dusky dolphins. The dynamics of the trawling fishery, in rapidly redirecting the fishing effort towards different target species, suggests a high variability and uncertainty in the mortality rates and the small cetacean species affected. Research results do not suggest significant effects on the predators involved. Nevertheless, any fishing gear used to pursue anchovies is harmful for pelagic dolphins. None of these small cetacean species are used for human consumption, bait or any other use.

More than 15 national and provincial laws protect marine mammals in Argentina. Nevertheless, law enforcement is ineffective in addressing the by-catch or any other conservation problem. There are provincial stranding networks only, with different levels of effectiveness. Stranding networks operate under provincial authority, usually the Fauna and Flora Departments. They comprise local people with an interest in marine mammal research and conservation working in universities, NGOs, etc. They coordinate work on individual and mass strandings.

#### 4.2 Bolivia

Aliaga-Rossel presented information on the river dolphin and its use as wildmeat in Bolivia (SC/M18/SAW07). The Bolivian river dolphin or bufeo (*Inia geoffrensis boliviensis*) is the only cetacean in landlocked Bolivia. It is distributed mainly in the rivers of the Department of Beni and Santa Cruz and listed as vulnerable in the 'Red Book of Vertebrates of Bolivia'. Several cases of net entanglement have been detected, mainly consisting of calves or juveniles. There is a traditional use of the fat and other parts of the Bolivian river dolphin, but it is thought that this is does not present a direct or severe threat to the populations. The biggest threat the dolphins face is directed take for use as fish bait. This practice was first noted in 2008 and reported in Aliaga-Rossel *et al.*, (2012) and highlighted in the 2012 River Dolphin Action Plan as a significant threat.

#### 4.3 Brazil

Siciliano presented information on the use of small cetaceans in the coastal areas of Brazil (SC/M18/SAW06; SAW13). Cetaceans have been used for multiple purposes since at least the 1980s (Borobia *et al.*, 1991; Siciliano, 1994). Dolphin harpooning was reported in some coastal villages of Pará and Ceará for the purpose of obtaining bait for the local shark fishery. Guiana dolphin (*Sotalia guianensis*) was the target species. This activity stopped in the mid-90s in these two states due to effective law enforcement but it is reported to have occurred at least for the last ten years in the central coast of Bahia. Species captured are *S. guianensis* but also can include rough-toothed dolphins (*Steno bredanensis*) and bottlenose dolphins (*Tursiops truncatus*).

Dolphin consumption has been reported to occur in Maranhão and eastern Pará states, Eastern Amazon coast. In this case, Guiana dolphins by-caught in gill nets are used for human consumption, as bait in the shark fishery, and for magical or religious purposes, including love or luck charms, traditional medicines and handicrafts. It is important to mention that food taboos associated with the dolphin (boto) legend in Marajó Bay area and surroundings, in Pará, are helping to protect *Inia* species (both *I. geoffrensis* and *I. araguaiaensis*). Live-stranded Fraser's dolphins (*L. hosei*) have been used for human consumption in Maranhão.

In Rio de Janeiro, the use of dolphins as bait for the shark fishery has not occurred in over a decade or is very rare. By-caught Guiana dolphins off the coasts of Amapá, Pará and Maranhão are the main source of bait for the shark fishery and also as raw material for the production of love luck-charms, handicrafts and for medicinal uses. Since November 2005, 700 by-caught dolphin carcasses have been recovered and curated by the Aquatic Mammal Study Group of Museu Paraense Emílio Goeldi. These have been obtained from the beaches of Marajó Island and Northeast Pará and of which 95% are *S. guianensis* and 3% are *I. geoffrensis* and *I. g. araguaiaensis*.

The production of love charms is commonplace throughout Brazil. An investigation of products in Pará and

Maranhão were confirmed to contain parts from Guiana dolphins. By contrast, products on sale in Rio de Janeiro do not contain dolphin products, as evidenced by genetic analyses which proved that the samples were derived from various breeds of pig. Various love potions were acquired in Santos and provided by Siciliano to the Workshop. The flesh within each sample was tested using the whale detection forensic kit developed in Asia (Chan *et al.*, 2015). Of the four potions tested, none were identified as cetacean (Annex D).

Recently, there were reports on the use of the blubber of stranded dolphins and whales in the central coast of Bahia. It is understood that fishermen bury cetacean flesh so that it can be used months later, as bait, in the shark fishery. Two threatened zoological groups, both cetaceans and sharks, are implicated.

On the eastern Amazon coast, myths surrounding the boto induce fear in local populations and it is taboo to eat small cetaceans in Marajó area, Pará. The high regard and reverence with which these species are associated, in Marajó Bay and its surroundings, assist efforts to protect botos from human harm.

#### 4.4 Chile

Sepulveda presented an overview of small cetacean use in Chile. Since 1974, small cetaceans, fur seals, sea lions, sea birds and sea otters, were deliberately taken for bait in the Chilean artisanal fishery for southern king crab and false king crab in southern Chile (Magellan Region). The main species of small cetaceans affected by this activity were Peale's, Chilean and Commerson's dolphins. However, by the beginning of the 1990s the dynamic of this fishery changed, thus lessening the pressure on dolphins (Lescrauwaet and Gibbons, 1994; Huckle-Gaete, 2000; Alfaro-Shigueto *et al.*, 2008; Goodall, 2009).

There are still some present-day anecdotal reports of individual small cetaceans being killed by harpoons or incidental bycatch and then used as a bait and also, as food by local people. The main species that could be affected by this activity include Chilean dolphins and Burmeister's porpoise.

As in many countries of South America, there are several threats to small cetaceans, including bycatch, habitat alteration, pollution and economic activities that are directly and indirectly affecting marine mammals in general. A particular and critical concern is the development of salmon and shellfish aquaculture that occupies most of the continental coast of southern Chile and overlaps with the distribution of coastal small cetaceans.

#### 4.5 Colombia

Trujillo and Avila presented information on the take of small cetaceans, focusing on coastal species, in Colombia (SC/M18/SAW05; Avila *et al.*, 2008). Colombia has 25 small cetacean species both in marine and fresh waters. At least 11 of these have been reported killed or harvested either accidentally, opportunistically or through direct take (42 cases). The most affected species are the Amazon river dolphin (*I. geoffrensis*) and the bottlenose dolphin (*T. truncatus*). Avila reported that bottlenose dolphins (*T. truncatus*) and the pan tropical spotted dolphin (*S. attenuata*) are hunted for bait by local fishermen in Bahía Solano (Choco, Colombia) for long-line fisheries. Other bait species include the Pacific bearded brotula, groupers and smooth-hound. Fishermen stated that at least 1.1 dolphin/month (a maximum estimation of 3 dolphins/month) were hunted during 2005-2006 (Avila *et al.*, 2018). Authors could not estimate how dolphin hunting might affect long-

term population viability, since population parameters for dolphins in this region were unknown. The preference for hunting mother-calf pairs could potentially influence the reproductive success of dolphins and alter their social structures (Avila *et al.*, 2018). There are indications that this practice of hunting dolphins for bait could still be occurring in the area when fish bait is scarce (pers. comm. to Isabel Avila and Diego Amoroch).

There are no reports of systematic killing of river dolphins for the piracatinga (*Calophrys macropterus*) fishery in Colombia.

Small cetaceans that inhabit Colombian waters face several threats: incidental and direct catch, boat traffic related threats, pollution (e.g. noise from vessels, seismic exploration and chemical pollution), infections and diseases, retaliation by fishermen that consider dolphins as competition, climate change, depleted food sources, indiscriminate deforestation (which affects sedimentation and turbidity), unregulated tourism growth and the potential construction of mega-projects e.g. commercial ports, oil platforms and hydropower plants.

#### 4.6 Costa Rica

Rodriguez-Fonseca presented new information on small cetacean use as bait in Costa Rica (SC/M18/SAW09). There has been no tradition of hunting for small cetaceans in Costa Rica for any purpose. In the last two decades, however, there has been an emergence of hunting activities focused on coastal dolphins which are used as bait for shark fisheries. It is noted that the Asian demand for shark fins for soup has dramatically increased shark fisheries in the area. This practice has been identified from both Costa Rican coasts. Three areas on the Pacific coast involve two species: the Pantropical spotted dolphin (*S. attenuata*) and the bottlenose dolphin (*T. truncatus*), and two areas on the Caribbean coast involve two species: the Atlantic spotted dolphin (*S. frontalis*) and the bottlenose dolphin (*T. truncatus*). All the available information has been obtained opportunistically, but it indicates some of the species that could potentially be at risk and provides areas in which to focus preliminary evaluations of the magnitude of the issue.

#### 4.7 Ecuador

Castro presented information from Ecuador and provided a summary of the country overview submitted by Félix (SC/M18/SAW02; SAW08). Ecuador's coastline lies between Colombia and Peru and includes the mainland and the Galapagos Islands as well as the rivers of the Amazon. Early reports document the use and trade of dolphins for bait in the early 1990s (Félix and Samaniego, 1994) by fishers in Puerto López in central Ecuador and Puerto Bolívar in southern Ecuador with a price up to US \$75 for a carcass depending on its size. Interviews with fishers in 2014 confirmed the practice continues in Puerto Bolívar.

While there are no official statistics, bycatch is the major threat for small cetaceans in Ecuador with several reports and scientific papers addressing its occurrence in artisanal fisheries and gillnets used for large pelagic fish such as tuna, marlins, sharks; nylon monofilament gillnets used for shrimps and large coastal fish; and long lines. No information on bycatch in commercial fisheries is recorded but interviews with fishers in 2014 confirmed that small cetaceans are also caught in purse seine nets targeting small pelagic fish (unpublished data).

The Ministry of Environment, through regional branches and MPA offices, is developing a megafauna stranding

database, as well as a draft protocol for megafauna stranding which includes cetaceans, elasmobranchs and sea turtles. A workshop comprising groups interested in this initiative was held in December 2017. This initiative will hopefully provide better connectivity between the strandings databases held by individual institutions (e.g. Chiliza *et al.*, 1997; Félix *et al.*, 2011). The Ministry of the Environment is the authority responsible for the conservation of marine biodiversity and the Ministry of Aquaculture and Fisheries oversees all fishing activities. Unfortunately, there is poor coordination between these authorities, mainly due to the resistance of the fishing sector to acknowledge that fishing is use of marine biodiversity.

#### 4.8 Peru

Campbell presented information on coastal cetaceans from Peru (SC/M18/SAW01). Despite the implementation in 1996 of a law banning the capture and trade of small cetaceans, the Peruvian small-scale driftnet fishery still has one of the highest reported rates of small cetacean bycatch in the world, due in part to its vast fishing capacity, with an estimated 15,000-20,000 animals killed per year (Read *et al.*, 1988; Van Waerebeek and Reyes, 1990; Alfaro-Shigueto *et al.*, 2010; Mangel *et al.*, 2010). This number is mostly composed of four species: common dolphins (*Delphinus* spp.), dusky dolphins (*L. obscurus*), common bottlenose dolphins (*T. truncatus*) and Burmeister's porpoises (*P. spinipinnis*). Cetaceans are either bycaught or harpooned to be used as bait for shark fisheries or other wildmeat uses. Bycaught Burmeister's are often favoured as food, either on-board or brought to shore. Dusky dolphins are preferred as bait (Van Waerebeek, Reyes and Luscombe, 1988; Van Waerebeek and Reyes, 1994; Alfaro-Shigueto *et al.*, 2010; Tzika *et al.*, 2010; Mangel *et al.*, 2013). Both species are data deficient, with limited distributions and are understood to comprise distinct populations within Peru (Cassens *et al.*, 2003).

River dolphins (*I. geoffrensis*) are also threatened since they are used as bait in the piracatinga (*C. macropterus*) fishery in the Loreto region. This is of special concern as the practice is growing in Loreto and spreading to the southern Peruvian Amazon in the Ucayali region.

#### 4.9 Uruguay

In Uruguay, the use of small cetaceans as wildmeat has been poorly reported and its extent is unknown. Therefore, Passadore conducted an online anonymous survey prior to the Workshop that was used to rapidly assess this issue (SC/M18/SAW04). The survey showed that the small cetaceans bycaught in the artisanal fishery were occasionally used as wildmeat. The most frequently bycaught species, the franciscana (*P. blainvilliei*), is used by fishermen, primarily as food or as oil to cure wooden boat hulls. Other bycaught species may also be used as wildmeat, such as the Burmeister's porpoise (*P. spinipinnis*). Limited knowledge of distribution patterns, habitat use and population size of most of the small cetaceans inhabiting Uruguayan waters hampers the proper assessment of the impacts of threats such as wildmeat use and bycatch.

#### 4.10 Venezuela

Briceño presented updated information on previously reported takes of small cetaceans for bait and an emerging threat in Venezuela (SC/M18/SAW11). In Venezuela 25 cetacean species are recognised, 22 of these are Delphinidae. The law 'Ley de Protección a la Fauna Silvestre', issued in 1970, governs the protection and rational use of wild fauna and its products and hunting. The hunting of any cetaceans



is prohibited. The use as bait in shark fisheries of eight small cetacean species has been reported throughout the country. Two of them, the Guiana dolphin (*S. guianensis*) and the boto (*I. geoffrensis*) have also been used for food and some cultural purposes (Bolaños, 1995; Ramírez, 2005; Sánchez *et al.*, 2008; Diniz, 2012; Briceño *et al.*, 2016).

A situation which is causing concern is the directed take of the Guiana dolphin from Lake Maracaibo. In the northern area of the lake, direct captures are estimated to be four individuals per week for use as bait in shark fisheries. In the southern region of the lake, the take is also estimated at four individuals per week, but here the flesh is used for food, both by the fishermen themselves and for sale in the market.

In the Orinoco River the Guiana dolphin and the boto are deliberately captured for use as bait for the *C. macropterus* fishery (commonly named 'zamorito' in Venezuela). The number of boto taken between 1990 and 2008 is estimated to be 840 animals but no estimate exists for the Guiana dolphin. Additionally, there are a few reports of boto being used as food, as well as its oil being utilised for other purposes. It is unknown if boto and Guiana dolphin are still used as bait in the Zamurito fishery in Venezuela, as in the past all production was sold to Colombia which now prohibits the import and sale of this fish.

Other threats identified for small cetaceans are bycatch and pollution from oil spills, particularly in Lake Maracaibo. The proposed Orinoco Mining Arch mega project is predicted to involve large discharges of mercury and other pollutants into the Orinoco River and its tributaries, threatening populations of both boto and Guiana dolphin.

#### 4.11 The Guianas: French Guiana, Guyana and Suriname

Little information is known from these countries. Rhone-Dos Reis submitted a written update that focused primarily on information from French Guiana. In French Guiana, the Guiana dolphin (*S. guianensis*) has been hunted by

indigenous people for food and, on the east coast, fishermen from Brazil utilise various dolphin parts as talisman, tinctures and tonics. In addition to hunting, both stranded and bycaught dolphins are used. Robards and Reeves (2011) note that dolphins have been deliberately targeted for food in Suriname. No information was available from Guyana, however, given its location between Suriname and French Guiana, it is likely that small cetaceans are used as wildmeat both locally and by fishermen from elsewhere working in Guyana national waters.

#### 4.12 National perspective summary

There is no country in South America that has not, at some time, utilised small cetaceans as wildmeat. From the information provided at this Workshop, areas where the current take of both riverine and coastal cetacean species is believed to be a cause for concern, according to the expert opinion of the Workshop attendees, are; Costa Rica, Colombia, Venezuela, Brazil, Bolivia, Peru and Ecuador (Fig. 1).

