RESTORE Council Activity Description

General Information

Sponsor:
Texas Commission on Environmental Quality

Title:
Shoreline Protection Through Living Shorelines

Project Abstract:
The RESTORE Council has approved $1,286,250 for planning activities as FPL Category 1 Council-Selected Restoration Component funding for the Shoreline Protection Through Living Shorelines program, sponsored by Texas, through the Texas Commission on Environmental Quality (TCEQ). In addition, the Council is also identifying a separate $10,963,750 implementation component as a FPL Category 2 priority for potential future funding. The program supports the primary RESTORE Comprehensive Plan goal to restore and conserve habitat through the construction of large-scale living shorelines that will stabilize estuarine shorelines and protect large tracts of land and coastal resources along the Texas coast. The program will target highly eroding shorelines along the Gulf Intracoastal Waterway (GIWW), vulnerable bay shorelines, and locations that have been identified as suitable areas for a living shoreline installation. This program will also address degrading coastal structures that need repair, such as critical seawalls, and add living shoreline elements to enhance their protective capabilities. The program will utilize specified criteria for selecting projects that were identified earlier through public meetings and as part of a stakeholder process.

Living shorelines can reduce damage to shorelines by dampening wave action and trapping sediments, elevating shore profiles to a level that will support marsh vegetation. This program will also provide ecosystem services by creating hard structure habitats for fish and oysters, nutrient and sediment removal, seagrass protection, and water quality improvement. Program duration is 4 years.

FPL Category: Cat1: Planning/ Cat2: Implementation

Activity Type: Program

Program: Shoreline Protection Through Living Shorelines

Co-sponsoring Agency(ies): N/A

Is this a construction project?: Yes

RESTORE Act Priority Criteria:
(I) Projects that are projected to make the greatest contribution to restoring and protecting the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast region, without regard to geographic location within the Gulf Coast region.
(II) Large-scale projects and programs that are projected to substantially contribute to restoring and protecting the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast ecosystem.
(III) Projects contained in existing Gulf Coast State comprehensive plans for the restoration and protection of natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast region.

Priority Criteria Justification:

This program meets three of the RESTORE Act Priority Criteria:

1. Projected to make the greatest contribution to restoring and protecting natural resources

This program will protect and restore shorelines and the habitats they provide and discourage the use of traditional armoring methods that impede the development of natural environments. In some cases large tracts of critical marsh habitat will be protected from erosion.

2. Large-scale projects and programs

This program will include a variety of individual, large-scale living shoreline projects along the Texas coast whose combined impacts will be substantial and serve as a demonstration to local communities on the effectiveness of nature-based solutions over traditional armoring techniques. The combined benefits of projects within the program will increase the resiliency of the Texas coast by providing for shoreline stabilization, increased habitat, and a buffer against the effects of storms and sea level rise.

3. Contained in existing Gulf Coast State comprehensive Plans

Most of the prospective projects in this program that were evaluated by the Texas FPL3b working group were sourced from the 2019 Texas Coastal Resiliency Master Plan (TCRMP), the state comprehensive coastal plan for Texas. Each project ranked highly in the TCRMP Tier 1 project list with high scores from the Technical Advisory Committee (TAC) members. The TAC was comprised of coastal experts from state and federal agencies, nongovernmental organizations (NGOs), local governments, academics, and engineering firms (TGLO, 2019).

Project Duration (in years): 4

Goals

Primary Comprehensive Plan Goal:
Restore and Conserve Habitat

Primary Comprehensive Plan Objective:
Restore and Enhance Natural Processes and Shorelines

Secondary Comprehensive Plan Objectives:
N/A

Secondary Comprehensive Plan Goals:
N/A

PF Restoration Technique(s):
Create, restore, and enhance coastal wetlands, islands, shorelines and headlands: Protect natural shorelines

