The RI C-AIM Narragansett Bay Observatory Project

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The RI C-AIM Narragansett Bay Observatory Project looks to achieve real-time monitoring and high frequency sampling of Rhode Island's Narragansett Bay. The effort towards a smart and interconnected bay is driven by the desire to better understand the ecosystem dynamics that contribute to the growth of harmful algal blooms (HABs) which disrupt the shellfish industry and coastal communities. HABs cause contamination of shellfish, and consumption can lead to illnesses such as paralytic shellfish poisoning, caused by saxitoxin, or amnesic shellfish poisoning caused by domoic acid. When a HAB event occurs, harmful species of algae dominate the phytoplankton community, and produce toxic organic compounds in large quantities. This results in build up of these toxic compounds in the tissues of higher trophic species like shellfish. The highest concern of shellfisheries in Narragansett Bay are the species Alexandrium and Pseudo-nitzschia, both of which produce neurotoxins that accumulate in shellfish tissue. The ability to predict these bloom events will allow for informed management decisions to mitigate their economic impact and risks to human health. To aid in the prediction of these events two coastal monitoring buoys were deployed near Jamestown and Greenwich Bay, in addition to a multi-depth pump station at Castle Hill Lighthouse in the East Passage. High-resolution data collected includes oceanographic parameters such as nutrients, chlorophyll a fluorescence, dissolved oxygen, turbidity, salinity, pH, and temperature. The data collected from these stations will be used to inform predictive algorithms that can forecast the likelihood of a HAB event based on real-time conditions within the bay. During the summer of 2022 improvements to the engineering of these autonomous buoy platforms were performed, including the design and fabrication of clamps to secure the oceanographic sensors. Created using CAD software and 3D printing, these clamps are a complete redesign of the current sensor retention mechanism, and eliminate the need for tools when divers service the sensors. Clamps were also designed to anchor data cables with unrestricted movement, which caused temporary data transmission blackouts when currents put strain on the connections. Lastly, modifications to the current Bay Observatory website were made, to create an interactive and educational component where the public can learn about the methods of this project and why the data collected is important.

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