

Compatibility Determination

Use: Re-nourishment of shoreline to arrest shoreline retreat, restore the degraded dune ridge, reduce the frequency/extent of sea water inundation into interior marshes, and restore historic, native beach habitat.

Refuge Name: McFaddin National Wildlife Refuge (NWR)

Establishing and Acquisitions Authority (ies):

The Migratory Bird Conservation Act of 1929.

Refuge Purpose:

“...for use as an inviolate sanctuary, or for any other management purpose for migratory birds.”
16 USC § 715d (Migratory Bird Conservation Act)

National Wildlife Refuge System Mission:

“The mission of the National Wildlife Refuge System (NWRS) is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Administration Act of 1966, as amended) [16 USC 668dd-668ee]

Description of Use:

a) What is the use? Is the use a priority public use?

Partnering with Jefferson County (Texas) and the Texas General Land Office (TGLO), McFaddin NWR is proposing to re-nourish a 20-mile stretch of shoreline to restore the degraded dune ridge, thus reducing the frequency/extent of sea water inundation of interior fresh water marshes located within McFaddin NWR, arrest shoreline retreat along the McFaddin coastline, and restore the historic, native beach habitat. The primary purpose of this action is to restore the longevity of the Chenier beach ridge in a manner that will delay shoreline retreat and prevent breaching of the beach ridge for decades to come. The primary goals of this project are: to prevent saltwater intrusion into McFaddin NWR along the shoreline due to tides and storm water levels occurring more frequently than the 5 year return interval (20% chance of occurrence in a given year); to decrease beach erosion during storm events and provide localized sediment increases to the littoral system; and to re-create dune/beach habitat.

Considering the purpose of McFaddin NWR, compatibility with potential future restoration activities, and budget constraints, shoreline re-nourishment will aid in preventing sea water overwash into the refuge by restoring the degraded dune ridge. McFaddin NWR consists of the largest remaining freshwater marsh on the Texas Coast, along with thousands of acres of

intermediate to brackish marsh. Meeting the habitat needs of diverse wetland dependent resident and migratory birds requires maintaining a range of coastal marsh habitat types, as well as sequential stages of the plant community within these marsh types. Providing freshwater inflows and restricting saltwater intrusion are critical to maintaining the Chenier Plain's historic continuum of fresh, intermediate, and brackish saline marshes. Habitat values for waterfowl, shorebirds, and many wading bird species are greatly enhanced in intermediate marshes with early successional plant communities containing several perennial and annual plant species (primarily grasses and sedges). The project will immediately reduce sea water inundation.

This use is not a priority public use, as identified in the Refuge Improvement Act. However, large scale restoration projects are also subject to compatibility. . Stipulations to Ensure Compatibility are to be included in the Special Use Permit to help minimize environmental impacts and ensure compatibility with the purposes for which the refuge was established, as well as the mission of the NWRS.

b) Where would this use be conducted?

Established in 1980, McFaddin NWR covers more than 58,000-acres and is part of the Salt Bayou marsh system which comprises the area west of Sabine Lake and the Sabine-Neches Waterway, and south of the Gulf Intracoastal Waterway (GIWW). This system consists of a continuum of saline tidal to freshwater microtidal systems. McFaddin NWR is located along SH 87 in the southeastern portion of Texas, near the Louisiana border. The Refuge lies approximately 15 miles south of Port Arthur, 90 miles east of Houston, and 12 miles west of Sabine Pass. McFaddin NWR is bounded on the south by the Gulf of Mexico (GOM), on the east by Texas Parks and Wildlife Department (TPWD) Property and private land, on the west by private land near High Island, and both the GIWW and private property to the north. The proposed project will be located along the Gulf shoreline, parallel to the remaining alignment of State Highway (SH) 87 in Jefferson and Chambers Counties.

This project includes construction on both state and federal lands. Of the proposed 2,541 acres of impact to U.S. waters through dredging, pipeline transport, and material placement, approximately 570 acres are located within the Refuge boundary on federal land. The remaining acreage is located both onshore and offshore on state lands.

c) When would this use be conducted?

