

DEMO PROJECTS

Coastwide DEMONSTRATION PROJECTS

Project Number	Proposed Project Name
Demo-01	Marsh Restoration and Enhancement Utilizing Floating Islands
Demo-02	The Wave Robber Wave Suppressor Sediment Collection System
Demo-03	Ecosystems Wave Attenuator for Shoreline Protection
Demo-04	Use of Sand Derived from Pulverized Glass as Beach Nourishment on Barrier Island Restoration Projects

D-1-Floating Island Environmental Solutions
BioHaven©

R4-D-1

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PPL~~19~~ DEMONSTRATION PROJECT NOMINEE FACT SHEET

26 January 2010

Demonstration Project Name: Marsh Restoration and Enhancement Utilizing Floating Islands

Coast 2050 Strategy(ies): Maintain bay and lake shorelines. Terracing and Plantings.

Potential Demonstration Project Location(s): Coastwide

Problem: Excessive erosion of bay and lake rims expose thousands of acres of interior marshes to increased erosion rates and severe hydrologic change. In addition, the loss of wetlands resulting from the direct effects of wave action is exacerbated over large open bodies of water where fetch distances are great. Highly organic interior marshes have limited options for restoration because of poor soil conditions. The need for stabilization in critical areas was noted in all four Coast 2050 regions.

Goals: The proposed demonstration project would restore and enhance interior marsh shorelines and maintain exchange and interface with estuarine systems. Additionally, some accretion may occur and build emergent marsh. When used in a terracing application, wave fetch would be reduced, nursery habitat will be increased, and sediment trapping will occur.

Proposed Solution:

The Floating Island is a multi-faceted marsh restoration and enhancement system that would absorb and deflect wave energy, protect and enhance vegetation, protect and create emergent marsh, trap sediment and provide nursery habitat. The islands are made from recycled PET plastic and adhered together with polyurethane marine foam. They are connected to each other and anchored into the soil with marine/earth anchor systems.

1. The interconnected islands can be oriented in numerous ways to restore and enhance marshes in many different types of environments coastwide.
2. The islands can be planted at various densities.
3. When used as a method of shoreline enhancement; it is cheaper than rock and could be considered a compromise between "hard" and "soft" shoreline protection methods.
4. The terracing orientation can break up wave action, reducing turbidity and allow sediment time to settle.
5. When used in the outfall of sediment laden diversions, it is reasonably expected that the islands will collect sediment behind and inside the island.

Project effectiveness would be monitored and evaluated after construction according to the CWPPRA workgroups' recommended treatments established for this product in Phase 0.

Project Benefits:

The proposed project would:

1. Absorb and deflect wave energy;
2. Protect and enhance existing or planted shoreline vegetation;
3. Allow ingress and egress of aquatic species;
4. Collect sediment by reducing wave energy.
5. Reduce interior marsh loss

Project Costs:

\$ 1 million

Preparer(s) of Fact Sheet:

Jason Kroll, NRCS, 225-389-0347 jason.kroll@la.usda.gov

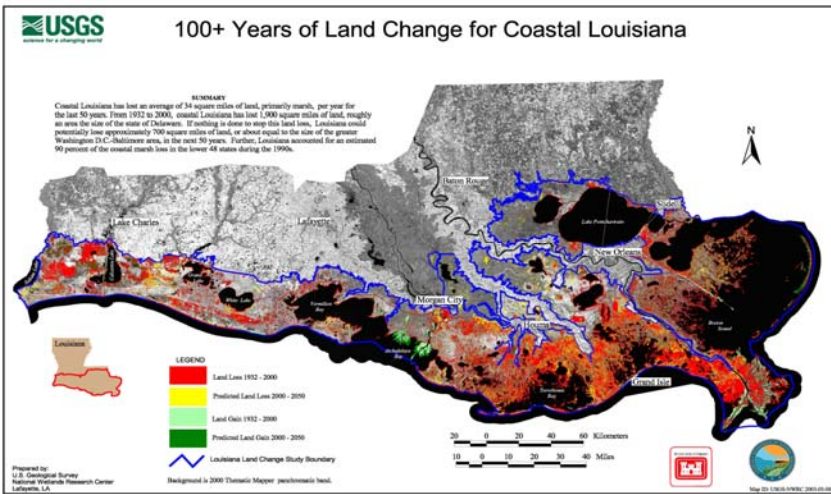
Nicole Waguespack, 225-923-2194 nicole@floatingislandES.com



