



# Living Shorelines Tour

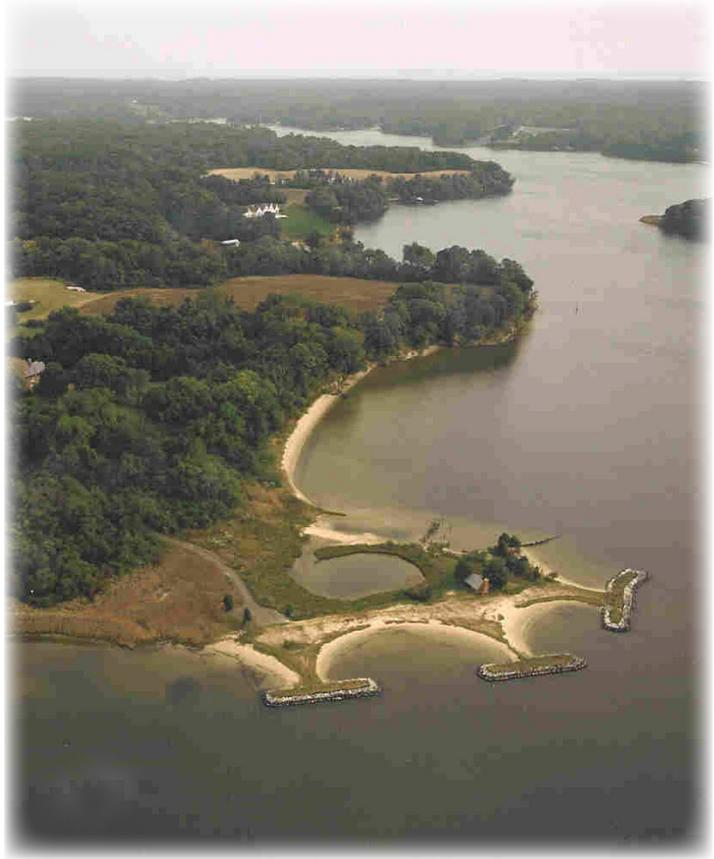
## Site #1 - Planter Breakwaters

### SHORE PROTECTION FUNCTION

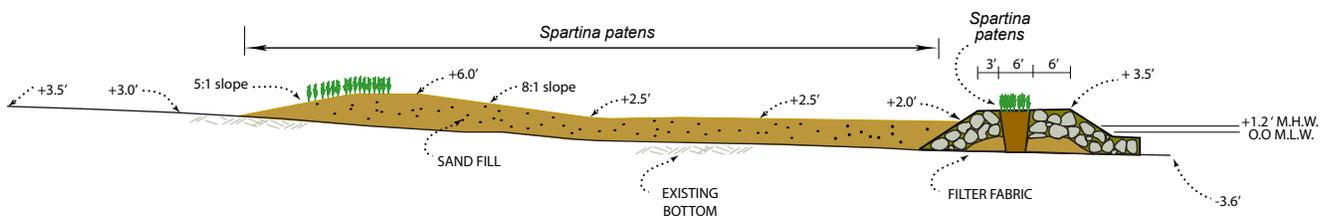
Breakwaters are built in near-shore waters, usually parallel to the shoreline, to reduce wave energy on the land side of the structure. Depending upon their function, they can be deployed as freestanding structures detached from the shoreline or they can be connected to the shoreline. They reduce wave action through a combination of wave refraction and dissipating incoming wave energy. Breakwaters are used to protect pocket beaches, or upland.

### DESIGN & CONSTRUCTION ELEMENTS

The “planter” breakwaters at JPPM provide “headland” (a higher point of land extending into the water) erosion control through the breakwater structure, beach fill material and vegetation. Key design considerations are breakwater length; distance offshore; gap width between breakwaters; and the maximum embayment indentation between breakwaters.



*Aerial view of planter breakwaters at Peterson Point.*



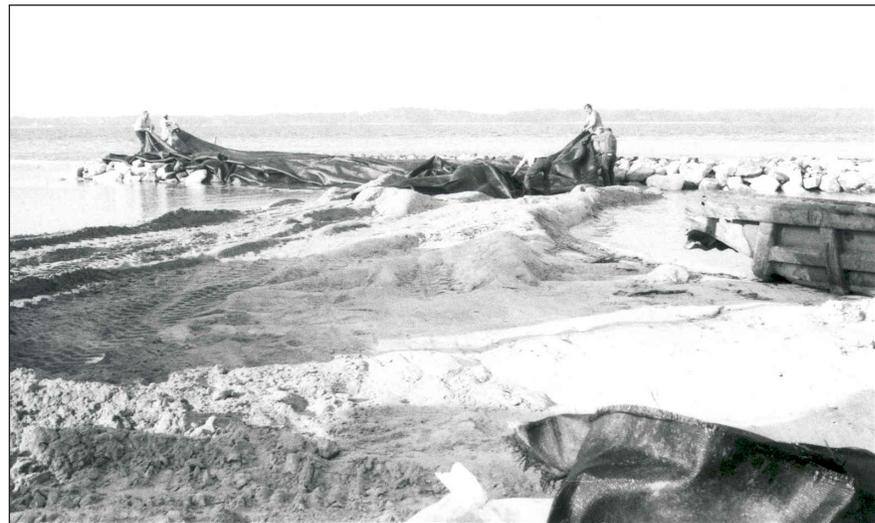
*Typical Planter Breakwater/Beach Section*

Headland breakwater design is complex, involving a thorough understanding of the local wave climate and shoreline geomorphology. To improve the breakwater's aesthetic appearance, saltmeadow hay (*Spartina patens*) and salt tolerant shrubs commonly found on high marshes in the Chesapeake, were placed in the center of each breakwater. The breakwater stands at 3.5' above mean low water and features sloping fronts with heavy armor stone. Sand fill material was brought in during construction to build the breakwater and create a beach.