The construction of the project is set to begin approximately May 01, 2016 and continue pending available funding. Large construction timeframes are necessary to allow for weather, equipment failure, and other construction-related delays, but approximately 3 miles of beach will be re-nourished by the end of the year. However the Compatibility Determination is intended to cover the entire 20 miles for restoration at concurrent or after this initial effort. Efforts to minimize impacts to the piping plover are to be incorporated in the construction plan. Impacts to wintering waterfowl will occur in the project area through construction. These short term impacts will provide increased habitat values for affected species for many years. Funding deadlines and the size of the project will not allow us to avoid these impacts by a seasonal construction closure.

d) *How will this use be conducted?*

The proposed shoreline re-nourishment will place sand dredged from an offshore sediment source by a cutter head-suction dredge and hydraulically pumped to shore as sediment-water slurry through a temporary pipeline. Surveys indicate an estimated volume of 4 million cubic yards of sand is available for use. This will allow for rebuilding the dune line and beach face with material similar to the native sand, recreate historic dune heights and beach widths to reduce shoreline retreat, and protect the sensitive inland marshes.

The selection of the borrow site was initiated in 2014, consisting of a review of historical field investigations and literature aimed at identifying sites with a high probability of containing useable sediments. The literature investigation considered both nearshore and offshore regions, with a focus on locating beach quality sediments buried in fluvial channels. The final investigation, conducted in 2015, was designed to narrow the search and focus on delineating the site or sites identified in the initial investigation for use as borrow sites. Based on field investigations, which included sub-bottom seismic data collection and review, sediment sampling, and sediment analysis, the proposed borrow site was selected based on the availability of a minimum of four million cubic yards of suitable sediment and that it was in close proximity to the proposed project area. Sediments tested at this location proved compatible with those tested during 2015 beach surveys at McFaddin NWR. Dredged slopes at the borrow site will not exceed (i.e. be steeper than) 5H:1V along the dredged boundaries to ensure integrity of the surrounding seabed, as suggested by Nairn, *et al* (2005) (from BOEM, 2012).

This re-nourishment project will be accomplished by transferring dredged sand to shore via submerged pipeline. Once onshore, the material would be pumped along the shoreline to the local construction areas and graded to the required construction template with heavy equipment. Based on conversations with State and Federal archeologists and biologists, impacts to cultural and biological resources can be mitigated by allowing for a maximum of six pipeline corridors between dredge/pipeline connections offshore and the coastline. This method also reduces the need for extra booster pumps by limiting the along-shore pipeline reach on either side of the shoreline connection points.

The design criterion for dune elevation and beach height and width is intended to reduce inundation events into the NWR marshes, slow recent increases in shoreline retreat, and return a portion of the sediments to the littoral system. Water level associated with a 5-year return interval (20% chance of occurrence in a given year) was used for this purpose. At the project location, this water level was determined to be 3.56 ft above Mean Sea Level (MSL). Combined with the effects of wave run-up, the water level to be withstood was determined to be 4.69 ft MSL or 5.36 ft NAVD88.

Based on these values, as well as relative sea level rise estimations of about 2 ft per century, it was shown that a dune crest of +8 to 9 ft NAVD88 was sufficient to adequately protect against salt water inundation into the wetlands, except under extreme conditions. Also, re-nourishing the beach face from about +5 ft NAVD88 along a mild slope (2%) to the existing mean high waterline, then increasing the slope (to about 5%) would result in 200-300 ft of dry beach berm and sufficient sand quantities to slow the recent advances in local erosion.

Dune alignment, height, and base width were explored for optimal performance, project longevity, and impacts to species and habitats within the guidelines specified by the TGLO. Where possible, dune alignment will parallel the +4-ft NAVD 88 contour. In locations where this is not possible, the alignment will slightly shift landward or seaward while maintaining a continuous dune line.

Lastly, fine-grained sediment from the borrow source (i.e. those with a percentage of fines > 20%) known as ‘overburden’ will be placed in a grade restoration area between the dune line and existing clay core berms. The deposition of fine sediments will create soil similar to what is present on the salty prairies and help direct water back towards the GOM. Current conditions in these areas slope toward the depleting wetlands causing water to become trapped against the berms. Standing water against the base of the berms can increase plasticity of the clay, and also the probability of failure to the recently constructed clay core berm during a tropical event. The trapping of seawater also increases salinities as evaporation occurs, creating hyper-saline environments detrimental to the natural vegetation – as is currently the case. This condition is causing the loss of salty prairie habitat dominated by *Spartina spartinae* with the conversion to a lower quality wetland type in the form of a non-vegetated salt flat. Dune plantings would be conducted to increase dune stability.

e) Why is this use being proposed?