FLOATING ISLAND

ENVIRONMENTAL SOLUTIONS

Coastal Louisiana Land Loss



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Our Solution: BioHaven® Floating Islands



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Can You Tell Which Is The Picture Of BioHaven® Floating Islands?



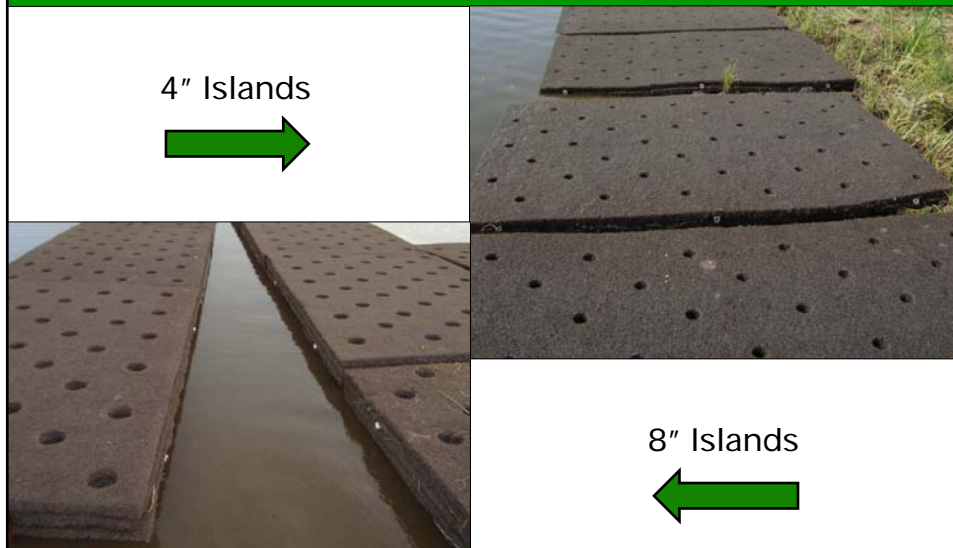
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What Is A BioHaven® Floating Island Made Of?

- **Matrix**
Nonwoven fibers from recycled PET plastic drinking bottles, which has been tested and found to be non-toxic to fish
- **Foam**
Coast Guard approved polyurethane inert marine foam, which provides adhesion & buoyancy
- **PVC Pipe**
Frame of PVC pipe inserted between 2 layers of matrix in order to run cable through for connecting islands

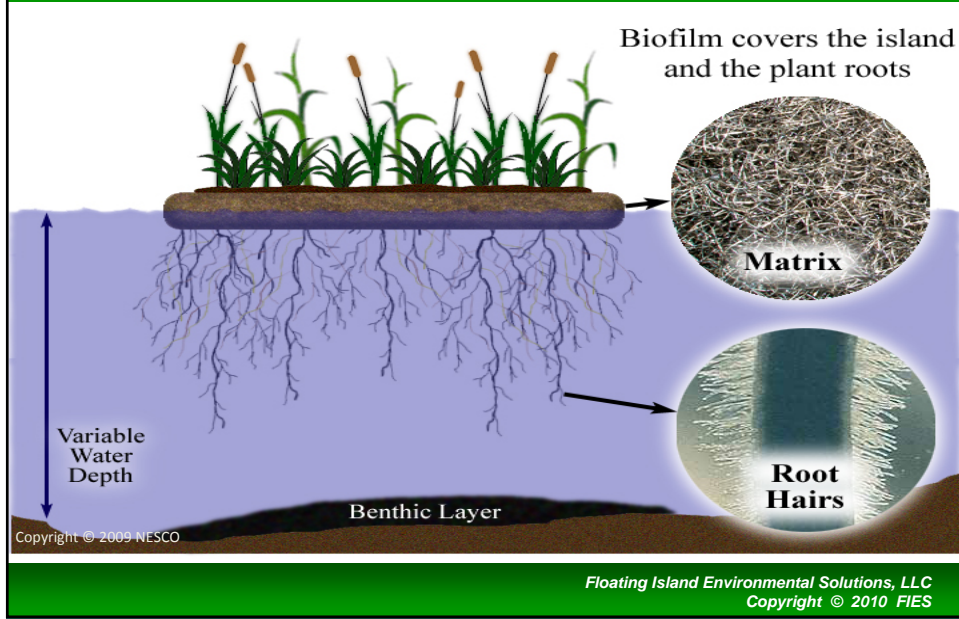
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What Does An Island Look Like?



