

ABSTRACT

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Title: COASTAL SEDIMENT DISPERSAL PATTERNS AT HAMMONASSET BEACH STATE PARK: TOWARDS AN ALTERNATIVE BEACH RESTORATION TECHNIQUE

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With over 2 miles of oceanfront, Hammonasset Beach State Park in Madison, Connecticut is a dynamic ecosystem providing ecological services, economic income, and recreational activities to local and regional communities. However, Hammonasset has been identified as chronically erosive, particularly at its western end. In December 2017, the Army Corps of Engineers completed a \$9-million-dollar beach replenishment project along 0.7 miles of the beach with sediment dredged from the mouth of the Housatonic River. Importing sand is a temporary but costly solution as large storm waves with a short periodicity erode sediment from the beach and transport it offshore. Due to the lack of a sufficiently energetic fair-weather wave field in fetch-limited Long Island Sound, sediment is not returned to the beach once it erodes, a characteristic beach process often referred to as *seasonal beach profiles*. For this study sediment erosion and dispersal at Hammonasset is tracked by analyzing 27 cross-sectional beach profiles along 1.68 miles of the Hammonasset shoreline. Results after an 18-month study conducted from June 2018 to November 2019 reveal that outside the replenishment region, changes in beach width and beach volume were minor. However, the replenished beach experienced major net losses in width and volume since the beach was presumably adjusting via cross-shore and longshore transport to an equilibrium size and shape. Maximum loss of profile width during the study period was -27.13 m on profile A9 of the replenishment area. Over all profiles, the total volume of erosion was $-569.70 \text{ m}^3/\text{m}$ while the total accretion was $222.52 \text{ m}^3/\text{m}$. The disparity between erosion and accretion during the study period was $-347.18 \text{ m}^3/\text{m}$ indicating that unaccounted for sediment may have moved offshore below the MLLW contour.