

# **DEMONSTRATION PROJECTS**

# DEMONSTRATION PROJECTS

<b>Project Number</b>	<b>Project Proposals</b>
DEMO-01	Sediment Capture Tide Pump
DEMO-02	Trap Bag
DEMO-03	Stabilized Shorelines for Shoreline Protection
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DEMO-05	Barrier Island & Levee System
DEMO-06	Innovative Bedload Sediment Collector
DEMO-07	Ecosystems by Walter Marine

**DEMO-01**

**Sediment Capture Tide Pump**

**PPL 24 DEMONSTRATION PROJECT NOMINEE FACT SHEET**  
**February 10, 2014**

**Demonstration Project Name:**

Sediment Capture Tide Pump

**Coast 2050 Strategies:**

Coast-wide strategies: Produce energy while building and maintaining land.

**Potential Demonstration Project Location:**

Jean LaFitte/Lake Salvador and Bayou Dupont Sediment

Delivery - Marsh Creation #3 (BA-164) for inland. The TV-16 Cheniere au Tigre shoreline demonstration project for off shore. Any canal, river, bay or body of water where sediment is present and available in the wetlands and beyond.

**Problem:**

The Louisiana wetlands has lost the timely and adequate flow of waters that has built and maintained the land.

**Goals:**

Utilize tidal, wave and wind energy, simultaneously or separately, into a force that is useful to rebuild the wetlands.

**Proposed Solutions:**

1. Reduces the need for fuel.
2. Shoreline waves are no longer the enemy, but an asset.
3. The captured sediment that is displaced by the pump will allow the rising waters of the ocean to flow into the displaced area, thus reducing the rise of the world's oceans.
4. Backfill the oilfield canals to the original land surface level or the best level with sediment captured from canals, rivers and bays.
5. Rebuild the shoreline beaches and barrier islands with sediment from the continental shelf.
6. Housed in a vertical box culvert type structure that protects the pump from the elements.
7. Can be manufactured and shipped to the location.

**Project Benefits:**

1. Reduces the carbon footprint.
2. Replace rock or structural embankments with energy producing structures.
3. Provides nutrient rich sediment.
4. Builds agriculture.

**Project Costs:**

Unknown, to be determined.

**Preparer(s) of Fact Sheet:**

Richard C. Russo, Vermilion Parish, 337-230-1963, myspacercer@yahoo.com

### Sediment Capture Tide Pump



Culvert in the canal with syphon pipes.



Flow Regulator Compartment

### Sediment Capture Tide Pump



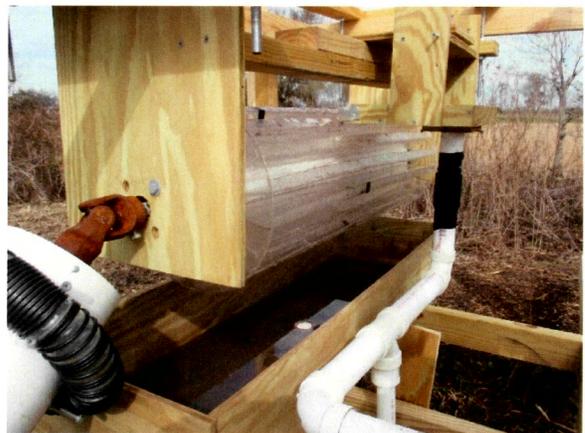
Incoming Dispersion Tray



Float Compartment Impeller Wheel



Trough Shape Pipe



Upper Impeller Wheel and Dispersion Tray



Containment Basin with syphon water flowing.



Trough with Basin water flowing.

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## Sediment Capture Tide Pump

Here is how it works:

The tidal water in the canal flows into the inlet end of a 2 inch PVC plastic pipe that travels through a culvert into the pond, and exits into a flow regulator compartment. As the water rises in the compartment, it begins to flow through a pipe in the compartment wall and into a dispersion tray, where it is dispersed into the side of an impeller wheel, causing the wheel to rotate. The water then falls into a float compartment where the impeller wheel is attached to a float system, which holds the horizontal shaft of the impeller wheel parallel at a set distance above the surface of the water that falls from the wheel. As the water rises in the float compartment it begins to flow through a one way flow pipe in the compartment wall and into a reservoir where it is stored. When the tide reverses, the water in the reservoir flows through another pipe in the float compartment wall, then into another dispersion tray, which repeats the flow process in reverse, before returning to the canal.

