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CMP South America River Dolphins

Goverments of Brazil, Colombia, Peru and Ecuador

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CMP Nomination Template of a Conservation Management Plan for Amazon, Orinoco and Tocantins-Araguaia river dolphins (*Inia geoffrensis, Inia boliviensis, Inia araguaiaensis and Sotalia fluviatilis*)

This Nomination was prepared by governments of Colombia, Brazil, Ecuador and Peru

Scientists involved Fernando Trujillo, Enzo Aliaga, Vera Da Silva, Miriam Marmontel, Waleska Gravena, Mariana Paschoalini, Marcelo Oliveira da Costa, Paul Van Damme, Verônica A. Barros, Victor Utreras, Cedric Gilleman, Saulo Usma, Vania Tejada, Jessica Pacheco and Fernando Felix.

May 2020




Annex 2 – CMP Nomination Template Nomination of a Conservation Management Plan for Amazon, Orinoco and Tocantins-Araguaia river dolphins (*Inia geoffrensis, Inia boliviensis, Inia araguaiaensis and Sotalia fluviatilis*)

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Scientific Rationale for a CMP

(a) Information on the cetacean population(s)

Inia geoffrensis

Taxonomy and species distribution

There is no consensus about the taxonomy of the genus *Inia*. The Society for Marine Mammalogy's Committee on Taxonomy (2017) only recognizes one species in the genus, *Inia geoffrensis*, the Amazon River Dolphin, with two subspecies: *I. g. boliviensis* (d' Orbigny 1834), the Bolivian Bufeo, and *I. g. geoffrensis* (Blainville 1817), the Boto. The Bolivian Bufeo occurs in the Iténez-Guaporé, Mamoré, and Rio Grande river basins in Bolivia (Tavera *et al*. 2010) and along almost the entire length of the Madeira River in Brazil (Gravena *et al*. 2014a,b, 2015). The boto occurs in the Amazon basin and tributaries of Brazil, Peru, Ecuador, and Colombia, in the Tocantins-Araguaia basins in eastern Brazil (Hrbek *et al*. 2014, Siciliano *et al.* 2016a), and in the Orinoco basin of Venezuela and Colombia (Best & da Silva 1989b, Trujillo *et al*. 2010a).

Mitochondrial DNA (mtDNA) and nuclear introns have been interpreted as suggesting that the *boliviensis* form is on a separate evolutionary trajectory and therefore it may deserve recognition as a phylogenetic species (Banguera-Hinestroza *et al.* 2002, Ruiz-García *et al.* 2008). However, Gravena *et al.* (2014a, b), with more extensive sampling of the Madeira River system above and below the Teotônio Rapids (the proposed barrier to movement of individuals and gene flow), found that these rapids did not appear to obstruct gene flow from the upstream to the downstream areas. They also increased the distribution of the *boliviensis* form for almost all the Madeira River. Nevertheless, Gravena *et al.* (2015) concluded that *Inia* found right below Teotônio rapids actually have almost all the nuclear genome belonging to the *geoffrensis* form, concluding that there is a hybridization area. Even though, botos along the Madeira River possess mtDNA of the putative species *I. boliviensis*, and they argued that even with this hybridization event in the contact zone in the Madeira River, *Inia* remain distinct and follow an independent evolutionary path.

The putative species *Inia araguaiaensis* was described from the Tocantins-Araguaia basin (Hrbek *et al*. 2014), which is not connected to the Amazon basin. Examination of tissue samples and osteological material from the Araguaia River revealed diagnostic molecular and morphological characters that justified separation of *I. araguaiaensis* from its proposed sister taxon (*I. geoffrensis*) from the Amazon Basin (Hrbek *et al.* 2014). This finding was confirmed by Siciliano *et al.* (2016b) with stranded specimens collected in the Marajó Island.

Population trends and structure

Data on the assessments of abundance of these species have increased significantly in recent years (past decade), with estimates for a significant number of rivers in Brazil, Peru, Ecuador, Colombia, Venezuela and Bolivia. In many of these cases, a standardized methodology has been used to establish comparisons (Gómez-Salazar *et al*. 2012a, Williams *et al*. 2016, Pavanato *et al*. 2016, 2019, Paschoalini *et al.* 2020). However, population trend data are scarce, and results are available only for two small areas so far: the Mamirauá Sustainable Development Reserve (Brazil) (da Silva *et al.* 2018) and the Amazon River in Colombia (Williams *et al*. 2016).

There is no range-wide estimate of abundance or trends in abundance for the species. Surveys have been conducted since 1979 in many areas within the species range in Bolivia, Brazil, Colombia, Ecuador, Peru, and Venezuela. Most part of these studies reported encounter rates, instead abundance estimates. From these, few studies assessed population numbers and for relatively small areas. These estimates varied from a few dozen to a few thousand individuals depending on the size of the survey area and hydrological phase (e.g., Martin & da Silva 2004a, b, Gomez-Salazar *et al.* 2012b, Pavanato *et al.* 2016, 2019, Williams *et al.* 2016). The interpretation of these estimates in the context of this assessment is difficult given potential biases associated with the different survey methods used, the limited understanding of the movements and the population structure of the species across different parts of its range including the entire Amazon system, the Tocantins-Araguaia system, and the Orinoco system.

A multi-season survey of botos in the 11,240 km^2 of Mamirauá reserve in Brazil, between 1999 and 2001 (i.e., before the rapid decline referred to below) estimated 13,000 dolphins (Martin & da Silva 2004a). However, these results are geographically limited and cannot be extrapolated to other areas, notably due to the biome´s heterogeneity. A range-wide program to estimate abundance was carried out from 2006 to 2016, accounting 33 expeditions and covering nearly 32,000 km of rivers in all range states (Trujillo *et al.* 2019). Some of the results of this program revealed that density was low in rivers in Ecuador and in parts of the Orinoco River whereas densities were relatively high in rivers such as the Itenez/Guaporé at the border of Brazil and Bolivia, the Samiria River in Peru (Goméz-Salazar *et al.* 2012a), and in the Purus River, Central Amazon in Brazil (Frias 2019).

Trends in abundance have been assessed in only two small geographical locations (relative to the vast total range of the species), as follows. Standardized transect surveys were conducted in the Amazon River in Colombia in 1993 (covering 259.7 km^2) (Vidal *et al.* 1997), and 2007 (592.6 km^2) (Gómez-Salazar *et al.* 2012). Analyzing these data, Williams *et al*. (2016) used a Bayesian framework to estimate the probability of a decline conditional on a range of scenarios for process variance to accommodate the fact that the data were collected from three independent survey programs rather than from a single, and as a way of attempting to account for uncertainty associated with seasonal movements. Annual variation in abundance, presented in Williams *et al.* (2016), was estimated to be in the order of 0.45 (4.5%), with a tentative decline evidence greater than 75%. As variances were substantially

different among surveys (1993 and 2002 more precise than 2007), it strongly influenced the trend estimate, and comparability with other studies must be cautious.

Standardized transect surveys conducted monthly since 1994 in the Brazilian Amazon (in and around the 11,240 km^2 Mamirauá Sustainable Development Reserve) revealed that between 2000 and January 2017 there was an annual average rate of decline in boto encounters of 6.7% (CI 5.7 - 7.7%), which implies a halving of the population each decade (da Silva *et al.* 2018). In the early 2000s, there was a rapidly expanding fishery for the piracatinga (*Calophysus macropterus*), a scavenger catfish species of economic relevance, using dolphin carcasses as a source of bait began in the Amazonian Brazilian Rivers.

There is evidence that the annual survival of botos that spend at least some of their time in the same area but likely range much more widely has been affected by the piracatinga fishery. Boto survival rate analysis is complicated by having evidence to vary with time (Mintzer *et al.* 2013) but a decline cannot be discounted.

Sotalia fluviatilis

Taxonomy and species distribution

Until two decades ago, the genus *Sotalia* was considered monotypic with two ecotypes, one riverine and one marine (da Silva & Best 1996). However, genetic and morphological studies subsequently (Cunha *et al.* 2005, Caballero *et al.* 2007, Monteiro-Filho *et al.* 2002, Fettuccia *et al.* 2009) showed that the two ecotypes should be recognized as separate species: *S. fluviatilis* in the Amazon River basin and *S. guianensis* in marine and estuarine waters of eastern South and Central America (da Silva & Best 1996, da Silva *et al*. 2010).

The *Sotalia* dolphins recorded at Ciudad Bolívar, some 300 km upstream of the mouth of the Orinoco River, were confirmed by molecular genetics to be an isolated and probably independent population of *S. guianensi*s occurring as far as 550 km upriver in the Orinoco (Caballero *et al*. 2017).

Although the taxonomic status of *Sotalia* dolphin in the southern freshwater portion of Maracaibo Lake (in Venezuela near the border with Colombia) is not yet fully established, there is no connection between Maracaibo Lake and the present-day known range of *Sotalia fluviatilis*. Maracaibo Lake has been isolated from the Amazon basin for the last 8-10 million years (Hoorn *et al*. 1995). Thus, the likelihood that *Sotalia* dolphins from Maracaibo Lake are of the same species that occurs in the Amazon basin is remote. The dolphins in Maracaibo Lake are included in the assessment of *S. guianensis* (Secchi *et al*. 2018).

At this point it is unclear how far out into the ocean, under the influence of the Amazon freshwater plume, *S. fluviatilis* occurs, or how far *S. guianensis* occurs into the estuary; there

is even a possibility of some hybridization between the two species at the mouth of the Amazon and surroundings, meriting further efforts in investigation.

Population trends and structure

There is no information on the population structure of *Sotalia fluviatilis*. The first data available suggest that the species has moderate to high genetic diversity, since 12 individuals from the same location in the central Brazilian Amazon had five different control region haplotypes (Cunha *et al.* 2005), and 21 river dolphins from the Peruvian, Colombian and Brazilian Amazon had 13 haplotypes (combining the control region and ND2, Caballero *et al.* 2007). Based on 26 samples of 11 locations from three Amazonian regions (Brazil n=4, Colombia n=4, Peru n=3), Caballero *et al*. (2010) found connectivity among the sampled regions and identified divergent haplotypes in the extremes of the species distribution. The same authors also found that compared to the boto, tucuxis showed high mitochondrial diversity overall, suggesting a surprisingly large effective population size and relatively high female gene flow throughout the sampled regions of the main river and its tributaries. In addition, using nuclear markers it was possible to evidence population differentiation. The Brazilian Amazon was clearly separated from the Peruvian/Colombian Amazon, suggesting reduced migrations between tucuxis of eastern and western Amazon (Caballero *et al.* 2018).

There are no estimates of population size for the tucuxi, though the species appears to have been relatively abundant throughout most of its range at one time, and may still be in some areas (da Silva & Best 1996, Leatherwood *et al*. 2000, Gómez-Salazar *et al*. 2011, Flores *et al*. 2017). Density estimates for some relatively small areas have been published but as well as for boto, population trends are scarce. In the Amazon drainage, an average density (encounter rate) of approximately 1.1 dolphin/km of river was estimated between Manaus and Tefé (~500 km) in the Solimões River in 1979 (Magnusson *et al*. 1980). Four boat surveys of about 1,525 km each, from Manaus to Leticia, resulted in a mean estimate of 768 (± 104.7 SD) dolphins per survey or 1.02 dolphin/km² in 1983-84 (da Silva & Best 1994, da Silva *et al*. 1984). Mean density along the margins of main rivers in the central Amazon, Brazil (1,320 km of strip survey) was estimated at 3.2 dolphins/km² between 1999 and 2001(Martin & da Silva 2004a). About 54% of the individuals were found within 50 m of the edge of rivers and channels (Martin *et al*. 2004). Coimbra *et al*. (2015), using mark and recapture analysis, by photo-id, in a 13.5 km^2 area of the confluence of the Solimões and Japurá rivers, and in the Mamirauá Lake system, estimated an abundance of 119 tucuxis in the studied area from March to June of 2013 in the flooding season (95% confidence interval = 105-150).

In Purus River, the most productivity area in terms of fishery (that supplies the Manaus fish market), the estimated density of tucuxi was 12.73 ind/km² (CV = 0.49), with an estimated abundance of ~9,000 individuals (538 km² total area) during the 2012 survey at the lower course of this river (Frias 2019).

About 350 tucuxis were sighted in Amazon-Marañon Rivers and 469 in the Samiria-Yanayacu Grande River system in Peru between July 1991 and August 1993 (Leatherwood 1996, Leatherwood *et al.* 2000). Encounter rates in this area were within the range for these dolphins elsewhere in South America and it is thought that populations were stable over the period between 1991 and 2000 (McGuire 2002). Mean encounter rates in the Peruvian Amazon were 0.1-0.8 dolphins/km in rivers and 0.05-2.17 dolphins/km^2 in lakes (28 surveys over a four-year time period, McGuire 2002). The species was reportedly common in Colombia in the Loretoyacu River, in the Tarapoto Lake, and in the El Correo Lake system from March to December 1993 (Vidal 1994). Vidal *et al*. (1997) estimated that in 1993 there were 409 tucuxis (CV = 13%) along 120 km of the Amazon River bordering Colombia, Peru, and Brazil. Density was highest in lakes (8.6 dolphins/km²), followed by areas along main banks (2.8 dolphins/km²) and around islands (2.0 dolphins/km²).

