Texas A&M Seaweed Enhanced Dune Project Proposal
May 2013

Step 1:
The first step is to build a prototype dune (possibly at Stewart or East Beach) as discussed in our last meeting with Mario and Kelly. The estimated costs for this 1-year pilot project are $135,710.00 and are detailed below. I will give a presentation at the next Park Board meeting and we are hoping to have this project included in the new Park Board budget:

A) Sr. Personnel:	$ 10,828	(Dr. Figlus 1 month summer salary incl. fringe)
B) Students:	$ 61,596	(1 Grad Student, Capt. Robert Webster, 1 undergrad student worker incl. fringe)
C) Travel:	$ 1,500	(Travel to and from project site over the entire year)
D) Supplies:	$ 2,500	(PC and Camera for dune monitoring)
E) Publication Cost:	$ 500	(Print and disseminate reports and education material)
F) Other:	$ 4,000	(In-house RTK/GPS beach surveys to monitor dune behavior)
G) Sub-award:	$ 5,000	(Licensed beach/dune profile surveys)
E) Equipment & Rental	$ 30,000	(Seaweed compaction equipment and rental – assume overhead exempt)
TOTAL DIRECT:	$ 105,096	
TOTAL INDIRECT:	$ 30,614	(@ 45.5%)
TOTAL PROJECT COST:	**$ 135,710**	

In this budget I am assuming that the City / Park Board can provide help with heavy equipment (i.e. front loaders) and staff to build the dunes. The 30k for equipment is there to rent and test some alternatives.

Step 2:
In a second step we would like to extend the 1-year pilot project to a more long-term study that would include further locations and more detailed scientific testing and engineering analysis. For this step the idea is to include wave flume testing at TAMUG to identify optimal sea weed dune geometries and test different scenarios. It would also include more detailed field measurements on the composition of the dune interior and on hydrodynamic forcing conditions (waves, currents, surge) using field instrumentation to be deployed in the water offshore of the dunes. This step is important to identify the best long-term strategy for Galveston beaches.

Step 3:
This step and step 2 can be attempted in parallel. It would include the mentioned CEPRA application to build a longer section of Sargassum-enhanced dunes along a selected beach (e.g. West End, Bolivar, or other) to create a short-term and long-term benefit by establishing natural-looking dunes and fostering their growth. Please let me know what kind of information you would need from me for the CEPRA application. We can base estimates on the above listed costs but it depends what you would like to have included in the CEPRA project and what exactly the A&M involvement would be. We can certainly provide oversight, planning and students to work on the project in cooperation with the Park Board.

CEPRA ProjectNo.:_____

(Agency Use Only)

PROJECT GOAL SUMMARY (PGS) APPLICATION FORM

For Erosion Response Project Funding Under the
Coastal Erosion Planning and Response Act (CEPRA) Cycle 8

Potential project partners must submit all required information using this form.

Applicant Information

Application Type: ◉ Regular Submission ○ Emergency Submission

If emergency submission, briefly explain the emergency situation the project proposes to mitigate:

PGS Application Submittal Date (mm/dd/yy): **06/26/2013** Date Received:_____
(*Agency Use Only*)

Project Title: **Innovative Technology Seaweed Prototype Dunes**

Name of Potential Project Partner: **Galveston Park Board of Trustees- (Park Board)**

Physical Address: **601 Tremont**

City: **Galveston** Zip+4: **77550**

Point of Contact (POC): **Ms. Kelly de Schaun** Title: **Executive Director- PB**
Dr. Jens Figlus Title: **Assistant Professor- TAMUG**

Phone:**409.797.5141** ext.: Fax: **(409) - 762 – 8911 PB**
409.741.4317 **TAMUG**

Email: **kdeschaun@galvestonparkboard.org PB**
figlusj@tamug.edu TAMUG

Authorizing Official (if different from POC): Title:

Project Type (check all that apply)

- ☐ Beach Nourishment
- ☒ **Dune Restoration**
- ☒ **Shoreline Protection**
- ☐ Marsh Restoration or Protection
- ☒ **Study/Research Project**
- ☐ Debris Removal
- ☒ **Demonstration Project**
- ☐ Storm Damage Mitigation Project
- ☐ Post-Storm Damage Assessment Project
- ☒ **Other (describe): Innovative Technologies**

For Beach Nourishment and Dune Restoration projects only:

Does project incorporate beneficial use of dredged material (BUDM)? ☉ Yes ☐ No

In future application BUDM is possible.