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Dynamics Of The BioHaven® Floating Island Technology



BioHaven® Biofilm



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BioHaven® Biofilm Close-up



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Vegetative Growth



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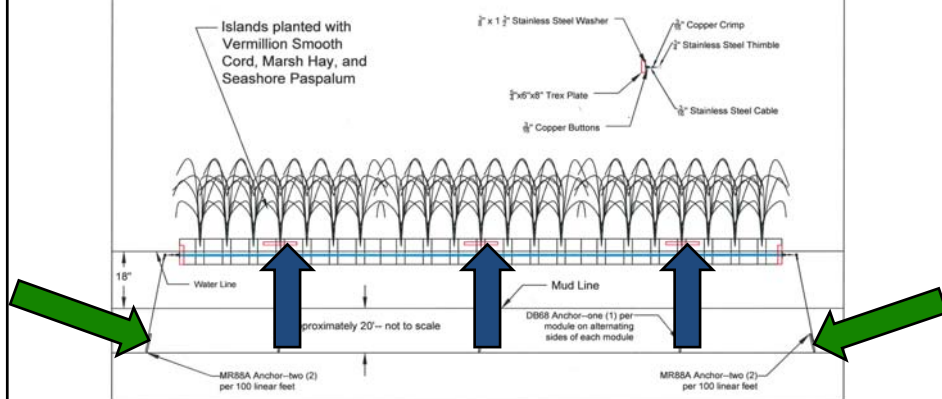
BioHaven® Floating Island Root Mass



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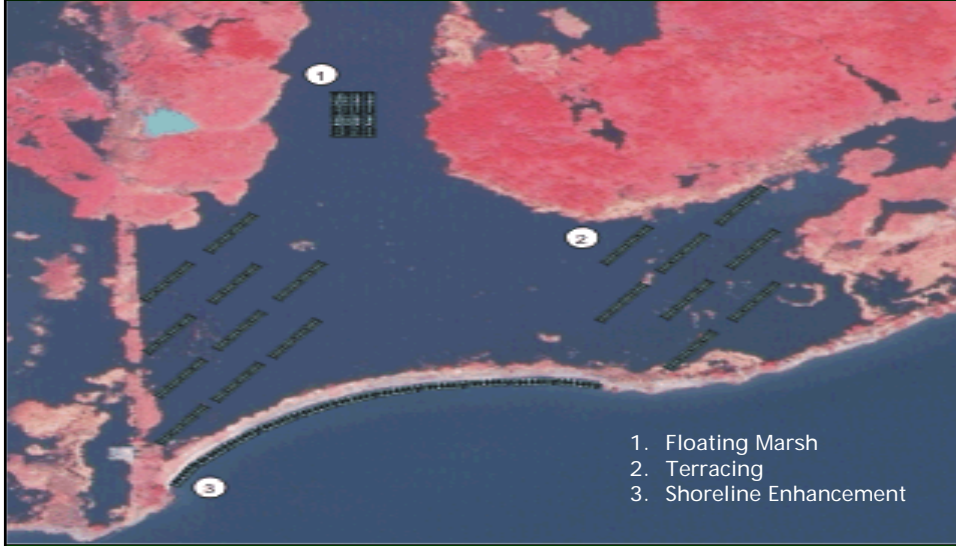
Marine Anchoring System

