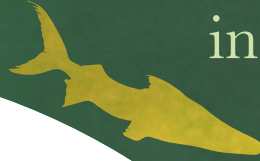


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Urgent action for conservation of gilded catfish (dorado) (*Brachyplatystoma rousseauxii*) in the Madera river basin



Policy Brief

Summary

The goliath catfish (local name dorado) (*Brachyplatystoma rousseauxii*) migrates 8,000 km throughout its life cycle, and uses all the Amazon Basin, from the mouth of the Amazon River to the headwaters of the Madera River in Peru and Bolivia, where it reproduces. As a consequence, the management of the dorado must include the overall Madera basin, as well as the main channel of the Amazon River and its estuary. This species faces several threats: the hydroelectric dams built on the Madera river, which cause isolation of the populations and make it impossible for the adults to arrive at the spawning grounds, the general degradation of the aquatic ecosystems, and overfishing. Therefore, urgent actions are needed to preserve this species, which has a high importance for food security and plays an important ecological role in the Amazon basin. This brief contains 25 priority actions.

1. The Madera basin is in need of a basin-approach.

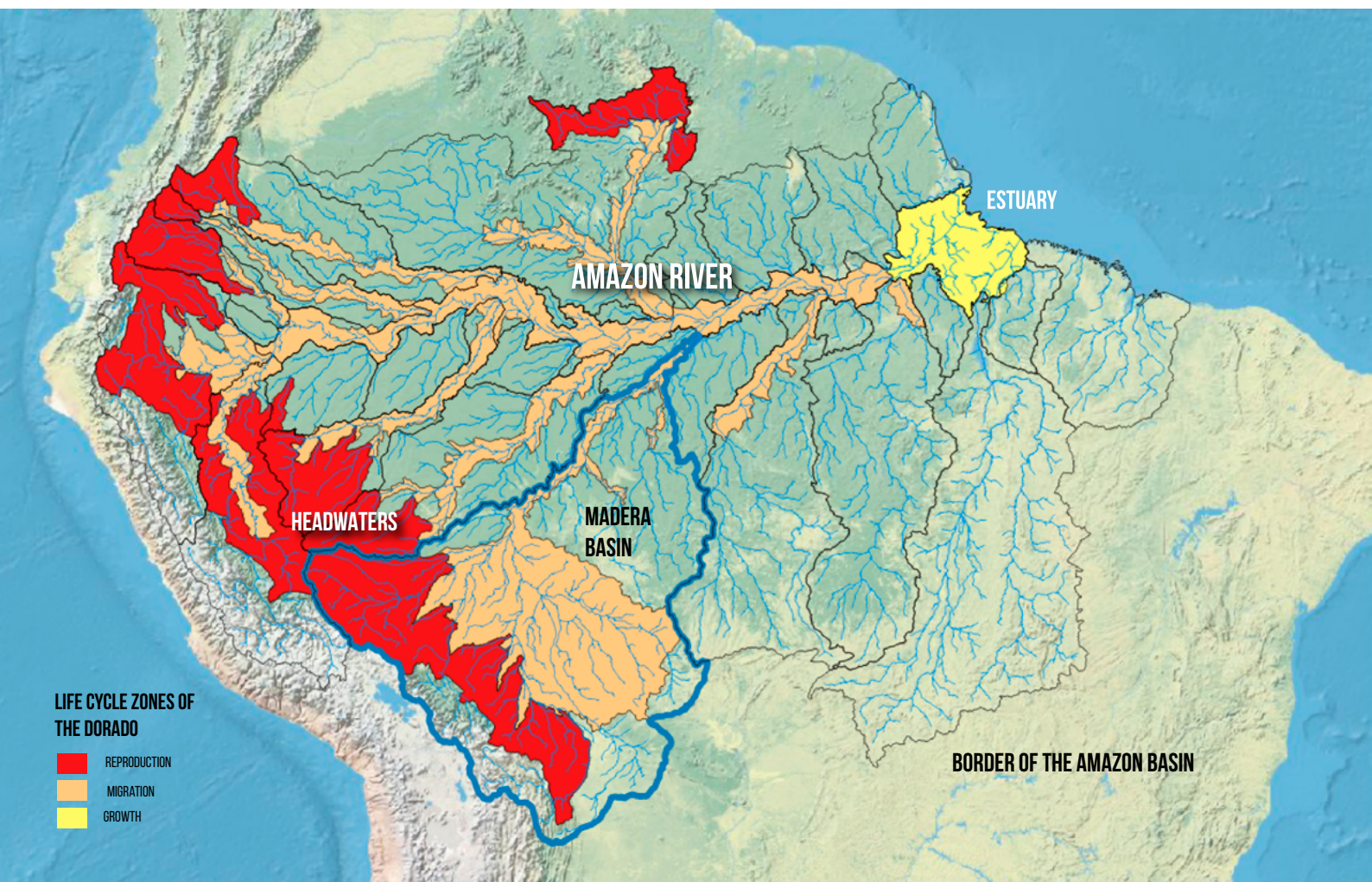
Brachyplatystoma rousseauxii, or dorado, is one of the main commercial species exploited in the Madera River basin fishery. The fishery takes place in the main channel of the river, from the point where it meets the Amazon River, all the way up to the Andean foothills at almost 400 metres above sea level. The Madera basin extends over 1.3 million km² and portions of three Amazon nations - Brazil, Bolivia and Peru.

