Facing the Storms: Ecological Mitigation Techniques

Gene McColligan
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Sandy Roars Ashore

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Cars Float Down Wall Street

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Failure of Sea Wall
Sea Bright NJ

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Mantoloking NJ

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We Forgot Our History

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1938

1944

1962
Standard Engineering Practices

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Eroding sites are usually stabilized by

- Bulkheads and retaining walls
- Riprap aprons
- Gabion walls
- Manicured Lawns
Standard Engineering Practices

Some commonly practiced shoreline modifications and erosion control methods can actually increase the rate of erosion as well, resulting in costly structural damage as well as property loss.

Others may aid in the destruction of the shoreline's natural environment.
Time for a Change

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Riparian Buffers

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Increase Buyouts
Restoration of Stream Systems

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Reforestation

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Raingardens

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Use Nature to assimilate wastes and provide services to society

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Which Habitat is Diverse, Dynamic, and Productive?

Which one is NOT?

Absorbs wave energy, filters pollutants, retains floodwater, produces food, provides habitat...

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Marsh Sill Construction

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• You can use the rock sill for habitat. Try oyster spat to form a small reef.
Oyster Reef
Ripple and pool *vane* created on a new tributary to Schuylkill River

Cross vane
TYPICAL USE OF WILLOW STAKES TO ANCHOR WILLOW WATTLE, STRAW ROLLS, BICO MATS, OR TURF REINFORCEMENT MATS

TYPICAL AREA STAKING - 1-3' (.3-1m) APART
MID-SUMMER WATER TABLE

TYPICAL - DRIVE OR PLANT WILLOW STAKES THROUGH OPENINGS IN RIPRAP OR GABIONS

CUT TOP OF STAKE SQUARE
2 TO 5 BUDS SCARS SHALL BE ABOVE THE GROUND. ADDITIONAL LENGTH SHOULD BE REMOVED.

18"(0.5m) MIN.

PLANT 80% OF STAKE LENGTH INTO THE GROUND

3/4"-3" (20-75mm) DIAMETER

MAKE ANGLED CUT AT BUTT-END, PLANT BUTT-END DOWN

NOT TO SCALE

LIVE STAKING

1. HARVEST AND PLANT STAKES DURING THE DORMANT SEASON.
2. USE HEALTHY, STRAIGHT AND LIVE WOOD AT LEAST 1 YEAR OLD.
3. MAKE CLEAN CUTS AND DO NOT DAMAGE STAKES OR SPLIT ENDS DURING INSTALLATION, USE A PILOT BAR IN FIRM SOILS.
4. SOAK CUTTINGS FOR 24 HOURS (MIN.) PRIOR TO INSTALLATION.
5. TAM THE SOIL AROUND THE STAKE.
Live staking and Riparian Planting
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Plants:
• Stabilize soils
• Improve water quality
• Provide wildlife habitat
• Anchor shorelines
Living Shorelines

High marsh: MHW to MHHW. S. patens, Distichlis spicata, Iva frutescens.

MLW to MHW. This is intertidal zone, called low marsh. Spartina alterniflora (Smooth cordgrass)

Build just above MHW
The sill/revetment is just there to enable the marsh to get established. It has a permanent value during storms.
Pre-grown wetland sods

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Eelgrass (Zostera marina)

Over 90% of eelgrass in North Atlantic has been lost since 1930.

Eelgrass is one of the most diverse and productive underwater habitats found in North America, providing protection for various species including bay scallops, quahogs, blue crabs, lobsters and even the occasional sea horse. Tautog and other fish lay their eggs on the surface of eelgrass leaves, and young starfish, snails, mussels, and other creatures attach themselves to the plant. Studies in New England have documented the occurrence of 40 species of fish and 9 species of invertebrates in eelgrass beds.

Restoration works: find the biological benchmark, plant with local genetic stock.
In the more protected zones, you get Amelanchier, Holly, Pitch pine, redcedar, Smilax (briars), Black cherry, some oaks, Bayberry, Beach plum, Blueberry, and grasses.
Christmas trees dropped at Bradley Beach for Dune Construction
Fencing, trees + dune grass = dunes

Public works employees in Bradley Beach, N.J., toss discarded Christmas trees over dune fencing Monday, Jan. 14, 2013 as part of a project to rebuild dunes damaged by Superstorm Sandy. Bradley Beach came through Superstorm Sandy in better shape than some other coastal towns in part because of its dunes.

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A Coastal dune restored at Paerdegat Basin on Jamaica Bay, Brooklyn
Don’t BUG Me

Maritime forest

Maritime grassland

Salt marsh (the $ community)
Alley Pond, as designed, uniform 3:1 shoreline slope
Memos didn’t work; Meetings didn’t work; I literally climbed up in the machine operator’s cab, and we had a little talk… And I discovered what worked…
Alley Pond, Queens, NY, plus two BMP ponds, NYCDOT project
Questions and Contact Information

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