Demonstration and Coastwide Project Proposals

The following Demonstration and Coastwide Project Proposals have not been evaluated by the CWPPRA Workgroups yet. Therefore they have not been deemed officially eligible, at this time, according to CWPPRA Guidelines. An update will be posted after the review is complete.

Demonstration Projects

Agency	Presenter	Project ID	Project Name
Independent	Chris Talbot/Matt Bernier	Demo-01	Reefbud: Pursuit of Happiness Farms

reefbuds

the only good thing to drop into the ocean

LOUISIANA COASTAL RESTORATION

2022 REEFBUD PROJECT

PRESENTED BY MATHEW BERNIER AND CHRIS TALBOT | FEBRUARY 8, 2022

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EXECUTIVE SUMMARY

Dear CWPPRA Team,

Per the RFP, we have condensed our creative Executive Summary to be as concise and informative as possible, reserving the details for our standup presentation. We look forward to illustrating how we will get this project done, the various components we will integrate, and how they will deliver a real solution for Louisiana in a most cost-effective way. Most importantly, **we want to protect our shorelines and for the marine life to thrive**— we're building a solution that solves for both.

Once again, thank you for your consideration. We look forward to presenting to you in person. Warm regards,

Mathew Bernier

Founder,
REEFBUD, LLC
vmbernier@gmail.com
985-507-9191

Secondary proposal contact:

Chris Talbot
Partner, Marketing & New Business Development REEFBUD, LLC
504-319-1452 (cell)
Nola.talbot@gmail.com

We certify the accuracy of all information submitted. The proposal is valid for one hundred twenty (120) days from February 8th, 2022.

GENERAL APPROACH

With over a decade of research under our belt, we intimately understand the Gulf States Coastlines, the marine life, and need for innovative thinking around coastal restoration—what works and what doesn't, what can be improved to enhance and maximize the stability of our shorelines and waterways, and help marine life thrive.

That said, our main goals are environmental benefits and cost-effectiveness. We accomplish this with a two-pronged strategy. First and foremost is our team—highly passionate and experienced in this industry—and extensively trained in executing environmental studies, supporting the delivery of maximum project knowledge and learnings.

Second is our proprietary **Reefbuds material solution** used to construct and fortify barrier islands, wave-breaks and other attenuation, and surge protection systems.

THE SOLUTION

Reefbuds. (The reason this project is a winner.)

What are Reefbuds? Reefbuds are made of environmentally friendly all natural organic and inorganic materials, such as shredded coconut husk, rice stalks, volcanic rock, activated carbon, sand and cement all combined to form a rough hollow pyramid structure. The key features and benefits include:

- POROSITY - Reefbuds structures are like solid sponges that absorb sea water. (up to 30% of its weight)
- PH – The entire Reefbud takes on the PH of the surrounding water as it penetrates the structure through capillary action. The absorbed marine life germinates quickly within the fertile environment inside the Reefbuds.
- CALCIFICATION - The blend of materials in the Reefbuds reacts with seawater and triggers a calcification process very much like the natural process that takes place continuously in the sea (e.g., calcification in coral structures, crab shells, crustaceans, turtle shells, etc.) This makes the Reefbuds a rock-solid natural habitat for all forms of marine life.
- STABILITY - Because they are heavy massive structures and become even heavier as they absorb sea water and marine life, Reefbuds cannot be moved by strong currents during storms. Moreover, they are built with an aquadynamic shape that allows currents to simply glide around the structures instead of pushing on them. Stability allows the Reefbuds to become permanent homes and spawning grounds for marine life.
- COMPATIBILITY - Reefbuds were formulated to use beach sand and sea water as basic raw materials. REEFBUD mix (25% of volume) are mixed and formed with beach sand and the cheapest cement (20% of volume). This ensures Reefbuds compatibility with the waters where they will be deployed. Use of materials near the seas are major sustainability and logistical benefits of employing our Reefbuds technology.

SPEED of GROWTH - This is perhaps the best feature of Reefbuds. Marine life such as algae, seaweeds, oysters, etc. can be found plentiful on Reefbuds in as little as 4 weeks after being dropped in a marine dead area (with only sand and/or mud). Reefbuds have been found to be one of the most effective and fastest ways to rekindle a marine ecosystem which has disappeared or severely damaged. https://youtu.be/4GTMkJ1_Sqk

PROJECT DESCRIPTION

The project goals include bringing an internationally proven technology to Louisiana. Scientific studies on massive Reefbuds projects like Boracay island show revival of a dead marine environment of coral rubble covering hundreds of hectares. The environmental benefits include shoreline protection (wave attenuation) as well as habitat creation. (Reference the 2006 World Bank Country Development Marketplace, “Development with Equity" contest) https://youtu.be/7HSiiqO_JCI

We seek to reproduce the results of the studies that show given coral spawning seasons, natural coral recruits taking life on Reefbuds surfaces are at least 6 times more than if the spawn fell on the natural environment of sand, rocks, coral rubble, and other debris. The studies also show that coral branches grafted onto Reefbuds surfaces exhibit healthy growth and can withstand the battering of powerful typhoons like Yolanda in 2013. For that matter the Reefbuds structures in the different projects (some of which go back over a decade), have remained intact as they continue to grow and play host to various forms of marine life.