Lafourche Levee District Shoreline Protection



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Coastal Application Options



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Real World Success: Shoreline Enhancement

South Lafourche Levee System
Golden Meadow, LA
Photo Date: 3-31-09
Pre-Installation



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Real World Success: Shoreline Enhancement

South Lafourche Levee System
Golden Meadow, LA
Photo Date: 3-31-09
Installation Day



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Real World Success: Shoreline Enhancement

South Lafourche Levee System
Golden Meadow, LA
Photo Date: 4-29-09
1 Month Post Installation



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Real World Success: Shoreline Enhancement

South Lafourche Levee System
Golden Meadow, LA
Photo Date: 6-10-09
2 Months Post Installation



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Real World Success: Shoreline Enhancement

South Lafourche Levee System
Golden Meadow, LA
Photo Date: 7-15-09
3 Months Post Installation



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Real World Success: Shoreline Enhancement

South Lafourche Levee System
Golden Meadow, LA
Photo Date: 1-14-10
9 ½ Months Post Installation



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Real World Success: Shoreline Enhancement



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Real World Success: Shoreline Enhancement



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Real World Success: Revegetation & Shoreline Enhancement

Citrus Land Lower Levee
Plaquemine Parish
Photo Date: 1-14-10
4 Months Post Installation



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**Real World Success:
Revegetation & Shoreline Enhancement**



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**Real World Success:
Revegetation & Shoreline Enhancement**



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Real World Success: Floating Marsh



Bayou Sauvage Wildlife Refuge
New Orleans, LA
Date of photo: 08-20-09
Installation Day

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Real World Success: Floating Marsh

Bayou Sauvage Wildlife Refuge
New Orleans, LA
Photo Date: 1-14-10
5 Months Post Installation



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Benefits of BioHaven® Floating Islands

- **ATTENUATES WATER & WAVE IMPACTS** reducing soil erosion
- **PROVIDES A MEDIUM FOR** roots to establish themselves in order to achieve vegetative growth
- **PROVIDES CRITICAL RIPARIAN-EDGE HABITAT** for fish, waterfowl and other wildlife
- **RESTORES & PROTECTS ECOSYSTEMS**

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A Product Everyone Can Root For



FLOATING ISLAND
ENVIRONMENTAL SOLUTIONS

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D-2-The Wave Robber Wave Suppressor
Sediment Collection System

THE WAVE ROBBER

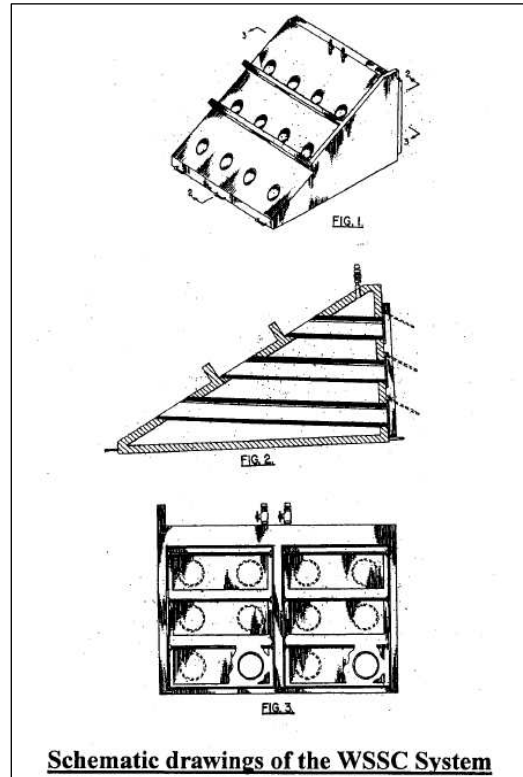
WAVE SUPPRESSOR SEDIMENT COLLECTION SYSTEM

Proposed by: Webster Pierce, Jr.; 215 West 58th St.; Cut Off, La. 70345
Phone/Fax (985) 632-3118; webj@mobiletel.com

