



**CONVENTION ON
MIGRATORY
SPECIES**

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Agenda Item 31.4

**PROPOSAL FOR THE INCLUSION OF THE LAULAO CATFISH (PIRAMUTABA)
(*Brachyplatystoma vaillantii*) ON APPENDIX II OF THE CONVENTION**

Summary:

The Governments of Brazil and Panama submit the attached proposal for the inclusion of the Laulao Catfish (Piramutaba) (*Brachyplatystoma vaillantii*) on Appendix II of CMS.

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PROPOSAL FOR THE INCLUSION OF THE LAULAO CATFISH / PIRAMUTABA¹ (*Brachyplatystoma vaillantii*) ON APPENDIX II OF THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

A. PROPOSAL

Inclusion of Amazonian Laulao Catfish (Piramutaba), *Brachyplatystoma vaillantii*, in Appendix II.

B. PROPONENT

Governments of Brazil and Panama

C. SUPPORTING STATEMENT

1. Taxonomy

1.1 Class: Actinopterygii, Superorder Ostariophysi

1.2 Order: Siluriformes

1.3 Family: Pimelodidae

1.4 Genus and species: *Brachyplatystoma vaillantii* (Valenciennes, 1840)

1.5 Scientific synonyms:

Platystoma vaillantii Valenciennesin Cuvier & Valenciennes, 1840, *Bagrus reticulatus* Kner, 1858, *Bagrus piramuta* Kner, 1858, *Brachyplatystoma parnahybae* Steindachner, 1908

1.6 Common name(s):

English: Laulao Catfish

Spanish: Blanco-pobre, Pirabutón, Bagre, Manitoa

Portuguese: Piramutaba, Mulher-ingrata, Pira-botão



Figure1. *Brachyplatystoma vaillantii* (Piramutaba). From Barthem & Goulding 2007.

2. Overview

The piramutaba, *Brachyplatystoma vaillantii* (Figure 1), is a large freshwater migratory catfish found in the Amazon and Orinoco basins and also occurs in Guiana coastal rivers and the Parnaíba river south of the Amazon estuary (Reis et al. 2003, Ramos et al 2014). Piramutaba migrations are best known in the Amazon basin, where a single population migrates annually in the main turbid rivers of Brazil, Peru, Colombia and Ecuador, ranging at least 3,129 km upstream from the Amazon estuary to the western Amazon (Barthem and Goulding 1997,

¹ Referred to by its Portuguese name, Piramutaba, throughout the document.

Batista et al. 2004, Utreras-Bucheli 2010, Agudelo-Cordoba et al 2013, Cella-Ribeiro et al 2016, Barthem et al 2017, Formiga et al. 2021).

Piramutaba is an important species in commercial fisheries in the Amazon, mainly in the Amazon estuary (Barthem and Goulding 2007). Studies conducted between the 1990s and 2000s indicate that the piramutaba stock is overfished (Dias-Neto 1991, Barthem and Petreire Jr 1995, IBAMA 1999, Alonso and Pirker 2005, Prestes et al. 2022). In view of this, it is important to emphasize what was discussed by Barthem and Fabré (2004), highlighting that the management of Amazonian fishing resources is necessary both for the conservation of the Amazonian aquatic systems and for the maintenance of an important socioeconomic activity for the local population. Considering the importance of the species for commercial fishing in the country, several regulations for fishing activity were established.

In addition, a series of factors, in synergy, have the potential to threaten the species. A combination of overfishing (Barthem and Petreire Jr 1995, IBAMA 1999, Alonso and Pirker 2005, Prestes et al. 2022), deforestation and mining (Finer et al. 2013, Castello and Macedo 2015, Goulding et al. 2019, Capitani et al. 2021), and the construction of numerous proposed hydroelectric dams for headwater rivers (Finer and Jenkins 2012), may impact fish migrations and affect flood pulse and sediment flow (Forsberg et al. 2017, Hauser 2018).

The aforementioned impacts have the potential to affect the piramutaba life cycle and reduce its population across the Amazon basin. This is because piramutaba belong to a single population that spawns in the turbid rivers of the Western Amazon, but whose nursery is in the Amazon estuary, making the migratory fish dependent for their existence on the connectivity of rivers from near the Atlantic to the Andes.

The management of piramutaba fisheries and integrated actions to mitigate the impacts generated by large infrastructure projects would benefit from international cooperation among countries that share this migratory fish population. Spawning areas are located in Colombia, Ecuador and Peru, and perhaps to some extent in far western Brazil. In contrast, the main nursery is located in Brazil in the Amazon estuary. All of these Amazonian countries exploit piramutaba and have large-scale infrastructure projects with significant impacts on river ecology. The inclusion of this species in CMS Appendix II will support collaborative management and environmental conservation initiatives among the countries where this species migrates.

In Brazil, currently, in the national assessment of *Brachyplatystoma vaillantii* risk of extinction, it was categorized as Least Concern (LC) (ICMbio, 2023). However, the inclusion of this species in Annex II of the CMS will support collaborative management and environmental conservation actions among the countries where this species occurs.

3. Migrations

3.1 Kinds of movement, distance, the cyclical and predictable nature of the migration

Piramutaba undertakes an annual upstream migration from the estuarine nursery to breeding areas in the western Amazon, for a maximum migratory distance of at least 3,129 km (Barthem et al. 2017)(Figure 2). The exact piramutaba breeding sites have not been located, though newly hatched individuals and larvae have only been captured in the western Amazon. Experimental fishing sites where piramutaba larvae have been captured include: Araracuara on the Caquetá-Japurá river Colombia (Agudelo-Córdoba et al. 2000); the Napo river in Ecuador on (Utreras-Ruptedeli 2010); Porto Velho on the Madeira River in Brazil (Cella-Ribeiro et al. 2016); and near Tefé on the Solimões River in Brazil (Barthem and Goulding 1997). Subsequent to eclosion, the larvae drift downstream, remaining in the deepest and fastest parts of the turbid river channels. The larvae and juveniles grow during their

downstream migration towards the Amazon estuary, feeding on phytoplankton, zooplankton, shrimp and insects (Barthem and Goulding 1997, Barthem et al. 2017).

The huge discharge of the Amazon River maintains a large expanse of freshwater in the estuary, which retracts and expands with seasonal differences in discharge (Nikiema et al. 2007) and provides the nursery for the piramutaba (Barthem and Goulding 1997, Barthem and Goulding 2007, Barthem et al. 2017). By the time young piramutaba reach the Amazon estuary, they are already juveniles at about 2cm fork length, and immediately begin feeding on polychaetes, insects, shrimp and other small crustaceans in their nursery. As they grow, their diet changes, and by 20 cm in length they feed mostly on fishes of the genus *Gobioides*.

