Gulf Coast Ecosystem Restoration Council Planning Framework Draft

April 2019

2019 Gulf Coast Ecosystem Restoration Council Members

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Executive Summary

The Gulf Coast Ecosystem Restoration Council (RESTORE Council or Council) provides this Planning Framework draft for public review and comment as the Council continues to advance its vision for "A healthy and productive Gulf ecosystem achieved through collaboration on strategic restoration projects and programs". This vision statement is included in the Council's *2016 Comprehensive Plan Update: Restoring the Gulf Coast's Ecosystem and Economy* (2016 Comprehensive Plan Update). In addition to this vision statement, the 2016 Comprehensive Plan Update defines foundational goals and objectives and describes the Council's commitment to enhanced collaboration among members, potential funding partners, and the public. The 2016 Comprehensive Plan Update is designed to ensure future Council investments address the highest priority restoration needs of the Gulf of Mexico (Gulf).

Funding has been made available to the Council through the *Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act of 2012* (RESTORE Act). Other *Deepwater Horizon* (DWH) oil spill-related funding sources, including the Deepwater Horizon Natural Resource and Damage Assessment (DWH NRDA) and the National Fish and Wildlife Foundation Gulf Environmental Benefit Fund (NFWF GEBF) also provide funds for Gulf ecosystem restoration. These funding sources present an unprecedented opportunity to restore Gulf ecosystem conditions and functions and represent some of the most substantial investments in landscape-level restoration in U.S. history. Despite this, funds are insufficient to fully address all the needs of the Gulf given the multiple environmental challenges impacting the region. This heightens the need for every dollar to be strategically allocated to maximize restoration benefits.

The Council plays a key role in developing strategies and implementing projects that help ensure the Gulf's natural resources are sustainable and available for future generations. With this responsibility in mind, under the Council-Selected Restoration Component of the RESTORE Act, the Council develops Funded Priority Lists (FPLs) that describe the projects and programs it will fund. Projects and programs funded through this component must be in furtherance of the goals and objectives of the Council's Comprehensive Plan and address at least one of the restoration criteria identified in the RESTORE Act. The first FPL was finalized in December of 2015 and had a strong focus on watershed and estuary restoration and foundational cross-Gulf projects (2015 Initial FPL). A second FPL known as the Commitment and Planning Support FPL (CPS FPL), was finalized in January 2018. Rather than funding specific restoration activities, the CPS FPL dedicates funds over a five-year period to help the Council meet its 2016 Comprehensive Plan Update commitment to increase collaboration in project development.

As the Council turns its attention to developing the next FPL (FPL 3), members are using CPS FPL funds to work with other Council members, potential funding partners (including other DWH funding sources), stakeholders, and the public to generate project ideas that address known environmental challenges and stressors across the Gulf. Members have held numerous

meetings throughout the Gulf to discuss ecosystem restoration concepts and potential techniques to address environmental challenges and stressors in various watersheds, estuaries and broader geographic regions. Project ideas emerging from the collaborative process will be further developed for funding consideration. As stated in the 2016 Comprehensive Plan Update and as a reflection of the increase in available funds dedicated to restoration activities, the Council anticipates that future FPLs will include larger projects than were funded in the 2015 Initial FPL.

This Planning Framework draft is provided to support the Council's commitments to transparency and collaboration, as well as the advancement and use of best available science in the Council's decision-making process. Restoration concepts identified through the collaboration meetings supported by CPS FPL funds are broadly represented herein. The discussion in this Planning Framework draft of priority approaches and associated techniques and their application within geographic areas is intended to provide the public and potential funding partners with an indication of the kinds of projects that are anticipated to be developed for FPL 3 funding consideration.

This Planning Framework draft identifies the following priority approaches in advance of the development of FPL 3:

- Create, restore, and enhance coastal wetlands, islands, shorelines, and headlands
- Protect and conserve coastal, estuarine, and riparian habitats
- Restore hydrology and natural processes
- Reduce excess nutrients and other pollutants to watersheds
- Restore oyster habitat

Details on how these priority approaches may be applied for different geographic areas are also described. The geographic areas described in the Planning Framework draft are:

- Texas
- Chenier Plain, Texas-Louisiana
- Pontchartrain Basin, Louisiana-Mississippi
- Mississippi Sound, Mississippi
- Mobile Bay and Mobile-Tensaw Delta, Alabama
- Perdido Bay and River, Alabama-Florida
- Florida
- Gulfwide

The geographic areas discussed herein vary in size and range from coverage of an entire coastal area of a state to specific watersheds. Included are many geographic areas that cross geopolitical boundaries (including a "Gulfwide" geographic area). To a certain extent, this range reflects the status of FPL 3 planning across the Gulf. In some areas, the planning process may narrow in on specific project ideas, whereas other areas may still be the subject of a broader review of restoration options. These geographic areas additionally reflect the anticipated collaboration between members and across states that may be needed to address broader

issues. Members will identify specific watersheds, estuaries, or ecoregions in FPL 3 and benefits of projects and programs selected for funding will be described within the context of those more specific areas.

The Planning Framework process is not intended to describe all of the restoration needs of the Gulf. Rather, the Planning Framework draft identifies priorities that purposefully and strategically link past and future restoration funding decisions. For example, the Council intends to continue building on previous investments from the 2015 Initial FPL on habitat and water quality, while expanding opportunities to meet other Comprehensive Plan goals and objectives in the future. In this way, the Planning Framework draft serves as a "bridge" between the Council's overarching goals and objectives identified in the 2016 Comprehensive Plan Update and the specific restoration projects and programs approved in future FPLs.

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1. Introduction

1.1. Purpose

The Gulf Coast Ecosystem Restoration Council (RESTORE Council or Council) provides this Planning Framework draft for public review and comment as it continues to advance its vision of "A healthy and productive Gulf ecosystem achieved through collaboration on strategic restoration projects and programs" (2016 Comprehensive Plan Update). This vision is included in the Council's *2016 Comprehensive Plan Update: Restoring the Gulf Coast's Ecosystem and Economy*.

Resolution of civil claims and criminal penalties associated with the 2010 *Deepwater Horizon* (DWH) oil spill has provided an unprecedented amount of funding for ecosystem restoration in the Gulf of Mexico (Gulf). Funding has been made available through the *Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act of 2012* (RESTORE Act), as well as through other DWH-related funding sources, including the Deepwater Horizon Natural Resource and Damage Assessment (DWH NRDA) and National Fish and Wildlife Foundation Gulf Environmental Benefit Fund (NFWF GEBF). However, those funds are not sufficient to adequately address all the environmental challenges that exist in the Gulf. As the Council proceeds with its ecosystem restoration activities, collaboration, planning, project selection, implementation, and monitoring are needed to ensure that these funds are used as effectively as possible.

This Planning Framework draft is another step toward meeting the RESTORE Council's commitments to the following:

- A regional ecosystem-based approach to restoration
- Leveraging resources and partnerships through increased collaboration
- Increasing public engagement, inclusion, and transparency regarding the Council-Selected Restoration Component[1] (commonly referred to as "Bucket 2") funding decisions
- Advancing science-based decision-making
- Delivering results and measuring impacts

This Planning Framework draft describes the Council's current focus on building the next Funded Priorities List (FPL), anticipated to be released in 2020. This draft document is not intended to describe all Gulf restoration needs. Rather, it is intended to serve as a "bridge" between the broad goals and objectives set forth in the Comprehensive Plan and specific projects and programs approved for funding in FPLs, as well as bridging funding decisions

[1] The RESTORE Act distributes amounts available in the Gulf Coast Restoration Trust Fund into five components. This Planning Framework is relevant to the component referred to as the Comprehensive Plan Component in the Treasury Regulations (USDT 2015).

between FPLs. The complexities associated with Gulf ecosystem restoration necessitate some flexibility in decision-making. The Council will therefore evaluate all proposals received for funding consideration and may choose to fund projects that are not captured within the restoration concepts outlined in this Planning Framework. This could include priority restoration activities of federally recognized tribes that have interests in the Gulf (tribes). Tribes could develop and propose their own restoration projects in coordination with a federal Council member. Though only Council members may submit project proposals and receive Bucket 2 funds, federal Council members may also submit proposals on behalf of federally recognized tribes.

1.2. RESTORE Act and Council-Selected Restoration Component

In July 2012, enactment of the RESTORE Act established the RESTORE Council, which includes the governors of the States of Alabama, Florida, Louisiana, Mississippi, and Texas; the Secretaries of the U.S. Departments of Agriculture (USDA), the Army, Commerce (DOC), Homeland Security (DHS), and the Interior (US-DOI); and the Administrator of the U.S. Environmental Protection Agency (EPA). Per the Council's standard operating procedures (RESTORE Council 2016), limited authority may be delegated to appointees of the governors and the secretary or administrator serving as chair. A Steering Committee led by the chair and an annually rotating state co-chair has been established to handle many of the delegated activities.

The RESTORE Act allocated 80 percent of Clean Water Act penalties paid from the DWH oil spill to the Gulf Coast Restoration Trust Fund (Trust Fund). Of the funds deposited into the Trust Fund, 60 percent is managed by the Council via two different restoration "components." One of those components, the Council-Selected Restoration Component (commonly referred to as "Bucket 2"), will receive 30 percent of the funds plus half of all interest from the Trust Fund to implement the Council's Comprehensive Plan to restore the ecosystem and the economy of the Gulf Coast Region. The Gulf Coast Region has been defined to include all federal waters in the Gulf of Mexico, all lands within the coastal zones as defined by the Coastal Zone Management Act, and any adjacent land, water, and portions of watersheds within 25 miles of the coastal zone (USDT 2015,CZMA 1972). Restoration activities funded through Bucket 2 must primarily benefit habitats and environmental resources within the Gulf Coast Region.

Funds are provided by the resolution of claims against three entities in association with the DWH oil spill. On January 3, 2013, the United States announced that Transocean Deepwater Inc. and related entities had agreed to pay a $1 billion (plus interest) Clean Water Act civil penalty in connection with the DWH oil spill. In accordance with the agreement, Transocean has paid all three of its installments of civil penalties plus interest to the U.S. Department of Justice. The U.S. Department of Justice has transferred 80 percent of these funds to Treasury for deposit into the Trust Fund, totaling $815 million. On November 20, 2015, a federal Court in New Orleans, Louisiana ordered Anadarko Petroleum Corporation to pay a $159.5 million Clean Water Act civil penalty in connection with the DWH oil spill. Of this amount, $128 million, including interest, has been deposited into the Trust Fund. On April 4, 2016, a federal court in New Orleans entered into a Consent Decree between the United States, the five Gulf States and

BP Petroleum and Exploration, Inc. (BP) that resolved the civil claims against BP in connection with the DWH oil spill (United States vs. BPXP et al.). Under the Consent Decree, BP will pay a $5.5 billion (plus interest) Clean Water Act civil penalty, payable over 15 years.

The funds provided to the RESTORE Act components under the Consent Decree are deposited into the Trust Fund each April over the 15-year period; thus, the funds available each year are an increment of the ultimate total. Payments to the Trust Fund began in 2017 and will continue through 2031. Annually, $91.01 million of the total payment will be provided for Bucket 2; the only exception was in 2018, when $45.52 million was provided, per the Consent Decree. The total ultimately dedicated to Bucket 2 will be approximately $1.6 billion ($1.32 billion plus interest from the Consent Decree and $296.33 million plus interest from the Transocean and Anadarko settlements).

In selecting projects and programs under Bucket 2, the RESTORE Act requires the RESTORE Council to give the highest priority to activities that address one or more of the following criteria:

1) 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.

2) 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.

3) 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.

4) Projects that restore long-term resiliency of the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands most impacted by the Deepwater Horizon oil spill.

1.3. Council-Selected Restoration Component Comprehensive Plan and Funded Priorities Lists

As required by the RESTORE Act, the RESTORE Council released the *2013 Initial Comprehensive Plan: Restoring the Gulf Coast's Ecosystem & Economy* (2013 Initial Comprehensive Plan). The Council's strategy for achieving a healthy Gulf is founded on the five Comprehensive Plan goals that address habitat, water, marine resources, community resilience, and the Gulf economy. In the 2013 Initial Comprehensive Plan, the Council committed to an overarching framework for an integrated and coordinated approach to region wide Gulf Coast restoration and to help guide the collective actions at the local, state, tribal, and federal levels.

The Council approves Bucket 2 funding for projects and programs through the development of FPLs. Projects and programs funded through this component must be in furtherance of the goals and objectives of the Comprehensive Plan and meet at least one of the above-mentioned criteria identified in the RESTORE Act.

The Council approved the Initial FPL in December 2015 (2015 Initial FPL). With this FPL, approximately $156.6 million from the Transocean and Anadarko settlements was approved for restoration and conservation activities that focus on habitat and water quality based on a watershed or estuarine approach, as well as several Gulfwide projects. These activities are intended to provide near-term "on-the-ground" ecological results, while also building a planning and science foundation for future success of projects.

A review of the process used to develop the 2015 Initial FPL was conducted that included both Council member and public input. Following completion of these reviews, the Council developed the *2016 Comprehensive Plan Update: Restoring the Gulf Coast's Ecosystem & Economy* (2016 Comprehensive Plan Update), which is intended to improve upon future actions and decisions by:

- Ensuring consistency with the Priority Criteria referenced in the RESTORE Act
- Reinforcing the Council's goals, objectives, and commitments
- Setting forth a 10-Year Funding Strategy, including a Council vision for ecosystem restoration
- Increasing collaboration among Council members and partner restoration programs
- Refining the process for ensuring that the Council's decisions are informed by the best available science
- Improving the efficiency, effectiveness, and transparency of Council actions

To that end, the Council approved a second FPL in January 2018, referred to as the Commitment and Planning Support FPL (CPS FPL). Rather than funding specific restoration projects or programs, the CPS FPL dedicates funds over a five-year period to help Steering Committee members meet 2016 Comprehensive Plan Update commitments and develop potential areas for proposal development for the next FPL, FPL 3. This began with collaborative discussions during Steering Committee meetings in Florida (April 2018), Mississippi (July 2018), Alabama (September 2018), Texas (November 2018), and Louisiana (February 2019). Council members used CPS FPL funds to pay for travel to these meetings and to develop and implement processes for working with potential funding partners (including other DWH funding sources), stakeholders, and the public to generate project ideas in support of the next FPL. Meetings were held by members throughout the Gulf to discuss ecosystem restoration concepts and potential techniques to address environmental challenges and stressors in various watersheds, estuaries and broader geographic regions. Additionally, the State of Louisiana chose to invest some of its CPS FPL funds in a Gulfwide stressors analysis. Most Council members are still in year 1 of 5 of their CPS awards and will continue to use funds to hold similar meetings as restoration concepts are developed into proposals for funding consideration. The restoration concepts identified through the activities supported by CPS funds are broadly represented in this Planning Framework draft.

The RESTORE Council intends to develop FPLs approximately every three years until all funds in the Trust Fund are committed. Under its current authorities, the Council can only commit funds actually in the Trust Fund. Thus, approved restoration projects and programs for an FPL cannot exceed the total available balance of the Trust Fund at the time the FPL is finalized. In the development of FPL 3, the Council will select projects and programs not to exceed approximately $360 million. This represents the amount of funds anticipated to be available in the Trust Fund in mid-2020, when the Council plans to vote to approve FPL 3.

1.4. The Planning Framework: A "bridge" linking investments and projects to Comprehensive Plan goals and objectives

The Planning Framework is a new element of the FPL process and is being used for the first time in the development of FPL 3. As noted above, this Planning Framework draft is intended to serve as a "bridge" between the Comprehensive Plan and FPLs, and from one FPL to the next. The Planning Framework strategically links past and future restoration funding decisions to the overarching goals and objectives outlined in the 2016 Comprehensive Plan Update. As the 2015 Initial FPL focused on Comprehensive Plan goals related to habitat and water quality, the Planning Framework draft provides an indication of the types of resources, habitats, and geographic areas where the RESTORE Council will focus in FPL 3 in advance of selecting projects and programs. In this way, this Planning Framework draft indicates priorities designed to continue building on previous investments in habitat and water quality, while expanding opportunities to meet all Comprehensive Plan goals and objectives in the future.

While this Planning Framework draft was developed to support decision-making for FPL 3, the Council views it as a "living" document that may be broad enough to serve as a foundation for future FPLs. As part of the process of developing future FPLs, this Planning Framework will be reviewed and revised as needed to incorporate outcomes and lessons learned from previously implemented projects (including monitoring data from previously implemented projects), scientific and technical developments, changing policy, public input, and other planning considerations. In addition to RESTORE Act activities, the Council will consider restoration activities funded by DWH NRDA, NFWF GEBF, and other restoration efforts in the Gulf of Mexico region as it determines future funding priorities.

The Planning Framework could be refined or even substantially altered during the development of future FPLs, depending upon the evolution of restoration progress or supporting scientific information. For example, the Planning Framework might begin by focusing on improving water quality and/or quantity as well as oyster habitat restoration in a particular geographic area. Through the process of developing and implementing FPLs, it may be determined to first focus on improving water quality and/or quantity conditions until such time that it is determined that oyster restoration would be viable. At that point, the Planning Framework might be modified to focus on restoring oyster habitat in the given geographic area. This change in focus would reflect an understanding that the previous water quality and/or quantity investments have resulted in conditions that increase the likelihood of success of the oyster restoration work. In this way, the Planning Framework is intended to support adaptive management based upon past successes and lessons learned.

1.5. Public Input Request

On April 26, 2019, the RESTORE Council began a 45-day public review and comment period on the Planning Framework draft, that will conclude at 11:59 pm MDT on June 12, 2019. The Planning Framework draft is available at www.restorethegulf.gov. The RESTORE Council will host and record two live public webinars on April 29, 2019. A recording of the presentation and a list of all questions and responses will be posted at www.restorethegulf.gov. In order to give the public additional opportunities to learn about the Planning Framework draft, ask questions, and provide comments, the RESTORE Council also will host public meetings in each of the Gulf Coast states during the public comment period. If you are interested in receiving notification of upcoming webinars, subscribe to our eBlasts, the RESTORE Council's automatic email alert system, at http://www.restorethegulf.gov/contact-us and select the Public Meetings or Public Comment Periods category in addition to other categories of interest.

During the comment period, the public is given the opportunity to review and comment on this Planning Framework draft before proposals are developed for FPL 3 funding consideration. Our goal is to identify which approaches and geographic areas are most appropriate to prioritize at this time. Upon completion of the public comment period, the Council will consider all comments as it finalizes the Planning Framework and develop a Response to Comments document. Both the final Planning Framework and Response to Comments documents will be made available to the public on the Council's website (www.restorethegulf.gov).

Right now, the Council is only soliciting comments on the Planning Framework draft. Once the Planning Framework is completed, the Council members will submit and develop specific project and program proposals for potential inclusion in FPL 3. Those proposals will be made publicly available on the Council's website (www.restorethegulf.gov). Once the Council has drafted FPL 3, the public will have an opportunity to comment before the final list of projects is approved for funding.

Public input is a critical part of the RESTORE Council process for finalizing the Planning Framework, leading up to development of FPL 3. Beginning April 26 through 11:59 pm MDT June 12, 2019, the public can provide feedback using one of the following options:

- Go to www.restorethegulf.gov for
  - Online link to the Planning, Environment and Public Comment (PEPC) site
  - In-person public meetings schedule
- By mail:
  Gulf Coast Ecosystem Restoration Council
  Attention: Planning Framework Comments
  500 Poydras Street, Suite 1117
  New Orleans, LA 70130
- By email to restorecouncil@restorethegulf.gov

2. Planning Framework

2.1. Planning Framework Organization

This section describes the elements of the Planning Framework draft.