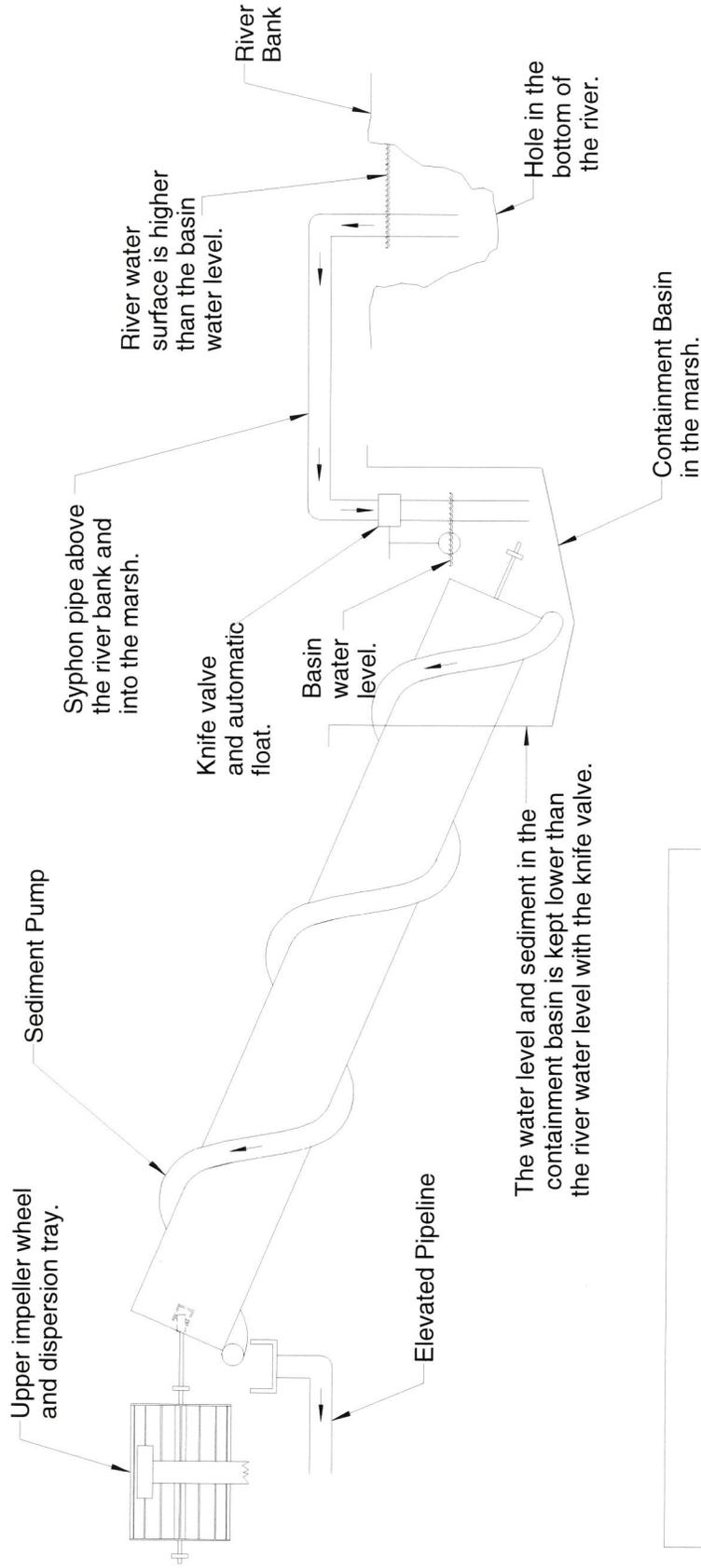
The impeller wheel is attached to an Archimedean screw pump by a universal joint set at 45 degrees. As the impeller wheel rotates, it causes the float compartment water to flow into the lower end of the screw pump and elevates the water to the upper end, where it is released into a trough shape pipe. The elevated water then flows into another dispersion tray, where it is dispersed into the side of another impeller wheel that is attached to the upper end of another Archimedean screw pump, thus rotating it as the water falls into an upper trough set beneath the upper impeller wheel. The lower end of this screw pump is set at the bottom of a containment basin, which is about 4 feet below the surface of the water in the canal. This screw pump lifts sediment at the bottom of the basin and releases it into the upper trough. When the rising elevation of the canal water is 5 inches above the float compartment, the impeller wheel will rotate until high tide, and continues to the height of a flood. It does the same in reverse.

The sediment is captured by a syphon in a pipe, which is designed as follows. A shallow hole is dug in the bottom of the canal at the end of the culvert. An inch and a half PVC pipe is placed at the bottom of the canal hole to serve as an inlet for the syphon. As the syphon water travels through the culvert, it picks up the sediment at the bottom of the canal hole and releases it into the containment basin. The syphon is started and maintained by filling a horizontal 4 inch PVC pipe with water, above the syphon pipe, then releasing the water into a 1 inch pipe downward into the flow regulator compartment. This creates a vacuum in the 4 inch pipe. Attaching another 1 inch pipe from the top of the 4 inch pipe to the top of the syphon pipe, will vacuum the air out of the syphon. This will pull the water from the canal into the pipe and start the syphon. Installing a knife valve will stop the syphon. The water from the float compartment screw pump also flows into the inlet of the 4 inch pipe that keeps it filled.

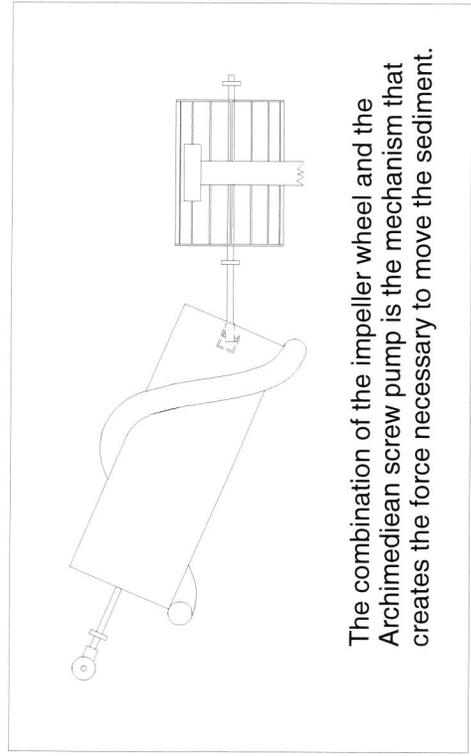
The water and sediment in the upper trough is released into a pipe line, then distributed by the gravitational force produce by the upper elevation. The tide pump is a work in progress. An automated system and a wind pump is in development.

Sediment capture

Richard C. Russo  
337-230-1963  
February 10, 2014



The water level and sediment in the containment basin is kept lower than the river water level with the knife valve.



The combination of the impeller wheel and the Archimedean screw pump is the mechanism that creates the force necessary to move the sediment.

[http://greenaccessibility.com/the\\_tide\\_pump\\_how\\_it\\_works\\_video](http://greenaccessibility.com/the_tide_pump_how_it_works_video)

