Evaluation of New Hydroacoustic System for Fine Scale Assessment and Mapping of Aquatic Vegetation and Substrate Classification

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Abstract:

This paper reports a test in Puget Sound, Seattle WA, using a single beam echosounder (BioSonics MX) and post-processing analysis and mapping software (BioSonics Visual Habitat).

A hydroacoustic survey was conducted to assess eelgrass and macrophyte coverage, bathymetry and substrate composition. A calibrated single beam echosounder with 200 kHz single beam transducer and an integrated DGPS for georeferencing was used for data collection. All data files were processed using Visual Habitat software and verified using data visualization tools in the form of a satellite imagery map overlain with each transect file and simultaneous viewing of a synchronized echogram for each transect file. Substrate classification was performed using a Principal Components Analysis (PCA) of each echo signal and clustering based on similarities of the components. This resulted in the delineation of areas with similar acoustic properties based on relative hardness and smoothness of seafloor. Aquatic vegetation canopy height was identified by the shift in signal strength of each echo through the water column. Plant density was calculated based on the presence or absence of vegetation in each sample contained in a report cycle. Bathymetry measurements were recorded with an accuracy of +- 1.7 cm. Processed data were exported to CSV and KML file formats. Results were ground truthed and showed high agreement with ship's depth sounder readings, visual observation, and simultaneous video recordings.

Keywords:

Submerged Aquatic Vegetation and Substrate Mapping