### 5. THE DEVELOPMENT OF DATABASES TO PROVIDE BROAD SCALE INFORMATION

#### 5.1 Overview

Ingram presented perspectives from current research on the use of terrestrial animals as wildmeat. Although this utilisation has been well researched and has been identified as one of the main pressures on terrestrial wildlife, currently there is no broad-scale information on the similar exploitation of cetaceans. Studies that have investigated the take of cetaceans for aquatic wildmeat are often at a local scale, are sporadically collected and the methods used differ widely. A regional picture is urgently needed to inform conservation policy and action. Analyses of databases on other threats to wildlife have been successfully used to understand regional patterns and trends and to identify data gaps. Lessons learnt during the development of these

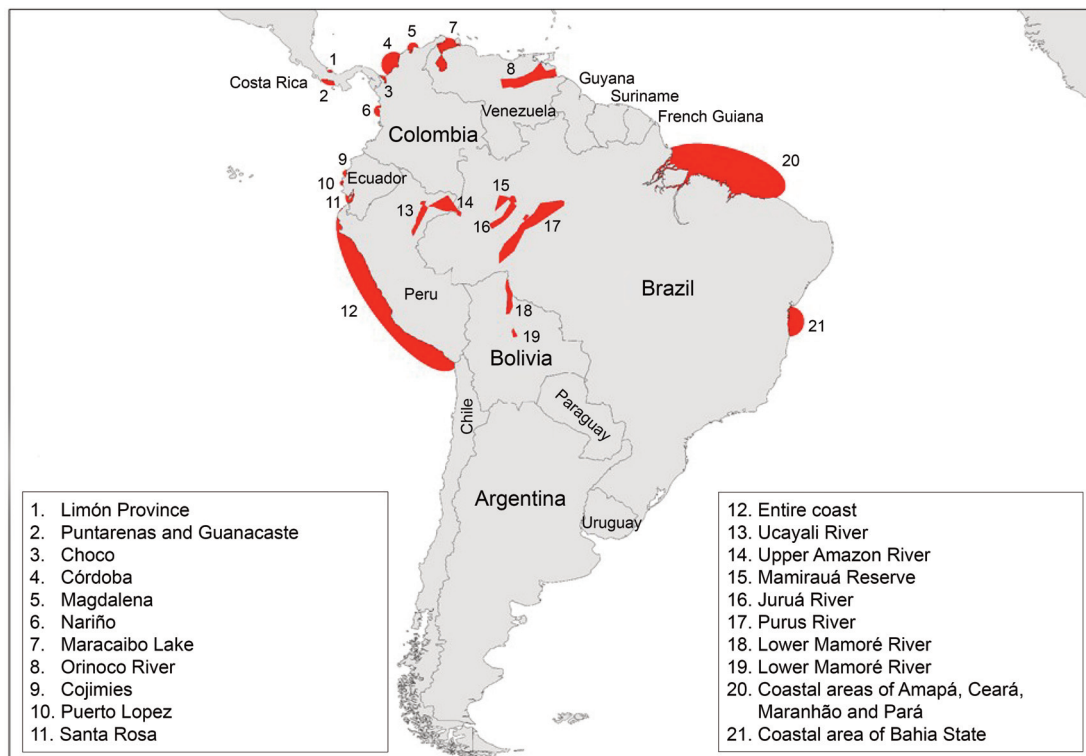


Fig. 1. Areas of South America where the use of small cetaceans as aquatic wildmeat is a cause for concern.

databases highlight that methods must be standardised and informed by best practice guidelines to ensure that datasets are comparable. To specifically address data gaps and to assess the current state of published knowledge with regards to risk to small cetaceans both from deliberate take, for bait, research and the aquarium trade, and subsistence take for food and other non-food uses, Avila extracted the relevant details from the extensive database she and co-authors have developed (Avila *et al.*, 2018<sup>2</sup>). In this way, the risk to **marine** small cetaceans can be visualised. Risk areas were obtained based on documented threats for marine mammals which occurred between 1991 and 2016. Threat is an action or event that causes to the species harmful effects, while risk is the possibility for a species of experiencing harmful effects (Avila *et al.*, 2018). For the purposes of IWC, small cetaceans are defined as those cetacean species (whales, dolphins and porpoises) not considered to be one of the 'great whales' (bowhead whales, right whales, gray whales, blue whales, fin whales, sei whales, Bryde's whale, minke whales, humpback whales and sperm whales). The cetaceans used for this visualisation comprise those small cetaceans res5.2 tricted to coastal and marine habitats.

## 5.2 Reporting effort

Avila identified the geographic distribution of published information on threats attributable to small cetaceans, which was extracted from the threat database of Avila *et al.*, (2018). The number of publications listing threats to small cetaceans were linked to a specific location occurring within a given country, ocean basin and Longhurst biogeographical province. There is a higher reporting effort from Brazil, Peru, Chile and Argentina but less so from other South American countries (Fig. 2).

## 5.3 Risk maps for small cetaceans based on all documented threats

Threats for 121 marine mammals were localised by assigning incidents to countries where they were reported (Avila *et al.*, 2018). This was further refined allocating incidents to ocean basins and Longhurst biogeographical provinces and by

<sup>2</sup> Also available at <http://www.biom.uni-freiburg.de/MarineMammalThreatDatabase>.

intersection with the mapped species' distributions of AquaMaps (Kaschner *et al.*, 2016). Marine mammal species classification in AquaMaps follows the Taxonomy of Catalogue of Life (<http://www.catalogueoflife.org/col/>) and for the threats collection, Avila *et al.*, (2018) used the classification published by the SMM Committee on Taxonomy (2016). As a result of these taxonomic discrepancies, Avila *et al.*, (2018) obtained risk maps for 114 different species (see Avila *et al.*, 2018 for methods). The risk maps were produced based on binary (presence/absence) range maps using the core habitat, defined as species present in any cell with a species-specific predicted probability threshold of  $\geq 0.60$ . Risk severity was quantified with respect to (1) number of species affected per cell, or (2) proportion of affected species compared to the total number of species present per cell. High risk areas or hotspots were where more than 75% of species were affected (Avila *et al.*, 2018).

For small cetaceans, when all threats were combined, Avila identified high-risk areas (where >15 species were exposed to threats), located along both the Pacific and the Atlantic coasts of the US as well as around Japan and southwest Australia (Fig. 3A). In terms of the locally occurring marine mammal species community, high-risk areas (where >75% of all small cetaceans were exposed to threats), hotspots were noted in the coastal waters of North America, South America, parts of Europe/north Africa, East Asia, and northern Australia (Fig. 3B).

By focusing on South American coastal waters and adjacent jurisdictions (Fig. 4), hotspots in terms of the number of species occur within the waters of Brazil (Fig. 5A), however, in terms of the proportion of species affected by threats, hotspots occur throughout all of South American (Fig. 5B).

## 5.4 Risk maps for small cetaceans based on documented threats from direct harvesting

Direct harvesting is defined by Avila *et al.*, (2018) as threats emanating from direct hunting, killing and harvesting, including live capture for the aquarium trade. Five attributes, which detail the threat, have been identified (Avila *et al.*, 2018):

- (1) Commercial: kill for commercial purposes, use as bait and illegal kill.

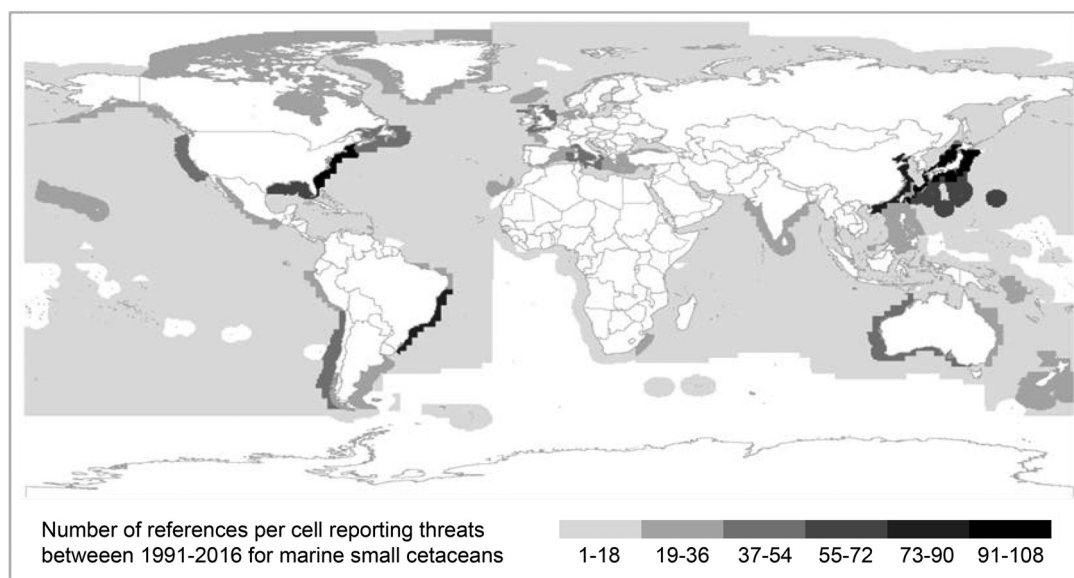


Fig. 2. Number of references that reported current threats for marine small cetacean species per cell (N references=1046). White areas represent areas without papers documenting threats (extracted from Avila *et al.*, 2018).

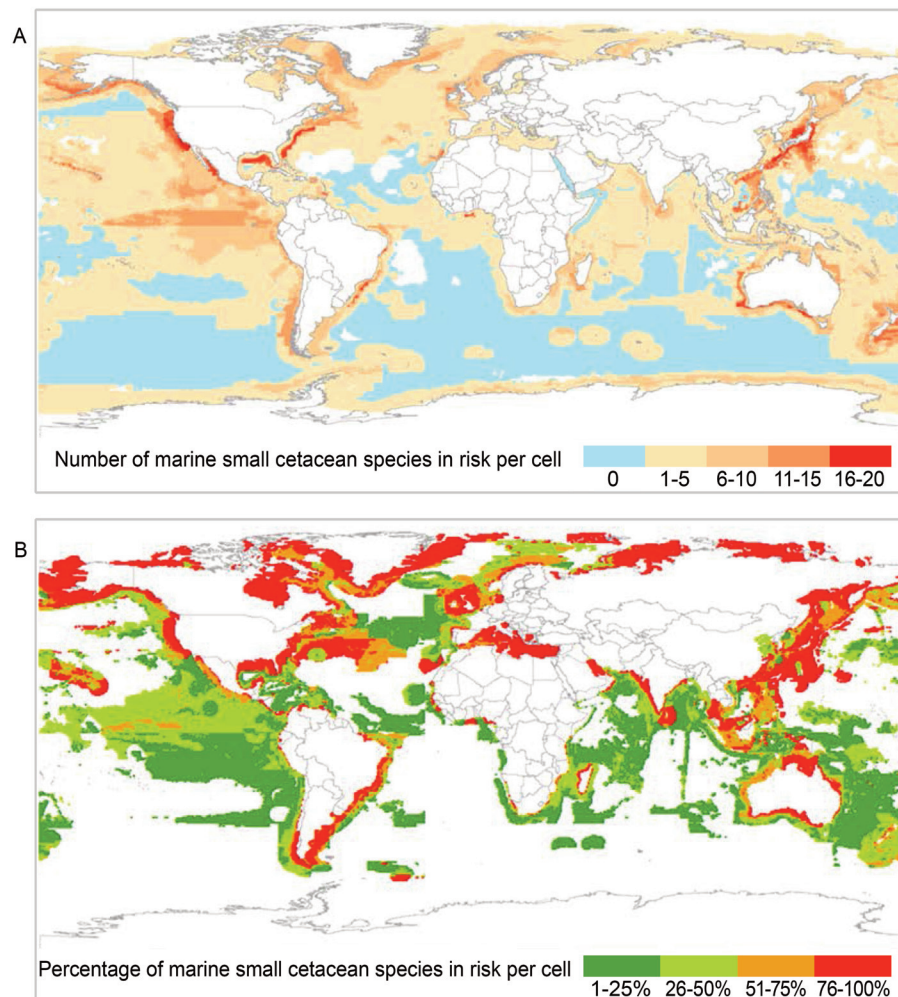


Fig. 3. Risk maps based on documented threats for all threat types and all marine small cetacean species combined. A: cumulative risk map showing the number of species affected by any threat category. Blue areas represent the core habitats for small cetacean marine mammals without any documented threat; and B: cumulative risk map showing the proportion of species of the total of species predicted to be present per cell with at least one documented threat (extracted from Avila *et al.*, 2018).

- (2) Subsistence: kill for subsistence purpose, also aboriginal hunt.
- (3) Control: kill for control or self-defense.
- (4) Live captured: harvest alive and remove from freedom e.g. for aquariums and zoos.
- (5) Research: kill for research or with special permit, or for museums.

Between 1991-2016, direct harvesting represented the third main threat for marine mammals worldwide, affecting 74% of marine mammal species. For small cetaceans (non-riverine) 53 species were affected (Avila *et al.*, 2018). Areas of risk from direct harvesting (all threat attributes above included) for small cetaceans are concentrated in the polar regions of the Northern hemisphere and some areas of the Mediterranean Sea, Asia and coastal South America (Figs 6A and 6B).<sup>3</sup>

Risk areas differ in relation to the direct harvesting attributes. In South American waters, hotspots of commercial harvesting are apparent in southern Chile and in some places in northern Brazil (Fig. 7A), and a hotspot for subsistence harvesting occurs in Maracaibo Lake, Venezuela (Fig. 7B). Although control harvesting is documented in Chile, Colombia and Venezuela, it is not sufficiently high to indicate a risk hotspot (Fig. 7C). For the live capture industry, risk areas are apparent on the Atlantic coast of

Colombia and in Guyana waters (Fig. 7D). No cases of takes for research were documented for South American waters between 1991-2016.

### 5.5 Towards developing a regional framework for assessing the South American wildmeat issue

To better develop a regional picture of the issue of wildmeat in South America, the Workshop developed a series of questions and discussed appropriate data collection methods and analyses (Annex E). This provided a data collection framework that can be referred to prior to any investigation so that scope, magnitude and impact of any wildmeat issue can be gathered systematically, thus providing standardised data that can be ultimately fed into a broad-scale analysis (Annex F).

#### 5.5.1 Regional overview of current knowledge

These questions and framework were then used to develop a database which provided an overarching view of the current state of knowledge for both marine and riverine small cetacean species from regions throughout South America (Annex F). For all countries reviewed, except from Uruguay and French Guiana, there is ongoing use of small cetaceans as wildmeat. In Bolivia, Brazil and Peru, small cetaceans are acquired as salvage, through deliberate killing of stranded or bycaught animals and through targeted catch. In Venezuela, small cetaceans are not acquired from live bycatch, however,

<sup>3</sup>For methods see Avila *et al.* (2018).



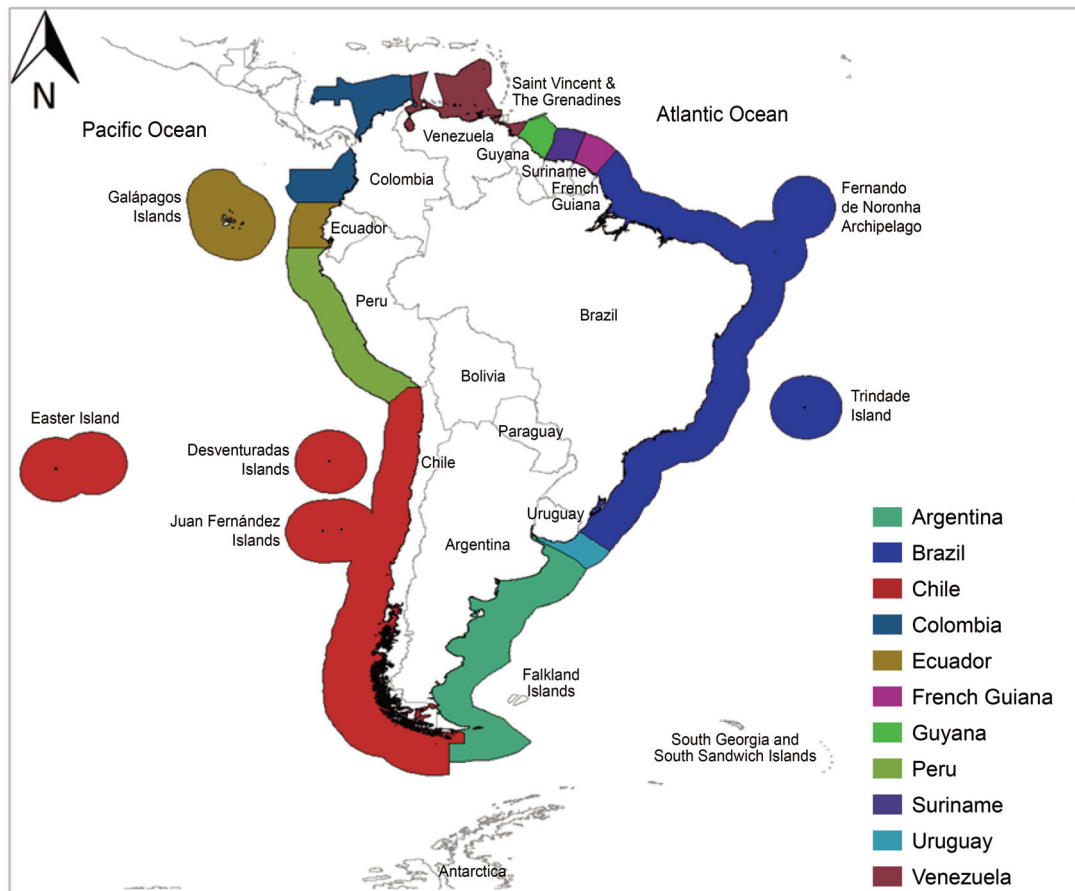


Fig. 4. South American waters including Exclusive Economic Zone (EEZ) and disputed waters.