**DEMO-02**

**Trap Bag**



CWPPRA REGIONAL PLANNING MEETINGS  
FEBRUARY 2014

### Proposed Project Name

TrapBag® Coastal and Canal erosion control DuneCore® barriers

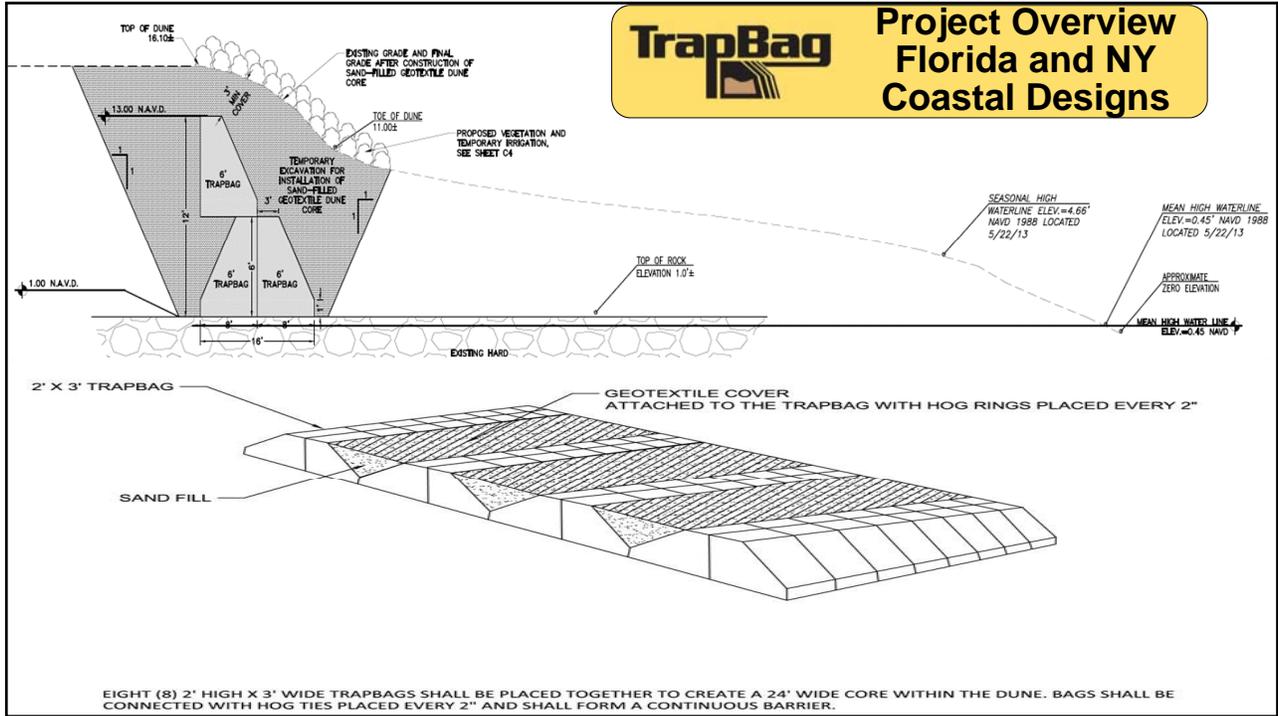
### Project Overview

Coastal and inland Louisiana are losing miles of beaches and canal banks due to erosion. The erosion is caused by loss of protective barrier islands, rising global tides, tropical weather events and unstable soil conditions.

TrapBag® DuneCore® is an engineered solution to reinforce coastal dunes, inland levees and canal banks. After Super Storm Sandy, DuneCore® coastal designs were jointly developed by TrapBag®, the NYC Parks department and USACE New York offices to give coastal communities a first line of defense against future storms by stopping beach front erosion through construction of engineered dunes.

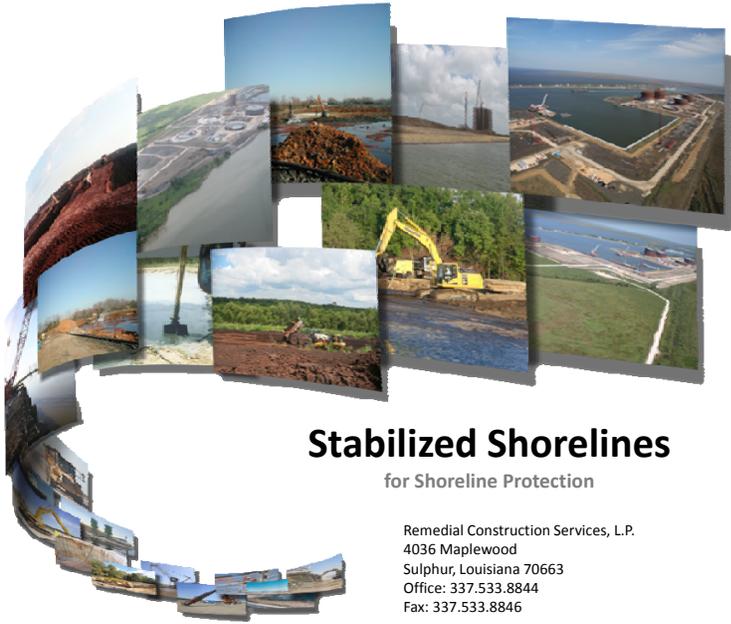
The key success of the DuneCore® is the containment of material, engineered shape, durability of construction and sheer filled mass. The DuneCore® can be filled with local materials, covered with geotextile grids and planted with natural vegetation to support wildlife habitat.





**DEMO-03**

**Stabilized Shorelines for Shoreline Protection**



## Stabilized Shorelines

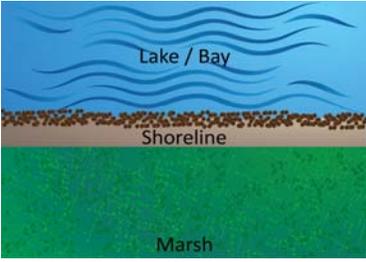
for Shoreline Protection

Remedial Construction Services, L.P.  
4036 Maplewood  
Sulphur, Louisiana 70663  
Office: 337.533.8844  
Fax: 337.533.8846



## Solutions

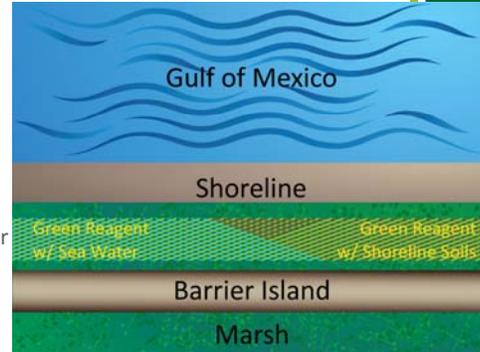
- Non-rock protective solutions
- Soil amendments strengthen highly erodible shorelines
- Use of stabilized dredge spoil to protect shorelines with a high organic content
- It's environmentally safe
  - [http://www.nolaenvironmental.gov/nola\\_public\\_data/projects/usace\\_levee/docs/original/IER33404b1signed.pdf](http://www.nolaenvironmental.gov/nola_public_data/projects/usace_levee/docs/original/IER33404b1signed.pdf)
  - <http://www.usace.army.mil/Portals/2/docs/civilworks/Project%20Planning/alton2gale.pdf>
- It's a long-term solution
  - To minimize erosion
  - To regain our coast





