

North Carolina
Coastal Federation
Working Together for a Healthy Coast

Tracy Skrabal- Coastal Scientist

Hierarchy of Erosion Control Options

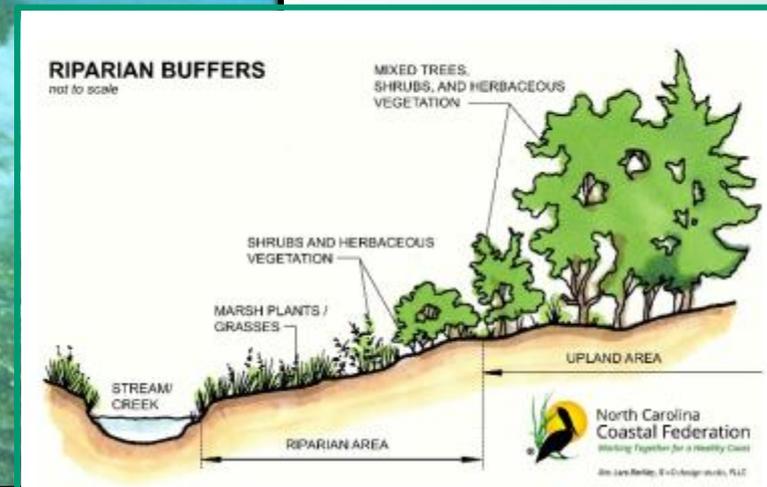
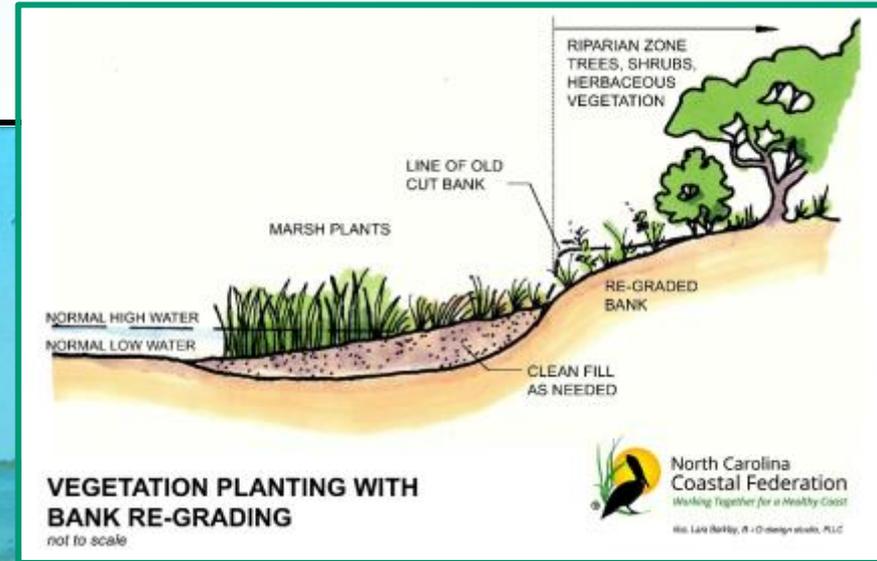


- No Action
- Relocation of Threatened Structures
- Non-Structural Stabilization Measures (Slope Grading, Marsh Creation, Bio- Engineering, beach nourishment)
- Combination Approaches (Sills, Stone containment cells, breakwaters with plantings)
- Hardening Structures (Groins, Revetments, Gabions, Bulkheads)