Subsequently, the sand between breakwaters was placed in a stable pocket beach configuration. Saltmeadow hay was planted on the beach above the mean tide line. Today, in the "low" marsh zone, flooded by daily tides, smooth cordgrass (*Spartina alterniflora*) can be seen. In the "high" marsh, above mean high tide, saltmeadow hay is well established. At the rear of the beach, flooded only during storm events, a narrow band of "dune grass" (*Ammophila breviligulata*) exists in some spots.



*Pre-construction photo showing former stone groins and low elevation beach.*



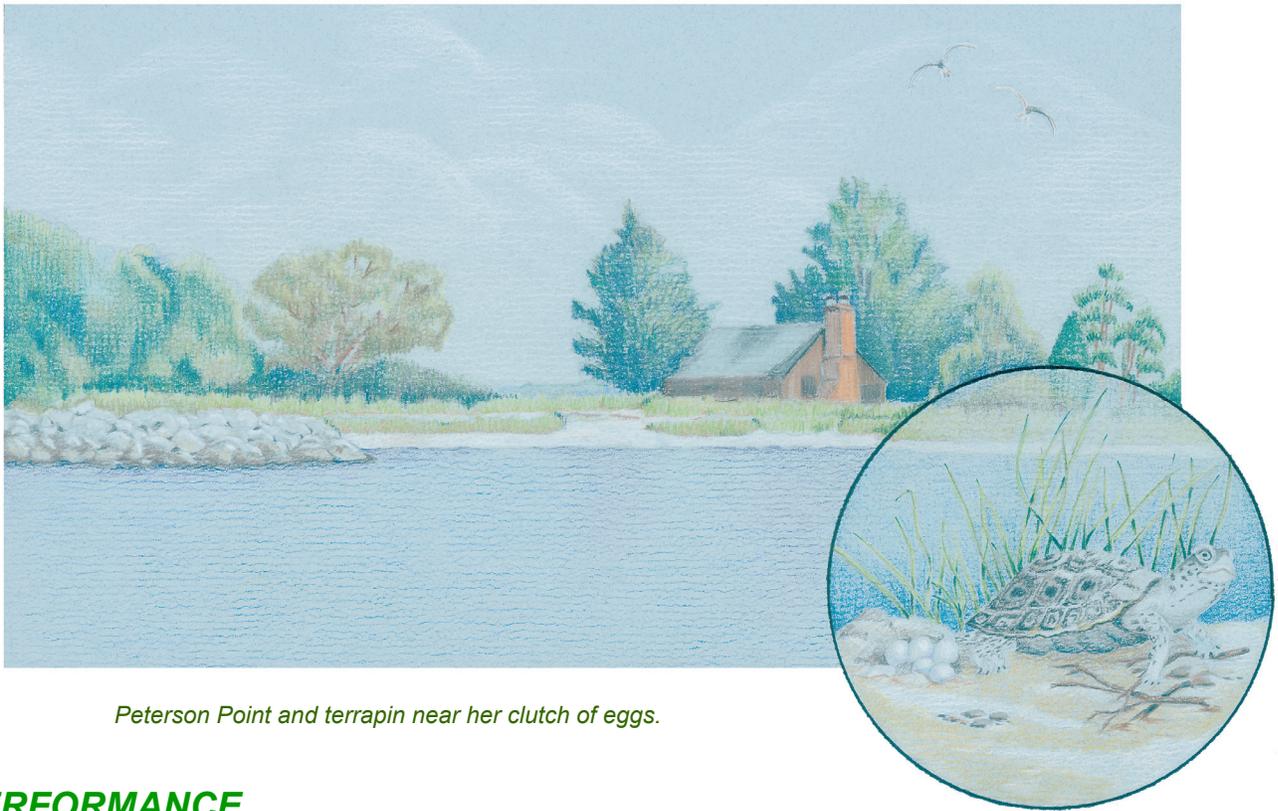
*Photo during construction showing filter cloth lining placed in planting bed and sand fill before grading.*



*Post-construction photo taken in the summer of 2004.*

## **ECOLOGICAL ELEMENTS**

Transient fish can be found in the quiescent waters behind the breakwater and in the Patuxent River. These include white perch, striped bass and spot - all fishes with commercial and recreational importance. Also present are Atlantic silverside, which have considerable value as food for other fish and wading birds. The sand edge and grassy beach environment is frequented by shore birds like sandpipers, terns and gulls. The common tern, a summer resident at JPPM, has declined in recent decades – in part due to the erosional loss of beach habitat and waterfront development. The beach is also important habitat for diamondback terrapin living in this part of the Patuxent River. Terrapin nest here in June and July. Females lay and bury up to 3 clutches, averaging 13 eggs, in sand above the high-tide line. Only 1-3% of all eggs produce live hatchlings and very few survive into adulthood. Eggs and hatchlings are preyed upon by many animals, including raccoons, crabs, crows, gulls, muskrats, foxes and skunks. Prized for their food value, terrapin have been over harvested and are still on a tenuous recovery.



*Peterson Point and terrapin near her clutch of eggs.*

## **PERFORMANCE**

During Hurricane Isabel in September of 2003, this headland breakwater system protected the shoreline and performed exceptionally well. Due to high storm surge elevations and wave action, the breakwater was overtopped, causing a minor loss of plant and sand material inside the southernmost structure.