## Solutions

- Beneficial use of green reagents can:
  - Turn saltwater-filled trench into a soft rock, without the weight
  - Stabilization of existing shoreline creates non-dispersive, irreversible characteristics
  - Reinforce perimeters of our barrier islands to contain spoils
- How it works:
  - Stabilization process forms calcium silicate hydrate minerals or derivative thereof
  - Minerals formed by a chemical reaction are strong, irreversible and long-lasting



## Benefits

- Stops erosion in its tracks
- Meets EPA Green Initiatives
- Long-term cost benefit over competing technologies
- Absorbs and deflects wave energy
- Protects and enhances existing or planted shoreline vegetation
- Allows ingress and egress of aquatic species
- Traps sediment and reduces wave energy
- Reduces interior marsh loss
- It's the best approach to regain our coast



## Experience

- 8MM cubic yards of stabilization
- Shoreline restoration
- Dike construction
- Sediment and erosion control
- Beneficial use of dredge spoils
- Multi-billion dollar facility protected from hurricanes Ike and Rita storm surge



**DEMO-04**

**Shoreline Protection/Sea Rise & Recovery Strategy**

# Shoreline Protection/ Sea Rise and Recovery Strategy



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RootZone@Humus  
Email: [johnwear@yahoo.com](mailto:johnwear@yahoo.com)  
*Barrier Islands, Marshlands, Berms Projects*  
*Coastal Restoration Projects Specialists*

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## Who we are and why we are here:

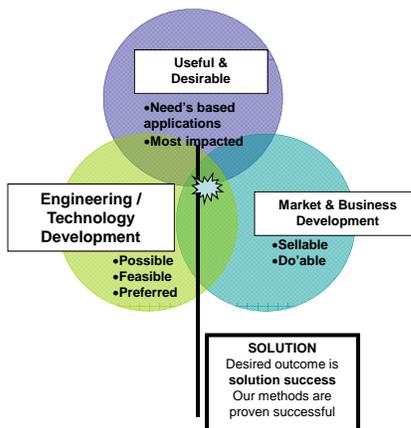
Our solution for restoration and recovery is a holistic offering. In this plan, we shoreline protection, will enhance building of habitat, and will assure land building and include berm stabilization.

Marshlands remediation and stabilizing are part of our plan, and we include a solution that includes “dead zone” control.

Our plan addresses needs of:  
**Fishing Industry – Ecological Systems –  
Marine Habitats - Political Tenure –  
and other stakeholders.**

*Our plan works sustainably because  
we cooperate with nature.*

*Our plan is a 'needs based' approach developed with and for those most impacted. **Fact and sustainable remedies are the principle focus of our solution.***



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Sea Level Rise/Shoreline Protection/ Habitat for Coastal Regions

- We have designed and patented a system that will help control effects of sea rise. Our system will provide shoreline protection, will enhance building of habitat, and will assure land building.
- Designed to replace rock jetty, our new concept (Geo-TECH-Jetti) is installed above the water line, considering projected sea rise (as determined by official government determinations). Our Geo-TECH-Jetti units are filled with dredged material sourced from near the installation. Within a prepared area on top of the Geo-tech containers are RootZone Humus-filled, (RZHO), biodegradable containers. The RZHO-filled containers are planted with mature native marsh grasses and other select native plants. Our specialized method, proven in several previous deployments, ensures highly energetic and sustained plant growth, while providing shoreline force and sea-rise protection. Land building also results as these solutions continue to work efficiently, while cooperating with nature.
- Once set in place the Geo-TECH-Jetti units are stabilized with XX heavy duty PVC pipe, driven down 7 feet for firm hold, there are stainless steel rings on the bottom of units in three locations for PVC pass through. The PVC stabilization devices are designed so that they can be retrieved at a future time, when it may be determined that plant rooting and accretion has been achieved and our "hold" feature is no longer needed.
- Our proven methods allow for replacement of rock as stabilization means. Using our proven methods, we ensure rapid reestablishment of habitat. Shellfish, fin-fishes, invertebrates, and other vital coastal organisms are able to reestablish populations.
- Installing our Geo-TECH-Jetti units, we accomplish rapid rebuilding of the entire food-web, by providing the multiple benefits. **(1)** We provide protection from sea-rise. **(2)** We ensure rapid establishment of native plants along shorelines, making possible rapid habitat establishment. **(3)** Our methods assure accretion, as the long, well-set units of Geo-TECH-Jetti prevent erosion. **(4)** The Geo-TECH-Jetties also provide protection from surface and sub-surface oil encroachment on shorelines and into adjacent marshes. **(5)** Shoreline areas of land, (marshes or barrier island shores), behind the rows of Geo-TECH-Jetti units are filled with dredged material has our process continues, the filled RZH and RZHO are applied to ensure fertility.
- The Geo-TECH-Jetti is set in place, working from barges. Our Geo-TECH-Jetti Placement System makes it possible for us to position units efficiently, one in front of the other, and over lapping with space between them allowing existing habitat to continue functions as installation is accomplished.
- If it is decided that marsh or shoreline is not to be filled in some areas where Geo-TECH-Jetti are being installed, our units are set next to each other and can be used to serve as solid shoreline protection without back-filling.

- **GEO-TECH-Jetti Spec:**
- Material- PP Woven Fabric
- Product Code = CPP 6500 (Uncoated fabric)
- Fill Test Value:

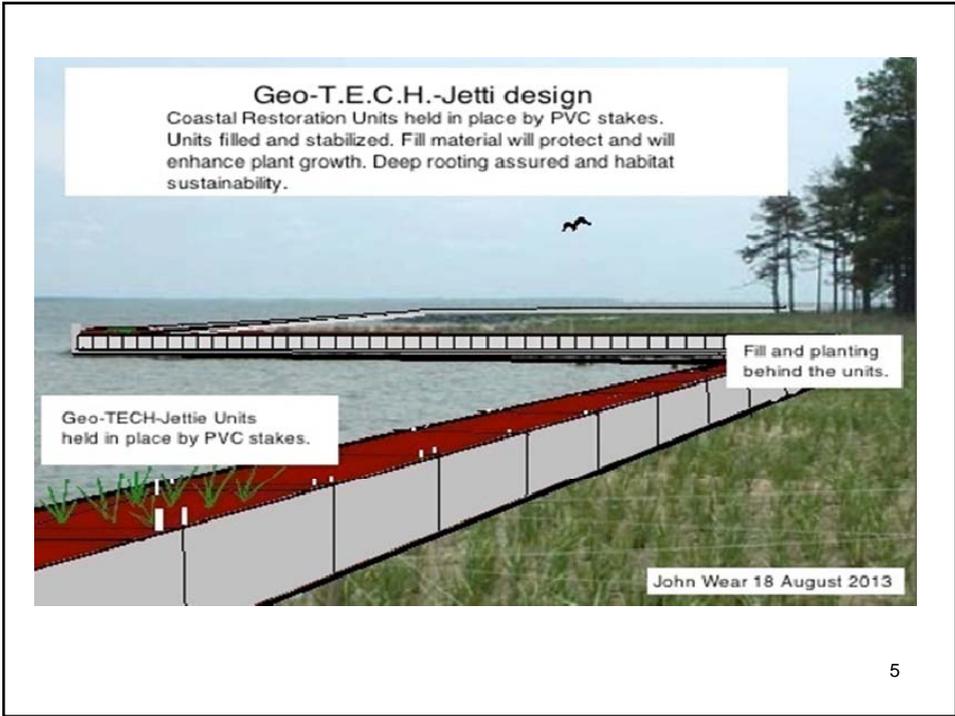
TEST PARAMETER	TEST STANDARD	UNIT	FIL TEST VALUE
GRAB TENSILE	MD D 4632	LBS	340
GRAB ELONGATION	MD	%	20
CD	%		20
TRAPEZODIAL TEAR	MD D 4533	LBS	140
CD		LBS	140
PERMITIVITY	D 4491		0.03
FLOW RATE		Gal/sqft/min	2.4
GSM	D 5261	GRAMS	245

- Filled Weight: 7,800 pounds.
- 6- RZHO containers w/ native marsh grass set on top.
- Estimated Life Duration: 28-34 + years.



Stainless Steel Rings not shown

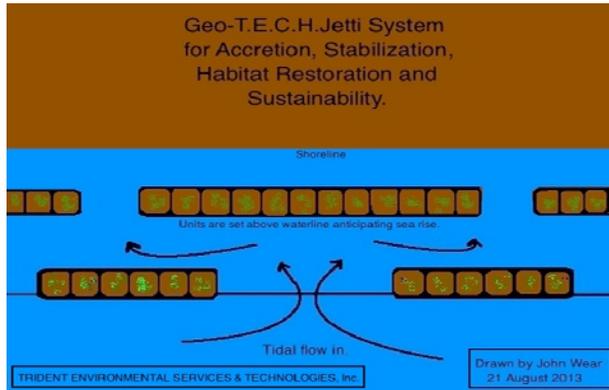
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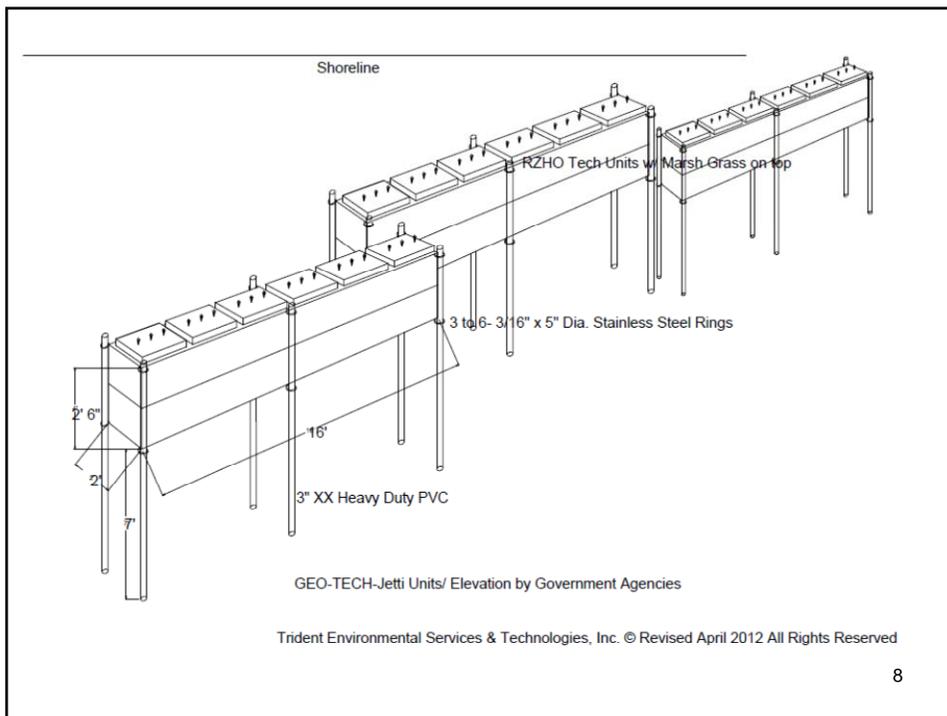


Water side of Jetti are spiked with XX heavy PVC pipe driven 7' into ground for stabilization.

