Demonstration Projects

Demonstration Projects

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Demo 2	Bioengineering Solutions using Fascines and Coir Mattresses
Demo 3	Habitat Enhancements through Vegetation Planting Using Gulf Saver Bags
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Demo 1 The Wave Robber

DEMO-01

PPL21 DEMONSTRATION PROJECT NOMINEE FACT SHEET
January 26, 2011

Demonstration Project Name: **The Wave Robber (Wave Suppressor Sediment Collection System)**

Coast 2050 Strategy(ies):
Maintenance of Bay and lake Shoreline Integrity.

Potential Demonstration Project Location(s):
Region 2, Barataria Basin, Lafourche Parish, southwestern shore of Little Lake

Problem:
What problem will the demonstration project try to solve? 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.
What evidence is there for the nature and scope of the problem in the project area? The southwestern portion of Little Lake is currently experiencing a high shoreline erosion rate of between 20' and 40' per year. 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.

Goals:
What does the demonstration project hope to accomplish? The primary goal of this demonstration is to manufacture, deploy and test an alternative method of shoreline protection equivalent to traditional methods, while trapping ambient sediments to facilitate expansion of emergent marsh.

Proposed Solution:
Describe demonstration project features in as much detail as possible. 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.

Install 45 WSSC units along three different shorelines (500LF each shoreline), with two different spacing patterns at each site. The first spacing would be installing a 10' gap every 50 LF (5 WSSC units) for 3 50' segments, then increase the number of WSSC units to 10 units (100 LF) between 10' gaps, for a total of 45 WSSC units per shoreline

location. All gaps would be made using the same material as the WSSC units. The spacing is as follows:

Shoreline

5 WSSC / 10' / 5 WSSC / 10' / 5 WSSC / 10' / 10 WSSC / 10' / 10 WSSC / 10' / 10 WSSC

Bay

Project Benefits:

Describe demonstration project benefits in as much detail as possible. 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.

If successful the product could be a low cost option in shoreline protection, dredge spoil containment, barrier island protection and island creation, direct creation of habitat in shallow waters where turbidity could be decreased, and used as an addition to both interior lake and exposed coastal bay shorelines and open bay waters.

Project Costs:

The estimated cost to implement the demonstration project including 25% contingency is $967,113.

Preparer(s) of Fact Sheet:

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

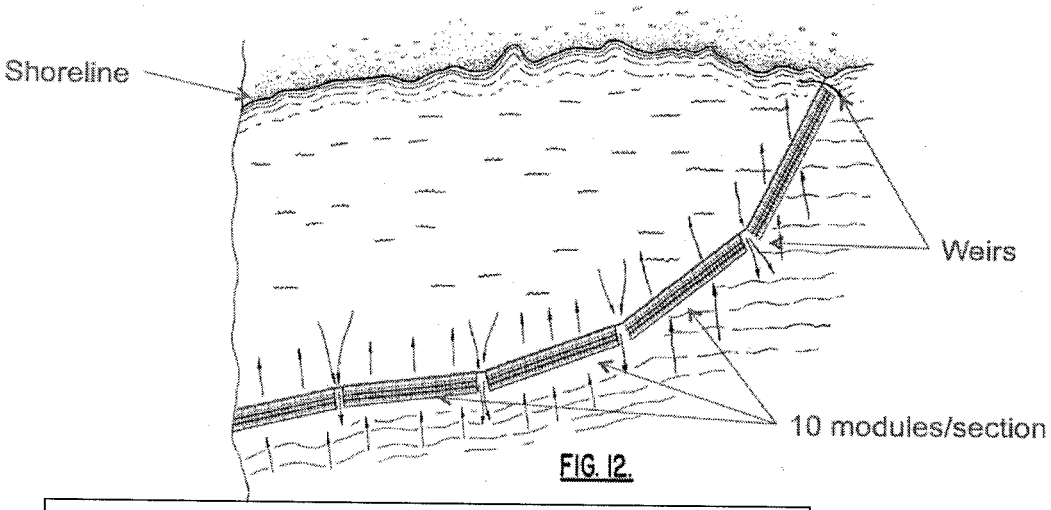


FIG. 12.

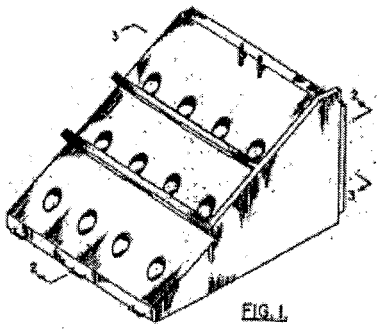


FIG. 1.

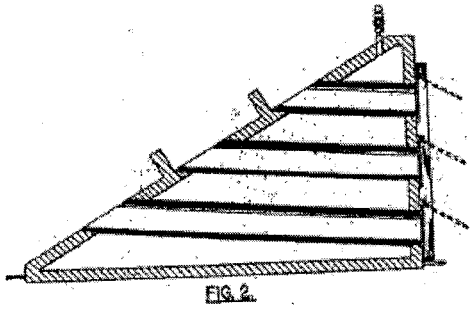


FIG. 2.

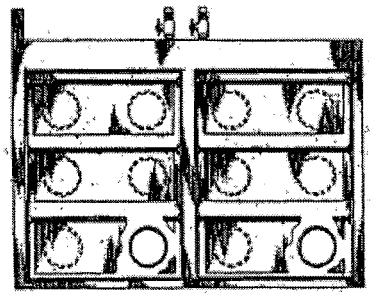
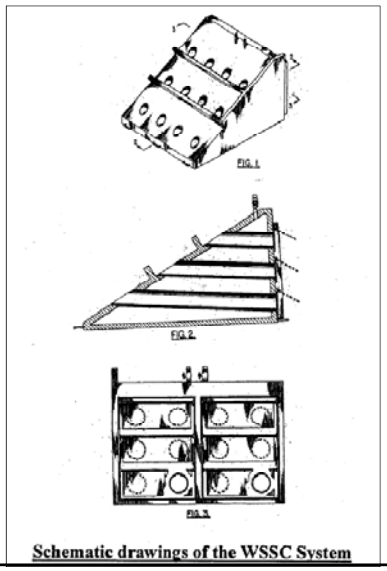


FIG. 3.