Along 2,704 km of rivers in Colombia, Brazil, Ecuador, Peru, and Venezuela, Gómez-Salazar *et al*. (2012a) estimated 764 tucuxis between May 2006 and August 2007 with high densities for lakes (12,3 dolphins/km) and confluences (28,14 dolphins/km). Williams *et al.* (2016), for the same area sampled by Gómez-Salazar *et al.* (2012a), indicates a relatively stable population of tucuxi with a tentative evidence (<75% chance) of increasing population. The only data available for the Negro River (Brazil) comes from two surveys between Novo Airão and Manaus, carried out during April and October 2016, during flooding and receding water periods respectively (582 km and 410 km each), in which 333 and 244 tucuxis were sighted with the most common group size of two individuals (Valle 2017). Because the magnitude of threats may differ between regions, and sampling methods and analytical approaches were different in many of the studies referenced, caution should be taken in comparing and extrapolating data to other areas in this river basin.

The only area for which a robust time-series analysis of population trend over a relatively long period is available is the 11,240 km^2 Mamirauá Reserve in Brazil, which is adjacent to the Amazon River main stem. Based on 363 standardized surveys of a 30 km transect conducted at regular intervals across all seasons from November 1994 to January 2017, and taking cyclical water level changes into account, the tucuxi population in that area was estimated to have declined by 7.4% per year over the study period, representing a halving of the number counted every 9.04 years (da Silva *et al.* 2018).

(b) Information on known and suspected threats to the populations of South American river dolphin species

Longstanding threats to river dolphins include incidental mortality in fishing gears, deliberate killing for fish bait or predator control, damming of rivers, and environmental pollution from organochlorines and heavy metals such as mercury (Best & da Silva 1989a, b; da Silva 2009, IWC 2007, Trujillo *et al.* 2008).

Incidental mortality or bycatch has not been systematically monitored in most areas but is known to be a major threat throughout the boto's and tucuxi´s range (Trujillo *et al.* 2010b). Similar to other small cetaceans, river dolphin species are vulnerable to entanglement in a variety of nets (lampara seine nets, fixed gill nets, drifting gill nets) (Best & da Silva 1993, da Silva & Best 1996, Martin *et al*. 2004, Siciliano *et al.* 2016a). They also die in drop traps intended to catch large fish or Amazonian manatees (*Trichechus inunguis*) in the flooded forest in Peru (Reeves *et al.* 1999). Carcasses of botos with evidence of fishery involvement have been observed in the Japurá and Solimões rivers around Mamirauá Reserve, and in the Orinoco River basin (Loch *et al*. 2009, Iriarte & Marmontel 2013b, Trujillo *et al.* 2010b). The proportion of carcasses found is believed to be very small because most of them would be expected to be taken by scavengers or disposed by fishermen within 24 hours of death. In Tefé River basin, at least 176 botos were estimated to have died in 2010 due to interactions with fisheries (Brum 2011, Brum & da Silva 2016). Bycatch is the greatest uncertainty in quantitative impact on dolphin population decline, but also the most spread and long-term. No data exist to infer, at least relatively, about mortality rates. Quantify this threat is imperative as goal for conservation management.

Use of river dolphin products was first reported in 1986 concerning both species (Best & Da Silva 1989). Local communities use eyes, teeth, genitalia and skin. Oil is extracted from the skin in order to use it against respiratory diseases. Other body parts are used as love charms and in traditional medicine (Best & Da Silva 1989b, Trujillo *et al*. 2006, Gravena *et al*. 2008, Sholl *et al*. 2008, Aliaga-Rossel 2010, Dos Santos *et al*. 2018). This threat was probably important during the 70s and 80s and in many cases corresponded to incidental catches of river dolphins in nets. Gravena *et al*. (2008) however found that in several markets, the eyes were mainly from pigs and not from *Inia*.

In Peru, the river dolphins hunt in conflicts with fisherman persists, between 2015 is considered one of the main threats for both species, *Sotalia fluviatilis* and *Inia geoffrensis*. Both species have long been subject to accidental entanglement in gillnets (Alves *et al*. 2012, Loch *et al*. 2009). However, despite being theoretically protected by law, dolphins are still captured directly for use as bait in Peru for 15 years or more (Gómez-Salazar *et al*. 2008, Alves *et al*. 2012, Brum *et al*. 2015). In Peru, through surveys conducted by Campbell & Alfaro-Siguetto (2016) in the ports of Caballococha, Requena and Bagazán (Loreto), bycatch of more than three individuals per year has been recorded, in some cases reaching up to 10 individuals by year. The main mentioned that *I. geoffrensis* is caught more frequently than *S. fluviatilis*, and that, during the period of emptying (no rain), between July and November, an increase in the bycatch of dolphins occurs. This information coincides with the results of da Silva (2009) and the breeding season of these animals.

The use of dolphins as bait in the piracatinga fishery (da Silva & Martin 2007, 2017, Gómez-Salazar *et al.* 2008, Trujillo *et al.* 2010b, da Silva *et al.* 2011, 2018, Mintzer *et al.* 2013, Iriarte & Marmontel 2013a, Brum *et al.* 2015) represents a serious human-caused threat to the species. Piracatinga fishing began to appear in the official records of Brazilian fisheries

statistics in 1998, as result of a growing demand from the Colombian market, boosted by the reduction of stocks of capaz in the Magdalena River (Perez 2018).

The government of Brazil reported the killing of 354 botos in 2006 but this number is thought to be an underestimate because it was solely based on interviews with fishermen (IWC 2007). Estimates of the numbers of dolphins killed are very difficult to obtain, and those that have been attempted have varied between 300 botos/year in just one area (Tefé, Brazil) to more than 4,000 botos/year for the whole Brazilian state of Amazonas (Serrano *et al.* 2007, da Silva *et al.* 2011, Brum *et al.* 2014). An evaluation of the piracatinga fishery suggested that almost 1,200 tons of this fish were traded from Brazil to Colombia every year, and that a substantial proportion of this catch apparently used dolphins as a bait. The main market was formerly in Colombia, but for the years 2008-2014 this fish was also sold in the states of Amazonas, São Paulo, Bahia, Minas Gerais, and elsewhere in Brazil under the name of "douradinha" among others (Flores *et al.* 2008, Trujillo *et al*. 2010b, Brum *et al.* 2015, Cunha *et al*. 2016).

Despite a ban on commercial piracatinga fishing introduced by the Brazilian government in 2015 (ended in January 2020) to prevent dolphin killing, there is evidence that this activity continues (da Silva & Martin 2017). It is important to emphasize that this directed hunting may be widespread in areas where piracatinga are common, mainly in areas close to Colombia, the main market center (Trujillo *et al.* 2010b, Brum *et al.* 2015).

Killing of dolphins for use as bait has also been confirmed in Venezuela (Portocarrero-Aya *et al.* 2010, Diniz 2011), and reported in the media and unpublished reports in Peru (F. Trujillo, unpublished data, Cédric Gilleman, pers. Comm. to M. Marmontel, Jan 2020) and Bolivia (M. Escobar-WWF, G. Rey, C. Coca, L. Cordova and P. Van Damme, pers. comm. to F. Trujillo).

River dolphins are also deliberately killed in some areas because they damage fishing nets and are regarded as competitors for fishery resources (Reeves *et al*. 1999, Araújo & Wang 2012, Siciliano *et al.* 2016a). At least one boto found dead at Tefé Lake, Brazil, had injuries consistent with an intentional human attack (Loch *et al.* 2009). Similar conflicts have been reported in Colombia (Bonilla *et al.* 2008, Trujillo *et al.* 2010b). Dolphins, specifically *Inia*, are regarded as strong competitors for resources. In some areas, dolphins steal or damage fish in nets, upsetting the fishermen. People usually report to killing or hurting the animals in many ways. They get shot, poisoned, hit or in the best case they are frightened with sounds (Trujillo *et al.* 2010a). In Peru, fishermen attempt to kill dolphins by injecting live fish with toxins and tossing them into the water near the animals (Reeves *et al.* 1999, McGuire & Aliaga-Rossel 2010). A similar practice, using *timbó* (a poison from a vine, usually employed by indigenous tribes to catch fish) has been reported for Tefé River (M. Marmontel, unpubl. data).

Furthermore, the use of dolphin products is a reality. It was first reported in 1986 concerning both species (Best & da Silva 1989b). Local communities use eyes, teeth, genitalia and skin. Oil is extracted from the skin in order to use it to cure respiratory diseases. Other body parts are used as love charms and in traditional medicine (Best & da Silva 1989a, Trujillo *et al*. 2006, Gravena *et al*. 2008, Sholl *et al*. 2008, Siciliano *et al*. 2018, dos Santos *et al*. 2018). Gravena *et al*. (2008) however found that in several markets, the eyes were mainly from pigs and not from *Inia*.

Fishing with explosives, although illegal in most countries, is common in some areas of the Amazon Basin (Goulding 1989, Smith 1985). In Venezuela, this practice is still in use and has been reported as a threat to botos (Portocarrero-Aya *et al.* 2010). Fishing with explosives threatens botos and tucuxis due to concussive effects. Fishermen also reportedly attempt to kill dolphins that are attracted to fishing operations to prey on stunned or dead fish (Best & da Silva 1989a).

Overfishing also represents a threat through the depletion of dolphins' food resource, which can lead them to abandon specific areas and even potentially affect their reproductive success.

Infrastructure projects are of major concern and an increasing threat to river dolphin species (Araújo & Wang 2014, da Silva *et al.* 2015, Paschoalini *et al*. 2020). Over 400 dams could be constructed in the Amazon basin (Fearnside 2008 Finer & Jenkins 2012, Forsberg *et al*. 2017). Currently, there are 142 dams operating or under construction and 160 proposed for rivers draining the Andean headwaters of the Amazon (Anderson *et al*. 2018). The accumulated negative effects will trigger massive hydrological and biotic disturbances (Latubesse *et al.* 2017). Despite the high number of operating dams and projects in the Amazon region today, and knowing that botos occur above and below rapids in some rivers, of the 83 rivers with operating hydroelectric dams in Brazil only 13 have had any kind of study involving botos (da Silva *et al*. 2015).

Most of these studies have shown that the dams fragmented, isolated, and eliminated connectivity of boto populations (da Silva *et al*. 1998, Araújo & Wang 2014, Paschoalini *et al.* 2020). Dams in the Amazon, Tocantins-Araguaia, Orinoco basin (the Guri and Tocoma dams in the Caroní River), have probably degraded downstream habitat due to their effects on flow and temperature regimes (Ward & Stanford 1989, Ligon *et al*. 1995, Kondolf 1997) although, in the short term, observations of dolphins feeding on concentrations of fish immediately downstream of some dams may be seen as “beneficial”, especially if protective measures are better enforced there (da Silva *et al.* 1998, Araújo & Wang 2014).

Additionally, dams are bound to restrict dolphin movements, contribute to more populations fragmentation, and continue to alter and degrade the habitat by opening commercialization networks, improving navigability, and increasing road access (Best & da Silva 1989a). Especially in Tocantins-Araguaia basin, dams might fragment Araguaian boto population up to 12 subgroups, isolated in small and degraded dam reservoirs (Paschoalini *et al.* 2020). In

addition to population and habitat fragmentation, one of the threats with the greatest impact corresponds to the effect of hydroelectric dams in the Andean region, where the flow of key nutrients for the productivity of the Amazon rivers that sustains fish populations, fisheries and food security of riverine communities is notably diminished and interrupted in some cases (Finer & Jenkins 2012, Anderson *et al*. 2018).

Contamination is another potential threat to the dolphin species. For instance, the widespread use of mercury in artisanal and small-scale gold mining has driven contamination of the environment and the people, threatening biodiversity, human health and livelihoods of traditional populations (Pfeiffer *et al*. 1993, Venturieri *et al*. 2017, Martín-Doimeadios *et al*. 2014, Berzas-Nevado *et al*. 2010). A study of mercury in the sediments and floating plants in the Tucuruí Reservoir of the Tocantins River, Brazil, emphasized the risk of mercury accumulation in the bed of non-flowing waters (Aula *et al*. 1995). Total mercury content in boto milk from one individual sampled near the city of Manaus (176 ng/ml = 0.176 ppm) was considered close to the minimum level of methylmercury toxicity in human adults (Rosas & Lehti 1996). Concentration values of total mercury in river dolphin muscle from the Amazon and Orinoco basins ranged from 0.003 to 3.990 $mg.kg^{-1}$ Hg, with the highest values found in botos from the Orinoco (Mosquera-Guerra *et al*. 2019). Studies are needed to clarify what effects those concentrations may have on dolphin physiology and health.

High concentrations of organochlorine compounds (DDT, PCB, HCH, HCB, Mirex) and organobrominated compounds (PBDE) were also found in boto samples from different areas of Brazil, including the Solimões, Japurá, Negro, and Madeira rivers (Torres *et al.* 2007, Lailson-Brito *et al.* 2008). All milk samples (n=62) from botos in the Mamirauá Reserve contained evidence of organochlorine accumulation (PCBs were present in 100% of the samples, DDT in 64%, HCHs in 95%, HCB in 64%, and Mirex in 66%) (NEEDS CITATION). Pesticide concentrations measured in these samples were similar to those verified in the milk of other aquatic mammals and humans, indicating substantial exposure of calves to organochlorines at a critical developmental stage. The effects of bioaccumulation of mercury and other chemical contaminants in botos are unknown but the high levels recorded in the Amazon ecosystem are a reason for concern.

