

AN INVESTIGATION OF SHORELINE DYNAMICS AT SHINNECOCK INLET, NEW YORK

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A monitoring program has been underway since November, 1997 at a site of downdrift erosion adjacent to a stabilized inlet on the south shore of Long Island (Shinnecock Inlet). Shinnecock Inlet was opened by a hurricane in 1938. The inlet was stabilized between 1952-54 with stone jettys; inlet width was fixed at 800 ft (Nersesian and Bocamazo, 1992). Due to the prolonged effects of downdrift erosion, a local road and a commercial fishery located on Shinnecock Bay have been repeatedly threatened. In the period between 1983 and present, approximately 369,500 m³ of sand were placed on the downdrift beach fronting the commercial fishery (Morang, per. comm.). Most recently, 63,700 m³ of sand were supplied to the beach in January 1997 and October 1998. A chronic erosion problem has been determined with both long-term and short-term analyses. Evidence suggests the dominance of longshore processes at the site, severely limiting accretion from cross-shore bar processes.

A historical shoreline analysis was undertaken to establish a long-term erosion rate for the downdrift beach. Periods of erosion were broken into intervals occurring between renourishment events. The mean rate of shoreline retreat for this analysis was 11 meters per year. Shoreline change was also calculated over the entire period. This resulted in a retreat rate of 2 meters per year. Given that this value is influenced by renourishment events, the value was recalculated subtracting these events from the overall change. The resulting value was 6 meters per year, which can be considered a more accurate representation of actual events.

Sub-aerial beach profiles have been measured on a biweekly to monthly basis. At the initiation of the monitoring, the beach width was 69 meters, the shoreline (NGVD) had retreated 56 meters, with 40% of the January 1997 renourishment fill remaining on the beach. Two Northeast storms in late January and early February reduced the beach width by 102 meters relative to the renourishment fill. Beach volume was reduced to 15% of the renourishment fill after these two events. In the period between late February 1998 and September 1998 the beach remained stable, accreting by 8%. The beach was renourished again in October 1998; the latest profiles (2/16/99) showed 65% of the fill remaining.

Due to the recurrent erosion at this site, it is suggested that beach processes are controlled by longshore factors at the west beach adjacent to Shinnecock Inlet. Evidence of cross-shore influences were rarely seen throughout the monitoring period, suggesting their minor role within the system. These observations, coupled with the chronic erosion are evidence for a system controlled by longshore processes. Present efforts to stabilize the erosion at the beach include research into a spur addition to the west jetty and a sand-bypassing project.

Acknowledgements:

I would like to acknowledge the following for their help and contributions to this project: Henry Bokuniewicz, Frank Buonaiuto, Fred Anders, Andrew Morang, Tom Rogers, Hy Smith, Ted Sandomenico, Karin Olsen.

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