

RESTORE Council Proposal Document

General Information

Proposal Sponsor: U.S. Department of the Interior (DOI)

Title:

Decommissioning Onshore Orphaned Energy Facilities on NPS and FWS lands

Project Abstract:

The U.S. Department of the Interior, through the U.S. National Park Services (NPS) and U.S. Fish and Wildlife Services (USFWS), is requesting \$10,595,140 in Council-Selected Restoration Component funding for the proposed Decommissioning Onshore Orphaned Energy Facilities on NPS and FWS Lands program. This includes approximately \$8.1M for project sites which are ready for implementation and planning as FPL Category 1 and approximately \$2.5M for project implementation as Category 2. The program will support the primary RESTORE Comprehensive Plan goal to restore and conserve habitat through activities to decommission and restore orphaned energy facilities on USFWS and NPS preserves and refuges in coastal Texas. The proposed program builds on investments made in the Council's 2015 Initial FPL, and includes work to plug 5 wells and restore 25 orphaned sites. Environmental clearances for most NPS sites have been completed. FWS clearances and remaining NPS sites are not complete, but this is expected to be a straightforward process.

Orphaned oil and gas facilities include unplugged wells, surface equipment, roads, and production pads. They pose risks to human safety, environmental risks to surface and subsurface resources, and continued habitat loss. The program would decommission orphaned wells and restore sites to conditions that existed before the sites were established. Program duration is 5 years.

FPL Category: Cat1: Planning/ Cat2: Implementation

Activity Type: Program

Program: Decommissioning Onshore Orphaned Energy Facilities on NPS and FWS lands (DOI/NPS & FWS)

Co-sponsoring Agency(ies): N/A

Is this a construction project?:

Yes

RESTORE Act Priority Criteria:

(I) Projects that are projected to make the greatest contribution to restoring and protecting the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast region, without regard to geographic location within the Gulf Coast region.

Priority Criteria Justification:

Orphaned energy facilities pose risks to human safety, pose environmental risks to surface and subsurface resources through contaminant release, and perpetuate habitat loss. These risks increase with time due to continued deterioration and lack of maintenance, as does the cost to address them.

This program would result in the plugging of 5 orphaned wells, the removal of orphaned oil and gas infrastructure and development on 25 sites that are unsafe, unusable, or otherwise negatively impact natural resources and processes, and the restoration of coastal resources and habitats to pre-disturbance levels.

Individual projects would occur over a large geographic area along the Texas coast from Brownsville to Beaumont and include locations within three Fish and Wildlife Service refuges and two National Park Service parks.

This program would lead to permanent results and improved resiliency for 76 acres of Gulf coastal habitats and species due to the elimination of environmental hazards and removal of existing contamination on public lands. Restored natural processes would sustain habitats and enhance the overall health, availability, and diversity of natural resources that include migratory and protected species. The restoration of important wind tidal flats would create habitat that supports 22 species of shorebirds and wading birds, which enhances bird populations that contribute to restored areas being designated as Globally Important Bird Areas by the American Bird Conservancy and Sites of International Importance by the Western Hemisphere Shorebird Reserve Network. Restored habitats would contribute to existing habitats (coastal grasslands and dunes) along coastal barrier islands that function as hurricane protection for the mainland of Texas.

Project Duration (in years): 5

Goals

Primary Comprehensive Plan Goal:

Restore and Conserve Habitat

Primary Comprehensive Plan Objective:

Restore , Enhance, and Protect Habitats

Secondary Comprehensive Plan Objectives:

N/A

Secondary Comprehensive Plan Goals:

N/A

PF Restoration Technique(s):

Protect and conserve coastal, estuarine, and riparian habitats: Decommission unused, orphaned energy facilities

Protect and conserve coastal, estuarine, and riparian habitats: Habitat management and stewardship

Location

Location:

This program would occur in Texas at 3 Fish and Wildlife Service refuges (Laguna Atascosa National Wildlife Refuge, Aransas National Wildlife Refuge (Matagorda Island), and McFaddin National Wildlife Refuge) and 2 National Park Service parks (Padre Island National Seashore and Big Thicket National Preserve). (Figure 1)

HUC8 Watershed(s):

Texas-Gulf Region(Neches) - Neches(Lower Neches)

Texas-Gulf Region(Neches) - Neches(Village)

Texas-Gulf Region(Neches) - Neches(Pine Island Bayou)

Texas-Gulf Region(Galveston Bay-San Jacinto) - Galveston Bay-Sabine Lake(East Galveston Bay)

Texas-Gulf Region(Central Texas Coastal) - Central Texas Coastal(East San Antonio Bay)

Texas-Gulf Region(Nueces-Southwestern Texas Coastal) - Southwestern Texas Coastal(South Laguna Madre)

Texas-Gulf Region(Galveston Bay-San Jacinto) - Galveston Bay-Sabine Lake(Sabine Lake)

Texas-Gulf Region(Nueces-Southwestern Texas Coastal) - Southwestern Texas Coastal(North Laguna Madre)

Texas-Gulf Region(Nueces-Southwestern Texas Coastal) - Southwestern Texas Coastal(Central Laguna Madre)

State(s):

Texas

County/Parish(es):

TX - Aransas

TX - Calhoun

TX - Cameron

TX - Hardin

TX - Jefferson

TX - Kleberg

Congressional District(s):

TX - 27

TX - 14

TX - 36

TX - 34

Narratives

Introduction and Overview:

Public lands managed by the U.S. Fish and Wildlife Service (FWS) and National Park Service (NPS) have orphaned oil and gas wells and associated features, including impacts from previous energy exploration that are currently impairing 76 acres of coastal habitat. These energy sites generally consist of unplugged wells, tanks, production equipment, flowlines, roads, and well pads.

Orphaned energy sites located on FWS and NPS properties have no responsible party because: (1) the orphaned features pre-date the establishment or expansion of FWS and NPS properties; (2) the oil and gas operators abandoned their operations and the last operating company of record is bankrupt; or (3) the agencies exhausted regulatory avenues for holding previous operators responsible for taking necessary corrective actions. Operators abandon operations for various reasons. Most often operators are small ventures with very little capital, and while wells may have been profitable when drilled and placed into production, costs to maintain the wells exceeded their production levels and/or they became marginally productive over the years. Additionally, natural movements of stream channels can expose wellbores that now pose hazards within navigable waterways as has occurred in Big Thicket National Preserve.

