Protection for Brazilian wetlands

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Brazil's wetlands, as seen here on the Amazon, may be afforded better protection in future. The country's Ministry of the Environment aims to impose new regulations for the conservation of the wetland ecosystems. The proposals are based on, among other things, a study by researchers from the Max Planck Institute for Chemistry. Credit: MPI for Chemistry / Susanne Benner

The results of research carried out by Max Planck scientists provide the basis for new environmental legislation in Brazil. The country's Ministry of the Environment has developed proposals for new regulations to conserve the sensitive ecosystems found in the extensive wetlands of the Amazon region, the Pantanal and the coasts. The measures proposed for the protection of these ecologically and economically important areas are based on the definition and classification of wetlands in a study, to which researchers from the Max Planck Institute for Chemistry in Mainz contributed.

Wetlands are among the world's most fragile ecosystems. In many countries, they are under threat from deforestation, groundwater drawdown and climate change. "The importance of wetlands, which account for around 20 percent of the national territory in Brazil, is becoming clear to more and more people," says Florian Wittmann, who works at a research station in Manaus in Brazil and contributed to the study on the Brazilian wetlands, under the leadership of the Brazilian Institute for Wetland Research (INAU). They act as a drinking-water reservoir, provide protection against floods, regulate the regional climate, serve as fishing grounds, and, thanks to the wide diversity of animal and plant species found in them, are highly attractive. "Nevertheless, many ecosystems are increasingly damaged or even destroyed by deforestation and pollution caused by the pursuit of short-term profits." This situation gives rise to periods of extreme drought, on the one hand, and extreme floods, on the other – as repeatedly experienced by the heavily populated cities in southern and southeast Brazil in recent times.

To counteract the destruction of the wetlands, the Brazilian Ministry of the Environment is currently initiating new regulations, with the aims to protect these ecosystems. The Ministry's recently published recommendations are intended to provide a basis for new laws. The recommendations are largely based on a scientific study, to which

Florian Wittmann from the Max Planck Institute for Chemistry contributed.

Maximum water level marks the border of a wetland

The research team began by defining what constitutes a wetland. "Up to now, there were no uniform criteria for defining wetlands in Brazil. As a result there were no binding regulations for their protection." Within the definition provided by the current study, Florian Wittmann believes that the passage, in which the borders of wetlands are described, is very important. This is particularly applicable to wetlands whose water levels fluctuate strongly on a regular basis like those found in the Amazon region. Based on the definition provided in the study, the highest water level delineates the peripheral boundary of the ecosystem. The protective measures proposed by the Ministry of the Environment should apply to correspondingly extensive areas.

If the proposals are actually implemented as legislation, the Brazilian government would reverse the measures it adopted in 2012 under pressure from the agricultural sector. At the time, it changed the definition of wetland borders from the maximum to mean water level. This may sound like an obscure detail, but it makes a huge difference in terms of the tightness of the regulations. For example, it resulted in the border of the Amazonian wetlands being moved much closer to the river and reduced the protected area by up to 50 percent. At best, the new regulations would reverse this measure.

The researchers also classify the ecosystems in their study. They not only differentiate between the wetlands on the coast, wetlands in the interior and artificially created wetlands, they also fine-tune the classification of the areas according to geological, hydrochemical, hydrographic and botanical characteristics. For example, the grass species Cyperus giganteus is characteristic of marshes with a relatively stable water level.

In contrast, the water level in the mostly forested white-water floodplains of the Amazon, in which the high proportion of suspended matter gives the nutrient-rich water a light brown colour, fluctuates by ten metres or more. "The level of protection afforded to the areas must be tailored to their different characteristics," says Florian Wittmann.

Agribusiness interests stand in the way of protection

The geographer hopes that the recommendations will be implemented quickly through sustainable legislation. "This is one of the few occasions when we scientists can influence policy," says the Max Planck researcher with pride. Awareness of the ecological and economic importance of the wetlands is growing in Brazil. "So I am confident that the new laws will be enacted," says Wittmann. It is very difficult to estimate precisely when this will happen, however. The process could drag on, as extending the protection of the wetlands is not in the interest of the agricultural sector, which has a powerful political lobby.

Plantation owners and cattle breeders are also responsible for the repeated cuts in the areas of environmental protection and nature conservation of the recent past. Florian Wittmann, who carries out research in the flooded forests of the Amazon, has been observing the deterioration in the state of Brazil's wetlands for years. The amendment of the law in 2012 made it possible to convert previously protected wetlands into agricultural land. And this is precisely what is happening in many locations. The seasonal change in the water levels of the wetlands is a factor, to which many plant and animal species have adapted. "The natural flood regime of the rivers is changing due to the large number of hydroelectric dams in the Amazon region," explains the researcher. "Suspended matter in the water, which is important for the nutrient balance, is being withheld as a result. So many plant and animal species are disappearing."

The current efforts to protect the wetlands are supported by the United Nations, which held a conference on the global inventory of wetlands of international importance in Uruguay in early June 2015. Brazil signed the Ramsar Convention for the protection and sustainable use of wetlands as far back as 1993. Germany is also one of the 158 nations that have already confirmed their commitment to the protection of wetlands by signing the Ramsar Convention.

More information: "Brazilian wetlands: their definition, delineation, and classification for research, sustainable management, and protection." *Aquatic Conserv: Mar. Freshw. Ecosyst.*, 24: 5–22. doi: 10.1002/aqc.2386

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