Development of Priority Approaches and Geographic Areas

Through use of CPS FPL funds, RESTORE Council members held collaboration meetings with one another, potential funding partners, and the public. As a result of these discussions, and reviews of relevant restoration plans and work in other restoration programs throughout the Gulf of Mexico (e.g. other RESTORE Act programs, DWH NRDA, NFWF GEBF), the Council identified the broad categories of restoration activities, which it describes as, "priority approaches and techniques" that will be considered in FPL 3. The Council also identified geographic areas in which those priority approaches and techniques may be applied. Together, they signal the resources, habitats, and general locations that the RESTORE Council may consider when selecting projects and programs for future funding.

Priority Approaches and Techniques

The Council's Comprehensive Plan goals and objectives can be met through actions called "priority approaches". Priority approaches are themselves achieved by various kinds of restoration activities termed "techniques" that can provide particular ecological benefits. Within the Planning Framework draft, the Council has identified priority approaches and techniques that support the Comprehensive Plan goals and objectives (Figure 2.1.1). For example, the objective to "restore, enhance, and protect habitats" is supported by the priority approach "Create, restore, and enhance coastal wetlands, islands, shorelines, and headlands." Within this priority approach, techniques could include sediment placement to rebuild marsh or using breakwaters to protect natural shorelines.

The Planning Framework draft identifies techniques based on relevance to particular Comprehensive Plan goals and objectives, potential for cascading benefits, scientifically-supported reliability and impact, broad geographic applicability, and unique ability to meet specific regional challenges and achieve desired outcomes. Given that each FPL project or program is proposed to address a particular Comprehensive Plan goal and objective – designated its "primary goal" and "primary objective" – the Planning Framework draft identifies the primary goal(s) and objective(s) that each technique may be employed to support. Like the projects or programs it may comprise, a technique can have additional or cascading benefits to other Comprehensive Plan goals and objects – designated as potential "secondary" goals and objectives in the Planning Framework draft.

The following two Comprehensive Plan objectives are-cross cutting. They can support the other Comprehensive Plan objectives and can be supported by all of the priority approaches and techniques:

- "Promote natural resource stewardship and environmental education" (Natural resource stewardship)
- "Improve science-based decision-making processes" (Science-based decision-making).

The Planning Framework draft does not attempt to identify all techniques that could support natural resource stewardship or science-based decision-making objectives, but instead highlights the types of activities that could be funded to help meet these objectives (see the Gulfwide geographic area Section 2.3.8 for details).

Details on each of the selected priority approaches, including corresponding techniques, can be found in Section 2.2. The five priority approaches under this Planning Framework draft are:

- Create, restore, and enhance coastal wetlands, islands, shorelines, and headlands (Section 2.2.1)
- Protect and conserve coastal, estuarine, and riparian habitats (Section 2.2.2)
- Restore hydrology and natural processes (Section 2.2.3)
- Reduce excess nutrients and other pollutants to watersheds (Section 2.2.4)
- Restore oyster habitat (Section 2.2.5)

Other restoration programs have identified additional approaches (e.g., DWH NRDA 2016a). However, the priority approaches presented in this document are those that the Council has identified through its collaboration activities that support the goals and objectives of the 2016 Comprehensive Plan Update. The terminology and classification scheme for organizing techniques into approaches was adapted from DWH NRDA (2016a) and modified where appropriate to accommodate use by the Council. Adopting this shared paradigm is intended to ease evaluation of restoration progress across programs and promote communication among all stakeholders. Minimizing barriers to communication will also allow improved coordination, leveraging, assessment, adaptive management, and other efficiencies.

Geographic areas

The geographic areas described in the Planning Framework draft are a step toward identifying priority watersheds and estuaries for investment to meet Comprehensive Plan goals and objectives (Figure 2.1.2). In the 2015 Initial FPL, the Council focused in part on key watersheds and estuaries to concentrate its resources for greatest effectiveness (2015 Initial FPL). The RESTORE Council further committed to using a watershed/estuary-based approach to restoration in the 2016 Comprehensive Plan Update, and this remains a strategic planning principle for FPL development.

The geographic areas discussed herein vary in size and range from specific watersheds to coverage of an entire coastal area of a state. Included are many geographic areas that cross geopolitical boundaries (including a Gulfwide geographic area). To some extent, this range reflects the status of FPL 3 planning across the Gulf. In some areas, the planning process may be narrowing in on specific project ideas, whereas other areas may still be the subject of a broader review of restoration options. In addition, these geographic areas reflect the anticipated

collaboration between members and across states that may be needed to address broader issues. Members will identify specific watersheds, estuaries, or ecoregions in the FPL and benefits of projects and programs selected for funding will be described within the context of those more specific areas.

Details on how priority approaches may be applied for different geographic areas can be found in Section 2.3. The geographic areas described in the Planning Framework draft are:

- Texas (Section 2.3.1)
- Chenier Plain, Texas-Louisiana (Section 2.3.2)
- Pontchartrain Basin, Louisiana-Mississippi (Section 2.3.3)
- Mississippi Sound, Mississippi (Section 2.3.4)
- Mobile Bay and Mobile-Tensaw Delta, Alabama (Section 2.3.5)
- Perdido Bay and River, Alabama-Florida (Section 2.3.6)
- Florida (Section 2.3.7)
- Gulfwide (Section 2.3.8)

The geographic areas provide linkages between understood needs and stressors of an area and how they may be addressed via the priority approaches and techniques under consideration by the Council. They also support more detailed future project planning within the context of regional ecosystem challenges.

Figure 2.1.1. *Supporting Comprehensive Plan goals and objectives via priority approaches and techniques. Techniques are given by bullet points beneath priority approaches. All investments the RESTORE Council will make in the next round of funding may not be captured, including activities of federally recognized tribes with interests in the Gulf, and activities with the primary objective "Promote natural resource stewardship and environmental education" or "Improve science-based decision-making processes" (*).*

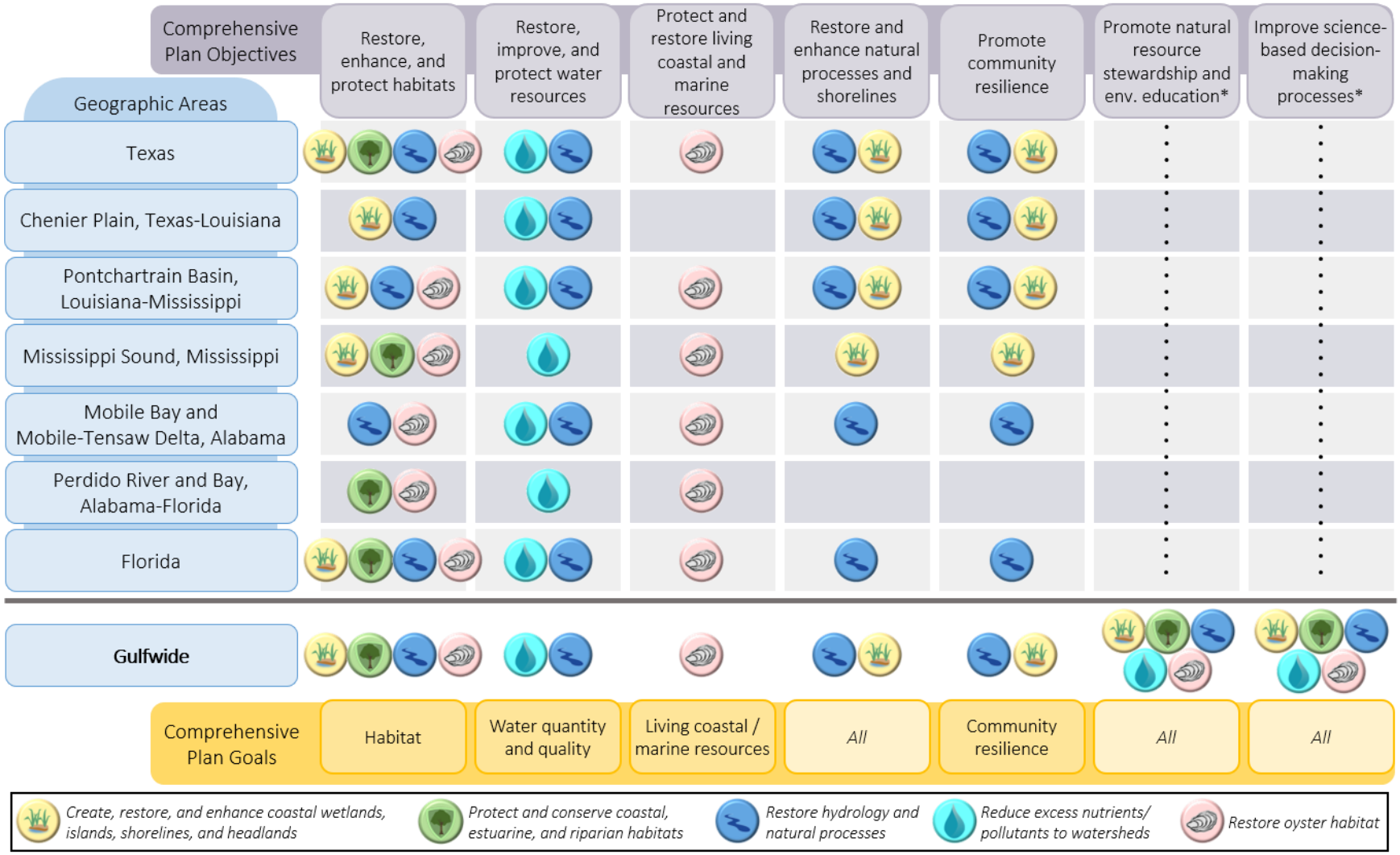

Figure 2.1.2. *Supporting Comprehensive Plan goals and objectives via priority approaches in different geographic areas. For each geographic area, icons representing the priority approaches of interest indicate corresponding primary goals/objectives. All investments the RESTORE Council will make in the next round of funding may not be captured, including activities of federally recognized tribes with interests in the Gulf, and activities with the primary objective "Promote natural resource stewardship and environmental education" or "Improve science-based decision-making processes" (*).*

2.2. Priority Approaches and Techniques for Restoration

2.2.1 Create, restore, and enhance coastal wetlands, islands, shorelines, and headlands

Comprehensive Plan goals and objectives

This priority approach supports the following Comprehensive Plan goals and objectives:

Primary goals:

- Restore and conserve habitat
- Enhance community resilience

Primary objectives:

- Restore, enhance, and protect habitats
- Restore and enhance natural processes and shorelines
- Promote community resilience

By addressing degradation or retreat of shorelines and tidally influenced habitats through supplementing sediment inputs, invasive species control, restoring natural sedimentation processes or implementing measures to reduce shoreline erosion, the Council aims to protect important habitats and coastal processes. These activities can also indirectly benefit living coastal and marine resources while increasing the resilience of communities that rely on them and improving resilience to future spills and other acute stressors.

Background

Coastal and nearshore environments of the Gulf of Mexico include a vast, biologically diverse collection of interrelated habitats, many of which have been degraded in recent decades, including impacts from the DWH oil spill. These habitats are ecologically and socially valuable (Galbraith et al. 2002, Möller et al. 2014, Sheaves 2009). This value is enhanced when considering the ecological connections of these ecosystems (Britton and Morton 1998, Cicchetti and Diaz 2002, Sklar and Diaz 1998). Sediment, nutrients, and food resources move between these ecosystems creating multiple, cascading benefits that enhance overall ecosystem productivity.

In many situations, the compounding effects of multiple stressors initiate the loss of intertidal and wetland habitats, and the retreat of shorelines (Turner 1997). Across the Gulf Coast states, coastal land loss is occurring primarily because of increasing wave impacts, loss of sediment supply, sea level rise, natural changes in the coastal system, and as a consequence of human activities (Morton 2003). Between 50 and 90 percent of shorelines in Gulf Coast states (50 percent in Florida, 90 percent in Louisiana) are experiencing both long-term and short-term erosion (Morton, Miller and Moore 2005). This increases the need to prevent or slow these effects through habitat restoration efforts.

Techniques that could be used to combat loss and degradation of shorelines, intertidal habitats and other coastal wetlands include: protecting shorelines from wave energy, supplementing sediment supply or vegetation loss, restoring wetland integrity through invasive species control, and attempting to counteract the effects of sea level rise. The specific technique chosen depends on a number of critical factors related to the habitat targeted for restoration and the suite of stressors causing the degradation of the habitat. A primary consideration relates to the underlying stressors behind the habitat change. For example, beaches and headlands may require repeated placement of sediment to maintain the desired ecosystem services in the face of continual erosion and sea level rise. In other instances, a one-time sediment placement may be viewed as a single beneficial step to slow the eventual loss of habitat or to allow more time for species and communities to adapt.

The coastal restoration techniques considered here by the RESTORE Council have been used extensively in the past throughout the northern Gulf of Mexico. For those techniques with which the Council has less experience, it will rely on best available science and adaptive management to address critical uncertainties (Hijuelos and Hemmerling 2015). Even with well-practiced techniques, uncertainties can arise given the dynamic nature of these coastal environments. Using tools such as ecosystem modeling and monitoring that incorporate best available science will provide insights into the nature and extent of these uncertainties, allow the Council to implement the most effective projects, and allow these projects to adapt and continue to be effective under changing conditions over time.

FPL 3 potential restoration techniques

The RESTORE Council is considering the following habitat creation, restoration, and enhancement techniques in geographic areas where impacts such as habitat loss and degradation represent a primary ecosystem stressor.

Sediment placement

This technique could include replacing lost or degraded coastal habitats which provide habitat for commercially, recreationally, and ecologically important species (e.g., fish and shellfish). This technique would restore wetlands, islands, and shorelines by placing dredged material into shallow water habitats (Stagg and Mendelssohn 2010). Dredged materials are soil, sand, or sediment material at the bottom of natural water bodies such as rivers, bays, and the open Gulf, as well as harbors and waterways that must be excavated for navigation or other sediment management purposes. Placing these dredged materials along degraded areas can raise elevation to heights needed to sustain native vegetation or re-establish the appropriate shoreline or barrier island profile.

The concept of using materials derived from existing dredging activities for such work as marsh creation is commonly known as “beneficial use”. In the 2015 Initial FPL, the Council invested in projects that implemented or developed plans for how to implement beneficial use in Mississippi, Texas, and Alabama (2015 Initial FPL). The technique has been similarly applied with funding from other organizations such as the NFWF GEBF. Additionally, the Gulf of Mexico Alliance supported the development of the Regional Sediment Management Master Plan for

the Gulf region (Byrnes and Berlinghoff 2012). Future investment in employing the sediment placement technique would allow the Council to consider ways of building off of existing efforts through complementary projects and programs addressing habitat losses and needs.

In many cases, native vegetation will naturally recolonize restored coastal areas once the appropriate elevation has been achieved (Edwards and Mills 2005). However, in some instances, more rapid establishment of desired vegetation cover can be achieved through seeding, propagating, and transplanting plants from nearby existing habitats or nursery grown plants (USFWS 2006). To enable habitat recovery, projects should aim to establish or re-establish the tidal hydrology, salinity gradients, native vegetation, and habitat-dependent animal communities that are characteristic of natural, undisturbed coastal habitats.

Protect natural shorelines

The primary purpose of this technique is to reduce or prevent shoreline retreat and promote habitat sustainability and creation by reducing wave energy and currents acting on shorelines, inducing sediment deposition, and providing shelter for wetland plants and shoreline habitats. This technique protects coastal shoreline habitat through the construction of offshore and/or nearshore breakwaters, reefs, or living shorelines parallel to the shore for the purpose of reducing erosion (NOAA 2015). These protection barriers are typically freestanding structures positioned adjacent to the shoreline, often beyond low-tide contours. While still allowing for the movement of water, sediment, and aquatic organisms into and out of the marsh or shoreline edge, these protective structures can counter the extensive shoreline loss experienced in coastal areas along the Gulf of Mexico. To maximize the habitat creation benefits of using protective structures like living shorelines, the technique should give preference to materials that promote resilience for the purpose of the project while also being cost effective.

The Council may consider ways to protect natural shorelines such that projects build on previous investments employing this technique to promote the conservation and restoration of important coastline habitats across the Gulf states. In the 2015 Initial FPL, the Council funded projects to implement or develop plans for the use of rock and oyster reef breakwaters planted with native vegetation to protect shorelines in Louisiana, Alabama, and Florida. This technique has similarly been implemented in all five Gulf states with funding from DWH NRDA and NFWF GEBF, the Gulf of Mexico Alliance, as well as other federal, state, and non-profit organizations.

2.2.2 Protect and conserve coastal, estuarine, and riparian habitats

Comprehensive Plan goals and objectives

This priority approach supports the following Comprehensive Plan goal and objective:

Primary goal:

- Restore and conserve habitat

Primary objective:

- Restore, enhance, and protect habitats

Protecting and conserving habitat not only reduces habitat loss and degradation, it is also critical to sustaining fish, shellfish, birds, and mammals that depend on healthy habitats for their survival. Through habitat protection and management, water quality is protected and improved, and flood damage to area communities can be reduced. This protection and management priority approach further provides potential opportunities to deliver on the RESTORE Council's objective (described in the 2016 Comprehensive Plan Update) to promote natural resource stewardship and environmental education through cooperative partnerships with landowners.

Background

Coastal, estuarine, and riparian habitats along the Gulf Coast have experienced significant declines in acreage and function due to a variety of natural and manmade stressors including those resulting from urban expansion and associated residential, commercial, industrial, and agricultural development. Conversion of land use results in direct habitat loss and fragmentation as well as degradation caused by altered hydrology and the spread of invasive species. Increased development results in more impervious surfaces and less land to naturally filter water, putting water quality at risk and increasing downstream flooding. If not properly managed, agriculture practices can remove native plant communities and cause degradation of downstream water quality and quantity. Additionally, energy and transportation industry activities can affect offshore and coastal habitats through petroleum pollution. Cumulatively, such stressors result in negative impacts to both fish and wildlife species and to coastal communities through loss of ecosystem services.

In the coming decades or even centuries, relative sea level rise is also expected to affect coastal habitats (NOAA NCEI 2018). Strategic habitat acquisition and management can help mitigate ecosystem impacts from the stressors of both development and sea level rise by protecting land for conservation purposes and by creating opportunities for habitat and species migration in response to changing environmental conditions (Reece et al. 2018, USGCRP 2018). In general, it is important to acquire coastal lands of sufficient scale, slope, and topography to accommodate sea level rise. In some instances, acquisition and conservation on lands vulnerable to sea level rise may still be considered a priority if the ecosystem benefit afforded in the near-term merits such conservation action.

The land area of the Gulf's five states encompasses more than 290 million acres, and 86 percent of that is privately owned (NRCS 2014). It can thus be argued that the health and future of the Gulf ecosystem depends on influencing land uses and management practices on private lands in addition to acquisition, enhancement, and management of public trust lands for successful protection of historic ecosystem values. While habitat protection and conservation are generally viewed as low risk restoration approaches, they are not without uncertainty. For instance, escalating coastal land costs may grow out of proportion with the available restoration funding thus affecting where properties can be acquired or conserved and the amount of land that can be protected. Given available, yet limited restoration funding, it may be strategic to address this risk by considering protection and conservation as an early component when implementing restoration activities.

FPL 3 potential restoration techniques

The RESTORE Council is considering the following types of habitat protection, conservation, and management techniques in geographic areas where habitat loss and degradation represents a primary ecosystem stressor.

Land acquisition

Land acquisition can include land purchase from willing sellers or acquisition of conservation easements from interested landowners to establish dedicated land use and long-term management goals to advance the preservation of natural habitats. Lands purchased will be permanently owned by an appropriate state or federal agency, local government, conservation organization, or land trust. In the case of conservation easements, the seller would retain ownership of the property but would agree to voluntarily restrict future use for conservation purposes. Both mechanisms could preserve native biodiversity and ecosystem function and, in some instances, may reduce future development in high risk areas, thereby mitigating potential economic losses associated with storm surge, flooding, and inundation risks to coastal residents and businesses (Shepard et al. 2016).