Neither FWS nor NPS have funding to eliminate the hazards posed by orphaned facilities; to plug wells; to characterize and remediate spilled hydrocarbons, produced water, and associated liquids; and/or to restore habitat degraded by the construction of well and production pads and roads. The State of Texas (hereafter, the State) established the Oil and Gas Regulation and Cleanup (OGRC) Fund in 2011, replacing the previous Oil Field Cleanup Fund. This fund is administered by the Railroad Commission of Texas (RRC) and allows the RRC to plug abandoned oil and gas wells and clean-up abandoned oilfield sites. OGRC funds have been insufficient to address the large number of orphaned wells in need of plugging and sites in need of reclamation.

Orphaned wells pose risks to human safety and the environment, including surface and subsurface resources; they also presently impair habitat at the well pad and surrounding area. These wells can leak pollutants, including methane and brine, as well as heavy metals and naturally occurring radioactive substances that can contaminate groundwater, surface water, or, in the case of methane, be released into the atmosphere (Ho et al. 2016). Pollutants can be released because of mechanical integrity failure, failed well casings, and cement failure within the wellbore. These risks unfortunately increase with time due to continued deterioration and lack of maintenance, as does the cost to address them.

The missions of the National Wildlife Refuge and National Park Systems are to improve and maintain fish and wildlife resources and preserve natural and cultural resource unimpaired for the enjoyment of future generations, respectively. Plugging orphaned wells and restoring these sites is consistent with, and advances these missions.

The proposed program includes work to plug 5 wells (4 FWS, 1 NPS) and restore 25 orphaned energy sites (10 FWS, 15 NPS) for a cost estimate of \$10.595 million. The wells and sites are located within the Gulf Coast Region defined as any adjacent lands, waters, and watersheds, that are within 25 miles of the coastal zones defined in section 304 of the Coastal Zone Management Act of 1972 (16 U.S.C. § 1453) (See Figure 1 and Table 1).

This program meets Goal 1: Restore and Conserve Habitat and Objective 1: Restore, Enhance and Protect Habitats of the Council's Comprehensive Plan by plugging orphaned wells and subsequently restoring surface habitats. The actions undertaken improves the health, diversity, and resilience of coastal and estuarine habitats by removing orphaned equipment, eliminating environmental risk, re-

establishing natural processes, creating foraging habitat, and enhancing the recovery of endangered species. This program directly aligns with two Planning Framework Techniques that are focused on 1) decommissioning orphaned energy facilities by plugging 5 wells and removing surface facilities and 2) the management and stewardship of habitat by restoring 25 sites.

Wells that are no longer producing in Texas are required to be plugged following RRC plugging standards (Texas Administrative Code, Title 16, Part 1, Chapter 3, Rule 3.14). The RRC's "Well Plugging Primer" (RRC 2000) is a useful guide describing plugging operations. In addition to state standards, the Bureau of Land Management's (BLM 1988) minimum standards of the Department of the Interior's Onshore Oil and Gas Order Number 2, Section III.G, Drilling Abandonment Requirements apply for plugging wells in parks. The plugging requirements of the Onshore Order were written specifically for plugging newly drilled wells; however, the NPS has applied the same standards to the permanent abandonment of wells. The use of state and federal plugging standards helps ensure that orphaned wells are plugged in a way that meets industry standards, as well as appropriate regulations. There are 5 wells in this proposal needing corrective actions: 4 land-based wells and 1 water-based well that poses a navigational hazard.

Producing oil or natural gas requires installation of various types of surface equipment. A battery of storage tanks and flowlines are used to transport produced oil or gas. Separation and treatment facilities are required to separate natural gas and water from oil. Storage tanks are required to hold brinewater produced during oil extraction. Proper disposal capability, most typically reinjection, must be developed. Upon well-plugging, well and production pads, access roads, surface equipment and flowlines can be removed to facilitate site reclamation.

Reclamation involves restoring a site with the following features: allows for safe movement of native wildlife, re-establishes native vegetative communities, re-creates the normal flow of surface and reasonable flow of subsurface waters, and returns the area to a condition that does not jeopardize visitor safety or public use. Reclamation projects may last a few days or weeks. Revegetation goals are based upon pre-operational analysis of the natural conditions that existed prior to drilling, or if unavailable, it is based on adjacent, undisturbed areas.

In this proposal, there are 30 individual projects that would result in reclaiming approximately 76 acres of coastal and riverine habitat with most of the projects occurring in wetland communities that have highly functional fish and wildlife values. The implementation of these projects involves relatively small land areas and pose very little risk or uncertainty. However, these orphaned energy sites represent significant sources of potential petroleum pollution that can impact groundwater, springs and seeps, and surface waters where ground waters enter.

Flowing rivers, streams, and ephemeral channels can quickly spread those contaminants coming to the surface and carry them into critical estuaries along the coast. This proposal offers full treatment of some of the potentially most damaging orphaned wells on federal lands found along the Texas coast. Therefore, the benefits of the individual projects in this proposal would have ecological benefits over a large geographical area.

The RRC and NPS have worked together previously to plug wells and remove surface equipment. Wells would be plugged using technical plugging standards established by the State and BLM. Contaminant characterization and remediation and site reclamation methodologies are well-established. FWS and NPS have a particularly strong understanding of the ecosystems they manage and extensive experience restoring native plant communities. The cost estimates and timelines outlined for the projects in this proposal are based on extensive knowledge and experience gained in the day-to-day management of these areas.

Previous energy exploration efforts caused significant vehicular impacts to wind tidal flats at Padre Island National Seashore. Seismic surveys conducted along the western shoreline resulted in compacted vehicle tracks that altered wind-driven inundation by Laguna Madre waters, thus affecting algal growth and degrading foraging habitat for migratory birds.

The strategy for restoration of tidal flat impacts would have an initial experimental design and test phase undertaken via a Cooperative Ecosystems Studies Unit (CESU) agreement with a university such as Texas A&M University-Corpus Christi, which has experience studying and researching wind tidal flats. In addition, the implementation of the projects in this proposal is anticipated to create more than 100 jobs, which would target youth, students, and veterans.