The dorado makes use of this basin to complete part of its life cycle. Adult fish migrate upriver to the headwaters in the Madre de Dios, Beni and Mamoré Rivers. After reproducing, the larvae float downriver with the current from the headwaters to the estuary, where they feed during their first years of life. This is to say that this species, which migrates distances of 8000 km over its lifecycle, makes use of the entire Amazon basin and distinct sub-basins during the different phases of its life.

As such, the dorado is an excellent indicator species to monitor connectivity between basins, as well as to evaluate and monitor the impacts of infrastructure and extractive industries, as well as the quality and quantity of water and of wetlands.

For this reason, management strategies that are proposed for dorado and other large-bodied migratory catfish should include a basin-approach, and appropriate scales of action that enable them to achieve objectives such as conservation of the species over the whole of the Amazon Basin. This basin-approach should be taken into account when generating information necessary to evaluate environmental impacts and mitigation actions for infrastructure projects that are presented for the Madera basin.

Dorado conservation actions should include the Madera basin, the main channel of the Amazon, and its estuary in Brazil.



Distribution of the dorado (*Brachyplatystoma rousseauxii*) in the Amazon and the Madera basin, outlined in blue (Adapted from Amazon Waters Initiative 2015).

2. Cumulative threats to the dorado in the Madera basin

2.1. Dams lead to isolation of populations

The flow of the Madera river, whose basin has been classified recently as the Amazon basin most vulnerable to human impacts, has been broken by two dams that act as barriers to migratory species, with unprecedented transboundary impacts. These changes contribute to significant local and regional socioeconomic change, due to a reduction in income from fishing. The construction of dams also affects the livelihoods of small-scale fishers by altering employment in the fisheries sector, generating changes in the physical access to fisheries resources, or changes in markets.

It is important to note that mitigation measures applied to dams in neotropical rivers have been found to have little effectiveness against the diminishment of populations of migratory fishes. Fish passages, which is the most common measure, have exhibited very low efficiency, in particular with large-bodied catfish, due to structural and operational problems that reduce the possibility of maintaining the lifecycle of these migratory species.

The existing reservoirs on the Madera (Santo Antonio and Jirau) have altered the hydrologic connectivity of the Madera basin, dividing the area of distribution of dorado in the BASIN and making it difficult for adults to access the reproductive areas. This isolation causes changes in the population dynamics of the dorado, taking into account that over its lifecycle each individual makes use of nearly the whole basin.

2.2. Infrastructure works in spawning areas and loss of river connectivity

The impacts of other infrastructure works, in addition to hydroelectric dams, such as roads and waterways; as well as extractive activities such as mining, extraction of aggregates, oil and gas are still poorly understood. If they are not mitigated, there is a risk that these impacts could affect the quality and quantity of water, nutrients and sedimentation cycles and even affect the annual flood regime over vast regions with unpredictable consequences.

The flood pulse in the Amazonian rivers and the connectivity between the main channels and the floodplains are essential for the productivity of flooded forests and for fish and other organisms that feed during the period of rising water. The flood regime is also essential for fruit production, floodplain agriculture and river transport.