Success of land acquisition may be measured not only in the number of acres conserved or enhanced through management actions, but also in the diversity and productivity of the habitats represented, their proximity and connectivity (e.g., conservation corridors) to adjacent or nearby conservation lands, and topography that will accommodate anticipated sea-level rise over the coming century (USGCRP 2018). Strategic acquisitions within Gulf Coast watersheds including riparian habitats have the potential to yield long-term habitat and water quality benefits. Strategic protection of lands also has the potential to enhance community resiliency by reducing development on lands most vulnerable to storm surges and coastal flooding, and by mitigating the effects of storm surge and coastal erosion on lands farther inland where development does occur. Conserved, publicly accessible lands can also provide secondary benefits associated with recreation and ecotourism activities such as bird and nature watching, kayaking, canoeing, and fishing that fuel coastal economies and public well-being.

In the 2015 Initial FPL, the Council invested in land acquisition to protect coastal habitats providing valuable ecosystem services in Texas and Mississippi Sound, including marshes,

barrier islands, tidal flats, prairie, longleaf pine, and other habitats. The Council also funded the development of tools to help identify and evaluate land conservation opportunities Gulfwide. Other investments in land acquisition for conservation have been made across the Gulf of Mexico by DWH NRDA, NFWF GEBF, USDA Conservation Reserve Program, and other diverse federal, state, and non-profit organizations. Future investments in this technique would allow the Council to consider ways of building off of existing work through complementary projects and programs addressing habitat protection needs.

Habitat management and stewardship

Habitat management and stewardship actions can be implemented on existing public lands, lands acquired and protected through purchase or by conservation easements and on privately owned lands through other forms of voluntary agreements (NRCS 2014). Examples of habitat management actions could include but are not limited to the following: increases in landowner stewardship, invasive species control, native vegetation plantings, forest and coastal prairie management, conservation and enhancement of riparian buffers, debris removal, best management practices on agricultural lands, prescribed burns, hydrologic restoration, and development and implementation of habitat management plans for conservation areas or private lands.

In the 2015 Initial FPL, the Council invested in a number of projects employing the habitat management and stewardship technique to complement land acquisition. The technique was also used to help landowners and private-public partnerships invest in land protection and conservation practices across the Gulf. The Council also provided support for the development of estuary and watershed plans in Alabama and Florida that will inform future implementation of habitat management and stewardship. Other efforts employing this technique in the Gulf region have been funded by DWH NRDA, NFWF GEBF, the Nature Conservancy, and other federal, state, and non-profit organizations. In developing FPL 3, the Council may consider ways to build on these existing projects and programs through additional habitat management and stewardship activities.

Decommission unused, orphaned energy facilities

Energy and transportation systems may affect offshore and coastal habitats through petroleum pollution that can impact groundwater, springs and seeps, and surface water (De Arujó et. al 2014). Abandoned oil and gas wells and sites, for example, can increase hazard potential during hurricane season. Storage tanks and other abandoned equipment could be blown over by high winds or tidal surge and release petroleum products that can be transported by flood waters, resulting in the oiling of coastal wetlands. Above ground infrastructure may pose threats to bird and mammal species that are drawn to sources of water that are contaminated from products or practices used during energy production. Barrier islands, shorelines and other coastal areas that are denuded of native vegetation due to oiling are less effective in blocking tidal surge to dissipate wave energy that provides a major defense for inland areas (Levine et al. 2017). Additionally, the development of well pads, access roads, and transportation corridors have the potential to remove native habitat, alter surface hydrology, and promote the spread of invasive species.

The Council invested in protecting coastal habitats in the 2015 Initial FPL by funding the plugging eleven oil and gas wells at Padre Island National Seashore in Texas. Elimination of the potential for contamination from these wells will result in the protection of water quality in adjacent waterways, improved habitat for dependent wildlife including endangered and migratory species, and improved visitor safety (2015 Initial FPL).

2.2.3 Restore hydrology and natural processes

Comprehensive Plan goals and objectives

This priority approach supports the following Comprehensive Plan goals and objectives:

Primary goals:

- Restore and conserve habitat
- Restore water quality and quantity
- Enhance community resilience

Primary objectives:

- Restore, enhance, and protect habitats
- Restore, improve, and protect water resources
- Restore and enhance natural processes and shorelines
- Promote community resilience

The RESTORE Council's 2016 Comprehensive Plan Update stresses the importance of restoring ecosystem processes including natural hydrologic regimes: *"Reintroducing natural ecological processes, such as natural fire regimes, freshwater inflows, and sediment diversions, is also essential to restore and maintain ecosystem function and sustain ecosystem integrity."*

Consistent with this principle, the Council is considering directing some portion of FPL 3 investments towards projects and programs that would re-establish more natural hydrologic regimes in order to restore and conserve critical coastal habitats, restore water quality and quantity, and provide community resilience benefits that such ecosystems can provide. Restoring hydrology can also provide important secondary benefits such as enhancing living coastal and marine resources by improving the habitat (including physically reconnecting habitats) upon which such resources depend. For all projects, enhancing and taking advantage of natural processes will be a key consideration to ensure the long-term sustainability of all restoration investments.

Background

Modifications to the hydrology of coastal ecosystems can have profound adverse impacts to the functions and services such systems provide. Natural hydrologic processes have been and continue to be modified across the Gulf Coast due to landscape changes, navigation canals, damming, roads, levees, deforestation, increased impervious surfaces, consumptive water uses, channelization, and other factors. Such changes can alter freshwater inputs, salinity gradients, nutrient and sediment inputs, and other important components of healthy coastal ecosystems (NRC 1994).

Changes in hydrology harm Gulf Coast ecosystems in a variety of ways. Changes in freshwater input and the associated salinity regimes have caused declines in oyster productivity and loss of freshwater wetlands (Powell et al. 2003). Reductions in sediment inputs due to altered riverine

processes result in ongoing coastal wetland loss in some areas, as do hydrologic changes due to damming and channelization (Weston 2014). Restoring natural hydrology is essential for mitigating these and other adverse impacts to important Gulf ecosystems.

Hydrologic restoration can involve activities ranging from backfilling oil and gas canals and mitigating impoundments caused by roads and other linear infrastructure to complex undertakings such as river diversions (otherwise known as river re-introduction). The general goal of these types of projects is to restore or mimic natural hydrologic processes as much as possible. For example, where a road may have blocked sheet flow (i.e., surface water flowing across a ground surface) across a wetland area, installing or enlarging culverts can help mitigate these hydrologic disruptions. River diversions can mimic natural deltaic processes disrupted by flood protection levees.

In some cases, hydrologic restoration can involve potential stakeholder tradeoffs (e.g., alterations in freshwater inputs can affect oyster productivity). The planning process for more complex hydrologic restoration projects may involve ecosystem modeling to determine the appropriate design and operation for optimal ecosystem benefits. Potential changes in sea level and rainfall can add a degree of complexity and uncertainty to hydrologic restoration efforts. For conceptual hydrologic restoration projects, the Council can invest in planning, engineering and design, and modeling prior to committing to project implementation. This allows the Council to address issues such as potential tradeoffs and uncertainties to ensure the project is viable and effective.

FPL 3 potential restoration techniques

The RESTORE Council is considering the following types of hydrologic restoration techniques in geographic areas where alterations to hydrology and natural processes represents a primary ecosystem stressor.

Restore hydrologic connectivity

Restoring natural hydrology often entails restoring or mimicking natural hydrologic connections that have been broken or disrupted. Linear infrastructure such as roads and levees traversing wetlands, floodplains, and other aquatic areas can block or impede surface flows essential to healthy ecosystem function (Sklar and Browder 1998). Culverts, gates, and other structures can be installed or enlarged to re-establish flows through the hydrologic impediment (NRCS 2008). Some efforts to re-establish hydrologic connections focus on impediments to sheet flow across wetland areas. For example, spoil banks associated with canal dredging can be degraded or gapped to allow water to flow across wetland landscapes and undo unnatural impoundment of surface waters. In other cases, restoring forested wetlands can require restoration of hydrologic connections that have been disrupted by logging roads, drainage ditches, and other landscape modifications.

In addition to being essential for restoring coastal habitat, re-establishing natural hydrologic connections can facilitate the movement of aquatic organisms into and out of estuarine areas, thus helping to restore and protect fish and other living coastal and marine resources (Sklar and

Browder 1998). Restoring sheet flow across wetlands can also benefit water quality by increasing sediment retention and nutrient assimilation (Regier et al. 2018). It may also reduce flooding by increasing rainwater retention and storage and reducing uncontrolled flows (Dixon et al. 2018).

Given the importance of restoring hydrologic connectivity, the Council invested in a number of such projects in the 2015 Initial FPL. These investments include both planning and implementation projects ranging from Texas to Florida, involving canal backfilling, replacement of undersized culverts and other measures to restore hydrologic connectivity and natural sheet flows. Additionally, similar projects have been funded though DWH NRDA, NFWF GEBF, and other federal, state, and local organizations. In FPL 3, the Council will consider ways to build upon these initial investments and work with funding partners to advance the restoration of hydrologic connectivity in critical areas along the Gulf Coast.

Controlled river diversions

Controlled river diversions (diversions) use channels and gated structures to divert sediment and fresh water from rivers into adjacent coastal basins. The goal is to restore natural deltaic processes disrupted by levees, thereby reducing habitat loss by increasing sediments and nutrients delivered to estuarine areas (USACE 2004). In some cases, diversions have a primary goal of increasing sediment input to a coastal basin, whereas other diversions are designed primarily to reintroduce freshwater and nutrients. Diversions may be designed to benefit marsh habitat, and forested wetlands (such as cypress swamp). Diversions are intended to improve wetland sustainability, which in turn can benefit fish and wildlife populations, enhance water quality, and help maintain important natural storm buffers.

Diversions can involve complex actions such as modifying a river levee and conveying river water under roads and other infrastructure. Because such projects address a primary systemic cause of coastal wetland loss in Louisiana (i.e., the disruption of deltaic processes), diversions are an important component of the strategy to restore the coastal Louisiana ecosystem (LA CPRA 2017). Estimating ecological benefits requires modeling for key variables such as sediment concentrations in the river, the amount and timing of diverted flows, and relative sea level rise. Diversions can potentially involve trade-offs, including changes in salinities that can affect oyster production and fisheries. Such challenges are being addressed through careful planning and design efforts in the state of Louisiana.

In the 2015 Initial FPL, the Council invested in planning, engineering and design, and environmental compliance for a diversion in Louisiana (2015 Initial FPL). Additional investments in river diversions have been made in Louisiana by NFWF GEBF, DWH NRDA, and other federal and state organizations, including investments in planning support such as *Louisiana's Comprehensive Master Plan for a Sustainable Coast* (LA CPRA 2017). In FPL 3, the Council may consider additional diversion investments to build upon and complement these existing investments.

Restore natural salinity regimes

The phrase “restore natural salinity regimes” refers to efforts to re-establish the complex, natural interactions between fresh and saltwater in coastal estuaries. Artificial changes in the timing and amount of fresh and saltwater inputs into an estuary can have profound effects on the composition of the habitat and associated estuarine organisms. When freshwater input is reduced (e.g., due to upstream dams and other factors), unnatural increases in salinity levels in receiving water bodies results. Other human modifications to the landscape can lead to unnatural increased saltwater coming from the Gulf of Mexico (known as “salinity intrusion”) into estuaries. For example, the creation and expansion of navigation channels and canals can increase inputs of Gulf waters thereby elevating salinities in an estuary. The resulting artificial salinity increases can harm habitat and the associated fish and wildlife species that are not adapted to such elevated salinity levels (USACE 2007).

Efforts to restore natural salinity regimes can focus on reducing artificially high inputs of saline waters. This includes plugging canals, restoring the natural dimensions of tidal passes and inlets, and installing gates, channelization, locks, and other structures in navigation channels to control saline inputs. For example, the Council has approved Spill Impact Component funding (Bucket 3) for the planning and construction of a lock on the Houma Navigation Canal in Louisiana (LA CPRA 2017). This lock is intended to reduce salinity intrusion while maintaining navigational access and reducing flood risk in the area. Restoring natural salinity regimes might also focus on ensuring sufficient freshwater inputs to estuarine areas. This includes, for example, upstream water conservation, modification to management regimes for upstream dams and reservoirs, river diversions, maintaining barrier islands that function to restore natural salinity prisms in estuaries, and undoing or mitigating other artificial barriers to freshwater input (e.g., roads, spoil banks).

In the 2015 Initial FPL, the Council funded planning efforts for similarly applying this technique to restore freshwater inputs to wetland habitats in Texas and Louisiana. Other federal and state organizations in the Gulf have funded salinity restoration projects as well as the development of regional watershed management plans that prioritize this technique (NWFWMD 2017a). Future investment in this technique would allow the Council to consider ways of building upon existing work to implement complementary projects and programs.

2.2.4 Reduce excess nutrients and other pollutants to watersheds

Comprehensive Plan goals and objectives

This priority approach supports the following Comprehensive Plan goal and objective:

Primary goal:

- Restore water quality and quantity

Primary objective:

- Restore, improve, and protect water resources

Restoring water quality can also provide secondary benefits relevant to other Comprehensive Plan goals and objectives. Reducing nutrient and pollutant loading is often important for restoring aquatic habitats and associated communities or other living resources sensitive to water quality impairment (e.g., oysters). Terrestrial habitat may also be restored under this priority approach as a technique to buffer waterways affected by contaminated inflows. By managing surface flows, many techniques under this priority approach can simultaneously address aspects of flood risk, providing potential benefits to community resilience.

Background

Delivery of nutrients and other pollutants to coastal waters has created persistent water quality problems across the northern Gulf of Mexico, compromising living resources as well as associated recreational and economic opportunities. Over-enrichment of water with nutrients, known as eutrophication, is the dominant source of Gulf Coast water quality degradation (Kennicutt 2017a). Eutrophication stimulates algal growth that can lead to oxygen-depleted (i.e. hypoxic) areas of water sometimes referred to as "dead zones" (Breitburg 2002). As a result of water quality degradation, Gulf estuaries and coasts are experiencing harmful algal blooms, fish kills, loss of submerged aquatic vegetation (SAV), and other disturbances to ecological communities. Harmful algal blooms, as well as biological pollutants (e.g., fecal bacteria), generate pathogenic contamination that can put human health at risk, frequently prompting beach closures, restrictions on shellfish harvesting, and air quality advisories (Kennicutt 2017a).

Water quality in estuaries and coastal habitats across the northern Gulf of Mexico is highly influenced by human activities (US EPA 2012). Coastal development has increased locally concentrated or "point" sources (e.g. wastewater effluent) and regionally dispersed or "nonpoint" sources (e.g. stormwater runoff) of municipal, agricultural, and industrial pollutants, while reducing riparian and coastal marsh habitat important for natural water filtration and storage. Stormwater runoff increases with the expansion of impervious surface area, delivering greater accumulation of nutrients, sediment, and other pollutants to surrounding waterways (NRC 2009). To address water quality issues, restoration techniques focus on storage to reduce the volume of contaminated discharge to watersheds and/or treatment to reduce the concentration of contaminants in discharge. These techniques may restore natural capacities

for filtering and storage, or replace and enhance these capacities using green or traditional infrastructure.

Because of the diversity of factors that influence water quality, and the large geographic areas over which interactions can take place, efforts to reduce excess nutrients and other pollutants entering coastal watersheds require comprehensive planning and coordination. These planning and coordination efforts should occur across habitats, resources, and political boundaries, bringing together state and federal agencies as well as public and private landowners including farmers, timber industry, and local authorities. Engagement with stakeholders will be useful for tapping local knowledge and informing management priorities. In addition, coordination with scientists will be needed to support effective adaptive management planning and implementation. Uncertainties to address may include impact of sites on downstream/regional improvements, how to coordinate projects to maximize benefits, transport and flow dynamics, and the relationship between specific pollutants and larger symptoms of habitat degradation or threats to human use (DWH NRDA 2016a).

FPL 3 potential restoration techniques

The RESTORE Council is considering the following types of nutrient and other pollutant reduction techniques in geographic areas where degraded water quality represents a primary ecosystem stressor.

Agriculture and forest management

Management of agricultural land and forests can substantially reduce pollutants entering the Gulf of Mexico (Kennicutt 2017a). Agricultural runoff carries high levels of sediment and represents a prominent source of Gulf nutrient pollution (e.g., fertilizers and animal waste), while forested areas which provide natural water storage and filtration are threatened by logging and other land use change (Kennicutt 2017a). On farmland, the potential for transport of sediment, nutrients, pesticides, and other pollutants can be reduced by altering farming practices (e.g., crop, tillage, pest, irrigation, and livestock management). To intercept agricultural runoff, drainage can be engineered (e.g., installing sediment basins) to retain potential pollutants on site (Higgins et al. 1993). Riparian and wetland vegetation can be planted to take up excess nutrients from farmland, providing a buffer that also reduces concentration of sediment and other pollutants in runoff to nearby waterways (Gilliam 1994). Converting perimeter farmland to wetlands by restoring soil and water flow can further promote filtering and sequestration of pollutants. For forested areas, water storage and filtration are part of healthy ecosystem function, which can be enhanced through habitat management. Such forest management activities may include reforestation, hydrologic restoration, invasive species removal, and prescribed burnings. In addition to reducing excess nutrients, sediment, and other pollutant loads to waters feeding the Gulf of Mexico, agriculture and forest management activities can improve critical habitat for native species and reduce the risk of flooding.

This technique has been implemented in diverse watersheds throughout the country by USDA-NRCS conservation programs, DOI-USFWS, and the EPA to successfully reduce nutrient loadings

(Osmond et al. 2012). Additional investments in agriculture and forest management have also been made in the Gulf states by other federal, state, local, and non-profit organizations. In the 2015 Initial FPL, for example, the Council invested in projects employing the agriculture and forest management technique in Florida (2015 Initial FPL). The Council may consider additional investments in this technique across the Gulf that build upon and complement previously funded projects to address agriculture and forest management needs.

Stormwater management

Stormwater runoff is the predominant nonpoint source of pollution to Gulf Coast waters (NRC 2009). Stormwater management for farms and forests is addressed by the agriculture and forest management technique. This technique addresses domestic and municipal stormwater as a source of nutrients and other pollutants to Gulf watersheds. There are many activities that can be implemented to control stormwater by retaining it on-site for treatment and/or re-use (US EPA 2003). These may include green infrastructure-type activities such as implementing rain gardens, permeable pavement, green roofs, rainwater harvesting, and stormwater wetlands. By reducing the volume of stormwater flows, such activities can also reduce risk of sewer overflow and associated water pollutants for combined sewer systems. Where necessary, more intensive traditional infrastructure can also be used to filter stormwater (e.g., dry retention basins, exfiltration trenches, concrete vegetated filter strips, and grassed swales) or otherwise retain pollutants (e.g., wet and dry ponds) (Lawrence et al. 2010).

This technique has been implemented across the Gulf states with funding from the Council, DWH NRDA, NFWF GEBF, and other federal, state, local, and non-profit organizations. In the 2015 Initial FPL, for example, the Council funded design and permitting for a project that would implement the stormwater management technique in Florida. In FPL 3, the Council will consider ways to build upon existing investments in stormwater management via complementary use of this technique in the Gulf states.