As the flow of the Amazon River decreases seasonally during the low water period, and the saline wedge in the estuary approaches the coast, piramutaba schools leave the estuary and begin their upstream migration in the Amazon River and some of its turbid water tributaries, such as the Madeira and Purus. Not all adult and sub-adult piramutaba leave the estuary during the low flow of the Amazon River, as a part of the population remains in the estuary as evidenced by fisheries (Barthem and Goulding 1997). The schools that migrate represent a trophic migration in which piramutaba feeds on prey, many species of which are also migratory, moving out of previously laterally flooded areas and into the river channels during the low water period. Piramutaba schools leave the estuary by about June and reach the city of Leticia on the Colombian-Brazilian border in mid-October and local commercial fishermen report them reaching Pebas, Peru somewhat later. Overall, the upstream migrating piramutaba schools average about 22 km/day. Piramutaba schools return to the estuary as the river begins to rise and concomitantly the increased flow of the Amazon River forces the saline wedge off the coast and a freshwater environment becomes available offshore.

The average size of piramutaba captured in the Amazon River is similar to that of the estuary (Alonso and Pirker 2005), suggesting that they are made up of individuals of the same age group. Ripe fish, however, are absent in migratory schools, suggesting that they perform reproductive movements undetected in the commercial fisheries of the Brazilian Amazon (Barthem and Goulding 1997). Even farther upstream, ripe individuals are only found rarely in fisheries of the Caquetá-Japurá River in Colombia (Agudelo-Córdoba et al. 2000) and on the Napo River in Ecuador (Utreras-Bucheli 2010).

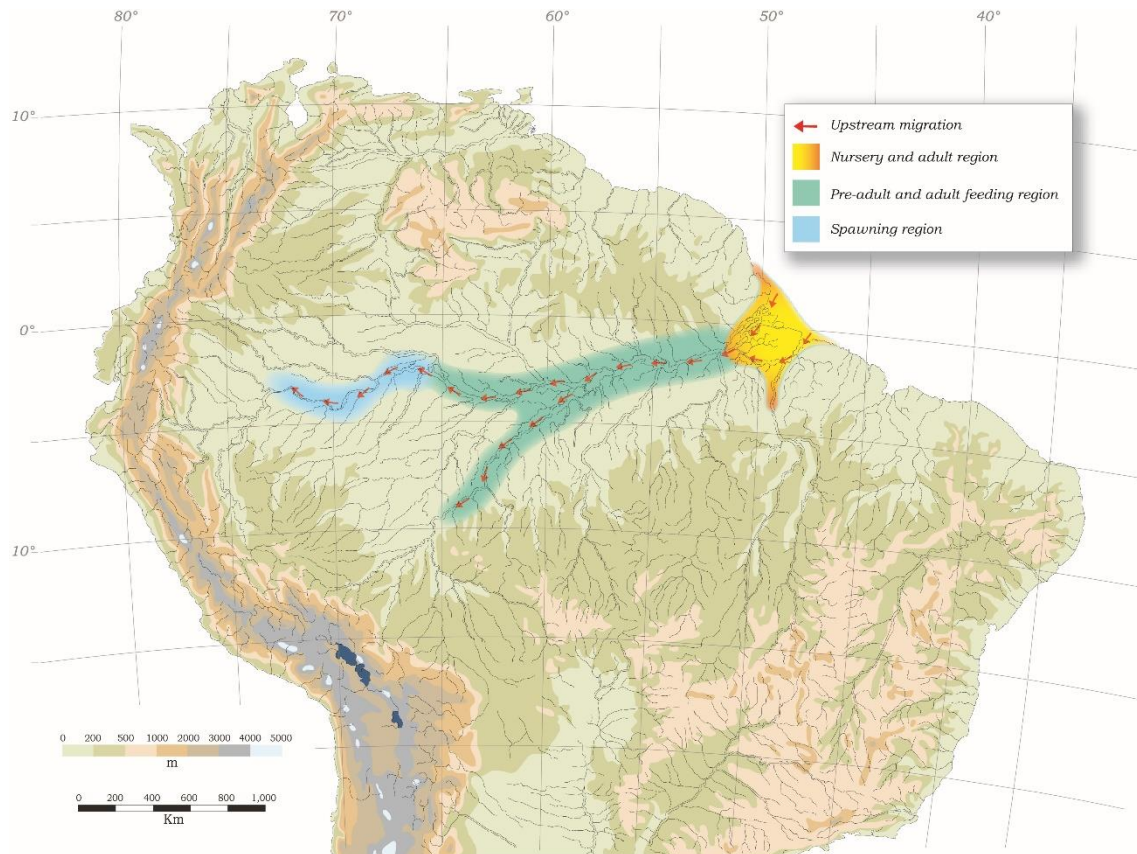


Figure 2. General migration pattern of *Brachyplatystoma vaillantii* (Piramutaba) in the Amazon basin. From Barthem and Goulding 2007.

3.2 Proportion of the population migrating, and why that is a significant proportion

The entire population of piramutaba migrates during different life history stages. The first migration includes eggs, larvae and juveniles that migrate downstream from the western Amazon to the estuary. The second migration consists of sub-adults and immature adults who leave the estuary as Amazon River levels fall to migrate upstream to feed, returning to the estuary months later when river flow and level increases. A distinct reproductive migration is still unclear (Barthem and Goulding 1997, Barthem et al. 2017).

4. Biological data

4.1 Distribution (current and historical)

Piramutaba is a large migratory catfish of the family Pimelodidae that belongs to a paraphyletic group of the genus *Brachyplatystoma* (goliath catfishes), with six existing species and one fossil. The piramutaba occurs in Brazil, Bolivia, Colombia, Ecuador, French Guiana, Suriname, Peru and Venezuela, and its distribution extends across the low-lying areas of the Amazon and Orinoco basins. Despite its wide distribution, there is little genetic divergence between populations of different basins (Reis et al. 2003, Lundberg et al. 2011). In Brazilian territory, the species occurs in the states of Pará, Amapá, Amazonas, Acre, Rondônia, Maranhão and Piauí (Source: Conservation Status Assessment Process for Amazonian Continental Fish Species, 2019 - ICMBio) (Figure 3). Major rivers where it occurs include the Lower Tocantins, lower Xingu, Beni-Madre de Dios and middle-lower Madeira in Brazil; the Putumayo-Içá and Caquetá-Japurá in Brazil; the Amazonas main channel in Brazil, Colombia and Peru; the Amazonas Estuary and Parnaíba in Brazil; and the Coppename-Suriname-Saramacca, Corentyne-Demerara, Essequibo of the Guianas.