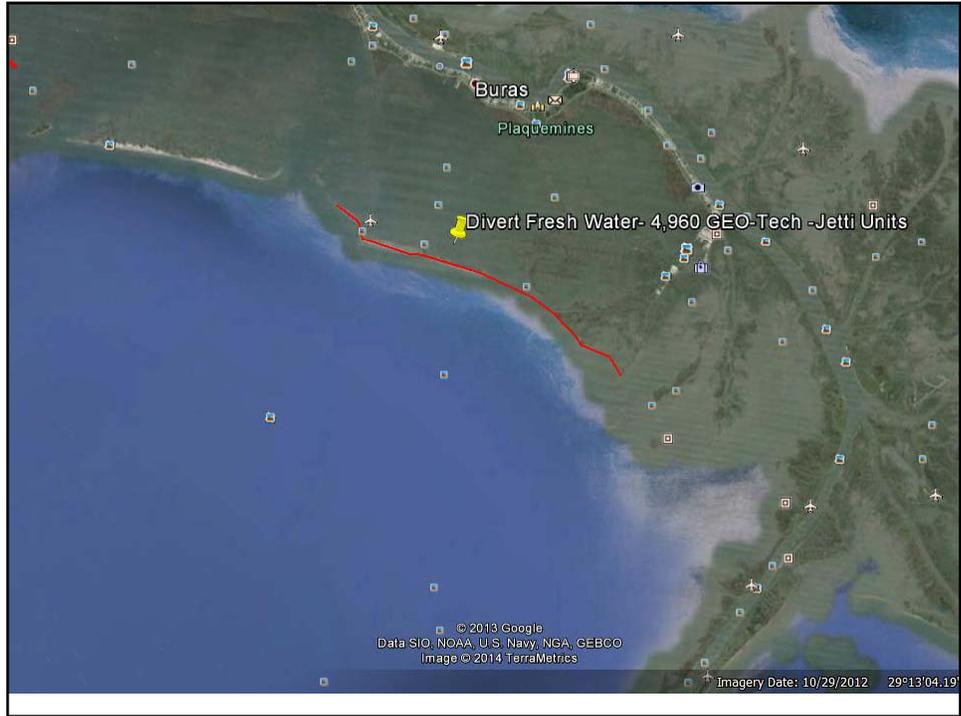


Biodegradable container for planting on top of the Geo-TECH-Jetti units.

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**VALUE PROPOSITION:**

- Our team realizes that many third parties will become involved in these projects. A variety of inter-related projects between third parties and our team will require expedited cooperation as appropriate in expediting agreements and in their subsequent performance.
- We will assist in operational issues and modernization requirements and their impacts on economic recovery by installing a safe, reliable, functional and efficient solution that will maximize the benefit of an integrated system and network.
- We will strive to ensure increased return on investment by providing solutions that exceed the needs and results sought by the concerned parties.

**BUSINESS DRIVERS for PROPOSED SOLUTION:**

- Regional economic development
- Local job creation and retraining
- 501C-3 and University Stipend support



**Our team can act as the single point of responsibility for coordinating the design, managing the delivery and serve as an ongoing advisor for the process.**

**NEXT STEPS:**

- Vetting & Due diligence
- Product(s) and concept approval
- Joint Planning, solution development and testing
- Contract process
- Implement, manage, expand and improve



**Recalling who we are and why we are here:**

Trident Environmental Services & Technologies

**Our plan provides an integrated solution, which offers:**

**Land stabilization by soil building and planting.**

- We provide the contracting, implementation and project management
- **TRIDENT ENVIRONMENTAL SERVICES & TECHNOLOGIES, Inc.** provides scientific expertise, with biodynamic product for fertility and remediation.
- Continued ecological improvement using specific grasses and trees, provided by **Trident Environmental Services & Technologies, Inc.**, and partners.

**We add replenishment** of invertebrates & fish into repaired marshlands and littoral areas. (The aquaculture initiative.)

*We are here with SOLUTIONS*

*Trident Environmental Services & Technologies, Inc. provides consultation, product, and solution application expertise.*

Continued ecological improvement through phyto-remediation



**Natural growth stimulating and remediating biotechnology**



## Contact Information

### Solution Team and Contact Information:

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**John Wear, Chief Scientist, Engineering Consultant**  
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*New Orleans, Louisiana 70112*  
Telephone: 504-520-0537 and 228-314-0400

RootZone Humus  
[johnwearusa@yahoo.com](mailto:johnwearusa@yahoo.com)  
Role: Technology Supplier, Solution Development and Planning

### Information and websites links:

- **Innovative Uses of Organic Matter, Compost: Bioremediation and Pollution Prevention** United States, Environmental Protection Agency,  
– [www.epa.gov/wastes/conservation/composting/pubs/bioremed.pdf](http://www.epa.gov/wastes/conservation/composting/pubs/bioremed.pdf)

- **Trident Environmental Services & Technologies'**
- [www.tridentworld.org](http://www.tridentworld.org)

[www.compostconcentrate.com](http://www.compostconcentrate.com)

**DEMO-05**

**Barrier Island & Levee System**

## **Louisiana's Coastal Land Loss Problem**

### **How much land has been lost?**

- 1880 sq. miles since 1930, CPRA Master Plan
- 1900 sq. miles, since 1932, US Geological Survey
- 2000 Sq. miles, various media reports

### **How to fund the restoration?**

- \$50 million, CPRA estimate 2010 dollars, will cost \$100 million to execute as planned
- \$8.7 billion 2013 annual oil and gas revenue
- \$?? Lawsuits vs. big oil, US Corps of Engineers

TIDAL SOLUTIONS, LLC

### **Before we can restore the land, we need to know why.**

- Habitat
- Shipping Industry
- Oil and Gas Industry
- Recreation/Culture

### **Where is the line in the sand drawn for the battle to save the coast?**

- The storm surge modeling was used to develop the flood protection systems to protect citizens from the 100 year event.
- Where was the coast line for the modeling? Is it now further inland? Is the flood threat now greater than what the system is designed for?
- How do the proposed restoration projects affect the storm surge modeling?
- How do the proposed restoration projects fit into the multiple lines of defense strategy? (Specifically barrier islands and wetlands)

TIDAL SOLUTIONS, LLC

Tidal Solutions, LLC focus is on the wetlands and barrier islands.

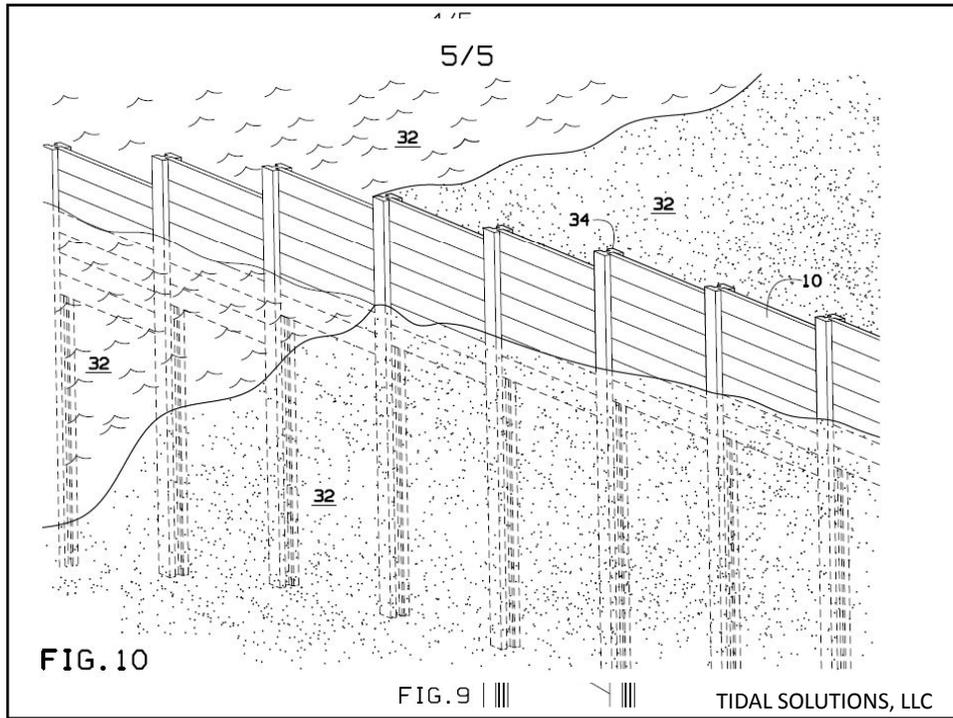
What has been tried in the past has not succeeded and we continue to lose our precious coast.