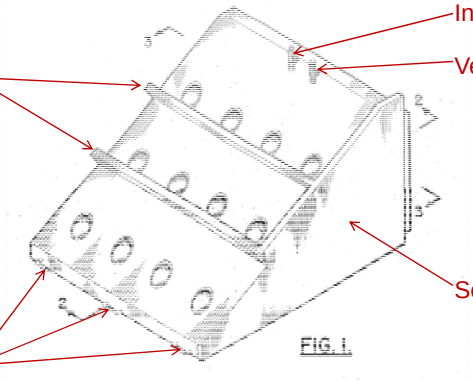
Schematic drawings of the WSSC System

The Wave Suppressor Sediment Collection System WSSCS

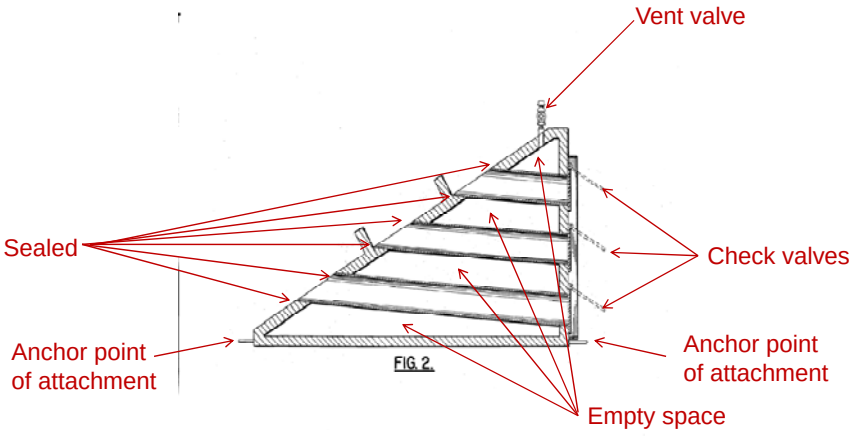


Schematic drawings of the WSSC System

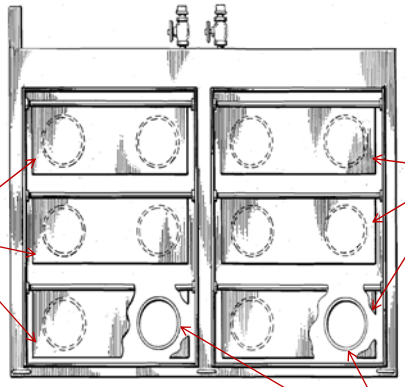
Wave Suppressor Sediment Collection System



Cross Section

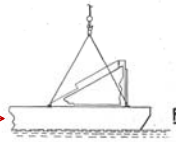


Rear View

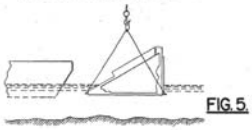


Deployment

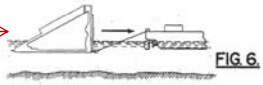
Barged or towed to site →



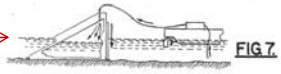
Floated in the water →



Towed in place using shallow draft watercraft →



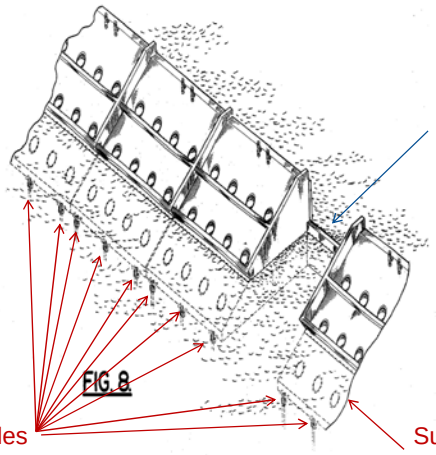
Submerged based on depth of water, currents and wave heights →



Weir and Anchor Attachment

Anchoring to module

Anchor



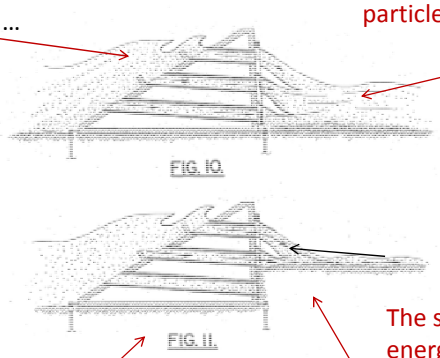
Weir

Anchors attached to modules

Submerged section

It is designed to suppress the energy of a wave …

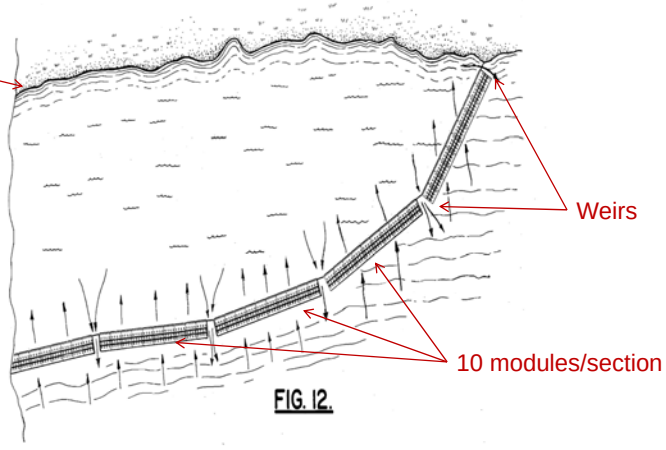
… yet maintain enough energy to carry suspended particles across the WSSCS



The slowing of the wave energy allows the suspended particles to fall out, more rapidly resulting in the building of sediment.

The WSSCS also prevents the newly collected sediment from washing away.

Proposed Deployment View



Demo 2 Bioengineering Solutions Using Fascines and Coir Mattresses

Bioengineering GROUP

Building Sustainable Communities on an Ecological Foundation

Presentation to:

CWPPRA Technical Committee and Stakeholders

What is Bioengineering?

Derived from German “Ingenieurbiologie” first used in 1857 to describe use of vegetation for land and water stabilization.

Relying on the principles of both biology and engineering, Bioengineering is the method of design and construction that uses vegetation (live, dead, and dormant) in combination with natural structural components for engineering purposes.