The increasing rate of human population is elevating water pollution levels resulting from agriculture, industry and other anthropogenic activities. This threat has been reported in 2000 regarding both species of dolphins and also on 2003 for *Inia* (IWC 2000, Reeves *et al*. 2003). Human population increase was suggested as a threat especially in Amazonian areas of Colombia and Brazil. In Ecuador, this is also a threat and it is mainly due to the industrial expansion of oil companies in the Amazonian area. Human population growth has a similar pattern in all countries in the Amazon River Basin, with large deforested areas along the river shore. It is currently estimated that the human population in the Amazon River basin exceeds 34 million people, with large urban centers such as Manaus and Belém do Pará, in Brazil.

Different levels of habitat transformation are affecting the ecological integrity of the Amazon and Orinoco river basins. Deforestation processes are dramatic in Brazil and Peru due to logging and commercial agriculture. In Brazil the main threat for the forest has been deforestation by cattle ranching, and more recently biofuel crops, specifically soybeans, that provides economic and political stimulus for new highways and infrastructure projects, which further accelerate deforestation patterns (Andersen *et al*. 2002, Fearnside 2017, Lovejoy & Nobre 2018). In total, an estimated 790,000 km2 of the Amazon have been lost to deforestation. One of the main drivers of deforestation is fire, generating an impact not yet completely understood on biodiversity and terrestrial and aquatic ecosystems. In 2019, for example, fires spread in the Amazon, with more than 90,000 outbreaks reported. Between 2000 and 2006 Brazil lost nearly 15,000 km2 of forest in the Amazon, and the process appears not to be abating. The main ecological impact of deforestation in aquatic ecosystems is associated to the reduction of aloctonous food for fish, especially in small tributaries where an important number of species rely on the provision of seeds and fruits from the flooded forest.

Oil exploration and exploitation are taking place in most of the countries where river dolphins are located. Perforations and use of big machinery increase the risk of spills. This was recently observed in the Ecuadorian Amazon in the area of the Cuyabeno River. It is alarming that in countries as Ecuador those camps of exploration and exploitation are located inside natural parks and reserves. Other kinds of oil spills were due to the Colombian guerrillas in the Colombian Orinoco during the 1980s. Their guerrilla warfare operations lead to water contamination and affect the habitat and fish resources (Trujillo *et al.* 2010b).

Unregulated ecotourism also poses river dolphin at risk. Boat traffic is generating underwater noise pollution that affects dolphin populations as well as possibly causing collisions that can injure dolphins (Zurita 2019). This activity has been reported from 1994 to 2008 in almost all Action Plans. Additionally, continuous presence of boats can interfere with reproduction and feeding behavior. Tourism and specifically dolphin watching may be a good economic alternative for riverine communities in the Amazon and Orinoco basins (Frias 2014, Silva Jr. *et al*. 2019). However, good practices and ethic codes should be promoted to prevent this activity from becoming a threat. During the last 15 years, some people have been implementing dolphin watching programs in some locations in Brazil not knowing environmental rules for the purpose of maintaining in captivity the species of aquatic mammals (IBAMA 2002), and creating serious problems that can end in injuries for dolphins and people (Loch *et al.* 2009, Romagnoli *et al*. 2011, Pinto de Sá Alves *et al*. 2012, Frias 2014). In many cases, wild botos have become habituated to human contact. Fortunately, in 2017, the Brazilian government regulated the activity of swimming with dolphins, and tourists were prohibited from directly feeding dolphins. Currently there are few authorized sites near Manaus, where dolphins are fed only twice a week.

In Colombia during the last 8 years, guidelines for responsible observation of aquatic mammals have been built, specifically including river dolphins (Trujillo *et al*. 2009).

Additionally, more than 1000 tourist guides have been trained in different regions of the Amazon and Orinoquia, and have been given printed material with the guidelines (Trujillo & Mosquera-Guerra 2018). In Bolivia a long-term program is promoting good practices in river dolphin, this program involves the participation of several community based and tour companies. Although they have a strong commitment, some guides are still promoting activities with full contact with river dolphins (Aliaga-Rossel *et al.* 2014). We include the following summary table of the main threats of the river dolphins' population:

Summary Table

Actual/Potential Threat	Cause or related activity	Evidence	Possible Impact on population	Priority for Action	Actual/possible mitigation measures
Bycatch	Set net fishing; Bottom trawls	Strong	Possible high Mortality +/or serious injury	High	Use of pingers; change in gear; law enforcement; long-term monitoring, closed fishing areas and/or seasons.
Deliberate killing	Ship strikes; Retaliation;	Moderate	Low	Medium	Public awareness; Human wildlife conflict projects; development of alternative income programs for local communities, such as sustainable tourism; spatial scale dimensions of boat traffic and dolphins movements; establishment of speed reduction and shifting in navigation routes.
Use of river dolphin as bait	Piracatinga fishing	Strong	High	High	Development of alternative income programs for local communities, such as community-based sustainable tourism; Monitoring; Policies; Law enforcement; Moratorium; Alternative baits
Loss of connectivity in rivers (dams)	Infrastructure projects (Dams)	Strong	High	High	Integrated hydro/landscape planning; Environmental safeguards; translocation of animals.




Contamination	Industrial development; sewer discharges; Small-scale gold mining	Moderate	Moderate	medium	Urban development planning; enforcement of safety procedures; contingency plans;
Fish stock depletion	Competition with humans	Strong	High	High	Monitoring; Law enforcement; fishery management plans
Deforestation	Agricultural expansion; land tenure conflicts	Strong	Moderate	medium	Law enforcement; forestry management

CMP Objectives and Outcomes

Main Objective:

Promote the conservation of river dolphin species (*Inia geoffrensis, Inia boliviensis, Inia araguaiaensis* and *Sotalia fluviatilis*) in the Amazon, Orinoco and Tocantins/Araguaia basins through a regional concerted strategy.

Objective 1 – Reduce conflict between river dolphins and fishing activities

- Outcome 1.1 – By 2030, national and regional policies are including and promoting the ecosystem approach to fisheries, including transboundary issues.

- Outcome 1.2 – By 2030, fishery planning is implemented, with an aim to harmonize fishery regulations in transboundary basins, in order to reduce conflicts between river dolphins, and fishing activities, ensuring dolphins conservation and human well-being.

- Outcome 1.3 - By 2025, databases on fishery activities in key areas within the species range distribution are developed and the potential impacts on river dolphins' species are identified and mapped, including the quantification of bycatch events.

- Outcome 1.4 - By 2025, the best available scientific evidence is used in support of the construction, update, and implementation of sound management and conservation plans.

Objective 2 – Mitigate effects human activities, especially illegal hunting and incidental capture of river dolphin

- Outcome 2.1 – By 2030, a long-term monitoring program support management and conservation measures implemented by CMP country members.

- Outcome 2.2 – By 2025, bycatch is quantified for critical areas within the species distribution range and new areas with threatening risk identified.

- Outcome 2.3 – By 2025, current and new knowledge about human impacts on river dolphin species support decision making to develop monitoring, law enforcement and conservation plans.

Objective 3 – Improve habitat connectivity and conservation

- Outcome 3.1: By 2035, key river dolphin habitats are identified, protected, connected and free-flowing rivers within the species distribution range.

- Outcome 3.2: By 2030, a network of well-managed conserved and protected areas in reserved zones or key river basins protects river dolphin populations.

- Outcome 3.3: By 2025, key areas for maintaining river dolphin populations are mapped and included in infrastructure project planning developed by the CMP countries.

Objective 4 – Improve knowledge on population trend, taxonomy, genetics, ecology and health of river dolphins

- Outcome 4.1: By 2035, distribution, population trend, genetic diversity and health are documented and support policies and action plans for river dolphins in CMP countries.

- Outcome 4.2: By 2030, distribution maps are fully improved and the population trend is modeled for key-areas within the species distribution range.

- Outcome 4.3: By 2025, regional cooperation supports the development of scientific research and promotes the integration of knowledge through virtual platforms in support of decision and stakeholders.

Objective 5 – Engage governments, private sector and society towards the conservation of river dolphins in South America

- Outcome 5.1: By 2035, communities, governments and businesses become custodians of river dolphins.

- Outcome 5.2: By 2030, each CMP country has developed and implemented public policies and awareness campaigns in support of raising awareness towards the conservation and sustainable use of aquatic resources in the Amazon and Orinoco basins and tributaries. The income of local communities has improved and human-dolphin conflicts reduced.

- Outcome 5.3: By 2025, CMP countries have developed public policies and awareness campaigns fostering the engagement of key decision-makers, researchers, and society. CMP countries have developed alternative income programs for local communities, mainly focused on community based sustainable tourism programs.

Agreed and anticipated delivery partners

The initiative has been supported by the governments of Colombia, Brazil, Ecuador and Peru. Likewise, the link between Bolivia and Venezuela will be sought through diplomatic channels. This initiative will be supported for a number of scientific organizations in South America including institutions from the species distribution range, such as Omacha Foundation (Colombia), Institute Mamirauá, Aqualie Institute and INPA (Brazil), Faunagua Institute (Bolivia), Pro Delphinus (Peru), WWF offices in Colombia, Peru, Ecuador, Bolivia and Brazil. Also, universities, research institutions and experts from the river dolphin range countries that has historically developing projects targeting research and conservation of the species will be engaged in the initiative. The Amazon Cooperation Treaty Organization will be engaged towards strengthening the cooperation between governments. The CMP initiative will be articulated with the IUCN Cetacean Specialist Group, the CMS Migratory Species.

Process to be adopted when developing a CMP

- Nominate candidates for the Steering Committee from each country
- Nominate candidates for a regional technical and scientific advisory group
- Define priority actions for research and conservation
- Nominate and define a coordination board
- Develop a strategic approach including awareness, fundraising and governance components
- Promote meetings among country members, scientific advisory group and key stakeholders
- Implement a fundraising plan
- Define and implement a monitoring plan
- Promote continuous adaptation process and share lessons learnt at regional scale

Timeframe for CMP Development and Implementation




Activity	YEAR 1				YEAR 2			
Develop the CMP	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Country meetings	x	x						
Regional meetings			x					
CMP review			x					
CMP finalized and approved by countries				x				
CMP review by IWC committees				x	x			
CMP improvement						x	x	
CMP final version submission to IWC							x	

Resource Requirements for Development of a CMP

Budget (£)		
Expenditures	**Year 1**	**Year 2**
Coordinator (fees)	20.000	20.000
Coordinator (travel)	8.300	8.300
Country meetings	104.000	100.000
Regional meetings (2)	14.000	17.000
Attention IWC meetings (stakeholder)	4.200	4.200
Totals	**150.500**	**149.500**

Nomination Submission Information

This nomination for a Conservation Management Plan for Amazon, Orinoco and Tocantins-Araguaia river dolphins (*Inia geoffrensis*, *Inia boliviensis*, *Inia araguaiaensis*, and *Sotalia* fluviatilis) has been submitted to the IWC Secretariat at least 60 days prior to the 68 IWC Commission Meeting in accordance with the Commission's document submission procedures.

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Annex 3 – CMP Template

A Conservation Management Plan for Amazon, Orinoco and Tocantins river dolphins (*Inia geoffrensis, Inia boliviensis, Inia araguaiaensis,* and *Sotalia fluviatilis*)

This Nomination was prepared by Governments of Colombia, Brazil, Ecuador, and Peru

Scientists involved Fernando Trujillo, Enzo Aliaga, Vera Da Silva, Miriam Marmontel, Waleska Gravena, Mariana Paschoalini, Marcelo Oliveira da Costa, Paul Van Damme, Verônica A. Barros, Victor Utreras, Cedric Gilleman, Saulo Usma, Vania Tejada, Jessica Pacheco and Fernando Felix.

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Table of contents

Executive Summary

The governments of Brazil, Colombia, Peru and Ecuador agree to develop a Conservation Management Plan (CMP) for river dolphins in South America. The main objective is to promote the conservation of river dolphin species (*Inia geoffrensis, Inia boliviensis, Inia araguaiaensis* and *Sotalia fluviatilis*) in the Amazon, Orinoco and Tocantins/Araguia basins through a regional concerted strategy.

The CMP will define the main lines of action to evaluate the dolphin populations in their different geographical ranges of distribution; quantitatively identify the threats and guide actions that guarantee their conservation in the short, medium and long term.

The CMP of river dolphins will allow articulating research and conservation actions among the different countries where these species live in South America, defining national and other regional actions. Likewise, it will focus on generating mechanisms for joint work among researchers, organizations and governments that will allow for influencing management policies in the Amazon, Orinoco and Tocantins/Araguaia basins.

Public awareness of governance and environmental agencies, depends directly on how fast and quality the scientific information is shared. A channel of communication and transparency, of planning/actions and results, is strongly advisable to potentially improve the efficiency of public awareness, and conservation management.

Many technical expertise is involved to design, planning, fieldwork and analysis, for getting data on biological and ecological aspects of the species. Capacity building is crucial to ensure the quality and reliability of the information produced and to standardize methods, that allows robust comparison in long-term. In this sense, training should focus on multiplication of technical analysts to avoid centralizing and storing information.