Is a sand source identified for beach nourishment? ☒ Yes ☐ No

The Park Board has a USACE permit for areas adjacent to the Seawall and west of the seawall

If "Yes" to either of the above two questions, please respond to the following:

1. Location of sand source: **Big Reef area adjacent to South Jetty**
2. Owner of sand source: **TGLO- submerged lands**
3. Cost of sand per cubic yard: **Determined by public procurement**
4. Is the source permitted by the US Army Corps of Engineers? ☐ Yes ☐ No If no, please attach, if available:
   a. sieve analysis of sand
   b. chemical analysis of sand
   c. archeological survey of borrow area
5. Quantity of sand available (cubic yards): **Unknown without future core ~1.5M cu/yds.** 6. Describe any availability restrictions: **Must conform to USACE permit conditions**

Project Length For Beach Nourishment and Shoreline Protection projects, linear length (in feet) of project: **~800 to 1,200LF project to be located on east beach adjacent to Apffel Park**

For Marsh Restoration projects, linear length (in feet) and acreage: **N/A**

Project Location

County or counties where project is located:
Galveston

State Representative name(s) /district(s) where project is located:
Hon. Craig Eiland; Texas House District #23

State Senator name(s) /district(s) where project is located:
Hon. Larry Taylor; Texas Senate District #11

US Congressional Representative name(s) /district(s) where project is located:
Hon. Randy Weber; U.S. Representative; 14th Congressional District of Texas

Erosion Rate at Project Location

Describe the erosion rate (feet/year) in the vicinity of the project:
Galveston Island is a historically eroding sand starved barrier island, with erosion rates ranging between -5m. per year west of the Galveston Seawall to accretion rates possibly in excess of +10m. or more per year.

NOTE: Historical average erosion rate data for Texas Gulf-facing shoreline is found in the Texas Shoreline Change Atlas, published online by the University of Texas at Austin Bureau of Economic Geology at http://igor.beg.utexas.edu/SCA/

Funding Summary **Need to confirm project costs and Park Board contribution/participation**

Total CEPRA Funds Requested: **$**

Total Partner Federal Match Funding: **$0**

Total Partner Non-Federal Match Funding: **$**

Total Project Cost: **$**

Sources of Match Funding

In the table below, list secured or potential sources of match funding including any federal funding sources and in-kind services. For each source indicated below, include a signed document on the funding agency's letterhead that indicates approved funding amount; funding availability date; funding expiration date; and other constraints as necessary. **Do not include requested CEPRA Cycle 8 funding in this table**.

Funding Source for Match **Need to confirm costs, contributions**	Cash Amount	In-Kind Amount	Is funding committed for the Cycle 8 biennium? (Y/N)	Funding Availability Date (mm/dd/yy) Ex:02/02/13	Funding Expiration Date (mm/dd/yy)	Other Constraints (describe)
	$	$	☉ Y ○ N			
	$	$	☉ Y ○ N			
TOTALS						

Beach Access and Use Plan/Local Coastal Erosion Response Plan Eligibility

If the local government(s) within whose jurisdiction the study or project is proposed is required to administer a beach/dune program, did the local government submit an approved Erosion Response Plan to the GLO? **YES**

○ Yes ○ No

If yes, name of the local jurisdiction: **City of Galveston**

Hazard Mitigation Eligibility

Is there a Hazard Mitigation Plan in place for the proposed project area? **YES**

☉ Yes ○ No

If yes, name of local jurisdiction responsible for hazard mitigation: **City of Galveston**

Is the proposed project eligible for FEMA disaster Public Assistance or mitigation funds under ☉ Yes ○ No **Yes** the Hazard Mitigation Grant Program?

Engineered Beach/Dune Maintenance and Monitoring

If the project is proposing re-nourishment of an existing engineered beach/dune or if it is for a new engineered beach/dune nourishment, is an ongoing beach/dune maintenance and

Yes No

monitoring plan in place for the proposed project area?

Proposed project would be implemented in coordination with the GLO, and would be monitored by TAMUG.

Project Description (500-word limit)

Provide a narrative of the project description that addresses each of the following:

Describe the location and geographic scope of the erosion problem:

Galveston Island is an eroding sand-starved barrier island located 50 miles southeast of Houston along the upper Texas coast approximately 60 miles from the Louisiana state line, at 29°18'17" latitude and 94°46'30" longitude. This proposed Innovative Technology Seaweed Prototype Dune Project would be implemented in the Apffel Park area on Galveston Island adjacent to the South Jetty. The proposed project area is accreting rapidly, and was one of the factors leading to its selection as the potential project site. Additional site benefits allow the demonstration project the opportunity to be monitored without being subject to immediate wave impacts. Erosion rates range from approximately -5.0m/yr west of the seawall to accretional areas of +10m/yr. per BEG. The majority of Galveston Island is eroding. Project proposes to utilize naturally occurring seaweed that washes ashore and utilize equipment to convert the seaweed into bales.

