

## APPLIED COASTAL

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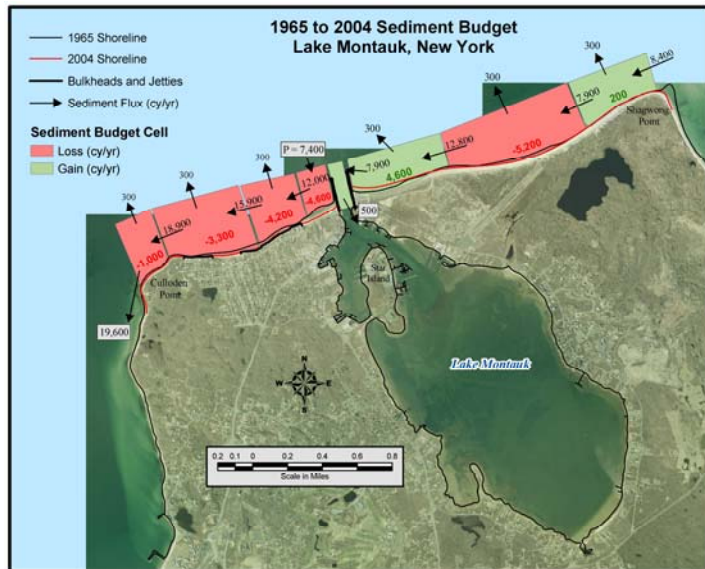
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**Project:** Sediment Budget Analysis:  
Culloden Point to Shagwong  
Point, Lake Montauk, NY

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A sediment budget was developed for the Lake Montauk coast between Shagwong Point (east) and Culloden Point (west) for the periods 1892 to 1933, 1933 to 1965, and 1965 to 2004. Eight sediment budget cells were established at coastal structure boundaries and where shoreline orientation change and geomorphic response are significant. Historical shoreline positions were established with U.S. Coast and Geodetic Survey (USC&GS) topographic maps (1838, 1892, 1933, and 1965), rectified aerial photography (1980 and 1992), and a 2004 differential GPS high-water shoreline survey. Bathymetry data (1933/34, 1943, and 1999) were used to quantify sand volume changes from the high-water line offshore to the 20-ft (NGVD) depth contour. USACE channel surveys were available for the years 2000, 2001, and 2003, and beach profile data collected by OCTI in 2004 were analyzed. Net longshore sand transport rates along Sound facing beaches were estimated using shoreline change adjacent to the entrance to Montauk Harbor and maintenance dredging records. Permanent offshore sand losses resulting from high-energy events were determined by quantifying sand accumulation seaward of the 20-ft (NGVD) depth contour from the bathymetric change surface.

Shoreline and bathymetry change data, as well as channel dredging quantities, formed the primary sources of information for developing a sediment budget for the periods 1892 to 1933 (41 years), 1933 to 1965 (32 years), 1965 to 2004 (39 years), and 1933 to 2004 (71 years) using the USACE Sediment Budget Analysis System (SBAS). These time periods were chosen to represent pre- and post-construction intervals relative to initial stabilization of the entrance in 1926 and major rehabilitation of the entrance structures in 1968. Intermediate years provided details on change trends within the 1965 to 2004 interval. Net longshore sediment transport was to the west.



Maintenance dredging data were used to derive average annual beach fill rates of 6,100 cy/yr for 1933 to 1965, 7,400 cy/yr for 1965 to 2004, and 6,800 cy/yr for 1933 to 2004. Net transport to the west and south from Cell 1 ranges from about 29,000 (1892 to 1933) to 23,000 (1933 to 2004) cy/yr. Although survey data do not exist to quantify sediment deposition rates south of Culloden Point, geomorphic data from the 2001 aerial photography and contours from topographic maps illustrate the presence of a subaqueous spit platform in this area. This deposit appears to be the depocenter for longshore transport from the east. The sediment budget analyses suggest that restoration of historical shoreline change and sand transport rates would require the addition of about 480,000 cy of sand along beaches west of the entrance jetties. Furthermore, to maintain historical trends, approximately 6,700 cy of sand should be added to the beach west of the west jetty on an annual basis, in addition to maintenance dredging quantities.