Erosion and sediment control

Erosion and sediment can degrade water quality by reducing water clarity and transporting or storing nutrients, pesticides, metals, petroleum, and other contaminants. Turbid water can cause problems to organisms in many ways, including preventing growth of submerged aquatic vegetation, burying filter feeding organisms such as oysters, and disrupting fish feeding and other behaviors (Bruton 1985, Kennicutt 2017a). As sediments settle out of water onshore or offshore, contaminants may accumulate and become buried (Kennicutt 2017b). In some cases, contaminated sediment can persist in bed material with the potential to become resuspended or reintroduced to water, posing long-term risks to water quality (NRC 1997, Kennicutt 2017b). Sources of sediment pollution include unpaved roads, agriculture- and silviculture-related erosion and runoff (which are addressed by the agriculture and forest management technique), but the largest contributions are from construction activities (US EPA 2002). Activities for reducing erosion and soil loss may include decommissioning roads (i.e., restoring as habitat), implementing sediment basins, and planting vegetation buffers. To remediate contaminated sediment, activities may include containment and treatment, either onsite or offsite, following dredging or other removal methods. The removal of contaminated sediments from watersheds

can present the risk of exacerbating contamination exposure and water quality impairment (NRC 1997). Such risks would be considered as part of project design and implementation.

Employing this technique would allow building on erosion and sediment control projects previously funded through the Council, DWH NRDA, NFWF GEBF, and other federal, state, local, and non-profit organizations across the Gulf. In the 2015 Initial FPL, for example, the Council funded design and permitting for a sediment control project in Florida. In FPL 3, the Council will consider ways to leverage and complement existing investments employing the erosion and sediment control technique in order to reduce pollutant load to watersheds in the Gulf states.

Wastewater system improvements

Wastewater delivers nutrients, pathogens, and other chemical pollutants to Gulf Coast waters from point sources, such as wastewater treatment plants and other municipal waste systems (NRC 1993, Carey et al. 2012). Septic systems used to treat residential wastewater are often point sources of locally elevated nutrient compounds due to aging infrastructure and improper management (NRC 1993, Carey et al. 2012). Recent advancements in chemical and biological wastewater treatment technologies can provide significant improvements regarding the removal of pollutants, including excess nutrients, from wastewater. Upgrading treatments facilities or household septic systems (e.g., septic-to-sewer programs) can be costly, but may provide dramatic reductions to significant point sources of pollutants with cost savings generated over time (Carey et al. 2012). Additional activities may include wastewater reuse or construction of wetlands or treatment ponds to provide additional bioremediation to treatment plant effluent (Carey et al. 2012).

This technique has been implemented across the Gulf states with funding from the Council and other federal, state, local, and non-profit organizations. In the 2015 Initial FPL the Council invested in wastewater system improvement projects in Florida. In developing FPL 3, the Council will consider ways to build upon existing investments in wastewater system improvement via complementary use of this technique in the Gulf states.

2.2.5 Restore oyster habitat

Comprehensive Plan goals and objectives

This priority approach supports the following Comprehensive Plan goals and objectives:

Primary goals:

- Restore and conserve habitat
- Replenish and protect living coastal and marine resources

Primary objectives:

- Restore, enhance, and protect habitats
- Protect and restore living coastal and marine resources

This approach has been prioritized by the Council because oysters are important both economically as a harvestable resource as well as ecologically as an important natural habitat. In the 2015 Initial FPL the RESTORE Council committed funding for oyster habitat restoration in several Gulf states (2015 Initial FPL). Continuing to invest in the restoration of oyster habitat in FPL 3 will provide multiple benefits that help the Council meet the goals and objectives of the 2016 Comprehensive Plan Update. Oysters provide important habitat to many species, help reduce shoreline erosion (Zimmerman et al. 1989, DWH NRDA 2017), promote coastal resilience (Sutton-Grier et al. 2015), and improve water quality (Coen et al. 2007).

Background

Historically, oyster reefs have been foundational components of the Gulf of Mexico's ecosystem (Bendick, DeAngelis and Blitch 2018), extending across the coastlines of the five Gulf states. Oyster reefs filter bay waters, provide habitat for marine life, and act as natural breakwaters to reduce coastal erosion (Bendick, DeAngelis and Blitch 2018). Over the last century, as Gulf coastlines have suffered from erosion and sedimentation, pollution, drought, and overharvesting, oyster reef habitat in the region has declined by as much as 85 percent (Beck et al. 2011),. These long-term, negative declines were magnified in 2010 as a result of the DWH oil spill and related cleanup efforts (Winter 2015), severely impacting the coastal economies and the long-term health of the Gulf.

Despite these challenges, the Gulf of Mexico continues to produce more oysters than anywhere else in the United States, and many Gulf estuaries maintain the water quality and oyster larval supply necessary for oyster reef restoration and resilience (Beck et al. 2011). Given this, and a growing understanding of the ecosystem services provided by oysters (Grabowski et al. 2012), coastal communities across the Gulf have begun investing in plans to reverse the decline of oysters in their bays and estuaries. Council investments in oyster restoration for FPL 3 will build on these plans, and other ongoing investments in oyster restoration by the DWH NRDA, NFWF GEBF, non-governmental organizations (e.g., The Nature Conservancy), commercial harvesters and local communities across the Gulf.

Oyster restoration techniques can take many forms and use a variety of construction materials. The restoration technique(s) used can vary by estuary or desired outcomes of restoration. For example, restoration could aim to provide maximum benefits to fish and benthic communities, or to enhance shoreline stability. Given the variety of potential benefits from oyster reef restoration, the Council is considering a suite of oyster habitat restoration techniques across several geographic areas in the Gulf of Mexico.

Successful restoration of oysters, regardless of technique, depends on having the appropriate hydrologic conditions, including water quality and sedimentation regime, an adequate supply of oyster larvae to recruit, and adequate benthic conditions and substrate for recruitment. Although oyster restoration is frequently conducted throughout the Gulf, the declines observed in the Gulf following the DWH oil spill and uncertainties surrounding potential impacts from hydrologic changes resulting from salinity changes (for detailed discussion see DWH NRDA 2017) or large-scale hydrologic restoration (see Section 2.2.3) have highlighted the need for continued monitoring of recruitment trends in locations targeted for restoration. This information, coupled with hydrologic modeling funded in the 2015 Initial FPL and through other funding sources, would support effective adaptive management for project implementation, and help inform future oyster restoration selection and management.

FPL 3 potential restoration techniques

The RESTORE Council is considering the following types of oyster habitat restoration techniques in geographic areas where oyster habitat degradation represents a primary ecosystem stressor.

Substrate placement

This oyster restoration technique places cultch material (usually oyster shells, crushed limestone, or crushed concrete) in water bodies with underlying hard bottom (e.g., sand, historic reef, existing shell) that can support the weight of hard structure materials and not sink into the sediment. Placement of substrate typically occurs in tidal creeks, estuaries, bays, and along the margins of marshes to provide hard structure for oyster recruitment and to restore or create oyster reef habitat. Habitat suitability modeling and onsite investigation and monitoring of conditions to determine appropriate restoration habitat are key to making effective investments of substrate placement. This technique can be used to restore lost oyster reef habitat, expand existing oyster reef habitat, and enhance oyster abundance at existing reefs. This technique has been used widely throughout the Gulf, primarily for the purpose of providing oysters for harvest (NIEPS 2019); however, secondary benefits can include water quality improvement, reduced shoreline erosion, and habitat for marine resources.

Restoration investments by the Council would build on similar existing restoration projects across the Gulf. NFWF GEBF, for example, has made investments in substrate placement for oyster habitat restoration in Texas (NFWF GEBF 2013a), Alabama, and Florida (NFWF GEBF 2016). Additionally, the DWH NRDA Florida, Alabama, Mississippi, Louisiana and Regionwide Trustee Implementation Groups (TIGs) haves identified substrate placement as a potential technique for oyster restoration investments (DWH NRDA 2017). Additionally, the DWH NRDA Texas TIG is assessing alternatives, including cultch placement for oyster reef restoration.

Living shorelines

Living shorelines restoration can include a variety of techniques intended to protect shorelines from erosion by helping to stabilize sediment and reduce the wave energy reaching the shoreline. Often the living shoreline restoration technique involves the use of concrete structures, rocks and limestone structures placed in intertidal areas to create substrate to which oysters can attach (NIEPS 2019). Like other oyster restoration activities, living shorelines can also provide shelter for benthic organisms and fish communities and increase water clarity.

In the 2015 Initial FPL, the Council invested in several living shorelines planning and implementation projects in Louisiana, Alabama, and Florida that were aimed at protecting natural shorelines (see Protect natural shorelines technique, Section 2.2.1), but could simultaneously help restore oyster habitat (2015 Initial FPL). Other projects designed primarily to restore oyster reef habitat have employed the living shoreline technique in Louisiana and Alabama with funding from NFWF, The Nature Conservancy, as well as other federal, state, and non-profit organizations. Moving forward, the Council may make similar investments in this technique and will consider ways to build on and complement existing efforts.

Enhance spawning and reserves

Projects to enhance oyster spawning stocks and reserves in key locations across the Gulf of Mexico can help facilitate oyster productivity and abundance. To enhance spawning, young oysters (called spat) can be planted on oyster shell/cultch, or cultchless seed oysters (small oysters that are not attached to any other substrate) can be used on existing reefs with low productivity as part of a living shoreline project or in combination with cultch placement for new oyster reefs (Andrews and Mason 1969, DWH NRDA 2017).

Alternatively, juvenile or adult oysters from reefs in areas with poor habitat conditions or obtained through hatcheries or from special oyster spawning reserve areas can be transported to desirable reef restoration sites. Creating special oyster spawning reserve areas is an increasingly common restoration strategy because of their importance as a source for oyster larvae. Spawning reserves can have the additional benefits of increased oyster size and larvae production, disease resilience, and greater overall ecosystem function. The Council could invest in this technique by identifying specific areas that would be closed to harvest to protect spawning oysters and serve as a source of oyster larvae to other reefs. Such reserves should employ a network design to enhance oyster populations over a broad area. The Oyster Technical Task Force's Gulf of Mexico oyster fishery management plan identifies the potential for protected, high productivity reefs to be used as seed and brood stocks for restoration projects (VanderKooy 2012) and to serve as a regional resource for this type of restoration investment.

Projects employing this technique have been implemented across the Gulf with funding from state, local, and non-profit organizations. For FPL 3, the Council may consider ways to build upon these existing projects and programs via complementary investment in the enhance spawning and reserves technique.

2.3. Geographic areas

2.3.1 Texas

Comprehensive Plan goals and objectives

Work in this geographic area would seek to address the following Comprehensive Plan goals and objectives:

Primary goals:

- Restore and conserve habitat
- Restore water quality and quantity
- Replenish and protect living coastal and marine resources
- Enhance community resilience

Primary objectives:

- Restore, enhance, and protect habitats
- Restore, improve, and protect water resources
- Protect and restore living coastal and marine resources
- Restore and enhance natural processes and shorelines
- Promote community resilience

Background

The Texas coast extends from the mouth of the Rio Grande River at the Texas-Mexico border to the mouth of the Sabine River at the Texas-Louisiana border and includes approximately 365 miles of Gulf of Mexico shoreline, 2,361 miles of bay shoreline, and 601,000 acres of fresh, brackish, and saline wetlands. Coastal marshes in Texas can be divided into two major ecosystems: the Chenier Plain ecosystem from the Texas-Louisiana border to East Galveston Bay and the Texas Barrier Island ecosystem from East Galveston Bay to the Texas-Mexico border (TPWD 2012). Twenty-one river basins terminate at the Texas coast giving rise to the following eight major bay and estuary systems: Lower Laguna Madre, Upper Laguna Madre, Corpus Christi, Aransas, San Antonio, Matagorda, Galveston, and Sabine Lake. Texas bay and estuary salinities are highly variable but generally decrease moving from west to east from the lower through the mid to upper Coast regions in response to increasing rainfall rates and resultant higher freshwater inflows (TSDC 2014). Important habitats along the Texas coast include: estuarine waters and their submerged water bottoms, barrier islands and peninsulas, rookery islands, fresh, brackish and saline wetlands, saline flats, mangroves, seagrasses, oyster reefs, forests, prairies, rivers and streams. Together, these key habitats make up a complex, interrelated ecosystem mosaic that supports vibrant wildlife, avian populations, fisheries, and human communities.

Currently, approximately 6.5 million people live along Texas shores, representing nearly 25 percent of the state's population located within only 10 percent of the state's total geographic area. Projections expect the coastal Texas population to reach more than 9 million by 2050

(TSDC 2014). Increasing coastal populations along with subsequent development, land use changes, water demand increases, sea level rise, coastal storms, and erosion are significant pressures that will continue to result in environmental stress. Resultant priority issues of concern such as habitat loss, habitat fragmentation and conversion, reductions in species populations and biodiversity, loss of hydrologic connectivity, reduction in freshwater inflows, increased flood and storm damages, and decreased water quality pose substantial ecological and economic challenges. Other stressors include abandoned oil wells, pipelines and other manmade structures. The RESTORE Council is considering these stressors, individually and as a collection, impacting the Texas coast, in conjunction with leveraging opportunities of past and planned restoration, along with cost effectiveness to develop the path forward for FPL restoration investments in this area.

Funding from federal, state, local, and non-profit organizations has already been directed towards addressing these environmental issues through some of the priority approaches and techniques under consideration for FPL 3. For example, the 2015 Initial FPL invested in Texas land acquisition, habitat management and stewardship, plugging abandoned oil and gas wells, and sediment placement (2015 Initial FPL). Texas' approved *RESTORE Act Direct Component Multiyear Implementation Plan (MIP)* includes proposed projects involving sediment placement and protection of natural shorelines to protect and restore rookery islands, wetlands, and barrier shorelines (TX MIP 2017). The NFWF GEBF has invested in Texas land acquisition; shoreline protection; and restoration of marshes, oyster reefs, and rookery islands (NFWF GEBF 2019a). Similarly, the DWH NRDA Texas Trustee Implementation Group (TX TIG) has selected 13 projects involving oyster restoration, wetland restoration, shoreline restoration, and land acquisition (TX TIG 2017). Significant opportunities for leveraging and building upon existing and planned Texas restoration investments exist and could synergistically advance the resilience of the Texas coastal ecosystem.

Uncertainties within the geographic area of the Texas coast exist regarding how to coordinate and sequence projects across watersheds to maximize benefits to priority natural resources and the ecosystem services they provide. Similarly, there is uncertainty regarding how future restoration actions might be affected by proposed large-scale coastal storm risk management actions. Ecosystem restoration measures and projects included in the Coastal Texas Study and the *Texas Coastal Resiliency Master Plan* may afford large scale opportunities to leverage expertise and resources that could maximize benefits to natural resource resiliency (TGLO 2019). These uncertainties and opportunities will become better defined as studies and planning advances, allowing them to be addressed through enhanced coordination between funding and implementing agencies and partners.

FPL 3 potential priority approaches and techniques

For FPL 3 in Texas, the RESTORE Council will consider prioritizing investments to improve the condition, extent, and sustainability of oyster reefs, coastal wetlands (including saline, intermediate, and freshwater wetlands), coastal prairies, barrier islands, peninsulas, and rookery islands. There are a variety of approaches and techniques to improve priority natural resources that could be considered. These could include land acquisition as well as habitat

restoration, enhancement, management, and stewardship. In addition, possible improvements to water quality and quantity could include hydrologic restoration to increase/restore freshwater inflows and hydrologic connectivity, actions to reduce excess nutrient and pollutant discharges to coastal watersheds including conversion of septic systems to sewer and improvements to stormwater management. Land acquisition, conservation, and management are essential to preserve and restore remnant Texas coastal prairie and imperiled freshwater wetlands as well as adjacent salt marsh and barrier island and peninsula habitats under pressures from population growth, development, land use changes, and sea level rise. Land conservation and habitat management and enhancement may be aimed to improve natural resource stewardship on privately owned land and protected conservation areas containing priority habitat types. Other conservation actions under consideration for FPL 3 could focus on creation, restoration, and enhancement involving sediment placement to restore proper elevations and/or to provide shoreline protection against erosion.

The following are the priority approaches and techniques the Council is considering in Texas:

Create, restore, and enhance coastal wetlands, islands, shorelines, and headlands (see description in Section 2.2.1)

Potential techniques:

- Sediment placement
- Protect natural shorelines

Protect and conserve coastal, estuarine, and riparian habitats (see description in Section 2.2.2)

Potential techniques:

- Land acquisition
- Habitat management and stewardship
- Decommission unused, orphaned energy facilities

Restore hydrology and natural processes (see description in Section 2.2.3)

Potential techniques:

- Restore hydrologic connectivity
- Restore natural salinity regimes

Reduce excess nutrients and other pollutants to watersheds (see description in Section 2.2.4)

Potential techniques:

- Agriculture and forest management
- Stormwater management
- Erosion and sediment control
- Wastewater system improvements

Restore oyster habitat (see description in Section 2.2.5)

Potential techniques:

- Substrate placement
- Living shorelines
- Enhance spawning and reserves

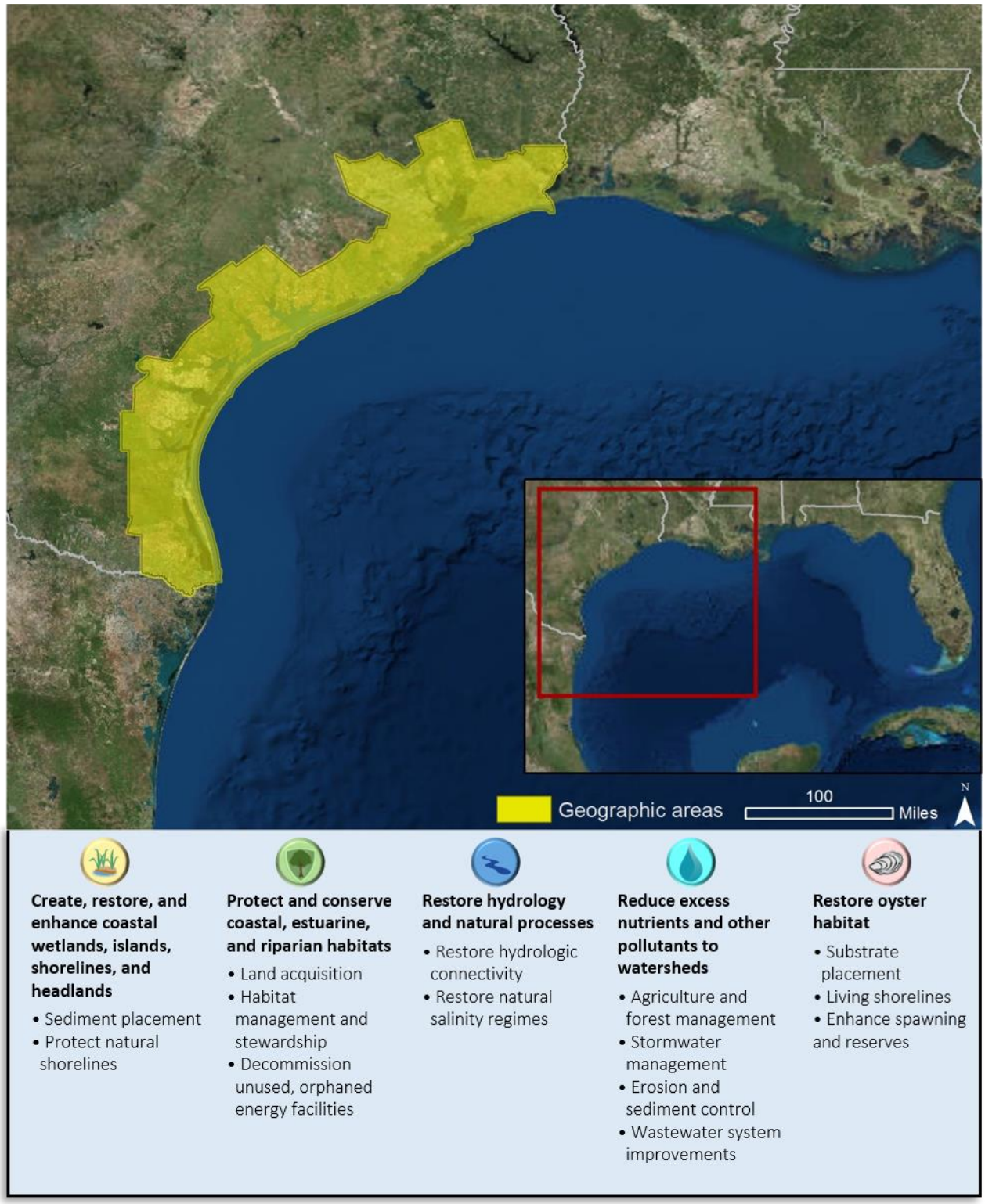

Figure 2.3.1. Priority approaches and techniques being considered in the Texas geographic area. Techniques are given as bullet points beneath priority approaches. All FPL 3 investments the RESTORE Council will make may not be captured, including activities of federally recognized tribes with interests in the Gulf, and activities with the primary objective "Promote natural resource stewardship and environmental education" or "Improve science-based decision-making processes."