Location

Location:
Texas Coastwide

HUC8 Watershed(s):
Texas-Gulf Region(Neches) - Neches(Lower Neches)
Texas-Gulf Region(Galveston Bay-San Jacinto) - Galveston Bay-Sabine Lake(East Galveston Bay)
Texas-Gulf Region(Galveston Bay-San Jacinto) - Galveston Bay-Sabine Lake(West Galveston Bay)
Texas-Gulf Region(Galveston Bay-San Jacinto) - Galveston Bay-Sabine Lake(Austin-Oyster)
Texas-Gulf Region(Lower Colorado-San Bernard Coastal) - San Bernard Coastal(East Matagorda Bay)
Texas-Gulf Region(Central Texas Coastal) - Central Texas Coastal(East Matagorda Bay)
Texas-Gulf Region(Central Texas Coastal) - Central Texas Coastal(West Matagorda Bay)
Texas-Gulf Region(Central Texas Coastal) - Central Texas Coastal(West San Antonio Bay)
Texas-Gulf Region(Central Texas Coastal) - Central Texas Coastal(Aransas Bay)
Texas-Gulf Region(Nueces-Southwestern Texas Coastal) - Southwestern Texas Coastal(North Corpus Christi Bay)
Texas-Gulf Region(Nueces-Southwestern Texas Coastal) - Southwestern Texas Coastal(South Laguna Madre)
Texas-Gulf Region(Galveston Bay-San Jacinto) - Galveston Bay-Sabine Lake(Sabine Lake)
Texas-Gulf Region(Nueces-Southwestern Texas Coastal) - Southwestern Texas Coastal(North Laguna Madre)

State(s):
Texas

County/Parish(es):
TX - Aransas
TX - Brazoria
TX - Calhoun
TX - Cameron
TX – Chambers
TX - Galveston
TX - Jefferson
TX - Matagorda
TX - Nueces
TX - Orange
TX - San Patricio

Congressional District(s):
TX - 27
TX - 14
TX - 36
TX - 34

Narratives

Introduction and Overview:

The Shoreline Protection Through Living Shorelines program will construct large-scale living shorelines to protect estuarine shorelines and marshes from loss due to erosion along erosional hotspots on the Texas coast. This program may also address degrading coastal protective structures that need repair, such as critical seawalls, and add living shoreline elements to enhance their protection capabilities. Living shorelines can reduce damage to shorelines by dampening wave action and trapping sediments, elevating sub-aqueous shore profiles to a level that will support marsh vegetation. Living shorelines consist of either marsh plantings or oyster reefs alone in low energy environments, or rock breakwaters combined with marsh vegetation in moderate energy environments. This program will provide ecosystem services by creating hard structure habitats for fish and oysters, nutrient removal, sediment retention, seagrass protection, and water quality improvement (Davis et al., 2006; Gittman et al., 2014; Gittman et al., 2016). The program will offer the Texas coast an alternative to hard structuring methods such as sheet piling and bulkheads that result in decreased species diversity, carrying capacity and productivity by preventing the development of critical natural environments like flats, marshes, mangroves, and beaches (Dugan et al., 2011; Dugan et al., 2018; Prosser et al., 2018). A number of factors have contributed to bay and channel shoreline loss, including boat traffic, altered sediment regimes, and increasing rates of relative sea level rise (Sweet et al., 2017; Prosser et al., 2018). As a result, growing numbers of private and public waterfront landowners are looking to harden or armor shorelines to stop or reduce rates of shoreline loss, which has produced a patchwork of bulkheads and riprap along the shore. The length of armored shoreline increased by approximately 376 miles along the Texas coast from the 1990's to 2010's (HRI analysis of ESI shoreline type maps). Unprotected shorelines, however, are vulnerable to storms, floods, land loss, and sea level rise, along with the daily erosive forces of wind, wave, and tidal energy (Kennish, 2001; Lotze et al., 2006; Leonardi et al., 2016).

The construction of living shorelines on the Texas coast will help stabilize shorelines while creating new and protecting existing critical environments. Living shorelines incorporate nature-based solutions to fully or partially reduce the impact of erosive forces while allowing natural processes to take place (Bilkovic et al, 2016; Gittman et al., 2016). Living shorelines work best in lower energy environments such as bay and estuary systems or other protected areas. Living shorelines are designed according to their specific location and contain several natural components that work together, including native or mixed vegetation, oyster reef, and seagrasses. These features can be adaptable, changing and growing over time as conditions change around them. They also increase coastal resiliency by providing effective protection from storm impacts, such as storm surge and storm water flow (Swann, 2008; Smith et al., 2018).

Past successful living shoreline projects implemented in Texas include Clear Lake Forest Park on Galveston Bay and the Shipe Woods living shoreline on Trinity Bay. Both living shorelines were constructed with funding from NOAA and the Galveston Bay Foundation. The two projects are on higher energy, eroding shorelines and include breakwater elements combined with marsh plantings (GBF, 2014).

