FLORIDA GULF OF MEXICO RESTORATION PROJECT SUBMITTAL FORM

Submit by Email

Form Purpose and Instructions:

- To assist the project proposal and review process, please complete this Submittal Form. Completion of the Form will contribute to the appropriate information being completely and accurately submitted for each project.
- Take as much space as needed for each question, but please keep responses as focused as possible. It may assist you to review all the questions before addressing any one question.
- If you have multiple projects – please submit one Form for each project.
- When you have completed the form hit the submit button in the upper right hand corner. Once your Form is successfully submitted, you will receive a confirmation email from the Florida Department of Environmental Protection.
- Submit all back-up maps, information, etc. to Restoration.Projects@dep.state.fl.us
- To submit updated information, please fill out this form and update fields as needed.

All of the following are **Required Fields** for project updates

New Project ☒ **Update to Previous Submittal** ☐ **Project #**

Project Name Big Bend Seagrass Propeller Scarring Restoration and Boater Education

Contact Information: *(Include at least one name, phone number, email address, and organization name if applicable)*

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Project Location:

(Include a map, if possible, and the city, county, watershed, longitude/latitude dec.deg, Parcel # if Applicable)

We will target areas of seagrass impacted by propeller scars in seagrass beds off Wakulla, Jefferson, Taylor, Dixie, and Levy Counties. Scarred seagrass areas were mapped in 1995 and exist mostly on shallow banks around islands/keys and nearby navigational channels. More recent observations indicate that scarring has generally increased since 1995 and new areas of seagrass scarring have emerged in the Big Bend Seagrasses Aquatic Preserve (Tim Jones, pers. comm., Savanna Barry, pers. obs.). The attached maps (reproduced from Sargent et al. 1995) highlight areas of seagrass scarring that could be targeted for propeller scar restoration. Boater education and improvements to navigational markers will be enacted in coastal communities and around shallow seagrass banks with the most severe damage (e.g., Sandy Hook Key off Crystal River, Little Grassy Key off Steinhatchee, Pepperfish Keys off Dixie County).

Project Description:

(Describe all aspects of the project)

Once seagrass has been scarred by propellers or anchors, natural recovery is very slow or does not occur at all (Zieman 1976, Lewis and Estevez 1988, Durako et al. 1992, Kenworthy et al. 2002, 2006, Whitfield et al. 2002). Propeller scar damage usually requires intervention with one

or more restoration techniques in order to repair existing scarring and prevent expansion of the scar. This typically involves adding material to bring the scarred area back up to grade with the surrounding seagrass and can include additional components, such as transplanting seagrasses to the area or the addition of PVC roosting poles to attract birds that fertilize the area.

This project aims to 1) evaluate variations on the Sediment Tube restoration technique for effectiveness in the Big Bend, 2) produce a set of best practices for propeller scar restoration in the Big Bend region, 3) implement propeller scar restoration in scarring hotspots, and 4) deploy in-water aids to navigation to protect restored areas and expand an existing boater education campaign aimed at reducing the occurrence of new seagrass scars (the Scars Hurt campaign, more at beseagrasssafe.com).

Restoration of propeller scars will be completed with the Sediment Tube method, proven to be effective in returning scarred areas to grade with the surrounding seagrass meadow and encourage natural recovery of seagrasses (Kenworthy et al. 2006, Gesselbracht et al. 2011). This method encourages natural recruitment of seagrasses to the denuded area and is more cost effective than other methods (i.e., seagrass plantings). Sediment tubes have no negative impacts on the surrounding seagrass habitat, as they are biodegradable, highly targeted, deployed by hand, and can be tailored to mimic local conditions. Our first objective is to compare the cost and benefits of different variations on the Sediment Tube restoration technique by evaluating three restoration strategies: Sediment Tube + nutrient amendment, Sediment Tube only, and control. Pilot efforts are currently underway to characterize sediment grain size and nutrient profiles of natural, undisturbed seagrass sediments in the Big Bend. These data will be used to tailor restoration material for the Sediment Tube + nutrient amendment treatment. We hypothesize tailoring the restoration material to local conditions in this way will encourage more rapid colonization and establishment of seagrasses. Propeller scars restored with all three treatments will be monitored quarterly for at least 36 months. Permanent photo quadrats, species composition, percent cover, and shoot density counts will be recorded at each sampling event to track seagrass recolonization and establishment. Restoration cost and relative success of seagrass recolonization will be compared between the three restoration strategies. The results from this effort will be used to complete our second objective of producing a locally tailored guide for propeller scar restoration in the Big Bend. In addition, the broader seagrass restoration effort (objective 3) will be guided by the results of the experimental comparison of techniques in order to maximize the success and cost-effectiveness of the the restoration.