McFaddin NWR lies within a bio-geographical region known as the Chenier Plain (Gosselink et al. 1979). Geographically, the Chenier Plain region extends from Vermillion Bay in southwestern Louisiana to East Galveston Bay in southeastern Texas. A distinguishing feature of the region is the presence of cheniers, ridges representing the ancient Gulf shorelines which are generally aligned parallel to the Gulf or as fanshaped alluvial deposits at the mouths of rivers. The higher cheniers support woody vegetation, hence the name chenier, a French word which means “place of oaks”. Cheniers are more prevalent in Louisiana than in Texas, perhaps because of the alignment of the Gulf shoreline and its proximity to the Mississippi River, the Chenier Plain region’s primary sediment source. Given the region’s significant annual rainfall, wetlands isolated from the Gulf by the cheniers and ridges developed into highly productive and diverse freshwater coastal marsh habitats. The existing beach ridge on McFaddin NWR was produced by those alluvial deposits and is responsible for the existence of the freshwater marshes within Salt Bayou.

McFaddin NWR is part of the Salt Bayou ecosystem, the largest contiguous estuarine marsh complex in Texas. This ecosystem is approximately 139,000 acres in size within a Chenier Plain landscape that includes freshwater to estuarine marsh, coastal prairie grasslands, tidal flats, creeks and basins and associated aquatic vegetation. This diversity of communities creates an extremely productive complex for an array of fish and wildlife resources.

In 2000, The Salt Bayou Marsh Workgroup, comprised of Federal, State, and County level government representatives and wetland conservation Non-Government Organizations (NGOs), assembled to collaborate on a plan that would describe and address the importance of the Salt Bayou system’s ecological functions, to discuss natural and man-made causes of decline, and to

propose a plan of action that would maintain ecological functions and values or reverse their decline. In May 2013, this technical stakeholder group completed the Salt Bayou Watershed Restoration Plan, a document reflecting the Salt Bayou Workgroup's understanding and knowledge of this ecosystem, as well as consensus on strategies to improve conditions of the Salt Bayou system. The final plan also represented a consensus of the workgroup members on a strategy to collectively improve conditions in the Salt Bayou system. One of the workgroup's recommendations was to restore the historic beach ridge where it was missing from High Island to Sabine Pass.

The clay core berm project currently underway on the Refuge directly responds to this recommendation and, when completed, will minimize the frequency of high tide overwash events to a periodicity of multiple years. This would allow the marsh ecosystem to stabilize after high salinity events and provide a productive vegetation community and habitat that supports freshwater dependent species. The proposed beach restoration will further protect both the clay core berm and McFaddin NWR against sea water inundation into the interior marshes, as well as return much needed sediments to the local littoral system. Additionally, the Refuge will be able to fully function as a natural protective buffer between the GOM and GIWW, protecting Jefferson and Chambers County residents, natural resources, and infrastructure.

The proposed beach re-nourishment project will aid in the protection of the clay core berm currently in construction; prevent saltwater intrusion into McFaddin NWR along the shoreline due to tides and storm water levels; decrease beach erosion during storm events; provide localized sediment increases to the littoral system; and to recreate dune/beach habitat. This protection will stop the future conversion of tens of thousands of acres of refuge habitat into open sea water. At current rates, more than 200 acres of marsh habitat are lost annually.

Beach re-nourishment is also needed to help conserve one of the largest freshwater marshes on the Texas Coast, along with thousands of acres of intermediate to brackish marsh. McFaddin NWR supplies important feeding and resting habitat for migrating and wintering populations of waterfowl. Meeting the habitat needs of McFaddin NWR's diversity of wetland dependent resident and migratory birds requires maintaining a range of coastal marsh habitat types and sequential stages of the plant community within these marsh types. Providing freshwater inflows and restricting saltwater intrusion are critical to maintaining the Chenier Plain's historic continuum of fresh, intermediate, and brackish saline marshes. Habitat values for waterfowl, shorebirds and many wading bird species are greatly enhanced in intermediate marshes with early successional plant communities containing several perennial and annual plant species (primarily grasses and sedges) which provide important food resources, and where disturbance reduces the height and/or density of vegetation.

Availability of Resources:

The construction funding has been developed from a combination of funds from Federal, State and Jefferson County funding sources. There are limited resources needed to administer this proposed project beyond the proposed construction budget. Adequate refuge personnel and operational funds are available to manage the recurring proposed project costs, such as

maintenance/small repairs and law enforcement to deal with trespass issues. No additional staffing needs are expected as a result of this project.