The absence of spatial genetic segregation of piramutaba in the Amazon River channel between the eastern and western Amazon suggests there is only a single population (Batista et al. 2004) in the Amazon Basin. Fossil evidence shows that large migratory goliath catfish have a historical relationship with northwestern and northern South America since the Miocene, at which time the Andes began to rise rapidly (Lundberg 2005) and when the Amazon River flowed north into the Paleo-Amazonas-Orinoco (Wesselingh and Hoorn 2011). This relationship suggests that spawning in the upper reaches of turbid rivers is the evolutionary result of an ancient association with the Andes (Barthem et al. 2017). The occurrence of a single piramutaba population and its association with spawning in turbid rivers of the western Amazon, but using the Amazon estuary as its nursery, demonstrates the vast connectivity of rivers on which its existence depends.



Figure 3. Distribution of the piramutaba (*Brachyplatystoma vaillantii*). Data based on: Processo de Avaliação do Estado de Conservação das Espécies de Peixes Continentais Amazônicos, 2019 - ICMBio.

4.2 Population (estimates and trends)

Bottom pair trawls in the Amazon estuary account for most of the piramutaba catch and are responsible for overfishing the species (Dias-Neto 1991, Barthem and Petrere Jr 1995, IBAMA 1999, Alonso and Pirker 2005, Dias-Neto and Dias 2015). Trawl fishing occurs in the innermost part of the Amazon estuary where piramutaba is the main target species. Maximum trawl catches (22,486 t) of piramutaba in the Amazon estuary occurred in 1977, but since then overfishing has resulted in decreased catches (Dias-Neto 1991, Barthem and Petrere Jr 1995, IBAMA 1999, Matsunaga et al. 2017, Mello-Filho 2020, Prestes et al. 2022) (Figure 4). There are also commercial fisheries for piramutaba in the Amazon River to about the Brazilian-Colombian-Peruvian border.

4.3 Habitat (short description and trends)

Piramutaba is a catfish that inhabits river channels and freshwater stretches of the Amazon estuary. Its inland distribution is generally associated with turbid rivers, and usually those of Andean origin. The young occur in the freshwaters of the Amazon estuary where they inhabit open waters of the coast and bays in a zone of strong currents caused by the macro tides. Upstream migrations begin when piramutaba leave the Amazon estuary and enter the Amazon

River, at which time their swimming abilities allow them to travel 18-26 km/day (Barthem and Goulding 1997, Barthem et al. 2015, Barthem et al. 2017, Mello-Filho 2020).

4.4 Biological Characteristics

Piramutaba is a large predatory catfish that can reach at least 102 cm (Fork Length) and about 10 kg. Reproduction occurs in turbid rivers of the Western Amazon in areas not yet well defined. Preliminary length estimate of minimum sexually mature piramutaba is 40 cm (fork length) and average length (L50) 55 cm (standard length) (Klautau et al. 2016a). Growth studies based on otoliths and length frequency analysis show that the species has slow growth rate (K) of 0.13-0.14 y⁻¹, and most individuals captured in commercial fisheries in the estuary were 2 years or older (Alonso and Pirker 2005, Barthem et al. 2015, Mello-Filho 2020).

4.5 Role of the taxon in its ecosystem

Piramutaba is a top end predator that feeds in the entire water column, but mainly on the bottom. It has a broad food spectrum throughout its life, feeding initially on insect larvae and pupae and juvenile fish as it drifts down the river channel to the estuary. Once in the estuary, juveniles add small crustaceans and polychaetes to their diet. The species becomes primarily piscivorous as it grows in the estuary, feeding almost exclusively on gobiids (Gobiidae). When piramutaba leaves the estuary and migrates upstream, it preys mainly on fish of the order Characiformes, especially the detritivores/algivores of the family Prochilodontidae, and catfishes of the families Doradidae and Pimelodidae (Barthem and Goulding 1997). Studies based on Ecopath models indicate its trophic level (TL) at 3.2, one of the highest in the Amazon and slightly behind that of *B. filamentosum* (3.3), *Pseudoplatystoma tigrinum* (3.3) and *P. fasciatum* (3.3) (Angelini et al. 2006).

5. Threat data

5.1 IUCN Red List Assessment (if available)

The IUCN has not conducted a Global Extinction Risk Assessment for the species. In Brazil, the species was nationally assessed as Least Concern (LC) in 2014 (ICMBio, 2018) and was recently reassessed maintaining this category (ICMBio, 2023).

5.2 Equivalent information relevant to conservation status assessment

The use of bottom pair trawls to catch piramutaba in the Amazon estuary began in 1972 to supply processing plants established in various cities, such as Belém and Vigia. In addition to trawling, there are artisanal fishing operations that use drift-nets that reach 4 km or more in length (Dias-Neto and Dias 2015). The trawl fleet consists of 17 to 29 m long boats with ice capacity of 20 to 105 tons (average 50 tons) and 165 to 565 HP engines (Barthem and Goulding 2007). The fleet uses two and sometimes three boats that together and in parallel drag a trawl across the muddy bottom. Although piramutaba is the main target, several other species are commonly captured, including the dourada (*Brachyplatystoma rousseauxii*) (Jimenez et al. 2013). Trawl catches peaked in 1977 (22,486 tons), only five years after the gear was first used, and by 1992 (6,299 tons) the stock was seriously overfished (Figure 4) (Barthem and Petrere Jr 1995, IBAMA 1999, Matsunaga et al. 2017, Mello-Filho 2020, Prestes et al. 2022). Trawl fishing was considered mainly responsible for this situation, given that the estuary fleet operates where historically 76-81% of the total piramutaba catch in the Amazon Basin was captured (IBAMA 1999, Barthem and Goulding 2007, Prestes et al. 2022). With the continued high demand for fish, piramutaba overfishing has intensified and further exacerbated the situation, though the last major studies of the species are now more than a decade old. Concurrent with piramutaba overfishing are impacts related to the construction of

hydroelectric dams along its migratory route and by deforestation and mining in headwaters (Castello and Macedo 2015, Forsberg et al. 017, Hauser 2018).