This program aims to construct individual, large-scale living shorelines that protect large tracts of land and coastal resources, targeting highly eroding shorelines along the GICWW, vulnerable bay shorelines, and locations that have been identified as suitable areas for living shoreline installation. The program will develop a process for selecting locations for living shorelines that builds on Texas' stakeholder driven process for developing the Planning Framework and for selecting preliminary projects for FPL 3b consideration. During this earlier work, county governments, NGOs, and a workgroup made up of Texas Texas Natural Resource Damage Assessment (NRDA) and Texas Coastal Resiliency Master Plan (TCRMP)

representatives submitted 38 projects for FPL 3b consideration. Coastal experts, Harte Research Institute (HRI) staff, and TCEQ staff reviewed the projects and selected 23 for public comment. Among these 23 projects, one project included 21 individual living shorelines that this program will consider for implementation. The 21 independent project sites that were evaluated by the Texas FPL 3b working group were sourced from the TCRMP Tier 1 project list, which were highly scored by a Technical Advisory Committee comprised of local, state, and federal experts and local governments (TGLO, 2019). The TGLO is the state permitting agency for living shoreline projects in Texas and has experience partnering with local NGOs like Galveston Bay Foundation, Matagorda Bay Foundation, and Coastal Bend Bays and Estuaries Program to implement shoreline stabilization projects. Each project may have a different sponsor depending on the region where the project will be implemented.

This program will also consider the living shoreline components of projects that were identified as potential priorities during the Texas FPL 3b development process. A key assessment for project planning will be consideration of the suitability of using living shoreline techniques for specific locations and objectives. The potential sites vary in their coastal setting and may require different methods of living shoreline implementation, described further in the methods section below.

The first year of the program will generally focus on selecting ideal sites for program activities. Year two will consist of engineering and design. Years three and four will span construction and monitoring activities. The cost of a living shoreline project will vary based on size, method used, location, materials, plants selected, permitting and engineering requirements and complexity. Because of the wide array of living shoreline techniques, it's difficult to calculate a standard cost for each project. Although hard stabilization techniques are often preferred by landowners as they typically have well-defined and easily understood cost parameters, less frequently taken into consideration are the hidden costs associated with the structure's gradual failure over their 15 to 20-year lifespan and the significant land loss that can occur as a bulkhead collapses and the land is converted back to open water.

Many factors may affect the cost of a living shoreline, including:
- Permitting and surveying costs
- Engineering and design of the project
- Shipping of materials
- Accessibility and procurement of materials such as recycled shell, reef dome materials, crushed or bagged concrete, limestone, stone, etc.
- Annual or bi-annual project monitoring and maintenance (e.g., additional vegetation plantings, removal of debris at the project site, possible repositioning of structural project components)

The projects within the program will be scalable. Several independent project sites will be identified with distinct line item budgets for each component. The project can be phased with construction at each site. If funded for less than the requested amount, projects within the program can be scaled down (for example, reducing the length of shoreline) or reduced in number.

This program addresses the 2016 update to the Comprehensive Plan by using the best available science for shoreline restoration, developing a monitoring and data management framework, and defining metrics of success of the living shoreline projects. Additionally, this program conforms to the Planning Framework by adhering to the priority to create, restore and enhance coastal wetlands, islands, shorelines, and headlands. The program also has the potential to restore natural processes and build oyster habitat along suitable portions of the Texas coast.

Potential partners could include the Texas General Land Office, who is responsible for non-federal permitting of living shorelines in Texas. The TGLO has identified potential activities included in this program in the 2019 Texas Coastal Resiliency Master Plan. Additional partners could include local NGOs in targeted areas with experience in living shoreline implementation.

Methods:

This program aims to construct large-scale living shorelines on highly eroding shorelines along the GIWW, vulnerable bay shorelines, and locations that have been identified as suitable areas for beneficial placement of dredge materials. The program will develop a process for selecting locations for living shorelines that builds on Texas' stakeholder-driven process for developing the Planning Framework and for selecting preliminary projects for FPL 3 consideration. The geographic scope of this project includes a large portion of the Texas coast and will consider numerous sites along the GIWW and within bay systems. A key component of this program will be identifying the ideal technique for the identified targeted locations. In general, the living shoreline design and implementation process will follow these steps:

1. Identify priority areas and analyze site-specific information
2. Engineering and design
3. USACE & TGLO Permitting
4. Oversee bidding and contractor selection
5. Construction
6. Monitoring and adaptive management.

The type of living shoreline the individual projects in this program will implement must be location specific. Living shorelines are not a one size fits all mechanism - they are versatile and can be designed and tailored to fit the specific conditions at that site (Morris et al., 2018). Site conditions that will affect living shoreline design include water depth, wave energy and the current rate of erosion. Living shorelines can be completed in phases that can be built up over time, as budget allows. For example, planting native vegetation could first be installed along the existing shoreline. Over time and if needed, an offshore breakwater could then be installed for an additional layer of protection.

