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Six years after the Mariana's dam collapse, marine ecosystem continues to suffer the

Ecology | Study shows that three species of seabirds that live hundreds of kilometers from the dam continue to feed on metal-contaminated prey, which indicates a cycle of contamination

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By *Mírian Socal Barradas*

The day is November 5th, 2015. Around 3:30 PM, Fundão's dam, property of Samarco Mineração S/A – company owned by Vale do Rio Doce and the Anglo-Australian consortium BHP, located in the countryside of Mariana (MG) – collapses and becomes the biggest environmental disaster in Brazil. With the dam's burst, 45 million cubic meters of metal-rich mining reject were immediately released in the environment. The effects: 19 deaths, hundreds of homeless, 41 cities and 3 indigenous reserves affected.

Regarding the environmental impacts, even now when we already know a lot, there are still questions without answers. A group of over 550 researchers from 27 research institutions, gathered at [Rede Rio Doce Mar](#),

tries to answer these questions – amongst them, the impact caused on birds that live in Rio Doce's mouth and in the marine waters nearby. An article published in the beginning of November in *Science of The Total Environment* concluded that the species *Phaethon aethereus*, *Sula leucogaster*, and *Pterodroma arminjoniana* keep feeding in the same areas and on the same food resources – but now these preys are contaminated with the mining tailings. From the analysis of these birds' tissues and the comparison with data collected before the disaster, the study showed that the animals are contaminated with heavy metals such as arsenic and cadmium.

"What I naively expected before starting field work after the dam collapse was that maybe this would have affected the availability of food resources for birds, and they would have searched for new feeding places," says Guilherme Tavares Nunes, professor at UFRGS *Campus Litoral Norte* and researcher for the CECLIMAR (*Center for Coastal, Limnological and Marine Studies*). From the analysis of three aspects – distribution of the birds on the sea, their diet and concentration of contaminants in birds' tissues –, the researchers realized that the hypothesis was wrong, what reveals that these species are still being contaminated by feeding.

"Imagine you always eat in the same restaurant. You basically eat the same food every day, until the moment the restaurant is closed – and you'll have to look for another place to eat – or the restaurant keeps serving the dishes, but now poisoned. This poison is colorless and odorless, you don't feel anything while eating it, but it will bring you a lot of problems in the medium and long run – in the individual and in the collective scope as well. Guilherme explains that the study used data from two different periods: before the collapse, data the researchers had collected between 2007 and 2015, and after, with information from 2018 to 2020. Thus, it was possible to get a comparison between both periods. "The problem is, in fact, much worse [than expected], because we saw that these birds keep feeding on the same resources and in the same places, but now this food is contaminated," he states. This is called ecological trap: when abrupt environmental changes happen and, because of that, species would rather continue to live in deteriorated habitats.

Data shows that the tailing volume that reached the feeding area of these seabirds was not enough to eliminate completely the prey these species eat. "But the marine area adjacent to the Rio Doce mouth, commonly used as feeding area by dozens of seabird and shorebird species, was totally contaminated by these metals and obviously, the prey ends up eating them too. Or the preys' preys, or the preys of the preys' preys. An increase in the concentration of potentially toxic metals, such as arsenic and cadmium, and a decrease in essential elements to the birds' metabolism, as manganese and zinc, were observed on the birds' tissues.

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Mariana's dam collapse (Minas Gerais, Brazil) 2015 | Agência Brasil Photo / Antônio Cruz

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