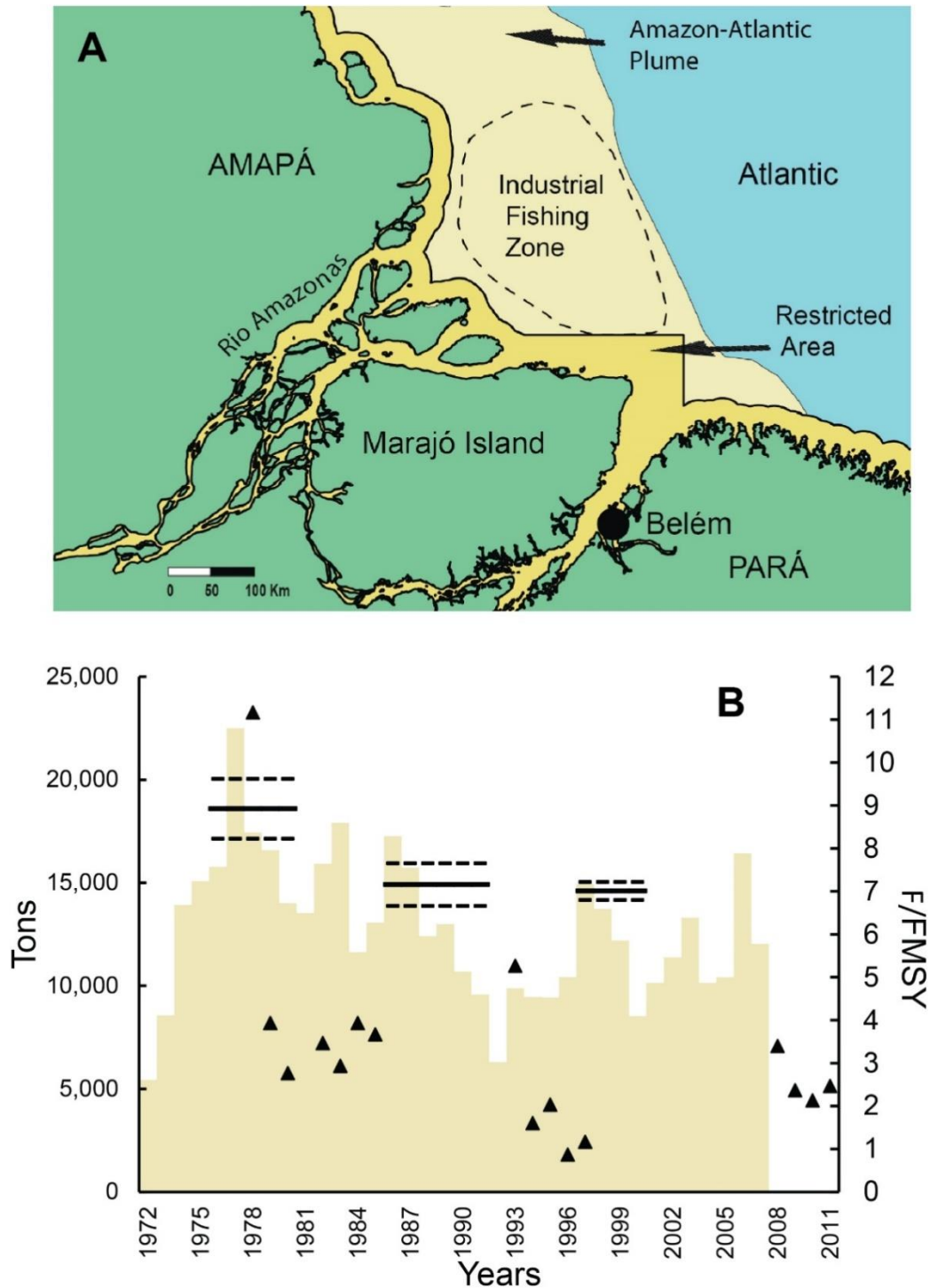


Figure 4. The goliath catfish fishery region and overfishing in the Amazon River estuary. (A) The industrial trawl fishing zone and the restricted fishing area based on legislation in force. (B) Annual catches (tons) of the *B. vaillantii* bottom pair-trawler fishing fleet in the Amazon estuary (yellow bars) available for the 1972-2006 period, combined with the maximum sustainable yield proxies (tons) with 95% confidence limits (black line) and the F/FMSY ratio (triangle) (Reprinted from Prestes et al. 2022).

5.3 Threats to the population (factors, intensity)

Continental fishery resources are heavily dependent on connected wetlands, including river channels where major migrations take place. Human activities, such as some combination of fishing, deforestation, hydroelectric construction and mining have large-scale upstream and downstream impacts (Garcia et al. 2003; Welcomme and Hagborg 1977, Forsberg et al. 2017).

To be effective, the management of the piramutaba needs to be at the scale of its migratory life history, but it is imperative to immediately control trawl fisheries in the estuary where 80 to 98% of its catch consists of immature individuals (Klautau et al. 2016a, Klautau et al., 2016b, Barthem et al. 2015, Mello-Filho 2020). The infrequent appearance of ripe piramutaba in commercial catches leaves unknown the exact sites where the species spawns (Barthem and Goulding 2007). This is a serious concern considering large-scale infrastructure now taking place in the western Amazon (Alho et al. 2015, Castello and Macedo 2015, Soares et al. 2018). An international agreement promoting the mitigation of impacts caused by major infrastructure development projects, particularly in the headwater areas of major Andes-Amazon rivers, would strengthen ecosystem services related to water quality, aquatic biodiversity and wetlands in general (Goulding et al. 2019). The inclusion of long-distance migratory species would further strengthen the mitigation process at more adequate scales.

Studies predict changes in river flows because of climate change. These changes project an increase in river flow and flooding in the Western Amazon and a decrease in the Eastern Amazon (Sorribas et al. 2016, Goulding et al. 2019, Feng et al. 2020). The consequences of these changes are not yet clear for Amazonian fish migrations, but piramutaba should be one of the keystone species to monitor the impacts of climate change along with infrastructure impacts and overfishing. International Cooperation Agreements can promote research on the conservation of transboundary migratory fish, as is being done in part by the ACTO/UN Environmental/GEF Project, which studies the impacts of climate change on transboundary water resources.

