

# *South River ... Living Shorelines Guidelines*

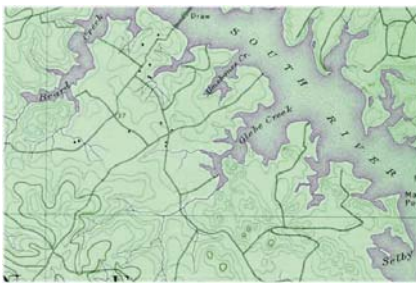
## **Definition:**

### **Living Shoreline Treatment**

**A shoreline management practice that provides erosion control benefits; protects, restores or enhances natural shoreline habitat; and maintains coastal processes through the strategic placement of plants, stone, sand fill and other structural and organic materials (e.g. bio-logs, oyster reefs etc.)**



Photo: Burke Environmental Associates



# Low Energy Environments

## Treatment Type N-1: Beach Replenishment



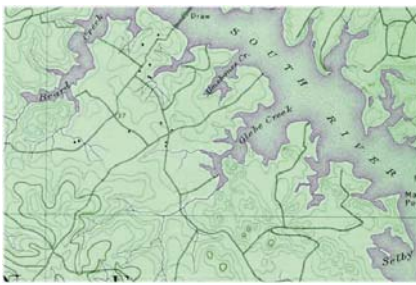
Photo: Burke Environmental Associates

### Description:

**Beach Replenishment, also called beach fill or beach nourishment, involves replacement of appropriately sized sand material to an existing beach which is experiencing erosion**

### Key Elements:

- **The most likely candidates for this treatment are existing public beaches and other special situations**
- **Beach replenishment does not stop erosion and will be periodically required, particularly after extreme storm events**



# Low Energy Environments

## **Treatment Type N-2: Fringe Marsh Creation or Restoration**



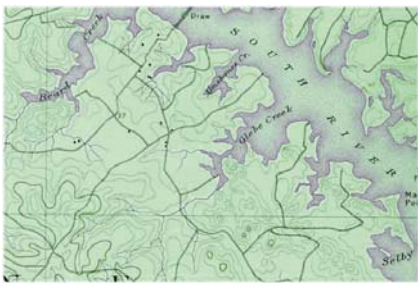
Photo: Northumberland Association for Progressive Stewardship

### **Description:**

**Planting fringe marsh in existing substrate**

### **Key Elements:**

- ❑ **Provides erosion protection of shoreline in limited fetch locations (<1/2 mile) with minor boat wake action**
- ❑ **Good sites have irregular coastlines, shallow offshore waters and evidence of marsh grass nearby**
- ❑ **At low tide there must be room to establish plants between the bank and the high tide line. If, at low tide, water remains at the bank – planting is not feasible using this treatment**



# Low Energy Environments

## Treatment Type N-3:

**Fringe Marsh Creation or Restoration with coir log edging**

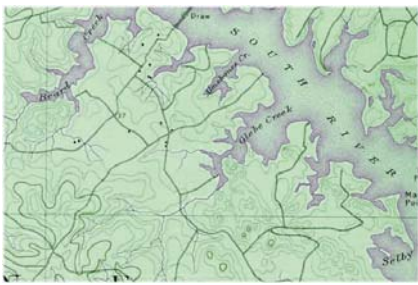


## Description:

**Fringe marsh creation with minor bio-degradable, structural support**

## Key Elements:

- ❑ **Biolog temporarily protects new plantings until they mature to provide erosion protection in limited fetch locations (<1 mile) with minor boat wake action**
- ❑ **Often used in conjunction with sand fill to expand fringe marsh planting area and protect from boat wake action**



# Low Energy Environments

## Treatment Type H-1:

**Fringe Marsh Creation or  
Restoration with stone containment  
groins**

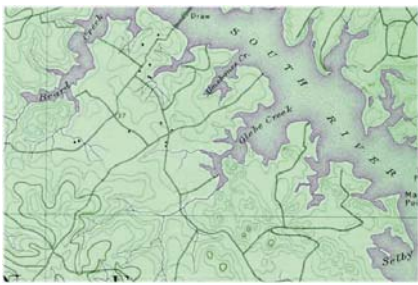


## Description:

**Fringe marsh creation on graded sand fill  
stabilized by small stone containment  
groins**

## Key Elements:

- **Treatment can be used in shallow water areas to expand or create a graded, stable marsh planting terrace**
- **Appropriate for shorelines with minimal erosion, fetch less than 1 mile and limited boat wakes**
- **Wider planting terraces of 20' or more provide for erosion protection of shoreline and bank**