2.3.2 Chenier Plain, Texas-Louisiana

Comprehensive Plan goals and objectives

Work in this geographic area would seek to address the following Comprehensive Plan goals and objectives:

Primary goals:

- Restore and conserve habitat
- Restore water quality and quantity
- Replenish and protect living coastal and marine resources
- Enhance community resilience

Primary objectives:

- Restore, enhance, and protect habitats
- Restore, improve, and protect water resources
- Restore and enhance natural processes and shorelines
- Promote community resilience

Background

The Chenier Plain extends roughly from Galveston Bay, Texas to Vermilion Bay, Louisiana (USFWS 2017a). It is comprised of wetlands, coastal prairie, chenier ridges, open water, cultivated lands, towns, industry, and transportation infrastructure. The natural resources of the Chenier Plain support important commercial and recreational activities including fishing, hunting, and birdwatching and help mitigate damage due to storm surges and flooding. According to the U.S. Fish and Wildlife Service, the Chenier Plain contributes substantially to the nation's commercial fishery landings, particularly shrimp, blue crab, oysters, and menhaden. The Chenier Plain ecosystem also provides important stopover habitat for migratory songbirds and shorebirds. These valuable natural resources are threatened due to wetland loss, shoreline erosion, relative sea level rise (including land subsidence), and altered natural hydrology (including salinity intrusion from the Gulf of Mexico).

The hydrology of the Chenier Plain has been substantially altered by the construction of navigation channels including the Calcasieu Ship Channel, Sabine-Neches Waterway, Gulf Intracoastal Waterway, Keith Lake Fish Pass, and numerous smaller canals. Saltwater intrusion due to these channels and relative sea level rise are considered to be the largest drivers of wetland loss in the Chenier Plain (LA CPRA 2017). Berms and levees created during excavation of such channels and for water management also inhibit sheet flow and funnel freshwater out of the wetland systems. In both fresh and saltwater flood conditions, marsh vegetation is subject to increased water residence time that can lead to waterlogging and result in plant death and subsequent accelerated land loss (TPWD 2013).

Opportunities for leveraging and building upon current investments exist throughout this geographic area. Past, ongoing, and planned investments to address wetland and shoreline loss in the Chenier Plain include public and private efforts to manage and restore marsh hydrology,

as well as publicly-funded efforts to restore and protect marsh and Gulf shorelines. *The Coastal Wetlands Planning, Protection and Restoration Act* program has funded marsh creation, hydrologic restoration, and shoreline protection projects in the area (CWPPRA 2019). The *2016 Corps of Engineers Southwest Coastal Louisiana Integrated Final Feasibility Report and Environmental Impact Statement* includes recommendations for ecosystem restoration activities in the Louisiana portion of the Chenier Plain (USACE 2016). Most recently, the *2017 Louisiana Comprehensive Master Plan for a Sustainable Coast* (Master Plan) recommends the construction of Calcasieu Ship Channel salinity control measures to reduce wetland loss due to salinity intrusion (LA CPRA 2017). Funding for this salinity control work has been approved under the Direct Component (or "Bucket 1") of the RESTORE Act (LA CPRA 2017). Within the Texas portion of the Chenier Plan, the Salt Bayou Watershed Restoration Plan (SBWP) outlines an interagency strategy, goals, and objectives for ecosystem restoration (TPWD 2013). Both DWH NRDA and RESTORE in Texas have committed to provide funding for implementation of restoration actions consistent with the SBWP. For example, both the *RESTORE Act Direct Component Multiyear Implementation Plan* (MIP) and the *Texas Trustee Implementation Group Final 2017 Restoration Plan* propose to fund a portion of the cost of the McFaddin Beach and Dune Restoration project to place sand along approximately 17 miles of Chenier shoreline in northeastern Texas (TX MIP 2017, TX TIG 2017).

Subsidence, sea level rise, development, and hurricanes pose a risk to the long-term sustainability of Chenier Plain natural resources and the communities that depend upon them. Coastal restoration and hurricane risk reduction measures are needed to mitigate these risks. Large-scale projects — particularly the Calcasieu Ship Channel salinity control project — will need to be implemented in a way that addresses wetland loss, while maintaining economically important navigation access to the area.

FPL 3 potential priority approaches and techniques

Based on the history of restoration planning and project implementation summarized above, the Council is considering funding restoration activities in future FPLs that would address primary ecosystem stressors such as salinity intrusion, erosion, hydrological alteration, and relative sea level rise. The Council will consider potential projects with the needs of the ecological region as a whole. The goal would be to reduce the rate of wetland loss and shoreline erosion, while possibly also addressing other important habitat features such as chenier ridges. Reducing the loss of these important natural resources would help the communities and economic sectors that rely upon the area's abundant fish and wildlife, while also helping to provide natural storm protection to this low-lying, high-risk area.

The Council may consider investing in projects to reduce wetland loss in the Chenier Plain of Louisiana. Within the Texas portion of the Chenier Plain, the Council may consider projects designed to restore hydrologic patterns within marsh systems, deliver sediments and nutrients to promote accretion of marsh soils at a rate capable of keeping up with relative sea level rise, and restore a sustainable Gulf shoreline ridge and dune system. In addition, possible improvements to water quality and quantity in this geographic area could include actions to

reduce excess nutrient and pollutant discharges to coastal watersheds through work in agricultural and forested lands.

Following are the priority approaches and techniques the Council is considering for the Chenier Plain:

Create, restore and enhance coastal wetlands, islands, shorelines, and headlands (see description in Section 2.2.1)

Potential techniques:

- Sediment placement
- Protect natural shorelines

Restore hydrology and natural processes (see description in Section 2.2.3)

Potential techniques:

- Restore hydrologic connectivity
- Restore natural salinity regimes

Reduce excess nutrients and other pollutants to watersheds (see description in Section 2.2.4)

Potential techniques:

- Agriculture and forest management

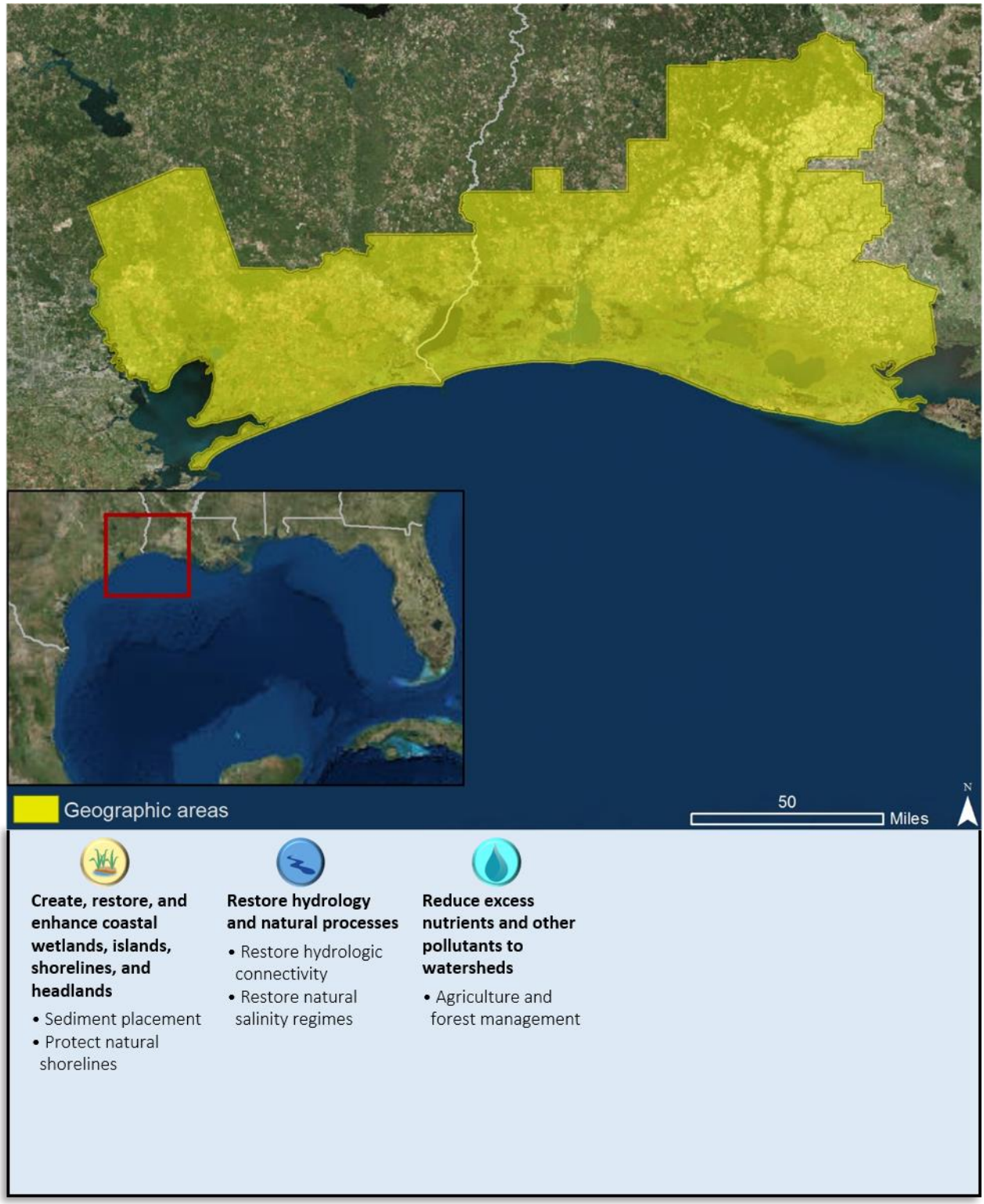

Figure 2.3.2. Priority approaches and techniques being considered in the Chenier Plain, Texas-Louisiana geographic area. Techniques are given as bullet points beneath priority approaches. All FPL 3 investments the RESTORE Council will make may not be captured, including activities of federally recognized tribes with interests in the Gulf, and activities with the primary objective "Promote natural resource stewardship and environmental education" or "Improve science-based decision-making processes."

2.3.3 Pontchartrain Basin, Louisiana-Mississippi

Comprehensive Plan goals and objectives

Work in this geographic area would seek to address the following Comprehensive Plan goals and objectives:

Primary goals:

- Restore and conserve habitat
- Restore water quality and quantity
- Replenish and protect living coastal and marine resources
- Enhance community resilience

Primary objectives:

- Restore, enhance, and protect habitats
- Restore, improve, and protect water resources
- Protect and restore living coastal and marine resources
- Restore and enhance natural processes and shorelines
- Promote community resilience

Background

The Pontchartrain Basin is a 10,000 square mile watershed that includes 16 Louisiana parishes and 4 Mississippi counties. It encompasses the area of the Maurepas Swamp, Lake Pontchartrain, Laplace, New Orleans, Slidell, Lake Borgne, and associated land formations out to the Chandeleur Islands. Mississippi Sound is also hydrologically connected to this basin. The environment includes freshwater swamps, brackish and saltwater marshes, and barrier islands. From rural farming communities to highly urban regions, the basin supports a population of approximately 2.1 million people (LPBF 2017).

This area faces challenges associated with reduced sediment and freshwater coming from the Mississippi River, shoreline erosion, sea level rise, and the degradation of major land formations such as wetlands and barrier islands (CWPPRA 2018). Resulting alterations in freshwater inputs (magnitude and duration) have impacted habitats and shellfish populations throughout the basin including Lake Maurepas, Lake Pontchartrain, Lake Borgne and Mississippi Sound. For example, high river flow events often provide benefits such as reducing disease or predation to oysters and other shellfish. However, there are often other cumulative impacts influenced by the magnitude, duration, and timing of any one event that could affect habitat and shellfish population recovery (LDWF 2016).

Many funding sources have and will continue to invest in this region of the Gulf of Mexico including CWPPRA, DWH NRDA, NFWF GEBF, employing techniques such as land acquisition, habitat management and stewardship, and controlled freshwater diversion. The 2015 Initial FPL also included projects that advance restoration planning in this area (2015 Initial FPL). Any additional investments that the RESTORE Council chooses to make in this region will continue to

be coordinated with these other efforts via Council members' overlapping roles as decision-makers for other funding sources.

Existing plans include large-scale projects to address the needs of this basin. For example, in the 2015 Initial FPL, the Council provided funding for the engineering and design of a controlled freshwater reintroduction from the Mississippi River into the Maurepas Swamp. This project is designed to reduce or minimize future loss of coastal forest habitat. Implementing such complex, large-scale restoration projects, while critical, can require addressing uncertainties. For example, this freshwater reintroduction raises questions pertaining to hydrodynamics, spatial, and temporal variabilities in habitat response, optimal residence time to maximize nutrient uptake, and the potential for salinity amelioration throughout the Pontchartrain Basin. Because of the complexities and uncertainties involved with Louisiana's first river reintroduction project targeting a coastal swamp, CPRA worked with a Technical Advisory Group (TAG) of forested wetland ecologists to develop performance measures and targets for key attributes of forested wetland ecosystem functioning and sustainability, including hydrology, vegetation, accretion, nutrients, and salinity (Krauss et al. 2017). Ongoing Council-funded activities include engineering and design, modeling prediction, data gathering and analysis, and creating an *Operations, Maintenance, Monitoring, and Adaptive Management Plan* (Buras et al. 2018) to help address such questions and reduce uncertainties prior to project implementation.

FPL 3 potential priority approaches and techniques

Restoration needs and projects have been identified through decades of study, planning, and implementation of projects in this region, as outlined in *Louisiana's Comprehensive Master Plan for a Sustainable Coast* (LA CPRA 2017). In particular, the Council will consider projects in this geographic area that contribute to flood protection and related benefits for surrounding communities, improve ecosystem sustainability of coastal habitats and resources (e.g., cypress-tupelo swamp, oysters), and increase longevity of important fish and wildlife habitats through restoration of wetlands and barrier islands. Such projects could re-establish hydrologic connectivity between the Mississippi River and the basin to re-establish freshwater flows and directly restore or protect marsh and barrier island habitat through a variety of techniques. In addition, possible improvements to water quality and quantity could include actions to reduce excess nutrient and pollutant discharges to coastal watersheds through work in agricultural and forested lands.

Following are the priority approaches and techniques the Council is considering for the Pontchartrain Basin:

Create, restore and enhance coastal wetlands, islands, shorelines, and headlands (see description in Section 2.2.1)

Potential techniques:

- Sediment placement
- Protect natural shorelines

Restore hydrology and natural processes (see description in Section 2.2.3)

Potential techniques:

- Restore hydrologic connectivity
- Controlled river diversions

Reduce excess nutrients and other pollutants to watersheds (see description in Section 2.2.4)

Potential techniques:

- Agriculture and forest management

Restore oyster habitat (see description in Section 2.2.5)

Potential technique:

- Living shorelines

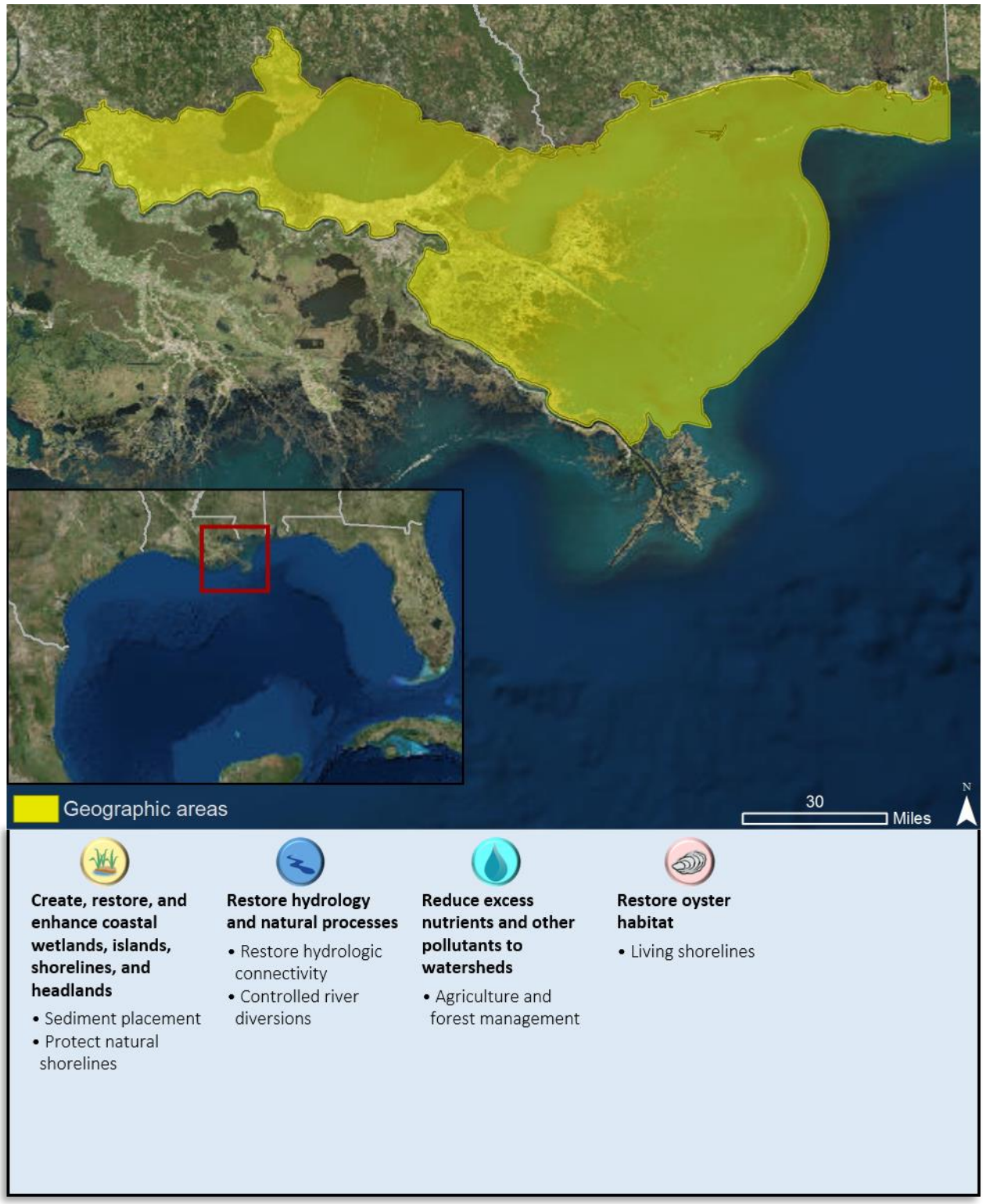

Figure 2.3.3. Priority approaches and techniques being considered in the Pontchartrain Basin, Louisiana-Mississippi geographic area. Techniques are given as bullet points beneath priority approaches. All FPL 3 investments the RESTORE Council will make may not be captured, including activities of federally recognized tribes with interests in the Gulf, and activities with the primary objective "Promote natural resource stewardship and environmental education" or "Improve science-based decision-making processes."

