

Catfish Fisheries Pose Threat to Amazon River Dolphins

Vanessa J. Mintzer

The Enchanted Boto

In the expansive rivers, floodplains, channels, and lakes of the Amazon basin, swims an aquatic mammal unlike any other, a creature renowned through the region for its unique ecological and cultural roles. Having spent 30 million years in the Amazon, the Amazon River dolphin (*Inia geoffrensis*), also known as “boto,” has evolved multiple morphological characteristics that set it apart from its marine counterparts. With an unfused vertebra that allows its neck to bend at a 90-degree angle, an elongated snout that facilitates foraging in submerged tree branches, and molars that crush riverine turtles and crabs, the boto is a highly efficient predator in Amazonian aquatic habitats (Figure 1). Even the seasonally flooded forests of the basin provide suitable habitat for this robust but flexible animal, which can easily maneuver its way between trees in search of prey (Figure 2).

In addition to its ecological importance as a top predator in the Amazon aquatic ecosystem, the boto is a focal figure in Amazonian culture. For generations, stories of the shapeshifter boto, or *encantado*, have been told readily throughout the region. Although the stories are diverse, many describe that the boto can take human-form at night, attend parties, and seduce persons of the opposite sex. One of these legends, rich in detail, explains that the boto turns into a Caucasian man, dressed in a white suit and matching white top hat (that hides the dolphin blow-hole still present on the man’s head). In some locales, the supernatural persona attributed to the boto has provided protection for the species, due to the belief that bad luck will transpire to anyone that harms a boto.



Figure 1. Botos feed on over 50 species of fish, turtles, and crabs. Photo © kevinschafer.com

Boto Bait

Regardless of the mythological protection afforded by these legends, the economic pressures that have befallen the Amazon have led to the expansion and creation of new fisheries with unprecedented direct impacts on the boto. Deliberate killing of botos for use as fish bait has become a growing and alarming problem. Since the mid-1990s, boto carcasses have been used to attract the catfish *Calophysus macropterus*, commonly known as “piracatinga” in Brazil and “mota” in Colombia. Demand for mota has grown in Colombia in the last decade, because it is acting as a replacement for another catfish known as

“capaz” (*Pimelodus grosskopfii*), that was overfished from Colombia’s Magdalena River. Consequently, an international market has emerged involving the catch of mota in Brazil (and recently other nations) and the export of this food fish to Colombia and a few large Brazilian cities. Although little is known about the extent and intensity of the boto harvest, we know that it occurs in at least 12 locations in four out of the five Amazonian countries with mota fisheries, and that in at least one of these locales, the harvest level is likely unsustainable. Although it is illegal to kill botos in most Amazonian countries, enforcement of natural resource protection laws in the Amazon is challenging, and is compromised as a consequence of institutional deficiencies.

The harvest is a complex socio-ecological issue, and diverse solutions will have to be developed and executed to address its multifaceted drivers. Increased government enforcement could decrease the harvest, but because the approach does not address the socio-economic conditions of Amazonian fishers, it is unlikely that this will be sufficient to eliminate the harvest in the long term. Instead, it is essential that solutions of various scope and scale be developed to simultaneously address several drivers of the harvest, including the challenging socio-economic



Figure 2. Botos are the largest of the world’s river dolphins, weighing up to more than 400 pounds. Photo © kevin-schafer.com

conditions of Amazonian fishers and the overexploitation of the preferred food fish in Colombia. For example, while a widespread education campaign aimed at catfish consumers could be the main initiative in Colombia, more localized efforts focused on educating fishers on legislation, the importance of the boto, and alternative economic activities, may be the best course of action at the Brazilian harvest sites.

Capacity for Change

In some cases, existing Brazilian protected areas may be able to play a considerable role in addressing the issue, both by providing local enforcement and executing education initiatives. The harvest of boto for bait began in and around the Mamirauá Sustainable Development Reserve located in the Western Brazilian Amazon, in approximately 2000. Ongoing research with local fishers is suggesting that Mamirauá community initiatives have played a role in limiting boto mortality in some areas of the reserve.