This program is anticipated to be completed in three to five years depending on the amount of funding awarded and specific sites selected. Many NPS sites have environmental clearances and are ready to begin implementation. Acquiring environmental clearances for the remaining sites is not expected to be particularly complicated and could be completed in 12 months once initiated. Contracting and site restoration is expected to take two to three years for cooperative agreement or contract development and preparing design documents needed for contractor bid packages. Up to two years of monitoring may be needed to meet restoration objectives for revegetation. Therefore, given the variety of sites and varying levels of readiness, up to five years could be necessary to fully complete this program.

Proposed Methods:

The 30 individual projects comprising this proposal present varied degrees of risk to human safety and habitat degradation, and the potential for impacting water quality. In general, wells needing plugging or re-plugging pose the highest risk and potential resource impacts, followed by sites requiring characterization and remediation of petroleum and other contaminating substances, then removal of orphaned surface equipment, and reclamation of sites to restore and protect habitats and water quality.

Both the FWS and NPS have well-defined processes to follow to ensure site reclamation is successful and that endemic plant communities are restored to the disturbed areas. For example, the National Park Service (NPS 1991) Natural Resource Management Reference Manual, Disturbed Lands Restoration, provides guidance for applying a planning process which includes the following 9 steps:

1. Inventory sites and select reference sites or conditions
2. Rank sites
3. Establish goals and objectives
4. Develop preliminary restoration alternatives
5. Undertake compliance and select alternative
6. Develop the project plan
7. Finalize the project plan
8. Implement and oversee the project
9. Report activities and results (including monitoring)

The sites identified in this proposal have already been inventoried and ranked by FWS and NPS. The planning phase of this program would begin with field assessments of the sites, if not already completed. Based on completed field assessments during which corrective actions have been determined, FWS and NPS would complete environmental compliance and permitting for their respective areas as needed and seek review by appropriate state and federal agencies on draft compliance documents for proposed corrective actions and mitigation measures. FWS and NPS would provide final compliance documents to the State.

Environmental compliance has been completed for some projects, and there are no anticipated complexities or uncertainties for completing the others.

Well plugging techniques can differ depending on the type of well drilled and the actual well conditions (Vrålstad et al. 2019). However, well plugging operations generally consist of removing the tubing, packer, and other completion equipment; pumping cement across producing zones; and placing cement plugs at various depths to protect freshwater zones (NPS 2006) (National Petroleum Council 2011) (Khalifeh and Saasen 2020). Finally, a cement plug is set at the surface to cap the well, and wellhead equipment is cut off. A permanent abandonment marker is often placed on the surface to identify the well's location.

Implementation of the well plugging would be done in cooperation with the RRC. FWS and NPS would enter into Cooperative Agreements with the RRC and would each designate an Agreements Technical Representative (ATR) to serve as the point of contact on each agreement. The ATRs would coordinate project implementation with their respective areas. The RRC would proceed to develop and award contracts to implement corrective actions. FWS and NPS would participate in the contracting process by providing information, assisting in the development of the contract scopes of work with the State, and reviewing draft contract scopes of work prior to the State advertising for bids. FWS and NPS would participate in contract monitoring, particularly with respect to avoiding visitor use conflicts and resource impacts. NPS and FWS have contracting programs that will evaluate potential programs and requirements to select the best contracting approach. Common business practices related to procurement and contracting will be followed.

The NPS has an established service-wide oil and gas management program and agency specific regulations that govern the management of non-federal oil and gas operations in parks. This program and the resulting regulations identify specific requirements needed for the exploration, drilling, production, and abandonment of oil and gas wells within national parks. One such requirement is the development of a robust Plan of Operation (PoP) for each well that outlines legal documentation and support not only for the operation, siting considerations, natural resource surveys and results, and detailed descriptions of each operational phase but also identification of mitigation measures, and remediation and reclamation actions (and more). Each PoP includes an environmental assessment or similar document that is made available for public review. Additionally, appropriate federal and state environmental, cultural, and regulatory permits are obtained that approve these operations. The PoP, its supporting documentation, program management requirements, industry standards, policies, regulations, and more are used to establish the expectations to be met. A similar program exists for the FWS. Plugging an abandoned well is a straightforward process and general risks are known. Environmental conditions known prior to a well being drilled or if unknown, the condition of habitat surrounding a well location provides a good baseline for what restoration should look like with respect to habitat type, vegetation composition, hydrology, soils, and more. Unknown risks may occur, but the use of best management practices minimizes these risks and enhance the likelihood of success. Implementation of this project would rely on the information available within each PoP, existing site conditions, and agency requirements to ensure that these wells can be plugged and sites restored.

A program goal would be to find efficiencies and cost-savings by combining multiple projects in as few contracts as possible. This is likely given that some energy sites are located near others, which provides for logical groupings of locations.

Some projects would be managed by the FWS and NPS, through contracts or agreements. In some cases, seasonal or term staff could be hired to carry out site reclamation projects, or to assist in administering project coordination, providing opportunities for youth, students, and veterans to

work and gain knowledge and experience in habitat restoration.

Most unplugged wells would be accessed using existing roads. Where roads have naturally reclaimed, or new access would require construction of new roads through areas that would be very difficult to reclaim, access would be by barge or other method to avoid or minimize impacts. Wells would be flushed, the existence of any previous cement plugs would be confirmed, and if needed, the wells would be plugged. Some wells are so old that plugging information is unavailable. Onsite inspection utilizing specialized equipment to “tap” the plug may be required to determine whether additional corrective actions are needed.

Upon well plugging, well and production pads and access roads can be reclaimed. Reclamation involves returning the area to conditions that existed before drilling the well. Steps in the reclamation process include:

- Remove all above ground structures, equipment, and roads used or generated during operations;
- Remove or neutralize any contaminating substances;
- Restore topographic contours of disturbed areas to near original grade;
- Construct plugs or other water control / hydrologic restoration features;
- Spread and prepare natural topsoil for vegetative restoration (importing suitable topsoil that is free of non-native weed seed and plant materials from outside the FWS or NPS areas might be needed);
- Re-establish native vegetative communities based on a planting plan;
- Apply erosion protection measures such as mulching; and
- Monitor vegetation and erosion control efforts. Conduct follow-up treatment of any invasive species that have established in the reclamation site.