Introduction

River dolphins are among the most threatened species of cetaceans on the planet due to the degradation and transformation of fluvial habitats. Recently the IUCN updated the threat category of *Inia geoffrensis* from DD to EN (Da Silva *et al*. 2018), supporting this change on some population trends in areas where a drastic decrease in the number of river dolphins is observed, as well as the overall increase in the magnitude of threats such as deforestation, loss of connectivity of rivers by dams, contamination by mercury, overfishing and directed catches. The situation for *Sotalia fluviatilis* is under review for the IUCN but the new threat category is likely to be Endangered as well. The situation became more critical considering the taxonomic uncertainty of the genus *Inia* because several researchers recognized *Inia boliviensis* and *Inia araguaiaensis* as different species, and with exacerbated vulnerability

due to population fragmentation in *I. araguaiaensis* and limited geographic distribution of both species.

A CMP for river dolphins in South America will generate a positive and coordinated change for the conservation of these species. In the last 10 years efforts have been made to increase the knowledge about these dolphins. As a result of such efforts, a South American action plan was elaborated. Additionally, all countries where river dolphins inhabit Brazil, Colombia, Bolivia, Peru, Ecuador, and Venezuela, have national species management plans endorsed. In the last two years, a network of organizations and researchers of the region called South American River Dolphins Initiative (SARDI) consolidated. However, no coordination between governments to promote effective cross-border and regional management measures have been conducted so far, which is precisely what a CMP can achieve.

While only Brazil, Colombia, Peru and Ecuador are signatory members of the International Whaling Commission (IWC), it is expected that the CMP has regional coverage including Bolivia and Venezuela as well. The area extends to more than 8 million square kilometers, and include the entire river dolphin habitat within the Amazon, Orinoco and Tocantins-Araguaian river basins.

Since national action plans have been elaborated in all countries where the species distribute, a CMP will be a useful management tool allowing for the coordination and harmonizing of actions at regional scale.

1.1 Overall Objectives of the CMP

Main Objective
Promote the conservation of river dolphin species (*Inia geoffrensis*, *Inia boliviensis*, *Inia araguaiaensis* and *Sotalia fluviatilis*) in the Amazon, Orinoco and Tocantins-Araguaia basins through a regional concerted strategy.

Objective 1 – Reduce conflict between river dolphins and fishing activities

- Outcome 1.1 – By 2030, national and regional policies are including and promoting the ecosystem approach to fisheries, including transboundary issues.

- Outcome 1.2 – By 2030, fishery planning is implemented, with an aim to harmonize fishery regulations in transboundary basins, in order to reduce conflicts between river dolphins, and fishing activities, ensuring dolphins conservation and human well-being.

- Outcome 1.3 - By 2025, databases on fishery activities in key areas within the species range distribution are developed and the potential impacts on river dolphins' species are identified and mapped, including the quantification of bycatch events.

- Outcome 1.4 - By 2025, the best available scientific evidence is used in support of the construction, update, and implementation of sound management and conservation plans.

Objective 2 – Mitigate effects human activities, especially illegal hunting and incidental capture of river dolphin

- Outcome 2.1 – By 2030, a long-term monitoring program support management and conservation measures implemented by CMP country members.

- Outcome 2.2 – By 2025, bycatch is quantified for critical areas within the species distribution range and new areas with threatening risk identified.

- Outcome 2.3 – By 2025, current and new knowledge about human impacts on river dolphin species support decision making to develop monitoring, law enforcement and conservation plans.

Objective 3 – Improve habitat connectivity and conservation

- Outcome 3.1: By 2035, key river dolphin habitats are identified, protected, connected and free-flowing rivers within the species distribution range.

- Outcome 3.2: By 2030, a network of well-managed conserved and protected areas in reserved zones or key river basins protects river dolphin populations.

- Outcome 3.3: By 2025, key areas for maintaining river dolphin populations are mapped and included in infrastructure project planning developed by the CMP countries.

Objective 4 – Improve knowledge on population trend, taxonomy, genetics, ecology and health of river dolphins

- Outcome 4.1: By 2035, distribution, population trend, genetic diversity and health are documented and support policies and action plans for river dolphins in CMP countries.

- Outcome 4.2: By 2030, distribution maps are fully improved and the population trend is modeled for key-areas within the species distribution range.

- Outcome 4.3: By 2025, regional cooperation supports the development of scientific research and promotes the integration of knowledge through virtual platforms in support of decision and stakeholders.

Objective 5 – Engage governments, private sector and society towards the conservation of river dolphins in South America

- Outcome 5.1: By 2035, communities, governments and businesses become custodians of river dolphins.

- Outcome 5.2: By 2030, each CMP country has developed and implemented public policies and awareness campaigns in support of raising awareness towards the conservation and sustainable use of aquatic resources in the Amazon and Orinoco basins and tributaries. The income of local communities has improved and human-dolphin conflicts reduced.

- Outcome 5.3: By 2025, CMP countries have developed public policies and awareness campaigns fostering the engagement of key decision-makers, researchers, and society. CMP countries have developed alternative income programs for local communities, mainly focused on community based sustainable tourism programs.

2. Legal Framework

2.1. International Conventions and Agreements

- The Convention on Migratory Species (CMS) classified *Inia geoffrensis* and *Sotalia fluviatilis* under Appendix II.
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) classified *Inia geoffrensis* under Appendix II and *Sotalia fluviatilis* under Appendix I.
- The Amazon Cooperation Treaty Organization (OTCA)
- Minamata Convention
- Global Programme of Action (GPA)
- International Whaling Commission (IWC)

Other International Initiatives:

- The IUCN listed *Inia geoffrensis* as Endanger (EN) A2acd+3cd+4acd; *Sotalia fluviatilis* as Data Deficient (DD) (At present is under review the category).
- WWF has a global strategy for the conservation of river dolphins (Asia - South America).

2.2. National Legislation and Management Arrangements

2.2.1. Brazil

Brazil has ratified several international agreements that aim to promote biodiversity conservation, including cetacean conservation, such as:

- Convention on Biological Diversity (CBD), approved by Legislative Decree nº 02/1994.
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), approved by Legislative Decree nº 54/1975.
- Convention on Migratory Species (CMS), approved by Decree nº 9.080/2017.

At the national level, cetaceans are protected by the Wildlife Protection Law (Law nº 5.197/1967), which explicitly states that "animals of whichever species, under any developmental stage and which live freely outside of captivity, comprising wildlife as well as their nests, burrows and natural breeding sites, are property of the State, being prohibited their use, harassment, hunt or collection."

Hunting of whales and dolphins, as well as any kind of deliberated molestation, is forbidden since 1987 in Brazilian waters (law nº 7.643/1987). Also, the Environmental Crimes Law (Law nº 9.605/1998) provides for criminal and administrative sanctions derived from conduct and activities harmful to the environment, establishing the classification of the so-called environmental crimes.

Endangered species are formally recognized by the federal government since the publication of the first National Red List of Threatened Species, in 1968. The list, which was updated in 2014 (Ordinance nº 444/2014) and is produced following the IUCN Red List categories and criteria, recognizes *I. geoffrensis* in the category Endangered.

Thereafter, the species was included in the National Action Plan for the Conservation of Small Cetaceans, published in 2010 (Ordinance nº 86/2010), which included both marine and freshwater species. In 2019 a specific National Action Plan for the Conservation of Amazonian Aquatic Mammals was established (Ordinance nº 19/2019), which aims to reduce and mitigate anthropic pressure and to increase scientific knowledge on *Inia geoffrensis, Inia araguaiaensis* and *Sotalia fluviatilis*, among other species, contributing to the conservation of these species in five years.

Specifically aiming to reduce the illegal use of river dolphins as bait, the federal government banned the fishing and commercialization of the piracatinga catfish (*Calophysus macropterus*, also known as mota in other countries) for a period of 5 years, through 2015 to 2019 (Interministerial Ordinance nº 06/2014).

2.2.2. Colombia

Colombia has ratified several international agreements that in one way or another are inclusive of the management of aquatic mammal species and their habitats.

- Convention on International Trade in Endangered Species of Wild Fauna and Flora - CITES: approved by Law 17 of 1981; links the country to ensure trade in those species listed in the various appendices of the Convention.
- United Nations Convention on Biological Diversity: assumed by law 165 of 1994 and which has as its objectives the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of benefits arising from the use of genetic resources.
- Convention concerning the Protection of the World Cultural and Natural Heritage: approved by Law 45 of 1983, it commits the country to conserve the world heritage properties present in the national territory and to protect its own heritage.
- Colombia has been part of the International Whaling Commission (IWC) for 11 years, which was adopted by Law 1348 of 2009, in which it has supported the debate aimed at the conservation of marine mammals, as a member of the Buenos Aires Group, which represents the interests of most Latin American countries that make up the Commission.

National aquatic mammals legislation

- In accordance with the provisions of Article 5 of Law 99 of 1993, Article 2 of Decree-Law 3570 of 2011 and Article 1.1.1.1 of Decree 1076 of 2015, this Ministry, as the governing body for the management of the environment and renewable natural resources, is responsible for guiding and regulating the environmental planning of the territory and defining the policies and regulations to which the recovery, conservation, protection, planning, management, use and sustainable development of renewable natural resources and the environment of the nation are subject.
- Decree-Law 2811 of 1974 in Colombia, the National Code of Renewable Natural Resources and Environmental Protection was issued, according to which the conservation, promotion and rational use of hydrobiological resources and the aquatic environment must be ensured in order to achieve their availability and rational use (Article 266).
- Resolution 787 of 1977 "By which the sport hunting of mammals, birds and reptiles of the wild fauna is forbidden".
- Regulatory Decree No. 1608 of 1978, By which the National Code of Renewable Natural Resources and Environmental Protection and Law 23 of 1973 on Wildlife are regulated.
- Law 84 of 1989 "By which the National Statute for the Protection of Animals is adopted and contraventions are created and the procedure and competence is regulated.

- Law 13 of 1990, by means of which the General Statute of Fishing is dictated and the Decree 4181 of 2011, by which some functions of the Colombian Institute of Rural Development (INCODER) and of the Ministry of Agriculture and Rural Development are separated and the National Authority of Aquaculture and Fishing - AUNAP is created, they arrange that the management and administration of the fishing resource, as well as, the expedition of permissions, concessions and authorization that correspond to activities of fish farming and aquaculture correspond to the National Authority of Aquaculture and Fishing - AUNAP
- Law 557 of 2000 (February 02) Through which the "Agreement on the International Dolphin Conservation Program" was approved, made in Washington, D.C., on May 21, 1998.
- Resolution 0589 of March 9, 2017 By which the species of wild fauna included in the categories of valuation coefficient and the corresponding value of the species established in numeral 3 of article 2.2.9.20.2.7 of chapter 10 of title 9 of part 2 of Decree 1076 of 2015 are established, in which article 42 of Law 99 of 1993 is regulated in relation to the compensatory rate for hunting of wild fauna (compensatory rate for hunting of wild fauna).
- The National Authority of Aquaculture and Fisheries - AUNAP, issued Resolution 799 of 2014 "By which it is prohibited in the exercise of fishing the use of live or dead marine and fresh native aquaculture species as bait, that are contained in the most updated red list of the International Union for the Conservation of Nature-IUCN and in the most updated red books of threatened species of Colombia, in categories of threat (VU), Near Threatened (NT), Endangered (EN) and Critically Endangered (CR), throughout the national territory".
- Resolution 1710 of 2017 "whereby the capture in the Colombian Amazon and Orinoco basins and the commercialization in Colombian territory of the species *Calophysus macropterus*, commonly known as mota, simi or comegente, is prohibited for an indefinite period of time".
- The Ministry of the Environment will issue a Ministerial Directive in 2017, in response to the problems of the country's aquatic mammals, addressed to the Environmental Authorities with Jurisdiction over the Natural Distribution of these species, in which it warns that measures must be taken to protect the species of dolphins and manatees.
- Resolution number 02883 of 2018 "Whereby the Dolphin Mortality Limit (DML) for the year 2019 is assigned among Colombian-flag tuna purse-seine vessels greater than 400 metric tons carrying capacity in the Eastern Pacific Ocean (EPO).
- Resolution 2865 of 2019 "Assigning the Dolphin Mortality Limit (DML) for the year 2020 to the Colombian-flagged tuna purse-seine vessels larger than 363 metric tons carrying capacity in the Eastern Pacific Ocean (EPO).
- Support mechanisms:
- Law 1333 of 2009 establishing the environmental sanctioning process (with specific regulations)

- Decree 2041 of 2014 regulating environmental licences (which includes subsequent amendments)
- Resolution 1912 of 2017 which stipulates the list of endangered species in Colombian territory.
- Decree 1376 of 2013, which regulates permits for the collection of specimens of wild species for non-commercial purposes
- Resolution 2064 of 2010 on post-release management of specimens of wild species of terrestrial and aquatic fauna and flora.