Examples of Bioengineering Approaches

- Fascines (wattles)
  - Dead brush
  - Dormant brush
  - Coir
  - Blocks
- Mattresses
  - Brush (layering)
  - Coir
- Live Staking
- Coir Fabric and “Live Lifts”

Brush Fascines

Coir Fabric

Coir Fascines

A natural fiber obtained from coconut husks. High tensile strength, slow decomposition, good growing medium

Coir Fascines

Coir Fascines

Brush Mattresses

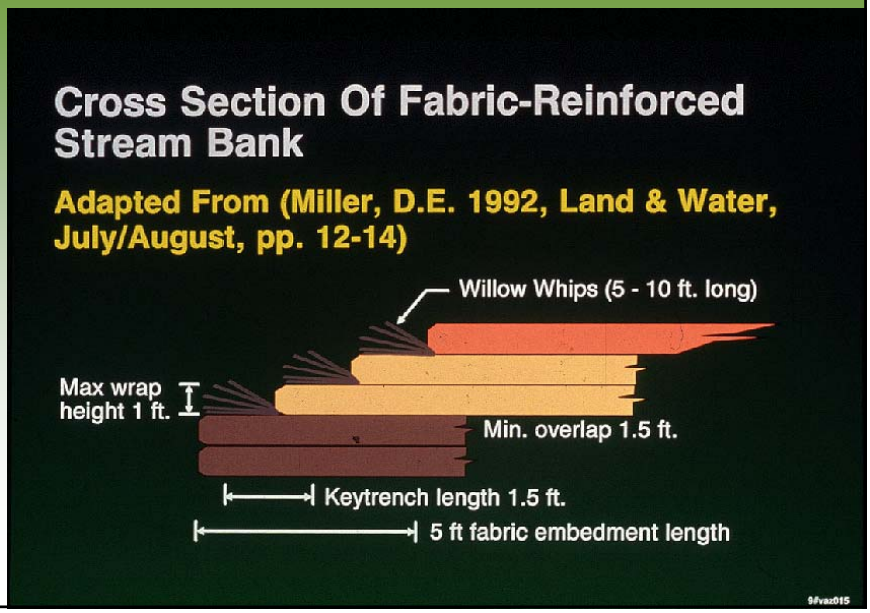
Coir Mattresses

Coir Mattresses

Coir Mattresses

Coir Mattresses

Coir Fabric and Live Lifts



Coir Fabric and Live Lifts

Advantages of Bioengineering

- Is based on the premise that a natural plant community with a solid foundation is the most effective approach to prevent erosion and establish a natural biological community.
- Does not require special skills or equipment to install
- Is cost effective to acquire and install
- Is aesthetic as it results in a natural, indigenous plant community

Advantages of Bioengineering

- Relies on natural, locally sourced materials
- Grows stronger over time
- Is self repairing and maintaining
- Roots spread, bind soil and hold it in place
- Vegetation shields the soil surface from waves, wind, rain and sheet flow.
- The plant community provides the basis for the rest of the ecological community.

Demonstration Applications

- Shoreline stabilization
- Canal bank stabilization
- Recreation of shallow vegetated marsh
- Establishment of Native Plant Communities

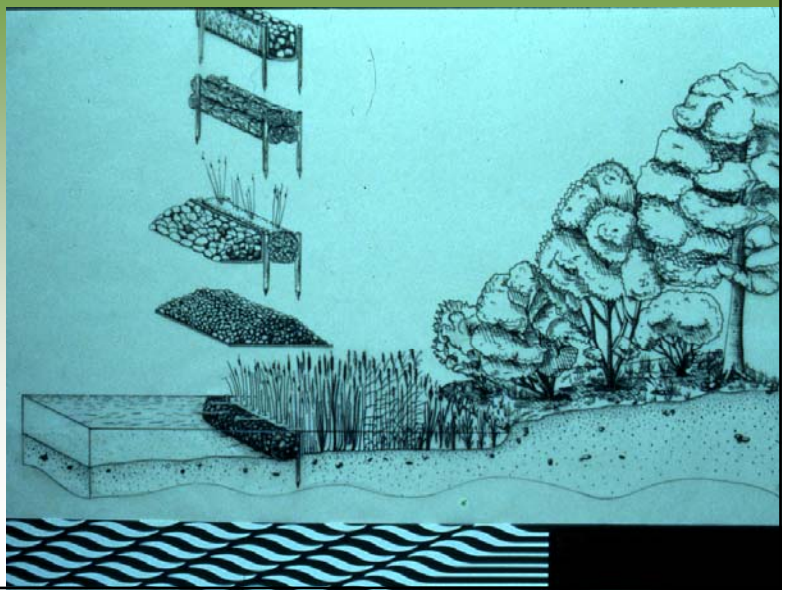
Cost Estimates

- Between $200 and $300 per linear foot.
- We are proposing a $2 million project, allowing for over a mile of stabilization.

Potential Demonstration Locations

- Jean Lafitte
- Lafourche Parish
- Plaquemines Parish

Potential Demonstration Approach



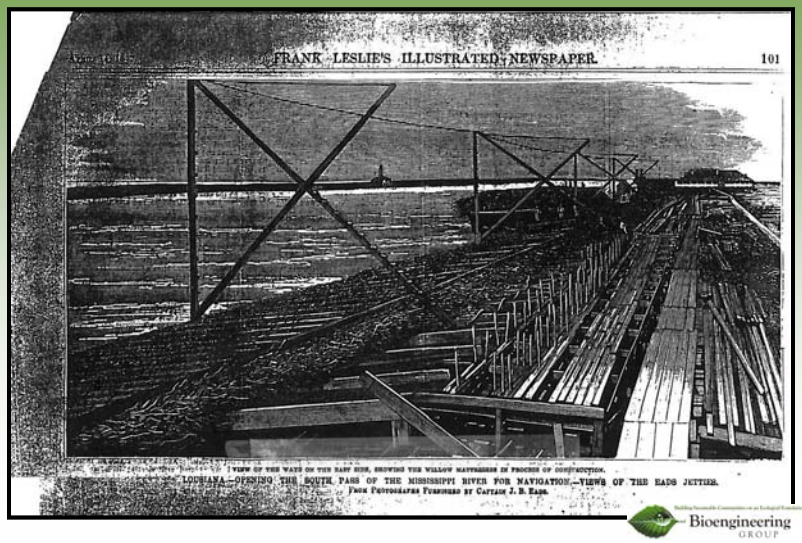
Potential Demonstration Approach

Potential Demonstration Approach

Potential Demonstration Approach

History of Bioengineering In Louisiana

JB Eads Mississippi River Jetties (1878)



The facts here recorded are taken principally from "A History of the Jetties at the Mouth of the Mississippi," by E. L. Corthell, C.E., chief assistant and resident engineer during their construction, and from "Harbours and Docks, Rivers and Canals," by L. F. Vernon Harcourt, M.A.C.E. The latter gives an outside opinion, and being used to describing majestic marine works, constructed in a costly manner, with the most imperishable materials, cannot disguise his contempt for the simple materials used in the Mississippi work, but he ungrudgingly testifies to the magnificent results obtained. The

Demo 3 Habitat Enhancements through Vegetation Planting Using Gulf Saver Bags

PPL21 PROJECT NOMINEE FACT SHEET
January 27, 2011

Demonstration Project Name
Habitat Enhancements through Vegetation Plantings using Gulf Saver Bags

Coast 2050 Strategy
Coastwide Common Strategy- Wetlands Vegetation Plantings
Benefits: Habitat Diversification and Vegetation Planting.