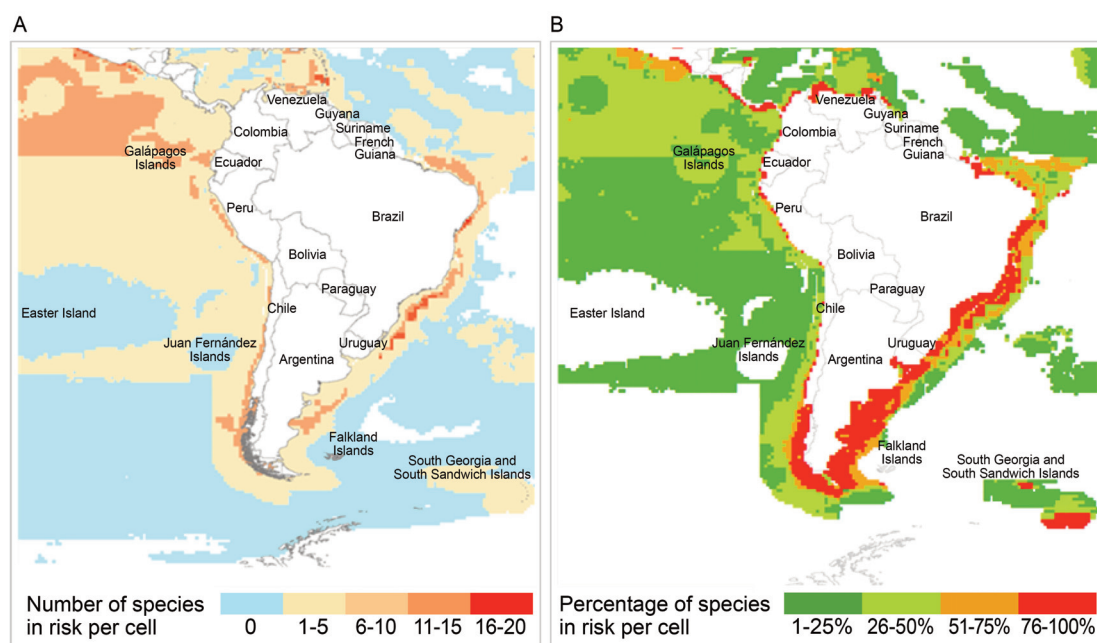


Fig. 5. Risk maps based on all documented threats to all small cetaceans. A: cumulative risk map of the number of species affected by any threat and B: cumulative risk map of the proportion of species predicted to be present per cell with  $\geq 1$  threat (extracted from Avila *et al.*, 2018).

are obtained by all other means, including from organised and directed catch. In Costa Rica, small cetaceans are acquired from bycatch (salvage and live) and from directed catch. Argentina, Chile and Colombia acquire small cetaceans from salvage of bycatch and from directed catches. Ecuador acquires small cetaceans from the salvage of bycatch (salvage and live). In Colombia, French Guiana and

Uruguay, there are some records of use of small cetaceans as wildmeat, however, it is unknown if this practice was in the past or is currently ongoing. For Bolivia, Costa Rica, Ecuador and Venezuela, there are no reports of the previous use of small cetaceans as wildmeat, however, it is an ongoing issue with records of small cetaceans being used for various reasons, particularly as bait (Fig. 8). Targeted acquisition of



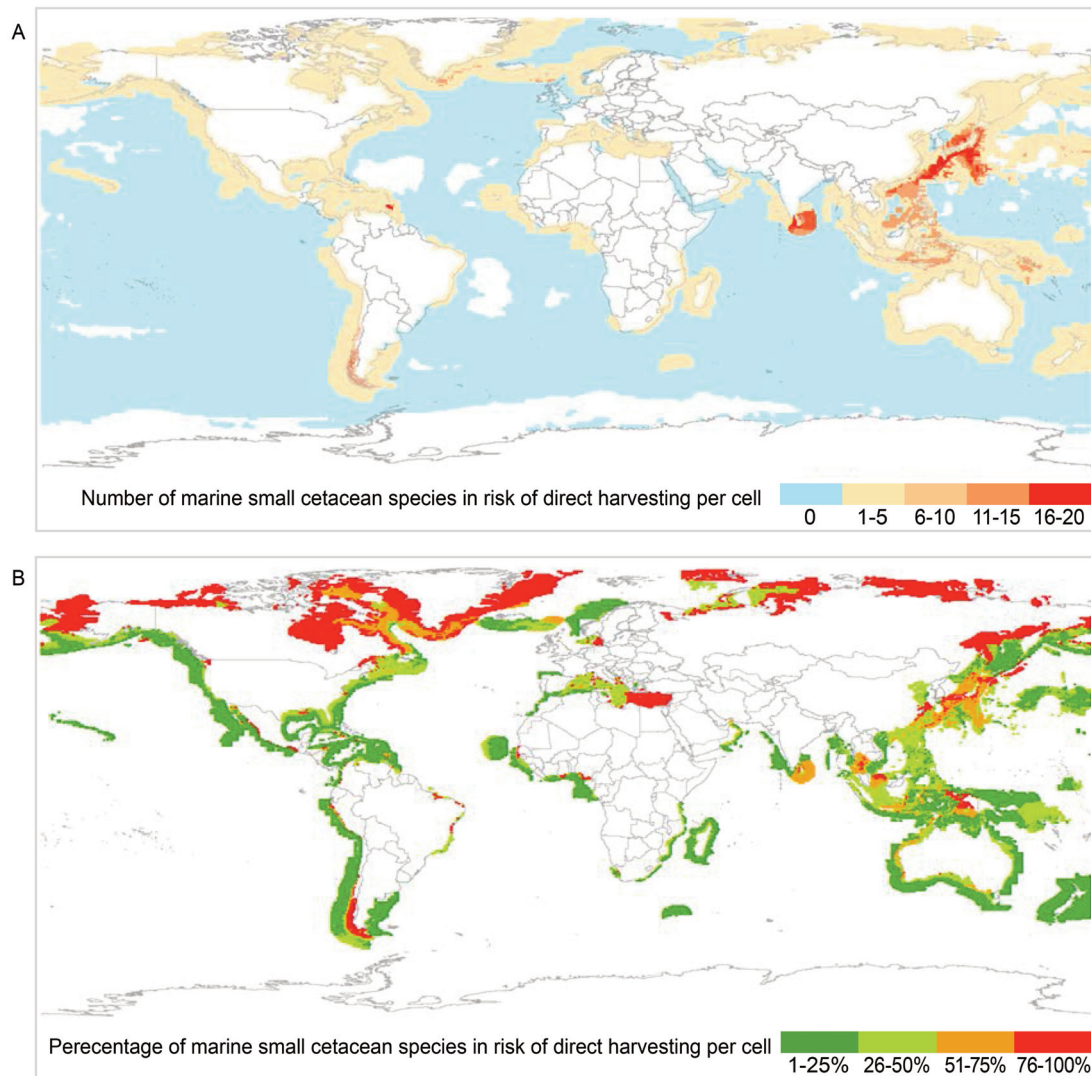


Fig. 6. Risk maps based on documented threat from direct harvesting for small cetacean. Cumulative risk maps for A: the number of species affected by direct harvesting and B: the proportion of species affected per cell by direct harvesting (extracted from Avila *et al.*, 2018).

small cetaceans has been documented previously for Argentina, Brazil, Chile and Colombia. Targeted acquisition is ongoing in all these countries and is also recorded in Bolivia, Costa Rica, Peru and Venezuela. Targeted acquisition in some parts of Colombia and French Guiana is known, however, it is not known if this is ongoing. In all countries which document targeted acquisition, small cetaceans are also obtained from salvage or the deliberate killing of stranded or bycaught animals. Only Ecuador and Uruguay do not report targeted acquisition (Fig. 9). Although this knowledge review is not exhaustive, there is a pattern of increasing use of small cetaceans in most South American countries and countries which did not document small cetacean use in the past, are now doing so. In all areas, little was known of the magnitude of use nor what impacts this might have on the small cetacean population being affected.

### 5.6 Recommendations

Throughout the data identification process, certain areas and issues were highlighted that give cause for concern. After review, there is evidence from all countries, other than Uruguay, that small cetaceans are regularly being used as wildmeat, acquired by both targeted and non-targeted means. The recommendations developed from the Workshop

discussions are based on available knowledge and the expert opinion of the Workshop participants.

It was **highlighted** that all countries should strictly enforce existing legislation pertaining to wildlife trade and openly report all seizures and prosecutions.

Following presentations of current information, expert knowledge and opinion, and the understanding that the magnitude of small cetacean take as aquatic wildmeat is a cause of concern, the Workshop **strongly encourages** all parties to make a concerted effort to standardise data collection to better understand the issues surrounding aquatic wildmeat, and to actively encourage a collaborative and coordinated approach to understand regional patterns and trends. A framework for such an approach is provided in Annex F.

This Workshop **recommends** that abundance and distribution surveys, in tandem with investigation into the magnitude of aquatic wildmeat use, be conducted on the following species and areas, and that data should be used to estimate the impact of deliberate takes for wildmeat on these populations:

- Chilean dolphin (*Cephalorhynchus eutropia*) in Chile;
- Burmeister's porpoise (*Phocoena spinipinnis*) in both Chile and Peru;

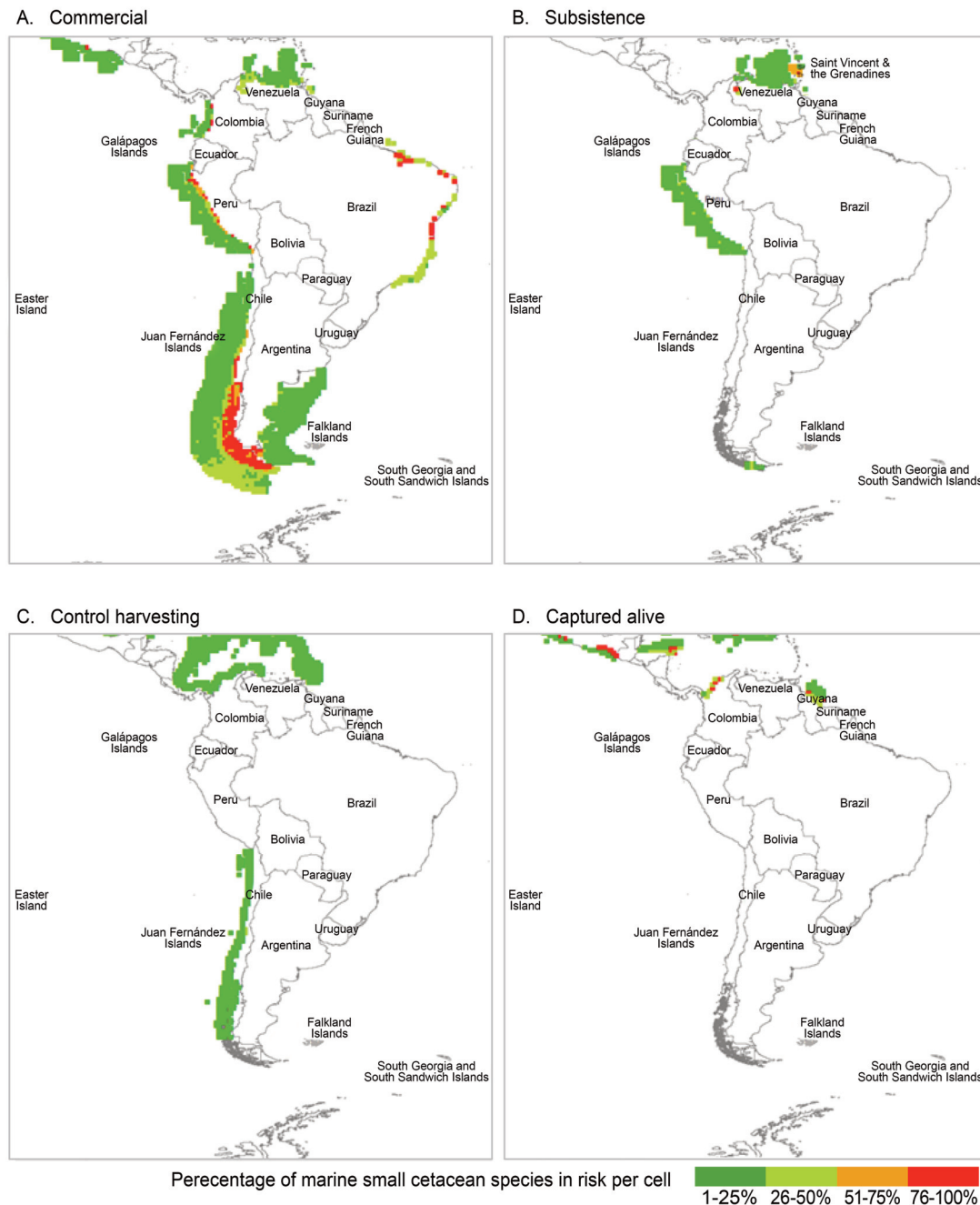


Fig. 7. Risk maps based on documented direct harvesting attributes. Cumulative risk map of A: commercial harvesting; B: subsistence harvesting; C: control harvesting; and D: live captures (extracted from Avila *et al.*, 2018).

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

as *Inia geoffrensis*, and may also be used as bait in the piracatinga fishery;

- Guiana dolphin (*Sotalia guianensis*) in Lake Maracaibo in Venezuela, noting that deliberate take for food is ongoing.

Further, this Workshop **recommends** that:

- An investigation be made of the magnitude of by-catch of Guiana dolphins (*Sotalia guianensis*) in the gillnet fishery operating off Maranhão, Pará and Amapá, north Brazil, noting that by catch is being used commercially for shark bait, human consumption and cultural use.
- A forensic investigation of the cetacean products for sale in the north and northeastern Brazilian markets be conducted coupled with better enforcement of wildlife trade legislation.



Fig. 8. Presence and number of categories for which small cetaceans were used for aquatic wildmeat per country in South America and Costa Rica as identified by experts. Stacked bars are shaded following a modified version of Robards and Reeves (2011) categories for cetacean acquisition. Panels separate records based on whether cetacean take for aquatic wildmeat occurred in the past (not ongoing), currently occurs (ongoing), or whether there was insufficient information (unknown). No information was available for Suriname and Guyana.

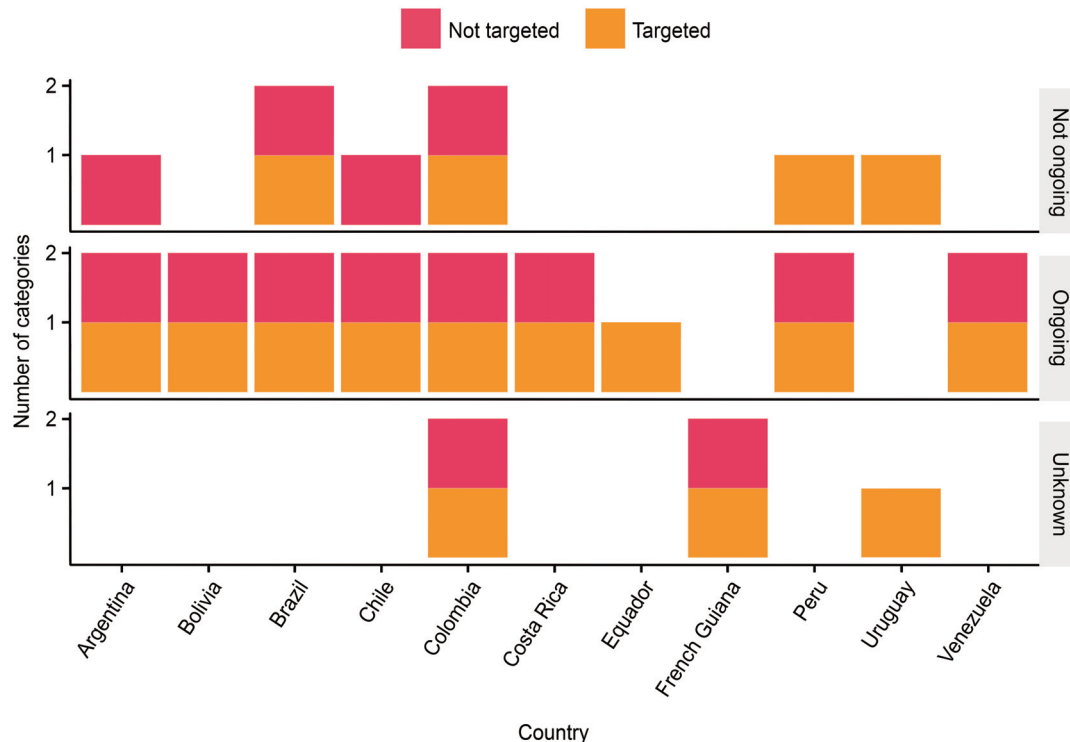


Fig. 9. The number of categories of small cetaceans used for aquatic wildmeat per country in South America and Costa Rica as identified by experts. Stacked bars are shaded based on whether cetacean acquisition was targeted or not. Panels separate records based on whether cetacean take for aquatic wildmeat occurred in the past (not ongoing), currently occurs (ongoing), or whether there was insufficient information (unknown). No information was available for Suriname and Guyana.