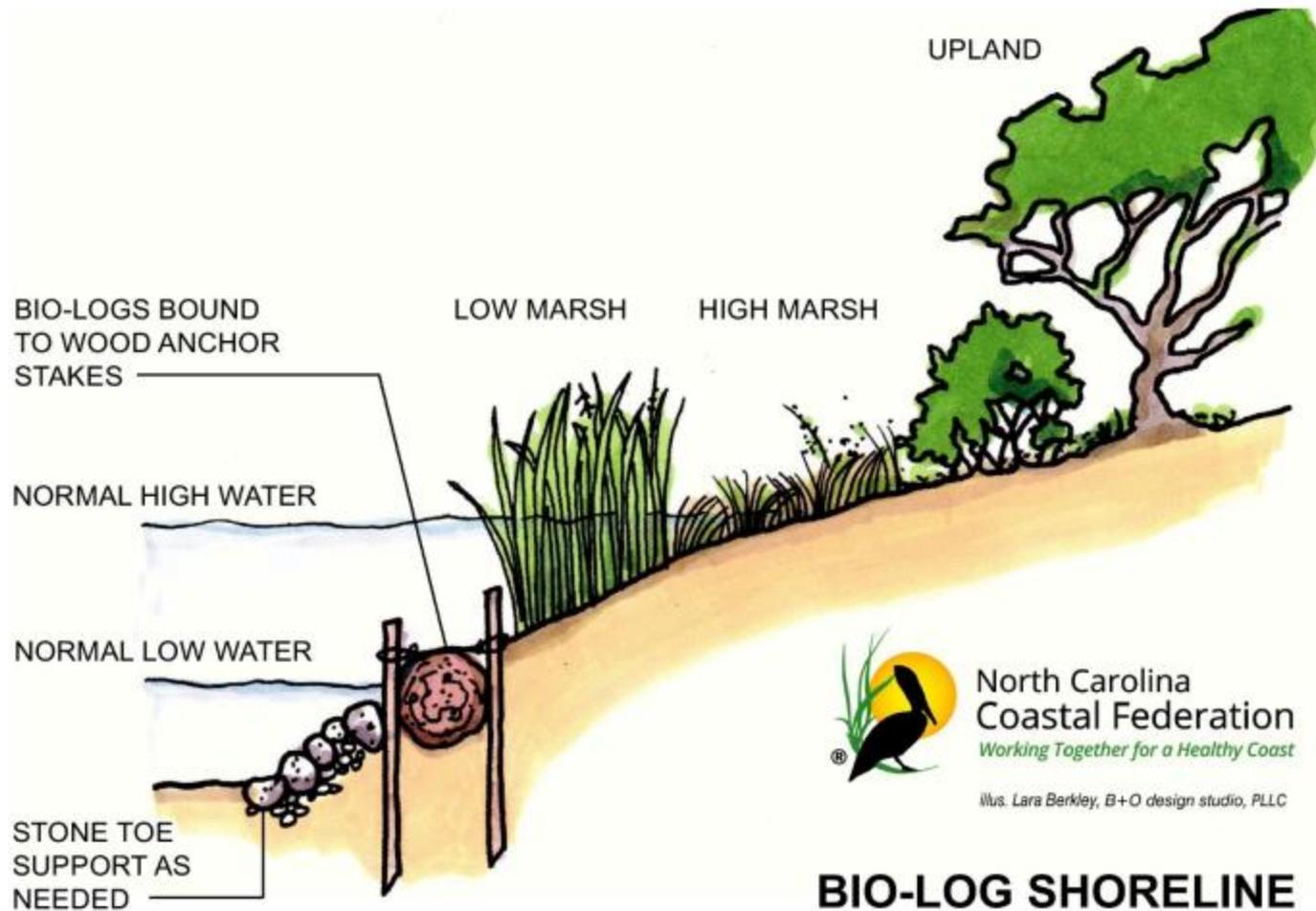
Beach Fill- Cape Lookout Lighthouse



Bank Grading, Riparian Buffer/Marsh Creation/Restoration/Preservation



Biologs



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illus. Lara Berkley, B+O design studio, PLLC