2.3.4 Mississippi Sound, Mississippi

Comprehensive Plan goals and objectives

Work in this geographic area would seek to address the following Comprehensive Plan goals and objectives:

Primary goals:

- Restore and conserve habitat
- Restore water quality and quantity
- Replenish and protect living coastal and marine resources
- Enhance community resilience

Primary objectives:

- Restore, enhance, and protect habitats
- Restore, improve, and protect water resources
- Protect and restore living coastal and marine resources
- Restore and enhance natural processes and shorelines
- Promote community resilience

Background

The Mississippi Sound geographic area encompasses a drainage area of approximately 1,545 square miles that empties into Mississippi and Alabama coastal waters and includes the Pearl and Pascagoula River watersheds (see Figure 2.3.4) (MDEQ 2019). Mississippi's coastal watersheds include barrier islands, marsh, maritime forest, pine savannah, cypress swamp, oyster reefs, seagrass, salt flats and other resources. These important coastal areas are threatened by a variety of stressors, including pollution from stormwater and wastewater system failures, coastal degradation from urban and industrial development, and altered hydrologic regimes (MDEQ 2018). The result has been a decline in the extent and health of critical habitats, including as much as a 90 percent decline in Mississippi's nationally important oyster reefs (Beck et al. 2009).

The RESTORE Council and the State of Mississippi have invested in several restoration activities to help address these challenges. In its 2015 Initial FPL the Council provided funding for landscape-scale planning and restoration based on beneficial use of dredged materials, land conservation and management, and hydrologic restoration planning in the Mississippi Sound region (2015 Initial FPL). Under the Spill Impact Component (or "Bucket 3") of the RESTORE Act, Mississippi is also investing in a Water Quality Improvement program that includes studies on water quality impairment in the Mississippi Sound and stormwater and wastewater system upgrades in the watershed. Additional Bucket 3 investments include creating living shorelines for reef restoration and shoreline protection and the beneficial use of dredged materials for marsh creation. These and continued restoration investments also build on other similar investments in the region by NFWF GEBF, DWH NRDA, and other federal, state, local, and non-

profit organizations, helping provide increased resilience for the ecosystems and economy of the Mississippi Gulf Coast.

Mississippi is investing in research and modeling activities to reduce uncertainties associated with potential restoration actions (RESTORE Council 2015). Uncertainties that may be related to the watersheds of the Mississippi Sound are subject to the impacts of sea level rise, storms, and freshwater flooding events (Posadas 2017). Additional uncertainties in the Mississippi Sound include how to coordinate projects across watersheds to maximize benefits (e.g., see Pontchartrain Basin discussion in Section 2.3.3) and the relationships between specific water quality pollutants and larger threats to habitats and human use. As more scientific understanding of the impact of certain restoration actions on Mississippi habitats and resources is gained, restoration endpoints can be adapted to reduce uncertainty and to help guide future restoration decisions. The Council will consider potential opportunities for funding projects and programs that provide cross-state benefits to this ecological region.

FPL 3 potential priority approaches and techniques

The Council is considering how to invest in Mississippi Sound restoration efforts in the upcoming FPL. Building upon past restoration planning and project implementation, the Council may fund restoration activities that would address primary ecosystem stressors that have degraded natural resources and the environmental quality of the Sound for many decades such as water quality impairments, coastal habitat loss and oyster reef degradation. Benefits of activities to address these stressors include the increased resilience of the habitats and communities of the Mississippi Gulf Coast through improved ecosystem health and water quality.

Following are the priority approaches and techniques under consideration for the Mississippi Sound:

Create, restore and enhance coastal wetlands, islands, shorelines, and headlands (see description in Section 2.2.1)

Potential techniques:

- Sediment placement
- Protect natural shorelines

Protect and conserve coastal, estuarine, and riparian habitats (see description in Section 2.2.2)

Potential techniques:

- Land acquisition
- Habitat management and stewardship

Reduce excess nutrients and other pollutants to watersheds (see description in Section 2.2.3)

Potential techniques:

- Agriculture and forest management
- Stormwater management
- Wastewater system improvements

Restore oyster habitat (see description in Section 2.2.5)

Potential techniques:

- Substrate placement
- Living shorelines
- Enhance spawning and reserves

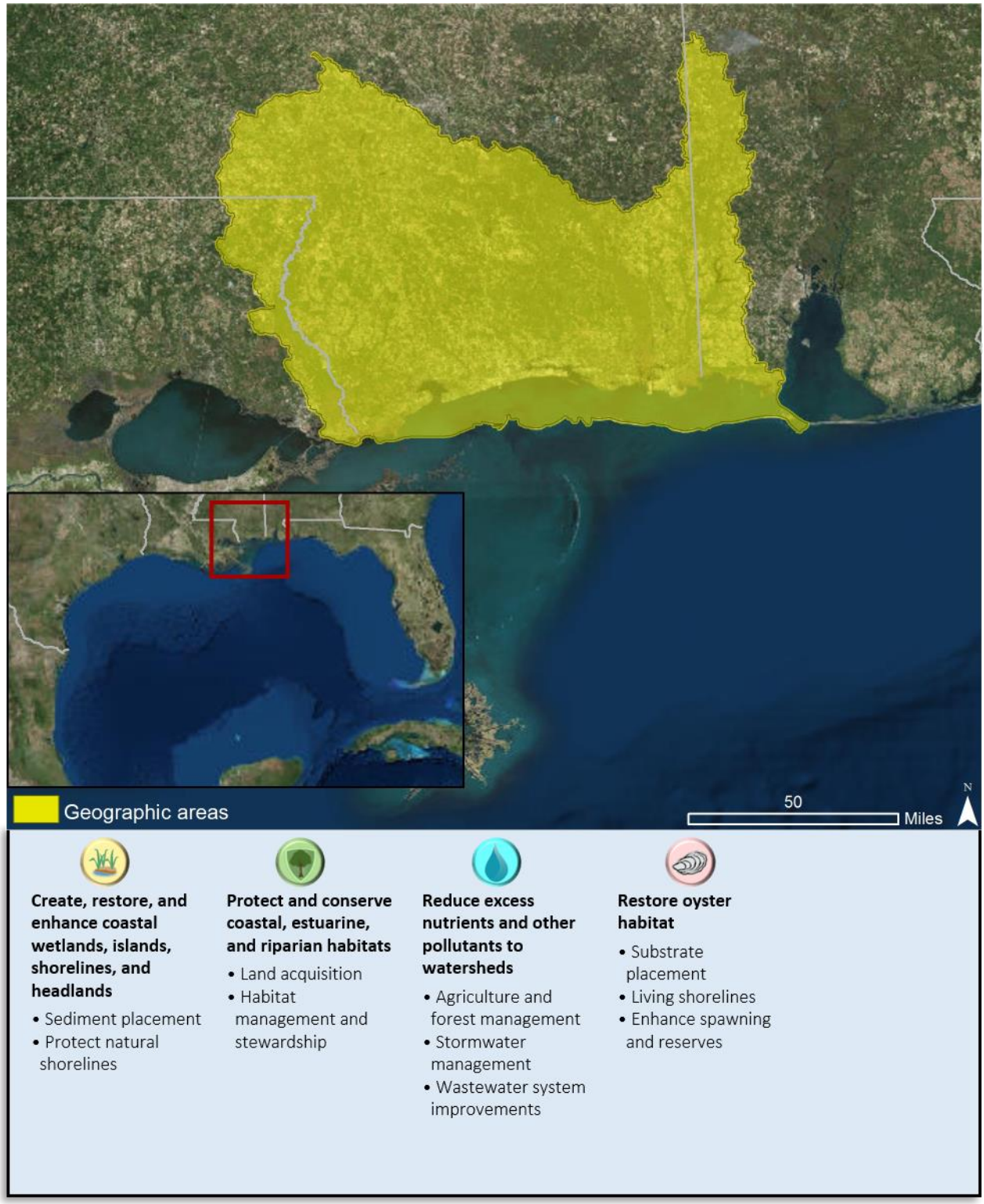

Figure 2.3.4. Priority approaches and techniques being considered in the Mississippi Sound, Mississippi geographic area. Techniques are given as bullet points beneath priority approaches. All FPL 3 investments the RESTORE Council will make may not be captured, including activities of federally recognized tribes with interests in the Gulf, and activities with the primary objective "Promote natural resource stewardship and environmental education" or "Improve science-based decision-making processes."

2.3.5 Mobile Bay and Mobile-Tensaw Delta, Alabama

Comprehensive Plan goals and objectives

Work in this geographic area would seek to address the following Comprehensive Plan goals and objectives:

Primary goals:

- Restore and conserve habitat
- Restore water quality and quantity
- Replenish and protect living coastal and marine resources
- Enhance community resilience

Primary objectives:

- Restore, enhance, and protect habitats
- Restore, improve, and protect water resources
- Protect and restore living coastal and marine resources
- Restore and enhance natural processes and shorelines
- Promote community resilience

Background

The Mobile Bay Watershed is the fourth largest drainage basin in North America. At over 43,000 square miles, it encompasses over 65 percent of the State of Alabama as well as portions of Mississippi, Georgia, and Tennessee. The watershed encompasses a vast, interconnected network of more than 250 waterways, ranging from large rivers to small sloughs. The terminus of the Mobile Bay watershed is Mobile Bay and its estuary, a diverse ecosystem that provides important ecosystem services and habitats for a number of commercially and recreationally important finfish and shellfish species and other wildlife. The Mobile Bay area also supports human uses for recreation and industry. Habitats in the Mobile Bay area include: beaches and dunes, fresh and saltwater wetlands, coastal maritime forests, longleaf pine habitats, seagrass, oyster reefs, streams and rivers and associated riparian areas, and subtidal habitats (MBNEP 2013, US EPA 2014).

Stressors that threaten the health and vibrancy of the Mobile Bay system include: habitat fragmentation, disruption of natural hydrologic flows, dredging and filling activities, fire suppression, land use changes, nutrient pollution, sedimentation and pathogen contamination impacting the waterways. Healthy water quality is a foundational element of coastal ecosystem health and community resilience. The State of Alabama considers septic to sewer conversion projects as well as updates to sewer and stormwater infrastructure to be a priority. Restoring and enhancing oyster reefs is a long-standing goal in Alabama. Oysters represent an important feature of our coastal heritage and are an integral component of Alabama's seafood industry. Oyster reefs also play an important role in the ecosystem—providing habitat for other species, helping to filter water, and potentially providing shoreline protection benefits depending on location. Additionally, re-establishing natural connections between the freshwater systems of

the Mobile-Tensaw Delta with Mobile Bay would provide multiple benefits to habitats and natural resources of the region. The Mobile Bay Causeway (U.S. Highway 90/98) is located at the transition of the five river Mobile-Tensaw Delta to Mobile Bay. The Causeway was constructed in 1927 by filling the marsh areas, resulting in the roadway acting to impede flow between areas north and south of the Causeway. This has interrupted natural processes of the delta system and estuary for many decades.

The State of Alabama has invested DWH restoration funds in an array of projects across coastal Alabama. Through the 2015 Initial FPL the RESTORE Council has supported development of watershed management plans, living shorelines, marsh, and submerged aquatic vegetation restoration (2015 Initial FPL). Additionally, investments in land acquisition, habitat restoration and support of science for improved management have been made with NFWF GEBF and DWH NRDA funds. In the past several years, the State of Alabama, in partnership with entities such as the Mobile Bay National Estuary Program (MBNEP), have implemented a number of projects in the Mobile Bay area to improve water quality and enhance ecosystem form and function. The MBNEP'S assistance with characterizing sub-watersheds in South Alabama as part of broader watershed management planning efforts provides one example of Alabama's commitment to leverage funding sources and partnership opportunities to improve the health of the Mobile Bay.

Implementing restoration at the scale of a large estuary such as Mobile Bay inherently creates a degree of uncertainty for obtaining the desired restoration outcomes. For example, stormwater and sewer management in a region with rapid growth and aging infrastructure creates a multifaceted problem with no single solution. A systematic evaluation of the best immediate actions to address water quality, as has been proposed by the Alabama Department of Conservation and Natural Resources, is a strategic step in a cost-benefit analysis for efficiency and impact.

FPL 3 potential priority approaches and techniques

Restoration needs have been identified from previous efforts by local, state, federal, and non-profit organizations that manage resources and support sustainable use in the bay. Based on prior investments and related analyses of stressors in the Mobile Bay system and surrounding watershed, the Council may consider projects that will improve habitat conditions by addressing water quality impairments, directly restoring oyster reef habitat, and focusing on re-establishing hydrologic connections along the Mobile Bay Causeway. These priorities have been outlined as critical needs for the estuary and related communities in numerous plans (MBNEP 2013, US EPA 2014). Projects selected for inclusion in FPL 3 could address one or more of the above-listed stressors in one or more of the priority sub-watersheds identified by the Mobile Bay National Estuary Program.

Following are the priority approaches and techniques under consideration for Mobile Bay and Mobile-Tensaw Delta:

Restore hydrology and natural processes (see description in Section 2.2.3)

Potential technique:

- Restore hydrologic connectivity

Reduce excess nutrients and other pollutants to watersheds (see description in Section 2.2.4)

Potential technique:

- Agriculture and forest management
- Stormwater management
- Wastewater system improvements

Restore oyster habitat (see description in Section 2.2.5)

Potential techniques:

- Substrate placement
- Enhance spawning and reserves

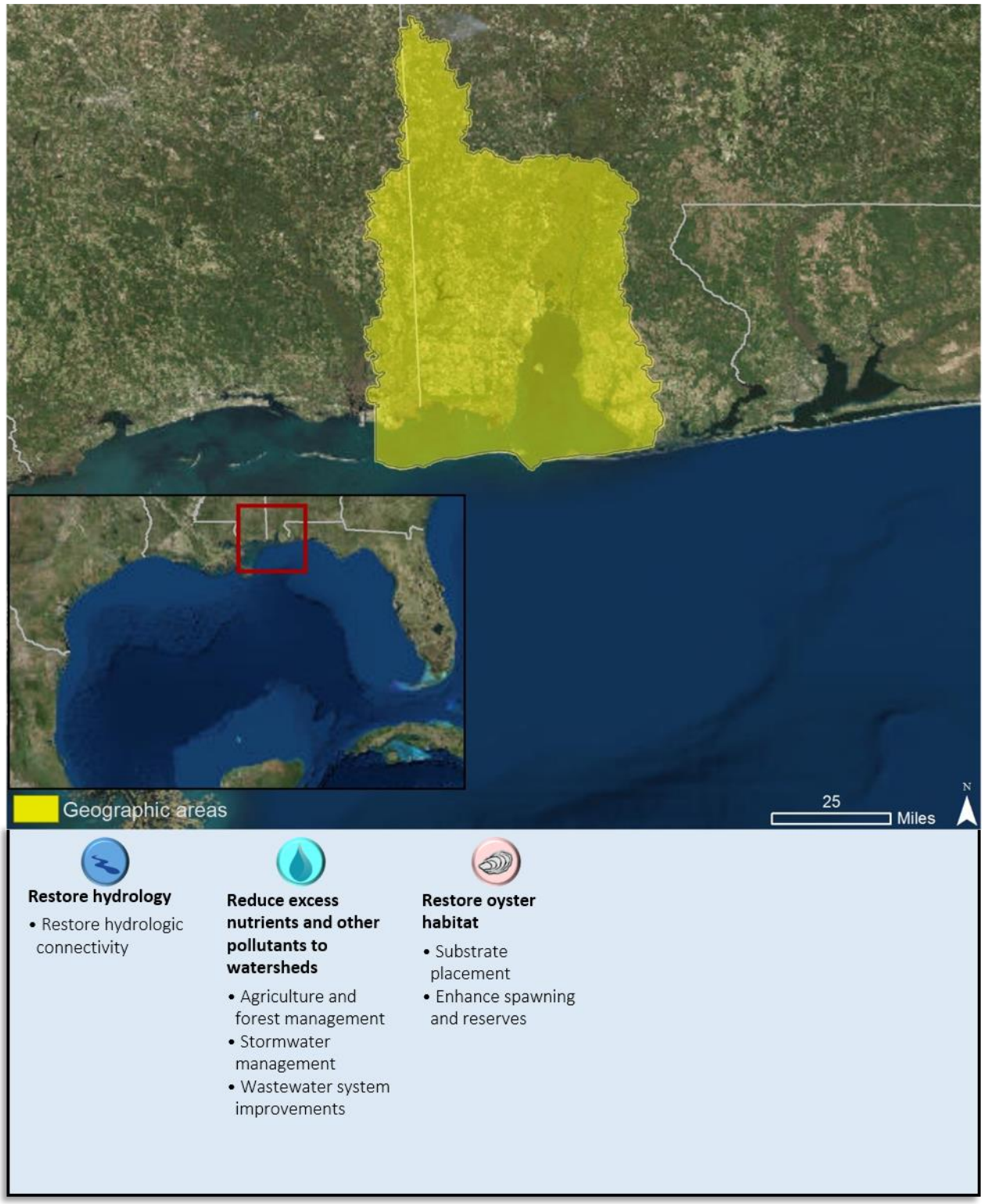

Figure 2.3.5. Priority approaches and techniques being considered in the Mobile Bay and Mobile-Tensaw Delta, Alabama geographic area. Techniques are given as bullet points beneath priority approaches. All FPL 3 investments the RESTORE Council will make may not be captured, including activities of federally recognized tribes with interests in the Gulf, and activities with the primary objective "Promote natural resource stewardship and environmental education" or "Improve science-based decision-making processes."

2.3.6 Perdido River and Bay, Alabama-Florida

Comprehensive Plan goals and objectives

Work in this geographic area would seek to address the following Comprehensive Plan goals and objectives:

Primary goals:

- Restore and conserve habitat
- Restore water quality and quantity
- Replenish and protect living coastal and marine resources

Primary objectives:

- Restore, enhance, and protect habitats
- Restore, improve, and protect water resources
- Protect and restore living coastal and marine resources

Background

Located in Southern Alabama (70 percent of the watershed) and Northwest Florida (30 percent of the watershed), the Perdido Watershed covers approximately 1,100 square miles and is dominated by the 63 mile-long Perdido River, designated as an outstanding Florida waterway (NWFWMD 2017b). The Perdido River provides most of Perdido Bay's freshwater. The watershed includes floodplain forests, hydric pine forests, longleaf pine forests, and freshwater wetlands.

The Perdido Watershed plays a critical role in the health of the ecosystem of Southeast Alabama and Northwest Florida. The components of the watershed, including the tributaries, floodplains, bayous, and wetlands of the Perdido provide water quality and quantity protection through healthy floodplains; healthy floodplains store and disperse runoff from storms and recharge aquifers. Undeveloped areas act as natural filters, protecting water quality of coastal waters that sustain wildlife such as recreationally and commercially important fish and oyster resources. The wetlands of the Perdido Watershed and coastal barrier islands also provide resiliency and protection against climate risks, hurricanes, and other storm events (NWFWMD 2017b).

Stressors in the watershed include water quality issues emanating from nonpoint source pollution, including the use of onsite septic systems and runoff associated with agriculture and silviculture activities (NWFWMD 2017b). Land use conversion and urbanization have contributed to the loss of habitats, including 80 percent of historic seagrass habitats, and have impaired the water quality of waterbody segments in both Alabama and Florida (Kirschenfeld et al. 2007). Development on the Florida side of the watershed is rapidly expanding, increasing the demand for land development in this natural watershed.

In the 2015 Initial FPL, the Council funded the development of watershed plans for this geographic area, the establishment of an estuary program, and the implementation of submerged aquatic vegetation (SAV) restoration and monitoring. Investments in the Perdido River and Bay area have also been made by other federal, state, and non-profit organizations. For example, projects have been funded to restore dune habitat and to construct and enhance artificial reef habitat in waters offshore of Perdido Bay, through DWH NRDA (DWH NRDA 2015, DWH NRDA 2016b) and NFWF GEBF respectively. Any additional investments that the RESTORE Council chooses to make in this region will continue to be coordinated with these other efforts and the Pensacola and Perdido Bays Estuary Program via Council members' overlapping roles as decision-makers for other funding sources.