It is possible due to a well’s age, past development practices, and current conditions of some wells, that contamination could exist. Unknown areas of contamination would be characterized to determine what is present and how best to remediate it. Characterization of possible contaminants at well sites would follow guidance developed by the National Park Service and outlined in its Operator’s Handbook (NPS 2006) and characterization procedures (NPS 2004). This guidance describes when and where to collect samples, what contaminants to test for, how to collect samples (from sediment, groundwater, and surface water), sample collection methodologies, quality assurance/quality control, how to analyze samples in the laboratory, detection limits, and sample plan and reporting requirements. While this is an internal guidance document, it references applicable EPA sources, in addition to scientific literature describing the effects of oil and gas contaminants on wildlife and natural resources.

Revegetation goals are developed based on pre-operational analysis, or if unavailable, are based on adjacent, undisturbed areas. Reclamation of orphaned oil and gas sites would be deemed successful when the canopy cover of native vegetation communities is at least 70% on NPS and FWS areas and sustained over at least 2 complete growing seasons. Canopy cover is defined as the vegetative cover above the soil surface that intercepts raindrops, but it does not contact the soil.

FWS and NPS have a particularly strong understanding of the ecosystems they manage and extensive experience restoring native plant communities. The cost estimates and timelines outlined for the projects in this proposal are based on extensive FWS and NPS knowledge and experience gained in the day to day management of FWS and NPS areas. FWS and NPS also have extensive experience working with oil and gas operators conducting operations under the agencies’ respective permitting mechanisms.

Environmental Benefits:

The natural resources restored and protected by this project include over 76 acres of coastal habitats such as freshwater and tidal wetlands, prairies, Tamaulipan thornscrub, bottomland hardwoods, cypress swamp, mudflats, beaches, and dunes. These areas are significant in that they protect portions of the largest freshwater wetland in Texas, conserve protected species, and provide wintering habitat for millions of migratory birds. This program ultimately provides for public safety and restores important habitat on public lands along coastal Texas, while building upon investments made in FPL1.

Specific benefits to state resources and values include:

- Protection and restoration of water resources, water quality and hydrology by plugging wells, removing fill material associated with roads, production pads and surface equipment, and restoring surface and subsurface habitats and ecological functions.
- Elimination of pollution by removing existing and potential contamination that can pollute coastal groundwater and surface water, alter habitats, degrade water quality, and reduce water availability.
- Restoration and improvements of wildlife habitat and ecological health in priority Texas landscapes where significant investment has been made such as the Chenier Plain (McFaddin NWR beach) and Bahia Grande corridor (Laguna Atascosa NWR).
- Increased public recreation at parks and refuges through restoration and transformation of orphaned well sites into native coastal habitat that support species of interest to visitors such as migratory and coastal birds.
- Enhancing public safety by eliminating sources of contamination that pose a health risk and removing orphaned equipment that can break free during storm events.

The highest priority site for plugging and restoration is a well posing a navigational hazard in Big Thicket National Preserve. Plugged in the 1980's in accordance with State plugging standards, the well has become exposed in the main channel of the Neches River. Well casings have become exposed due to natural river processes and now pose a serious threat to park visitors and boat traffic. These casings could also be damaged by collision from boats and flood-borne debris thereby causing contamination of the river through the release of fluids into the water. This program would ensure the well is plugged properly below the mudline and all structures in the water body are removed.

One component of this proposal is the restoration of wind-tidal flat habitat, which is a very limited and specialized environment. Wind-tidal flats are low, flat areas inundated when high water conditions are created by northerly winds and left uncovered when low-water conditions are created by southerly winds. Tidal flat elevation changes range from sea level to .8 feet and change on the order of 0.2 feet per mile (Watson 1979).

Tidal flats provide abundant amounts of blue-green microalgae, which contribute to the primary productivity of estuarine systems comparable to seagrass beds and to 20-40 percent of a typical marshhay cordgrass (*Spartina patens*) marsh. These flats play a crucial role in the life history of some of Texas' most important commercial fish and shellfish industries and offer significant feeding areas for aquatic bird life (Withers 1993).

Wind-tidal flats provide winter and migration foraging habitats for 22 species of shorebirds and waterbirds, including the federally threatened piping plover and red knot (Withers 1994). Padre Island National Seashore is designated a Globally Important Bird Area by the American Bird Conservancy and a Site of International Importance by the Western Hemisphere Shorebird Reserve Network. Forty-five (45) species of algae have been identified in Laguna Madre tidal flats, with cyanobacteria representing the dominant taxa (Fisk 1950, Sorenson and Conover 1962, Zimba et al.

2017, Shalygin et al. 2019).

Approximately 3,038 acres of these flats have been damaged by past seismic surveys for energy resources that have altered surface hydrology and resulted in the loss of algal mats. The addition of fill material and soil compaction are disturbances that adversely affect blue-green algal mat production, which is dependent upon flats that are alternately inundated. The use of fill not only converts the flats to an elevated landform, but it also disrupts the hydrological cycle. The filled area acts as a barrier to inundation or allows retention of water behind the filled area. Soil compaction by vehicular traffic disturbs the hydrological regime by allowing compacted areas to remain submerged. Wind-tidal flats that are submerged too frequently do not have extensive algal mats (Weise and White 1980).

This project would implement a trial into the best methods to be used to restore tidal flat habitat, enhance benthic communities for shorebird foraging, support protected species conservation, and increase algal biomass that contributes to the high productivity of adjacent wetland communities. Though there are no established or standard methods to restore this type of wetland, the project team has considerable knowledge and tools for such restoration. By example, the NPS has substantial experience in beach restoration, such as but not limited to Cape Hatteras National Seashore where 2.6 million cubic yards of beach quality sand along approximately 2.2 miles of shoreline (USACE 2015), Cape Lookout National Seashore where 3,850 linear feet of beach was restored (Schupp 2017) and with several projects at Gulf Islands National Seashore where approximately 4.9 miles of shoreline along the eastern end of Perdido Key (Gibson and Looney 2020), and a beach nourishment project where approximately 500,000 cubic yards of beach quality sand was placed along 10,000 feet of the northern shoreline of West Ship Island, within the Mississippi District of Gulf Islands National Seashore (USACE 2016). Though tidal mudflat restoration is somewhat different, the basic principles are the same: establish a proper slope in the tidal range, restore with similar grain sized sediments and plant with appropriate flora.