Anticipated Impacts of the Use:

The following is a summary of the anticipated impacts associated with beach re-nourishment. Please refer to the EA for a more complete review of the anticipated impacts of the project.

Beneficial Impacts:

Restoring historic, native beach habitat, arresting shoreline retreat, and rebuilding the degraded dune ridge can provide many beneficial impacts to various species by reducing the frequency and extent of sea water inundation into interior marshes. Reducing these salt water inundations would keep the current ratio of emergent marsh to open water the same, or would slowly change toward increasing emergent marsh habitat.

Waterfowl

Due to decreased salinities, overall productivity of marsh vegetation would increase, which will provide more forage for wintering waterfowl. With increases in species diversity, a corresponding increase in diversity of the types of forage would occur as well. Dabbling ducks would have increased availability to plant tubers and seeds. Diving ducks would have increased availability to prime forage, such as sago pondweed (*Potamogeton pectinatus*), banana waterlily (*Nyphaea mexicana*), and perhaps water shield (*Brasenia*). Snow geese numbers would likely be maintained at or near current levels. Some increases in both white-fronted geese and white-cheeked geese would likely occur as suitable habitat increased. Local population of mottled ducks would likely increase as more suitable habitat occurs at low salinity levels. This will increase the probability of brood survival across McFaddin NWR, rather than just portions of it, as is the current situation.

Sea Turtles

Loss or degradation of suitable foraging and nesting habitat is one of the major threats identified for sea turtles. Several factors can contribute to loss including natural processes (erosion, sea level rise, hurricanes), coastal development, contamination, human disturbance, etc. The project area does not currently contain suitable nesting habitat for sea turtles; however, the project's goal is to create several miles of restored dunes and sandy beach, resulting in creation of suitable sea turtle nesting habitat. Beach nourishment can provide habitat for sea turtles in areas that otherwise have little to no existing habitat.

Additionally, maintaining natural beach habitats for recreational purposes or for the protection of adjacent upland properties is beneficial to species that rely on beaches for portions of their life cycles. Sea turtles utilize beach habitats for nesting during the summer months, and coastal zone managers regard beach nourishment as a viable option for restoring nesting habitat that would otherwise be vulnerable to erosion (Gallaher, 2009). The beneficial effects of this project construction should outweigh any adverse effects, which are expected to be minimal. As for hatchlings, Crain et al (1995) reported most studies find no adverse effect of re-nourishment on hatchling emergence; rather, some studies have noted that more hatchling turtles emerged from

nests in re-nourished areas than from nests in natural areas, which was attributed to the optimal substrate used for re-nourishment.

Piping Plovers

While advocating primary reliance on conservation of natural habitat formation processes, the 1996 U.S. Atlantic Coast piping plover recovery plan acknowledges the potential role of artificial habitat creation and enhancement as compensation for disruption of natural processes (Rabon and Hecht, 2005). Thus, the project would likely have long term beneficial effects to the piping plover by increasing the amount of available beach wintering and foraging habitat. Beach re-nourishment projects are important and, while immediate benefits may not be seen at the project site, it can create future habitat for piping plover use.

Red Knot

The proposed project would likely have long term beneficial effects to the red knot, by creation of suitable wintering/foraging habitat. This threatened shorebird is losing areas along its range due to sea level rise and development (USFWS, 2015c). Limited data exists about red knots that spend the non-breeding season in coasts and salt marshes in the Gulf of Mexico. Except for in localized areas, there have been no long-term systematic surveys of red knots in Texas or Louisiana. Still beach re-nourishment projects are important and, while immediate benefits may not be seen at the project site, it can create future habitat for red knot use.

Waterbirds:

Waterbird species utilizing the marshes on McFaddin NWR for shallow water feeding, breeding, and resting habitat would benefit by long-term protection of these habitats. For several of the larger long-billed species like willet, whimbrel, godwits, and long-billed curlews, constructing the berm would create highly preferred habitat for foraging on fiddler crabs. Wading and marsh birds would benefit from the creation of shallow fresh water habitat by providing increased foraging areas. Increases in nesting rails and bitterns would be very likely, as well as in pied-billed grebe and common moorhens.

Raptors:

Raptors, commonly observed on McFaddin NWR, would benefit in a positive manner as the habitat conditions stabilize, and forage species would not disappear due to habitat loss. Northern Harriers should experience long term prey base increases, as marsh rodent populations' increase with fresher marsh conditions.