Working at the scale of a watershed to provide comprehensive benefits from habitat conservation and water quality improvements creates uncertainties for achieving long-term watershed goals. Given the potential development pressure for this riparian corridor, strategic land conservation and land-use management are low risk methods to mitigate impacts from future development. Uncertainties arise from the balance of providing adequate buffers from conservation lands protecting against the unknown future extent and location of urbanization impacts. The RESTORE Council will consider potential opportunities for funding projects and programs that provide cross-state benefits to this ecological region.

FPL 3 Potential priority approaches and techniques

Through development of management actions plans for this region and by keeping ahead of anticipated development trends, the States of Alabama and Florida have identified a number of priority conservation targets in the Perdido Watershed to limit impacts from current land use practices and forecasted development. Conserving and restoring lands are a foundational strategy for addressing habitat and water quality conservation in a watershed with current low levels of development. The RESTORE Council will consider habitat acquisition projects that serve as an effective buffer to the Perdido River and Bay and increase habitat connectivity to act as migratory corridors for rare and endangered or threatened species. The Council will consider addressing conservation goals through restoration of existing priority habitats from historical degradation and target existing water quality impacts from stressors derived from silviculture, wastewater, and stormwater management. In coordination with planned water quality improvements, the Council also will consider investments in oyster habitat restoration in the bay through substrate placement and the construction of living shorelines. The collective effects from these strategies will likely provide the efficient measures to protect against identified current and future watershed stressors and habitat degradation.

Following are the priority approaches and techniques under consideration for Perdido River and Bay watershed:

Protect and conserve coastal, estuarine, and riparian habitats (see description in Section 2.2.2)

Potential techniques:

- Land acquisition

- Habitat management and stewardship

Reduce excess nutrients and other pollutants to watersheds (see description in Section 2.2.4)

Potential techniques:

- Agriculture and forest management
- Stormwater management
- Erosion and sediment control
- Wastewater system improvements

Restore Oyster Habitat (see description in Section 2.2.5)

Potential techniques:

- Substrate placement
- Living shorelines

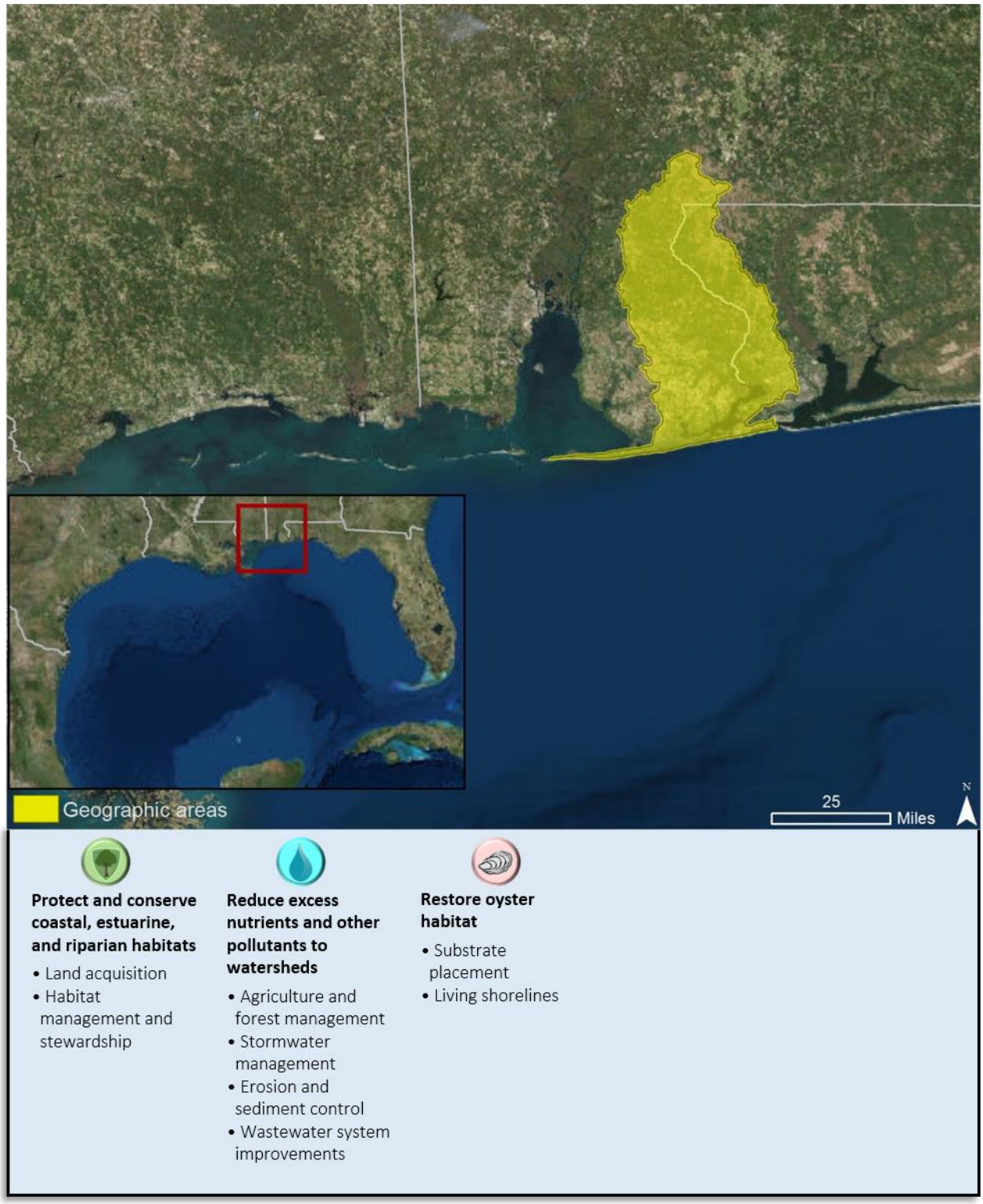

Figure 2.3.6. Priority approaches and techniques being considered in the Perdido River and Bay, Alabama-Florida geographic area. Techniques are given as bullet points beneath priority approaches. All FPL 3 investments the RESTORE Council will make may not be captured, including activities of federally recognized tribes with interests in the Gulf, and activities with the primary objective "Promote natural resource stewardship and environmental education" or "Improve science-based decision-making processes."

2.3.7 Florida

Comprehensive Plan goals and objectives

Work in this geographic area would seek to address the following Comprehensive Plan goals and objectives:

Primary goals:

- Restore and conserve habitat
- Restore water quality and quantity
- Replenish and protect living coastal and marine resources
- Enhance community resilience

Primary objectives:

- Restore, enhance, and protect habitats
- Restore, improve, and protect water resources
- Protect and restore living coastal and marine resources
- Restore and enhance natural processes and shorelines
- Promote community resilience

Background

Florida's natural resources are the foundation of the state's communities, economy, and way of life. Along the Gulf Coast alone, Florida has more than 7.4 million acres of tidally submerged lands. The state's sandy beaches are consistently ranked among the best in the nation, and millions of residents and visitors alike come to Florida's Gulf Coast each year to fish, dive, swim, and view wildlife.

Florida has shown that it is possible to successfully grow a robust economy and protect environmental resources at the same time. For example, Florida has the most comprehensive set of nutrient standards for water quality in the nation. The protection and restoration of water resources and other natural resources is guided by comprehensive planning efforts including Basin Management Action Plans (BMAPs), which serve as a blueprint for restoring impaired waters by reducing nutrient pollution to meet Total Maximum Daily Loads (TMDLs), Surface Water Improvement Plans (SWIM), which evaluate and address water quality and quantity stressors at a watershed level, and the *Florida Gulf Environmental Benefit Fund (GEBF) Restoration Strategy*, which is an overarching framework for restoring and conserving the natural resources of Florida's Gulf Coast (FL FWC and FL DEP 2018). Through these planning efforts, stressors and threats were identified to natural resources in Florida including nutrient pollution from a variety of sources, hydrologic alterations, and habitat fragmentation. Furthermore, these adverse impacts to water quality and quantity harm aquatic habitat and reduce fish and shellfish populations.

Funding from the DWH oil spill settlements has been directed towards addressing stressors and priorities identified for Gulf Coast watersheds in the various restoration plans discussed throughout this document. For example, in Pensacola Bay DWH funds have been invested and

leveraged towards living shorelines (DWH NRDA 2014, 2015 Initial FPL, NFWF GEBF 2015, NFWF GEBF 2018) and implementation of the BMAP for Bayou Chico, including septic tank replacements, improved stormwater management, contaminated sediment removal, and stream restoration (2015 Initial FPL, NFWF GEBF 2014). DWH funds have been heavily invested in oyster restoration in Apalachicola Bay (2015 Initial FPL, NFWF GEBF 2013b, DWH NRDA 2014). In the Suwannee River watershed DWH funds will be used for improving water quality from agricultural activities, improving hydrology at the National Wildlife Refuge, and facilitating large-scale habitat conservation (2015 Initial FPL, NFWF GEBF 2019b, DWH NRDA 2019). The Florida Gulf Consortium is investing RESTORE Act Spill Impact Component funding (Bucket 3) in septic to sewer conversions in several coastal watersheds, along with other projects to improve water quality and restore the ecosystem and economy of the Florida Gulf Coast (Gulf Consortium 2018). DWH funds have been invested throughout Florida's Gulf Coast watersheds to improve water quality, hydrology, and habitats, and Florida will continue to collaborate among these DWH funding partners to build on existing investments and ensure that future investments are targeted towards priority restoration activities.

FPL 3 potential priority approaches and techniques

For FPL 3, the RESTORE Council may consider building on existing restoration investments in the Panhandle and addressing critical needs in other parts of the Florida coast. Potential investments in the Panhandle could be directed toward longleaf pine ecosystems, living shorelines, contaminated sediment removal, and erosion and sediment control. In other parts of the coast, the Council is considering investments in living shorelines, oyster reefs, nutrient reduction, and large-scale hydrologic restoration.

Following are the priority approaches and techniques the Council is considering in Florida:

Create, restore and enhance coastal wetlands, islands, shorelines, and headlands (see description in Section 2.2.1)

Potential technique:

- Protect natural shorelines

Protect and conserve coastal, estuarine, and riparian habitats (see description in Section 2.2.2)

Potential techniques:

- Land acquisition
- Habitat management and stewardship

Restore hydrology and natural processes (see description in Section 2.2.3)

Potential techniques:

- Restore hydrologic connectivity

Reduce excess nutrients and other pollutants to watersheds (see description in Section 2.2.4)

Potential techniques:

- Agriculture and forest management
- Stormwater management
- Erosion and sediment control
- Wastewater system improvements

Restore oyster habitat (see description in Section 2.2.5)

Potential technique:

- Substrate placement
- Living shorelines

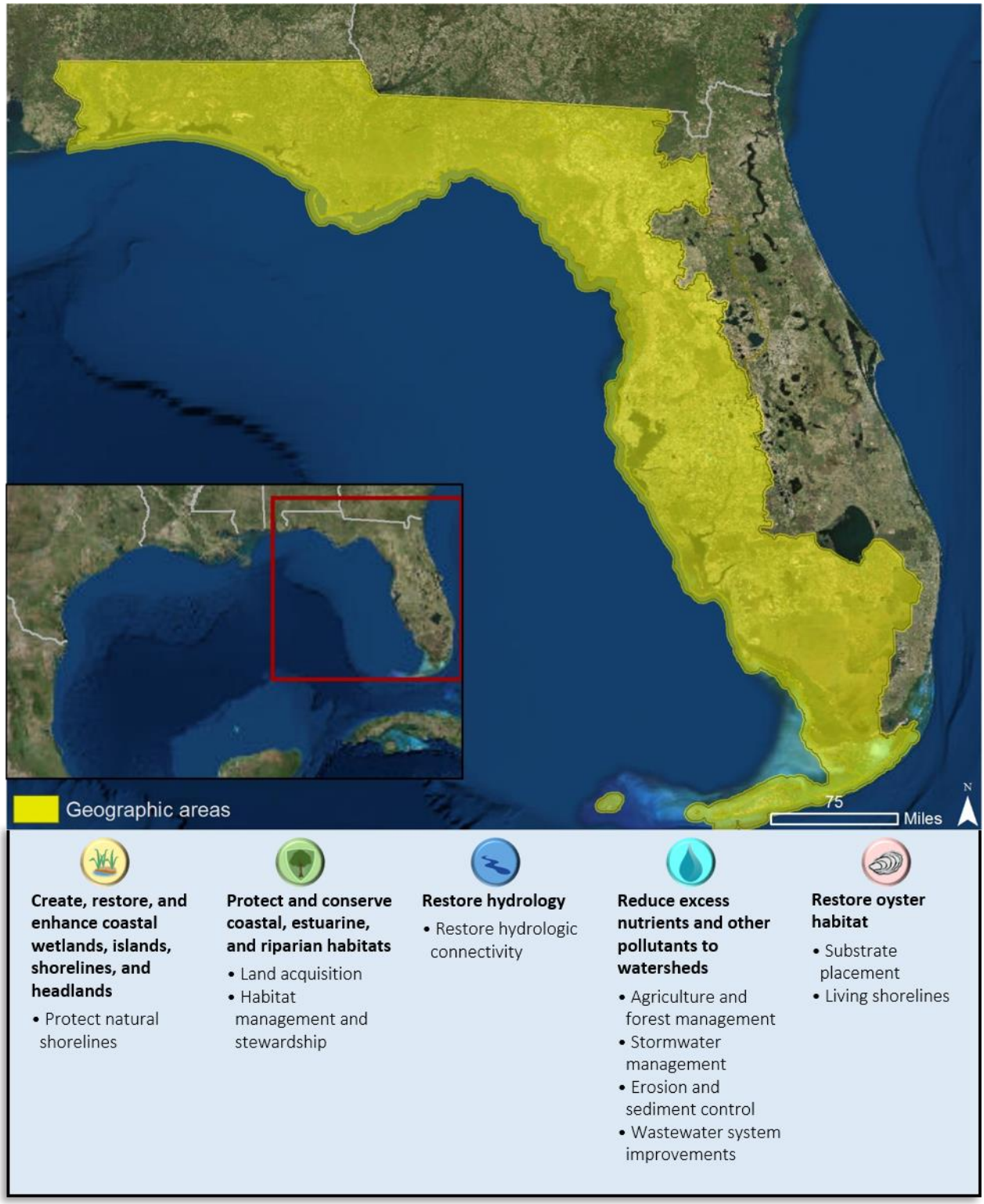

Figure 2.3.7. Priority approaches and techniques being considered in the Florida geographic area. Techniques are given as bullet points beneath priority approaches. All FPL 3 investments the RESTORE Council will make may not be captured, including activities of federally recognized tribes with interests in the Gulf, and activities with the primary objective "Promote natural resource stewardship and environmental education" or "Improve science-based decision-making processes."

2.3.8 Gulfwide

Comprehensive Plan goals and objectives

Work in this geographic area would seek to address the following Comprehensive Plan goals and objectives:

Primary goals:

- Restore and conserve habitat
- Restore water quality and quantity
- Replenish and protect living coastal and marine resources
- Enhance community resilience

Primary objectives:

- Restore, enhance, and protect habitats
- Restore, improve, and protect water resources
- Protect and restore living coastal and marine resources
- Restore and enhance natural processes and shorelines
- Promote community resilience
- Promote natural resources stewardship and environmental education
- Improve science-based decision-making

Background

In addition to focusing on particular geographic areas, Gulfwide investments are important to support holistic ecosystem restoration and lay the foundation for future success. In developing project ideas, the Council will consider how mutual priorities across multiple geographic areas may be combined to create "Gulfwide" programs. For example, to invest in the oyster reef restoration priority approach in a more holistic way, members could choose to coordinate implementation using similar techniques and metrics of success in multiple geographic areas.

Additionally, projects that address the Comprehensive Plan objectives to "Promote natural resource stewardship and environmental education" (Natural resource stewardship) and "Improve science-based decision-making processes" (Science-based decision-making) are cross-cutting, Gulfwide objectives that the Council values as essential to successfully reaching its restoration goals. Promoting environmental stewardship and education can provide long-term benefits by increasing awareness of the value of natural resources to community well-being and building community capacity for ecosystem restoration-related engagement. Projects and programs that meaningfully contribute to restoration while also economically benefiting coastal communities through environmental education, training, and opportunities to implement conservation projects may be considered for funding as part of any FPL.

Similarly, investments that support science-based decision-making and/or improve our ability to plan for acute events, such as hurricanes or potential oil spills, can help the Council meet its commitments to best available science and measuring outcomes. In the 2015 Initial FPL and the CPS FPL, the Council invested in the Council Monitoring and Assessment Workgroup (CMAWG)

to support the Council in identifying the monitoring, data management, and analyses necessary to track restoration success. The Council will build on its investment in CMAWG through ongoing and future investments in decision-support tools, monitoring, and assessments critical for effective restoration planning, identifying restoration outcomes, and informing adaptive management at different geographic scales across the Gulf of Mexico. Particularly for those techniques with which the Council has less experience, it will rely on monitoring, targeted data collection, modeling, and adaptive management to address critical uncertainties and maximize restoration benefits.

FPL 3 potential priority approaches and techniques

As shown in Figure 2.1.2, all of the priority approaches and techniques could be considered for Gulfwide projects and programs. Projects and programs designed to broadly meet the objectives of Natural resource stewardship and Science-based decision-making and those that address these objectives via specific priority restoration approaches and techniques, may be considered for future funding by the Council. In addition, the Council will consider how these objectives may be advanced by all other proposed FPL projects and programs.

3. Summary and Next Steps

3.1. Summary

For the RESTORE Council, the Planning Framework draft represents another step toward meeting the commitments of improved, transparent, and collaborative planning and decision-making made in the 2016 Comprehensive Plan Update. The priority approaches and associated techniques discussed in this document and their application within certain geographic areas are intended to provide the public and potential funding partners with a better understanding of the context under which projects will be developed as part of FPL 3. The Council views the Planning Framework as a "living document" that will support the Council's continued efforts to build upon prior restoration investments during the project or program selection process. As part of the development process for future FPLs (e.g., FPL 4, FPL 5, etc.), this Planning Framework will be reviewed and revised as needed.

Once the Planning Framework is finalized, Council members will identify and develop project and program proposals for FPL 3 funding consideration. In the FPL 3 document, the projects and programs selected for funding will be described with greater specificity, in scope and location, along with the rationale for the investments in those locations. In addition to RESTORE Act activities, the Council will consider restoration activities funded by DWH NRDA, NFWF GEBF, and other Gulf of Mexico region restoration efforts as it determines future funding priorities.

Once the Council has considered all project or program proposals and developed an FPL 3 draft, Council members will again solicit input from the public during a future public comment period. The public will have an opportunity to comment on the draft FPL 3 before the final list of projects is selected for funding.

3.2. Public Input Request

Beginning April 26 through 11:59 pm MDT June 12, 2019, the public can provide feedback using one of the following options:

- Go to www.restorethegulf.gov for
    - Online link to the Planning, Environment and Public Comment (PEPC) site
    - In-person public meetings schedule
- By mail:

  Gulf Coast Ecosystem Restoration Council
  Attention: Planning Framework Comments
  500 Poydras Street, Suite 1117
  New Orleans, LA 70130
- By email to restorecouncil@restorethegulf.gov

At present, the Council is only soliciting public comments relating to the Planning Framework, and not on particular projects and programs for FPL 3. Upon completion of the public comment

period, the Council will consider all comments as it finalizes the Planning Framework and develop a Response to Comments document. Both the final Planning Framework and Response to Comments documents will be made available to the public on the Council's website (www.restorethegulf.gov).