5.4 Threats connected especially with migrations

The main threats to piramutaba migration are the synergistic effects of overfishing (Dias-Neto 1991, Barthem and Petrere Jr 1995, IBAMA 1999, Alonso and Pirker 2005, Matsunaga et al. 2017, Mello-Filho 2020, Prestes et al. 2022) and the individual and combined impacts of dams, deforestation and mining activity (Castello and Macedo 2015, Barthem et al. 2017, Forsberg et al. 2017, Goulding et al. 2019, Duponchelle et al. 2021,). Some 150 potential dams, mainly for hydroelectricity, have been listed for the Andean region (Finer and Jenkins 2012) and initial studies of the six largest in the Andes indicate that impacts would lead to the alteration of the flood pulse, sediment and nutrient retention and blockage of fish migrations (Forsberg et al. 2017). Deforestation also generally has consequences on the regional precipitation, which would consequently affect the river discharge pattern (Castello and Macedo 2015, Feng et al. 2020). In addition, deforestation and headwater mining activities increase the erosion process and introduce pollutant compounds into the water, compromising their quality and contaminating downstream aquatic organisms (Finer et al. 2008, Soares et al. 2018).

6. Protection status and species management

6.1 National protection status

Piramutaba is considered a Vulnerable (VU A2cd) species in Colombia (Mojica et al. 2012) and of Least Concern (LC) in the Brazilian assessment of Amazonian extinction risk (ICMBIO 2018; 2023).

6.2 International protection status

There is no international law to manage or conserve piramutaba fishing.

6.3 Management measures

The main countries exploiting piramutaba in the Amazon Basin, which are Brazil, Colombia and Peru, have adopted some regulations to protect the species. Fishing regulations for piramutaba and other catfish in Brazil are intended only for bottom pair trawls in the estuary, the measures of which are to restrict: fishing areas, fishing periods (three-month closure), number of boats trawling in pairs and a minimum size of 100 mm in the trawl tunnel bag mesh (Matsunaga et al. 2017, Mello-Filho 2020, Prestes et al. 2022). Colombia lists a minimum catch size of 40 cm (FL) and Peru lists a minimum gillnet mesh size (20 cm) (Fabr e et al. 2005).

In Brazil, there are mechanisms and tools for monitoring and control of fishing activities applied throughout the territory (table 01).

Table 01: Brazilian mechanisms and tools for monitoring and control of general fishing activities:

Mechanism/Tool	Legal Basis	Object	Fishery
National Program for Satellite Tracking of Fishing Vessels.	Interministerial Normative Instruction N� 02 of September 4, 2006.	Use for monitoring, fishery management, and control of operations of the fleet authorized by the competent authority of national fishery management.	Industrial
Board Map.	MPA Normative Instruction N� 20 of September 10, 2014.	Specific form for recording data and information about the fishing operations of a given vessel at each fishing bid.	Industrial
Stock Declaration	IBAMA Ordinance N� 48 of November 5, 2007 SAP/MAPA Normative Instruction N� 6 of April 13, 2020.	Safeguarding that the fish was caught in a previous period, closed season, or spawning season, and therefore complies with the regulations.	Artisanal
Fishing Report Activity	SAP/MAPA Ordinance N� 265, of June 29, 2021.	Maintenance of the Fisherman and Artisanal Professional Fisherman License in the General Record System for Fishing Activity (SisRGP).	Artisanal

Since 2006, the Special Secretariat for Aquaculture and Fisheries of the Presidency of the Republic (SEAP/PR) implemented the National Program for Satellite Tracking of Fishing Vessels (PREPS), which began remotely monitoring fishing vessels with a total length equal to or greater than 15 meters, aiming to ensure compliance with the exclusion area by the industrial fleet and strengthening surveillance of the activity (Zagaglia et al., 2008; Chaves et al., 2003; Sousa et al., 2007).

According to Batista et al. (2004), among the variety of fish species existing in the Amazon, the piramutaba is the preferred target of fishing in almost the entire distribution area. Therefore, considering the importance of this species for commercial fishing in Brazil, it is relevant to present the compilation of national fishing regulations associated with it (Table 02).

Table 02: Brazilian national compilation of fishing regulations associated with *Brachyplatystoma vaillantii*.

Legal Basis	Object
Interministerial Normative Instruction N° 10 of June 10, 2011.	Approves the general rules and organization of the fishing vessel permission system for access to and sustainable use of fishery resources, defining fishing modalities, species to be caught, and authorized operating areas
SAP/MAPA Ordinance N° 1,448 of January 28, 2022.	Establishes Fishing Modalities, Complementary Fishing Modalities, and general rules for Brazilian fishing vessels for the sustainable use of fishery resources (comes into effect on January 2, 2024).
IBAMA Normative Instruction N° 166 of July 18, 2007.	Regulates gillnet fishing
SAP/MAPA Normative Instruction N° 6 of April 13, 2020.	Regulates piramutaba (<i>Brachyplatystoma vaillantii</i>) fishing in the area between the border of Brazil and French Guiana and the border between the state of Pará and the state of Maranhão in Brazil.
SAP/MAPA Ordinance N° 212 of August 28, 2020.	Establishes criteria and procedures for the complementary authorization of piramutaba (<i>Brachyplatystoma vaillantii</i>).

6.4 Habitat Conservation

The life-history area of piramutaba is associated with turbid rivers arising in the Andes, lateral wetlands associated with these rivers and the estuary (Goulding et al. 2019). Approximately 15% of the areas flooded by turbid rivers have some type of protection, but only 1% have full protection, the latter including: the Pacaya-Samiria National Reserve between the Ucayali and Marañón Rivers in Peru; the Mamirauá Sustainable Development Reserve between the confluence of the Solimões and Japurá Rivers; and the Piagaçu-Purus Sustainable Development Reserve of the Purus River. Protected areas of some flooded areas of blackwater tributaries from which characiforms migrate and are prey for turbid river predatory catfish include the Anavilhanas National Park and Jaú National Park in the lower Negro Basin. Protected areas in the estuary and freshwater coastal areas prohibit the use of trawls in some areas, such as those associated with Marajó Island which is part of an Environmental Protection Area (Goulding et al. 2003, Barthem and Goulding 2007, Barthem et al. 2015, Matsunaga et al. 2017, Goulding et al. 2019) (Figures 5-8).