A section of Mamirauá functions according to a community-based management scheme, where local residents are heavily involved in the management and monitoring of reserve resources. Residents of Mamirauá and

nearby communities are encouraged to participate in reserve ecotourism and research projects, where they receive training, attend talks on natural resources, and interact frequently with researchers. For example, for approximately three weeks each year, local fishers work with Projeto Boto, a research program in Mamirauá, to capture botos. During these expeditions, fishers receive hands-on-training and practice on how to capture, handle, and release botos. Additionally, some fishers assist biologists in measuring, weighing, marking, and collecting tissue and blood samples from the botos. The educational value of these trainings and interactions is becoming evident in the ongoing study that shows that many fishers involved with these types of initiatives have developed an appreciation and understanding for the boto.

Overall, fishers that participate in reserve initiatives, including the boto capture program and ecotourism, have more positive attitudes toward the botos than those not involved. For example, most of the fishers involved in these activities claim to “like” the boto despite botos frequently stealing fish from their nets, and believe the Amazon will change negatively if the boto becomes extinct. Many of these fishers have learned the

importance of the boto as a predator in the Amazon aquatic system, or recognize it as an animal that others (the researchers and tourists) value. "It serves a purpose in nature," "It is important for researchers," and "It is important for tourism," are examples of responses provided by fishers to explain why the boto is important.

Moreover, the majority of fishers involved with Mamirauá and Projeto Boto show high levels of support for protection of the boto (considerably higher than recorded elsewhere in the Amazon) and do not believe the boto should be killed for bait. We have also learned of several cases in which fishers that killed botos previously because they considered them a nuisance, now refrain from killing botos. One of these fishers attributes his change in behavior specifically to a newly gained appreciation for the boto resulting from his involvement in reserve ecotourism.

Furthermore, residents in a community located in Mamirauá, have asked a fisher trained during Projeto Boto's capture program, to release botos that have accidentally become entangled in fishing nets. The fisher has released several botos successfully. Likely due to a combination of reserve enforcement and the education provided by the community initiatives, an overall pattern seems to be emerging in which fewer botos are killed for bait in areas where the fishing communities are most involved in reserve initiatives.

The experience with fishers involved in the capture expedition highlights the importance and success of hands-on-learning in conservation. Even though these fishers live in a region where killing botos can be a relatively easy way to make substantial income, these fishers not only refrain from harvesting botos, but in some cases have applied the skills learned to release botos and save them from incidental drowning. Why has the capture expedition experience been successful both in terms of learning applicable techniques, and changing attitudes? The fishers' existing fishing skills are a great asset to the research project, and these skills are acknowledged and respected by the researchers during the expeditions. The fishers capture and release the botos with only minor guidance and supervision from the biologists, allowing for self-directed learning and development.

Moreover, by being involved in the marking and handling of the botos, some fishers appear to have developed a sense of "ownership" toward the research and marked botos, a sentiment that is likely responsible for their positive attitudes towards the species. Involving communities directly in research programs where they are allowed learning autonomy, cannot only result in development of applicable skills and techniques, but may also lead to changes in attitudes toward natural resources, even within the context of a serious human-wildlife conflict. Expanding and developing similar hands-on-learning opportunities, related to natural resource management and research, could be a successful approach to encouraging conservation in the Amazon and beyond.

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scientists and volunteers. In small community groups and often one-on-one, these well versed and passionate "water educators" share their knowledge and skills with others. NALMS is actively working on outreach efforts to provide useful science-based information and tools to our affiliates and members to enable this arm of water education to improve and grow, both in numbers of volunteers and effectiveness of the educational outreach. Mother Teresa makes the point with an image we can all understand: "I alone cannot change the world, but I can cast a stone across the waters to create many ripples." In NALMS we are all indeed educators for water.

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