Describe the desired outcome(s) of the proposed project:

To develop a prototype seaweed core dune with material removed from adjacent beaches and monitored by TAMUG to rate performance, utilizing in-kind contributions from Park Board staff, and a final performance report to document project outcomes.

Discuss any prior erosion response work, including a listing of any known erosion response studies and investigations in the vicinity of the proposed project, and whether the proposed project compliments existing erosion response measures:

Previous erosion response efforts have included veneer nourishments, with supplemental larger projects implemented by the GLO and City of Galveston. Previous dune projects have included both round and rectangular haybale projects and larger geo-textile tube core dune projects constructed west of the seawall.

The proposed project is an innovative technology demonstration project intended to facilitate the removal of seaweed from Galveston area beaches, while not disturbing the upper beach template. Seaweed landings occur on multiple occasions throughout the season, and local capacity for storage of the stockpiled seaweed is limited at best. This project seeks to remove the seaweed in an environmentally sustainable manner and utilize that material to strengthen natural sand dunes. The material removed from the beach will be baled and placed at the vegetation line to facilitate sand covering, with ongoing monitoring conducted by TAMUG.

Describe the proposed work sequencing including, if applicable, whether the proposed project will be divided into phases (e.g. reconnaissance study, preliminary engineering, alternatives analysis/feasibility study, permitting, engineering design, construction):

The following steps would be undertaken after receiving an award in a coordinated effort between TAMUG and the Park Board.

<u>Step 1</u>: Permit clearance: Coordinate possible dune construction with regulatory agencies- USACE, General Land Office, City of Galveston.

Step 2: Build Prototype Dune: Construct prototype dune at East Beach and incorporate a one year monitoring program. The estimated costs for this 1-year pilot project is $135,710.00.

Step 3: Research and Longevity: Monitor dune, extend initial pilot project to long-term study include other locations, more detailed scientific testing and engineering analysis, wave flume testing at TAMUG to identify optimal dune geometries testing different scenarios and detailed field measurements on internal dune composition and hydrodynamic forcing conditions (waves, currents, surge) using field instrumentation deployed offshore of prototype dunes.

Step 4: Project Extension/Monitoring Report: Develop additional demonstration sites, incorporate "seabales" into locations. Develop 6 month and annual monitoring reports, make presentation to the Park Board.

Recommend the preferred erosion response alternative that would address the problem, if known:
Implementation of Prototype Dune Demonstration project.

Project Benefits

Describe the effect and benefits of the proposed project on public safety, access and public infrastructure and property threatened by erosion:
The intent of the "Innovative Technology Seaweed Prototype Dune" project is multifaceted. The proposed project will seek to establish an environmentally sustainable process to remove seaweed from the beach, then incorporating the material into the core of the dunes to alleviate the difficulties with creating "stacking" areas. The lifting of seaweed from the beach will be accomplished without the need to aggressively dig into the beach, reducing the volume of sand disturbed, and left in place. Public infrastructure and property will be protected through the development of the prototype dunes and access will be protected due to the surge suppression protection gained from the dunes.

Describe the effects and benefits of the proposed project on private infrastructure and property threatened by erosion:
Implementation of the "Innovative Technology Seaweed Prototype Dunes Sand Management Plan" is presently intended to be placed in areas fronting public property. However, upon successful implementation the prototype dune areas could be extended into adjacent areas fronting private property. when utilized to help improve surge suppression through the construction of wider beaches and a more healthy dune system will reduce the impacts of storms and increase the storm damage reduction benefits of coastal projects making them more cost beneficial to construct.

Describe the effects and benefits of the proposed project on natural resources threatened by erosion:
When implemented the "Innovative Technology Seaweed Prototype Dunes Sand Management Plan" will identify a more efficient use of materials, and greatly reduce the impact of present beach grooming technologies. Additionally the material is not lost to the beach, but incorporated into the dune to enable it to withstand tidal impacts. Dunes can provide habitat for nesting turtles and foraging habitat for Piping Plovers.

Describe whether the proposed project will provide for the beneficial use of dredged material from the construction and maintenance of navigation inlets and channels of the State: **The proposed project may ultimately result in the beneficial use of dredged material; however, at the**

present time there is sufficient material to be used as encasement for the prototype dunes. Without beginning a BUDM project.