- Separate assessments for (a) directed take for bait and (b) for other uses be made in the small-scale fisheries of Peru.
- The use of dolphins for bait in the long-line fishery in Bahia Solano, Choco in the Colombian Pacific, is

evaluated using dedicated interview surveys and the use of alternative bait evaluated.

- Heavy metals levels of *Sotalia guianensis* and *Inia geoffrensis* in the Orinoco river basin and Maracaibo Lake

be estimated and the impact on of consumption of dolphin meat on human health be evaluated.

- The governments that are part of the Eastern Pacific Corridor (CMAR), Colombia, Costa Rica, Panama and Ecuador assess the current practice of using marine mammals in Fish Aggregating Devices (FADs) and enforce the existing legislation which prohibits the use of cetaceans as attractors of these gears.
- The Inter American Tropical Tuna Commission RFMO documents and registers the capture and incidence of cetaceans (or pinnipeds) during their fishing operations along the Eastern Pacific through the appropriate onboard observers programme.

## 6. REVIEW OF INFORMATION ON THE AMAZON RIVER DOLPHIN

Two genera of dolphins occur within the Amazon, Orinoco, Tocantins and Araguaia River basins. In this report, the common names 'boto' and 'tucuxi' are used to refer to *Inia* and *Sotalia*, respectively. Both genera were reviewed with information compiled throughout the dolphin's riverine ranges in Bolivia, Brazil, Colombia, Ecuador, Peru and Venezuela.

### 6.1 Taxonomy and population structure

With respect to the taxonomic status of the genus *Inia* and *Sotalia*, the position of the Taxonomy Committee of the Marine Mammal Society (SMM) is that only one species, *Inia geoffrensis* is recognised with two sub-species: *I. g. geoffrensis* for the Amazon basin and *I. g. humboldtiana* for the Orinoco basin. At the regional level, most researchers recognise the existence of *I. boliviensis* as a separate species based on genetic studies that show a clear difference from *I. geoffrensis* (Banguera-Hinestroza *et al.*, 2002, Ruiz-García *et al.*, 2008, Gravena *et al.*, 2015). Likewise, the recently described *I. araguaiaensis* is recognised for the Tocantins and Araguaia basins (Hrbek *et al.*, 2014; Siciliano *et al.*, 2016), although continued genetic evaluation throughout its distribution is recommended. A fundamental point is that the Tocantins basin is geologically and hydrologically separate from the Amazon basin, which reinforces the hypothesis of isolation of *Inia* in the former. For clarity this report will use the taxonomy currently recognised by SMM.

In the case of *Sotalia*, two separate species are recognised at present: *S. guianensis* (marine) and *S. fluviatilis* the freshwater form in the Amazon basin, however, the dolphins that occur in the Orinoco basin probably represent an independent population unit, isolated from coastal populations of this species (Monteiro-Filho *et al.*, 2002; Cunha *et al.*, 2005; Caballero *et al.*, 2006; Caballero *et al.*, 2017). Additional population genetic studies with increased sampling and analyses of more variable molecular markers (i.e., microsatellites or Single Nucleotide Polymorphisms, SNPs) are required to further understand population structure of *S. guianensis* in this region.

### 6.2 Abundance estimations and population trends

Information on abundance of boto and tucuxi has been produced by a number of different research groups in the region over the last two decades. One example is a regional initiative that has surveyed more than 30 rivers in Brazil, Colombia, Peru, Ecuador, Bolivia and Venezuela (28,600km), producing density and abundance values (Martin *et al.*, 2004; Gomez-Salazar *et al.*, 2012; Pavanato *et al.*, 2016; Williams *et al.*, 2016). The primary benefits of this study have been standardisation of methods which has led to the comparability of results along the Amazon and

Orinoco basins, training of more than 240 researchers and the creation of a regional network.

While there are abundance estimations for several rivers, there is limited information on population trends. Systematic evaluation of river dolphin's abundance is only possible in the case of small areas of Brazil and Colombia. For the central Amazon (Mamirauá) River Japurá, da Silva *et al.* (2018) estimate a 70.4% decline of botos during the last 22yrs in a 40km<sup>2</sup> area. In the Upper Amazon River, at the border between Colombia and Peru, Williams *et al.*, (2016) estimated a 3.4%/year reduction of the *Inia* population between 1993 and 2007.

Additional methods have been used to estimate abundance and evaluate the distribution and behaviour of dolphins. These include the use of drones and deployment of satellite transmitters. Drones have been used in Brazil and Colombia in order to produce correction factors for abundance estimates computed from boat surveys, especially at river confluences and lakes. As for satellite tagging, in 2017 satellite transmitters were attached to 15 botos: five in Brazil (Tapajos), five in Bolivia (Itenez/Guaporé), four in Colombia (Orinoco) and one in the Amazon River between Colombia and Peru. Preliminary results show that some animals moved more than 450km while others remained associated with productive areas such lakes.

### 6.3 Threats

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

#### 6.3.1 Deforestation

Although the rate of deforestation stabilised at the beginning of the century, there has been a marked increase in recent years, amounting to approximately 600,000km<sup>2</sup> of lost forest. This has an indirect effect on dolphins, especially on the 'blackwater' (tannic) rivers, where productivity is low and the fish that dolphins prey upon depend on the seeds and fruits of the flooded forest. It is estimated that one hectare of this ecosystem can produce 20t of seeds per year. When the forest is lost, there is no way to sustain fish stocks and this affects the availability of prey for the dolphins.

#### 6.3.2 Hydropower development

Dams and future dam development are currently among the greatest threats in the Amazon since they affect the connectivity of rivers, the migrations of fish and in some cases, result in the fragmentation of dolphin populations (e.g. as observed in the Tocantins and Madeira river basins). It is estimated that 155 large dams are currently operating in the Amazon, Orinoco and Tocantins/Araguaia basins, and there are proposals for 277 more, although it is noted that there is uncertainty with regards to the number of dams in operation and those proposed.



### 6.3.3 Tourism

Inappropriate tourism practices, including feeding and swimming with dolphins conditioned to human interaction and dependent on human feeding, disrupt normal foraging and social behaviour. The operation of boats at high speed in the vicinity of dolphins may also cause disturbance and even, when animals are struck by boats, injury and death.

In January 2018, the Environmental Agency of the Amazon Government (Brazil) established a regulation for tourism activities with wild dolphins in the Amazon (Resolução /CEMAAM No. 28, de 22 de janeiro de 2018) with the view of better controlling poor practices.

### 6.3.4 Negative interactions with fisheries

Negative interactions with fisheries are also a major threat to dolphins. In the sixties, the mechanisation of fishing practices allowed large fishing nets to be used for the first time and, according to reports from fishermen and traders, this resulted in a large bycatch of dolphins. In the eighties, when more systematic assessments of dolphins began, significant mortality was also reported. In the nineties, in the Colombian Amazon, dolphins were reported approaching nets without always being caught and, at the beginning of the 2000's, the first observations were made of dolphins removing fish directly from nets. This created a conflict with some fisheries, especially those of large catfish, and retaliation against dolphins was reported. Dolphin poisoning is reported as commonplace in several locations in Peru. In Brazil, botos caught accidentally in nets are killed by the fisherman to avoid net damage. On the other hand, if tucuxi's are accidentally caught, they are released unharmed.

### 6.3.5 Deliberate take

In recent years, the deliberate killing of dolphins for use as bait in the piracatinga fishery has resulted in a high mortality of Amazon river dolphins. The need to better understand the potential impact of this mortality on both *Inia* and *Sotalia* prompted the following in-depth review of the fishery and its practices.

## 6.4 In-depth review of the use of Amazon river dolphins as bait in piracatinga fisheries

After several decades of unregulated fishing for the catfish 'capaz' (*Pimelodus grosskopfii*) in the Magdalena River, Colombia, the fishery collapsed. This prompted the opening of new fisheries for the catfish 'piracatinga' (*C. macropterus*), at first in Brazil and later in other countries within the Amazon. The meat of dolphins, caimans and other animals is used as bait in these fisheries, with dolphins being the preferred choice. This led to the intentional killing of botos and tucuxis, as well as the use of carcasses from bycatch in other fisheries (Flores *et al.*, 2008; Trujillo *et al.*, 2010; Alves *et al.*, 2012; Brum *et al.*, 2015).

Da Silva provided an overall summary of the status of the use of Amazon dolphins for bait in the piracatinga fisheries. After initial reports in the 1990s, evidence of killing dolphins started to accumulate from interviews with fishermen and increasing observations of the distinctive piracatinga fish traps. A decline of caimans and botos became evident in well-studied areas in the following years. In 2015, with the understanding that this use of dolphins as bait was having a detrimental impact on populations, a five-year moratorium on the commercial fishing and trade of the piracatinga was established by the Brazilian government.

Both dolphin species that occur in the Amazon river basin, botos and tucuxis, are used as bait. Most of the hunting

pressure is on botos, which are larger, easier to catch, and slower swimmers than tucuxis, which are used only occasionally. There is a preference among fishermen for botos because of their larger size (which provides more bait per animal) and the greater attractiveness of their meat to piracatinga (more fish are caught per unit of effort). Of the bait being utilised, it is estimated to comprise 70% caimans and 28-30% botos.

On the basis of reports and expert knowledge, Workshop participants identified areas where dolphins have been, or are currently being, used for bait in Bolivia, Brazil, Peru and Venezuela (Figs 10A and 10B). The occurrence of this practice was divided into two periods: historical (pre-2015) and recent (2015-2018). There is a concentration of trading activity at the border of Colombia, Peru and Brazil.

### 6.4.1 National Perspectives

#### 6.4.1.1 BOLIVIA

The killing of botos (referred to as bufeos in Bolivia) for use as bait in Bolivia was first observed in 2008 (Aliaga-Rossel *et al.*, 2012) and was highlighted in the River Dolphin Action Plan of 2012 (Trujillo, 2012) as one of the current threats to this species. Botos were being used as bait in commercial fishing for whitefish (*Pinirampus pirinampu*) and for the piracatinga, and possibly also meeting the demand for 'traditional' products and oils derived from this cetacean species in local and international markets. An interview study documented reports from fishermen or community members of 150 botos killed in 2015 and 30 in the period from January to April 2016 (Escobar *et al.*, 2016). The fishing is oriented to local markets in the cities of Cochabamba and Santa Cruz where there is a large demand for fish products. In the central area of Mamoré, Department of Beni, commercial fishing is still traditional, but intense. Work has been undertaken to introduce sustainable practices and find sustainable markets for less invasive or destructive fishing practices, although the effectiveness of these interventions has been difficult to quantify. This practice largely occurs in the central part of the country but information is lacking on how this evolving activity might be spreading throughout the country. Since the publication of the moratorium on the piracatinga fisheries in Brazil in 2015, there are suspicions that the piracatinga trade in Bolivia is orienting toward Brazilian markets.

#### 6.4.1.2 BRAZIL

SC/M18/SAW10 provided information on the killing of dolphins for use as bait in the piracatinga fisheries in Brazil, as well as presentations given by Britcha, da Silva and Marmontel. Dolphin catches for the piracatinga fishery in Brazil have occurred since the late 90s, mainly in the Central Amazon. The fisheries occur throughout the year, with peaks during the dry season – from July to October (Iriarte and Marmontel, 2013; da Silva *et al.*, 2011; Brum *et al.* 2015). An intense fisheries period was identified in 2012 and 2013 in the rivers Purus, Japurá, Solimões, Juruá, Amazonas, including within the Sustainable Development Reserves of Mamirauá (MSDR, 11,240km<sup>2</sup>) and of Amanã (ASDR, 23,500km<sup>2</sup>). Surrounding areas along these rivers are also known to have similar practices, but less intensively. There are large areas where piracatinga fisheries may occur but have not yet been formally documented and other larger areas where such fisheries are neither known nor suspected to occur, e.g. no fisheries for piracatinga or killing of botos have been documented in the Araguaia and Tocantins. The most widespread method of catching piracatinga is with 'currals' (or boxes), with or without doors (Fig. 12). These

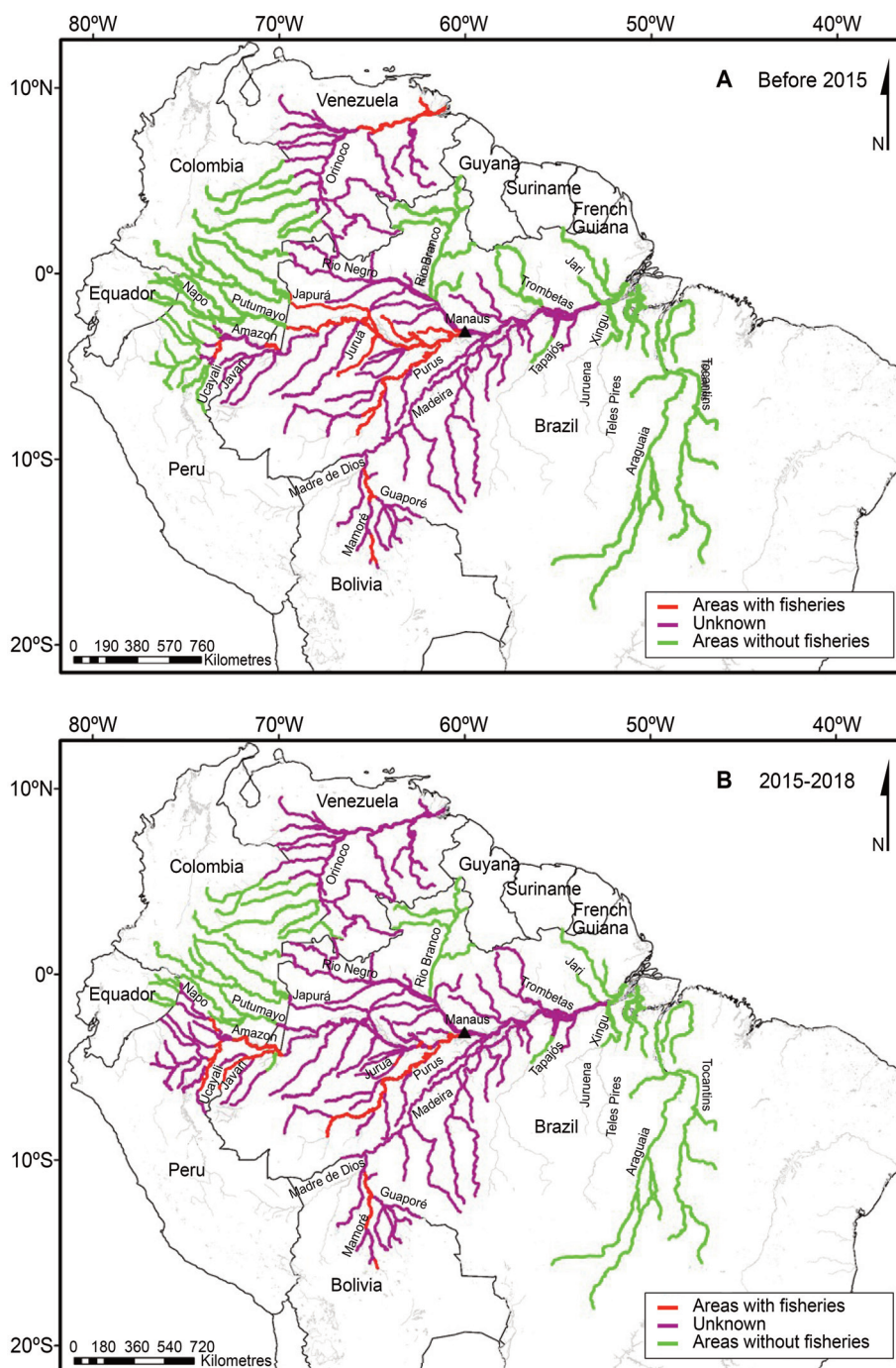


Fig. 10. A: historical (pre-2015) and B: recent (2015-2018) presence of fishing activities using dolphins as bait. Also included are areas where the practice does not occur and areas where information is lacking.

traps are built by the fishermen solely for capturing this fish (Botero-Arias *et al.*, 2014; Brum *et al.*, 2015; Brum and da Silva, 2017). From the 1990s to 2014 the production of piracatinga in Brazil was oriented to Colombian markets. Since 2008 the market has also expanded to cities in Brazil as well and is sold in internal markets as ‘douradinha’ and other names (Cunha *et al.*, 2015). Landing statistics are poorly known but monitoring by the Mamirauá Institute for Sustainable Development (MISD) of only one freezing plant in Tefé indicate that 330t of piracatinga were landed from 2011 to 2014. Additional data were provided by da Silva following the Workshop and is provided in Fig. 11.

