Development of a new acoustic mapping method for eelgrass using a multi-beam echo-sounder

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Eelgrass plays important roles in temperate coastal ecosystems, including as primary producers and as habitat for many species. The distribution and health of eelgrass beds are also sometimes used as a bio-indicator for water quality. The deepest edges of eelgrass beds are especially vulnerable to water quality issues because of the pre-existing light limitation with increasing depth due to natural light attenuation. However, the deep edges of beds are also often the most difficult to delineate with satellite and aerial imagery often used for large-scale seagrass mapping programs; the use of aerial imagery for mapping eelgrass beds is also sometimes hindered by turbidity issues common in estuarine environments. We are in particular developing methods to determine and map the maximum depth limit ('deep edge'), percent cover, functional type (i.e., macroalgae or eelgrass) and canopy height of the beds using water column backscatter data from a multi-beam echo-sounder because these characteristics are difficult to obtain using existing optical and acoustic methods. Water column data was collected using an Odom MB1 sonar in 2014 and 2015 over a variety of vegetated sites in New Hampshire and Massachusetts, selected to represent a range of conditions: dense/sparse eelgrass, long/short eelgrass, mixed macroalgae and eelgrass, eelgrass on muddy or hard substrates, etc. The data processing workflow will look at both echo and terrain characteristics to determine the presence and characteristics of vegetation. In addition to sonar data, drop camera data was collected, and data from a regional aerial mapping program also exist for comparison. Initial data analysis shows good agreement between drop camera and sonar detections, and patches as small as $1m^2$ and as short as 20 cm are detectable.