Potential Demonstration Project Location
Region 2; Mississippi River Basin; Pass a Loutre Wildlife Management Area

Problem
Louisiana's coastal marsh continues to disappear at the rate of 50 acres a day from erosion. This equates to the loss of an area about the size of one football field every 30 minutes. The years of impact from storms, shipping, dredging, flooding, nutrient run off and now the recent oil spill has indirectly and directly affected untold numbers of plant and animal species and diminished the overall diversity of this unique and complex ecosystem.

The Louisiana wetlands provide habitat for 70% of the countries waterfowl and the over 100 species of neo-tropical migrant birds that utilize the Mississippi flyway. The wetlands are the nursery for the Caribbean basin, and provide critical storm protection for Gulf Coast communities. Wetlands are the fabric and the glue that holds together essential Gulf Coast Ecosystems.

Though wetland restoration with grass plugs is being done, in many challenged sites re-establishing success is limited. New technologies and applications are needed to achieve greater stabilization, higher survivability and integration of diverse species back into to these areas, particularly where invasive species like roseau cane (*Phragmites*) have become excessively dominant.

Goals
Provide more efficient, reliable and cost effective vegetative planting techniques.

Proposed Solution
Install a variety of applications at critical wetland areas using “Gulf Saver” bags to demonstrate the relative success, applicability, and cost effectiveness of this method. The bags would be planted with a diverse selection of native marsh grasses or Black Mangrove and deployed at critical sites. Black Mangrove would be planted in bags at appropriate sites where increase in nesting areas and wildlife habitats for birds and greater shoreline protection is needed.

The plant materials could be grown by local grassroots organizations and school groups as part of their wetland education programs and all deployment efforts would include an environmental education and awareness component.

Application sites would be selected based on best or typical conditions that support the various species to be tested. Treatments would be applied to allow statistical testing applications. It is recommended that treatments would be monitored immediately after deployment, and at least at 2 and then 6 month intervals to ascertain success of the plantings. The Pass a Loutre Wildlife Management Area in Venice, Louisiana is recommended as the general demonstration site due to its potential for diverse applications, and availability of on-site State field personnel to assist with regular monitoring.

Gulf Saver Bags

The Gulf Saver Bag is a package of native marsh grasses with its own supply of totally natural nutrients and billions of oil eating micro-organisms to support, feed and protect the marsh grasses, promoting survival and growth, restoring the ecosystems and habitats. Each Gulf Saver Bag protects and restores one square foot of wetland.

A Gulf Saver Bag is a US Army Corps of Engineers standard biodegradable "burlap (sand) bag", that is filled with an all natural humus mix rather than sand. (weight and size adapted for easy handling by volunteers).

The humus inside the Gulf Saver Bag is a mixture of all natural organic nutrients that support maximum plant growth and survivability. The humus is custom mixed to be site specific and included in the humus mixture is billions of all-natural oil eating microorganisms, already being used by nature, to support as well as protect plants from potential toxins.

The plants "plugged" into the Gulf Saver Bag are native marsh plants that are vital to protecting, holding together, and restoring the ecosystems that are essential to the Gulf Coast. The 100% all natural biodegradable Gulf Saver Bags decompose and continue to provide additional food for the marsh plants as they thrive and grow.

Objectives

Demonstrate the applicability of Gulf Saver Bags for long term stabilization and reestablishment of coastal wetland.

- Reduce wetland loss rates along coastal wetland fringes
- Improve habitat quality
- Increase diversity of native plant species and wildlife
- Restore and increase wildlife habitat
- Establish black mangrove areas for rookeries and storm protection
- Demonstrate applicability of “Gulf Saver Solutions” and technology to large scale sites and compatibility with other CWPPRA projects.
- Promote coastal wetland education
- Wetland monitoring and research opportunities
- Increase sediment accretion by slowing overflow, promoting sediment accretion using vegetation

Preliminary Project Benefits

- Increased Habitat value through increased species diversity

Identification of Potential Issues

- None known

Preliminary Construction Costs

- Unknown at present

Preparers of Fact Sheet

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- Leslie Carrere, Gulf Saver Solutions lc@gulfsaversolutions.com
- Melanie Goodman, US Army Corps of Engineers

Prepared for

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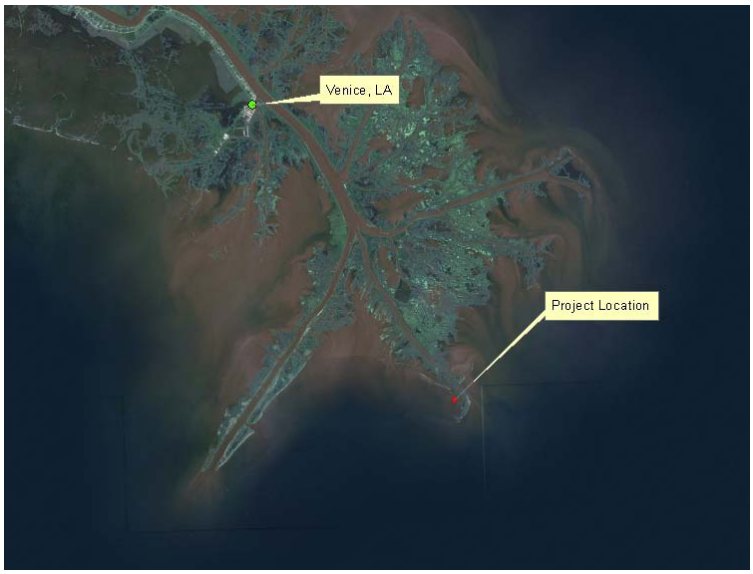


