

PROCESSING AND ACCURACY OF TOPOGRAPHIC LIDAR DATA IN COASTAL MARSHES

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Scientific literature suggests that physical changes to coastal marshland habitat and its associated vegetation will be the first indicators of accelerated rates of sea level rise. Such changes include vertical accretion, marsh habitat translation (i.e., low to high marsh), increased erosion, and loss of vegetation. Because marsh habitat and vegetation are strongly linked to substrate elevation and local drainage patterns, accurate high-resolution representations of both the vegetation height and surface elevations are requisite components for systematic analysis and temporal monitoring. Topographic lidar data provide an excellent avenue for measuring vegetation heights and surface elevations. Lidar data are becoming more available in coastal regions, with some locations having data that spans over ten years. While Lidar data can measure vegetation and bare earth surface elevations, the ability to discern the two surfaces with enough accuracy to examine centimeter-level variation is still being resolved; this is the primary goal of this study.

Marsh surface, vegetation canopy heights, and marsh species will be measured in the field at several different locations. These variables will be used to assess the relative accuracy of the lidar data as well as fine tune the processing required to generate improved marsh-couple surfaces (i.e., bare earth and canopy). The results from the site-specific process will be tested against various 'generic' processes in order to measure and evaluate the applicability of common, global techniques. Results are expected to: (1) produce high quality marsh surfaces for site-specific sea level rise models, (2) examine long-term marsh surface changes in the selected study areas, and (3) expand the use of generic lidar processing techniques in marshes. Techniques, both for site-specific and generic processes, their vertical accuracies, and character will be documented for increased applicability at other marshland locations.

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