Sargassum Impacts at Palmas del Mar

Since 2011, massive accumulations and inundations of Sargassum in various sites in Puerto Rico, including Palmas del Mar in Humacao, have occurred. As Sargassum decays, it produces bad odors and murky brown waters that reduce the amount of light and oxygen (hypoxia or anoxia) available for marine ecosystems in addition to other impacts to water quality.

What Is being done

Several mitigation strategies have been implemented by the Palmas del Mar Housing Association (PMHOA). These include:

1) dredging the flushing channel entrance and removing accumulated Sargassum to improve water flow,
2) monitoring of gas emissions at various sites,
3) proposed installation of aerators to improve water quality, and
4) use of Sargassum to stabilize beach area.

What we found

Two sites (Sites 2 and 6 in graph) in Palmas del Mar, showed dissolved oxygen levels that were mostly below 3 milligrams per liter (mg/L) (yellow line) and very close to 1 mg/L (red line) during the 2021 and 2022 Sargassum season. According to the Environmental Protection Agency (EPA), levels less than 3 mg/L are alarming and can impact certain marine organisms, but levels less than 1 mg/L is considered hypoxia where it is detrimental to marine life. For the 2022 season we found that from the weekly surveys conducted between April August 2022 at Palmas del Mar, Sargassum was always present at the sites surveyed. Also, surveys indicated a 21% high level of accumulation, while 22% were categorized as very high or extreme Sargassum accumulation events. These results were very similar to the 2021 Sargassum season at Palmas del Mar.

This study was sponsored by the Sea Grant Program of the University of Puerto Rico Mayaguez (UPRM) in collaboration with partners from PMHOA and the University of Puerto Rico Humacao (UPRH) and included the water quality and Sargassum accumulation surveys that were collected for various sites in Palmas del Mar during the 2021-2022 Sargassum season.

For more information about this project, please contact Dr. William J Hernández, william.hernandez@upr.edu.
They allow us to observe accumulations of Sargassum in areas of:

- Coral reefs in Cayo San Cristóbal at La Parguera
- Marine areas (Palmas del Mar)
- Mangroves of Cueva Island
- Boat docks (La Parguera)
The Accumulation of Sargassum on Guayacán Island

In this image you can clearly see the extent of sargassum accumulation in the small inlets and bays created by the fringing mangrove.

It can also differentiate sargassum in various stages of decomposition and submerged sargassum, and allows us to estimate its potential impact on marine and coastal communities in the area.
USE OF "DRONES" OR UNMANNED VEHICLES

The use of drones or unmanned aerial vehicles (UAVs) allows us to complement our field observations and provide more detail on areas of accumulation that are not clearly visible on satellite imagery and to differentiate submerged sargassum at various locations.
MONITORING SARGASSUM IMPACT

As part of our efforts to quantify the impact of sargassum in coastal areas, we are assessing water quality in areas of accumulation.

In addition, we are documenting sargassum observations via smart phones where we collect sargassum location, level of accumulation, stage of decomposition, presence of sea turtles, debris, and photos of the accumulation.
This monitoring is being carried out on a voluntary basis by undergraduate students from the University of Puerto Rico in Humacao, who in turn are being trained in these environmental monitoring techniques for the first time.

The compilation of this data is extremely valuable, as it allows us to validate satellite imagery observations for the presence and spread of sargassum.
These products are developed by the research project funded by the Sea Grant Program titled: "Developing Decision-making Tools for Sargassum Management in Coastal Areas", which seeks to learn more about the impacts of sargassum in the coastal areas of Puerto Rico and provide recommendations on its management.

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