Strategic Ecosystems for Dolphin Conservation:

- Decree number 1275 of 2014, which designates the Inírida River Star Wetland Complex to be included in the list of Wetlands of International Importance, in compliance with the provisions of Law 357 of 1997
- Decree No. 1573 28 Sep 2017 "By which a section is added to Decree 1076 of 2015, in order to designate the Lagos de Tarapoto Wetlands Complex to be included in the list of Ramsar Wetlands of International Importance, in compliance with the provisions of Law 357 of 1997".
- Decree No. 1235 of 2018 "By which a section is added to Decree 1076 of 2015, in order to designate the wetland complex of the Bita River basin for inclusion in the list of Wetlands of International Importance Ramsar, in compliance with the provisions of Law 357 of 1997'.
- Conservation Plans And Programmes
- Colombia's National Policy for Inland Wetlands in 2002.
- National Policy for the Integral Management of Biodiversity and its Ecosystem Services (PNGIBSE) as a general objective, seeks to promote the integral management for the Conservation of Biodiversity and its Ecosystem Services, in order to maintain and improve the resilience of the socio-ecological systems, as well as to guide the use and occupation of the territory at national, regional and local scales, considering scenarios of change and through the joint, coordinated and concerted action of the State, the productive sector and the civil society.}

Year	Document
2006	The Red Book of Mammals of Colombia
2008	Management plan for aquatic fauna of the colombian Amazon
2010	South American River dolphins Action Plan 2010-2020
2013	Diagnosis of the state of knowledge and conservation of aquatic mammals in Colombia
2014	National Action Plan for the Conservation of Aquatic Mammals of Colombia (PAN mammals Colombia)
2016	Guide of responsible observation of river dolphins and fluvial tourism in the Department of Meta.

2016	Management plan for river dolphins (*Inia geoffrensis*) in the area of jurisdiction of Cormacarena
2017	Conservation and Management Plan for Aquatic Mammals (Cetaceans, Manatees and Otters) in the Department of Magdalena
2017	Guide to the care of stranded aquatic mammals in Colombia
2017	Guide for responsible observation of aquatic mammals in Colombia
2019	Conservation plan for the river dolphin or pink dolphin (*Inia geoffrensis*) for the jurisdiction of Corporinoquia

2.2.3. Ecuador

- Constitution of Ecuador 2008:
  - Art. 3, Establishes as a primary duty of the Ecuadorian State the conservation of the country's natural and cultural heritage.
  - Art. 14, declares the preservation of the environment, the conservation of ecosystems and biodiversity of public interest.
  - Art. 71 , establishes that nature or Pacha Mama, where life reproduces and realizes, has the right to have its existence fully respected and the maintenance and regeneration of its life cycles, structure, functions and evolutionary processes.
  - Art. 73, obliges the State to apply precaution and restriction measures for activities that may lead to the extinction of species, the destruction of ecosystems or the permanent alteration of natural cycles.
  - Art. 400, establishes that the State will exercise sovereignty over biodiversity, whose administration and management will be carried out with intergenerational responsibility.
  - Art. 405, establishes that the national system of protected areas will guarantee the conservation of biodiversity and the maintenance of ecological functions.

- The Republic of Ecuador, ratified by Supreme Decree No. 77, published in the Official Register No. 739 of February 7, 1975, the Convention on International Trade in Endangered Species of Wild Fauna and Flora CITES. Aquatic mammals such as the pink dolphin (*Inia geoffrensis*), the gray dolphin (*Sotalia fluviatilis*), the Amazonian manatee (*Trichechus inunguis*), the giant otter (*Pteronura brasiliensis*) and the neotropical otter (*Lontra longicaudis*) are species listed in CITES Appendices I and II, constituting nationally and internationally threatened species of extinction.

  Pursuant to the same legal instrument, in its Article XIV, it is determined that the provisions of this Convention will not affect, in any way, the right of the Parties to adopt stricter internal measures regarding the conditions of trade, capture, possession or transportation. specimens of species included in Appendices I, II and III, or to ban them entirely; or internal measures that restrict or prohibit the trade, capture, possession or transport of species not included in Appendices I, II or III.

- The Convention on Biological Diversity (CBD), signed in 1992 and ratified in 1993, Ecuador is a signatory to this agreement, the strong idea that moves the CBD is that "conservation of biological diversity is a common interest of all humanity". This vision is reflected in the Strategic Plan for Biological Diversity 2011-2020 and Aichi Targets, where the mission was adopted "To take effective and urgent measures to stop the loss of biological diversity in order to ensure that, by 2020, ecosystems be resilient and continue to provide essential services, thereby ensuring the variety of life on the planet and contributing to human well-being and the eradication of poverty.

- In 1991, Ecuador, together with Colombia, Chile, Panama, and Peru, adopted the Action Plan for the Conservation of Marine Mammals of the Southeast Pacific, committing to conserve all species, subspecies, races and populations of marine mammals and their habitats in the region.

- The National Biodiversity Strategy 2015 - 2030, prepared by the Ministry of the Environment, published in 2016, concerning species of fauna, they report that in Ecuador one species is belonging to the order Sirenia, seven to the order Carnívora and 28 species of cetaceans; Of these, 6 are baleen whales and 22 are dolphins and toothed whales. According to a summary of several sources cited in a publication of the MAE-Fundación Natura in 2010 and recently supplemented by the Ecuadorian Foundation for Marine Mammals-FEMM, at least 29 of the 36 species with known distribution in Ecuador are found in marine areas SNAP.

- Comprehensive Organic Penal Code, Official Registry 180 of February 10, 2014, Article 247.- Offenses against wild flora and fauna. The person who hunts, fishes, captures, gathers, extracts, has, transports, traffic, pr, exchange or commercialize, specimens or their parts, their constituent elements, products and derivatives, of terrestrial, marine or aquatic flora or fauna, of threatened, endangered and migratory species, listed nationally by the National Environmental Authority as well as international instruments or treaties ratified by the State, will be punished with a custodial sentence of one to three years.

- The Organic Code of the Environment, Official Registry 983 of April 12, 2017 and its approved Regulation, with Official Registry 507 of June 12, 2019, established the guidelines on the conservation of biodiversity based on its ecological characteristics, levels of endemism, category of species threatened with extinction, to safeguard the biological heritage from genetic erosion, in accordance with the policy formulated by the National Environmental Authority.

- Interministerial Agreement 2014-0004 (May 30, 2014), which regulates the observation of whales and dolphins in Ecuadorian waters.

- Article 1 of Resolution No. 050, published in Official Register No. 679 of October 8, 2002, recognizes red books as mechanisms to identify those legally protected species regarding their level of threat.

- The Red Book of Mammals of Ecuador (Tirira 2011), the same one referred in Resolution No. 050, categorizes the five species of aquatic mammals present in Ecuador as:
    - Pink Dolphin *Inia geoffrensis* Endangered (Red Book of Mammals of Ecuador) CITES Appendix II.
    - Gray Dolphin *Sotalia fluviatilis* Endangered (Red Book of Mammals of Ecuador) CITES Appendix I.
    - Amazonian manatee *Trichechus inunguis* Critically Endangered (Red Book of Mammals of Ecuador) CITES Appendix I.
    - Giant otter *Pteronura brasiliensis* Critically Endangered (Red Book of Mammals of Ecuador) CITES Appendix I.
    - Neotropical otter *Lontra longicaudis* Vulnerable (Red Book of Mammals of Ecuador) CITES Appendix I.

2.2.4. Peru

International agreement: Peru has ratified several international agreements that aim to promote the conservation of biodiversity, including the conservation of cetaceans, such as:

- Convention on Biological Diversity (CBD), approved by Legislative Resolution No. 26181
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), approved by Decree Law No. 21080
- Convention on Migratory Species (CMS), approved by Supreme Decree No. 002-97-RE.
- International Convention for the Regulation of Whaling, approved by Law No. 22375, and its Protocol, approved by Decree Law No. 22737.
- Convention on Wetlands of International Importance especially as Waterfowl Habitat. "Ramsar Convention", approved by Legislative Resolution No. 25353.

National Regulations

At the national level, Peru has the following regulations:

- Political Constitution of Peru.
- Law No. 26821, which approves the Organic Law for the Sustainable Use of Natural Resources.
- Law on the Conservation and Sustainable Use of Biodiversity, and its Regulation approved by Supreme Decree No. 068-2001-PCM.
- Law No. 28611, General Environment Law.
- General Fisheries Law, approved by Decree Law No. 25977, aims to regulate fishing activity in order to promote its sustained development as a source of food,

employment and income and to ensure responsible use of hydrobiological resources, optimizing benefits economic, in harmony with the preservation of the environment and the conservation of biodiversity.

- Regulation of the General Fisheries Law, approved by Supreme Decree No. 012-2001 -PE.
- Law No. 26585, which declare the species of marine mammals known as dark dolphins or piglets (*Lagenorhynchus obscurus*), tonino or porpoise (*Phocoena spinipinnis*), bufeo (*Tursiops truncatus*), and common dolphin (*Delphinus delphis* and *Delphinus capensis*) and inland water mammals dolphin pink or Amazon River dolphin (*Inia geoffrensis*) and black bufeo (*Sotalia fluviatilis*), and legally protected species.
- Regulation for the Protection and Conservation of Minor Cetaceans, approved by Supreme Decree No. 002-96-PE, which regulates and guides activities related to minor cetaceans in the maritime domain and continental waters of the country, in order to achieve their adequate protection and conservation.
- Fisheries Management Regulations of the Peruvian Amazon, approved by Supreme Decree No. 015-2009-PRODUCE, which has among its objectives g to guarantee the dynamic balance between economic growth, the promotion of investments and the conservation of resources, including the protection of the environment and biological diversity.
- Regulations for the Implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in Peru, approved by Supreme Decree No. 030-2005-AG.
- Regulation of Fiscalization and Sanction of Fishing and Aquaculture Activities, approved by Supreme Decree No. 017-2017-PRODUCE.
- National Action Plan for the Conservation of River Dolphins *(Inia geoffrensis* and *Sotalia fluviatilis*) and Amazonian Manatee (*Trichechus inunguis*) in Peru, approved by Supreme Decree No. 007-2018- PRODUCE, which aims to guarantee the conservation of river dolphins (*Inia geoffrensis* and *Sotalia fluviatilis*) and the Amazon manatee (*Trichechus inunguis*) in the Peruvian Amazon.
- National Wetland Strategy approved by Supreme Decree 04-2015-MINAM.
- Law N° 26834, Natural Protected Areas Law.
- Regulation of Natural Protected Areas Law, approved by Supreme Decree Nº 038-2001-AG.

3. Governance

3.1 Coordination of a CMP

The Governments of Colombia, Brazil, Ecuador and Peru will select a coordinator for the CMP of South American River Dolphins.

3.1.1. Steering Committee

Each country will nominate candidates for the Steering Committee, whose terms of reference are:

1. Constituted by government representatives from the range states (Colombia, Brazil, Peru and Ecuador) and by one representatives from the IWC.
2. The Steering Committee can invite observers to attend its meetings.
3. The Coordinator is an ex-officio member of the Committee.
4. A Chair will be selected by the Countries for each meeting.
5. Members serve for the duration of the CMP unless replaced by the nominating parties.
6. Provide a focus to, and monitor the delivery of, the CMP.
7. Provide guidance to, and encourage conservation actions by, the range states.
2. Report and respond, as appropriate, to requests from range states, IWC and other international fora regarding the CMP.
3. Facilitate the exchange and sharing of information.
4. Report to the IWC through the Conservation Committee.
5. Oversight the work program of the Coordinator.
6. Manage any funding provided by the IWC to implement the CMP.

3.2 Timeline for a CMP

ACTIVITIES	**YEAR 1**				**YEAR 2**			
DEVELOP THE CMP	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q 2**	**Q3**	**Q 4**
Country meetings	x	x						
Regional meetings			x					
CMP review			x					
CMP finalized and approved by countries				x				
CMP review by IWC committees				x	x			
CMP improvement						x	x	
CMP final version submission to IWC							x	

4. Science

4.1 Biology, Status and Environmental Parameters

Inia geoffrensis

Taxonomy: There is no consensus about the taxonomy of the genus *Inia*. The Society for Marine Mammalogy's Committee on Taxonomy (2019) only recognizes a single species in the genus, *Inia geoffrensis*, the Amazon River Dolphin or Boto, with two subspecies: *I. g. boliviensis* (d' Orbigny 1834), the Bolivian Bufeo, and the Boto *I. g. geoffrensis* (Blainville 1817). The Bolivian Bufeo occurs in the Iténez-Guaporé, Mamoré, and Rio Grande river basins in Bolivia (Tavera *et al*. 2010) and along almost the entire length of the Madeira River

in Brazil (Gravena *et al*. 2014a, b). The Boto occurs in the Amazon River system of Brazil, Peru, Ecuador, and Colombia, in the Araguaia-Tocantins River system in eastern Brazil (Hrbek *et al*. 2014, Siciliano *et al.* 2016a), and in the Orinoco river basin of Venezuela and Colombia (Best & da Silva 1989b, Trujillo *et al*. 2010a).

Mitochondrial DNA (mtDNA) and nuclear introns have been interpreted as suggesting that the *I. boliviensis* form is on a separate evolutionary trajectory and therefore it may deserve recognition as a phylogenetic species (Banguera-Hinestroza *et al.* 2002, Ruiz-García *et al.* 2008). However, Gravena *et al.* (2014a, 2014b), with more extensive sampling of the Madeira River system above and below the Teotônio Rapids (the proposed barrier to movement of individuals and gene flow), found that these rapids did not appear to obstruct gene flow from the upstream to the downstream areas. They also increased the distribution of the *I. boliviensis* form for almost all the Madeira River. Gravena *et al.* (2015) nevertheless concluded that "*Inia found right below Teotônio rapids actually have almost all the nuclear genome belonging to the geoffrensis form, concluding that there is a hybridization area".* Even though, botos along the Madeira River possess mtDNA of the putative species *I. boliviensis*, and they argued that even with this hybridization event in the contact zone in the Madeira River, *Inia* remain distinct and follow an independent evolutionary path.

