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Belo Monte mill threatens rare fish from the Xingu River

Endemic species may disappear with 80% reduction in river flow from next year, study warns

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When fully operational, the Belo Monte mill in Pará can cause the disappearance of several species of endemic fish - which only live in a stretch of rapids on the Xingu River known as Volta Grande. The threat can occur even if the enterprise meets requirements that have been established in the environmental licensing process.



O acari-zebra (*Hypancistrus zebra*) é uma das espécies endêmicas que vivem na região de Volta Grande, no Rio Xingu. Criticamente ameaçado de extinção, e apreciada como peixe ornamental, corre o risco de desaparecer com o funcionamento da usina de Belo Monte Foto: Leandro Sousa / UFPA

This is what warns a study recently published by a group of 8 Brazilian and foreign researchers in the journal *Biological Conservation*, which analyzed the diversity of fish in the region in three segments of Volta Grande impacted by the work.

+++ Death of fish paralyzes Belo Monte turbines

Before the works began, species were collected in the area that was flooded today in the construction of the dam; in an area between the dam and the main powerhouse, which will have a reduction of water flow; and in a

posterior segment with flow altered by the discharge of the power house.

The study, led by Daniel Fitzgerald of Texas A & M University, noted that the first two segments are extremely rich in species highly dependent on rapids habitats, including several endangered species, and many of them are restricted to those sites.

+++ Belo Monte installs grills on turbines to avoid fish death

This is the case of an ornamental goldfish very appreciated by aquarists known as acari zebra (*Hypancistrus zebra*) which does not exist anywhere else in the world. Being critically endangered, its fishing is prohibited. But today, even for fear of the species disappearing with the operation of the plant, it has been widely fished and smuggled.

The characteristics of this stretch of the Xingu that make it so unique, with curves and pedals, and that both allow water to flow quickly and offer refuges for species to protect themselves and reproduce, are also interesting factors for the production of energy, the plant was installed there.

+++ Eletrobrás is involved in two processes in Operation Lava Jato

But the two things are not exactly compatible. At the end of 2015, in the process of filling the dam, which transformed what were formerly rapids into a lake, died in one stroke only in the filling of the reservoir, 16.2 tons of fish. Norte Energia, the concessionaire responsible for Belo Monte, received from Ibama a fine of R \$ 35.3 million for environmental crime .

It would only be the first impact on the local fauna. This year, in a different

situation, Ibama requested the suspension of turbine tests after verifying the death of 1 ton of fish .

"We believe that in the dammed stretches we have almost completely lost the fauna of the rapids, because it demands a lot of oxygen, running water, a series of conditions that no longer exist," says Jansen Zuanon, a researcher at the National Institute of Amazonian Research one of the authors of the article.

+++ Project foresees change in environmental law

The fear now is what can happen with the species that live in the following stretch after the dam. A certain amount of species loss was already foreseen in the environmental impact study (EIA) of the project and, in an attempt to minimize it, in agreement with IBAMA and the National Water Agency (ANA), the so-called consensus ", the first environmental condition of the installation license.

It states that there will still be a water flow dam below, but 80% lower than if there was no power plant. Based on the results obtained in the study, researchers warn that these 20% may not be enough to maintain these species.

"It will still be a stretch of rapids, but what is left of the area to be used by the fish is very small. The water can run very shallow, on a stone slab, heating up. The water will be there, but it is not the proper environment to keep the rapids that lived in that stretch, "Zuanon adds.

Indians report reduction of pacu supply

Although Belo Monte is still in the testing phase and the consensus hydrograph is not yet in full operation, riverine and indigenous communities living in the Volta Grande region are already feeling impacts from the plant on the supply of fish, especially food, like the pacu, enjoyed in the area.

The species feeds on fruit from trees that stand on the river's edge and usually bear fruit with the flood. But today, says biologist Leandro Sousa of the Federal University of Pará in Altamira and another author of the paper, the water pulse in the stretch below the dam is not very predictable, so that the fruit can end up falling in a dry area rather than into the water and the fish have nothing to eat.

"In addition, if the pulse comes at once, the fish enters the pond, but if the pulse stops after and the place gets dry, the fish may die. There is no time to close the life cycle," says Sousa.

Reports of very thin fish were made by Juruna Indians of the village Muratu, which is in the Big Volta. This community has participated in an independent monitoring done since 2013 by local researchers with assistance from the Socio-Environmental Institute (ISA) and UFPA.

This is a monthly survey on the dynamics of fishing and food consumption of village families since before the dam, which allows monitoring of future monitoring and changes that will occur.

The work noted that by 2015, fish were the main source of animal protein - more than 50%. Beginning in 2016, when, in addition to the work, there was

an intense drought promoted by the El Niño of the previous year, the Indians began to consume more food bought in the city, such as farm chicken and canned. Last year, only 30% of the protein came from fish. The products of the city now represent 60%.

According to biologist Cristiane Costa, who leads the work, the scenario with the consensus hydrograph may be even worse than the one observed in 2016 due to El Niño. "That year has already changed the behavior of the Indians and was a warning of a scenario that can be established from now on."

"We did not expect to see such changes at once. This should only be felt after the hydrograph is already in operation. It is still not indicated how much the flow is. If I did not have this independent monitoring, nobody would even be aware of the problem," says Biviany Rojas, an ISA lawyer.

Based on scientific work and monitoring, the NGO advocates a revision of the consensus hydrogram, believing that it is an insufficient measure to guarantee the socio-environmental conditions of Volta Grande.

Other side

By means of a note, Norte Energia said that since 2012 it monitors the fishing resources of the Xingu River in the region of the plant and that there was no record of species disappearance. "The results obtained so far by these studies also do not indicate risk of extinction of species," he said.

Regarding the hydrograph of consensus, he informed that the flow values were predefined in the Environmental Impact Study (EIA) in 2009 and approved by IBAMA and ANA.

He said that it aims to mimic the dynamics of flood and ebb of the river in order to reduce the interference in the aquatic biota and living conditions of the riverine and indigenous communities that inhabit the Volta Grande.

Ibama said that when the hydrogram starts up - which is scheduled for next year, when all 18 turbines are in operation - it will be in the testing phase. In the six-year period there will be monitoring to assess whether these socio-environmental conditions are in fact being maintained. If they are not, says the organ, the limits of the hydrogram can be reviewed at any time.

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