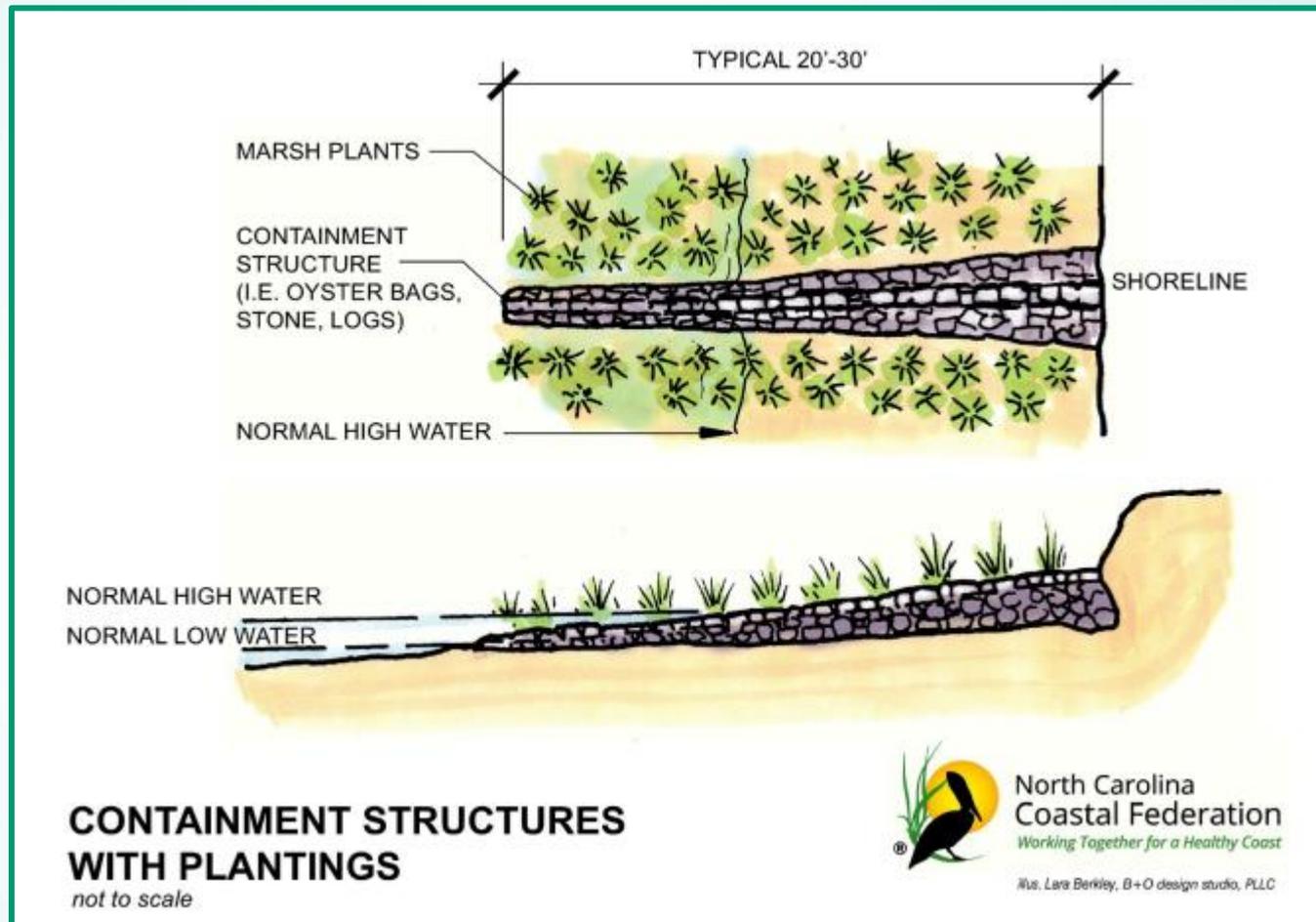
BIO-LOG SHORELINE
not to scale



Combination/Hybrid Projects

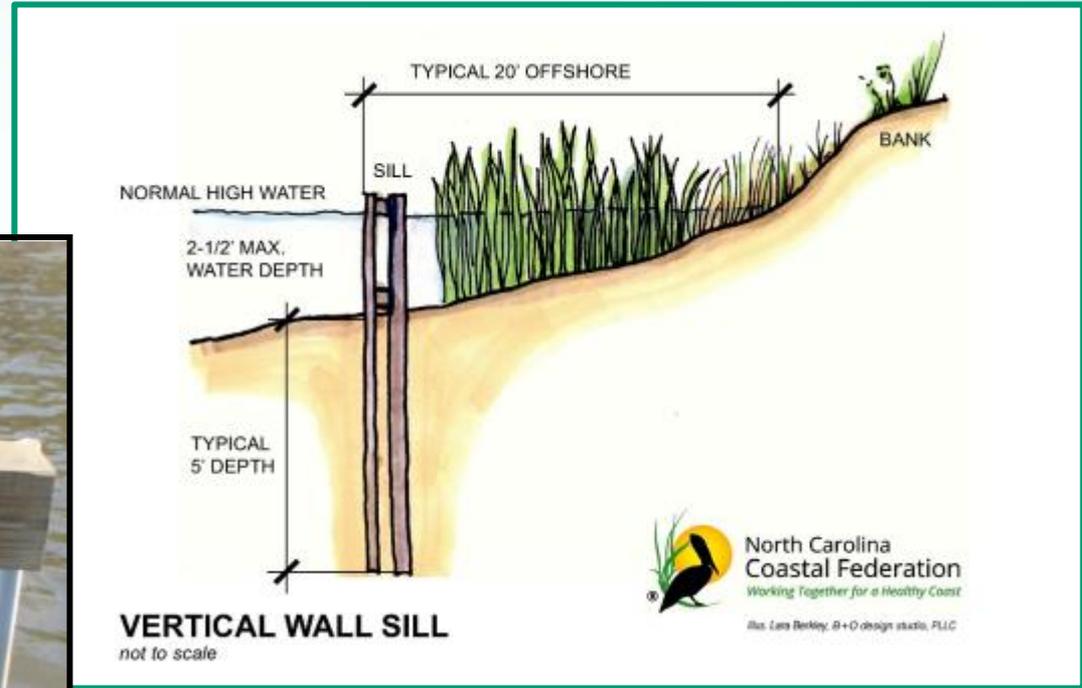


Containment Structures with Plantings





Vertical Sill with Marsh Plantings