In general, there are two main living shoreline techniques– soft stabilization and hybrid stabilization. Determining which type of living shoreline is best suited is the first step toward implementation. Each technique works best in a specific set of conditions and has several associated implementation methods to decrease erosion, protect the shoreline and prevent land loss.

Soft stabilization methods are non-structural in nature and involve planting marsh grasses or placing oyster reef along the existing shoreline. In hypersaline parts of the coast, the use of benthic algal mats may be implemented where vascular plants do not grow well (Pulich and Rabalais, 1986). These techniques work best on shallow, low-energy shorelines. Marsh grass planting involves the placement of native plants, such as native low marsh (*Spartina alterniflora*) and high marsh (*Spartina patens*) species, planted along the existing shoreline. Plant roots help hold soil in place and shoots will break small waves and increase sediment deposit. Marsh planting projects may be designed and constructed as a component of a larger project or done as a stand-alone project. Shoreline grading or the addition of sediment may be needed to obtain appropriate elevations, to provide a suitably gradual slope for marsh creation, or to enable a marsh to maintain its elevation with respect to sea level rise. This technique can create a variety of habitats, including salt marsh, a tidal buffer landward of the salt marsh, coastal beach, and mud flat.

Another soft stabilization technique commonly used is creating submerged oyster shell beds by placing a hard substrate, often recycled oyster shells or crushed concrete, limestone, or river rock on the seafloor and seeding them with oyster larvae. The larvae attach to the shells or rocks and begin to grow. Oyster shell-based living shorelines will primarily be an option on the mid-Texas coast. This technique creates habitats such as shellfish reef and structure for fisheries habitat (Scyphers et al., 2011).

Hybrid stabilization methods incorporate the living materials used in soft techniques combined with the construction of breakwater features to provide additional erosion protection and increase sediment retention. This technique is suited for low to moderate energy shorelines. Low-profile breakwaters are constructed nearshore or along the shoreline to break waves, reduce erosion and promote accumulation of sand and gravel landward of the structure (Hardaway et al., 2019). Nearshore low profile breakwaters typically have marsh grass plantings appropriate for salinity and site conditions behind them. Materials required generally include living reef materials (oysters/mussels) or precast concrete forms or stone, typically limestone. Low-profile breakwaters can be irregularly shaped or spaced in a specific pattern and involve placing low-profile stone, bagged concrete or shell bag structures in the water and then plants are added to the march environment behind. The breakwater structures can become valuable substrate for marine organisms, as well as provide shelter and habitat for many fish, crab and other mobile species (Bushek et al., 2016).

Environmental Benefits:

The numerous benefits of living shorelines make them appealing for long-term coastal resiliency planning in suitable settings. Implementation of the program has the potential to protect wetlands, reduce erosion, improve water quality, create habitat, provide land reclamation, and increase coastal resiliency by buffering storm surges (Arkema et al., 2013; Barbier et al., 2013; Manis et al., 2015). Living shorelines are resilient as they mimic natural shoreline processes, having the ability to adapt to changing conditions to endure over time (Mitchell et al., 2019). In addition, strategic placement of shore protection projects will facilitate the use of dredge material for marsh restoration activities.

Living shorelines are also an economical solution as they can cost less to build and maintain and can provide equal or greater protection from erosion than an armored structure (Gittman et al., 2014). Living shorelines can also recover naturally and more quickly after disruptive weather and tidal events than armored options (Gittman et al., 2014; Gittman et al., 2015). Traditional hard stabilization structures can increase erosion to adjacent shorelines whereas living shorelines may increase sedimentation (Sutton-Grier et al., 2018).

Specific methods provide for different environmental benefits. Marsh plantings in particular can increase water infiltration, uptake of nutrients, filtration, denitrification and sediment retention, and recruitment of vegetation (Davis et al., 2015; Kibler et al., 2019). The extensive root systems of marsh vegetation help to retain the existing soil, thus reducing erosion while plant stems attenuate wave energy. A healthy salt marsh may reduce wave energy and provide habitat for many species of plants and animals while maintaining the aquatic/terrestrial interface. Marshes also provide carbon sequestration services, suggesting that the widespread use of living shoreline techniques may provide climate benefits (Davis et al., 2015).