Describe how project costs are reasonable relative to benefits:
The "Innovative Technology Seaweed Prototype Dunes " cost is relatively inexpensive and has the opportunity to result in additional cost savings and increase the resilience of the dunes through the use of seaweed

Project Permitting

List all required local, state, and federal permits that have been or will need to be acquired to undertake the proposed project:

Permit Type	Estimated Date of Receipt (mm/dd/yy) Ex: 02/02/13	Who will obtain permit?
USACE Permit Review	**08/15/2013**	**Review existing with USACE, determine if project activities are within existing Park Board permit**
City of Galveston Planning Commission	**12/2013**	**Pending USACE approval above, Park Board will seek to coordinate permit**
General Land Office	**12/2013**	**Concurrent with Planning Commission**

Elaborate on any known permitting or regulatory issues that will need to be addressed: **The Park Board has permits with the City of Galveston for Beach Maintenance, and two permits with the USACE for beach nourishment and dune restoration. It is unknown at this time if the proposed activities in this PGS will result in additional permit review by the USACE or other Resource agencies.**

For proposed Gulf beach projects, describe how the proposed project will comply with the local beach and dune plan, floodplain administration, and beach access:
The "Innovative Technology Seaweed Prototype Dunes" project for Galveston Island will be coordinated with the City of Galveston Beach Access and Dune Protection Plans and will be vetted with the USACE prior to other activities taking place. The project is required to go through the City of Galveston permitting review process. Permitting requirements established by USACE, General Land Office, and the City of Galveston will be strictly followed.

Project Phasing and Timeline

Is this project a single-phase project or one phase of a multi-phase project?

- (•) Single-Phase Project
- ( ) One phase of a multi-phase project

Can the project or phases proposed in this application be completed between 9/1/2013 and 8/31/2015? **YES**

☑ Yes ☐ No

Describe the phases of the proposed project, if applicable, including a description of the phases that would extend into future funding cycles:
Please see the project description on page #4. Task headings are included below. It is anticipated the project will be a single phase / multi step project and it is not anticipated that any project activities would extend into future funding cycles.

Step 1: Permit Clearance
Step 2: Build Prototype Dune Step 3:
Research and Longevity
Step 4: Project Extension/Monitoring Report

Describe anticipated delays due to permitting timelines, match funding approval/timelines, habitat issues, tourist and bird-nesting season provisions, or approval process timelines from local governing bodies:
It is possible that USACE permitting issues could delay the project, the actual length of the potential delays are unknown at this time. Additionally, work to construct the dune would be implemented in strict observation to the seaturtle nesting windows and Plover guidelines. With the authorization and submission of this Project Goal Summary the Galveston Park Board of Trustees supports and approves of this project as evidenced by their affirmative vote on Tuesday, June 25, 2013.

Does an adequate financial infrastructure exist to maintain the project/perform post-project monitoring following construction?

☑ Yes ☐ No

If yes, please describe:
Yes, the Galveston Park Board of Trustees is a public entity on Galveston Island created by an act of the Texas Legislature in 1963. The Park Board has the necessary financial infrastructure to manage the project and analyze its long term impacts. The Park Board has implemented multiple CEPRA projects in the past and this proposed project will be managed in a similar manner.

Additionally, Texas A & M University on Galveston brings the necessary technical background to monitor the project and the resources to support the monitoring effort. TAMUG is a local project partner and will dedicate the necessary resources to ensure the projects successful implementation and the academic resources to document the process in a verifiable manner.

