Undergraduate Research Symposium May 19, 2017 Mary Gates Hall

Online Proceedings

Poster Session 1

Balcony, Easel 120

11:00 AM to 1:00 PM

Benthic Monitoring as an Early Warning System for *Alexandrium* Blooms in Puget Sound

Alexis Dittoe, Senior, Oceanography, Pre-Nursing
Mentor: Miles Logsdon, School of Oceanography

The production of saxitoxin by the dinoflagellate *Alexandrium catenella* and the bioaccumulation of the neurotoxin in shellfish can result in people contracting paralytic shellfish poisoning (PSP) after consuming contaminated shellfish. While the Washington State Department of Health (WDOH) routinely tests commercially farmed shellfish for saxitoxin concentrations, people who recreationally farm shellfish are at increased risk of contracting PSP because of the long process from water sampling to warning signs or beach closures. Many *Alexandrium* blooms are initiated by cysts, a dormant form of *A. catenella* that can remain viable in sediments for long periods of time. The purpose of this research is to develop a low cost and easy to deploy early warning system for *Alexandrium* blooms that monitors benthic conditions as a proxy for the likelihood of a bloom. The instrument has multiple nodes along the cable containing temperature and light sensors. Temperatures above 7 C and light reaching the cysts on the seafloor can trigger cyst germination making these variables good predictors of *Alexandrium* blooms. Because of the simple design and spatial coverage of the instrument, citizen scientists can become engaged in this public health issue and have a direct impact by increasing scientific awareness of *Alexandrium* bloom progression in Puget Sound.

Session 1M

Environmental Monitoring and Modeling: Atmosphere, Mountains, and Ocean

Session Moderator: Andrea Ogston, Oceanography

MGH 287

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

Monitoring of Subtidal Ecosystem and Bathymetric Changes by Shoreline Armoring Restoration Using Multibeam Sonar Technology

Julia June Jackson Wallace, Senior, Oceanography
Mentor: Miles Logsdon, School of Oceanography

In recent years, local organizations have moved to restore the anthropogenically-altered shorelines of the Salish Sea. Changes to the beach and intertidal have been observed, however little research has recorded effects on the subtidal. This region is home to several species including eelgrass (*Zostera marina*), an important species in the Salish Sea often used to indicate ecosystem health. This research utilizes multibeam sonar bathymetric data to analyze changes to subtidal seafloor structure in response to shoreline modification and investigates potential subsequent ecosystem consequences. Two Washington state study sites were analyzed, Seahurst Park in Burien, and the Snohomish County Nearshore Restoration Project in Everett. Multibeam data was acquired using a Kongsberg EM 2040 system and post-processed in Caris HIPS to generate a base surface of sub-meter resolution. The data detected eelgrass beds in addition to revealing bathymetric changes. ArcGIS was used to generate descriptive and pattern metrics such as total elevation change, percent area changed, surface roughness, and Bathymetric Position Index. Data revealed small but noticeable changes in bathymetry and the presence of eelgrass following shoreline alteration. The changes observed could indicate that restoration may have negative consequences for *Zostera* populations and may potentially affect other organisms using the sublittoral habitat.

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Evaluating Video Documentation as a Method for Monitoring Ecosystem Change

Malea Marie (Malea) Saul, Senior, Oceanography, Environmental Studies
Mentor: Miles Logsdon, School of Oceanography

The ability to conduct and communicate climate related environmental changes relies heavily on the tool used for documentation. A key benefit of video as a scientific tool can allow scientists to obtain uninterrupted documentation over all temporal scales that provide physical and structural evidence of change. We present a video system to be used for the acquisition of duel field of view angles and 360 degree mosaics that is easily deployed and compatible for use with both stationary and mobile data collection. The visual acquisition system focuses on providing physical change information for use in comparison of GIS-based change models. Along with the video system, we present the protocol for its use and results from preliminary tests focused on measuring the accuracy and precision of the system. Additionally, a case study of a nearshore habitat, a system that experiences a significant amount of change from different climate and environmental forcings, was conducted. Completion of such a system allows scientists to use video to monitor and collect visual data regarding ecosystem change over temporal and spatial scales, and provides a communication tool for education and outreach purposes.