Figure 1. General Area for Plantings

Figure 2. General Area for Plantings

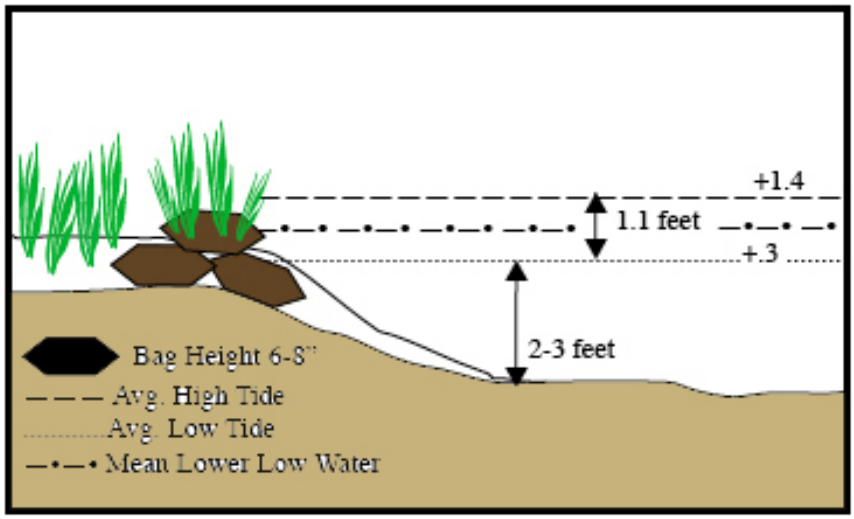


Figure 3. Typical Vegetation deployment using Gulf Saver bags

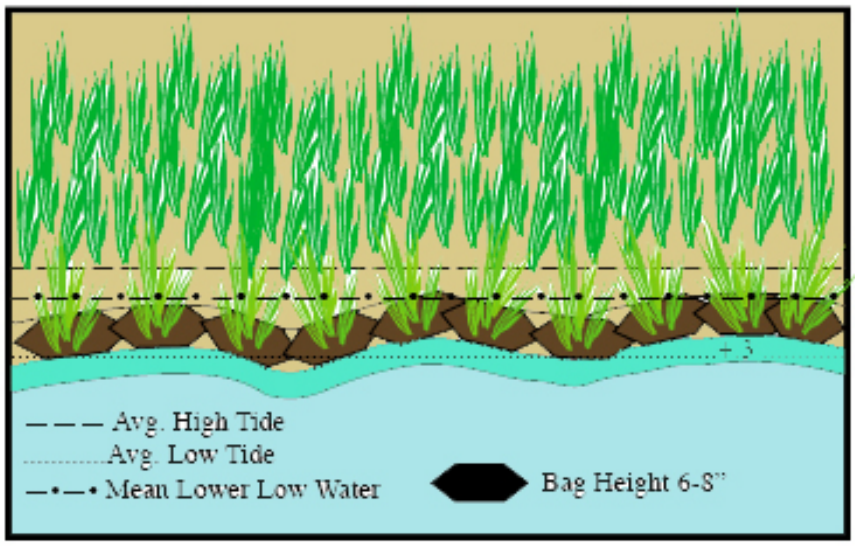


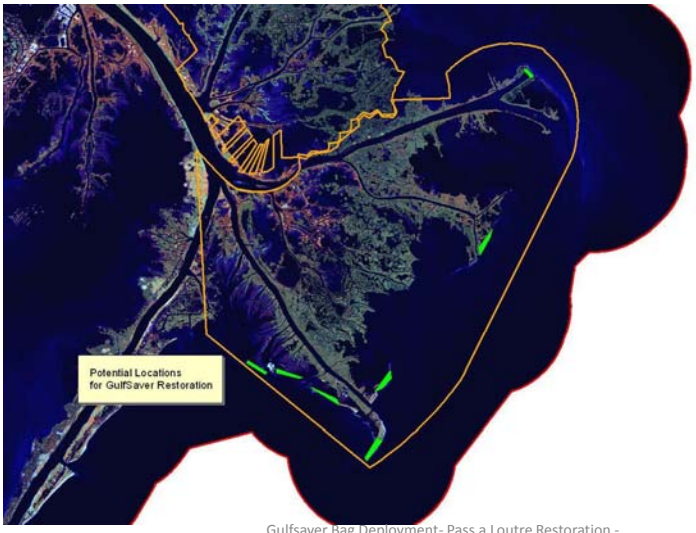
Figure 4. Typical Shoreline Configuration

Figure 5. Prototype Project, and of Pass a Loutre, North Pass deployed December 2010

Goals

- Establishment of habitat (especially bird roosting habitat) in unvegetated areas of Pass a Loutre WMA
- Follow up & expansion to pilot test of GulfSaver bags in an accreting environment for establishment of both grasses (*Spartina spp*.) and ultimately for Black Mangrove (*Avicennia germinans*).
- Serve as a GulfSaver deployment location by volunteer organizations

Sites at LDWF
Pass a Loutre WMA



Deployment Materials
GulfSaver bag

Gulfsaver bags are burlap bags filled with a humus mix for rapid rooting of plants that are plugged with a species of choice for individual deployments.

Gulf Saver Bag Specs:

Material: Untreated all natural burlap
Size: 14" X 26" (flat)
Weight: 15 lbs, 20 lbs-22 lbs (for volunteer handling)

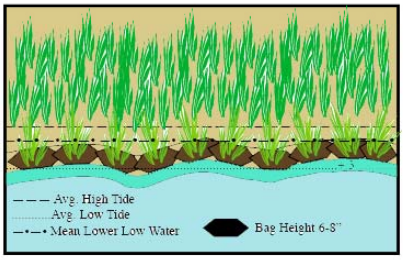
Humus Composition:

Nutrients	Percentage	lbs/ton
Organic Nitrogen	1.37	27.4
Urea NH4	0.17	3.4
Nitrate N	0.16	0.32
Water Unsoluable N	1.24	24.8
P205	1.56	33.08
K20	2.21	44.28
Ca	2.02	40.4
Mg	0.87	17.36
Zn	0.52	10.46
Na	0.487	9.75
Cu	0.0018	0.04
I	0.4021	8.04
Mn	0.0122	0.24
Zn	0.0123	0.25