We seek to demonstrate that Reefbuds can play a vital role in fish enhancement even in areas not suitable to coral growth as they did in the highly polluted seas in and around Manila Bay. In Rosario Cavite, a Reefbuds project supported by the Cavite Export Processing Zone Authority since 2009, some 1400 Reefbuds structures have played host to various forms of edible marine life such as fish, crabs, clams, and shrimps. Until now, we have only been able to imagine what it could do for coastal restoration and revitalization in Louisiana.

- **Demo Project Location and Plan:** We are open to deploy wherever our solution is needed. We believe deploying in - **the Chandeleur Islands and the Rockefeller Refuge** would be a great place to prove Reefbuds is the right solution for our coastline.
    - Ref: ChandeleurIslands.pdf (usgs.gov)
    - Ref: https://www.wlf.louisiana.gov/page/rockefeller-wildlife-refuge
- We aim to design, create, deploy, and monitor a reefbud wall similar to the picture below. However, our application would be positioned at different depths and distances from the coastline and will help with managing coastal erosion, storm surge and wave attenuation. It will also build a habitat that will boost the ecosystem in the area.
- Phillip Trosclair with LWF has agreed to sponsor a location for us to deploy in the Rockefeller Refuge (see photo attached of area highlighted in yellow). Scooter Trosclair, ptrosclair@wlf.la.gov

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Lacassine
National
Wildlife
Refuge
Wright
White Lake
Wetlands
Conservation
Area
Grand Chenier
Rockefeller
Wildlife
Refuge
White Lake
Pecan Island

SOLUTIONS AND ADVANTAGES

Reefbuds' proprietary mix is engineered to rapidly restore marine life in dead or depleted areas while being more cost efficient and environmentally friendly than other materials like concrete, rock, and scrap materials.

Solutions

- Living shorelines and sustainable Reefbuds planters providing anchoring for planting projects along the Gulf Coast in partnership with RES.gov Resource Environmental Solutions, LLC
- Surge and shoreline Protection: Southern and Coastal parishes including St. Tammany
- Wave attenuation: Reefbud speed bumps, sandbars, and natural wave breaks
- Land bridges/bulkheads: Kremnitz Wall
- Marine Life/habitat/haven for oyster, crab, shrimp, and fish

Key Advantages

Reefbuds are a more sustainable cost-effective method of rebuilding a marine ecosystem and protecting shorelines. The popular method of deploying rock or rubble results in excessive settlement in weak, coastal Louisiana soils. The material erodes over time, supports minimal marine life growth, and is expensive to deploy.

Additional advantages include:

- Adaptable along all coasts, different regions
- Cost effective
- Environmentally friendly
- Multiple designs and molds
- Rapid growth
- Easy to construct
- Sustainable, Resilient, Synergy, environmental beneficial
- Anchor system for planting projects
- Proven technology, successfully deployed, monitored, and data
- Shelter/haven for smaller species allow successful spawning and growth

Problems Solved by Reefbuds

Reefbuds represent a new and effective way of reviving near shore marine ecosystems that have been severely damaged by unregulated human activity. In addition to environmental benefits and cost-effectiveness, our demonstration seeks to evaluate different deployment methods to find the one that bears the best results (geometries, anchor systems, Gulf coast, bays and lakes, channel shoreline stabilization, bulkheads, etc.). As we can create different molds for specific areas to assist with diverse issues such as surge protection, wave breaks, natural sandbars, and speed bumps to help with wave attenuation.

For Example: The Kremnitz Wall:

The Kremnitz Wall is conceived to be an immovable stable structure that is free from the dependence of binders by virtue of its hexagonal locking mechanism. This concept was inspired by one of nature's most stable structures, the beehive honeycomb. Each tube acts as a brace for its counterpart and increases the overall stability of the wall. The Kremnitz Wall is specifically engineered to act as a wave-mitigating sieve, effectively serving as an anti-erosion alternative to the traditional Reefbuds design. Moreover, because the wall is made of Reefbud mix, it becomes an increasingly hardened yet porous shell-like construction with marine life making the structure their home.

- Anti-Erosion Above and Below Sea Level
- Hexagonal Locking Mechanism
- Long Term Stability
- Customizable Wall Dimensions

GETTING IT DONE - STRATEGY

Having successfully studied the growth of this solution globally for almost ten years gives us inside knowledge of how to execute efficiently within budget. Your 2022 project comes with a budget that we take very seriously. Our approach to delivering a successful project within these parameters includes a prototype testing phase and a schedule for gathering metrics and data throughout the project timeline.