Do we try an alternative approach, or continue trying the same things over and over?

TIDAL SOLUTIONS, LLC

**Tidal Solutions LLC,  
Our alternatives for  
the restoration of the  
barrier islands and  
wetlands in Louisiana.**

TIDAL SOLUTIONS, LLC



**DEMO-06**

**Innovative Bedload Sediment Collector**

## SEDIMENT Collector Technologies



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## About OUR Company

- Streamside Technology, LLC. was started in 2002 to test and market the previously patented sediment collector technology. Since then we have developed, tested and patented multiple technologies for the in-stream separation and removal of sediment.
- These environmentally friendly technologies provide for improved water quality and, in most cases, the production of a separated, clean, marketable product. The future of this technology for the treatment of contaminated sediment is paramount and is driving our current development efforts. Our goal is the on-site capture and treatment with beneficial re-use or release of treated sediment. For success, this must be done economically in both large rivers and in the smallest of streams.



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## Intellectual property

- Streamside Technology has 4 issued patents for varied Collector models in the United States.
  - Patent No. 6,042,733 / 6,346,199 / 6,764,596 / 7,850,857
- Three additional Collector Patents Pending
- Streamside Systems® is a Registered Trademark of Streamside Technology, LLC.



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## THIRD PARTY VALIDATION

**Hydraulics Laboratory, Engineering**  
Research Center, Colorado State University  
Ft Collins, CO  
Summer/Fall 2004

Twenty-four tests were performed by Colorado State University under a variety of substrates and velocities to assess the efficiency of total bedload capture.

*RESULT: up to 99% efficient in selective removal of fine sediments*





## COLLECTOR TECHNOLOGY

- Sediment Collectors represent a new, innovative technology, using simple physical principles to capture targeted sizes of bedload sediments.
- Passive Collectors allow the energy of the stream to move bedload sediment up the Collector's ramp and into a hopper. As the sediment fills the hopper, it is pumped to a dewatering or disposal site.

**STREAMSIDE TECHNOLOGY**  
simplified thinking.

## NEW APPROACH TO DREDGING

- The installation of Sediment Collector Systems on major river systems to reclaim sand as a usable bi-product and can generate revenue.
- Reduce the environmental impact of dredging in different areas and provide a reduction in cost.
- This approach would have a dramatic improvement on the environment, fish habitat, along with improving shipping and transportation within the harbors and bays.



**What's New About This?**

- **Selective Capture**
  - Low possibility of accidental entrainment
  - Bedload (coarse) sediments, minimizing sand bars
  - Control top size with grate opening
- **Removal at the Natural Transport Rate**
  - **Maximum production cant exceed natural transport rates**

## TYPES OF SEDIMENT COLLECTORS

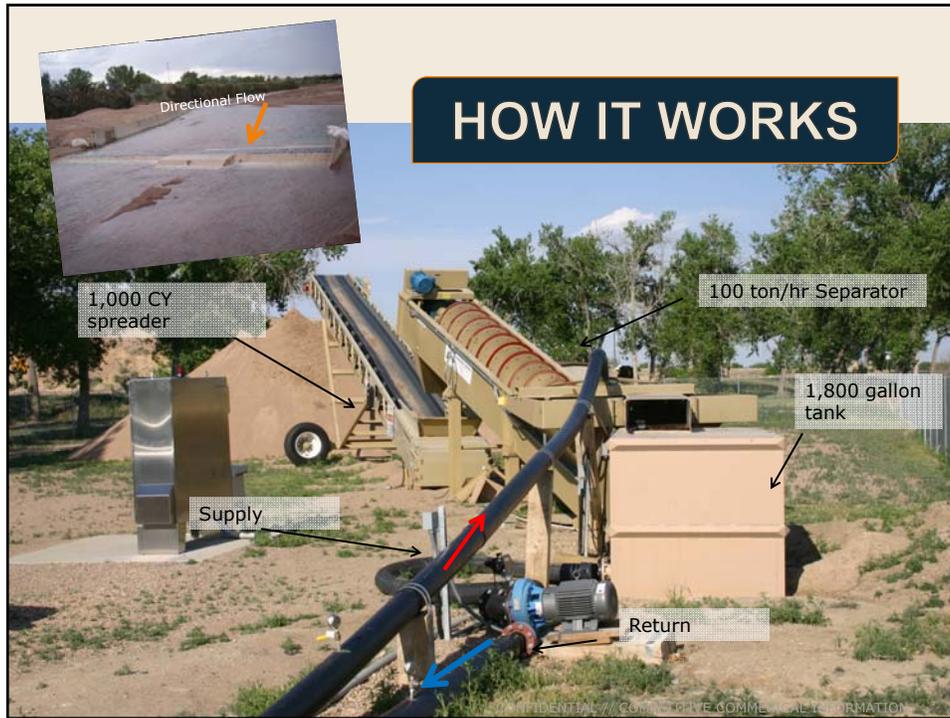
- **Bedload Monitoring Collector**
  - Can be used to develop watershed sediment budgets for fine bedload sediments, to develop Total Maximum Daily Loads (TMDL) specially for bedload fines and to monitor bedload transport rates through the watershed
- **Contractor Collector System**
  - Designed to eliminate downstream sediment impacts from bedload transport during in-stream construction projects. It can be used to control bedload sediment transport and prevent impacts to downstream aquatic habitats or biota.
- **Forebay Collector**
  - The purpose of a Forebay Collector is to capture transporting sediment during storm events, thus reducing maintenance on sediment retention ponds and waterways.
- **Large Scale Collector System**
  - Similar to the previous variations, large scale systems are fully scalable for most applications. The fluidized sediment is pumped to a dewatering site for beneficial reclamation of harvested sediments and the water is returned to the Collector in a semi closed-loop scenario.

