Insights into the Effects of Tropical Disturbances Hurricane Irma and Invest 92L on the Dynamics of the Phytoplankton Community of the Estero Bay Estuary

Leone, Mark (School: Canterbury School)

This second-year study explored how an active tropical moisture season affected the dynamics of the phytoplankton populations of Estero Bay. The hypothesis states that as an active tropical moisture season ends, the concentration, composition, diversity, grazing rates, and growth rates of estuarine phytoplankton will be affected. The hypothesis was partially supported. Several experiments were conducted during this study. The first compared the phytoplankton counts and environmental variable levels from 2016 to 2017. The second compared a 24-hour zooplankton grazing experiment conducted in late wet season to two conducted in the dry season. In the third, three nutrient exposure experiments were conducted over a period of nine days and then compared. The results of the water samples' phytoplankton counts and environmental factor levels show that the concentration of phytoplankton in Estero Bay, in comparison to 2016, was extremely high. The composition and diversity of the phytoplankton in the water samples were not significantly different from that of 2016, as shown by a nMDS, cluster analysis, and Simpson's similarity index. Following Hurricane Irma, the zooplankton grazing curves normalized, inferring that Invest 92L and Hurricane Irma caused decoupling between zooplankton and phytoplankton. The growth rates in the nutrient exposure experiments showed that all types of phytoplankton were both nitrate and phosphate limited. As nutrients were washed out by Invest 92L, diatoms divided faster than cyanobacteria, therefore no major eutrophication event occurred after Hurricane Irma. This data shows that Invest 92L and Hurricane Irma did impact some dynamics of the Estero Bay phytoplankton community.

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