The putative species *Inia araguaiaensis* was described from the Tocantins-Araguaia river basin (Hrbek *et al*. 2014), which is not connected to the Amazon river basin. Examination of tissue samples and osteological material from the Araguaia River revealed diagnostic molecular and morphological characters that justified separation of *I. araguaiaensis* from its proposed sister taxon (*I. geoffrensis*) from the Amazon basin (Hrbek *et al.* 2014). This finding was confirmed by Siciliano *et al*. (2016b) with stranded specimens collected in the Marajó Island.

Population: Data on the assessment of abundance of the South American river dolphin species have increased significantly in recent years, with estimates for a significant number of rivers in Brazil, Peru, Ecuador, Colombia, Venezuela, and Bolivia. In many of these cases, a standardized methodology has been used to establish comparisons (Gómez *et al*. 2012a, Williams *et al*. 2016, Pavanato *et al.* 2016, 2019, Paschoalini *et al.* 2020). However, population trend data are scarce, and the only tendency results are available at three small areas so far: the Mamirauá Sustainable Development Reserve (Brazil) (da Silva *et al*. 2018), the Amazon River in Colombia (Williams *et al*. 2016) and central area of Moxos floodplains in Bolivia (Aliaga-Rossel & Guizada in press).

There is no range-wide estimate of abundance or of trends in abundance for the Boto. Surveys have been conducted since 1979 in several areas within the species range in Bolivia, Brazil, Colombia, Ecuador, Peru, and Venezuela. Some of these studies resulted in estimates of abundance for relatively small areas. These estimates varied from a few dozen to a few thousand individuals depending on the size of the survey area and hydrological phase (e.g., Martin & da Silva 2004a,b, Gomez-Salazar *et al.* 2012b, Pavanato *et al.* 2016, 2019, Williams

et al. 2016). The interpretation of these estimates in the context of this assessment is difficult given potential biases associated with the different survey methods used and the limited understanding of the movements and the population structure of the species across different parts of its range including the entire Amazon system, the Tocantins-Araguaia system, and the Orinoco system.

A multi-season survey of botos in the 11,240 km^2 Mamirauá reserve, Brazil, between 1999 and 2001 (i.e., before the rapid decline referred to below) estimated 13,000 dolphins (Martin & da Silva 2004a). However, this result represents an extrapolation from a very small area of about 40 km^2, limited and cannot be extrapolated to other areas, notably due to the biome´s heterogeneity. A range-wide program to estimate abundance was carried out from 2006 to 2016, accounting 33 expeditions and covering nearly 32,000 km of rivers in all range states (Trujillo *et al*. 2019). Some of the results of this program revealed that density was low in rivers in Ecuador and in parts of the Orinoco River whereas densities were relatively high in rivers such as the Itenez/Guaporé at the border of Brazil and Bolivia, the Samiria River in Peru, and in the Purus River, Central Amazon, Brazil (Gómez-Salazar *et al.* 2012, Pavanatto *et al*. 2016, Williams *et al.* 2016, Frias 2019, Aliaga- Rossel & Guizada in press).

Trends in abundance for the Amazon have been assessed in two small geographical locations (relative to the vast total range of the species), as follows. Standardized transect surveys were conducted in the Amazon River in Colombia in 1993 covering 259.7 km^2 (Vidal *et al.* 1997), and in 2007 covering 592.6 km^2 (Gómez-Salazar *et al*. 2012a). In analyzing these data, Williams *et al*. (2016) used a Bayesian framework to estimate the probability of a decline conditional on a range of priors for process variance to accommodate the fact that the data were collected from three independent survey programs rather than from a single coordinated program, and as a way of attempting to account for uncertainty associated with seasonal movements. Annual variation in abundance, presented in Williams *et al.* (2016), was estimated to be in the order of 0.45 (4.5%), with a tentative decline evidence greater than 75%. As variances were substantially different among surveys (1993 and 2002 more precise than 2007), it strongly influenced the trend estimate, and comparability with other studies must be cautious. In Bolivia, using data from standardized surveys from 20 years of study in two tributaries (Ibare and Tijamuchi) and a main river (Mamore), covered an approximate area of 400 km, it showed a slight decrease in the populations, especially in Ibare and Tijamuchi River (Aliaga- Rossel & Guizada in press).

Standardized transect surveys conducted monthly since 1994 in the Brazilian Amazon around the 11,240 km^2 of the Mamirauá Sustainable Development Reserve revealed that between 2000 and January 2017 there was an annual average rate of decline in boto encounters of 6.7% (CI 5.7 - 7.7%) in the Mamirauá study area, which implies a halving of the population each decade (da Silva *et al.* 2018). In the early 2000s, there was a rapidly expanding fishery for the piracatinga (*Calophysus macropterus*), a scavenger catfish species of economic importance, using dolphin carcasses as a source of bait began in the Amazonian Brazilian rivers. There is evidence that the annual survival of botos that spend at least some of their

time in the same area but likely range much more widely, has been affected by the piracatinga fishery. Boto survival rate analysis is complicated by having evidence to vary with time (Mintzer *et al*. 2013) but a decline cannot be discounted.

Sotalia fluviatilis

Taxonomy: Until two decades ago, the genus *Sotalia* was considered monotypic with two ecotypes, one riverine and one marine (da Silva & Best 1996). However, genetic (Cunha *et al.* 2005, Caballero *et al.* 2007) and morphological (Monteiro-Filho *et al.* 2002, Fettuccia *et al.* 2009) studies subsequently showed that the two ecotypes should be recognized as separate species, *Sotalia fluviatilis* in the Amazon river basin and *S. guianensis* in marine and estuarine waters of eastern South and Central America (da Silva & Best 1996, da Silva *et al*. 2010).

The *Sotalia* dolphins recorded at Ciudad Bolívar, some 300 km upstream of the mouth of the Orinoco River, were confirmed by molecular genetics to be an isolated and probably independent population of *S. guianensis* occurring as far as 550 km upriver in the Orinoco (Caballero *et al*. 2017).

Although the taxonomic status of *Sotalia* dolphins in the southern freshwater portion of Maracaibo Lake (in Venezuela near the border with Colombia) is not yet fully established, there is no connection between Maracaibo Lake and the present-day known range of *S. fluviatilis*. Maracaibo Lake has been isolated from the Amazon basin for the last 8-10 million years (Hoorn *et al*. 1995). Thus, the likelihood that *Sotalia* dolphins from Maracaibo Lake are of the same species that occurs in the Amazon basin is remote. The dolphins in Maracaibo Lake are included in the assessment of *S. guianensis* (Secchi *et al*. 2018).

At this point it is unclear how far out into the ocean, under the influence of the Amazon freshwater plume, *S. fluviatilis* occurs, or how far *S. guianensis* occurs into the estuary; there is even a possibility of some hybridization between the two species at the mouth of the Amazon and surroundings, meriting further efforts in investigation.

Population: There is no information on the population structure of *S. fluviatilis*. The only data available suggest that the species has moderate to high genetic diversity, since 12 individuals from the same location in the central Brazilian Amazon had five different control region haplotypes (Cunha *et al.* 2005), and 21 river dolphins from the Peruvian, Colombian and Brazilian Amazon had 13 haplotypes (combining the control region and ND2, Caballero *et al.* 2007). Based on 26 samples of 11 locations from three Amazonian regions (Brazil n=4, Colombia n=4, Peru n=3), Caballero *et al*. (2010) found connectivity among the sampled regions and identified divergent haplotypes in the extremes of the species distribution. The same authors also found that compared to the boto, tucuxis showed high mitochondrial diversity overall, suggesting a surprisingly large effective population size and relatively high female gene flow throughout the sampled regions of the main river and its tributaries. Also,

using nuclear markers it was possible to evidence population differentiation. The Brazilian Amazon was clearly separated from the Peruvian/Colombian Amazon, suggesting reduced migrations between tucuxis of eastern and western Amazon (Caballero *et al*. 2018).

There are no estimates of total population size for the tucuxi, though the species appears to have been relatively abundant throughout most of its range at one time, and may still be in some areas (Da Silva & Best 1996, Leatherwood *et al*. 2000, Gomez-Salazar *et al*. 2012a, Flores *et al*. 2017). Density estimates for some relatively small areas have been published, though many may be out of date if population declines mirror those in and around Mamirauá (see below), but again a note of caution regarding the very limited study area from which the Mamirauá levels were generated and extrapolated. In the Amazon basin, an average density (encounter rate) of approximately 1.1 dolphins/km of river was estimated between Manaus and Tefé (~500 km) in the Solimões River in 1979 (Magnusson *et al*. 1980). Four boat surveys of about 1,525 km each, from Manaus to Leticia, resulted in a mean estimate of 768 (± 104.7 SD) river dolphins per survey or 1.02 dolphins/km² in 1983-1984 (da Silva & Best 1994, da Silva *et al*. 1984). Mean density along the margins of main rivers in the central Amazon, Brazil (1,320 km of strip survey) was estimated at 3.2 dolphins/km² between 1999 and 2001. About 54% of the individuals were found within 50 m of the edge of rivers and channels (Martin *et al*. 2004).

Coimbra *et al*. (2015), using mark and recapture analysis in a 13.5 km^2 area of the junction of the Solimões and Japurá rivers and the Mamirauá Lake system, estimated an abundance of 119 tucuxis in the studied area from March to June of 2013 (95% confidence interval = 105-150). Because the magnitude of threats may differ between tributaries, caution should be taken in extrapolating from these small study areas. In Purus River, the most productivity area in terms of fishery (that supplies the Manaus fish market), the estimated density of tucuxi was 12.73 ind/km² (CV = 0.49), with an estimated abundance of ~9,000 individuals (538 km² total area) during the 2012 survey at the lower course of this river (Frias 2019).

About 350 Tucuxis were sighted in Amazon-Maranon rivers and 469 in the Samiria-Yanayacu Grande river system in Peru between July 1991 and August 1993 (Leatherwood 1996, Leatherwood *et al*. 2000). Encounter rates in this area were within the range for these river dolphins elsewhere in South America and it is thought that populations were stable over the period between 1991 and 2000 (McGuire 2002). Mean encounter rates in the Peruvian Amazon were 0.1 - 0.8 dolphins/km in rivers and 0.05-2.17 dolphins/km² in lakes (28 surveys over a four-year time period; McGuire 2002).

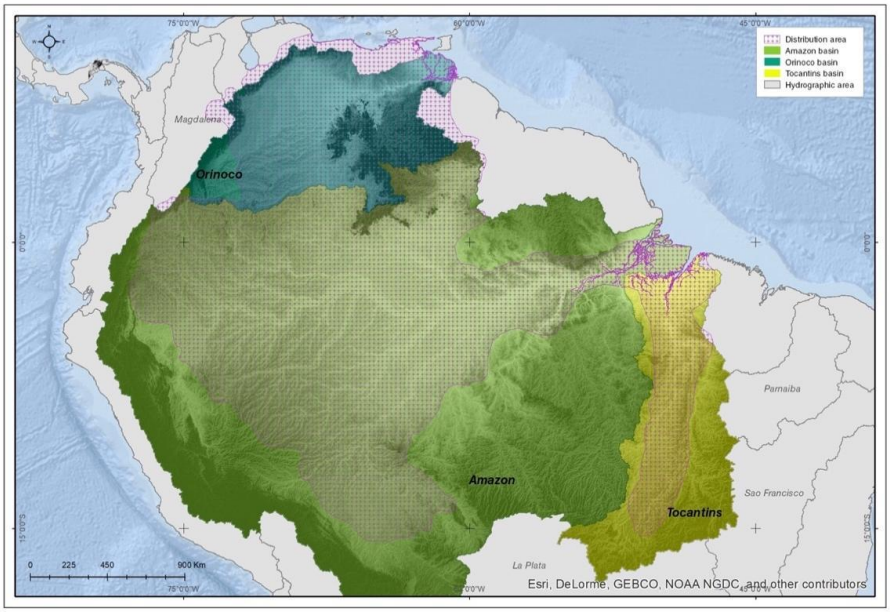
The species was reportedly common in Colombia in the Loretoyacu River, in the Tarapoto lake, and in the El Correo Lake system from March to December 1993 (Vidal 1994). Vidal *et al*. (1997) estimated that in 1993 there were 409 tucuxis (CV = 13%) along 120 km of the Amazon River bordering Colombia, Peru, and Brazil. Density was highest in lakes (8.6 dolphins/km²), followed by areas along main banks (2.8) and around islands (2.0). Along 2,704 km of rivers in Colombia, Brazil, Ecuador, Peru, and Venezuela, Gómez-Salazar *et al*.

(2012a) estimated 764 tucuxis between May 2006 and August 2007 with high densities for lakes (12,3 ind/km) and confluences (28,14 ind/km). Williams *et al.* (2016), for the same area sampled by Gómez-Salazar *et al.* (2012a), indicates a relatively stable population of tucuxi with a tentative evidence (<75% chance) of increasing population.