From Spencer M. Rogers, Jr., N.C. Sea Grant

Stone Sill with Marsh Plantings



Oyster Shell Patch Reefs/ Domes/ Sills

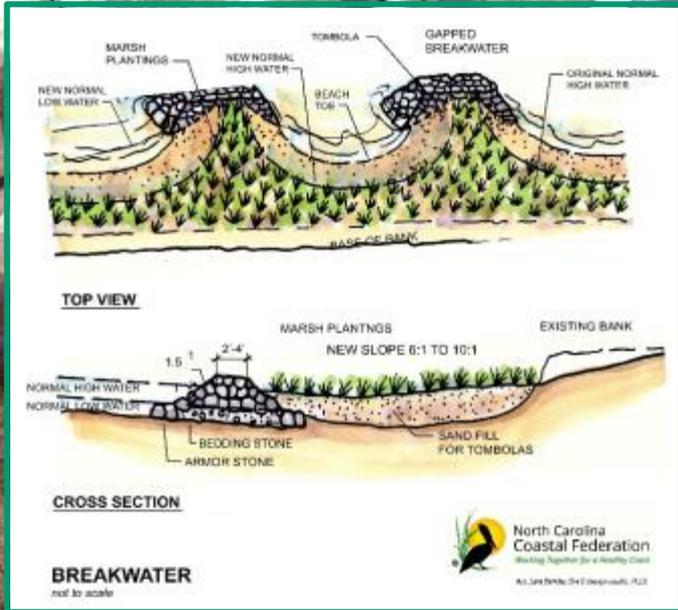
3 OPTIONS: OYSTER REEF / SILL WITH PLANTINGS

