

### Tragedy of the Commons: How Subtle, “Legal” Decisions Are Threatening One of the Largest Wetlands in the World

Twenty-one years ago, Gottgens and colleagues (2001) warned in this journal of the tragic consequences of a planned waterway in one of the world's largest and most diverse wetlands: the Pantanal. The authors explored the waterway's potential damages, and discussed how the accumulation of small, wrong decisions may lead the Pantanal to collapse. Gottgens and colleagues referred to it as the *tyranny of small decisions* (Odum 1982), when apparently trivial decisions can lead to profound geographic, ecological, and social consequences that are difficult to estimate on a large scale.

Incredibly, Gottgens and colleagues' (2001) alert is still valid: The threats from land use in the Upper Paraguay River Basin and in the Amazon Forest, the source of the rain that defines the Pantanal as a wetland, are still in place. The synergy among these threats and the climate change potentialize their impacts on the flood pulse, the main driver of biodiversity and ecosystem services in the floodplain. In fact, extreme droughts and wildfires have been causing impacts in the Pantanal in the last 3 years. The hydrological scenario is worsened by an increasing number of hydroelectric dams, as well as by the eventual implementation of additional ones and the proposed Paraguay river waterway. For instance, in January 2022, the Environment Council of Mato Grosso State gave a preliminary approval for the construction of the Barranco Vermelho port, on the banks of the Paraguay river. Although the approval has followed the legal process, the ecosystem-scale consequences of the port were ignored; the analysis was rather focused on the port's local, isolated impacts, despite of the fact that the port will be viable only if the engineered waterway is

implemented. Threats come also from changes in public policies. In spite of its National Heritage status by the Brazilian Constitution, as well as its status as restricted-use region that should be managed under an ecologically sustainable approach, according to the Native Vegetation Protection Law (bill number 12.651,2012), subtle attempts at opening up the wetland to more intensive uses have been often proposed. Locally, land-use changes sum to the global, continental, and regional-scale threats to challenge the Pantanal's conservation status. In such a multiscale context, regional and local decisions are key to mitigate the negative impacts of broader, difficult-to-access threats.

Pantanal is a large common pool resource: an area where extraction or change (e.g., construction of a port) will generate private benefits, whereas the impacts or costs (e.g., loss of wetland area, erosion, changes in ecosystem productivity) will be shared collectively. When users weigh the benefits and costs of their actions, they tend to choose the first, known as the collective action dilemma. However, since everyone makes similar decisions (individual benefits over collective costs), the users as a whole will lead the system to collapse, in a process known as *the tragedy of the commons* (Hardin 1968) or *the tyranny of small decisions* (Odum 1982), already cited by Gottgens and colleagues (2001). However, there are thousands of examples of groups that managed to overcome the collective action dilemma and achieve sustainability in their common pool resources. Therefore, there is still hope for the Pantanal, but its sustainable use must not be challenged by the consequences of small mistaken decisions that fail to consider their cumulative impacts, compromising the future of sustainable cattle ranching, fishing, ecotourism, traditional communities, biodiversity, and ecosystem services.

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