The NPS has existing relationships with experts in mudflat ecology from Texas A&M University-Corpus Christi. Restoration techniques are not extensively developed, but the project team and practitioners in the field know enough to be able to perform a series of exploratory test plots to inform the larger restoration efforts. Suzuki (2004) and Lee and Lee (2000) studies show that newly groomed sediments can be a successful platform for tidal flat restoration. In general, restoration will involve grooming of the tracks with the use of hand tools and ambient soils, to prevent further impacts, establishing the proper slope within the tidal range, and inoculating the soils with a mixture of the 12 dominant algal species, all of which can easily be grown in controlled conditions in roughly 30 days (Zimba, pers. comm. 6/3/2020). Only 0.2 grams of algal material has been shown to reestablish 1m² of tidal flat. Salinity concentrations will be monitored using salinity recorders at low, medium and highest elevations. Up to 41-1.0 cm cores will be obtained monthly to determine the developing algal community structure. This information will help to determine how best to approach large-scaled restoration efforts.

Metrics:

Metric Title: PRM013 : Restoration planning/design/permitting - # environmental compliance documents completed

Target: 30

Narrative: The metric is to measure when an orphaned energy site has received all environmental compliance documents including NEPA, cultural resource, and various other environmental laws. Once they receive these clearances, they will be considered ready to implement. FWS and NPS have completed environmental compliance for some projects. For those projects where cultural and environmental compliance needs to be completed,

there are no anticipated complexities or uncertainties for completing the necessary compliance.

Metric Title: HC005 : Decommissioning energy facilities - Number of wells plugged

Target: 30

Narrative: The metric is to measure when an orphaned energy site has been decommissioned which may include well plugging, surface restoration and removal of derelict structures. The program proposes to plug 5 wells and restore 25 orphaned sites.

Metric Title: HR004 : Habitat restoration - Acres restored

Target: 76

Narrative: An objective of this proposal is to restore decommissioned energy sites to the natural habitats which were impacted by the sites' establishment. The natural resources restored and protected by this project include over 76 acres of coastal habitats such as freshwater and tidal wetlands, prairies, Tamaulipan thornscrub, bottomland hardwoods, cypress swamp, mudflats, beaches, and dunes.

Risk and Uncertainties:

One component of this program that presents risk is the project to reclaim vehicle tracks in wind tidal flats caused by past seismic surveys. The project would mitigate these risks by only implementing a small trail to assess restoration techniques. If that trial proved successful the project proponent could, at a later date, seek funding for the extensive tidal flat restoration that is needed. Although there are no established and standard method to restore wind tidal flats, the NPS would test potential techniques on a relatively small portion of Padre Island National Seashore, based upon its experience in Big Cypress National Preserve reclaiming and restoring vehicle tracks from oil and gas work in sensitive habitats. To reduce uncertainty, the NPS would assemble an expert team from the park, NPS and US Army Corps of Engineers wetland scientists, reclamation specialists and local university professors who have conducted extensive studies, some of which are published in peer reviewed journals, on the wind tidal flats, to evaluate alternative restoration practices to develop one or more preliminary restoration methods to test in a small area. There is distinct value in developing and evaluating a transferrable method for this and future restoration efforts in wind tidal flat systems. Based upon techniques established at Texas A&M University – Corpus Christi (Zimba pers. comm. 6/3/2020), starter colonies from the dominant taxa can be grown under controlled conditions and used to establish tidal flat algal communities.

Plugging land-based wells and removing surface equipment, debris and fill material used to construct well pads and roads will follow standard procedures, which have very low levels of risk or uncertainty.

Plugging or re-plugging water-based wells introduces some risk as access by barge is required, which increases project complexity due to potential conflicts with other boating traffic; however, standard mitigation would be applied, such as stationing shoreline monitors and employing navigational warning beacons to alert other boats of slower barge traffic and work occurring in navigable waterways.

The risks of leaving a well unplugged are well documented in literature and examples across the country. Many of these wells are located in an environment that is highly corrosive. In some cases, wells have had little to no maintenance for years, which further exacerbates the likelihood of failure. Abandoned wells pose a continual risk and will eventually fail at which time contamination will affect subsurface and surface resources causing additional damage that is unnecessary and costly. Risks associated with well plugging operations exist and impacts can be caused at any stage of the well plugging operation. However, reliance on industry standards, best management practices, past

experiences, existing NPS and FWS program management requirements, and more considerations minimize or eliminate these risks. As an example, Padre Island National Seashore has identified approximately 80 mitigation measures within their Oil and Gas Management Plan/EIS that are designed to minimize risks to visitor experience, night sky, threatened and endangered species, coastal habitats, and more resources. Additionally, natural resource trustee agencies require risk mitigations as part of their permit processes that are designed to lessen the impact on the environment and species, which would be required for plugging operations. There isn't an effective way to eliminate all risks, but relying on past experiences, applying existing mitigation measures, and using best available techniques will substantially reduce these risks. When compared to leaving a well unplugged in areas with sensitive habitats, well plugging operations when completed and surface and subsurface habitats restored are expected to be the least impactful overall.

Risk and uncertainty associated with successfully revegetating sites would be reduced to insignificant levels by: 1) selecting appropriate native seed and plant materials to provide for rapid surface cover, 2) applying appropriate mulching materials to prevent erosion and allow for retaining moisture to facilitate seed germination and growth, 3) planting at the right time of the year when rainfall and temperature provide the most advantageous growing conditions, 4) seeding and planting areas in close timing upon completion of re-contouring and surface preparation, 5) conducting routine monitoring to ensure re-vegetation, and 6) taking corrective actions in the event re-vegetation is not occurring at the rate anticipated.

A hurricane or other large storm could jeopardize revegetation success, particularly for projects along shorelines; however, risk could be avoided or minimized by scheduling reclamation around hurricane season or applying mitigation techniques to reduce damage by wave action.

Monitoring and Adaptive Management:

FWS and NPS would implement the projects through Cooperative Agreements with State Oil and Gas Divisions or agency administered contracts or agreements if needed. The initial phases for reclamation of vehicle tracks in wind tidal flats at Padre Island National Seashore would be conducted via an existing CESU agreement with Texas A&M University-Corpus Christi. Cooperative Agreements would provide one method for tracking project status and budget.

FWS and NPS would also maintain separate tracking systems to track progress in completing projects and monitoring expenditures.

Well plugging would be monitored and approved by the RRC inspector or qualified contractor to ensure well plugging meets required standards. After plugging a well, there would be no further monitoring required.

Monitoring of the experimental reclamation design for reclaiming the vehicle tracks in wind tidal flats at Padre Island National Seashore would be conducted by graduate and possibly undergraduate students with guidance of a university professor under a scope of work developed by NPS and the professor, with student participation. This project would be administered and managed by the NPS.