The majority of seagrass scars occur because of poor boater navigation skills, poor marking of navigational channels, intentional use of short cuts, and attempting to get a boat on plane in shallow water or power out after running aground (Sargent et al. 1995, Whitfield et al. 2002, SFNRC 2008). Interviews conducted in April 2016 with local natural resource professionals, local government officials, and state law enforcement officers who work in the Big Bend indicated that seagrass damage mostly occurs because boaters encounter difficulties navigating in the shallow waters of the Nature Coast and lack awareness about the lasting ecological consequences of seagrass damage. Increasing boater awareness and improving aids to navigation have been identified as strategies that are likely reduce seagrass damage in a cost-effective manner (Sargent et al. 1995, SFNRC 2008, Geselbracht et al. 2011). Therefore, a significant boater education and outreach component is included in this project (objective 4). Educational materials about propeller scarring, including boat ramp signage and an educational website, have already been developed by social scientists and Sea Grant extension agents at the University of Florida. These resources, along with shallow seagrass marker buoys, seagrass maps for boaters, seagrass fact sheets, and public seminars (timed to coincide with the recreational scalloping season) will be distributed throughout the study area. The effectiveness of these outreach efforts

will be measured by Sea Grant extension agents, and a pilot effort to this effect is already underway.

Estimated Project Costs:

(Describe the estimated costs of the project, including any assumptions for contingency and ongoing operations/maintenance. Identify other secured funding sources such as matching funds, in-kind contributions or state/federal dollars. In addition, if possible, complete and submit the Cost Appendix Sheet associated with this Form)

The project will cost approximately $891,200 including all direct, indirect, and contingency costs. The majority of the project cost ($435,000) is for the purchase, preparation and deployment of the Sediment Tube restoration material. Planning ($50,000), site selection and reconnaissance ($55,000), and monitoring ($90,000) are the other major costs in the proposed budget. Indirect costs are calculated using the standard University of Florida rate of 26% for off-campus faculty.

Secured funding:
University of Florida Sea Grant Extension Program Mini-Grant: $5,000.00 (funding pilot boater education, permitting, and sediment characterization)
Sea and Shoreline, LLC.: $11,500 In-Kind Contribution - sediment sample processing, engineering expertise, project permitting

Other Funding:

(Indicate if the project is submitted for any potential funding or if it may be used to leverage additional funding, if so, please describe the funding source [e.g. State/Federal Grants])

This project has not been submitted for funding anywhere else.

Technical Feasibility:

(Describe the technologies involved and any relevant past experience or proven success with similar projects)

The Sediment Tube is a proven propeller scar restoration technique. Sediment Tubes are biodegradable cotton tubes filled with sediment that are deployed in propeller scars. Sediment Tubes bring the propeller scars back to grade with the surrounding seagrass, deliver a controlled sediment type and amount to an area, and stabilize the prop scar and prevent further erosion and scour. Sediment Tubes can be tailored to match site-specific sedimentary conditions and typically enhance seagrass recovery relative to untreated scars when paired with other appropriate techniques, such as supplementation of limiting nutrients (Kenworthy et al, 2006).

Savanna Barry, Ph.D., is a Sea Grant Extension Agent with 8 years of experience researching seagrass ecosystems. She has built multiple regional partnerships that will increase the feasibility of the boater education portions of the project and she will recruit citizen volunteers to assist in deploying the Sediment Tubes. She will also assist with the seagrass monitoring portion of the project. Josh Patterson, Ph.D. is Assistant Professor of Restoration Aquaculture with 10 years of experience conducting aquaculture research and evaluating restoration techniques. The project will be carried out in collaboration with Jim Anderson and Carter Henne of Sea and Shoreline,

LLC., who developed and patented the Sediment Tube method. They have extensive experience deploying and monitoring seagrass restoration projects with Sediment Tubes and many other methods. Savanna Barry, Jim Anderson, and Carter Henne have close working relationships with the DEP Big Bend Seagrasses Aquatic Preserve manager and staff. The BBSAP office supports the project and have used Sediment Tubes to restore propeller scars in the past.

Conflicts or Complements to Existing Efforts:

(Describe any ongoing activities in the project implementation area, if the project is part of another plan, and why the project does or does not interfere with that work. Please consider how the project may complement existing local, regional, and state efforts/plans/objectives)

We are not presently aware of any conflicting efforts. This effort is in support of the goals of the FWC (FWC 2012) and many local governments to protect and restore critical seagrass habitats.

Complies with Federal, State, Local, and Tribal Laws/Regulations:

(Describe any concerns or potential conflicts)

Yes, this project complies with all laws and will be permitted by all of the appropriate agencies before implementation.

Readiness for Implementation:

(Describe if the project has had any design or permitting work started or completed [attach permits or design work]. Please address any issues that may delay start or finish of the project)

The permitting work for Sediment Tube application, a pilot boater education program, and the sediment characterization of candidate restoration sites are already underway. We are working with the USACE to obtain an individual permit to apply Sediment Tubes in propeller scars throughout the region. The project received a favorable review in the pre-applicaiton meeting and the permit application will be submitted to the USACE for processing by July 13, 2016.