The only data available for the River Negro (Brazil) comes from two surveys between Novo Airão and Manaus, held during April and October 2016, during flooding and receding water periods respectively (582 km and 410 km each) in which 333 and 244 tucuxis were sighted with the most common group size of two individuals (Valle 2017). Because the magnitude of threats may differ between regions, and sampling methods and analytical approaches were different in many of the studies referenced, caution should be taken in comparing and extrapolating data to other areas in this river basin.

The one area for which a robust time-series analysis of population trend over a relatively long period is available is the 11,240 km^2 Mamirauá Reserve in Brazil, which is adjacent to the Amazon River main stem. Based on 363 standardized surveys of a 30 km transect conducted at regular intervals across all seasons from November 1994 to January 2017, and taking cyclical water level changes into account, the tucuxi population in that area was estimated to have declined by 7.4% per year over the study period, representing a halving of the number counted every 9.04 years (da Silva *et al.* 2018).

Distribution, migration and movements: *Inia* is distributed in the Amazon, Orinoco and Tocantins basins, as shown the following map (source: Omacha Foundation):



Sotalia is distributed in the Amazon, Orinoco basins, as shown the following map (source: Omacha Foundation):

4.2 Critical Habitats Associated with river dolphins

River dolphins inhabit an extensive area along three river basins. Monitoring their critical habitats should be oriented to areas where aquatic ecosystem transformations have occurred by hydroelectric plants (Tocantins, Madeira, Tapajos), areas with high levels of bycatch, and areas contaminated by hydrocarbons and heavy metals such as mercury.

4.3 Attributes of the Populations to be Monitored

Over the past ten years, knowledge about the abundance of river dolphins in South America has increased. However, there is limited information on population trends. Consistent information exists only for two areas, the Mamiraua Sustainable Reserve in Brazil (Martin *et al.* 2018) and the Amazon River in Colombia (Williams *et al*. 2015).

It is important to develop new studies on population trends in areas where illegal hunting occurs, such as in the piracatinga fishery that uses dolphin meat as bait, as well as where fragmentation and loss of habitat due to hydroelectric facilities have been installed.

Another key aspect to consider in the population analysis of these species is to define management units. Currently, the IUCN only recognizes *Inia geoffrensis* and *Sotalia fluviatilis* as valid species, but the South American scientists consider *I. boliviensis* and *I. araguaiaensis* as different species. These last two species face greater risk because they have more limited geographic distribution. In the case of the Araguaian dolphin, the situation is even more critical due to its reduced population numbers compares to the Amazon river basin (Paschoalini *et al*. 2020) and for having isolated individuals in segments of the Tocantins River inside dams reservoirs.

5. Threats, Mitigation Measures and Monitoring

5.1 Identification of Threats

Information on known and suspected threats to the population of botos and tucuxis. The main longstanding threats to river dolphins are incidental mortality in fishing gears, deliberate killing for fish bait or predator control, damming of rivers, and environmental pollution from organochlorines and heavy metals such as mercury (Best & da Silva 1989a, 1989b, da Silva 2009, IWC 2007, Trujillo *et al.* 2008).

Incidental mortality has not been systematically monitored in most areas but is known to be a major threat throughout the boto's and tucuxi´s range (Trujillo *et al.* 2010b). Similar to other small cetaceans, river dolphins are vulnerable to entanglement in a variety of nets (lampara seine nets, fixed gill nets, drifting gill nets) (Best & da Silva 1993, da Silva & Best 1996, Martin *et al*. 2004, Siciliano *et al.* 2016a). They also die in drop traps intended to catch large fish or Amazonian manatees (*Trichechus inunguis*) in the flooded forest in Peru (Reeves *et al.* 1999).

Carcasses of botos with evidence of fishery involvement have been observed in the Japurá and Solimões rivers around Mamirauá Reserve and the Orinoco basin (Loch *et al*. 2009, Iriarte & Marmontel 2013b, Trujillo *et al.* 2010b). The use of long nets across the river and in the mouth of streams and some lakes increases the chance of dolphins getting entangled and drowning. The proportion of carcasses found by observers is believed to be very small because most of them would be expected to be taken by scavengers or disposed of by fishermen within 24 hours of death. In Tefé, at least 176 botos were estimated to have died in 2010 due to interactions with fisheries (Brum 2011, Brum & Da Silva 2016).

The river dolphins, specifically *Inia*, are regarded as a strong competitor for resources. In some areas dolphins steal or damage fish in nets, upsetting the fishermen. People usually report to killing or hurting the animals in many ways. They get shot, poisoned, hit or in the best case, they are frightened with sounds (Trujillo *et al*. 2010a). At least one boto found dead at Tefé Lake, Brazil, had injuries consistent with an intentional human attack (Lock *et al*. 2009). Similar conflicts have been reported in Colombia (Bonilla *et al*. 2008, Trujillo *et al*. 2010b).

Overfishing should be regarded as a threat in itself since in addition to the operational interactions that occur with dolphins (bycatch), it also represents the depletion of the dolphins' food resource, which can lead them to abandon geographic areas and even probably affect their reproductive success.

The use of river dolphin products was first reported in 1986 concerning both species (Best & da Silva, 1989b). Local communities use eyes, teeth, genitalia and skin. Oil is extracted from

the skin to use it against respiratory diseases. Other body parts are used as love charms and in traditional medicine (Best & da Silva 1989b, Trujillo *et al*. 2006, Gravena *et al*. 2008, Sholl *et al*. 2008, Aliaga- Rossel 2010, Dos Santos *et al*. 2018). This threat was probably important during the 70s and 80s and in many cases corresponded to incidental catches of river dolphins in nets. Gravena *et al*. (2008) however found that in several markets, the eyes were mainly from pigs and not from *Inia*.

In Peru, the hunt for river dolphins for the conflict with fisherman persists, between 2015 is considered one of the main threats, both species, *Sotalia* and *Inia*. Both species have long been subject to accidental entanglement in gillnets (Alves *et al*. 2012, Loch *et al*. 2009). However, despite being theoretically protected by law, river dolphins are still captured directly for use as bait in Peru for 15 years or more (Gómez *et al*. 2008, Alves *et al*. 2012, Brum *et al*. 2015). For Peru, through surveys conducted by Campbell & Siguetto (2016) in the ports of Caballococha, Requena and Bagazán (Loreto), bycatch of more than three individuals per year has been recorded, in some cases reaching up to 10 individuals by year. The main mentioned that *I. geoffrensis* is caught more frequently than *S. fluviatilis*, and that, during the period of emptying (no rain), between July and November, an increase in the bycatch of dolphins occurs. This information coincides with the results of da Silva (2009) and the breeding season of these animals.

The deliberate killing of botos for use as bait in the piracatinga fishery (*Calophysus macropterus*) (da Silva & Martin 2007, 2017, Gómez-Salazar *et al.* 2008, Trujillo *et al.* 2010b, da Silva *et al.* 2011, 2018, Mintzer *et al.* 2013, Iriarte & Marmontel 2013a, Brum *et al.* 2015) is probably the most serious human-caused threat to this species, though incidental drownings in monofilament fishing nets are also likely to cause widespread mortality. The directed hunt, which appears to have begun in Brazil in 1998, has been noticed since around 2000 when is believed to be expanding to other regions, as result of a growing demand from the Colombian market, boosted by the reduction of stocks of capaz in the Magdalena River (Perez 2018). The government of Brazil reported the killing of 354 botos in 2006 but this number is expected to be an underestimation because it was solely based on interviews with fishermen (IWC 2007).

Estimates of the numbers of river dolphins killed are very difficult to obtain, and those that have been attempted have varied between 300 botos/year in just one area (Tefé, Brazil) to more than 4,000 botos/year for the whole Brazilian state of Amazonas (Serrano *et al.* 2007, da Silva *et al.* 2011, Brum *et al.* 2014). An evaluation of the piracatinga fishery suggested that almost 1,200 tons of this fish was traded from Brazil to Colombia every year and that a substantial proportion of the catch apparently was made using river dolphins for bait. The main market was formerly in Colombia, but for the years 2008-2014 this fish was also sold in the states of Amazonas, São Paulo, Bahia, Minas Gerais, and elsewhere in Brazil under the name of "douradinha" among others (Flores *et al.* 2008, Trujillo *et al*. 2010b, Brum *et al*. 2015, Cunha *et al*. 2016).

Despite a ban on commercial piracatinga fishing introduced by the Brazilian government in 2015 to prevent river dolphin killing, there is evidence that this activity continues (da Silva & Martin 2017). It is important to emphasize that this directed hunting may be widespread in areas where piracatinga are common, mainly in areas close to Colombia, the main market center (Trujillo *et al.* 2010b, Brum *et al.* 2015), and that it occurs in addition to the longstanding problems of bycatch (see above) and control killing (see below). Killing of dolphins for use as bait has also been confirmed in Venezuela (Portocarrero-Aya *et al.* 2010, Diniz 2011) and reported in media and unpublished reports in Peru (Trujillo, unpublished data, Gilleman, pers. comm. to Marmontel, Jan 2020) and Bolivia (Escobar-WWF, Rey Ortiz, Coca Mendez, Cordova & Van Damme, pers. comm. to F. Trujillo) and Bolivia (M. Escobar-WWF, G. Rey, C. Coca, L. Cordova and P. Van Damme, pers. comm. to F. Trujillo).

River dolphins are also killed deliberately in some areas because they damage fishing nets and are regarded as competitors for fishery resources (Reeves *et al*. 1999, Araújo & Wang 2012, Williams *et al.* 2016, Siciliano *et al.* 2016a). At least one boto found dead at Tefé Lake, Brazil, had injuries consistent with an intentional human attack (Loch *et al*. 2009). Similar conflicts have been reported in Colombia (Bonilla *et al.* 2008, Trujillo *et al.* 2010b) and in the upper Purus River in Perú (Van Damme, pers. comm.). Fishing with explosives, although illegal in most countries, is common in some areas of the Amazon Basin (Goulding 1983, Smith 1985). In Venezuela, this practice is still in use and has been reported as a threat to botos (Portocarrero-Aya *et al.* 2010). Fishing with explosives threatens botos and tucuxis due to concussive effects.

Fishermen also reportedly attempt to kill dolphins attracted to fishing operations to prey on stunned or dead fish (Best & da Silva 1989a). At least in Peru, fishermen attempt to kill dolphins by injecting live fish with toxins and tossing them into the water near the animals (Reeves *et al.* 1999, McGuire & Aliaga-Rossel 2010). The killing of 22 botos in Caballo Cocha, Peru, was reported in 2008 (Trujillo, unpublished data). A similar practice, using *timbó* (a poison from a vine, usually employed by indigenous tribes to catch fish) has been reported for Tefé River (Marmontel, unpubl. data).

Water development projects are another major concern and an increasing threat to river dolphin species (Araújo & Wang 2014, da Silva *et al.* 2015, Paschoalini *et al.* 2020). Over 400 dams could be constructed in the Amazon basin eventually (Fernside 2008, Finer & Jenkins 2012, Forsberg *et al*. 2017). Currently, there are 142 dams operating or under construction and 160 proposed for rivers draining the Andean headwaters of the Amazon (Anderson *et al*. 2018). Despite the high number of operating dams and projects in the Amazon region today, and knowing that botos occur above and below rapids in some rivers, of the 83 the rivers with operating hydroelectric dams in Brazil only 13 have any kind of study involving Botos (da Silva *et al*. 2015). Most of these studies have shown that the dams fragmented, isolated, and eliminated connectivity of boto populations (da Silva *et al*. 1998, Araújo & Wang 2014, Paschoalini *et al*. 2020).

Dams in the Tocantins-Araguaia, Amazon, and the Guri and Tocoma dams in the Caroní River, an Orinoco tributary, have probably degraded downstream habitat due to their effects on flow and temperature regimes (Ward & Stanford 1989, Ligon *et al*. 1995, Kondolf 1997) although in the short term, observations of river dolphins feeding on concentrations of fish immediately downstream of some dams may be seen as "beneficial," especially if protective measures are better enforced there (da Silva *et al*. 1998, Araújo & Wang 2014).

The Jirau and Santo Antonio dams in the Madeira River have interrupted downstream movements of *I. boliviensis* populations and led to population fragmentation. Additional dams are bound to restrict dolphin movements, contribute to more population fragmentation, and continue to alter and degrade the habitat by opening commercialization networks, improving navigability, and increasing road access (Best & da Silva 1989a, Williams *et al.* 2016). Especially in Tocantins-Araguaia basin, dams might fragment Araguaian boto population up to 12 subgroups, isolated in small and degraded dam reservoirs (Paschoalini *et al*. 2020). This also affects fish reproductive migration leading in a reduction of food availability. In addition to habitat fragmentation, one of the threats with the greatest impact corresponds to the effect of hydroelectric dams in the Andean region, where the flow of sediments and key nutrients for the productivity of the Amazon rivers that sustains fish populations, fisheries and food security of riverine communities is notably diminished and interrupted in some cases (Finer & Jenkins 2012, Anderson *et al.* 2018).

Chemical contamination is another potential threat to the South American river dolphins. Mercury is often used to separate gold from soil and rock in mining operations along the Amazon (Pfeiffer *et al.* 1993, Venturieri *et al.* 2017, Martín-Doimeadios *et al*. 2014, Berzas-Nevado *et al.* 2010). A study of mercury in the sediments and floating plants in the Tucuruí Reservoir of the former Tocantins River, Brazil, emphasized the risk of mercury accumulation in the bed of non-flowing waters (Aula *et al*. 1995). Total mercury content in boto milk from one individual sampled near the city of Manaus (176 ng/ml = 0.176 ppm) was considered close to the minimum level of methylmercury toxicity in human adults (Rosas & Lehti 1996).