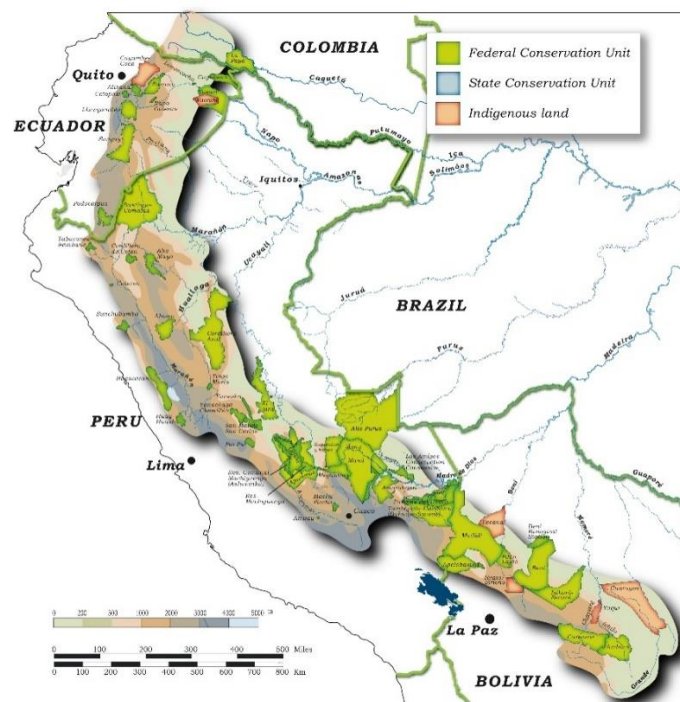


Figure 5. Protected areas in the far western Amazon associated with Andes-Amazon headwaters. Reproduced from Barthem and Goulding 2007.



Figure 6. Protected areas in the Peruvian Amazon. Reproduced from Barthem and Goulding 2007.

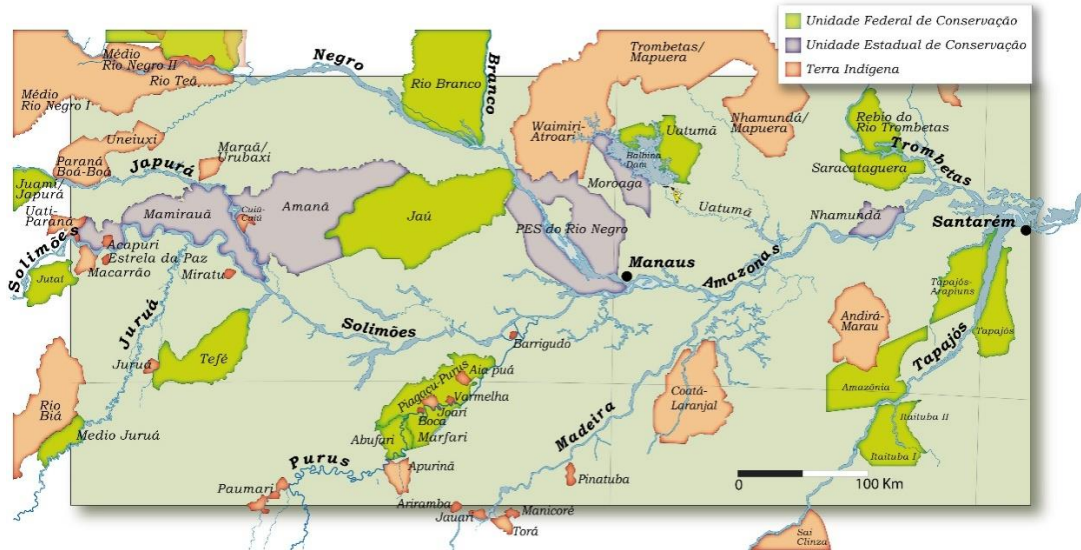


Figure 7. Protected areas in the Central Amazon. Reproduced from Barthem and Goulding 2007.



Figure 8. Protected areas in the Amazon Estuary and coastal areas. Reproduced from Barthem and Goulding 2007.

6.5 Population monitoring

There is no official program dedicated to monitoring piramutaba fisheries. There are no integrated basin fishery statistics and regional statistics cover only part of the species life history area.

7. Effects of the proposed amendment

7.1 Anticipated benefits of the amendment

The CMS advocates that all Parties should act jointly for the conservation and effective management of migratory wildlife species. In this sense, the inclusion of piramutaba in the CMS would encourage the establishment of combined actions, aiming to establish guidelines for the elaboration of strategies for conservation, management, research, monitoring and fishing information.

7.2 Potential risks of the amendment

No potential risks foreseen for to piramutaba conservation from an Appendix II listing

7.3 Intention of the proponent concerning development of an Agreement or Concerted Action

If this proposal is accepted, the member countries of the piramutaba distribution area will help promote national, regional and international coordination, collaboration and partnership for the conservation and management of the species. To this end, jointly organized workshops will assess the conservation status of freshwater migratory fish and list priority measures. These workshops can be a starting point and an opportunity to develop concerted action between countries in the near future and to start negotiations for an agreement on CMS freshwater migratory fish.

8. Range States

Piramutaba occurs in Brazil, Bolivia, Colombia, Ecuador, French Guiana, Suriname, Peru, and Venezuela in the Amazon and Orinoco River basins and at the mouth of the main rivers that flow into the Brazil-Guyana Platform (Reis et al. 2003, Lundberg et al. 2011). However, its capture is by far most intense in Brazil in the states of Pará, Amapá, Amazonas and Rondônia; in Peru in the Departments of Loreto and Ucayali; and Colombia, in the Department of Amazonas.

9. Consultations

10. Additional remarks

11. References

- Agudelo-Córdoba, E., M. Petrere Jr, Á. V. Joven-León, M. Peláez, C. A. Bonilla-Castillo, and F. Duponchelle. 2013. Breeding, growth and exploitation of *brachyplatystoma rousseauxii castelnaui*, 1855 in the caqueta river, colombia. *Neotropical Ichthyology* **11**:637-647.
- Agudelo-Córdoba, E., Y. Salinas-Coy, C. L. Sánchez-Páez, D. L. Muñoz-Sosa, M. E. Arteaga-Díaz, O. J. Rodríguez-Prieto, N. R. Anzola-Potes, L. E. Acosta-Muñoz, M. Núñez-Avellaneda, and H. Valdés-Carrillo. 2000. *Bagres de la amazonia colombiana: Un recurso sin fronteras*. SINCHI, Bogotá.
- Alho, C. J., R. E. Reis, and P. P. Aquino. 2015. Amazonian freshwater habitats experiencing environmental and socioeconomic threats affecting subsistence fisheries. *Ambio* **44**:412-425.
- Alonso, J. C., and L. E. M. Pirker. 2005. Dinâmica populacional e estado atual da exploração de piramutaba e de dourada. Pages 21-28 *in* N. N. Fabr e and R. B. Barthem, editors. *O Manejo da Pesca dos Grandes Bagres Migradores*. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renov aveis, Bras lia.