Reclamation of orphaned oil and gas sites would be monitored by FWS and NPS staff, although monitoring revegetation would be the primary responsibility of the reclamation contractor, with the agencies conducting limited monitoring. Revegetation success would be monitored for 2 years following initial reseeding and plantings. Should monitoring show revegetation is not progressing as planned, or that invasive species have been introduced, reassessment and application of adaptive revegetation strategies will occur.

Routine conference calls would be held between FWS, NPS, and the RRC to discuss progress, identify

deficiencies, and adjust as needed. Information regarding seed and plant material sources, mulch sources, and other aspects of the projects would be shared to improve efficiencies and maximize revegetation success.

Reclamation of orphaned oil and gas sites would be deemed successful when the canopy cover of native vegetation communities is at least 70% on NPS and FWS areas and sustained over at least 2 complete growing seasons. Canopy cover is defined as the vegetative cover above the soil surface that intercepts raindrops but does not contact the soil.

Data Management:

Data on the locations treated and monitoring results would be collected and maintained by NPS, FWS, or RRC; however, this program will not include significant data collection. Progress and accomplishment reports, which would include site data, would be shared with the RESTORE Council staff and Steering committee, which would include site data.

Collaboration:

The FWS and NPS have collaborated on the development of this proposal including the selection and prioritization of the sites. The implementation of this program would also involve the RRC, which has worked closely with FWS and NPS for many years. The RRC administers the State's Oil and Gas Regulation and Cleanup (OGRC) Funds. The OGRC Fund is a fund that was created by the 82nd Texas Legislature in 2011. This fund replaced the previous Oil Field Cleanup Fund. This fund allows the RRC to plug abandoned oil and gas wells and clean-up abandoned oilfield sites. OGRC funding has been unavailable to address the sites proposed in this program. The plugging of wells would be done in cooperation with the RRC through a cooperative agreement between FWS and NPS. The two bureaus would coordinate project implementation with their respective areas. The RRC would proceed to develop and award contracts to implement corrective actions. FWS and NPS would participate in the contracting process by providing information, assisting in the development of the contract scopes of work with the State, and reviewing draft contract scopes of work prior to the State issuing for solicitation. FWS and NPS would participate in contract monitoring, particularly with respect to avoiding visitor use conflicts and resource impacts.

Public Engagement, Outreach, and Education:

In addition to public engagement through the NEPA process, where necessary, public outreach would also be achieved by FWS and NPS posting updates on the agencies' public websites, in visitor centers and in entrance stations where projects are proposed. During project implementation, particularly near park or refuge visitor use areas, interpretive information such as brochures, exhibits, social media postings, websites, interpretive programs, a banner or large sign, or similar items would be posted notifying visitors that the project is restoring the Gulf Coast. The initial phase of the project to reclaim vehicle tracks in wind tidal flats at Padre Island National Seashore would be undertaken with the Texas A&M University-Corpus Christi. The initial phase would enable students to participate in the development of experimental reclamation method(s) and conduct the test phase and monitoring on a small plot. The students could earn credit while learning how to design wetland restoration methods. Monitoring the restoration of tidal flats would likely involve students who would conduct field assessments, gather scientific information, implement actions to modify restoration efforts if needed, and report and publish findings. There will be opportunities for youth to learn about habitat restoration and work on revegetation projects where success depends on the planting of large numbers of trees by hand over a short time span.

Leveraging:

Funds: \$1,371,567.00

Type: Bldg on Others

Status: Received

Source Type: Other

Description: This proposal is a continuation of the FPL1 project, "Plug Abandoned Oil and Gas Wells on Padre Island National Seashore" and addresses additional sites on the Seashore and other parts of coastal Texas. This proposal also complements other FPL1-funded projects including the Bahia Grande Coastal Corridor.

Funds: \$200,000.00

Type: Bldg on Others

Status: Received

Source Type: Other Federal

Description: Additional funding provided through forfeiture of a performance bond that is associated with the FPL1 project, "Plug Abandoned Oil and Gas Wells on Padre Island National Seashore."

Environmental Compliance:

Most National Park Service (NPS) sites and wells have completed environmental compliance, and DOI is preparing the documentation needed to move the implementation component of this proposed activity into FPL Category 1. DOI will provide this documentation - as needed - prior to publication of the draft FPL and will revise the proposal accordingly.

Remaining NPS sites and sites located on FWS Refuge lands have not acquired full environmental clearances necessary for the decommissioning. These FWS sites are proposed as Category 2 to complete site planning and necessary clearances. For those projects where cultural and environmental compliance needs to be completed, there are no anticipated complexities or uncertainties for completing the necessary compliance. (See attached checklist).

Bibliography:

Bureau of Land Management. 1988. Onshore Oil and Gas Order Number 2, Drilling Operations on Federal and Indian Oil and Gas Leases. Section III.G.

https://www.blm.gov/sites/blm.gov/files/energy_onshoreorder2.pdf.

Coastal Zone Management Act of 1972, 16 U.S.C. § 1453.

Fisk, H.N. 1959. Padre Island and the Laguna Madre flats, coastal South Texas. Louisiana State University, 2nd Coastal Geography Conference 6-9: 103-151

Gibson, David J., and Paul B. Looney. "Vegetation Colonization of Dredge Spoil on Perdido Key, Florida." *Journal of Coastal Research*, vol. 10, no. 1, 1994, pp. 133–143. JSTOR, www.jstor.org/stable/4298198. Accessed 29 May 2020.

Ho, J., A. Krupnick, K. McLaughlin, C. Munnings, and J. Shih. 2016. Plugging the Gaps in Inactive Well Policy. 82 pp.

Khalifeh, M. and A. Saasen. 2020. Introduction to Permanent Plug and Abandonment of Wells. *Ocean Engineering and Oceanography*. 285 pp.

Lee, J. and N. Lee. 2000. An Experimental Study on the Restoration Creation of Tidal Flats. *Journal of the Korea Organic Resources Recycling Association*. 8(1):77-82.

National Park Service. 1991. Natural Resource Management Guideline Manual, NPS-77, Disturbed Lands Restoration. <https://irma.nps.gov/DataStore/DownloadFile/152697>

NPS. 2004. Guideline for the Detection and Quantification of Contamination at Oil and Gas Operations. 16 pp.