not to scale



Marsh Toe Revetments





Stormwater Wetland

Reef Balls

Oyster Shell Bag Sill

Stone Sill

Offshore Breakwaters

Bogue Sound

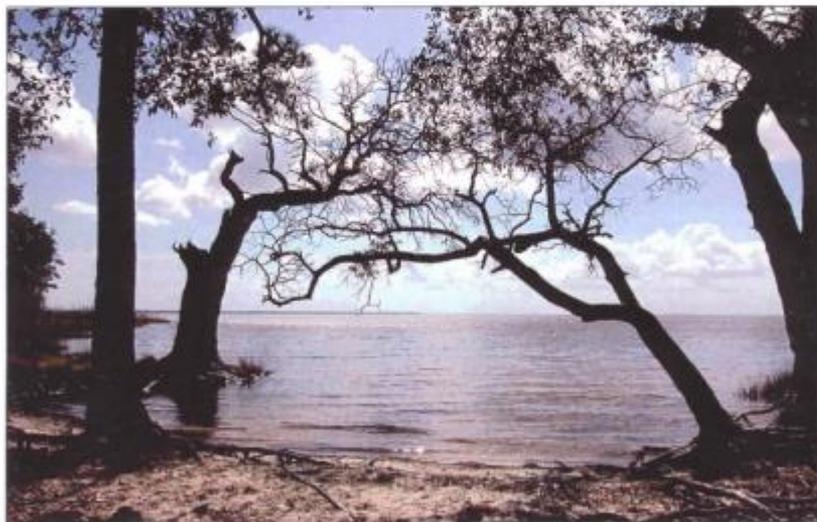
Google earth

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The North Carolina Estuarine Biological and Physical Processes Work Group's



Recommendations for Appropriate Shoreline Stabilization Methods for the Different North Carolina Estuarine Shorelines Types



North Carolina Division of Coastal Management

August 2006

Table 8-1: Summary of ranking of stabilization methods.

	Swamp Forest	Marsh	Marsh with Oysters	Marsh with Mudflats	Low Sediment Bank with Marsh	Low Sed. Bank with Swamp Forest
Land Planning	1	1	1	1	1	1
Vegetation Control	2	2	2	2	2	2
Beach Fill	3	3	NR	NR	NR	NR
Sills	4	4	3	3	3	3
Groins	5	5	4	4	4	4
Breakwaters	6	6	NR	NR	4	4
Sloped Structures	4-toe only NR-other	4-toe only NR-other	3-toe only NR-other	3-toe only NR-other	3-toe only 4-other	3-toe only 4-other
Vertical Structures	NR	NR	NR	NR	4	4

NR = Not Recommended

Table 8-2: Summary of ranking of stabilization methods continued.

	Low Sediment Bank with Sand	Low Sediment Bank with Woody Debris	Low Sediment Bank with Oysters/SAV	High Sediment Bank	Overwash Barrier/Inlet Areas
Land Planning	1	1	1	1	1
Vegetation Control	3	2	2	3	2
Beach Fill	2	NR	NR	2	2
Sills	5	3	3	5	4
Groins	4	NR	NR	4	3
Breakwaters	6	NR	NR	6	5
Sloped Structures	7	4	4	7	6
Vertical Structures	8	5	5	8	7

NR = Not Recommended



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Current Regulatory Options in NC

Shoreline Approach	State of North Carolina (CAMA permit)	US Army Corps of Engineers (federal permit)
Bulkheads/Revetments	General Permit No app/plans, no agency coord., 2 day- 1 week approvals	Regional General Permit (RGP80) No app/plans, no agency coord., auto approved with state GP.
Living Shorelines (Bank grading/sills) (Option 1)	General permit App/plans, APO notice, 60-90 days	Individual Permit- public notice, multi-agency review 90-120 days?
Living Shorelines (Bank grading/sills) Option 2)	Major CAMA permit- app/plans, multi-agency review 90-180 days	RGP 291 (possible) App/plans, multi-agency review- 60 days?

Livingshorelinesacademy.org



www.nccoast.org/protect-the-coast/restore/living-shorelines/

www.nccoast.org/protect-the-coast/estuarine-shorelines/

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