- Angelini, R., N. N. Fabrè, and U. L. d. Silva-JR. 2006. Trophic analysis and fishing simulation of the biggest Amazonian catfish. *African Journal of Agricultural Research* **1**:151-158.
- Barthem, R. B., A. Mello-Filho, W. Assunção, and P. F. F. Gomes. 2015. Estrutura de tamanho e distribuição espacial da piramutaba (*Brachyplatystoma vaillantii*) na foz Amazônica: implicações para o manejo da pesca. *Bol. Inst. Pesca, São Paulo* **41**:249-260.
- Barthem, R. B., and M. Goulding. 1997. *The catfish connection: Ecology, migration, and conservation of amazon predators*. Columbia University Press, New York.
- Barthem, R. B., and M. Goulding. 2007. *An unexpected ecosystem: The Amazon as revealed by fisheries*. Missouri Botanical Garden Press.
- Barthem, R. B., and M. Petrere Jr. 1995. Fisheries and population dynamics of the freshwater catfish *brachyplatystoma vaillantii* in the amazon estuary. Pages 329-350 in *Condition of the World's Aquatic Habitat. Proceedings of the World Fisheries Congress, Theme 1.* . Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi, Athens, Greece.
- Barthem, R. B., M. Goulding, R. G. Leite, C. Canas, B. Forsberg, E. Venticinque, P. Petry, M. L. Ribeiro, J. Chuctaya, and A. Mercado. 2017. Goliath catfish spawning in the far western Amazon confirmed by the distribution of mature adults, drifting larvae and migrating juveniles. *Sci Rep* **7**:41784.
- Batista, J. d. S., K. Formiga-Aquino, I. P. Farias, and J. A. Alves-Gomes. 2004. Genetic variability studies of piramutaba (*Brachyplatystoma vaillantii*) and dourada (*B. rousseauxii*) (Pimelodidae: Siluriformes) in the Amazon: Basis for management and conservation. Pages 253-258 in *International Congress on the Biology of Fish, Manaus, AM, Brazil*.
- Batista, V. S.; Isaac, V. J.; Viana, J. P. 2004. Exploração e manejo dos recursos pesqueiros da Amazônia. In: Ruffino, M.L. (ed.) *A pesca e os recursos pesqueiros na Amazonia brasileira*. Manaus: Edições ProVarzea/Ibama, pp. 63– 152.
- Capitani, L., R. Angelini, F. W. Keppeler, G. Hallwass, and R. A. M. Silvano. 2021. Food web modeling indicates the potential impacts of increasing deforestation and fishing pressure in the Tapajós River, Brazilian Amazon. *Regional Environmental Change* **21**.
- Castello, L., and M. N. Macedo. 2015. Large-scale degradation of Amazonian freshwater ecosystems. *Glob Chang Biol* **22**:990-1007.
- Cella-Ribeiro, A., G. Torrente-Vilara, J. A. Lima-Filho, and C. R. d. C. Doria, editors. 2016. *Ecologia e biologia de peixes do Rio Madeira*. EDUFRO, Porto Velho-RO.
- Chaves, R.A.; Silva, K.C.A.; Corrêa Ivo, C.T.; Cintra, I.H.A.; Aviz, J.S. 2003. Sobre a pesca da piramutaba, *Brachyplatystoma vaillantii* (Valenciennes, 1840) em pescarias da 18 frota industrial no Estado do Pará. *Boletim Técnico Científico CEPNOR*, 3(1): 163-177.
- Dias-Neto, J. 1991. A pesca da piramutaba (*Brachyplatystoma vaillantii*) na região norte do Brasil. *Atlantica* **13**:11-19.
- Dias-Neto, J., and J. d. F. O. Dias. 2015. O uso da biodiversidade aquática no Brasil: uma avaliação com foco na pesca. Ibama, Brasília.
- Duponchelle, F., V. J. Isaac, C. Doria, P. A. Van Damme, G. A. Herrera-R, E. P. Anderson, R. E. A. Cruz, M. Hauser, T. W. Hermann, E. Agudelo, C. Bonilla-Castillo, R. Barthem, C. E. C. Freitas, C. García-Dávila, A. García-Vasquez, J. F. Renno, and L. Castello. 2021. Conservation of migratory fishes in the Amazon basin. *Aquatic Conservation: Marine and Freshwater Ecosystems*.
- Fabrè, N. N., R.B. Barthem, A. Carvalho, and R. Angelini. 2005. Sistema integrado para o manejo dos grandes bagres migradores. Pages 73-93 in N. N. Fabrè and R. B. Barthem, editors. *O Manejo da Pesca dos Grandes Bagres Migradores*. Ibama, ProVárzea; Coleção Documentos Técnicos: Estudos Estratégicos, Manaus.
- Feng, D., R. Raoufi, E. Beighley, J. M. Melack, M. Goulding, R. B. Barthem, E. Venticinque, C. Cañas, B. Forsberg, and M. V. Sorribas. 2020. Future climate impacts on the hydrology of headwater streams in the Amazon River Basin: Implications for migratory goliath catfishes. *Hydrological Processes*.
- Finer, M., and C. N. Jenkins. 2012. Proliferation of hydroelectric dams in the Andean Amazon and implications for Andes-Amazon connectivity. *PloS one* **7**:e35126.