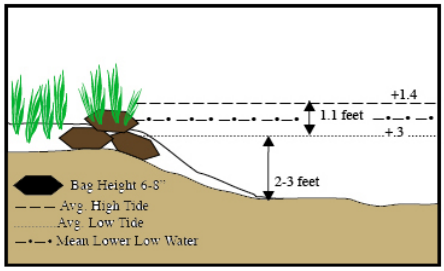
Heavy Metals

Arsenic	None detected
Cadmium	None detected
Lead	None detected

Typical Deployment Detail
Plan View and Cross Section



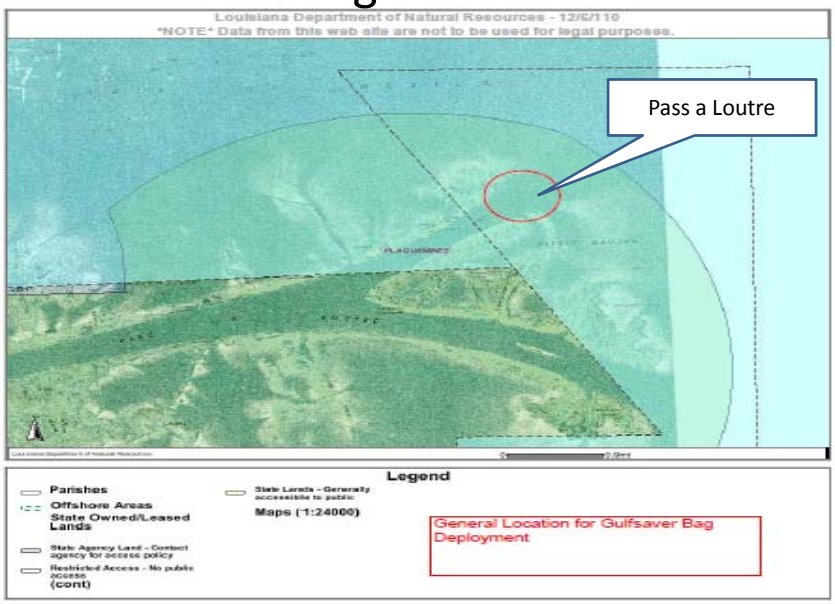
Plan View - Detail



Cross Section - Typical

Bags will be placed on top bare sand/substrate, and stacked 2 wide with a 3rd bag placed on top. Wooden stakes will be driven through alternating bags to anchor the system. Bags will be plugged, prior to placement with *Spartina alterniflora* for the grass deployments.

Existing Site Location



Deployment December 2010

Deployment December 2010

Monitoring

Following deployment, monitoring of the site will be performed at 0, 2 and 6 months following each deployment, and thereafter semiannually, using aerial photographic mapping techniques from handheld balloons. Aerial photos will be georeferenced, stitched, and spatial coverage of the plants will be monitored.

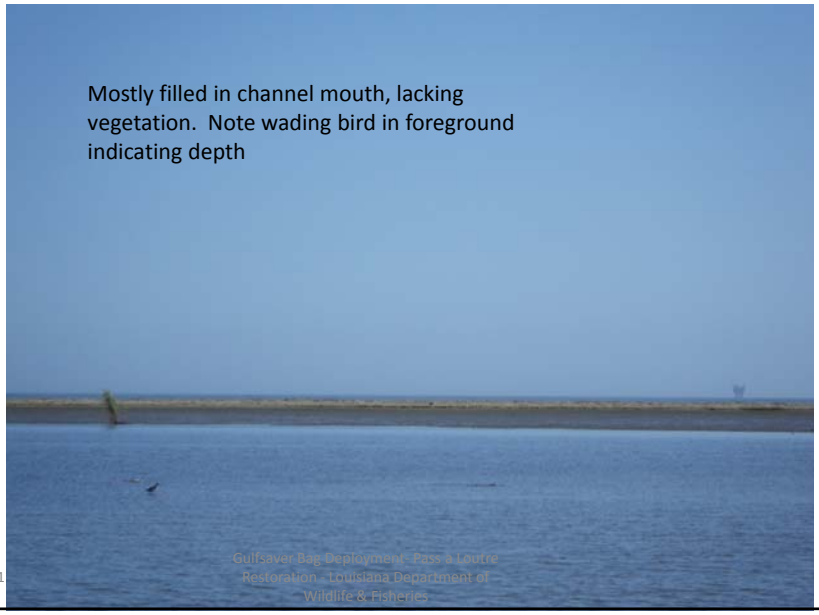
In addition, plant health and growth monitoring will be periodically performed by the Coalition to Restore Coastal Louisiana (CRCL) to document plant growth.

2/1/2011

Gulfsaver Bag Deployment- Pass a Loutre Restoration - Louisiana Department of Wildlife & Fisheries


Google
Image USDA Farm Service Agency

Current Conditions



Current Conditions

Current Conditions

Current Conditions

Schedule

- Deploy 350 Grass GS bags by January 2011 (COMPLETE)
- Deploy an additional 350 Grass Bags before end of 2nd quarter 2011
- Schedule 2 more deployments 350 bags each with Black Mangrove (depending on availability) before November 2011

Contact Info

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Demo 4 Autoclaved Aerated Concrete for the Coastline

PPL21 DEMONSTRATION NOMINEE FACT SHEET
January 27, 2011

Demonstration Project Name:
Shoreline Protection Applications of Autoclaved Aerated Concrete

Coast 2050 Strategy(ies):
Maintain bay and lake shoreline integrity

Potential Demonstration Project Location(s):
Site not yet determined

Problem:
Coastal area shorelines with unstable soil conditions have traditionally presented an array of challenges to restoration efforts. Rip rap has proven to be the most stable, durable, and effective means of erosion protection and shoreline armoring , but is not always an option due to unsuitable load bearing capabilities of the local sediments. As a result, some critical areas with high erosion rates are left exposed to impacts from wave fetch, tidal surges, etc.

Goals:
The primary goal of this project is to manufacture, deploy, and demonstrate the effectiveness of Autoclaved Aerated Concrete as a viable alternative to traditional shoreline protection and stabilization materials.

Proposed Solution:
The first application of this material as a shoreline protection feature is as an alternative to shoreline armoring via concrete or rock rip rap along shorelines with high risk for failure due to low load bearing capacities. This product is only 20% the weight of solid concrete, therefore will greatly reduce the likelihood for increased subsidence, and could present an option where other heavier materials would have never been considered. Another application for this product is to potentially construct artificial oyster reefs and placing the structures in areas where conditions are unsuitable for foreshore rock dikes or revetments, to break up wave action. As oysters accumulate on these structures, the effectiveness of the reef increases.

Project Benefits:
The proposed project's potential benefits include:

1. Dissipation and absorption of wave energy
2. Protect existing shoreline
3. Discover a lighter alternative to rip rap structures
4. Possibility for multiple applications of product

Preparer of Fact Sheet:
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Scott Wandell, USACE, (504) 862-1878, scott.f.wandell@usace.army.mil.

Demo 5 Deltalok

PPL21 PROJECT NOMINEE FACT SHEET

Demonstration Project Name
Deltalok® Coastline Stabilization

Coast 2050 Strategy
Coastwide Strategy: Maintain, Protect or Restore Ridge Functions; Vegetation Planting;
Regional Strategies: Protect Bay, Lake and Shorelines; Restore and Maintain Barrier Islands & Critical Land Forms

Project Location
Coastwide

Problem
Marsh and Wetland loss throughout coastal Louisiana . The loss of vegetation has accelerated the rate of erosion, and reducing this loss is proving difficult and costly. Shore stabilization is crucially needed to prevent the eroding marsh footprint. Though wetland restoration with grass plugs is being done in some areas re-establishing success but is limited in its scope. Shore stabilization is still needed to prevent the eroding marsh footprint.