Recent evaluations of mercury in river dolphins have been carried out in the Amazon and Orinoco basins. Concentration values of total mercury in river dolphin muscle from the Amazon and Orinoco basins varied from 0.003 to 3.990 $mg.kg^{-1}$ Hg, with the highest values found for botos from the Orinoco (Mosquera *et al*. 2019). In Peru, illegal gold mining is rapidly expanding throughout the south in Madre de Dios Region, although mercury pollution is heavy, the panorama for the north Amazonia is quite different, there no mining activity. Nevertheless, the border of Madre de Dios and Ucayali region have been affected also by mercury pollution. High level of mercury have been reported in fishes and people, in this area remains a small population of river dolphins.

High concentrations of organochlorine compounds (DDT, PCB, HCH, HCB, Mirex) and organobromine compounds (PBDE) were also found in boto samples from different areas of

Brazil, including the Solimões, Japurá, Negro, and Madeira rivers (Torres *et al.* 2007, Lailson *et al.* 2008). All milk samples (n=62) from botos in the Mamirauá Reserve contained evidence of organochlorine accumulation (PCBs were present in 100% of the samples, DDT in 64%, HCHs in 95%, HCB in 64%, and Mirex in 66%). Pesticide concentrations measured in these samples were similar to those verified in the milk of other aquatic mammals and humans, indicating substantial exposure of dolphins calves to organochlorines at a critical developmental stage. The effects of bioaccumulation of mercury and other chemical contaminants in botos are unknown but the high levels recorded in the Amazon ecosystem are a reason for concern.

The increase of the human population leads to increased water pollution levels resulting from agriculture, industry and other anthropogenic activities. This threat has been reported in 2000 regarding both species of dolphins and also in 2003 for *Inia* (IWC 2000, Reeves *et al*. 2003). The population increase was suggested as a threat especially in Amazonian areas belonging to Colombia and Brazil. In Ecuador, this is also a threat and it is mainly due to the industrial expansion of oil companies in the Amazonian area. Human population growth has a similar pattern in all countries in the Amazon river basin, with large deforested areas along the river shore. It is currently estimated that the human population in the Amazon basin exceeds 34 million people, with large urban centers such as Manaus and Belém do Pará in Brazil.

Different levels of habitat transformation are affecting the ecological integrity of the Amazon, Tocantins-Araguaia and Orinoco river Basins. The deforestation is dramatic in Brazil and Peru due to logging and commercial agriculture. In Brazil the main threat for the forest has been deforestation for cattle ranching, and more recently biofuel crops, specifically soybeans, that provides economic and political stimulus for new highways and infrastructure projects, which further accelerate deforestation patterns (Andersen *et al*. 2002, Fearnside 2017, Lovejoy & Nobre 2018). In total, an estimated 790,000 km^2 of the Amazon have been lost to deforestation.

One of the main drivers of deforestation is fire, whose impact on biodiversity and terrestrial and aquatic ecosystems is not yet completely understood. In 2019, for example, fires increased in the Amazon, with more than 90,000 outbreaks reported. Between 2000 and 2006 Brazil lost nearly 15,000 km^2 of forest in the Amazon, and the process appears not to be abating. In Bolivia, 60,000 km^2 of chiquitano forest were burned in 2019, affecting the highly sensible headwaters of the Iténez basin, which might be of crucial importance for upstream migrating dolphins during the high-water season. The main impact of deforestation in aquatic ecosystems is associated with the reduction of allochthonous food for fish, especially in small tributaries where an important number of species rely on the provision of seeds and fruits from the flooded forest.

Oil exploration and exploitation are taking place in most of the countries where river dolphins are located. Perforations and use of big machinery increase the risk of spills. This has been observed recently in the Ecuadorian Amazon in the area of the Cuyabeno River, where

exploration and exploitation fields are located inside natural parks and reserves. Other kinds of oil spills were due to the Colombian guerrillas in the Colombian Orinoco during the 1980s. Their guerrilla warfare operations lead to water contamination and affect the habitat and fish resources (Trujillo *et al.* 2010b).

As a result of the unregulated eco-tourism, boat traffic is generating underwater noise pollution that affects dolphin populations and increasing collisions risk that can injure dolphins (Zurita 2019). This activity has been reported since 1994 to 2008 in almost all Action Plans. Additionally, continuous presence of boats can interfere with reproduction and feeding behavior.
Tourism and specifically dolphin watching may be a good economic alternative for riverine communities in the Amazon and Orinoco basins (Frias 2014, Silva Jr. *et al*. 2019).

These activities are promoted to tourist visiting the Brazilian Amazon and they were able to feed wild botos at some locations and this lucrative activity was spreading to new locations. However, good practices and ethical codes should be developed to prevent this activity from becoming a threat. During the last 15 years, some people have been implementing unregulated dolphin feeding programs in some locations in Brazil creating serious problems that may produce injuries for dolphins and people (Loch *et al.* 2009, Romagnoli *et al*. 2011, Pinto de Sá Alves *et al*. 2012, Frias 2014). Additionally disregarding the Brazilian Environmental Agency rules for the purpose of maintaining aquatic mammals species at condition of semi captivity (IBAMA 2002). In many cases, wild botos have become habituated to human contact. Fortunately, in 2017, the Brazilian government regulated the activity of swimming with dolphins, prohibiting feeding on dolphins. Currently, few authorized sites near Manaus where dolphins are fed only twice a week (Resolução nº 28/2018 Conselho Estadual do Meio Ambiente (Cemaam)).

In Colombia during the last 8 years, guidelines for responsible observation of aquatic mammals have been elaborated, specifically for river dolphins (Trujillo *et al*. 2009). Additionally, more than 1000 tourist guides have been trained in different regions of the Amazon and Orinoquia, and printed material with the guidelines delivered (Trujillo & Mosquera-Guerra 2018). In Bolivia, a long-term program promoting good practices in river dolphin was established. This program involves the participation of several community-based and tour companies. Despite a strong commitment, some companies continue promoting activities with full contact with dolphins (Aliaga-Rossel *et al.* 2014).

Actual/Potential Threat	**Cause or related activity**	**Evidence**	**Possible Impact on population (maybe an educated guess)**	**Priority for Action**	**Actual/possible mitigation measures**
Bycatch	Gillnetting	Moderate	Possibly high mortality or serious injury	Highest; Research and Mitigation	Pingers, gear modification; closed areas and/or seasons; reduce fishing effort




Deliberate killing	For use as piracatinga	Low	Population decrease	Medium	Moratorium, alternative bait, other economic incentives
Deliberate killing/ injuring/harassing	Retaliation, perception	Moderate	Population decrease	Medium	Awareness programs
Loss of connectivity in rivers	Dam construction	Strong	Fragmentation, isolation	Highest; Research and Mitigation	Change the energetic matrix, building in upriver areas, translocation of animals
Metal pollution (including mercury)	Industrial development, sewer discharges, illegal gold mining	Moderate	Mortality, impaired reproduction, health issues	Medium	Strict implementation of existing measures
Oil spills	Oil exploration, barge traffic	Low	Mortality, impaired reproduction, health issues (effects synergistic fitness, health, viability)	Medium	Enforcement of safety procedures, travel corridors for vessels
Chemical pollution	Industrial development, sewer discharges, agricultural	Low	Mortality, impaired reproduction, health issues	Medium	Enforcement of safety procedures, contingency plans
Boat strikes	Increased boat and barge traffic	Low	Mortality, injury	Medium	Propeller guards, zoning
Depletion of fish stocks	Lack of food	Strong	Mortality, decreased fitness	Highest; Research and Mitigation	Fisheries management
Deforestation	Sedimentation, change in water cycles, food sources	Strong	Decreased fitness	Medium	Law enforcement, forestry management

6. Actions

These form the key component of any CMP. While there may be overlap, these can generally be incorporated under the following categories: RES = research, MON = monitoring, MIT = mitigation, PACB = public awareness campaigns and capacity building, and COORD = Coordination).




Actions	Basin	Countries	Tentative Timeline
RES-1. Continue to investigate Population Structure			
RES 1.1. Assess taxonomy, population structure and stock identify of Amazon river dolphins through molecular techniques.	All areas	All countries	2030
MON-1. Monitor Abundance, Trends and Bycatch			
MON. 1.1. Estimate abundance and trends in key areas identified and prioritized.	All areas	All countries	2030
MON 1.2. Evaluate use of alternate, more economic, standardize methods to assess trends in abundance (e.g. passive acoustics monitoring).	All areas	All countries	2028
MON.1.3. Estimate the level of bycatch in Amazonias fisheries.	All areas	All countries	2030
MON. 1.4 Establish and strengthen onboard observer programs.	All areas	All countries	2030
MON. 1.5. Eradicate killing of river dolphins to be used as bait in the piracatinga fishery	Amazon/Orinoco	All the countries	2025
MON. 1.6. Evaluate the ecological effect of habitat fractioning caused by dams in river dolphins.	Amazon/Orinoco/ Tocantins	Brazil, Peru	2025
MON. 1.7. Assess mercury and other heavy metals contamination on river dolphins and fish.	All areas	All countries	2025
MON. 1.8. Develop and implement a river dolphins database with information on abundance, distribution, threats, research efforts, and research gaps.	All areas	All countries	2025 - 2035
MON. 1.9. Assess and monitor the translocation of dolphins in rivers with dams (i.e. Tocantins).	All areas	Brazil, Peru	2025
MON. 1.10. Update the processes of categorization and recategorization of river dolphin species according to IUCN criteria and the regulations of the countries to generate concrete actions on the threat factors.	All areas	All countries	2025
MIT-1. Mitigate Bycatch/habitat loss/pollution			

MIT 1.1. Evaluate methods to reduce bycatch (e.g. development of alternative fishing methods, pingers, fishery agreements, no-take areas).	All areas	All countries	2025
MT.1.2. Monitor river dolphins in protected areas with the support of rangers and local communities.	All areas	All countries	2025
MIT 1.3. Training workshops for fishermen to promote good fishing practices and eventually dolphin rescue and release.	All areas	All countries	2025 -2030
MIT 1.4. Increase surveillance, control and enforcement for the conservation of the river dolphins in protected areas and critical habitats.	All areas	All countries	2025 - 2030
MIT 1.5. Evaluate the potential impact of future dams projects on river dolphins an aquatic diversity.	All areas	Brazil, Peru	2025
MIT. 1.6. Implement provisions of the Minamata Convention for the reduction of mercury in the Amazon, Orinoco and Tocantins basins.	All areas	All countries	2025 - 2030
MIT. 1.7. Promote actions to reduce deforestation and habitat loss.	All areas	All countries	2035
MIT 2. - Develop or Implement Conservation Strategies			
MIT 2.1. Identify strategic and priority sites for the life cycle of species.	All areas	All countries	2030
MIT 2.2. Prioritize the most effective conservation actions at site and landscape level.	All areas	All countries	2030
MIT. 2.3. Identify and specify the conservation status of the species in the planning instruments of the conservation strategies.	All areas	All countries	2030
MIT. 2.4. Design and harmonize cross-border cooperation actions.	All areas	All countries	2030
MIT 2.5. Create and implement Management Plans for existing PAs in Colombia, Brazil, Ecuador and Peru incorporating river dolphins as key species.	All areas	All countries	2030
MIT. 2.6. Promote new Ramsar sites in key areas for river dolphins to strengthen management.	All areas	All countries	2025 - 2030

MIT-3. Encourage the implementation of the National Action Plan to Reduce the Interactions of river dolphins with Fisheries			
MIT. 3.1. Strengthen control and monitoring measures to avoid the use of river dolphins as bait for the piracatinga fishery.	All areas	All countries	2025
MIT. 3.2. Strengthen or establish responsible trade chains that privilege trade in products obtained responsibly.	All areas	All countries	2025
MIT. 3.3. Encourage technical support between local communities, fishery authorities and Governments to control the piracatinga fishery based on the killing of river dolphins	All areas	All countries	2025
PACB-1. Develop a Strategy to Increase Public Awareness of the river dolphins			
PACB 1.1. Design and implement a public awareness campaign promoting river dolphins conservation.	All areas	All countries	2025 - 2030
PACB 1.2. Include in educational programs topics related to ecology and conservation of river dolphins.	All areas	All countries	2025
PACB 1.3. Build capacity on river dolphin conservation focused on different stakeholders (e.g. fishermen, park rangers, tourism agencies, indigenous communities, hydroelectric companies).	All areas	All countries	2030
PACB 1.4. Socialize in each country the policy and legal instruments, action plans, and initiatives around river dolphin conservation (stakeholders, fishermen, indigenous communities).	All areas	All countries	2025
PACB-2. Include the river dolphins in Bilateral and Multilateral Discussions			
PACB 2.1. -Propose on the OCTA agenda the coordination for the implementation of the CMP.	All areas	All countries	2025
PACB 2.2. Propose support for the implementation of the CMP on the agenda of the Neighborhood Commissions.	All areas	All countries	2025
PACB 2.3. - Promote collaboration agreements among stakeholders, such as NGOs and research institutes (2025-2035, continuo).	All areas	All countries	2025 - 2030

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