Brum *et al.* (2015), in a study conducted between 2010 and 2013 in the middle Solimões river comprising the cities of Tefé, Alvarães and Uarini and the surroundings of the MSDR

and the lower Purús River comprising the cities of Beruri, Anori, and Tapauá, inside the Piagaçu-Purus Sustainable Development Reserve, revealed that in the middle Solimões river area all interviewed fishermen used botos and caimans meat as bait; in the lower Purús 70% of the fishers used boto as bait and 52% used caimans. Fisher’s Association historical records of piracatinga yields in the middle Solimões region revealed that during the study period, the yields increased by 2679% (at an average increase rate of 446.5% per year), from 865kg in 2003 to 23.176kg in 2009.

The use of both species of dolphins, and of caimans, as bait in the piracatinga fisheries in Brazil was only confirmed in the 2000s. Although dolphin is preferred – due to its firmer flesh and higher blubber content – meat from caiman is more prevalent. It was estimated that in July 2003, 6-8 dolphins

The Boletim do Desembarque Pesqueiro do IDSM report the following volume of Piracatinga in one Freezing Plant (Frigorífico Frigopeixe):

|                             |            |
|-----------------------------|------------|
| 1st Semester 2014 (Jan-Jun) | 25.134kg   |
| 2nd Semester 2013 (Jul-Dec) | 140.227kg  |
| 1st Semester 2013 (Jan-Jun) | 37.618kg   |
| 2nd Semester 2012 (Jul-Dec) | 108.830kg  |
| 1st Semester 2012 (Jan-Jun) | No mention |
| 2nd Semester 2011 (Jul-Dec) | 4.545kg    |

*After the Moratorium, there were no more official reports of piracatinga landings*

Fig. 11. Additional information on landing provided post-Workshop.

were being killed per day at the confluence of Japurá River and Paranã do Aranapu (Souza, *pers. comm.* to Marmontel). Monitoring of the fisheries and examination of piracatinga traps near MSDR and ASDR in 2010 and 2011 indicated that 68% of traps used caimans and 32% used dolphins as bait (Iriarte and Marmontel, 2013). In traps involving only cetaceans, botos corresponded to 91% and tucuxis to 9% of the bait. The proportion of caimans and river dolphins may be different in other areas and often a mix of dolphin and caiman carcasses are used as bait (Lima, 2015). Most of the bait used in the piracatinga fishery comes from incidental catches in gillnets, from both salvaged and intentionally killed dolphins (Botero-Arias *et al.*, 2014). The use of dolphins as bait has become so common that fishermen have reported the existence of a specific market for trading carcasses. Depending on the dolphins size, a carcass can be valued value between R\$ 50 to R\$ 300 (US\$ 20 to US\$ 100) (Alves *et al.*, 2012; Botero-Arias *et al.*, 2014; Brum *et al.*, 2015; Franco *et al.*, 2016). Of 315 mortality events recorded in the mid-Solimões between 1991 and 2016, 143 were associated with fishing nets (mostly entanglement in gillnets), 55 suffered harpoon wounds and 59 of them were somehow associated with the piracatinga fishery (2004-2016) (Loch *et al.*, 2009; Iriarte and Marmontel 2013a, 2013b; Marmontel, *unpub. data*). Using piracatinga landing data from Tefé, da Silva *et al.* (2011) estimated that 1650 botos were killed annually in the MSDR area. The 25-year long population monitoring database compiled by Projeto Boto has records, from 2000 onwards, of animals with wounds, such as punctures from harpoons, machetes, etc. ropes around the caudal peduncle; and the removal of pectoral fins and dorsal ridges.

Since the 1990s, the MISD and Marine Mammal Laboratory of the Instituto Nacional de Pesquisas da

Amazônia (INPA) have conducted river dolphin monitoring, in various parts of the Amazon River basin in Brazil, including the MSDR and the ASDR, and in areas around the mid-Solimões river, the western Amazon and other river basins within the Brazilian Amazon (e.g. Loch *et al.*, 2009; Iriarte and Marmontel, 2013; da Silva *et al.*, 2018). Research methods used in the monitoring include boat surveys, radio and satellite tagging as well as unmanned aerial vehicles (UAV) surveys to conduct interviews, estimate population abundance and to recover carcasses. Some of these studies suggest that the use of both species of dolphins as bait in the piracatinga fisheries has contributed to the severe decline of botos and tucuxis in the MSDR (Mintzer *et al.*, 2013; Brum *et al.*, 2015; da Silva *et al.*, 2018). It was noted, however, that as incidental mortality in fishing nets is observed in the region, it is difficult to determine the relative contribution of the intentional killing of dolphins to the population decline.

In 2014, the Government of Brazil published an inter-ministerial directive (INI nr. 06/2014) and established a moratorium on fishing and commercialization of piracatinga within the Brazilian jurisdictional waters and in its national territory for a period of five years (2015-2019). Subsequently, in August 2014 a working group was established by ordinance for the purpose of monitoring compliance and the effects of the moratorium. This working group developed a monitoring and follow-up plan outlining the actions to be undertaken, including initial monitoring expeditions of the populations of botos and tucuxis, with subsequent bi-annual monitoring in priority rivers, formalisation of agreements between countries for the effective implementation of the moratorium and increased inspection of local markets, supermarkets, slaughterhouses and warehouses to ascertain the availability of piracatinga in commerce.

Enforcement actions have included inspections of the region's freezing plants, but these have been suspended due to lack of funds. While these inspections did not find piracatinga, the Instituto de Proteção Ambiental do Amazonas (IPAAM) reported that approximately 1.8t of piracatinga were seized at the MSDR and ASDR in 2016. This agency noted that, in the Amazon region, irregularities in fish trade are related to other illicit activities, such as drug trafficking. Threats to the lives of the inspectors by traffickers in the regions have resulted in suspension of surveillance operations. The Secretaria Estadual de Meio Ambiente do Amazonas (SEMA) reported that the activity of piracatinga fishing in the middle Solimões (Mamirauá region) had decreased since the establishment of the moratorium, and it has become less likely that piracatinga are found in the freezing plants of that region. Both the possible establishment of an IBAMA office in Tabatinga on the Colombian border and the development of the Document

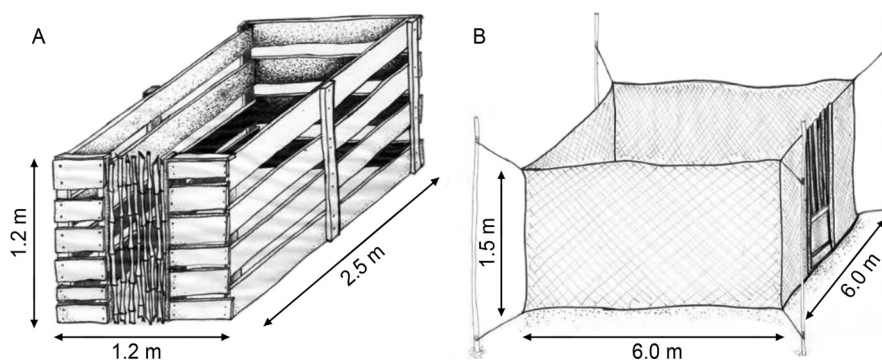


Fig. 12. The fishing traps (currals) which are built specifically for use in the piracatinga fishery.



of Origin of Fish – DOP by IBAMA, could help in the control of the piracatinga trade. SC/M18/SAW10 provided the results of a molecular analysis of fish products obtained from freezing plants in Manaus and local supermarkets. It was discovered that some products were labelled as one species of catfish but proved to be piracatinga, thus confirming that despite the moratorium, the fishing of piracatinga, albeit on a smaller scale, continues.

Future possibilities for addressing trade issues at higher levels include the Sustainable Landscapes Project of the Amazon, in which, based on a field diagnosis of the trade routes of the piracatinga, Brazilian Government officials, with the support of Amazon Cooperation Treaty Organisation (ACTO), could develop diplomatic strategies to promote dialogue with Peru and Colombia on the trade and its ecological consequences for the native populations of dolphins and caimans in the Brazilian Amazon.

Since the publication of piracatinga fishing prohibition in 2015, fishing and trade of piracatinga still occurs in most areas identified in Fig. 8, but with much less intensity. Information is lacking from a large portion of the Amazon but there are indications that this practice occurs elsewhere.

The continuation of the five-year moratorium is an issue for internal discussion and a rationale for its continuation needs to be developed. It must be considered that dolphins are long-lived and occur in widespread populations and thus determining population trends in the short term is not possible. There is also a need to continue outreach efforts to both the retail sector and communities in the Amazon so that the ban might be better understood. There is also a need to develop transparent product identification so that it is clear what fish is being sold.

#### 6.4.1.3 COLOMBIA

A piracatinga fishery using river dolphins as bait has not developed in Colombia, although there are anecdotal accounts of dolphins being used as bait especially in the Putumayo (Amazon) and Meta (Orinoco) rivers. A government resolution enforcing the prohibition of using dolphins as bait was established in 2014.

In the early 2010s, the main market for piracatinga was Colombia. The piracatinga trade into Colombian markets relied primarily on the Brazilian (70%) and Peruvian (20%) fisheries. The piracatinga was exported from Brazil via Manaus (air) or via Leticia (fluvial) and distributed to the main Colombian cities (Gómez *et al.*, 2008; Trujillo *et al.*, 2010b). Local communities along the rivers in the Amazon and Orinoco basins of Colombia do not consume piracatinga fish. In recent years, after the Brazilian moratorium, a greater proportion of the catch came from Peru, but there is also evidence of the movement of piracatinga fish illegally from Brazil.

Before 2015, it was common to find piracatinga being sold as capaz (the Colombian fish product for which it is a substitute) from the Magdalena River or as capacete in Colombian supermarkets and in popular markets (Salinas *et al.*, 2013). After the national media publicised the issue of the piracatinga fishery using river dolphins as bait, as well as the information regarding high mercury concentrations in piracatinga, a recommendation against consumption of piracatinga meat was issued by the Government (INVIMA 2015). This resulted in piracatinga being removed from commercial sale in supermarkets but commercialization continued in popular local markets (Plazas de Mercado).

A pilot study conducted by researchers and students from the Economy Faculty at Universidad de los Andes, examined

the amount of piracatinga traded in popular markets in Bogotá for two months in 2016. This pilot study showed that between 6 and 10% of the income of fish traders came from piracatinga sales in these markets, and there was a peak in piracatinga sales (3t) in the weeks before Easter.

In August 2017 a Resolution permanently banned the trade of piracatinga in Colombia because of high mercury levels and public health concerns.

#### 6.4.1.4 ECUADOR

In Ecuador, there is no record of the killing of botos or tucuxis to use as bait in fishing activities. Opportunistic and occasional catches are related to entanglements in fishing nets and conflicts with local people, especially in the Putumayo River.

#### 6.4.1.5 PERU

Information on the use of botos as bait for the piracatinga (referred to as mota in Peru) fisheries was provided by Gilleman and Campbell. The intentional killing of botos has been monitored by the non-governmental organisations Solinia and ProDelphinus through questionnaires and interviews, workshops and, sometimes, photo or video documentation. Surveys have been conducted with fishermen and the local communities in the Loreto and Ucayali regions since 2010.

Reports of catching dolphins for use as bait in Peru are historically recorded for the lower regions of the Ucayali River and Caballococha area that comprises the upper Amazon River region in Peru. There is evidence that a fishery for piracatinga is present throughout the department of Loreto, as an artisanal practice by local fishermen in isolated cases and on a larger scale by 'moteros', fishermen skilled in this practice from other regions, who are helped by local fishermen. The product is exported to Colombia but there is also a national market in the Andes with products shipped via Pucallpa and Yurimaguas. While more investigation is required, it appears that killing of botos (and caimans) for bait and piracatinga fisheries occurs mainly near Requena and Caballo Cocha. Other events of poisoning and direct aggressive actions (gun shots, harpoons) against river dolphins, spurred by fisheries competition were also registered in significant numbers in the last five years.

There is no estimate of the number of dolphins used for bait in the piracatinga fishery in Peru. Hernandez & Gonzalves (2010) estimated that the boto population of the Javari river (Peru) was 250 animals and that 20 botos were harvested to catch piracatinga in this area, representing a hunt of 8% per annum. Surveys show that this is a relatively new practice which is not carried out by the majority of fishers. The timing of its emergence indicates that the moratorium in Brazil led to an increase in the fisheries (and killing of dolphins) in Peru to supply the Colombian market.

Only 4-15% of survey respondents in Loreto reported the piracatinga as their main target species. Local communities do not typically consume this fish and fishing for other species is more profitable. The piracatinga has been sold in Andean towns or exported. Previous investigations have reported an average of  $0.5 \pm 0.1$ t of this fish species landed in Iquitos per year (Garcia *et al.*, 2012).

After the implementation of the piracatinga moratorium in Brazil in 2015, it is believed that Brazilian immigrants introduced this fishery and the use of dolphins as bait into the Marañón and Pucallpa regions. Even in areas with more environmental enforcement such as Iquitos City, there are first hand reports of this practice occurring nearby.



Piracatinga are now exported for Colombian markets and also consumed by the national market.

#### 6.4.1.6 VENEZUELA

The use of boto as bait for the piracatinga fishery was recorded in many villages (26) along the Orinoco in Venezuela with an estimate from official data of a minimum 840 animals taken from 1990-2008 (Diniz, 2012). All piracatinga products have been exported to Colombian markets. There is no evidence of local consumption. Since 2008, no information is available about the Piracatinga trade or dolphin catches in Venezuela. Trade with Colombia is now prohibited but there is no current information on suspected movements of piracatinga products through the black market to Colombia.

#### 6.4.2 Summary

All range countries of botos and tucuxis have laws in place to protect dolphins and prohibit killing them intentionally or through bycatch. Fishing for piracatinga is banned in Brazil on the basis of its impact on botos and other wildlife. Colombia passed a resolution to permanently ban the trade of piracatinga in 2017. This went forward on the basis of public health concerns over the high levels of mercury in the fish. Piracatinga fishing with boto as bait does not occur in Colombia but Colombian demand was driving the practice making this an important measure to assist in the conservation of botos in the overall region. No other range country has taken specific legislative or regulatory action, beyond the general protection of river dolphins, in response to the emergence of the use of botos as bait in the piracatinga fishery.

The practice of using dolphins as bait has moved from country to country with the imposition of restrictions in Brazil and the arrival of traders who encourage fishers to use botos for bait to generate a supply of piracatinga, or in some cases with immigration of Brazilians familiar with the practice.

Fishing for export to Colombia using boto for bait was reported for Brazil, Peru, Bolivia, Ecuador and Venezuela. While the original market for piracatinga was in Colombia, piracatinga is now known to be consumed in the following additional countries – Brazil, Peru, Bolivia and Ecuador. As fishing for export has been introduced into other countries, domestic markets have emerged and the products are often sold under different names to avoid negative associations with piracatinga consumption.

#### 6.5 Recommendations

While this Workshop focused on the impact of the piracatinga fishery it was understood at the outset that the intentional killing of dolphins for bait is only one of the threats the dolphins face in the river basins of South America. Incidental bycatch in fisheries is a threat of equal or greater importance and intentional killing of dolphins in the name of reducing fisheries competition has been reported from several countries. Destruction of the habitat that supports freshwater dolphins is a growing concern. Hydropower development leads to habitat fragmentation, changes in water flows and reductions in fish numbers and species. Pollution, including plastic and other debris, from a wide range of sources degrades habitat and water quality with presumed longer term health effects and, in some cases, multiple deaths from poisoning events.

Domestic and international discussions and priority setting are already taking place among the scientists and government

authorities of the South American river basin countries, focused on river dolphin conservation, including on response to the threat of intentional killing of botos for the piracatinga fishery. Action plans have been finalised and adopted for the conservation of South American river dolphins at regional and national levels that contain detailed and prioritised recommendations. As a first priority the actions in these plans should be implemented and funded. Basic research on abundance and trends of cetaceans and fishery and trade studies on the piracatinga fishery are of particular importance.