NPS. 2006. Operator's Handbook for Nonfederal Oil and Gas Development in Units of the National Park System. 351 pp.

National Petroleum Council. 2011. Paper #2-25 Plugging and Abandonment of Oil and Gas Wells. 21 pp.

Railroad Commission of Texas. 2000. Well Plugging Primer. 20 pp. <https://www.rrc.texas.gov/media/2142/plugprimer1.pdf>

Schupp, C. 2017. Cape Lookout National Seashore: Geologic resources inventory report. Natural Resource Report NPS/NRSS/GRD/NRR—2017/1491. National Park Service, Fort Collins, Colorado.

Shalygin S., Kavulic K. J., Pietrasiak N., Bohunická M., Vaccarino M. A., Chesarino N. M., & Johansen J. R. 2019. Neotypification of *Pleurocapsa fuliginosa* and epitypification of *P. minor* (Pleurocapsales): resolving a polyphyletic cyanobacterial genus. *Phytotaxa* 392: 245–263

Sorensen, L.O. and Conover, J.T. 1962. Algal mat communities of *Lyngbya confervoides* (C.Agardh) Gomont. *Publ. Inst. Mar. Sci. Univ. Texas* 8:237-249

Suzuki, T. 2004. Large-scale restoration of tidal flats and shallows to suppress the development of oxygen deficient water masses in Mikawa Bay, Japan. *Bull. Fish. Res. Agen. Supplement* 1:111-121

Texas Administrative Code. Title 16, Part 1, Chapter 3, Rule 3.14, Plugging.

[https://texreg.sos.state.tx.us/public/readtac\\$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=16&pt=1&ch=3&rl=14](https://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=16&pt=1&ch=3&rl=14)

US Army Corps of Engineers and US Department of Interior, National Park Service. 2015. Beach Restoration to Protect NC Highway 12: Clean Water Act 404 and NPS Special Use Permits, at Buxton, Dare County, North Carolina. Environmental Assessment, NPS 603/129663. 61 pages.

US Army Corps of Engineers, Mobile District. 2016. Mississippi Coastal Improvements Program (MsCIP): Comprehensive Barrier Island Restoration, Hancock, Harrison, and Jackson Counties, Mississippi. Final Supplemental Environmental Impact Statement. 400 pages.

Vrålstad T., A. Saasen, E. Fjær, T. Øia, J.D. Ytrehus, and M. Khalifeh. 2019. Plug & Abandonment of Offshore Wells: Ensuring Long-term Well Integrity and Cost-efficiency. *Journal of Petroleum Science and Engineering*. Vol 173. Pages 478-491.

Watson, R.L. 1979. Geological History of South Padre Island Wind-Tidal Flats. Unpublished paper, Port Aransas, Texas.

Weise, B.R. and W.A. White. 1980. Padre Island National Seashore: A Guide to the Geology, Natural Environments, and History of a Texas Barrier Island. Bureau of Economic Geology. Reprinted 1981.

Withers, Kim. 1993. "Study to Determine the Abundance and Distribution of Benthic Invertebrates and Shorebirds on a North Padre Island Blue-Green Algal Flat." Unpublished paper, National Park Service, Corpus Christi, Texas.

Withers, Kim. 1994. "The Relationship of Macrobenthic Prey Availability to Shorebird Use of Blue-Green Algal Flats in the Upper Laguna Madre." Published Ph.D. Thesis. Texas A&M University, College Station, Texas.

Zimba P. V., Huang I.-S., Fole, J. E., & Linton, E W. 2017. Identification of a new-to-science cyanobacterium, *Toxifilum mysidocida* gen. nov. & sp. nov. (Cyanobacteria, Cyanophyceae). *Journal of Phycology* 53: 188–197.

Zimba P. V. 6/3/2020. Texas A&M University, College Station, Texas. Personal communication with author(s).

Budget

Project Budget Narrative:

The overall budget for this project is \$10,595,140. The bulk of the funds requested will be used for implementation of well plugging and site restoration in the amount of \$9,162,000. Most sites and wells on the NPS lands have completed environmental clearances and are ready for implementation (approximately \$7.4M). Planning funds are also sought in the amount of approximately \$740,000 to complete the environmental clearances and planning needs for FWS refuges and remaining NPS sites. The FPL Category 1 funding requested for implementation ready project sites and planning for other sites is approximately \$8.4 million. Once planning is complete, FPL Category 2 implementation funds of approximately \$2.5 million are included in the request to carry-out well plugging and site restoration on FWS sites also. Monitoring and adaptive management (MAM) funds in the amount of \$396,080 are requested for monitoring the restoration sites and adapting to changes in site conditions. Project management (PM) in the amount of \$297,060 are requested to provide oversight of contracts, agreements, and field activities. As appropriate, funds for contingency will be considered for inclusion in the budgets for the individual restoration sites as these are developed. MAM and PM funds are included in the estimates below for implantation or planning.

Estimated sites costs

Cat 1: implementation of most NPS sites = \$7,401,190

- South Sprint (PAIS) (\$999,380)
- Lemon Wells (PAIS) (\$722,250)
- Shorebased Production (PAIS) (\$1,605,000)
- Peach Wells (PAIS) (\$532,860)
- A4 Pad (PAIS) (\$419,440)
- A3/A8 Pad (PAIS) (\$606,690)
- PanAm Road (PAIS) (\$2,248,070)
- TEEL Well (BITH) (\$267,500)

Cat 1: planning for remaining FWS and NPS sites = \$740,000

Cat 2: implementation of all FWS sites and 2 sites at BITH = \$2,453,050

- Aransas NWR (\$983,300)
- Laguna Atascosa NWR (\$563,000)
- McFaddin NWR (\$164,000)
- Kirby Wells (BITH) (\$267,500)
- ZigZag Road (BITH) (\$155,150)
- Wind Tidal Flats (PAIS) (\$321,000)

Obligation of these funds will be accomplished using various procurement methods. An existing Cooperative Agreement allows funding to be provided to the Railroad Commission of Texas for the management and contracting of well plugging actions and possibly site restoration. While the agreement will help expedite the obligation of funding, contracts might be awarded by either NPS or FWS for individual plugging and/or restoration projects if appropriate. Restoration monitoring will be accomplished via a contract or the hiring of temporary staff.

