



Figure IV-3-26. Shinnecock Inlet, Long Island, New York, 24 September 1938. Taken three days after Great New England Hurricane breached the barrier, this image shows the new Shinnecock Inlet and many overwash fans along the adjacent shore. Immediately after the storm, all the inlets along this stretch of the coast trended left of the shore-perpendicular. (Photograph mosaic from Beach Erosion Board archives)

(4) Ebb shoal growth. The ebb shoal at Shinnecock Inlet has continued to grow in volume since the inlet was formed. Figure IV-3-30 shows that in 1998, the shoal contained about 6,000,000 m³ (8,000,000 yd³) of sand. It appears that the shoal is still growing, but the latest three surveys were spaced only 1 year apart (1996, 1997, and 1998), so another survey will be needed in several years to verify this conclusion. However, present evidence indicates that the shoal is a sediment sink, although some of the littoral drift is probably bypassing.

IV-4-5. Morphodynamics and Shoreface Processes of Clastic Sediment Shores

a. Overview.

(1) Introduction. This section discusses morphodynamics - the interaction of physical processes and geomorphic response - of clastic sediment shores. The topic covers beach features larger than a meter (e.g., cusps and bars) on time scales of minutes to months. Details on grain-to-grain interactions, the initiation of sediment motion, and high frequency processes are not included. A principle guiding this section is that the overall shape of beaches and the morphology of the shoreface are largely a result of oscillatory (gravity) waves, although tide range, sediment supply, and overall geological setting impose limits. We introduce basic relationships and formulas, but the text is essentially descriptive. Waves are discussed in detail in Part II of the *Coastal Engineering Manual*, while sediment properties are covered in Part III-1.

(2) Literature. Beaches and sediment movement along the shore have been subjects of popular and scientific interest for over a century. A few of the many textbooks that cover these topics include Carter (1988), Davis (1985), Davis and Ethington (1976), Greenwood and Davis (1984), Komar (1998), and Zenkovich (1967). Small-amplitude (Airy) and higher-order wave mechanics are covered in EM 1110-2-1502; more detailed treatments are in Kinsman (1965), Horikawa (1988), and Le Méhauté (1976). Interpreting and applying wave and water level data are covered in EM 1110-2-1414.