Oyster reefs and breakwater structures can become valuable substrate for marine organisms, as well as provide shelter and habitat for many fish, crab, oysters and other mobile species (Davis et al., 2006; Scyphers, et al., 2011). Reefs and offshore structures also dampen wave energies and increase sediment retention. Because shellfish are filter feeders, oyster reefs can improve water quality (Scyphers, et al., 2011). Living shorelines also contribute to healthy habitat for juvenile fish, which can improve

recreational and commercial fisheries in the area, thus protecting important natural resources that support activities which are critically important to the region's economy such as fishing, hunting, and nature-based tourism (Sutton-Grier et al., 2015).

Metrics:

Metric Title: HR012: Shoreline protection - Miles of living shoreline installed
Target: TBD
Narrative: The goal of this program is to install relatively large scale living shorelines over a broad geographic area to enhance bay shorelines coastwide in Texas. The target is to install living shoreline features within the four-year project timespan, which will provide the maximum benefit to reducing shoreline erosion and preserving the greatest amount of critical environments given the funding amount requested. After project selection and design is complete, a quantitative target of shorelines protected will be set. Texas will provide annual updates to the Council on the length of shoreline features installed and the types of features constructed.

Metric Title: HR014: Habitat restoration - Acres of coastal habitat prevented from eroding
Target: TBD
Narrative: The goal of installing living shoreline features is to reduce or prevent the erosion of coastal environments, including marshes, beaches, mudflats, and uplands. A critical metric of the program's success will therefore be the quantity of critical environments that would have eroded if not for the living shorelines. We do not have a good target at this time of the length and location of shoreline to be protected, and therefore, we do not have a target for amount of habitat not eroded. Once project selections are made, a reasonable target metric will be set. Texas will report to the Council an estimated area of coastal habitats that were prevented from eroding throughout the lifetime of the program and throughout continued monitoring of the program's activities. This metric will be quantified through ground and aerial surveys and comparison to past rates of erosion.

Risk and Uncertainties:

The placement of living shorelines is a widely used marsh protection technique that has proven to be effective and successful in application. However, there are risks and uncertainties to the implementation and success of the program. Short-term implementation risks and uncertainties will vary based on each individual project and its various elements. The most important uncertainties to consider are the longevity of the project, how much sediment will be needed, sea level rise impacts, how the project could affect natural processes like vertical accretion of sediment, impacts on native flora and fauna, and the impacts on the overall functioning of the ecosystem (Bushek et al., 2016). For each project, the risks and uncertainties will be identified once the engineering and design phase has identified the type of project that is suitable for the selected location.

The predominant risk to utilizing breakwaters is relative sea level rise and compaction of soils which lowers breakwater elevation, reducing their effectiveness. Relative sea level rise also has the potential to drown intertidal marsh plantings. In order to help alleviate this risk, relative sea level rise will be incorporated into project design to ensure that elevations remain sufficient to protect the shorelines from erosive forces and to promote sediment trapping to decrease water depths to levels that support marsh vegetation.

A risk in the placement of marsh plantings is identifying the proper vegetation for a site given changing wave energy, water depth and salinity conditions over time. There is the potential for the vegetation to fail to take root and die off, requiring re-planting. Monitoring and adaptive management will decrease these risks. The potential for a storm to strike the site of a project is another risk. For example, the plantings may not be adequately protected from increased wave energy if a breakwater is not constructed or is compromised, requiring the need to re-plant or repair a damaged shoreline.

In addition, risks for implementing living shorelines include identifying a proper design for site-specific conditions. Incomplete geotechnical information regarding substrate stability and data on wave and tidal energy, sea level changes, water quality, and sediment supply can cause a project to be risky. This program will assess each project site for data gaps and for suitability for using a living shoreline technique.

Monitoring and Adaptive Management:

Project monitoring for this program will involve observations for ensuring (1) proper construction, (2) performance, and (3) to support adaptive management (NAS, 2017). Types of monitoring data will include biophysical observations (elevation, morphology, vegetation, hydrologic) of the project and of adjacent areas to serve as reference sites and to detect off site impacts (DWH-NRDA, 2017). Monitoring will occur on semiannual or annual bases for a minimum of two years following project completion.

