ASSOCIATION FOR TROPICAL BIOLOGY AND CONSERVATION

Resolution to halt the Hidrovia, a planned waterway that puts the world's largest wetland, Pantanal, in danger

Background

Wetlands and other freshwater ecosystems are amongst the most threatened across the world. Despite that, more than 1 billion people directly depend on these ecosystems. They produce high-value and diverse ecosystem services and are key to nature-based solutions for climate change mitigation. Yet, we are losing wetlands at unprecedented rates, even faster than forests. It is critical that we protect the world's wetlands and maintain their free-flowing rivers undisrupted. In particular, the Pantanal, the world's largest tropical wetland, is at imminent risk.

Problem statement

The Brazilian government has reappraised a project to make the 700 km-long upper section of the Paraguay River navigable. This section directly feeds the Pantanal with its flood water. The projected "Northern Section" of the river is embedded in the multinational "Hidrovia Paraguay-Paraná" waterway (also including the countries of Bolivia, Paraguay, Argentina, and Uruguay). It is intended to facilitate the transport of crops and metal ores to oceanic ports in the estuary of the Plata River and the movement of fuels, pesticides, and fertilizers upriver. The plan to make the Upper Paraguay River navigable was turned down by the Brazilian government in the 1990s due to ecological, social, and economic concerns. Yet, in recent years, this project has been reinitiated.

The largest collateral damage of the project will be the disintegration of the socio-environmental structures and processes in the Pantanal wetland. At nearly half the size of Germany (it covers around 170,000 km2), the Pantanal is the largest contiguous wetland in the world. It is situated in the heart of South America in Brazil, Bolivia, and Paraguay. The seasonal wetland is flooded annually by the water of the upper section of the Paraguay River for around 7–8 months and has a dry season of 4–5 months. This wet-and-dry cycle supports an outstanding landscape with exceptional levels of biodiversity, including ca. 2,200 plants, 600 birds, and 400 fish species, along with the last large populations of charismatic animals like the jaguar, jabiru storks, swamp deer, and hyacinth macaws. Further, the floodplain forms the nursery for a host of migratory fish species that comprise the majority of fishery production in the area. The *Pantaneiros,* Indigenous peoples, and traditional communities who live and depend on the Pantanal are

well-adapted to the periodicity of flooding. The wetlands are vital for regional food security and maintaining a rich cultural heritage (Wantzen et al. 2023).

The consequences of establishing the waterway's Northern Section have been highlighted in more than 20 peer-reviewed scientific publications and reports. They were recently summarized in an independent analysis by a team of long-term experts on the Pantanal (Wantzen et al. 2024). This clearly and unambiguously demonstrated the environmental and societal damage anticipated from this project.

The Paraguay River in Brazil is highly sinuous, narrow, and shallow. To make it navigable would require the deepening of the river bed by dredging and the fixation of natural river banks to allow navigation of barge trains up to 120 m long and 1.8 m deep. Construction of harbors is also planned. The biophysical consequences of dredging and fixation of river banks would be an increased discharge and a disconnect between the river mainstem and floodplain habitats. This would result in a reduction of the floodplain size and duration of the floods, compromising the integrity of the ecosystem, its highly adapted fauna and flora, and the traditional resource use strategies by the local human populations, **including fisheries, which have a great cultural and socioeconomic importance in the entire region**. Further, the project brings risks of oil spills, fuel and pesticide release, massive oxygen depletion when fertilizers are spilled into the river, and the introduction of invasive aquatic species. **This would lead to massive fish kills, eutrophication, and long-term alteration of this highly sensitive ecosystem.**

The Pantanal plays an important role in the context of climate change and the hydrological budget of the entire Plata system. It temporarily stores enormous amounts of water during the flood period and is one of the largest evapotranspiration windows in South America. Deepening the river channel would result in a coincidence of the flood crests of the Paraguay and Paraná rivers at their confluence—currently lagged by 4 to 5 months—leading to severe flooding in the lower river sections. The Pantanal is also being impacted by climate and land use change. Recent extreme droughts caused anomalously dry vegetation in the Pantanal that helped the spread and escape of (mostly man-made) fires, which eventually killed millions of native organisms and transformed their habitats and life-support systems. Drying up the remaining wetlands, caused by the Hidrovia project, would aggravate the risk of wildfires, releasing vast amounts of the carbon currently stored in the wetland sediments, destroying entire ecosystems, and leading to severe ramifications for people who depend on and are part of this social-ecological system.

On the socioeconomic-cultural side, the loss of the natural flood rhythm and the biota depending on it would erode the social structure of traditional communities, eventually displacing thousands of people who would lose their incomes and livelihoods. A treasure of ancient ecological knowledge (e.g., the use of pharmaceutical plants, fisheries, sustainable cattle ranching, and indigenous knowledge) would be lost.

The Hidrovia would severely impact the entire biome, which is a national Brazilian heritage, with parts designated as National Park, UNESCO World Heritage Site, UNESCO Biosphere Reserve, several Ramsar sites, Indigenous Reserves, and State Conservation parks. Breaching national conservation concepts and international treaties signed by the Brazilian government would discourage European and US enterprises from investing in these unsustainable ventures and ecological disasters.

Besides the imminent impacts on the local ecology and people living in the region, the Hidrovia project is unsustainable in a climate change context. In recent years, the low average river discharge halted navigation for several weeks. Most climate and hydrological scenarios indicate that droughts will worsen in the next decades. To maintain navigability, additional dredging, blasting of rocky outcrops, and

straightening of river meanders would be needed, compounding the problem and turning it into a vicious cycle with ever-increasing economic and environmental costs.

Recommendations

In consideration of the inevitable environmental and social impacts of the Hidrovia, the Association for Tropical Biology and Conservation (ATBC), the world's largest scientific organization devoted to the study, protection, and sustainable use of tropical ecosystems, urges the Brazilian government and the involved enterprises and investors to:

1. **Step back** from the deleterious plan to enlarge the Hidrovia waterway project on the Northern Section of the Paraguay River flowing in the Pantanal wetland;
2. **Preserve** the sensitive wetland area and river sections, specifically the diverse reserves and the rocky outcrops, which are essential for the natural flooding of the Pantanal, especially the "Fecho dos Morros" outcrop in Paraguay (21.453993°S, -57.923745°W), as this represents the "cork in the bottle" in hydrological terms;
3. **Invest in alternative transport modes to navigation**, such as improving existing railway networks for seamless transportation of goods;
4. **Consider alternatives to the produced crops** as incentives for producers to conserve larger areas on the plateau;
5. **Foster public awareness of the Pantanal values** nationally and internationally through actions and processes acknowledging its roles for climate change mitigation and adaptation, flood control, biodiversity and cultural conservation, and spiritual awakening;
6. **Develop a legally binding and reinforced conservation policy for the Pantanal Wetland;**
7. **Create a Commission for the Protection of the Paraguay River, led by Brazil, Bolivia, and Paraguay, supported by the international community,** by investing funds towards its emergence and operation as a plurinational decision forum to discuss challenges to this critical ecosystem, disseminate credible information to the public, and forge solutions that serve the conservation of nature and people's well-being.