Particular attention needs to be paid to infrastructure works that have impacts at cross-border or regional levels. Most of the dams, except those of the Madera, are constructed or planned in the headwaters, above the breeding areas, but it is assumed that these will have an impact on the flow of water, sediments and nutrients, modifying in this way the dynamics of flooding in the lower basin, with consequences for the ecological functioning of the entire Amazon.



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2.3. Overfishing

The population of dorado in the Madera basin has suffered overfishing before the construction of dams. This overfishing, together with the reduction in populations expected due to the interruption of their migratory routes, will further reducing the size of the remaining dorado populations in the Beni, Madre de Dios, Mamoré and Itenez basins.

These threats described for the population of dorado in the Madera can become serious risks for the survival of the species overall, whose extinction could have very significant ecological and social impacts.

3. Priority Actions

3.1. Action recommendations to avoid the population isolation of the dorado

- a. Articulate an integrated and shared management agenda for large migratory catfish in the Madera basin involving multinational agencies, as well as with ministries and / or agencies responsible for the use and conservation of the fishing resources of each country.
- b. Promote in the respective governments the preparation of proposals to funding agencies such as FAO and OTCA, as well as RAMSAR Convention and the Convention for the Conservation of Migratory species.
- c. Conduct exchanges of scientific and fisheries information among the countries of the basin
- d. Identify possible spawning areas in the upper watersheds and propose the creation of Ramsar Sites
- e. Conduct joint studies on the importance of migratory fish for food security, employment and the economy.
- f. Establish scientific exchange projects between Bolivia, Brazil and Peru and multinational research teams.
- g. Long-term studies on the production of larvae and eggs of dorado and other species in breeding sites to measure changes due to isolation.
- h. Conduct cross-border biotelemetry studies to monitor the movement of individuals from the lower Madera and up to the headwater areas.



Dorado *Brachyplatystoma rouseauxii* / ©Fernando Carvajal Vallejos

3.2. Recommendations to avoid dam impacts

- a. The impacts of dams must be evaluated and understood at different scales, including local, regional, national and international. This context will allow identifying the cumulative effect of these impacts on migratory species.
- b. Have adequate biological and ecological information on migratory species before the implementation of mitigation measures (such as the construction of fish passages or repopulation to prevent the disappearance of migratory species), so that they can be effective.
- c. Address the design of dams from a multidisciplinary perspective as the only way to understand the potential impacts on the fishery
- d. Involve technicians and scientists from countries in the impact evaluations when the dams are located in cross-border areas or sectors
- e. Evaluate the relationship between the energy generated by hydroelectric dams and the loss of ecosystem services and socio-economic benefits that can be generated.
- f. Inform and educate the different actors about the positive and negative impacts of the works on the resources of the river.



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3.3. Recommendations in relation with other infrastructure works

- a. Develop methods of calculating environmental flows that take into account the complexity of the Amazonian aquatic systems.
- b. Carry out coordinated actions between Brazil, Bolivia and Peru to establish which species and/or their stocks are shared among different regions and / or countries and verify vulnerability of fishing resources to the development of infrastructure in the basin.
- c. Consider the synergistic effects of the different impacts on the population of dorado and other migratory catfishes.

3.4. Recommendations related to overfishing

- a. Implement urgently a fishing information registration system between Bolivia, Brazil, Peru (and Colombia) focused on the migratory species of the genus.
- b. Promote the signing of an agreement between these countries to standardize length measurements for catch sizes, fishing seasons, use of gear and fishing gear, fishing areas, fishing and other regulatory measures to manage the catfish fisheries.
- c. Define common management areas and protected areas between countries for large-bodied migratory catfish

d. Establish exchange projects between fishers from the countries of the basin with the object of sharing experiences, knowledge and proposals.

e. Make bilateral and / or multilateral agreements that establish modes of cooperation around biological-fishery research, fishery monitoring and information exchange.

3.5. Recommended actions for the cross-border management of fisheries resources

- a. Ensure that the Environmental Impact Assessments of large-scale projects contemplate transboundary areas of influence that cover the complete migration routes of migratory species
- b. Sign a Memorandum of Understanding for the conservation of large-bodied migrating catfish within the framework of the Convention for the Conservation of Migratory Species and preparation of a conservation plan.
- c. Within the framework of the Commission for Inland Water Fisheries of Latin America (COPESCAL) and / or Organization of the Amazon Cooperation Treaty (ACTO) propose the creation of a project for the management of large-bodied transboundary migratory catfish in which these agencies can contribute financial resources.

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