A successful living shoreline requires maintenance and monitoring (NAS, 2017; Thayer et al., 2005; TGLO, 2020). It is important to recognize that design life may be shorter in the future given changes in sedimentation rates, sea level rise, and other climate change impacts (Thayer et al., 2005). Monitoring the area over time will help determine how well the living shoreline is performing and if it is providing the expected benefits. Before and after testing of the project site will help evaluate project success. Baseline elevations of the vegetation line, structures and other features, as well as documentation of flora and fauna, including quadrat photos, percent land cover, and fauna counts of oysters and other native species, will be measured at the start of the project and compared after the project has been implemented (Bushek, et al., 2016). These observations will continue to be monitored over time. Semiannual or annual project monitoring will enable effective adaptive management actions such as additional vegetation plantings, removal of debris at the project site, and repositioning of structural components (Kreeger and Moody, 2014; GBF, 2019; TGLO, 2020).

To assess how well the shoreline has been stabilized, the elevation at the edge of the marsh and the position of the continuously vegetated shoreline will be monitored (Kreeger and Moody, 2014). Vegetation plantings will be monitored for size, density, area of coverage, the abundance of native species, and wave attenuation performance (NAS, 2017; Thayer et al., 2005). For stone or concrete breakwaters and oyster reefs whose main purpose is shoreline stabilization, the structural integrity will be monitored (Kreeger and Moody, 2014).

Maintenance activities will likely include periodic removal of large debris, such as logs, algae mats, and trash, from the site to protect wetland plants from being smothered. Non-native invasive plants, including invasive *Phragmites*, should be controlled and possibly replaced with native wetland plants and shrubs (Bushek, et al., 2016; Saltonstall, 2002). Plants that are removed or die during the early stages of growth need to be replaced immediately to ensure the undisturbed growth of the remaining plants. After significant growth has occurred, only periodic inspections may be necessary (TGLO, 2020).

Data Management:

Data management for this program is designed to make data publicly available thereby enhancing outcomes and future restoration efforts.

Planning data: During program planning, a variety of existing data and newly acquired data will be gathered. Data in this category includes mostly existing geospatial data on shoreline change rates, land cover, elevation, and ecological data describing past and current environmental conditions. Geotechnical and engineering data with construction specifications are also included.

Project implementation data: These data are needed for determining as-built conditions. Detailed engineering survey data and photography are included.

Post-project implementation data: These data are needed for monitoring performance, informing adaptive management actions, and for improving future projects. They will include a time series of biophysical and engineering data plus hydrological data for understanding trends.

Program activities will identify data used. TCEQ and GRIIDC (Gibeaut, 2016) will work with data users to ensure data are shared when key activities end. GRIIDC is a well-known data repository designed to receive data from a variety of sources and from various scientific and engineering disciplines. GRIIDC will track, curate, and archive data in the GRIIDC repository and make it publicly discoverable and available. Metadata will follow the ISO 19115-2 standard and datasets will be reviewed for completeness and organization to enable reuse.

Collaboration:

Two Texas workgroups were established to provide input on coastal priorities: State & Federal Representatives and Non-Governmental Organizations. On-line and in-person meetings were held to discuss plans to develop Texas coastal priorities and to ensure the public's involvement. A survey was developed that asked for individual's coastal priorities. These surveys were available to the public and were also completed by members of the two work groups. Public meetings were conducted in three coastal cities for the public to present their issues and concerns. Information received from work group meetings, discussions with elected officials, public meetings and the surveys was used to develop a list of priorities to be included in the RESTORE Council's Planning Framework document. These efforts of collaboration will continue throughout the process to develop programs and projects. Work will continue with Texas representatives for NRDA/NFWF to consider leveraging opportunities.

Public Engagement, Outreach, and Education:

The decision to submit this program was based on many months of discussions with workgroups and participation by the public. It began with discussions with the Texas representatives for NRDA & NFWF to identify programs/projects for FPL 3b. This identified list was shared with the two workgroups (State & Federal and NGOs) established for Bucket 2 planning purposes, for their review and comment. County judges in the coastal area also were given the opportunity to identify potential programs/projects for their areas. Using the information compiled as part of this process, a list of 23 projects was posted for public comment on the Texas RESTORE website. In addition, two public hearings were held in coastal cities. In reviewing the comments received, the timing to move forward with proposals, and in discussions with the Texas Governor's staff, it was determined that program rather than project specific proposals would be submitted. The development of the program proposals was done to ensure that projects posted for public comment could be considered in at least one of the program submissions. Much of the work has already been done to identify projects that could be funded within this program.

