

Wastewater discharges into the Pacific affecting fish, marine mammals and humans

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According to a study by the University of Colima (UCOL), discharges of wastewater to the sea are responsible for the growth of algae that produce certain toxins that could be harmful to humans. They have also affected the fishing and tourism sectors in the region.

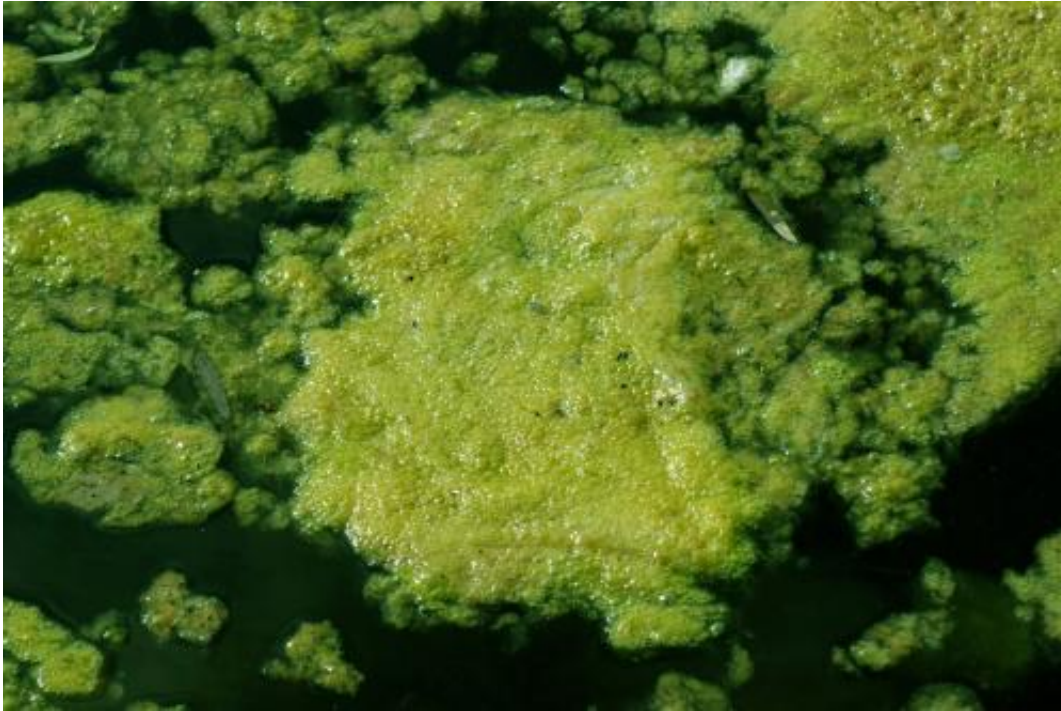
For five years, algal blooms have been detected in the southwest coast of

Mexico as a result of uncontrolled wastewater discharges into the coastal zone, increasing the availability of phosphorus, nitrogen and silicon, as well as the uncontrolled discharge of ballast water by boats that come to the area from elsewhere.

In 1999, Aramis Olivos was repatriated by CONACYT, and in late 2000 he was hired by the University of Colima (UCOL) which has been devoted to studying urban wastewater as a source of nutrients for algal blooms in the region.

"Seawater maintains an availability of nitrogen, phosphorus and silicon, elements that are the basis for the formation of phytoplankton. And the wastewater is enriched with high concentrations of these three elements."
"

The goal, says the specialist, was to see if the contribution of residual water alters the natural environmental conditions. For example, the city of Manzanillo, treatment plants only screen the suspended solids, but the dissolved matter remains untreated.



UCOL has determined that when it doesn't rain, there are areas where wastewater is not channeled into the sewer and stays exposed in the open; when it rains, everything is washed into the sea, which creates an over-enrichment of phosphorus, silicon and nitrogen nutrients of human origin.

"Another objective was to determine how this excess of nutrients impacts phytoplankton, which are microalgae that perform photosynthesis. The generated microalgae are ingested by filter feeders, and those are eaten by fish, which are then eaten by humans, becoming vectors of intoxication for the resident population and tourists."

By altering nutrients in these spaces, natural local flora would be at a disadvantage to species from elsewhere, which, with the benefit of

[excess nutrients](#), could conquer the environment, causing changes to phytoplankton species and affecting the food chain, ie the transfer of food through a number of organisms. The natural chain would cease to exist and potentially toxic microalgae, known as opportunists, would take advantage.

The specialist at UCOL cites the example of the Mississippi River in the US, which empties into the Gulf of Mexico. The natural species of phytoplankton that served as shrimp food were displaced there, and in the absence of these organisms, the ecology and economy of the region were affected.

Watercrafts



According to Aramis Olives, vessels that by international standards should not discharge their [ballast water](#) nonetheless do, thereby introducing opportunistic phytoplankton and displacing native species. Exotic species from Malaysia have been detected.

"The organisms that eat the (introduced) opportunistic phytoplankton, such as fish, can be poisoned and can even generate mass mortalities, relating to red tides, which are part of [harmful algal blooms](#), with events that impact the economy of a region."

When [algal growth](#) occurs on the coast in Colima, authorities contact the researchers to know if it presents a danger or not in order to make a decision to establish a prohibition in the area, which may affect fishermen and tourism, affecting the economy of the region.

In order to integrate real monitoring of the conditions that can generate these [algal blooms](#) in the area and nationally, specialists from several institutions have formed the Mexican Society of Harmful Algal Blooms, which will lead to better understanding of this phenomenon and the mechanisms needed to prevent and mitigate the damage they cause.

Provided by Investigación y Desarrollo

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