# Medium Energy Environments

## Treatment Type H-2:

### Fringe Marsh Creation or Restoration with stone sills



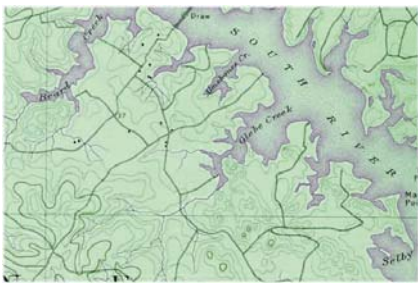
Photo: Burke Environmental Associates

## Description:

A segmented shore parallel stone structure usually a foot or less above normal high water, located a short distance offshore to protect created fringe marsh

## Key Elements:

- Sills hold additional fill material placed on channelward side of graded and planted marsh terrace and can be used in deeper waters with fetch exposures greater than 1 mile or frequent boating activity
- Sills height can be adjusted up or down & follow shoreline curves to provide tailored shore erosion control and habitat benefits
- Water flow - through, over the top, and via gaps between the sill permits free access to shoreline by marine life & allows better nutrient & detrital exchange with wetlands and tidal waters



# Medium Energy Environments

## Treatment Type H-2 (variation):

**Fringe Marsh Creation or Restoration with coir log edging and rock footer**

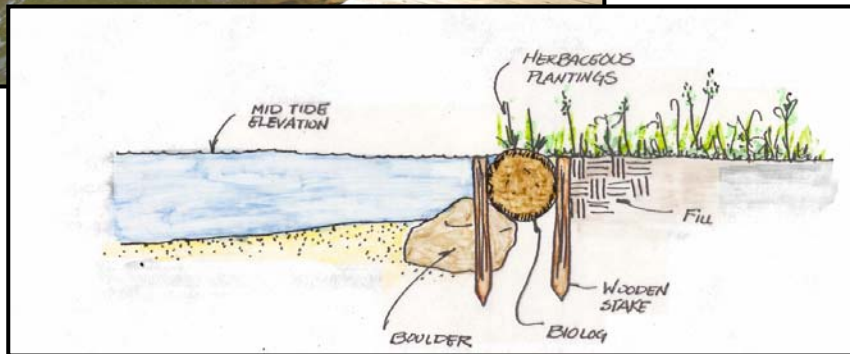


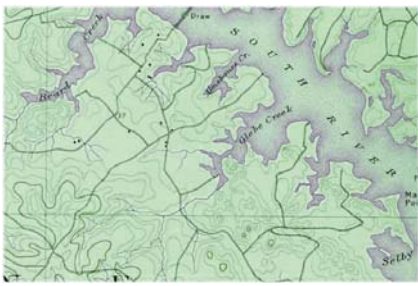
Photo & Drawing: Chesapeake Bay Foundation

## Description:

**Fringe marsh creation with limited permanent structural support**

## Key Elements:

- **Stone edge in front of marsh permanently protects new plantings after biologic decays and provides increased erosion protection in areas with greater fetch or increased boat wake action**
- **Typically used in conjunction with sand fill to create new or expand existing fringe marsh planting area; can be used in deeper waters**



# Medium/High Energy Environments

## **Treatment Type H-3: Marsh Fringe Marsh Creation or Restoration with Breakwaters**



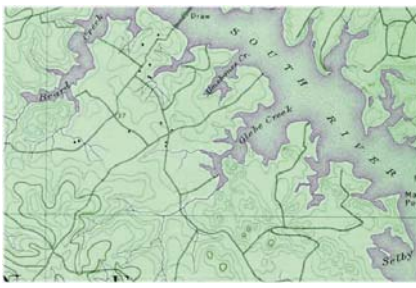
Photo & Drawing: Chesapeake Bay Foundation

### **Description:**

**Establishing a marsh fringe in conjunction with offshore stone breakwaters**

### **Key Elements:**

- ❑ **Massive stone structure erected offshore intercepts and protects from direct impact of incoming waves**
- ❑ **Can be attached to shoreline or freestanding and requires extensive sand fill & heavy equipment for installation and materials placement**
- ❑ **3 or more planting zones possible – keyed to hydrology, salinity etc.**
- ❑ **Often used to stabilize long shoreline segments**
- ❑ **Complex design considerations require experienced professional assistance**