The process to select FPL 3b grant subrecipients will include the requirement that projects will have to already be vetted by this process or through other public processes such as the GLO's Coastal Resiliency Master Plan, NRDA, or NFWF related activities. The criteria to select the specific projects will include, but are not limited to, the following: addresses issues presented in the program activity description; amounts of funds available for the program; readiness; leveraging opportunities; scalability; risk/benefit ratio; and distribution of funds across the Texas coastline. Notification of the projects selected to receive grant funds will be posted on the Texas RESTORE website. This overall process, including parts already completed and others to be completed during program planning and implementation, will ensure that the ultimate selection of projects for this program are not only consistent with the RESTORE Planning Framework document, but also reflect the ideas that were discussed by the workgroups, the elected officials, the public and the Office of the Governor.

Leveraging:

Funds: TBD
Type: TBD
Status: TBD
Source Type: TBD
Description: As part of the process to initially identify programs for FPL 3b, Texas held discussions with county judges, NGOs, NRDA and NFWF. Projects that are selected for funding in Texas could likely include partnerships leveraging various funds, including RESTORE, NRDA and NFWF monies. All parties have emphasized the need to leverage DWH Oil spill associated funds, as well as other funds, and it is Texas' intent to consider leveraging as a criteria in selecting projects, including the recognition of previous projects and the potential for a new project to add to the cumulative benefits

Environmental Compliance:

Construction involving the discharge of fill into the waters of the United States below mean high tide requires a permit from the U.S. Army Corps of Engineers (USACE). Living shorelines will require Section 10 and 404 permits from the USACE and a submerged lands lease from the Texas General Land Office. The USACE permit process ensures compliance with all applicable federal laws, primarily environmental laws such as the Clean Water Act. Coordination is planned with the USACE and other reviewing agencies such as the Texas General Land Office, United States Fish and Wildlife Service, NOAA, Texas Historical Commission, and TCEQ to address applicable environmental laws, as applicable.

The approved FPL Category 1 portion of this program involves only planning actions that are covered by the Restore Council's NEPA Categorical Exclusion for planning, research, or design activities (Section 4(d)(3) of the Council's NEPA Procedures). The implementation component has been identified as a FPL Category 2 priority for future funding consideration.

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Budget

Project Budget Narrative:
The total budget for this program is $12.25 million. Of that amount, approximately $11,576,250 will be provided to sub-recipients to implement projects selected for this program. TCEQ estimates that it will require approximately $673,750 to support the following: administrative expenses (salary, indirect, travel, fringe, supplies, etc.); hosting & maintenance costs for the Texas RESTORE web site; and for a contract to provide technical assistance to TCEQ staff.

Category 1: $1,286,250

Planning (5%) = $612,500
Project Management (5.5%) = $673,750

Category 2: $10,963,750
Implementation (86.5%) = $10,596,250
Contingency (3%) = $367,500

Data management and monitoring & adaptive management costs are included in the implementation costs.

Since some costs are uncertain depending on the type of individual project ultimately selected, contingency costs are included at this point and could be considered in a project specific budget as appropriate.

Total FPL 3 Project/Program Budget:
$ 12,250,000.00

Estimated Percent Monitoring and Adaptive Management: 0 %
Estimated Percent Planning: 5 %
Estimated Percent Implementation: 86.5 %
Estimated Percent Project Management: 5.5 %
Estimated Percent Data Management: 0 %
Estimated Percent Contingency: 3 %

Environmental Compliance

Environmental Requirement	Has the Requirement Been Addressed?	Compliance Notes (e.g., title and date of document, permit number, weblink etc.)
National Environmental Policy Act	Yes	The FPL Category 1 portion of this program involves only planning actions that are covered by the Restore Council's NEPA Categorical Exclusion for planning, research, or design activities (Section 4(d)(3) of the Council's NEPA Procedures). The implementation component is in Category 2.
Endangered Species Act	N/A	
National Historic Preservation Act	N/A	
Magnuson-Stevens Act	N/A	
Fish and Wildlife Conservation Act	N/A	
Coastal Zone Management Act	N/A	
Coastal Barrier Resources Act	N/A	
Farmland Protection Policy Act	N/A	
Clean Water Act (Section 404)	N/A	
River and Harbors Act (Section 10)	N/A	
Marine Protection, Research and Sanctuaries Act	N/A	
Marine Mammal Protection Act	N/A	
National Marine Sanctuaries Act	N/A	
Migratory Bird Treaty Act	N/A	
Bald and Golden Eagle Protection Act	N/A	
Clean Air Act	N/A	
Other Applicable Environmental Compliance Laws or Regulations	N/A	