Fisheries Resources:

Re-nourishing the beach and berm area, to provide long term protection from salt water, would re-establish the natural isohaline gradients that are present in estuarine ecosystem and benefit all species that utilize the coastal marsh as nurseries. This portion of McFaddin NWR would remain highly productive and continue to serve as the one of the last functioning estuarine nurseries for the Texas side of the Sabine Lake ecosystem. Fresh water fisheries species utilizing these coastal marshes would have positive impacts due to this alternative. As salinity fluctuations are stabilized and salinity ranges decrease, these species would likely become reestablished across the entire western portion of Salt Bayou.

Mammals:

All species of mammals would likely benefit by long-term protection of habitat and the increase in primary plant production that would result.

Alligators:

Decreases in salinity and increases in water quality would benefit the American alligator by increasing suitable habitat.

Public Access/Visitor Use

Due to coastal erosion, beach access is currently accessible only at low tide on the west side and very difficult to navigate by vehicle from both sides. With beach re-nourishment, Refuge visitors would experience long term positive impacts for recreational uses such as swimming, surf fishing, and various other beach uses.

Additionally, waterfowl hunting would experience long term positive impacts as the salinities decrease in the coastal marsh and submerged aquatic vegetation is re-established. Fishing on the refuge would experience positive impacts as salinity fluctuations stabilize and more historical isohaline lines are established across the coastal marsh. Wildlife observation and photography would likely experience slight positive impacts as salinities stabilize across the marsh and wildlife re-establishes itself across the coastal marsh.

Negative Impacts:

If no beach re-nourishment is done, the beach, dune, wetland, and shoreface habitat would continue to be lost due to shoreline retreat, continued loss of sand from the littoral system, and seawater inundation into the Refuge marshes. Additionally, dune ridge overwashes based on the low elevations of these decimated 'structures' would continue to occur. These overwashes may, in turn, create breaches in the clay core berm under construction, as well as turning the adjacent areas immediately seaward of the berm into barren salt flats due to hypersaline conditions. Below are identified negative impacts of beach re-nourishment, however, these are likely to pale in comparison to the beneficial impacts expected for wildlife, beach users, and the Refuge as a whole.

Water Quality

The project may result in temporary degradation of water quality and clarity due to increased sediment distribution in the water column, especially in the vicinity of the borrow area. Effects would be short-term and localized to work areas.

Human Disturbance

Human disturbance is currently present within the project area in the form of recreation. In some wintering and stopover areas, a variety of shorebirds share beach habitat with recreational users (Niles *et al.*, 2008; Tarr, 2008). However, recreational activities can affect some, particularly red knots and piping plovers, both directly and indirectly. These activities can cause habitat damage (Schlacher and Thompson, 2008; Anders and Leatherman, 1987), cause shorebirds to abandon otherwise preferred habitats, negatively affect the birds' energy balances, and reduce the amount of available prey. Effects to red knots and piping plovers from vehicle and pedestrian

disturbance can also occur during construction of shoreline stabilization projects, including beach nourishment. However, the long term beneficial effects to red knot, piping plovers, and other shorebirds by the creation of suitable wintering/foraging habitat should outweigh the negative effects of potential disturbance.

Sea Turtles (sand compaction):

Ernest and Martin (1999) found that on most beaches in the southeastern U.S., sea turtle nesting success typically declined for the first year or two following construction, even though more nesting habitat is available for turtles. This decline is attributed to sand compaction. Other studies have reported reduced nesting success attributed to increased sand compaction, escarpment formation, and changes in beach profile (NMFS, 2009). Although compaction can be a problem associated with beach nourishment, it does not occur with every nourishment project. When increased compaction does occur, nesting success commonly decreases in the first nesting season after nourishment, but returns to normal values in subsequent years (Crain et al., 1995). Best management practices (BMPs) would be utilized by contractors to minimize soil compaction.

Piping Plovers

Piping plovers, present in the vicinity of operations, have the potential to be disturbed/ stressed by the presence of crews and equipment, as well as potentially displaced to adjacent areas containing suitable habitat. However, the largest concentrations of piping plovers are expected to be in areas designated as critical habitat, which does not include the project area. Likewise, piping plovers are also likely to be present in other suitable habitat across the Refuge during project operations. For these reasons, beneficial impacts should outweigh any negative impacts.