1. **Prototype Testing**
   Working with our sponsor at the Rockefeller refuge, we will design, build, and deploy the correct size structures using Reefbud materials.

2. **Monitoring Plan**

   We are prepared to collect data, monitor the reefs, and surrounding areas for as long and as often needed to document this study.

3. **Summary of Project Budget**

   We are asking for a grant to protect the shoreline of the Rockefeller refuge. Our cost to construct, deploy, and monitor will be determined by the size of the project, and funds available.

FINAL WORDS.

We're thrilled at the option of partnering with you on this project and know we can make it a success. We're looking forward to presenting to your team in person and further illustrating our ideas and strategy.

Thank you!

Links to more information on Reefbuds:

https://reefbuds.net/about-us/

https://youtu.be/7HSiiqO_JCI

https://youtu.be/_jXzNGwyuHc

https://youtu.be/L6JgFD30jgo

https://youtu.be/efTaBx7jrw4

https://youtu.be/4GTMkJ1_Sqk

https://www.facebook.com/RBGCorals/

Reference Monitoring Process

reefbuds

the only good thing to drop into the ocean

- Award-Winning
- Internationally patented
- All-natural
- Simple and easy construction and deployment

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Reedbud Solutions

Reefbud Dome

Kremnitz Wall assembly

Kremnitz Wall

Living Shoreline

Domes ready to deploy

Living Shorelines, Bulkheads, Landbridges

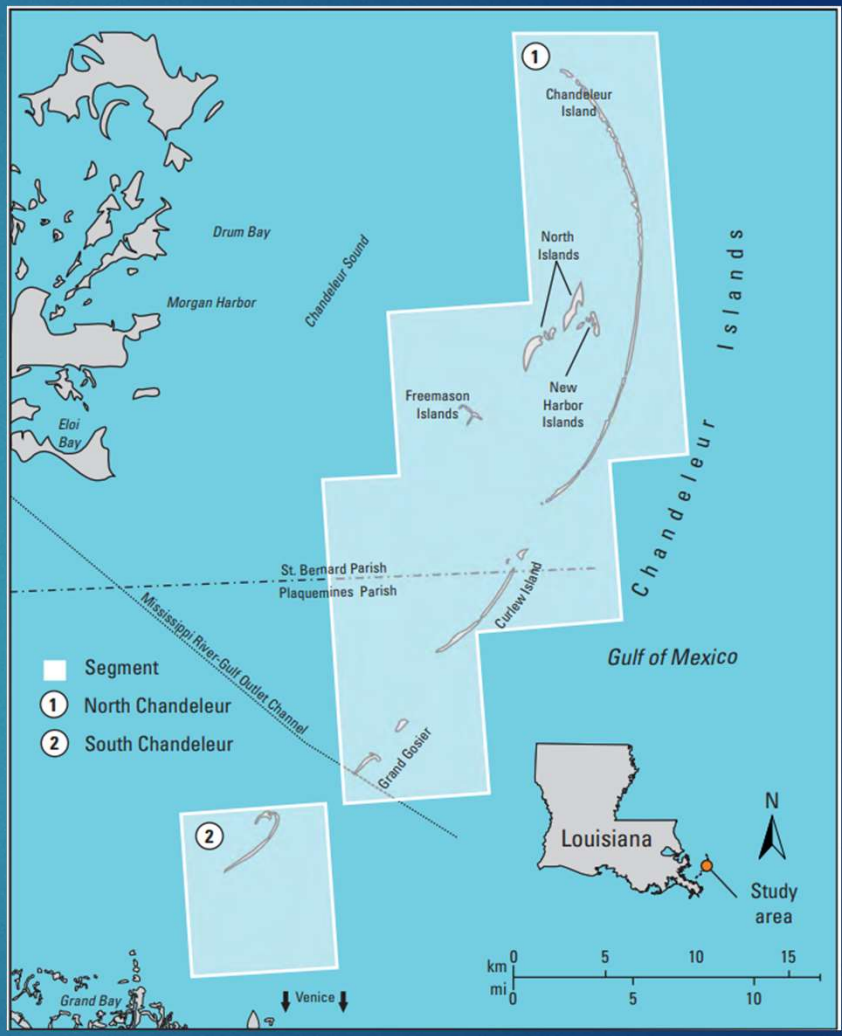
Wave Attenuation, Surge Protection

Habitat Restoration: oysters, shrimp, fish

Simple Deployment

Rockefeller Wildlife Refuge

Chandeleur Islands



The REEFBUDS Difference!

Concrete Structures

At first glance they look the same, BUT:

REEFBUDS- porous organic/ inorganic structures

Inactive structure	⟷	Absorbent fertile structure
Slow, limited growth	⟷	Rapid growth and propagation
Heavy and Expensive	⟷	Lighter and Cheaper

Rapid marine life growth and propagation on REEFBUDS

After about 6 weeks (installations at Cavite/Rosario)