In order to better elucidate the status of river dolphins in the Amazon and Orinoco basins and the past and current impact of the piracatinga fishery, the Workshop participants recommended that work proceed in the following general areas.

#### 6.5.1 Research on the piracatinga fisheries and the location and severity of threats to dolphins (mapping and documentation)

Conduct studies focused on areas of known or recent fisheries using boto as bait and new areas where the practice is unknown. At the local scale this will involve continued efforts to document fishing in boto habitat based on the presence of traps typical of piracatinga fishing, landings of piracatinga and other evidence. Physical market evidence should be gathered, as part of enforcement or civil society efforts, in larger towns where fish processing facilities are located. Freezer surveys and sampling at markets, using available ID guides for identifying fish species and processed fillets, can be particularly valuable in identifying illegal sources and illegal trade. Such studies should extend to more distant domestic markets and in cooperation with foreign authorities to international markets.

#### 6.6 Specific recommendations

- Identify and specify the products of piracatinga that are falsely labelled as other products (e.g. the label douradinha or surubim) and work to require clear labelling so consumers are aware of what they are buying. This may require work at the inter-ministerial level on product labelling to clarify. Investigate whether there are requirements or other means to put the species name on such products.
- Use government monitoring and enforcement and other databases to provide data and information on source areas for fish arriving in urban or international markets.
- Enhance understanding of the characteristics of piracatinga, the fishery and the products thereof (using genetics, stable isotopes and other tools) to identify differences between populations and localities and enhance the traceability of whole fish and parts.
- Conduct socio-economic research to identify the significance of the piracatinga fishery to local people.

#### 6.6.1 Research on taxonomic status

It is very important to elucidate the taxonomic status of *Inia* to identify the genetic units for conservation management and generate the corresponding evaluations and categorisation of the threat status for the IUCN.

#### 6.6.2 Research on abundance and trends of river dolphins

Continuation and expansion of research to document abundance and trends of dolphins in the South American river basins should be a high priority. There are severe methodological and resource challenges to conducting

standardized and comparable surveys and monitoring over the vast areas of the region and in each country. Such research should be designed to provide basic data as well as the capability to evaluate population response to threats or measures to reduce them, in particular the use of dolphins for bait in the piracatinga fishery. Participants agreed that the five-year period of the Brazilian moratorium is not long enough to assess its impact on reducing mortality of dolphins.

### 6.7 Specific recommendations

- Continue the moratorium on the piracatinga fishery in Brazil to allow sufficient time to evaluate the effectiveness of protective measures and continue necessary protection of dolphins.
- Trend and abundance surveys should be continued or initiated in areas where the methodology has already been standardized and in areas of particular concern with respect to deliberate killing of dolphins for use as bait in the Piracatinga fishery (e.g. Purús, Japurá, etc.).
- Monitoring programs should be designed taking into consideration the statistical power to detect patterns and trends over the medium and long-term.
- Consolidate and evaluate historical data in order to compare historical and current conditions and consider whether repetition of earlier studies can provide insights in to current trends.
- Strengthen research capacities at the regional level and promote the standardisation of methodologies and the incorporation of new technologies (drones, satellite tracking) to understand key aspects of these species biology, at population, behavioral, habitat use, acoustic and other levels.

#### 6.7.1 Legal measures

While legal measures are in place to some degree in all countries, means to strengthen these and build the effectiveness of enforcement should be pursued.

### 6.8 Specific recommendations

- Review the laws that include the use of wildlife and protection of cetaceans and enhance enforcement under the existing laws and action plans. Consider the need for more specific laws concerning the deliberate killing for use as bait in the piracatinga fishery.
- Take measures to increase the effectiveness of deterrence against illegal activities including by increasing criminal and civil penalties for engaging in activities that result in the killing of dolphins.
- Consider the specific circumstances of border regulations and the effectiveness of policies and border agreements governing the transboundary movement of fish.
- Encourage governments to be aware of these fisheries and the dangers they present to dolphin populations, and study the necessity of legislative action to ban such fisheries in these countries.

#### 6.8.1 General enforcement

- Encourage governments at all levels to support and enhance enforcement effort. Focus trade enforcement efforts on the freezing plants and other areas or facilities identified as key bottlenecks of the trade.
- Engage in targeted enforcement on the river directed at fishing activities meeting the characteristics of this illegal fishery.
- Enhance fishery laws and controls.

### 6.9 Specific recommendations

- Develop and review the fishery management plans for regions and countries to encourage sustainable legal fisheries in the Amazon and avoid the emergence of such unsustainable practices and cetacean interactions in the future.
- Recognising the difficulties and shortfalls in characterising the fisheries species of the Amazon, encourage governments to work together to increase scientific understanding of fisheries and develop a single regional sustainable fisheries management plan for the Amazon.

#### 6.9.1 Outreach and public awareness

While legal measures are in place in most of the range countries, the level of awareness of the basic existence of freshwater cetaceans, the understanding of the prohibitions in place and the impact of intentional take is low.

### 6.10 Specific recommendations

- Build public awareness, education, communication and outreach to communities both in the areas where fisheries take place and in the areas where piracatinga products may be processed or consumed. Target messages to specific sectors, such as fishermen and fishermen's associations, traders, consumer's etc.
- Provide information on the conservation implications for the dolphins of their use as bait.
- Provide information on the potential health risks of consuming mercury contaminated fish.

#### 6.10.1 International cooperation

The current Workshop is an outcome of previous deliberations of the IWC Scientific Committee and its sub-committee on Small Cetaceans. Previous IWC/SC recommendations expressed concerns over the decline in dolphin populations as a result of the use of dolphins and bait in the piracatinga fishery and encouraged collaboration among the range states and regular reporting to the IWC/SC on this matter.

### 6.11 Specific recommendations

- The Workshop reiterates and expands on previous IWC/SC recommendations that range states engage in bilateral and multilateral discussions of legislative, enforcement, management and scientific efforts to ensure effective cooperation among them.
- The Workshop recommends that range state authorities work together to exchange information on the movement of products across international borders.

#### 6.11.1 Additional recommendations related to the larger range-wide distribution and threats

- Assess the magnitude and impact of all existing threats on dolphins and their habitats. It must move from the descriptive to the quantitative in order to make appropriate conservation decisions and at an appropriate scale.
- Evaluate the threat status of *Sotalia* taking into account that it shares most of the same threats as *Inia*.
- Evaluate the dolphins that currently inhabit areas of hydropower dams, or whose populations are fragmented and exposed to habitat degradation and genetic change, as in the case of the Tocantins River.
- Analyze the population size and population trends of *Inia geoffrensis* and *Sotalia guianensis* during the mega Project 'Arco Minero del Orinoco' in the Orinoco River basin.

- Strengthen networks of work between researchers and organisations and create a regional strategy for the conservation of river dolphins.

## 7. COOPERATION WITH OTHER ORGANISATIONS

The importance of collaboration with other international organisations is well recognised and encouraged on many issues that the IWC SC tackles. On the issue of poorly documented takes of small cetaceans for food and non food purposes, IWC and the Aquatic Mammal Working Group (AMWG) of the Convention on Migratory Species (CMS) have been coordinating efforts since 2014. In 2018 this collaboration led to a new cross-taxa approach to aquatic wild meat that provides a platform for a strengthened and coordinated approach between the CMS Scientific Council and the IWC SC. During CMS 12th Conference of the Parties (CoP) (October 2017) governments formally recognised aquatic wildmeat as a significant and immediate threat to at least 33 CMS-listed aquatic species—cetaceans, sirenians, turtles and crocodiles. At this meeting, a new cross-taxa Aquatic Wild Meat Working Group was established, within the structure of the CMS Scientific Council, which includes members of the IWC Scientific Committee as well as representatives from other conventions. The working group aims; to establish an online knowledge base on aquatic wild meat relating to CMS-listed cetaceans, sirenians, turtles and crocodiles; collaborate with the IWC and participate in IWC meetings with a focus on aquatic wildmeat; input aquatic wildmeat information to the Abidjan Convention Endangered, Threatened or Protected Coastal and Marine Species Action Plan; and serve as an expert resource for CMS Parties and the CMS Secretariat about aquatic wild meat issues.

The Working Group will also develop an aquatic wild meat action plan which will include information gathered during the IWC series of workshops on aquatic wild meat and small cetaceans. The Working Group will also work closely with regional CMS agreements for dugongs, marine turtles, water birds, and marine mammals. The Working Group will formally present its activities to each CMS Scientific Council meeting and at the IWC Scientific Committee, providing a consistent platform for a science/policy interface on this important issue.

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## Annex A

### List of Participants

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## Annex B

### Agenda

1. Introductory items
2. Opening remarks
  - a. Appointment of Rapporteurs
3. Presentation of the Workshop goals and outcomes of previous workshop
4. Poorly documented takes of small cetaceans globally and in South America
  - a. Introduction
  - b. Country reports
  - c. Argentina
  - d. Bolivia
  - e. Brazil
  - f. Chile
  - g. Colombia

- h. Costa Rica
- i. Ecuador
- j. Peru
- k. Uruguay
- l. Venezuela
- m. French Guiana, Guyana and Suriname
- 5. Data gaps
- 6. Tools for investigating and understanding wildmeat issues
  - a. Analyse techniques to determine regional drivers, scale and impacts of exploitation
  - b. Data collection tools and techniques
- 7. Recommendations
- 8. Overview: status of Amazon dolphins
- 9. Status of Amazon dolphins used as bait in the Piracatinga fisheries
- a. Bolivia
- b. Brazil
- c. Colombia
- d. Ecuador
- e. Peru
- f. Venezuela
- 10. Summary of proposed and existing management actions and their effectiveness
  - a. Bolivia
  - b. Brazil
  - c. Colombia
  - d. Ecuador
  - e. Peru
  - f. Venezuela
- 11. Recommendations
- 12. Governing legislation and management mechanisms

## Annex C

### List of Documents

SC/M18/SAW01. Elizabeth Campbell. Country Report for Peru.

SC/M18/SAW02. Fernando Felix. Country Report for Ecuador.

SC/M18/SAW03. Enrique Crespo and Pablo Bordino. Country Report for Argentina.

SC/M18/SAW04. Cecilia Passadore. Country Report for Uruguay.

SC/M18/SAW05. Fernando Trujillo and Isabel C. Avila. Country Report for Colombia.

SC/M18/SAW06. S. Siciliano and Renata Emin-Lima. How cetaceans are used along the Eastern Amazon coast: two contrasting situations.

SC/M18/SAW07. Enzo Aliaga Rossel. Country Report for Bolivia.

SC/M18/SAW08. Cristina Castro A., Diana Cardenas and Gregory Kaufman. First records of marine mammal takes in fisheries on the Ecuadorian Continental Coast.

SC/M18/SAW09. Javier Rodriguez. Country Report for Costa Rica.

SC/M18/SAW10. Vera M F da Silva, Angelica C G Nunes, Louzamira F B de Araujo, Jacqueline S. Batista, Haydee Cunha, Tony Martin. The use of Amazonian dolphins (*Inia* and *Sotalia*) as bait for the piracatinga fishery.

SC/M18/SAW11. Yurasi Briceno. Report of aquatic wildmeat: Venezuela.

SC/M18/SAW12. Vera M.F. da Silva, Carlos E.C. Freitas, Rodrigo de L. Dias and Anthony R. Martin. Both cetaceans in the Brazilian Amazon show sustained, profound population declines over two decades.

SC/M18/SAW13. Salvatore Siciliano, Ana Carolina Meirelles, Fabia Luna, Adriana Vieira de Miranda, Pedro Fruet and Vera Maria Ferreira da Silva. Country Report for Brazil: coastal section.

## Annex D

### Forensic Testing for Cetacean Meat

‘Love charms’ that allegedly contained boto flesh were purchased from local markets in Santos, Brazil, during the Workshop. Four were tested for the presence of cetacean DNA using the rapid test kit developed by Chan *et al* (2016).

#### REFERENCE

Chan, K.W., Lo, C., Chu, C.S., Chin, L.T., Wang, Y.T. and Yang, W.C., 2016. Development of a colloidal gold-based immunochromatographic test strip for detection of cetacean myoglobin. *J. Vis. Exp.* p113. [p.e53433].



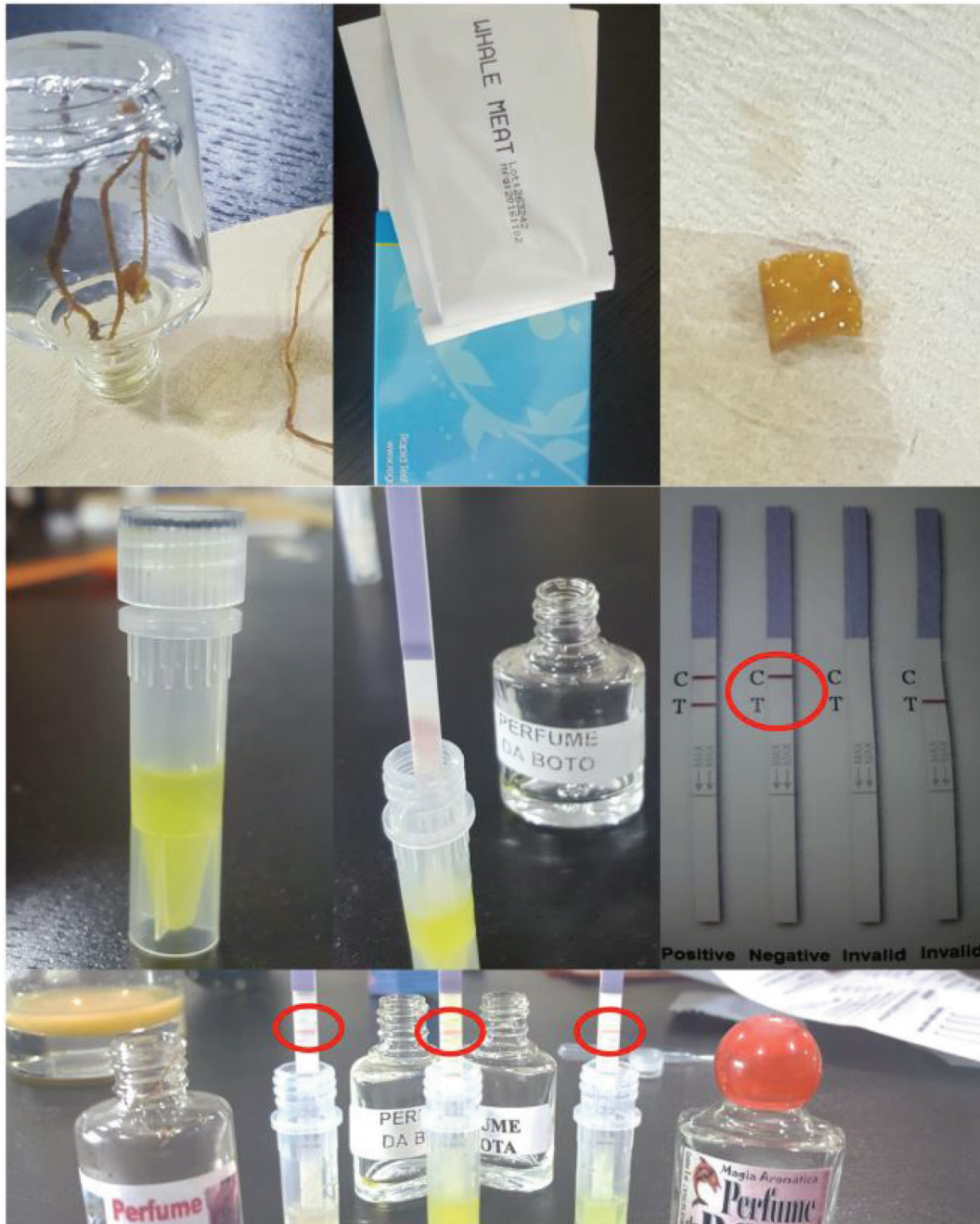


Fig. 1. Testing flesh samples found in 'boto perfume': (a) remove sample; (b) prepare test kit; (c) thoroughly rinse alcohol from sample; (d) macerate sample in the buffer from kit; (e) insert test strip; (f) lines will appear and negative test is single line at 'C'; and (g) all three perfumes tested are negative for cetacean DNA.

## Annex E

### Study Objectives, Appropriate Data Collection Methods and Suggested Analyses

#### RECOMMENDED DATA REQUIREMENTS

1. Data on take of wild meat
  - 1.1. What are the genera/species/subspecies is taken?
  - 1.2. How many individuals are taken?
  - 1.3. What is the location of the take?
  - 1.4. When does the take occur?

- 1.5. What body part is used?