# Medium/High Energy Environments

## Treatment Type H-4:

### Beach Replenishment with Breakwaters



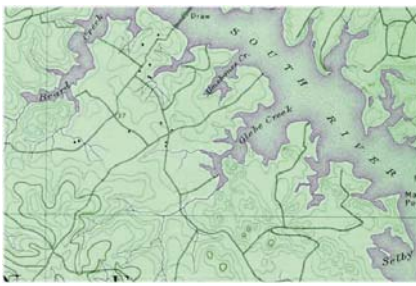
Photo: Burke Environmental Associates

## Description:

Establishing or replenishing a recreational beach using breakwaters

## Key Elements:

- ❑ Massive stone structure erected offshore intercepts and protects from direct impact of incoming waves
- ❑ Can be attached to shoreline or freestanding and requires extensive sand fill & heavy equipment for installation and materials placement
- ❑ Often used to stabilize long shoreline segments
- ❑ A low dune and beach grass can be incorporated on the backshore to protect the bank and provide a sand source to repair beaches after major storm events



# Medium Energy Environments

## Treatment Type H-5:

### Marsh Toe Revetment



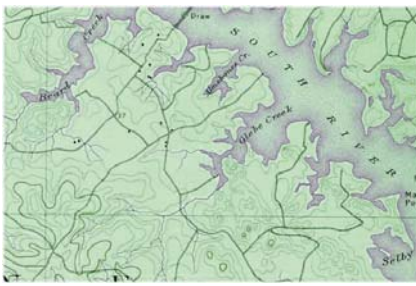
Photo: Karen Duhring, VIMS

## Description:

Protecting the front edge of existing eroding marsh

## Key Elements:

- Involves placement of a low profile, sloping stone revetment along the leading edge of the marsh; "spot" treatments possible for problematic areas
- Revetment is placed even with or not more than a foot above the marsh surface elevation
- Backfill is not used in conjunction with this treatment



# High Energy Environments

## Treatment Type S-1:

### Revetment



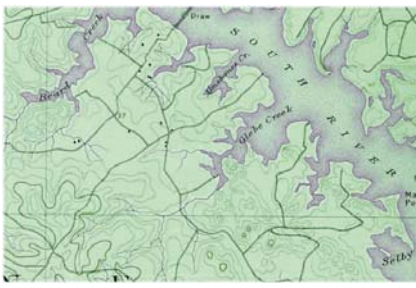
Photo: Burke Environmental Associates

## Description:

**A sloping stone structure placed along eroding banks**

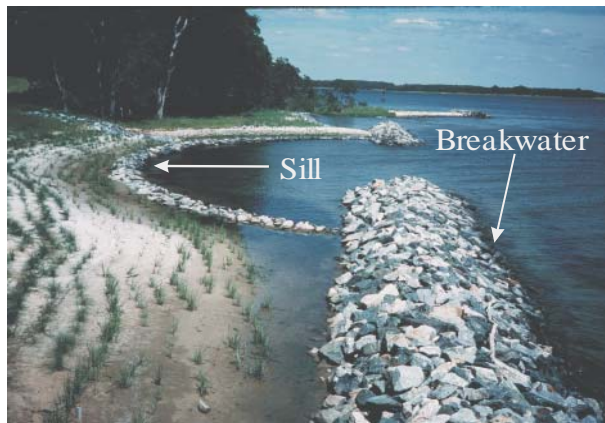
## Key Elements:

- ❑ **Made of layered, well placed stone, concrete rubble or other materials**
- ❑ **Revetment height and scour depth at the toe of the structure are important design considerations**
- ❑ **Stone weights used in revetment design are sized to withstand expected storm surge and wave conditions**



# High Energy Environments

## Treatment Type S-2: Breakwater System

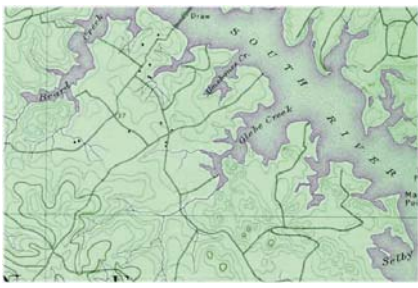


## Description:

**A series of offshore breakwaters designed to achieve site specific shore erosion control and sediment transport goals**

## Key Elements:

- **May include supplementary sill and spur structures that work in conjunction with the breakwaters and habitat restoration features**
- **Work best when applied to at least a 300' area or an entire shoreline reach – terminating at a convenient reach break like an existing structure, inlet jetty, or a natural headland to minimize effects on adjacent shorelines**



# High Energy Environments

## Treatment Type S-3:

### Spurs



## Description:

**A finger like extension of a structure extending channelward or parallel to the shoreline to achieve added erosion protection**

## Key Elements:

- ❑ **Can protect features leeward of the structure like a beach, channel or sill opening**
- ❑ **Also used to protect an adjacent beach downdrift from a terminal groin**