Project Description

The Wave Suppressor Sediment Collection System addresses two critical areas of need in Coastal Louisiana. First, the WSSC is a system designed to protect the shorelines and wetlands from erosion caused by wave action or tidal surge. Second, the WSSC system can assist in the rebuilding of shorelines and restoration of wetlands loss from wave action and tidal surge. The WSSC system serves as a barrier to disrupt the tidal wave flow into the shorelines and wetlands while at the same time allowing sediment to be carried through the system by the wave action and water currents. The sediment is trapped and deposited between the system and the shorelines and wetlands. Trapped

sediment would then consolidate to form a solid base for the establishment of emergent marsh. The WSSC system has several distinct advantages over other wave suppression and sediment retention structures that makes it ideal for the rebuilding and restoring of the degraded wetlands of south Louisiana as well as other areas in the United States and throughout the world. One major advantage is that the WSSC system is transportable and can be easily installed along shorelines and wetlands. Additionally, the WSSC units are reusable and designed to be removed from one location and easily moved to another. The WSSC system is also less expensive than fixed dike structures, a distinct advantage in managing project cost. Lastly, the WSSC system allows a continuous water exchange for ecological support rather than isolating areas behind the structure.



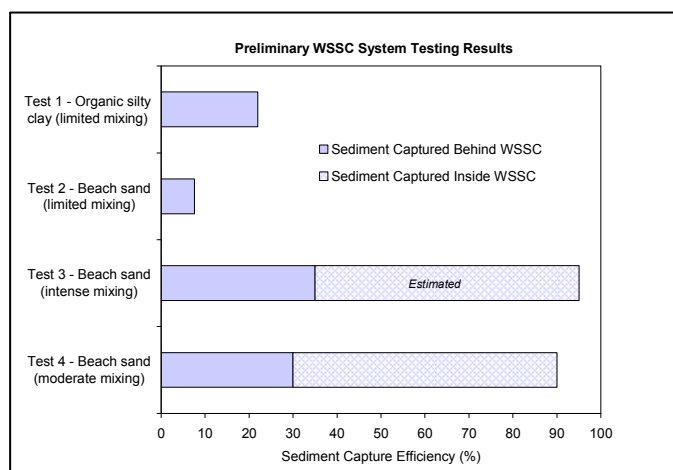
Opportunity

The magnitude of Louisiana’s coastal and wetlands loss problems requires an expansive and courageous effort. While the proposed device will not in itself solve Louisiana’s problems, it does provide a tool that address the 5 most significant of needs:

- *Reduce and arrest coastal and wetland erosion.*
- *Trap ambient sediment to increase coastal and wetland growth.*
- *Trapping and holding dredged sediment.*
- *Ridge building.*
- *Island building.*

Test results using a working scaled prototype model of the WSSC System

Four tests were conducted in a wave tank that simulated placement of the WSSC unit on a shoreline with a three foot water depth and waves of between two and three feet. In test one, five pounds of soil (organic clay mix, dry weight) was added to the wave tank and suspended uniformly with the water in the tank; the suspension was remixed for 2 to 3 minutes at the beginning of each hour for the duration of the test. After four hours of continuous wave action, 1.1 pounds (22%) of material (dry weight) were recovered from the rear of the WSSC unit. In test two, the design was the same, except five pounds of sand were used instead of the organic clay mixture. After four hours, 0.38 pounds (7.6%) of material (dry weight) were recovered from the rear of the WSSC unit. The limited recover in Test 2 resulted from rapid settling of the sand in front of the unit, leaving only a small fraction of sediment in suspension to be captured by the WSSC unit. Thus, Tests 3 and 4 were conducted for 2 hours, with no mixing during the



first hour, followed by intense mixing (Test 3) or moderate mixing (Test 4) during the second hour. Very little sediment capture occurred during the first hour of Test 3 or Test 4. However, after the second hour, Test 3 had captured 1.75 lb (35%) of sediment behind the unit while Test 4 had captured 1.5 lb (30%). Additionally, 6 lb of sediment was found

inside the unsealed unit after the tests; these sediments reflect additional material captured, but not passed through to beyond the WSSC unit. The residual sediment in front of the unit after testing was only measured for Test 4; this was measured as 0.5 lb (10%). Thus, 3 lb of the sediment captured within the unit had to come from Test 4 leaving the remaining 3 lb to be from Tests 1, 2, and 3. It is suspected that these 3 lbs resulted primarily from Test 3, but this can not be proven with the available data.