- 1.5.1. Meat
- 1.5.2. Fins/tail
- 1.5.3. Blubber
- 1.5.4. Oil
- 1.5.5. Genitalia

- 1.5.6. Tooth
- 1.5.7. Others
- 1.6. For what use is it taken?
  - 1.6.1. Medicinal / zootherapeutics
  - 1.6.2. Aphrodisiac?
  - 1.6.3. Bait
  - 1.6.4. Food
  - 1.6.5. Religious / customary
    - 1.6.5.1. Taboos
  - 1.6.6. Boat maintenance
  - 1.6.7. Hand crafts (decoration, ornamental)
  - 1.6.8. Cosmetics (personal beauty)
  - 1.6.9. Gift
  - 1.6.10. Others
- 1.7. Who takes the wild meat?
  - 1.7.1. Migrants
    - 1.7.1.1. Age
    - 1.7.1.2. National
    - 1.7.1.3. Regional
  - 1.7.2. Locals (?) / indigenous
  - 1.7.3. Industry workers
  - 1.7.4. Religious groups
  - 1.7.5. Tourists
  - 1.7.6. Non-conformist cultures
  - 1.7.7. Non-nationals
- 1.8. Who is the end user?
  - 1.8.1. Personal use
  - 1.8.2. Family / neighbours
  - 1.8.3. Local settlement / market
  - 1.8.4. National market
  - 1.8.5. International market
- 1.9. What is the value of the animals or their derivatives?
  - 1.9.1. Price per kg / carcass
    - 1.9.1.1. At each stage (hunter, intermediate, market sale)
  - 1.9.2. Cultural / social value (?)
- 1.10. How was the animal obtained? (Robarts and Reeves 2011)
  - 1.10.1. Non-target salvage bycatch
  - 1.10.2. Non-target salvage stranding
  - 1.10.3. Non-target deliberate stranding
  - 1.10.4. Non-target deliberate bycatch
  - 1.10.5. Targeted opportunistic
  - 1.10.6. Targeted direct
- 1.11. What method was used to obtain wild meat
  - 1.11.1. Harpoon
  - 1.11.2. Gill net
  - 1.11.3. Long-line
  - 1.11.4. Strandings
  - 1.11.5. Machete / baton
  - 1.11.6. Guns
  - 1.11.7. Poison
  - 1.11.8. Dynamite
- 1.12. Individual information on animals taken
  - 1.12.1. Sex
  - 1.12.2. Age (class)
  - 1.12.3. Body length / measurements
  - 1.12.4. Body mass
  - 1.12.5. Tissue / blood samples
  - 1.12.6. Stomach contents
2. Data on the motivations or reasons for take / use?
  - 2.1. Socio-economic drivers
  - 2.2. Opportunity
  - 2.3. Environmental (change in it)
  - 2.4. Cultural / religious
  - 2.5. Others

3. What is the perception of fishermen to cetaceans?
4. Data on the species
  - 4.1. Distribution (endemism / cosmopolitan)
  - 4.2. Abundance (relative or metrics thereof) of the species
  - 4.3. Demographic parameters of the unit (e.g. survival, migration routes)
  - 4.4. Residency / transient
  - 4.5. Conservation status (IUCN, national and regional lists, CITES, CMS)
  - 4.6. Structure and composition of the threatened/ impacted unit (connectivity, genetics)
  - 4.7. Behaviour (habituation etc.)

#### RECOMMENDED METHODS TO OBTAIN THE DATA

5. Methods used
  - 5.1. Interview
  - 5.2. Community survey
    - 5.2.1. Cultural items
  - 5.3. Market survey
  - 5.4. On-board observer
  - 5.5. Opportunistic records
  - 5.6. Literature review / meta-analyses
  - 5.7. Fisher records (log book)
  - 5.8. Authorities reports (landings)
  - 5.9. Seizures / law enforcement
  - 5.10. Museum collections
  - 5.11. Proxies
    - 5.11.1. Bait counting methods (e.g. Piracatinga boxes)
    - 5.11.2. Hunting signs
    - 5.11.3. Permanent fishing gear (fences, Fish Attract Device [FAD])
    - 5.11.4. Damage to net gear
    - 5.11.5. Carcass survey
    - 5.11.6. Bone survey
    - 5.11.7. Strandings (?)
    - 5.11.8. Behavioural changes
    - 5.11.9. Fishermen's perceptions (?)
  - 5.12. Source of information
    - 5.12.1. Interview 1<sup>st</sup> hand
    - 5.12.2. Anecdotal
      - 5.12.2.1. Personal observation – direct informant
    - 5.12.3. Published (peer reviewed)
    - 5.12.4. Grey literature
      - 5.12.4.1. Federal agencies
    - 5.12.5. Databanks
    - 5.12.6. Social media
  - 5.13. Quality of data
    - 5.13.1. Survey effort
      - 5.13.1.1. Area surveyed
      - 5.13.1.2. Length of survey
      - 5.13.1.3. Season
    - 5.13.2. Surveyor
      - 5.13.2.1. Citizen science
      - 5.13.2.2. Parabiologist / trainee / technician / community researcher
6. Analysis
  - 6.1. Is the data comparable?
  - 6.2. Which species are taken?
  - 6.3. Assess data needs (e.g. power analyses)
  - 6.4. What is the distribution of the take (spatial extend)?
  - 6.5. What is the change over time?

- 6.6. What is the magnitude of the take?  
 6.7. Evaluation of risk? (overlap of human activities and species occurrence)

- 6.8. Vulnerability of the species  
 6.9. Extrapolation to other communities (people per location)

# DATA COLLECTION REQUIREMENTS FOR THE SYSTEMATIC REVIEW OF REGIONAL AND GLOBAL TRENDS IN AQUATIC WILDMeat USE

| Category                        | Data Type                             | Unit                        | Categories                                                                                                                                                                    |
|---------------------------------|---------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Take                            | Taxonomic group                       |                             |                                                                                                                                                                               |
|                                 | Number taken                          | Individuals, biomass, items |                                                                                                                                                                               |
|                                 | Location of take                      |                             |                                                                                                                                                                               |
|                                 | Time of take                          |                             |                                                                                                                                                                               |
|                                 | Body part used                        | Carcass, biomass, items     | Meat<br>Fins/tail<br>Blubber<br>Oil<br>Genitalia<br>Teeth<br>Other                                                                                                            |
|                                 | Use of take                           |                             | Medicinal<br>Bait<br>Food<br>Religious / customary (inc. taboos)<br>Handicrafts (decoration, ornamentation)<br>Maintenance (e.g. boat)<br>Cosmetics<br>Gift<br>Other          |
|                                 | Target category                       |                             | Non-target salvage bycatch<br>Non-target salvage stranding<br>Non-target deliberate bycatch<br>Non-target deliberate stranding<br>Targeted opportunistic<br>Targeted directed |
|                                 | Acquisition method                    |                             | Harpoon<br>Gill-net<br>Long-line<br>Stranding<br>Machete<br>Guns<br>Poison<br>Dynamite<br>Other                                                                               |
|                                 |                                       |                             |                                                                                                                                                                               |
|                                 |                                       |                             |                                                                                                                                                                               |
| Individual animal information   | Age category                          |                             | Calf<br>Juvenile<br>Sub-adult<br>Adult                                                                                                                                        |
|                                 | Sex                                   |                             |                                                                                                                                                                               |
|                                 | Body mass                             |                             |                                                                                                                                                                               |
|                                 | Body length                           |                             |                                                                                                                                                                               |
|                                 | Tissue/blood taken                    |                             | Y/N                                                                                                                                                                           |
|                                 | Stomach contents taken                |                             | Y/N                                                                                                                                                                           |
| Acquisitioner information (who) | Group                                 |                             | Non-local<br>Local                                                                                                                                                            |
|                                 | Age category                          |                             | <20, 20-30,30-40...                                                                                                                                                           |
|                                 | Occupation                            |                             | Industry worker<br>Handicraftsmen<br>Fisher                                                                                                                                   |
|                                 | Tourist                               |                             | Y, N                                                                                                                                                                          |
|                                 | Cultural /religious group             |                             | [Categories]                                                                                                                                                                  |
|                                 | Motivation                            |                             | Economic<br>Cultural<br>Opportunistic<br>Environmental<br>Others                                                                                                              |
|                                 | Perception of cetaceans               |                             | Like<br>Dislike                                                                                                                                                               |
|                                 | Perceived pop trends                  |                             | Increase<br>Decrease<br>Static                                                                                                                                                |
|                                 |                                       |                             |                                                                                                                                                                               |
|                                 | Perceived changes in animal behaviour |                             |                                                                                                                                                                               |
|                                 |                                       |                             |                                                                                                                                                                               |



| Category                    | Data Type                             | Unit                      | Categories                          |
|-----------------------------|---------------------------------------|---------------------------|-------------------------------------|
| End user                    | Group                                 |                           | Acquisitioner (personal)            |
|                             |                                       |                           | Family/neighbours                   |
|                             |                                       |                           | Local settlement (people or market) |
|                             |                                       |                           | National market                     |
|                             |                                       |                           | International market                |
|                             | Age category                          |                           | <20, 20-30,30-40...                 |
|                             | Occupation                            |                           | [Categories]                        |
|                             | Tourist                               |                           | Y, N                                |
|                             | Cultural /religious group             |                           | [Categories]                        |
|                             | Motivation                            |                           | Economic                            |
|                             |                                       |                           | Cultural                            |
|                             |                                       |                           | Opportunistic                       |
|                             |                                       |                           | Environmental                       |
|                             | Others                                |                           |                                     |
| Perception of cetaceans     | Like                                  |                           |                                     |
|                             | Dislike                               |                           |                                     |
| Perceived population trends | Increase                              |                           |                                     |
|                             | Decrease                              |                           |                                     |
|                             | Static                                |                           |                                     |
|                             | Perceived changes in animal behaviour |                           |                                     |
| Survey information          | Time of study                         | Number of fishers         |                                     |
|                             | Effort                                |                           |                                     |
|                             |                                       | Distance surveyed         |                                     |
|                             | Location                              |                           |                                     |
|                             | Surveyor                              | Scientist                 |                                     |
|                             |                                       | Local                     |                                     |
|                             | Source                                | Interview                 |                                     |
|                             |                                       | Anecdote                  |                                     |
|                             |                                       | Published (peer-reviewed) |                                     |
|                             |                                       | Theses                    |                                     |
| Grey Literature             |                                       |                           |                                     |
|                             | Database                              |                           |                                     |
|                             | Social media                          |                           |                                     |
| Site level information      | Seasonality of take                   |                           |                                     |
|                             | Site population                       |                           |                                     |
|                             | Historic use                          |                           |                                     |
| Value                       | Price                                 | Currency per unit         |                                     |
|                             | Price stage                           |                           |                                     |
|                             |                                       |                           | Local, intermediary, market         |
| Importance to community     | Cultural                              |                           | High                                |
|                             |                                       |                           | Medium                              |
|                             |                                       |                           | Low                                 |
|                             | Food                                  |                           | [Categories]                        |
|                             | Cash                                  |                           | [Categories]                        |
|                             | Economic                              | [Categories]              |                                     |

## Annex F

### Database of Collated Information and Expert Knowledge on the Use of Small Cetaceans for Wildmeat Purposes in South America

[illegible]

[illegible]

| Scientific name code | Location     |                            | Region | Time    |                    | Use   |       |                                                |       |       |       | Source animals |       |                                                |       |       | Information source |       |       |                                                |       |       |       |       | Who takes the wildmeat |                                                |       |       |       | Consumer, end user |       |                                                | Cause for concern | Comment | Submitters |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                        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  |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |
|----------------------|--------------|----------------------------|--------|---------|--------------------|-------|-------|------------------------------------------------|-------|-------|-------|----------------|-------|------------------------------------------------|-------|-------|--------------------|-------|-------|------------------------------------------------|-------|-------|-------|-------|------------------------|------------------------------------------------|-------|-------|-------|--------------------|-------|------------------------------------------------|-------------------|---------|------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------|-------|-------|-------|-------|-------|
|                      |              |                            |        | Ongoing | Period of activity | Use   |       |                                                |       |       |       | Source animals |       |                                                |       |       | Information source |       |       |                                                |       |       |       |       | Who takes the wildmeat |                                                |       |       |       | Consumer, end user |       |                                                |                   |         |            |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |                                                |       |       |       |       |       |
|                      | Country code | Ocean and river basin code |        |         |                    | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia          | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia              | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará                  | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia              | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará |                   |         |            | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará | Amazonas, Roraima, Rondônia, Acre, Amapá, Pará | Ceará | Amapá | Bahia | Bahia | Ceará |



| Scientific name code | Country code | Location              |                     | Time    |                    | Use |   | Source animals |   |   |   |   | Information source |   |   |   | Who takes the wildmeat |   |   | Consumer, end user |   |      | Cause for concern                                                                                                                        | Comment | Submitters |
|----------------------|--------------|-----------------------|---------------------|---------|--------------------|-----|---|----------------|---|---|---|---|--------------------|---|---|---|------------------------|---|---|--------------------|---|------|------------------------------------------------------------------------------------------------------------------------------------------|---------|------------|
|                      |              | Ocean and river basin | Region              | Ongoing | Period of activity |     |   |                |   |   |   |   |                    |   |   |   |                        |   |   |                    |   |      |                                                                                                                                          |         |            |
|                      |              |                       |                     |         |                    |     |   |                |   |   |   |   |                    |   |   |   |                        |   |   |                    |   |      |                                                                                                                                          |         |            |
| SLON                 | BR           | ATL                   | Ceará               | X       | 1990-2018          | X   | X | X              | X | X | X | X | X                  | X | X | X | X                      | X | X | X                  | X | X    | NO                                                                                                                                       |         |            |
| SGUI                 | BR           | ATL                   | Rio Grande do Norte | X       | 1990-2018          | X   | X | X              | X | X | X | X | X                  | X | X | X | X                      | X | X | X                  | X | UNKN |                                                                                                                                          |         |            |
| SGUI                 | BR           | ATL                   | Rio de Janeiro      |         | 1980-2005          |     | X |                |   |   |   |   |                    |   |   | X | X                      | X | X | X                  | X | NO   | The use of dolphin for shark fishery has stopped around 2005.                                                                            |         |            |
| SGUI                 | BR           | ATL                   | Piauí               | X       | 2000-2018          | X   | X | X              | X | X | X | X | X                  | X | X | X | X                      | X | X | X                  | X | UNKN |                                                                                                                                          |         |            |
| SGUI                 | BR           | ATL                   | Pará, Marajó Island | X       | 1990-2018          |     | X | X              | X | X | X | X | X                  | X | X | X | X                      | X | X | X                  | X | YES  | Carcasses of bycatch specimens intensely used for multiple purposes, protected species, population size unknown, law enforcement needed. |         |            |
| SGUI                 | BR           | ATL                   | Pará                |         | 1970-1985          |     | X | X              | X | X | X | X | X                  | X | X | X | X                      | X | X | X                  | X | YES  | Past harpooning practice could have depleted local populations.                                                                          |         |            |
| SGUI                 | BR           | ATL                   | Northeast Pará      | X       | 1990-2018          | X   | X | X              | X | X | X | X | X                  | X | X | X | X                      | X | X | X                  | X | YES  | Carcasses of bycatch specimens intensely used for multiple purposes, protected species, population size unknown, law enforcement needed. |         |            |
| SGUI                 | BR           | ATL                   | Maranhão            | X       | 2004-2006          | X   | X | X              | X | X | X | X | X                  | X | X | X | X                      | X | X | X                  | X | YES  | Carcasses of bycatch specimens intensely used for multiple purposes, protected species, population size unknown, law enforcement needed. |         |            |

| Scientific name code | Country code | Location                   |                     | Time    |                    | Use |   | Source animals |  |  |   |  | Information source |              |           |              | Who takes the wildmeat |        |          | Consumer, end user |       |          | Cause for concern | Comment                                                                                                                      | Submitters |
|----------------------|--------------|----------------------------|---------------------|---------|--------------------|-----|---|----------------|--|--|---|--|--------------------|--------------|-----------|--------------|------------------------|--------|----------|--------------------|-------|----------|-------------------|------------------------------------------------------------------------------------------------------------------------------|------------|
|                      |              | Ocean and river basin code | Region              | Ongoing | Period of activity |     |   |                |  |  |   |  | Direct observation | Direct comm. | Anecdotal | Social media | Scientific             | Locals | Migrants | Transient          | Local | National | International     |                                                                                                                              |            |
| <i>CEUT</i>          | CH           | PAC                        | Magellan region     |         | 2-1990             | X   | X |                |  |  |   |  |                    |              |           |              | X                      |        |          |                    | X     |          | NO                |                                                                                                                              | SEPÚ       |
| <i>CEUT</i>          | CH           | CEN                        | Maule - Los Lagos   | X       |                    | X   |   |                |  |  |   |  | X                  | X            |           |              |                        | X      |          |                    | X     |          | UNKN              |                                                                                                                              | SEPÚ       |
| <i>CCOM</i>          | CH           | PAC                        | Magellan region     |         | 1970-1990          | X   | X |                |  |  |   |  |                    |              |           |              | X                      |        |          |                    | X     | X        | NO                |                                                                                                                              | SEPÚ       |
| <i>ZCAV</i>          | BR           | ATL                        | Rio Grande do Norte |         | 2000               |     | X |                |  |  |   |  |                    |              |           |              | X                      |        |          |                    |       |          | NO                | Opportunistic use.                                                                                                           | SICI       |
| <i>ZCAV</i>          | BR           | ATL                        | Bahia               |         | 2005               |     |   |                |  |  | X |  | X                  |              |           |              |                        |        |          |                    |       |          | NO                | Opportunistic use.                                                                                                           | SICI       |
| <i>TTRU</i>          | BR           | ATL                        | Pernambuco          | X       | 1990-2018          | X   | X |                |  |  |   |  | X                  | X            |           |              | X                      | X      |          |                    | X     |          | NO                |                                                                                                                              | MERE       |
| <i>TTRU</i>          | BR           | ATL                        | Ceará               | X       | 1990-2018          | X   | X |                |  |  |   |  | X                  | X            |           |              | X                      | X      |          |                    | X     |          | NO                |                                                                                                                              | MERE       |
| <i>TTRU</i>          | BR           | ATL                        | Bahia               | X       | 1990-2018          | X   | X |                |  |  |   |  | X                  | X            |           |              | X                      | X      |          |                    | X     |          | NO                |                                                                                                                              | MERE       |
| <i>TTRU</i>          | BR           | ATL                        | Bahia               | X       | 2010-2018          |     | X |                |  |  |   |  |                    |              |           |              | X                      |        |          |                    | X     |          | YES               | Intentional and incidental catches reported, populations are probably resident and relatively small, law enforcement needed. | SICI       |