Proposed Project Features
Shoreline protection and vegetation plantings utilizing the The Deltalok® Terra-Soft Block™ (TSB) System. It is a completely new category of civil engineering products, as it is a highly adaptive soft material product that exhibits hard material capabilities. These TSBs serve two purposes: stop further erosion; provide a stable foundation for growth of vegetation. TSBs will blend with the local environment to leave a natural finish (unlike riprap or other hard material), and follow the natural contours of the marsh. Once built, the Deltalok® shoreline would be planted with indigenous vegetation plugs. The TSBs offer the structural integrity of hard structure, and the vegetation of an earthen berm.

Goals:
The goal of this project is demonstrate the successful use of the Deltalok® TSB System to both armor shorelines and ridges, but server as a viable planting ground for marsh vegetation:

Proposed Solution:
Construction of a mile of Shoreline protection using The Deltalok® Terra-Soft Block™ (TSB) System.

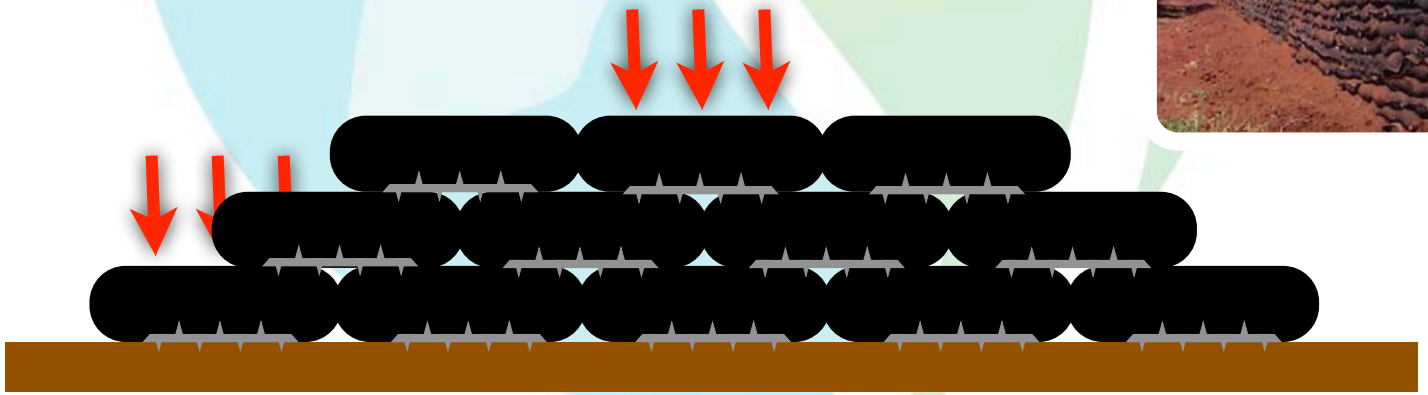
Project Benefits:
1) Reduce the cost of shoreline stabilization (2/3 the cost of Riprap)
2) Rapid and efficient effective construction
3) Durable, resists differential settlement and seismic activity
4) Achieves 100% system strength on installation, does not rely on root strength/reinforcement

Construction Costs
$650K

Coastal Erosion Control – British Columbia

Construction

- Surface is leveled
- A Deltalok® Interlocking Plate secures first layer of Terra-Soft Blocks to the ground
- Build wall like a block & mortar wall
- Tamp TSB's down to engage with interlocking plate



Building a Deltalok® wall

Demo 6 Dewater and Revegetate Small Open Water Areas Using Plantings and Aerial Seeding

PPL21 DEMONSTRATION PROJECT NOMINEE FACT SHEET
January 28, 2011

Dewater and Revegetate Small Open Water Areas Using Plantings and Aerial Seeding

Coast 2050 Strategies:
Coast 2050 Coastwide strategies – Vegetative Plantings, Management of Bay/Lake Shoreline integrity.

Potential Demonstration Project Location(s):
Region 4, Mermentau and Calcasieu Sabine Basins, Cameron and or Vermilion parishes, in existing marsh management or natural mudflat areas due to the greater success of active management in this region.

Problem:
There many marsh management areas in the Louisiana's coastal zone, especially southwestern Louisiana, with the ability to dewater open water areas that have converted from marsh to shallow open water. Many of these active marsh management plans are not able to regularly achieve water level lowering events for the length of time needed for natural revegetation to occur. Revegetation, if it occurs at all, normally occurs along a small band adjacent to existing marshes. Many years of draw-downs are often necessary to achieve natural revegation of these areas.

Goals:
This demonstration project will test the ability to accelerate the revegetation of marsh management through vegetative plantings and natural draw-down areas through aerial seeding.

Proposed Solution:
A sample of existing active marsh management plan areas and natural draw-down areas (i.e., mudflat areas) will be located within the Chenier Plain (Region 4). Sample management and/or natural draw-down areas totaling approximately 300 to 400 acres will be selected, with Engineering and Environmental Work Group approval, for vegetative plantings and aerial seeding.

Vegetative Plantings – Draw-down areas in fresh to brackish marsh areas will be hand-planted with Smooth cordgrass (*Spartina alterniflora*) sprigs, marshhay cordgrass (*Spartina patens*), seashore paspalum, or other suitable vegetation, set on 5 to 10 foot-wide centers totaling from 435 (10-foot centers) to 1,800 (5-foot centers) plants per acre.

Aerial Seeding – Aerial seeding is a revegetation technique that uses aircraft to seed large areas in a timely and cost effective manner in areas which would ordinarily be uneconomical or very difficult to vegetate. Success rates can be comparable to more traditional methods of seeding. The rice industry routinely employs aerial seeding techniques. Aerial seeding of coastal wetland plants such as Smooth cordgrass, and other

suitable coastal grasses (i.e., seashore paspalum) will be attempted on 100 to 200 acres of managed and natural draw down areas. Variability with this type of seeding technique is high and depends on location and types of seeds. Costs and benefits of vegetative plantings vs. aerial seeding will be compared to determine which technique is most cost effective and reliable.

Project Benefits:
Approximately 200 to 400 acres of actively managed and natural draw-down open water areas would be restored by revegetation during times of the year when water levels are sufficiently lowered to stimulate germination and vegetative growth in the late spring and summer. Active marsh management areas would be stimulated to revegetate more rapidly than would occur naturally through management alone.

Project Costs:
The estimated construction cost is $1.4 M.
(Sprigs planted on 5 foot-wide centers = $4.50 each planted X 1,800 plants per acre (5 foot centers) = $8,100/acre X 100 acres = $810,000. 10-foot-wide centers = $4.50 X 435 plants/acre = $2,000/acre X 100 acres = $200,000. The aerial seeding technique budget is based on a cost of $500/acre. $500 X 200 acres = $100,000.)