Maneuverability and installation of prefabricated units

The ability to prefabricate the units, move them on-site via conventional surface transportation methods (truck and barges), float the unit to the point of use, and anchor it in place is an important component of the proposed technology and it's implementation.

Estimated unit cost

Fabrication costs were estimated by a Louisiana-based manufacturing company as \$2,900.00 per production unit. This does not include the cost of the weirs, installation, oversight, management or royalty fees.

Patent and Copyright protection

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D-3-Ecosystems Wave Attenuator for Shoreline Protection

PPL20 DEMONSTRATION NOMINEE FACT SHEET
January 28, 2010

Demonstration Project Name:

EcoSystems Wave Attenuator for Shoreline Protection Demo Project

Coast 2050 Strategy(ies):

Maintenance of Bay and lake Shoreline Integrity

Potential Demonstration Project Location(s):

Gulf, bay, or lake shorelines; specific site to be determined later. Applicable Statewide

Problem:

Coastal Louisiana consists of areas with unstable soil conditions, subsurface obstructions, accessibility limitations, etc. which limit the types of shoreline protection suitable to provide adequate relief of shoreline erosion. Traditional methods that have shown the most success are through the use of rock riprap. The major advantages of rock are the effectiveness and durability of protection that is provided. The disadvantages are the cost, supply, and site specific problems with placement and handling of material. However, the same problems are also associated with other “non-rock” alternatives that have been tried as substitutes to provide equivalent protection against shoreline erosion.

Goals:

The primary goal of this demonstration is to manufacture, deploy and test an alternative method of shoreline protection equivalent to traditional methods in areas where site conditions limit or preclude traditional methods.

Proposed Solution:

Walter Marine has developed a method of protection against shoreline erosion using the EcoSystems Wave Attenuator. This product is a unit of EcoSystems discs mounted on piling with an innovative anchoring system, which dissipates wave action. The EcoSystems Wave Attenuator could be applicable for use as a shoreline protection or in place of a channel plug. The intent of this demonstration project is to place the EcoSystems Wave Attenuator in an area where traditional restoration strategies would have used a rock plug or sheetpile for a channel closure. The project will evaluate the effectiveness of reducing wave energy and shoreline erosion.

Project Benefits:

If successful the project benefits include: 1) reduction in shoreline erosion associated with wave energy; 2) information regarding deployment and installation of EcoSystems Wave Attenuator; 3) information obtained would allow a comparison with riprap structures; 4) identification of other applications of EcoSystems Wave Attenuators.