[illegible]



| Scientific name code | Country code | Location |                                        | Time    |                    | Use |  | Source animals |  |  |  |  | Information source |  |  |  | Who takes the wildmeat |  |  | Consumer, end user |  |  | Cause for concern | Comment                                                                                                      | Submitters |
|----------------------|--------------|----------|----------------------------------------|---------|--------------------|-----|--|----------------|--|--|--|--|--------------------|--|--|--|------------------------|--|--|--------------------|--|--|-------------------|--------------------------------------------------------------------------------------------------------------|------------|
| SATT                 | EC           | PAC      | Region                                 | Ongoing | Period of activity |     |  |                |  |  |  |  |                    |  |  |  |                        |  |  |                    |  |  |                   |                                                                                                              |            |
|                      |              |          |                                        |         |                    |     |  |                |  |  |  |  |                    |  |  |  |                        |  |  |                    |  |  |                   |                                                                                                              |            |
| <i>SATT</i>          | EC           | PAC      | Puerto López, south Manabí             | X       | 2012               |     |  |                |  |  |  |  |                    |  |  |  |                        |  |  |                    |  |  | YES               | Information from SM/M18/SAW08 using cetaceans as bait in Fish Aggregation Devices (FAD).                     | CAST       |
| <i>IGEO</i>          | EC           | AMA      | Cuyabeno, Napo, Yasuni, Aguarico       | X       | 1995-2016          |     |  |                |  |  |  |  |                    |  |  |  |                        |  |  |                    |  |  | YES               | Occasional bycatch, not quantified, but may be important in a region with low river dolphins density values. | TRU, UTRE  |
| <i>GMAC</i>          | EC           | PAC      | Puerto López, south Manabí             | X       | 2016               |     |  |                |  |  |  |  |                    |  |  |  |                        |  |  |                    |  |  | YES               | Information from SM/M18/SAW08 using cetaceans as bait in Fish Aggregation Devices (FAD).                     | CAST       |
| <i>GMAC</i>          | EC           | PAC      | Cojimies, north of Manabí              | X       | 2016               |     |  |                |  |  |  |  |                    |  |  |  |                        |  |  |                    |  |  | YES               | Information from SM/M18/SAW08 using cetaceans as bait in Fish Aggregation Devices (FAD).                     | CAST       |
| <i>DDEL</i>          | EC           | PAC      | Puerto López, south Manabí             | X       | 2016               |     |  |                |  |  |  |  |                    |  |  |  |                        |  |  |                    |  |  | YES               | Information from SM/M18/SAW08 using cetaceans as bait in Fish Aggregation Devices (FAD).                     | CAST       |
| <i>TTRU</i>          | CR           | PAC      | Provinces of Guanacaste and Puntarenas | X       | 2000-2018          |     |  |                |  |  |  |  |                    |  |  |  |                        |  |  |                    |  |  | YES               | Situation continues and possibly growing, and started with the beginning of shark finning in the region.     | RODR       |
| <i>SFRO</i>          | CR           | PAC      | Province of Limón                      | X       | 2008-2018          |     |  |                |  |  |  |  |                    |  |  |  |                        |  |  |                    |  |  | YES               | Situation continues and possibly growing, and started with the beginning of shark finning in the region.     | RODR       |
| <i>SATT</i>          | CR           | PAC      | Province of Puntarenas                 | X       | 2000-2018          |     |  |                |  |  |  |  |                    |  |  |  |                        |  |  |                    |  |  | YES               | Situation continues and possibly growing, and started with the beginning of shark finning in the region.     | Submitters |

| Scientific name code | Country code | Location                   |                                  | Time    |                    | Use |   | Source animals |   |   |   |     | Information source |              |           |              | Who takes the wildmeat |        |          | Consumer, end user |       |          | Cause for concern | Comment                                                                                                                                                                   | Submitters |
|----------------------|--------------|----------------------------|----------------------------------|---------|--------------------|-----|---|----------------|---|---|---|-----|--------------------|--------------|-----------|--------------|------------------------|--------|----------|--------------------|-------|----------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
|                      |              | Ocean and river basin code | Region                           | Ongoing | Period of activity |     |   |                |   |   |   |     | Direct observation | Direct comm. | Anecdotal | Social media | Scientific             | Locals | Migrants | Transient          | Local | National | International     |                                                                                                                                                                           |            |
| IGEO                 | PE           | AMA                        | Caballo Cocha, Bagazán, Requena  | X       | 1990 to 2018       | X   |   | X              | X | X | X | X   | X                  | X            | X         | X            | X                      | X      | X        |                    |       |          | YES               | There are often reports of bycatch in these <b>three strategic</b> areas, but also poisoning of dolphins accounting at least 45 dead dolphins during the last five years. | GILL, TRUJ |
| IGEO                 | PE           | AMA                        | Ucayali                          | X       | 2010-2018          |     | X | X              | X | X | X | UNK | X                  | X            | X         | X            |                        | X      |          |                    | X     |          | YES               | Yes, as is a growing trend.                                                                                                                                               | CAMP       |
| IGEO                 | PE           | AMA                        | Loreto                           | X       | 2010-2018          |     | X | X              | X | X | X | X   | X                  | X            | X         | X            |                        | X      | X        | X                  | X     | X        | YES               | Yes, as is a growing trend. Also locals in case of the cultural use in the Belen market.                                                                                  | CAMP, GILL |
| GGRI                 | PE           | PAC                        | Southern Peru                    |         | 2010               | X   | X |                | X |   | X |     |                    | X            |           | X            | X                      | X      |          |                    | X     | X        |                   |                                                                                                                                                                           | CAMP       |
| DSP                  | PE           | PAC                        | Entire coast                     | X       | 1980-2018          | X   | X | X              | X | X | X | X   |                    | X            |           |              | X                      | X      | X        |                    | X     | X        |                   |                                                                                                                                                                           | CAMP       |
| SGUI                 | FG           | ATL                        |                                  | UNKN    |                    | X   | X |                | X |   |   |     |                    |              |           |              | X                      | X      |          | X                  |       |          | UNKN              |                                                                                                                                                                           |            |
| UNSM                 | EC           | PAC                        | Santa Rosa, Santa Elena          | X       | 2014               |     | X |                | X |   | X |     | X                  |              |           |              | X                      | X      |          |                    |       |          | YES               | Fernando Felix data and report in IWC SM/M18/SAW02.                                                                                                                       | CAST       |
| SFLU                 | EC           | AMA                        | Cuyabeno, Napo, Yasuni, Aguarico | X       | 1995-2016          |     | X | X              | X |   |   |     | X                  |              |           |              | X                      | X      |          |                    |       |          | YES               | Occasional bycatch, not quantified, but may be important in a region with low river dolphins density values.                                                              | TRUJ, UTR  |

| Scientific name code | Country code | Location                   |                                   | Time    |                    | Use |   | Source animals |  |   |  |   | Information source |              |           |              | Who takes the wildmeat |        |          | Consumer, end user |       |          | Cause for concern | Comment                                                                                         | Submitters |
|----------------------|--------------|----------------------------|-----------------------------------|---------|--------------------|-----|---|----------------|--|---|--|---|--------------------|--------------|-----------|--------------|------------------------|--------|----------|--------------------|-------|----------|-------------------|-------------------------------------------------------------------------------------------------|------------|
|                      |              | Ocean and river basin code | Region                            | Ongoing | Period of activity |     |   |                |  |   |  |   | Direct observation | Direct comm. | Anecdotal | Social media | Scientific             | Locals | Migrants | Transient          | Local | National | International     |                                                                                                 |            |
| <i>PBLA</i>          | UY           | ATL                        | Maldonado, Rocha                  | UNKN    | 1970-2016?         | X   |   |                |  |   |  |   | X                  | X            | X         |              |                        | X      |          |                    | X     |          | NO                | Information based on an online (SC_M18_SAW04).                                                  | PASS       |
| <i>SGUI</i>          | SU           | ATL                        |                                   |         |                    |     |   |                |  |   |  |   |                    |              |           |              |                        |        |          |                    |       |          |                   |                                                                                                 |            |
| <i>UNSM</i>          | PE           | PAC                        | Central                           | X       | 2010               | X   |   |                |  |   |  |   |                    |              |           |              | X                      |        |          |                    | X     |          |                   |                                                                                                 |            |
| <i>TTRU</i>          | PE           | PAC                        | Entire coast                      | X       | 1980-2018          | X   |   |                |  |   |  | X |                    | X            | X         |              | X                      | X      | X        |                    | X     |          |                   |                                                                                                 |            |
| <i>SFLU</i>          | PE           | AMA                        | Loreto and Ucayali                | X       | 2010-2018          |     |   |                |  | X |  |   |                    | X            | X         | X            |                        | X      |          |                    | X     |          |                   |                                                                                                 |            |
| <i>SFLU</i>          | PE           | AMA                        | Amazon river, Caballo Cocha       | X       | 1990 to 2018       | X   |   |                |  | X |  |   |                    | X            | X         | X            | X                      | X      | X        |                    |       |          | YES               | Ongoing bycatch.                                                                                | TRUJ       |
| <i>PSP1</i>          | PE           | PAC                        | Entire coast                      | X       | 1970-2018          | X   |   |                |  | X |  |   | X                  | X            | X         |              | X                      | X      | X        |                    | X     |          | YES               | Almost no information available, distinct population.                                           | CAMP       |
| <i>LOBS</i>          | PE           | PAC                        | Entire coast                      | X       | 1970-2018          | X   |   |                |  | X |  |   |                    | X            | X         |              | X                      | X      | X        |                    |       | X        | YES               | Reduction in proportion of landings. Distinct population of dolphins.                           | CAMP       |
| <i>IGEO</i>          | PE           | AMA                        | River Javari (border with Brazil) | X       | 2010-2016          |     | X |                |  |   |  |   | X                  | X            |           |              | X                      | X      | X        |                    |       |          | YES               | There are report of killing of dolphins for piracatinga bait specially from Peruvian fishermen. | MOSQ. TRUJ |

[illegible]



| Scientific name code | Location     |                            | Time                        |         | Use                |      | Source animals |                |          |                    |              |                    | Information source |            |        |          |                        | Who takes the wildmeat |          |                    | Consumer, end user |  |  | Cause for concern | Comment | Submitters |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|                      | Country code | Ocean and river basin code | Region                      | Ongoing | Period of activity | Use  |                | Source animals |          |                    |              | Information source |                    |            |        |          | Who takes the wildmeat |                        |          | Consumer, end user |                    |  |  |                   |         |            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |              |                            |                             |         |                    | Time | Location       | Non-targeted   | Targeted | Direct observation | Direct comm. | Anecdotal          | Social media       | Scientific | Locals | Migrants | Transient              | Local                  | National | International      |                    |  |  |                   |         |            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| TTRU                 | VE           | ATL                        | Margarita Island, northeast | X       |                    | X    |                |                |          |                    |              |                    |                    |            |        |          |                        |                        |          |                    |                    |  |  |                   |         |            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

| Country       | Country abbreviation |
|---------------|----------------------|
| Argentina     | AR                   |
| Brazil        | BR                   |
| Bolivia       | BO                   |
| Chile         | CL                   |
| Colombia      | CO                   |
| Costa Rica    | CR                   |
| Ecuador       | EC                   |
| French Guiana | FG                   |
| Peru          | PE                   |
| Suriname      | SU                   |
| Uruguay       | UY                   |
| Venezuela     | VE                   |

| Submitter                | Submitter short |
|--------------------------|-----------------|
| Ana Carolina Mereilles   | MERE            |
| Cecilia Passadore        | PASS            |
| Cédric Gilleman          | GILL            |
| Cristina Castro          | CAST            |
| Elizabeth Campbell       | CAMP            |
| Enrique Alberto Crespo   | CRES            |
| Enzo Aliaga Rossel       | ROSS            |
| Fernando Trujillo        | TRUJ            |
| Frederico Mosquera       | MOSQ            |
| Gabriel Melo-Santos      | MELO            |
| Isabel Cristina Avila    | AVIL            |
| Javier Rodríguez-Fonseca | RODR            |
| Maritza Sepulveda        | SEPU            |
| Miriam Marmontel         | MARM            |
| Monique Pool             | POOL            |
| Salvatore Siciliano      | SICI            |
| Vera de Silva            | SILV            |
| Victor Utreras           | UTRE            |
| Yurasi Briceño           | BRIC            |

| Ocean and river basin          | Ocean and river basin code |
|--------------------------------|----------------------------|
| Amazon River basin             | AMA                        |
| Atlantic Ocean                 | ATL                        |
| Central                        | CEN                        |
| Madeira River basin            | MAD                        |
| Orinoco                        | ORI                        |
| Pacific Ocean                  | PAC                        |
| Rio de la Plata                | PLA                        |
| Tocantins-Araguaia River basin | TOAR                       |

| Species scientific name             | Scientific name short |
|-------------------------------------|-----------------------|
| <i>Cephalorhynchus commersonii</i>  | CCOM                  |
| <i>Cephalorhynchus eutropia</i>     | CUET                  |
| <i>Delphinus delphis</i>            | DDEL                  |
| <i>Delphinus spp.</i>               | DSP                   |
| <i>Globicephala macrorhynchus</i>   | GMAC                  |
| <i>Grampus griseus</i>              | GGRI                  |
| <i>Inia geoffrensis</i>             | IGEO                  |
| <i>Inia geoffrensis boliviensis</i> | IGBO                  |
| <i>Kogia breviceps</i>              | KBRE                  |
| <i>Kogia sima</i>                   | KSIM                  |
| <i>Lagenodelphis hosei</i>          | LHOS                  |
| <i>Lagenorhynchus australis</i>     | LAUS                  |
| <i>Lagenorhynchus obscurus</i>      | LOBS                  |
| <i>Lissodelphis peronii</i>         | LPER                  |
| <i>Megaptera novaeangliae</i>       | MNOV                  |
| <i>Phocoena spinipinnis</i>         | PSPI                  |
| <i>Physeter macrocephalus</i>       | PMAC                  |
| <i>Pontoporia blainvillei</i>       | PBLA                  |
| <i>Pseudorca crassidens</i>         | PCRA                  |
| <i>Sotalia fluviatilis</i>          | SFLU                  |
| <i>Sotalia guianensis</i>           | SGUI                  |
| <i>Stenella attenuata</i>           | SATT                  |
| <i>Stenella clymene</i>             | SCLY                  |
| <i>Stenella frontalis</i>           | SFRO                  |
| <i>Stenella longirostris</i>        | SLON                  |
| <i>Steno bredanensis</i>            | SBRE                  |
| <i>Tursiops truncatus</i>           | TTRU                  |
| Unidentified small cetacean         | UNSM                  |
| <i>Ziphius cavirostris</i>          | ZCAV                  |