

Groins - are shore-perpendicular structures made of timber, steel or concrete sheet pile, or rubble, whose purpose is to entrap sediment moving alongshore. The shoreline accretes on the updrift side and erodes on the downdrift until sand is able to pass around the end of the structure and restore the longshore drift. If the fillet is placed artificially during groin construction, much of the downdrift erosion can be prevented. For long stretches of beach, a groin "field" of many structures is used, examples of which are found at Rehoboth Beach, Delaware; West Hampton Beach, Long Island, New York; and Madeira Beach, Florida. It is stressed that groins are only useful if local erosion is due to spatial variation in the longshore drift, and have little positive impact if erosion is due to on/offshore sediment transport. Consequently, the use of groins will do little to modify shoreline response to sea level rise.

Sea level rise will generally result in a loss of efficacy of existing groin projects. Increased water level will allow more overtopping by waves, and eventually flanking could occur at the landward end of the structure as the shoreline retreats. Groins with long useful lives may require lengthening and raising, while those with shorter lifespans should be replaced with redesigned structures.

Fig. 6.10 shows the groin field at Long Branch, New Jersey, where the longshore drift is from south to north. This project has succeeded in trapping sand and building a beach, but apparently at the expense of the North Long Branch shoreline.

Jetties - are shore-perpendicular structures, usually of rubble mound construction, placed at tidal inlets in order to stabilize their position and maintain a navigable channel. Shoreline response to construction of jetties is similar to that of groins, but on a larger scale as jetties are usually very long. A large fillet is formed on the updrift side of the inlet, with the downdrift shoreline often subject to severe erosion. Jetties serve to increase the velocities in a tidal inlet, which deepens the cross-section and pushes the ebb shoals offshore, entrapping even larger amounts of sediment. Without mechanical bypassing of sand from the updrift to downdrift side of an inlet, the downdrift beach will erode until the updrift fillet and ebb shoals are large enough to shunt sand across the inlet.