Total FPL 3 Project/Program Budget Request:

\$ 10,595,140.00

Estimated Percent Monitoring and Adaptive Management: 4 %

Estimated Percent Planning: 6 %

Estimated Percent Implementation: 87 %

Estimated Percent Project Management: 3 %

Estimated Percent Data Management: 0 %

Estimated Percent Contingency: 0 %

Is the Project Scalable?:

Yes

If yes, provide a short description regarding scalability.:

This program involves actions that take place at discreet locations within the State, refuges, or parks that can be addressed independently from other project locations. Additionally, the proposed plugging and restoration activities are consistent between locations and therefore can be combined in numerous ways to capitalize on the proximity of locations.

Environmental Compliance¹

Environmental Requirement	Has the Requirement Been Addressed?	Compliance Notes (e.g., title and date of document, permit number, weblink etc.)
National Environmental Policy Act	Yes	Council's Planning CE.
Endangered Species Act	N/A	Note not provided.
National Historic Preservation Act	N/A	Note not provided.
Magnuson-Stevens Act	N/A	Note not provided.
Fish and Wildlife Conservation Act	N/A	Note not provided.
Coastal Zone Management Act	N/A	Note not provided.
Coastal Barrier Resources Act	N/A	Note not provided.
Farmland Protection Policy Act	N/A	Note not provided.
Clean Water Act (Section 404)	N/A	Note not provided.
River and Harbors Act (Section 10)	N/A	Note not provided.
Marine Protection, Research and Sanctuaries Act	N/A	Note not provided.
Marine Mammal Protection Act	N/A	Note not provided.
National Marine Sanctuaries Act	N/A	Note not provided.
Migratory Bird Treaty Act	N/A	Note not provided.
Bald and Golden Eagle Protection Act	N/A	Note not provided.
Clean Air Act	N/A	Note not provided.
Other Applicable Environmental Compliance Laws or Regulations	N/A	Note not provided.

¹ Environmental Compliance documents available by request (restorecouncil@restorethegulf.gov).

Maps, Charts, Figures

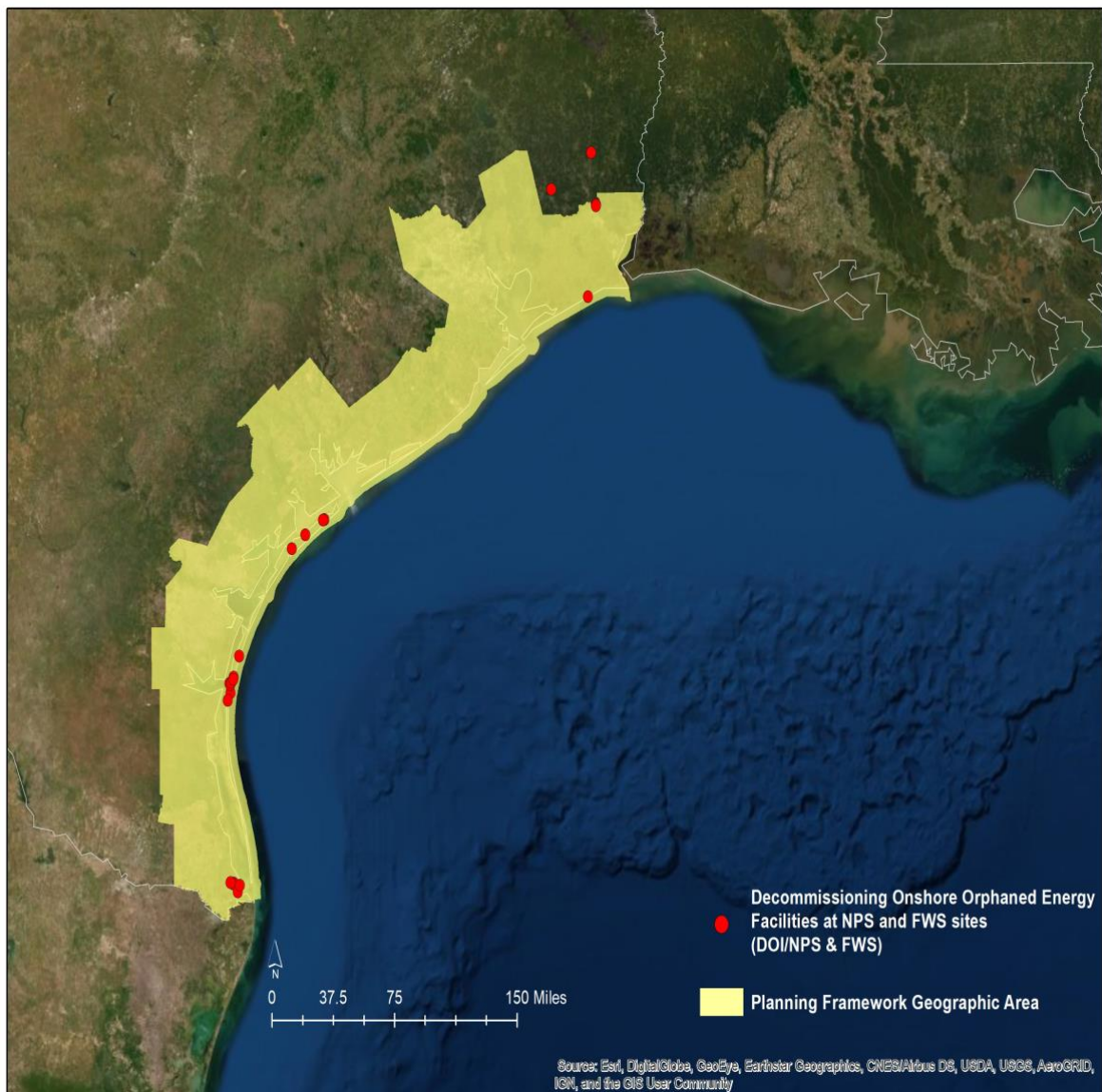


Figure 1: Location of onshore orphaned energy facility sites.

Other Uploads

Main Uploads_0:

RRC Public Comment_Restore FPL Number 3.pdf

Caption : N/A

[Link to Download](#)

<http://www.restorethegulf.gov/apps/piper/web/Uploads/Download/proposal/554/50>

Tables_2:

TABLE 1 - Proposed NPS and FWS Oil and Gas Sites to be Decommissioned.pdf

Table 1

[Link to Download](#)

<http://www.restorethegulf.gov/apps/piper/web/Uploads/Download/proposal/544/50>