Maps, Charts, Figures

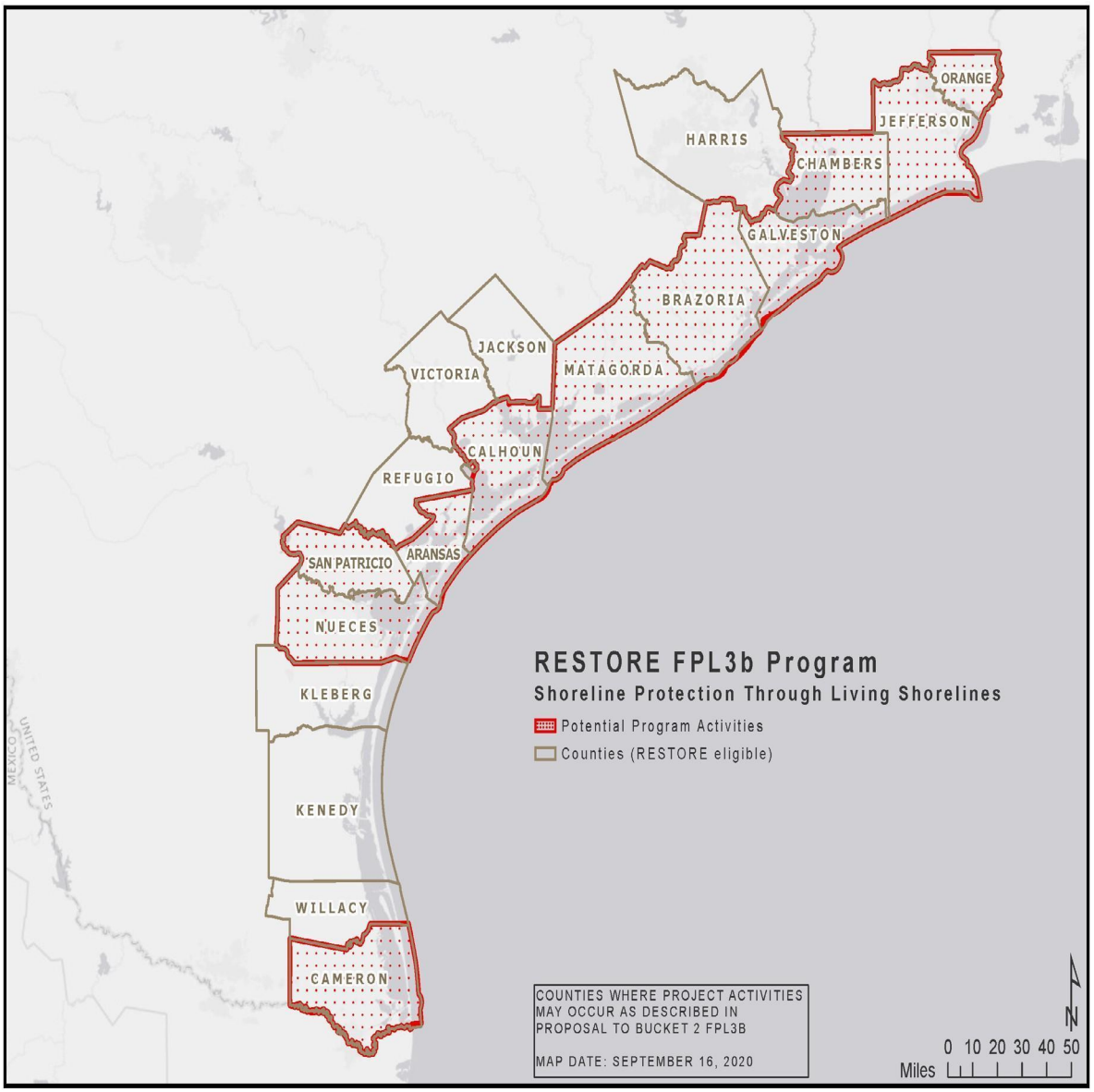

Figure 1: Map of potential program activities.

Other Uploads

Tables_1:
Table_ShorelineProtectionThroughLivingShorelines_Program_20200717.docx
Potential projects, locations, and nominators for Texas' Shoreline Protection Through Living Shorelines program.
Link to Download: http://www.restorethegulf.gov/apps/piper/web/Uploads/Download/proposal/826/42

Tables_2:
Table_ShorelineProtectionThroughLivingShorelines_Program_20200717.docx
Potential projects, locations, and nominators for Texas' Shoreline Protection Through Living Shorelines program.
Link to Download: http://www.restorethegulf.gov/apps/piper/web/Uploads/Download/proposal/827/42