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Appendix I – Glossary of Terms

Planning Framework: **Glossary**

Terms and references	Description
2013 Initial Comprehensive Plan	**2013 Initial Comprehensive Plan**: Restoring the Gulf Coast's Ecosystem & Economy: This document represents the Council's initial strategy for achieving a healthy Gulf. The strategy focuses on the five Comprehensive Plan goals that address habitat, water, marine resources, community resilience, and the Gulf economy. In the 2013 Initial Comprehensive Plan, the Council committed to an overarching framework for an integrated and coordinated approach to region-wide Gulf Coast restoration and to help guide the collective actions at the local, state, tribal, and federal levels.
2015 Initial FPL	**2015 Gulf Coast Ecosystem Restoration Council Initial Funded Priorities List:** In this FPL, the Council approved approximately $156.6 million from the Transocean and Anadarko settlements for restoration and conservation activities that focus on habitat and water quality based on a watershed/estuarine approach, as well as several Gulfwide projects. These activities are intended to provide near-term "on-the-ground" ecological results, while also building a planning and science foundation for future success of projects.
2016 Comprehensive Plan Update	**2016 Comprehensive Plan Update:** Restoring the Gulf Coast's Ecosystem & Economy: Based on a review of the process used to develop the 2015 Initial FPL which involved both Council and public input, the Council released the 2016 Comprehensive Plan Update: Restoring the Gulf Coast's Ecosystem & Economy. The 2016 Comprehensive Plan Update presents the Council's vision for long-term restoration in the Gulf of Mexico. This vision is to promote a "healthy and productive Gulf ecosystem achieved through collaboration on strategic restoration projects and programs." The plan does not include a prescriptive process for selecting specific projects or programs. Instead, it describes Council's commitment to enhanced collaboration to ensure that future Council investments address the highest priority restoration needs of the Gulf. The 2016 Comprehensive Plan Update also commits to enhanced coordination among restoration funding partners, public engagement, and use of best available science in developing and selecting restoration projects.
Activity 2016 Comprehensive Plan Update, p.15	A general term used by the RESTORE Council that includes both projects and programs and may also be used to describe components of a project or program. For example, on the 2015 Initial FPL, all the funded projects and programs on the list could be referred to as restoration "activities."
Beneficial use	Use of sediment dredged or excavated from existing shipping channels, harbors, and waterways for beneficial purposes such as restoration, creation, or protection of wetlands, eroding shorelines, beaches, barrier islands, or rookery islands. It is an alternative to disposing of this material in open water, confined disposal facilities, or uplands disposal facilities.
BP	Formerly British Petroleum
Breakwaters	Structures that protect a shore area, harbor, anchorage or basin from waves.
CMAWG 2016 Comprehensive	**Council Monitoring and Assessment Workgroup:** The council invested in the development of a monitoring and assessment program in both the the 2015 Initial FPL and the CPS FPL. In doing so, the Council Monitoring and Assessment Workgroup

Terms and references	Description
Plan Update, p.64	(CMAWG) was established to support the RESTORE Council in the development of monitoring standards and protocol recommendations necessary to track current and future restoration success. The CMAWG consists of eleven representatives: one representative and one alternate representative for each RESTORE Council Member.
Coastal wetlands	Plant communities that are influenced by saltwater from the Gulf. This can include salt marshes, brackish marshes, tidal freshwater marshes and swamps, mangrove swamps, and beaches and dunes. Coastal wetlands habitats provide a variety of ecosystem benefits to people and the environment.
Community resilience 2016 Comprehensive Plan Update, p.15	From a Council perspective, activities that support community resilience seek to build and sustain Gulf Coast communities' capacity to adapt to short- and long-term natural and manmade hazards, particularly increased flood risks associated with sea-level rise and environmental stressors.
Council-Selected Restoration Component/ Bucket 2	The Council has oversight of the expenditure of 60 percent of the funds made available from the Gulf Coast Restoration Trust Fund. Under the Council-Selected Restoration Component (often called Bucket 2 in reference to the five "buckets" to which funds from the Trust are allocated), 30 percent of available funding (approximately $1.6 billion plus a portion of the interest accrued in the Trust Fund) is administered for Gulfwide ecosystem restoration and protection according to the 2013 and 2016 Comprehensive Plans developed by the Council.
Council/ RESTORE Council Subtitle F- Gulf Coast Restoration (31)	**Gulf Coast Ecosystem Restoration Council**: In addition to creating the Gulf Coast Restoration Trust Fund, the RESTORE Act established the Gulf Coast Ecosystem Restoration Council. The Council is currently chaired by the Administrator of the U.S. Environmental Protection Agency and includes the Governors of the States of Alabama, Florida, Louisiana, Mississippi and Texas, and the Secretaries of the U.S. Departments of Agriculture, the Army, Commerce, Homeland Security, and the Interior.
CPS FPL	**2018 Commitment and Planning Support Funded Priorities List:** Rather than funding specific restoration projects or programs, the 2018 CPS FPL dedicates funds over a five-year period to help Council members meet 2016 Comprehensive Plan Update commitments. Council members use CPS funds to pay for the travel for members to effectively collaborate. CPS FPL funds also provide a means for members to develop and implement their own processes for working with potential funding partners, stakeholders, and the public to generate project ideas.
Clean Water Act	A federal law that was enacted in 1948 as the Federal Water Pollution Control Act and significantly amended in 1972 to become commonly known as the CWA. The CWA establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.
CWPPRA	**The Coastal Wetlands Planning, Protection and Restoration Act** is a federal law enacted in 1990, designed to identify, prepare, and fund construction of coastal wetlands restoration projects in Louisiana.
CZMA	**The Coastal Zone Management Act (CZMA)** is a federal law enacted in 1972 that provides for the management of the nation's coastal resources, including the Great

Terms and references	Description
	Lakes. The goal of the CZMA is to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone."
DWH	***Deepwater Horizon***
DWH NRDA	***Deepwater Horizon* Natural Resource and Damage Assessment.** In accordance with the Oil Pollution Act of 1990, federal and state agencies came together to form the *Deepwater Horizon* Natural Resource Damage Assessment trustees. The trustees continue to study the effects of the DWH oil spill and fund activities to restore the Gulf of Mexico to its condition prior to the spill.
Estuarine	Estuaries and their surrounding wetlands are bodies of water usually found where rivers meet the sea. Estuaries are home to unique plant and animal communities that have adapted to brackish water—a mixture of fresh water draining from the land and salty seawater. Estuarine habitats provide a variety of ecosystem benefits to people and the environment.
FPL Initial FPL in 2015 CPS FPL in 2018	**Funded Priorities List:** A list of the projects and programs that the RESTORE Council has voted on to approve for funding as well as activities to be considered for potential future funding. The Council approved its Initial FPL in 2015, the CPS FPL in 2018, and is preparing to develop FPL 3.
Geographic areas Details on how priority approaches may be applied for different geographic areas can be found in Section 2.3 of the Planning Framework.	The geographic areas described in the Planning Framework serve as a way to provide linkages between needs and stressors of an area and the priority restoration approaches and techniques that the Council is considering within those areas at present. **The geographic areas described in the current draft Planning Framework are:** Texas Chenier Plain, Texas-Louisiana Pontchartrain Basin, Louisiana-Mississippi Mississippi Sound, Mississippi Mobile Bay and Mobile-Tensaw Delta, Alabama Perdido River and Bay, Alabama-Florida Florida Gulfwide
Goals	As stated in the 2016 Comprehensive Plan Update, the goals provide the overarching framework for an integrated and coordinated approach to Gulf Coast Region restoration and help guide actions at the local, state, tribal and federal levels. **The Council has committed to the following five goals:** **Goal 1: Restore and Conserve Habitat:** Restore and conserve the health, diversity, and resilience of key coastal, estuarine, and marine habitats. **Goal 2: Restore Water Quality and Quantity Restore** and protect the water quality and quantity of the Gulf Coast region's fresh, estuarine, and marine waters. **Goal 3: Replenish and Protect Living Coastal and Marine Resources:** Restore and protect healthy, diverse, and sustainable living coastal and marine resources. **Goal 4: Enhance Community Resilience:** Build upon and sustain communities with capacity to adapt to short- and long-term changes. **Goal 5: Restore and Revitalize the Gulf Economy:** Enhance the sustainability and

Terms and references	Description
	resiliency of the Gulf economy.
Gulf	Gulf of Mexico
Gulf Coast Region	The Department of the Treasury regulation at 31 CFR § 34.2 defines **Gulf Coast Region** as (1) In the Gulf Coast States, the coastal zones defined under section 304 of the Coastal Zone Management Act of 1972 that border the Gulf of Mexico; (2) Land within the coastal zones described in paragraph (1) of this definition that is held in trust by, or the use of which is by law subject solely to the discretion of, the Federal Government or officers or agents of the Federal Government; (3) Any adjacent land, water, and watersheds, that are within 25 miles of the coastal zone described in paragraphs (1) and (2) of this definition; and (4) All Federal waters in the Gulf of Mexico.
Headlands	Narrow pieces of land that project from a coastline into a body of water. Headlands break the impact of destructive ocean waves before they can reach the estuary or mainland, consequently protecting them.
Hydrology	The occurrence, distribution, movement and properties of the waters of the earth and their relationship with the environment.
Intertidal habitats	Habitats found on shorelines between high and low tide. The intertidal zone is underwater during high tide and exposed to air during low tide. Intertidal habitats are home to diverse species.
Invasive species	Any kind of living organism—an amphibian, plant, insect, fish, fungus, bacteria, or even an organism's seeds or eggs—that is not native to an ecosystem and causes harm. They can harm the environment, the economy, or even human health. Non-native species that grow and reproduce quickly, and spread aggressively, with potential to cause harm, are often given the label "invasive."
Landscape-level restoration	Improvement of a degraded ecosystem on a large, system-level scale (e.g. by watershed, estuary, or ecoregion) working across landscapes through a holistic, interconnected ecosystem-based approach to rebuild ecological and functional integrity and enhance people's lives.

Terms and references	Description
Living shoreline	A protected, stabilized coastal edge made of natural materials such as plants, sand, or rock. Unlike concrete seawalls or other hard structures, which impede the growth of plants and animals, living shorelines grow over time. Natural infrastructure solutions like living shorelines provide wildlife habitat, as well as natural resilience to communities near the waterfront. Living shorelines are sometimes referred to as nature-based, green, or soft shorelines.
MIP	**Multiyear Implementation Plan.** The plan submitted by entities eligible for funding directly from the Department of the Treasury (Treasury) under the RESTORE Direct Component/Bucket 1 and described at 31 CFR § 34.303 of the RESTORE Act regulations published by Treasury.
Natural shorelines	Naturally occurring shoreline habitats that are not armored by structures such as seawalls, bulkheads or revetments.
NFWF GEBF	**National Fish and Wildlife Foundation (NWFW) Gulf Environmental Benefit Fund (GEBF):** The NFWF GEBF was founded in early 2013, after a U.S. District Court approved two plea agreements which arose from the 2010 *Deepwater Horizon* explosion and oil spill. The agreements directed a total of $2.544 billion to NFWF, which established the GEBF to fund projects benefiting the natural resources of the Gulf Coast that were impacted by the spill.
Objectives	As with the 2016 Comprehensive Plan goals, the Council has identified objectives that best represent how to focus future Council funding decisions. **The seven objectives are:** **Objective 1: Restore, Enhance, and Protect Habitats:** Restore, enhance, and protect the extent, functionality, resiliency, and sustainability of coastal, freshwater, estuarine, wildlife, and marine habitats. **Objective 2: Restore, Improve, and Protect Water Resources**: Restore, improve, and protect the Gulf Coast region's fresh, estuarine, and marine water resources by reducing or treating nutrient and pollutant loading; and improving the management of freshwater flows, discharges to, and withdrawals from critical systems. **Objective 3: Protect and Restore Living Coastal and Marine Resources:** Restore and protect healthy, diverse, and sustainable living coastal and marine resources including finfish, shellfish, birds, mammals, reptiles, coral, and deep benthic communities. **Objective 4: Restore and Enhance Natural Processes and Shorelines:** Restore and enhance ecosystem resilience, sustainability, and natural defenses through the restoration of natural coastal, estuarine, and riverine processes, and/or the restoration of natural shorelines. **Objective 5: Promote Community Resilience**: Build and sustain Gulf Coast communities' capacity to adapt to short- and long term natural and manmade hazards, particularly increased flood risks associated with sea-level rise and environmental stressors. Promote ecosystem restoration that enhances community resilience through the re-establishment of nonstructural, natural buffers against storms and flooding. **Objective 6: Promote Natural Resource Stewardship and Environmental Education**:

Terms and references	Description
	Promote and enhance natural resource stewardship efforts that include formal and informal educational opportunities, professional development and training, communication, and other actions for all ages. **Objective 7: Improve Science-Based Decision-Making Processes:** Improve science-based decision-making processes used by the Council
Planning Framework Current Document	**Gulf Coast Ecosystem Restoration Council Planning Framework Draft**: A dynamic, "living document" intended to serve as a "bridge" between the Comprehensive Plan and FPLs and from one FPL to the next. As the 2015 Initial FPL focused on Comprehensive Plan goals related to habitat and water quality, the Planning Framework provides an indication of the types of resources, habitats, and geographic areas where the RESTORE Council will focus in FPL 3 in advance of selecting projects and programs. In this way, this first Planning Framework draft signals priorities designed to continue building on previous investments in habitat and water quality, while expanding opportunities to meet all Comprehensive Plan goals and objectives in the future.
Priority Criteria RESTORE Act, 33 U.S.C. § 1321 (t)(2)(D)(iii)	**Priority criteria for Bucket 2 restoration activities set forth in the RESTORE Act are as follows** 1. 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. 2. 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. 3. 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. 4. Projects that restore long-term resiliency of the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands most impacted by the Deepwater Horizon oil spill.
Program 2016 Comprehensive Plan Update, p.16	A suite of intrinsically-linked restoration and/or conservation activities that must be implemented together in order to achieve the desired outcome. A program should generally be covered by one unified Council environmental compliance review and should have a common set of performance measures to effectively assess and measure outcomes. A program's sub-activities may be related by geography, environmental stressors, resources, restoration, protection activities, and other aspects. A program can be separated into a "planning" or "implementation" phase or can include both. One or more Council members can conduct a program. For example, a single program might be a Gulfwide environmental monitoring effort.
Project 2016 Comprehensive Plan Update, p.15	A single ecosystem restoration or conservation activity (or both) that cannot be separated into stand-alone sub-activities. A project may be "scalable," meaning that its scope, size, and cost can be expanded or reduced as needed and appropriate. A project

Terms and references	Description
	can be separated into a "planning" or "implementation" phase or can include both. One or more RESTORE Council members can conduct a project. For example, a single project might restore marsh in a specific geographic location. Another example of a project might be the planning, engineering, and design required to advance a marsh restoration proposal to a construction-ready status.
Public trust lands	Lands, waters, and natural resources, such as beaches, navigable rivers, and wildlife located within a state that are held by that state in trust for the benefit of the public. Although the scope of protected lands and uses varies by state, in general the public may fully enjoy public trust lands, waters, and natural resources for a wide variety of recognized public uses.
Resilience	A measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables.
RESTORE Act /Act	**The Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act (33 U.S.C. § 1321(t) and *note*):** The Act calls for a regional approach to restoring the long-term health of the valuable natural ecosystems and the economy of the Gulf Coast Region. The Act dedicates 80 percent of civil and administrative penalties paid under the Clean Water Act, after the date of enactment, by responsible parties in connection with the *Deepwater Horizon* oil spill to the Gulf Coast Restoration Trust Fund) for ecosystem restoration, economic recovery, and tourism promotion in the Gulf Coast Region.
Revegetation	The process of planting bare areas (raw mineral soils) with perennial plants and less often annual plants. Revegetation may help control erosion and restore habitat.
Riparian areas	Lands that occur along watercourses and water bodies. Typical examples include flood plains and streambanks. They are distinctly different from surrounding lands because of unique soil and vegetation characteristics that are strongly influenced by the presence of water. Riparian areas provide habitats for many species and play an important role in hydrologic processes.
Salinity gradients	Forms where salt water from the ocean (or the Gulf) meets and mixes with the fresh water from land. The salinity gradient can result in unique species assemblages (e.g. different species of shrimp have different salt water tolerances) and transport processes.
SAV	Submerged aquatic vegetation
Science-based adaptive management strategy	An approach for improving resource management by learning from management outcomes and incorporating Best Available Science into all steps of decision-making. Adaptive management is a science-based resource management approach that is helpful for dealing with uncertainty in restoring an ecosystem. Supported by a science feedback loop, adaptive management helps decision-makers meet their goals by planning restoration actions and reducing the risk of setbacks, therefore increasing the probability of success.
Sediment placement	Placement of sediment to support the creation, restoration, and enhancement of habitats. Sediment is solid material that is moved and deposited in a new location by

Terms and references	Description
	natural processes such as water, wind, or erosion. Sediment can consist a variety of material including soil, rocks and minerals, as well as the remains of plants and animals.
State Expenditure Plan or SEP	In accordance with the RESTORE Act (33 U.S.C. § 1321(t)(3)(A)(i)), the plan that must be developed by a Gulf Coast state and approved by the Council that describes the projects, programs, and activities that will be implemented by the state under the Spill Impact Component of the RESTORE Act (commonly referred to as "Bucket 3").
Spill Impact Component Initial Funded Priorities List p.3	As part of the RESTORE Act, the **Spill Impact Component** provides funding to the five Gulf Coast states (Alabama, Florida, Louisiana, Mississippi and Texas) for ecosystem restoration, economic recovery, and tourism promotion in the Gulf Coast Region. The RESTORE Council oversees the Spill Impact Component, commonly referred to as "Bucket 3". Spill Impact Component funds are allocated among the Gulf Coast states according to a formula in the Council's December 9, 2015, Spill Impact Component Final Regulation (40 U.S.C. part 1800). To access funds, each state must first have an approved State Expenditure Plan (SEP). The Act lists the types of activities that can be contained in a SEP, including planning, ecosystem restoration, tourism promotion, and to a limited extent, infrastructure projects such as flood protection.
Techniques The Planning Framework Draft, p. 15-16	A technique is employed to address Comprehensive Plan goals and objectives that are considered its "primary" goal(s) and objective(s), but may also provide some additional benefit to other Comprehensive Plan goals and/or objectives, considered its "secondary" goal(s) and/or objective(s). The Planning Framework identifies techniques based on relevance to primary goals and objectives, ability to simultaneously address multiple secondary goals and objectives, scientifically-supported reliability and impact, broad geographic applicability, and/or unique ability to meet specific regional challenges and desired outcomes.
Terrestrial habitats	Habitats found on land, which include forests, grassland, deserts, shorelines and wetlands
TIG	**Trustee Implementation Group.** These workgroups are teams of state and federal representatives established by the DWH NRDA governance structure that are assigned various restoration planning, public engagement, project selection, implementation and monitoring tasks associated with a given geographic restoration area (e.g.Texas TIG, Alabama TIG, Louisiana TIG, Mississippi TIG, Florida TIG, Open Ocean TIG, and Region-wide TIG).
Tribes	Federally Recognized Tribes
Trust Fund or Trust RESTORE Act § 1602	**Gulf Coast Restoration Trust Fund:** The RESTORE Act dedicates 80 percent of civil and administrative penalties paid under the Clean Water Act, after the date of enactment, by responsible parties in connection with the *Deepwater Horizon* oil spill to the Gulf Coast Restoration Trust Fund for ecosystem restoration, economic recovery, and tourism promotion in the Gulf Coast region.
Watershed	A land area that channels rainfall and snowmelt to creeks, streams, and rivers, and eventually to outflow points such as reservoirs, bays, and the ocean.