Public Support/Other Supporting Documentation

Please see attached

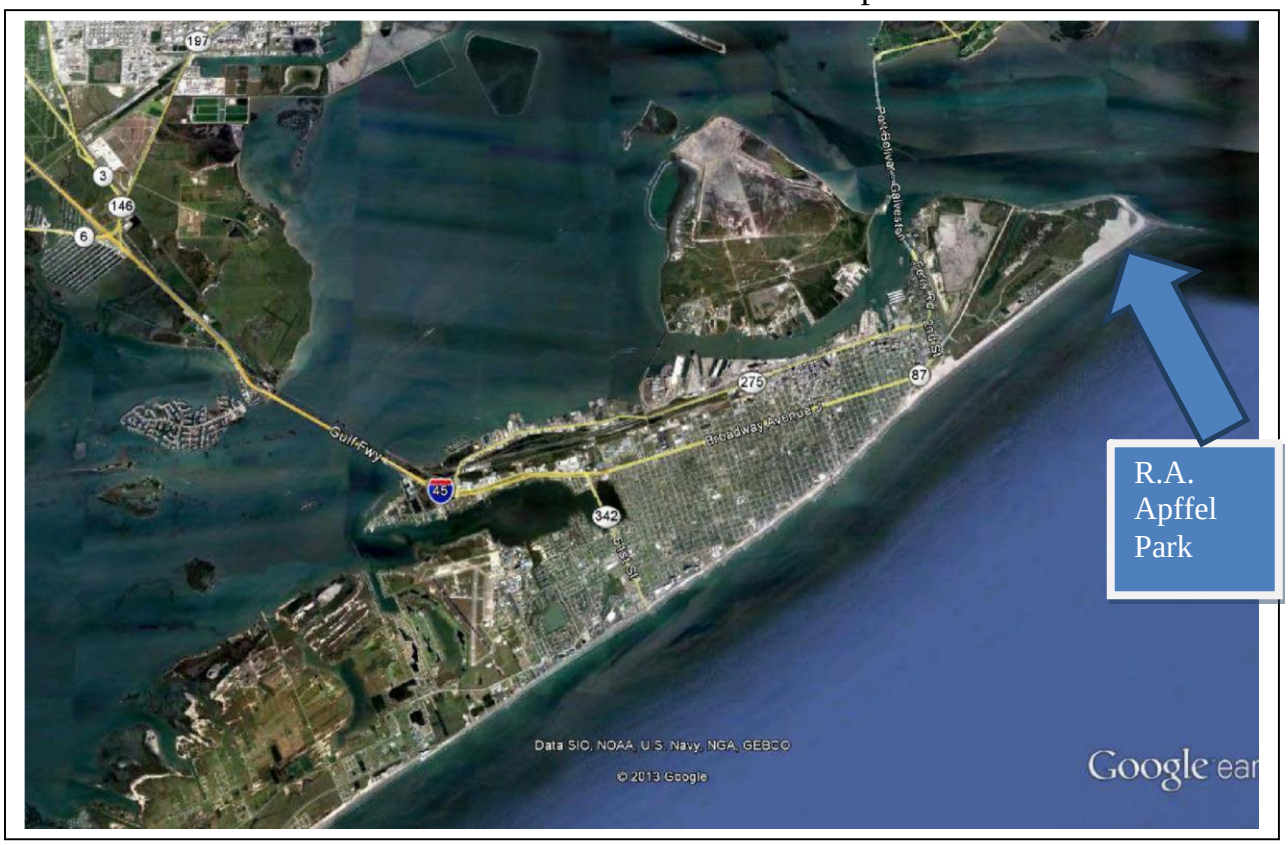
Documentation of Public Support

Attach to this application letters of support you have received from potential co-sponsors, elected officials, affected jurisdictions, and other stakeholders with an interest in and generally documenting support for the project.

Project Location Map

Attach to this application a map with sufficient detail to show the specific geographic location and boundary of the proposed project.

Aerial View of Galveston Island R.A. Apffel Park



R.A. Apffel Park Adjacent to the South Jetty


Boddeker Rd
Apffel Park Rd
Sunrise Ln
Sunrise Rd
E Seaside Dr
Ocean View Dr
Prototype Dune Project Area
© 2013 Google
Google earth

June 16, 2013

Honorable Commissioner Jerry Patterson
Texas General Land Office
1700 N. Congress Avenue
Room 330
Austin, Texas 78701
Via Email: coastalprojects@glo.texas.gov

RE: Letter In Support of the Galveston Park Board's CEPRA Grant Application Entitled: "Innovative Technology Seaweed Prototype Dunes"

Dear Commissioner Patterson,

On behalf of **(insert organization here)** I am sending this letter of support for the Galveston Park Board of Trustees and Texas A & M University's grant application entitled, **"Innovative Technology Seaweed Prototype Dunes"**.

This project is an innovative approach to a problem that has plagued Galveston Island since visitors started coming to the island in the early 1800's and before. Periodically throughout the summer season the beaches on Galveston Island become covered with seaweed, and as it biodegrades it produces an unpleasant odor. Complicating matters is the question of what to do with the seaweed after it is picked-up…? The concept is simple- pick-up the seaweed with as little disturbance to the beach as possible, find a use for the material, and finally, find a method of packaging the seaweed in order for it to be in its new role.

It sounds simple, but it has taken the collective academic abilities of TAMUG to arrive at a simple and practical solution. This project proposes to use haybaling technology to remove the seaweed from the beach, creating "seabales" out of the removed seaweed and using the bales to construct reinforced dunes that will provide surge protection and habitat for endangered species. The Maritime Systems Engineering School is coordinating the project monitoring to verify performance of the constructed dune.

Again, on behalf of **(insert name of organization here)**, I would like to express my support for this project. Should you have any questions, please do not hesitate to contact me at **(insert phone number or email address here).**

Thank you for your consideration of this important project.

Sincerely,

(Insert name and title below signature)