- Finer, M., C. N. Jenkins, and B. Powers. 2013. Potential of best practice to reduce impacts from oil and gas projects in the amazon. *PloS one* **8**:e63022.
- Finer, M., C. N. Jenkins, S. L. Pimm, B. Keane, and C. Ross. 2008. Oil and gas projects in the western amazon: Threats to wilderness, biodiversity, and indigenous peoples. *PloS one* **3**:e2932.
- Formiga, K. M., J. d. S. Batista, and J. A. Alves-Gomes. 2021. The most important fishery resource in the Amazon, the migratory catfish *Brachyplatystoma vaillantii* (Siluriformes: Pimelodidae), is composed by an unique and genetically diverse population in the Solimões-Amazonas River System. *Neotropical Ichthyology* **19**.
- Forsberg, B. R., J. M. Melack, T. Dunne, R. B. Barthem, M. Goulding, R. C. D. Paiva, M. V. Sorribas, U. L. d. Silva Jr., and S. Weisser. 2017. The potential impact of new Andean dams on Amazon fluvial ecosystems. *PloS one* **12**:e0182254.
- Garcia, S. M., A. Zerbi, C. Aliaume, T. Do Chi, and G. Lasserre. 2003. The ecosystem approach to fisheries. Issues, terminology, principles, institutional foundations, implementation and outlook. FAO, Rome.
- Goulding, M., E. Venticinque, M. L. d. B. Ribeiro, R. B. Barthem, R. G. Leite, B. Forsberg, P. Petry, U. Lopes da Silva-Júnior, P. S. Ferraz, and C. Cañas. 2019. Ecosystem-based management of Amazon fisheries and wetlands. *Fish and Fisheries* **20**:138-158.
- Goulding, M., R. Barthem, E. J. G. Ferreira, and R. Duenas. 2003. The Smithsonian atlas of the Amazon. Washington London: Smithsonian Books.
- Hauser, M. 2018. Migração dos grandes bagres amazônicos pela perspectiva dos isótopos de estrôncio em otólitos. Universidade Federal de Rondônia, Porto Velho.
- IBAMA. 1999. Reunião do grupo permanente de estudos sobre a piramutaba. IBAMA.
- ICMBIO. 2018. Livro Vermelho da Fauna Brasileira Ameaçada de Extinção: Volume I. 1. ed edition. ICMBio/MMA, Brasília, DF.
- ICMBio. 2023. Sistema de Avaliação do Risco de Extinção da Biodiversidade – SALVE. Dados não publicados. *Brachyplatystoma vaillantii* - Acesso em: 10 de maio de 2023.
- Jimenez, E. A., M. Asano Filho, and F. L. Frédou. 2013. Fish bycatch of the laulao catfish *Brachyplatystoma vaillantii* (valenciennes, 1840) trawl fishery in the amazon estuary. *Brazilian Journal of Oceanography* **61**:129-140.
- Klautau, A. G. C. d. M., A. P. B. Cordeiro, I. H. A. Cintra, L. E. O. d. Silva, C. E. M. C. Bastos, H. R. L. d. Carvalho, and L. S. Itó. 2016a. Analysis of the Industrial Fishing of Piramutaba Catfish, *Brachyplatystoma vaillantii* (Valenciennes 1840), in two Estuarine Areas of the Brazilian Amazon. *Pan-American Journal of Aquatic Sciences* **11**:143-150.
- Klautau, A. G. C. d. M., A. P. B. Cordeiro, I. H. A. Cintra, L. E. O. d. Silva, H. R. L. d. Carvalho, and L. S. Itó. 2016b. Impacted biodiversity by industrial piramutaba fishing in the Amazon River mouth. *Bol. Inst. Pesca, São Paulo* **42**:102-111.
- Lundberg, J. G., J. P. Sullivan, and M. Hardman. 2011. Phylogenetics of the South American catfish family Pimelodidae (Teleostei: Siluriformes) using nuclear and mitochondrial gene sequences. *Proceedings of the Academy of Natural Sciences of Philadelphia* **161**:153-189.
- Matsunaga, A. M. F., I. F. Junior, and L. S. Itó. 2017. Análise quantitativa da influência de parâmetros ambientais sobre a captura por unidade de esforço (CPUE) da piramutaba *brachyplatystoma vaillantii* (Valenciennes, 1840) da costa amazônica do Brasil. *Boletim Técnico Científico do CEPNOR* **17**:9-19.
- Mello-Filho, A. d. S. 2020. A dinâmica da pesca e avaliação de estoques de piramutaba, *Brachyplatystoma vaillantii*, pela frota de arrasto, na região do estuário amazônico. Doctoral dissertation. Universidade Federal do Pará, Belém, PA.
- Mojica, J. I., J. S. Usma, R. Álvarez-León, and C. A. Lasso, editors. 2012. Libro rojo de peces dulceacuícolas de Colombia 2012. Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, Instituto de Ciencias Naturales de la Universidad Nacional de Colombia, WWF Colombia y Universidad de Manizales, Bogotá, D. C., Colombia.
- Nikiema, O., J.-L. Devenon, and M. Baklouti. 2007. Numerical modeling of the Amazon River plume. *Continental Shelf Research* **27**:873-899.

- Prestes, L., R. Barthem, A. Mello-Filho, E. Anderson, S. B. Correa, T. B. D. Couto, E. Venticinque, B. Forsberg, C. Canas, B. Bentes, and M. Goulding. 2022. Proactively averting the collapse of Amazon fisheries based on three migratory flagship species. *PLoS One* 17:e0264490.
- Ramos, T. P. A., R. T. d. C. Ramos, and S. A. Q. A. Ramos. 2014. Ichthyofauna of the Parnaíba river Basin, Northeastern Brazil. *Biota Neotropica* 14:e20130039.
- Reis, R. E., S. O. Kullander, and C. J. Ferraris-Jr. 2003. Check list of the freshwater fishes of South and Central America. Porto Alegre : EDIPUCRS.
- Soares, J. M., J. M. Gomes, M. R. Anjos, J. N. Silveira, F. B. Custódio, and M. B. A. Gloria. 2018. Mercury in fish from the Madeira River and health risk to Amazonian and riverine populations. *Food research international* 109:537-543.
- Sorribas, M. V., R. C. D. Paiva, J. M. Melack, J. M. Bravo, C. Jones, L. Carvalho, E. Beighley, B. Forsberg, and M. H. Costa. 2016. Projections of climate change effects on discharge and inundation in the Amazon basin. *Climatic change* 136:555-570.
- Sousa, G. C.; Souza Filho, P. W. M.; Costa, F. R.; Cintra, I. H. A.; Silva, K. C. A; Souza, R. F. C. 2007. Análise espaço-temporal da pesca da piramutaba *Brachyplatystoma vaillantii* (Valenciennes, 1840) na plataforma continental do Amazonas através do uso 7 de Sistema de Informação Geográfica (SIG).p. 4723-4725. In: Anais XIII Simpósio 8 Brasileiro de Sensoriamento Remoto. INPE, Florianópolis, Santa Catarina.
- Utreras-Bucheli, V. M. 2010. Caracterización de la pesca de grandes bagres en el Alto Río Napo (Ecuador), recomendaciones para su manejo y conservación. . Universidad Internacional de Andalucía (UNIA), Sevilla, Spain.
- Welcomme, R. L., and D. Hagborg. 1977. Towards a model of a floodplain fish population and its fishery. *Environmental Biology of Fishes* 2:7-24.
- Zagaglia, C. R.; Hazin, F. H. V. 2008. Sensoriamento remoto aplicado a pesca. In: Souza, R. B. (Org.). *Oceanografia por satélites*. 2. ed. São Paulo: Oficina de Textos, 382 p.