

HAS THE 10,000 YEAR PERIOD OF BAY INFILLING PASSED? IF SO, WHAT ROLE WILL BAY EDGE EROSION PLAY IN HELPING TO MEET PLATFORM SALT MARSH SEDIMENT NEEDS?

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Observations of ancient (>1000 yrs) fine organic material in marsh surface sediments has led us to examine the source and importance of this material in maintaining marsh elevation relative to sea-level rise. We find very low inputs of sediments from the watershed to the Plum Island Sound estuary, less than 10% of that needed to sustain marsh elevation relative to SLR. An imbalance between SLR and allochthonous sediment inputs to the estuary is contributing to the expansion of tidal waterways through lateral erosion of marsh creekbanks. Based on an analysis of 2005 and 2011 LiDAR imagery, we estimate annual erosion of about 42,000 m², and a daily input of about 27 MT of sediment. ¹⁴C dating of suspended POC along the length of the estuary shows that ancient blue carbon peat can make up over a third of the total load on occasion, confirming that eroded creekbank sediment is being resuspended and transported via tidal currents. If all this material is deposited on the marsh platform during inundating tides, it could provide 33% of the sediment required to maintain elevation of all salt marshes in the Plum Island system.

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