Preparer(s) of Fact Sheet:
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Demo 7 Alternative to Manual Planting

PPL21 PROJECT NOMINEE FACT SHEET
February 2, 2011

Project Name:
Alternative to Manual Plantings

Coast 2050 Strategy:
Coastwide: Dedicated dredging for wetland creation; Wetlands Vegetation Plantings
Regional: Dedicated delivery of sediment for marsh building by any means feasible Habitat Diversification and Vegetation Planting.

Project Location:
Demonstration project. This could be done at any dedicated or beneficial use of dredge material site creating a marsh platform.

Problem:
Though wetland restoration with grass plugs is being done in some areas re-establishing success is limited in many challenged sites. New technologies and applications are needed to achieve greater stabilization, higher survivability, and integration of diverse species back into to these areas. Hand planting is costly and time consuming.

Goals:
The goal of this project is demonstrate a possible alternative to manual plantings.

Specific goals: 1) To test if rhizomes or seeds can survive passing through a dredge pipe. 2) To determine if this method gives an even distribution of plants. 3) To determine the optimal time to input the rhizomes for maximum growth and distribution.

Proposed Solution:
To install a hopper on the dredge pipe that would allow rhizomes or seeds to be carried to the dredge placement site with the dredge material. Use this method and compare it to natural recruitment and hand planting. Test would include no planting, last 15 minutes of dredge cycle, last 30 minutes of the dredge cycle and manual plantings.

Preliminary Project Benefits:
1) The preliminary Project benefit would be to reduce the cost of planting.
2) Increase habitat value.

Identification of Potential Issues
1) Damage to the Rhizomes as they travel through the dredge pipe.
2) Uneven distribution of plant material.

Preliminary Construction Costs
Estimated one time cost to construct a reusable hopper or retrofit existing system $20,000. Potential saving on manual planting depends on site size and planting density.

Prepare of Fact Sheet
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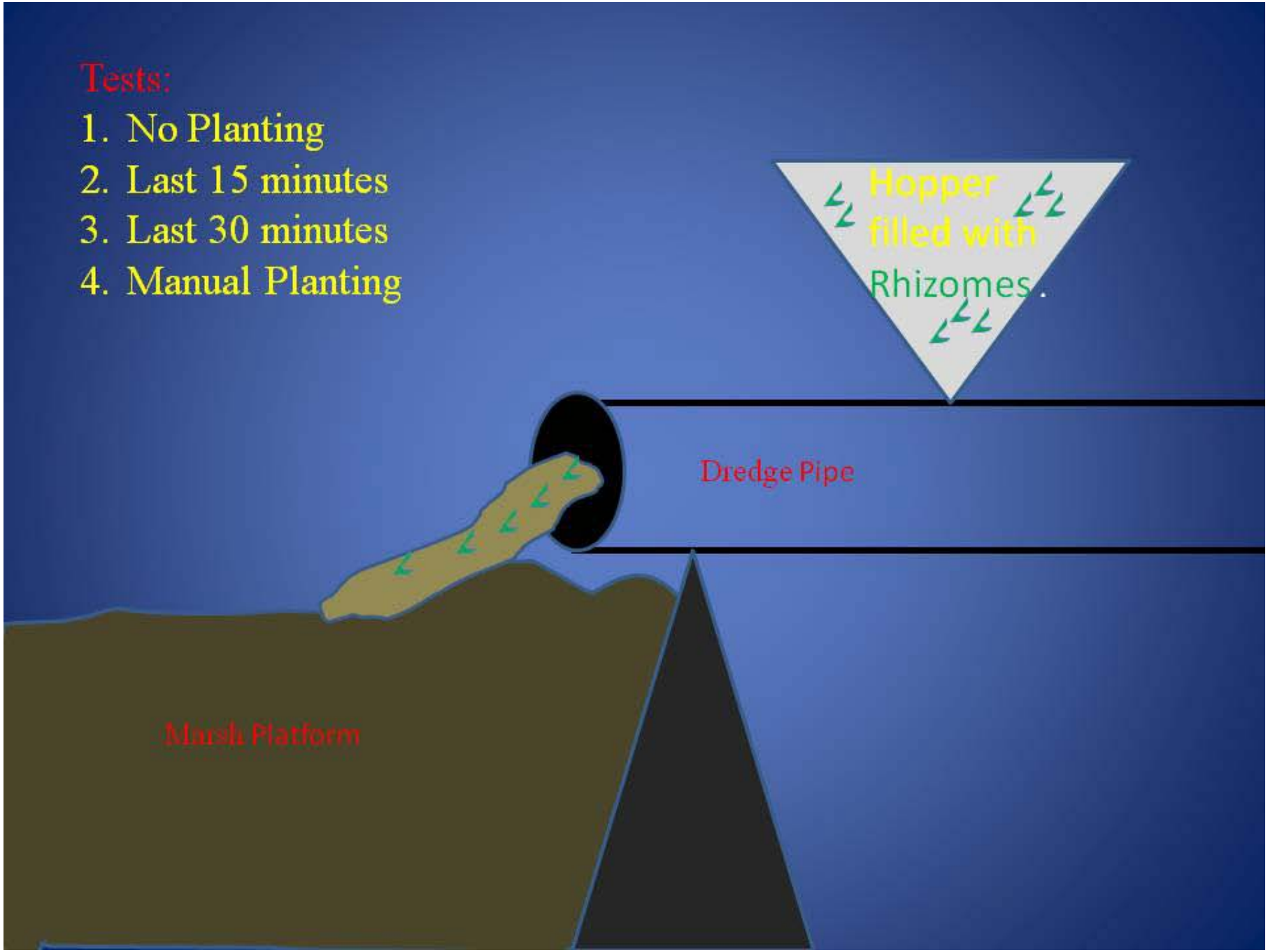
Tests:
1. No Planting
2. Last 15 minutes
3. Last 30 minutes
4. Manual Planting
Hopper filled with Rhizomes.
Dredge Pipe
Marsh Platform

Mini Feed Bin with Collar and Slide Valve - 65 Bushel
Mini feed bin features:
Storage for: Grain, corn burning stoves, various grain pellets, bulk seed, or anything you need
With the increasing popularity of corn-burning stoves, the mini corn bin offers a solution for storing the corn needed to burn those stoves
Ideal as a feed bin for small hobby farms
Works well for range cubes - approx. 3/4" round and 2" long
Feed bin has a 65 bushel or 3,640lbs. capacity
Protects feed from moisture and bugs
Feed bin is constructed of galvanized steel
Load feed through the lid on top of bin
This mini feed bin weighs 325 Lbs.
5' diameter, 10' tall