Environmental Benefits:

(Describe the nature, magnitude, and timing of any environmental benefits attributable to the project. If possible, describe potential environmental performance measures [e.g. pollutant reduction]. Please address any potential environmental impacts associated with implementing or maintaining the project [e.g. loss of a habitat or conversion of habitat from one type to another during implementation])

At least 2,300 acres of seagrasses off Wakulla, Franklin, Taylor, Dixie, and Levy counties are moderately or severely scarred, with some degree of scarring in over 25,000 acres (Sargent et al. 1995). Scarring reduces the resilience and habitat quality of seagasses, making them more vulnerable to loss when other stressors (such as altered water quality or hurricanes) are present (Whitfield et al. 2002). The restoration portion of this project will increase the resilience of seagrasses by reversing propeller scar damage in 2 acres of scars (covering between 10 and 40 acres of damaged seagrasses depending on scarring intensity). In addition, the best practices recommendations we produce will be instrumental in forming a cohesive and successful seagrass restoration strategy for the Big Bend and facilitate further restoration. Finally, the boater education portion of the project will reduce new damage to seagrasses by increasing boater awareness and improving navigational aids around historical scarring hotspots.

This project will not have negative impacts on any other habitats or lead to conversion of one habitat type to another (except to restore seagrass coverage in areas made bare by the impacts of motorized boats).

Economic and Social Benefits:

(Describe the economic and social benefits including those related to the project's improved ecosystem services and any estimates on jobs created or preserved)

Seagrasses perform many ecosystem services that have been valued at approximately $95,600/ha/yr (Blair et al. 2015). This project will restore at least 10 acres (and up to 40 acres) of the most scarred seagrass areas in the Big Bend. The project will facilitate further restoration the rest of the most impacted 2,300 acres of scarred seagrasses by producing regionally tailored restoration guidelines and maintaining a general permit for the work. Restoration of 10-40 acres of scarred seagrasses would secure ecosystem services in this region that amount to a total estimated value between $956,000 and $3,824,000/year. In addition, boater education efforts will reduce the occurrence of new damage and reduce the need for restoration over the longer term, representing an important savings to society.

A major ecosystem service provided by seagrasses is their contribution to productive fisheries. In fact, a large majority of the species targeted by commercial and recreational fisheries in Florida depend on seagrasses for at least part of their life cycle (Seaman 1985). Gulf coast seagrass meadows support lucrative fisheries, such as those for bay scallop (Argopecten irradians) and blue crab (Callinectes sapidus), which are extremely important to local and state economies (Stevens et al. 2004, Mattson et al. 2007). Florida's tourism and fishing industries, in general, are heavily dependent on seagrass ecosystem services (Dawes et al. 2004). Maintaining high quality natural resources is especially important in the rural counties of the Big Bend because these local economies are disproportionately dependent upon activities such as recreational and commercial fishing and wildlife viewing (Southwick Associates 2015). In addition, the rich cultural heritage of many small historical fishing towns in this region is tied to seagrass ecosystem services.

Community Resilience:

(Describe if the project assists Florida's ability to anticipate, withstand, or recover from hazards or threats [e.g. hurricane preparedness, establishing living shorelines])

Living shorelines, including seagrasses, are increasingly recognized as important components of

coastal resilience. Propeller scarred seagrasses are more vulnerable to extirpation during hurricanes and other storms because the rhizome system is degraded and vulnerable to undercutting (Whitfield et al. 2002). Restoration of propeller scars increases meadow integrity and ensures seagrasses continue to perform vital ecological functions such as wave attenuation and sediment accumulation that reduce coastal erosion and contribute to shoreline protection.

Public Acceptance:

(Describe any known or potential public approval or opposition to the project)

There is no known public opposition to this project. Early results from boater interviews indicate that many residents are upset about the propeller scars they observe and want action to be taken to educate visiting boaters and reverse the damage.

Additional Information you wish to provide:

(Please include any maps, designs, drawings, photos or background resources that may assist in completely and accurately understanding the project. If these are too large to attach here, please email them to

Restoration.Projects@dep.state.fl.us

References Cited:

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Cost Appendix Sheet

Cost Item	Cost Estimate
Planning	

Contracts	
Feasibility	
Engineering, Design, Land Rights & Bid Prep	
Restoration Plan	50,000
Site Visits & Cost of Site Selection	55,000
Administration, Overhead and Indirect	180,180
Other	
Planning Subtotal:	285,180

Construction

Contracts	435,000
Administration & Mobilization/Demobilization	
Other	
Construction Subtotal:	435,000

Monitoring

Contracts	
Data Collection	80,000
Monitoring Administration	
Other	10,000
Monitoring Subtotal:	90,000

Project Cost

Supervision	
Subtotal:	810,180
Contingency *(traditionally calculated at 10% of the subtotal)*	81,018
TOTAL:	891,198

Estimated Costs by Year

Year 1	315,000
Year 2	100,000
Year 3	315,000
Year 4	40,000
Year 5	40,000
Year 6	