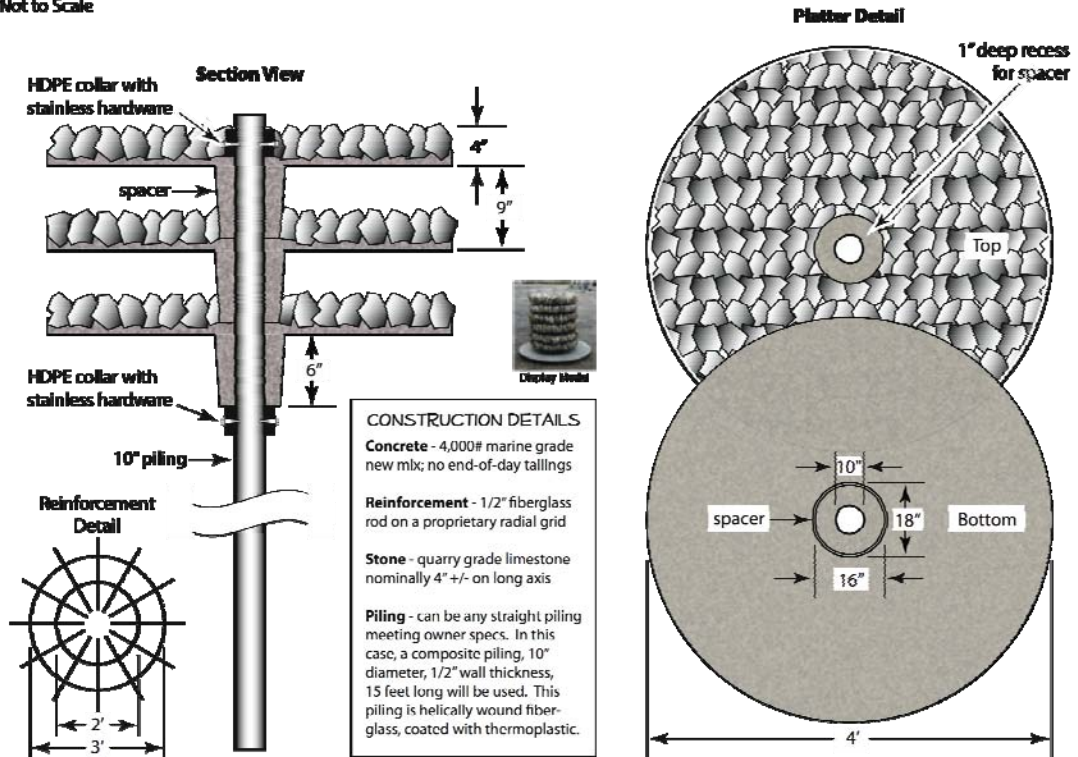
Total Project Costs +25%: \$1.5M

Preparer of Fact Sheet:

John D. Foret, Ph.D., NOAA Fisheries Service, (337) 291-2107, john.foret@noaa.gov.

ECOSYSTEMS[®] WAVE ATTENUATION SYSTEM

Not to Scale



D-4-NOLA Glass

**Use of Sand Derived from Pulverized Glass
As Beach Nourishment on
Barrier Island Restoration Projects**

Steven O'Connor
NOLA Glass – A 501(c)(3) Corp.
504-914-0739 or nolaglass@gmail.com

Sand usable for barrier island construction is getting more difficult and costly to obtain due to restrictions on where material can be dredged. These restrictions are due to right of way issues with pipelines and leases for the oil and gas industry. There is also, according to the Mineral Management Service, a dearth of sand available that is of a suitable particulate size to minimize beach erosion on completed barrier island projects.

This project would demonstrate the use of sand derived from pulverized glass as superior material to use as beach topping to prevent erosion. This material has been used in other parts of the world for this exact application. The project with the most thorough studies (and Corps of Engineers permits) was in Broward Co. Florida. Information and access to these studies are available at <http://www.broward.org/waste/awards.htm>.

NOLA Glass is a non-profit dedicated to social enterprise. By utilizing sand from pulverized glass for coastal restoration our community will realize several benefits:

- A direct cost saving to coastal restoration projects by offering material below the current costs of obtaining the material.
- A method of obtaining material that has less of an environmental impact than current methods.
- An outlet for glass waste that will allow recycling programs in the region to expand and lower costs.
- Direct cost savings to local municipalities who will not have to pay for land filling usable material.
- Direct reduction in amount of material flowing to land fills.
- The opportunity for the local hospitality industry to participate in recycling programs.
- Greater awareness for the importance of coastal restoration efforts in the local community and across the nation.

It is the hope of NOLA Glass that a viable use for glass waste that helps our coastal restoration efforts, together with a sustainable collection program, will move the state toward the implementation of a glass bottle deposit law similar to those of other states. This will greatly reduce environmental degradation throughout the state as well as lead to greater amounts of material to use for coastal projects.

We also hope to assist other communities throughout the gulf south with starting similar programs.