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## SEDIMENT COLLECTOR INSTALLATIONS



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## Construction and Maintenance Cost

Collector (pumps, controllers, pipe, etc.)	\$319,000.00
Sediment Spreader	\$39,000.00
Installation	\$110,000.00
Approx. Cost of Contract Documents	\$50,000.00
Upgrades/Repairs	\$10,000.00
<b>Total</b>	<b>\$528,000.00</b>

*\*Costs are approximate*

- Operations
  - Uses 1kwh/min
  - <\$53,000 per year if operated continuously



## The results



- ERDC (Navigation Systems Research Program) study and released paper at International Sediment conference regarding Sediment Collector technology.
- The system, as designed on Fountain Creek, has the capability to remove **874,000 Cubic/Yard/Year**, if operated continuously and the river is able to produce that amount of material.
- This validation was accomplished at Fountain Creek over a three day storm event, which the system **removed approximately 2.75 cubic yards per minute**.

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## Large-scale Projects for 2014-15

- Lake Lure North Carolina, City of Lake Lure
  - 30' high Capacity with Screw Separator and Stacker. Designed to handle 1,200,000 Cu/Yd/YR, 1800 GPM
- Cleveland, Ohio, Cuyahoga River, Port Authority
  - 50' high Capacity with Screw Separator and Stacker. Designed to handle 874,000 Cu/Yd/YR, 1200 GPM
- Army Corps of Engineers, Rock Island District, Mackinaw River, Illinois
  - Corps testing and evaluation
- Confidential contaminated superfund site; 2014-15
  - 2-30' High Capacity with Screw Separator and Contamination Processing/Washing
  - 1200 GPM

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## Ecosystem Restoration Applications



Direct Sediment Placement for Beneficial Use at Marshes/Wetlands

Connect to Existing/Permanent Sediment Conveyance Pipelines



Sediment Stockpiling for Rehandling on Future Ecosystem Restoration Projects

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**DEMO-07**

**Ecosystems by Walter Marine**

## Unique Anchoring System



Ecosystems patented Living Wave Barrier and Snorkeling Reefs are Limestone rocks embedded in discs of concrete.

Mounted on fiberglass piling to withstand storm events, it solves the subsiding and moving problems other units have in soft soils and high energy surf conditions. It is so stable, it is approved by the Corps of Engineers for installation in the Gulf of Mexico.

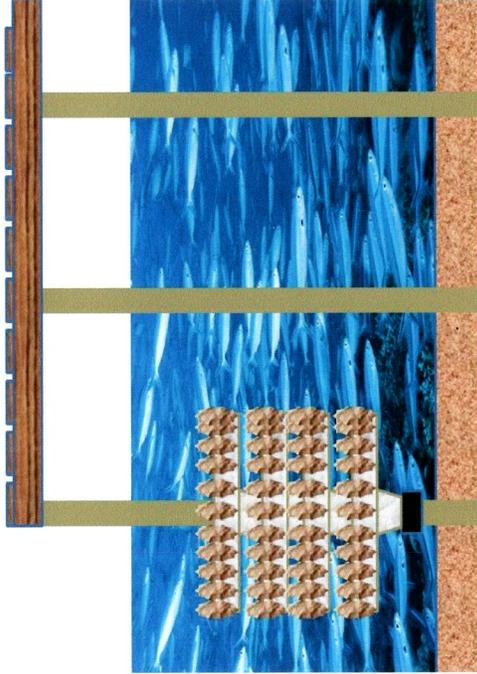
Natural Florida Limestone Rock provides perfect PH for marine organisms to live.

Can be designed to any shape and height.

Distance above ground, from surface and between discs can be easily adjusted to suit any requirement.

## Dock Reef

Mitigate dock shading, Estuary, Grow Filter Feeding Animals or Fishing Reef At Your Own Dock



**WALTER MARINE**  
ARTIFICIAL REEFS  
[www.reefmaker.net](http://www.reefmaker.net)  
251-979-2200

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## EcoSystems

**Snorkeling  
Estuary  
Wave Attenuation  
Oyster Growth  
Artificial Reef**



EcoSystems  
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Demo-07



# Configure EcoSystems to Suite Any Need

## Snorkeling Reef



Installation of **EcoSystems Snorkeling Reef** in Pensacola Beach, FL.

Make your area the #1 for tourist destination, by adding a family orientated attraction to your community.

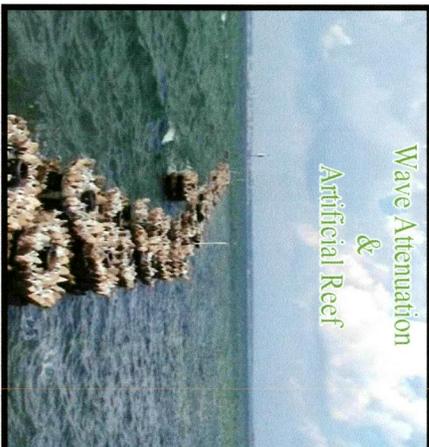
Corps of Engineer approved snorkeling reef for use in the surf.

Tourists, fishermen, snorkelers and divers will enjoy this asset. Bring tourists to



parks and hotels, rent snorkeling gear, Scuba training, fishing, etc. Best value for the dollar to provide additional family activities.

## Living Wave Barrier



Chosen as shoreline protection for historic Deadman's Island located in Gulf Breeze, FL. **EcoSystems Living Wave Barrier** is working to remove destructive wave energy from the shoreline and providing estuary for marine animals.

EcoSystems reef units have removable sections to soak in Oyster spat and reinstall



to jump start oyster growth.

## Artificial Reef



Eco-



Superior to concrete alone.

Complex artificial reef with natural Florida Limestone rock provides habitat for all life found on natural reefs.

The complex design provides spaces for juvenile fish to find protection.

Installed near estuaries or outlets as habitat for juvenile fish until they are large enough to fend for themselves.