Public Access/Visitor Use

Short term negative impacts to public access/visitor use include beach closure to through traffic both during construction, and for a short time following while sediments sufficiently de-water to the extent the beach surface is “hardened” enough to support vehicular traffic. This timeline is expected to be minimal, but will require the approval of the contractor and the County and/or the Engineer, as well as the TGLO to ensure public safety.

Also, effects to recreational and commercial fishing, as well as recreational boating along the Refuge shoreline, would be temporarily impacted by the presence of the dredge and pipeline corridor(s). These effects on the local economy are expected to be low and short-lived. Anglers and commercial fishing interests would move along the shoreline to unaffected local areas.

Public Review and Comment:

A 30-day comment period will be established for this Compatibility Determination (CD), in conjunction with the EA. The USFWS will provide copies of the CD and EA on their website and at field offices. Additionally, Jefferson County officials will publish a news release, send out letters, and/or emails to potential interested parties announcing the public comment period for this CD and EA, and receive all public comment.

Determination (check one below):

Use is Not Compatible
 Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:

Conducting beach re-nourishment to restore historic, native beach habitat, arrest shoreline retreat, restore the degraded dune ridge, and reduce the frequency/extent of sea water inundation into interior marshes provides the Refuge with a management tool to improve habitat quality for target organisms, while ensuring the long term viability of fragile marsh habitat. Environmental stipulations are to be included to help minimize environmental impacts and ensure compatibility with the purposes for which the Refuge was established, as well as the mission of the NWRs.

These stipulations include:

General Stipulations

- All crew members (contractors, workers, etc.) will attend training sessions prior to the initiation of, or their participation in, project work activities. Training will be conducted by qualified personnel and the scope of training will include: 1) recognition of sea turtles and piping plovers, their habitats, and tracks; 2) recognition of other listed species; 3) impact avoidance measures; 4) reporting criteria; 5) contact information for different rescue agencies in the area.
- Project equipment and vehicles transiting between the staging area and project site will be kept to a minimum and will use designated routes. Vehicle access shall be confined to the immediate needs of the project.
- The contractor will coordinate and sequence the work to minimize the frequency and density of vehicular traffic on the beach to the greatest extent practicable.
- Beach driving by the contractor shall be reduced to the maximum extent practicable. Areas of nourishment will not be accessed by construction equipment after targeted volumes are achieved.
- Use of construction lighting at night shall be minimized, directed toward the construction activity area, and shielded from view outside of the project area to the maximum extent practicable.
- A designated monitor(s) will be identified who will act as the single point of contact responsible for communicating and reporting endangered species issues throughout construction of the project.

Conservation Measures Specific to Sea Turtles

- Permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles. All construction personnel are responsible for observing water-related activities for the presence of these species.
- Permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles, which are protected under the Endangered Species Act of 1973.
- All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.
- All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.
- During sea turtle nesting season (March 15 to October 1), the County, in coordination with the GLO, USACE and other project partners, will ensure that a qualified monitor(s) is onsite during work and maintenance activities and provide the USFWS Clear Lake Ecological Services Office with the names and qualifications of the monitor(s). The monitor(s) will: 1) survey the project area (i.e., immediate project area and 100-ft buffer zone outside the project area) and equipment access routes for turtles and turtle nests before beginning work activities each day, after work has concluded each day, once a day on non-construction days, and other such times as deemed necessary by the monitor(s); 2) escort large vehicles when necessary to ensure that sea turtles and nests are protected; 3) determine when the beach is clear for work; and 4) ensure that tire ruts and other disturbed areas on the beach are smoothed out and sand loosened upon the completion of each work day.
- Information regarding the qualifications of the independent qualified monitor(s) will be submitted to the Corps prior to starting work in the permitted area.
- If a sea turtle is seen within 100 ft of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 100 ft of a sea turtle. Operation of any mechanical construction equipment shall cease immediately if a sea turtle is seen within a 100 ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.
- If a sea turtle or nest is located in or adjacent to work areas, the monitor will call 1-866-TURTLE-5 and notify the USFWS Clear Lake Ecological Services Field Office (281-286-8282). Work activities will not resume within 100 ft of the nest site or turtle until authorization from the monitor is received to do so.
- Any equipment, including but not limited to silt fencing should be made of a material in which a sea turtle cannot become entangled. Any equipment with potential for entanglement will be monitored closely.

Conservation Measures Specific to Red Knots and Piping Plovers

- The County, in coordination with the Corps and other project partners, will ensure that a qualified monitor(s) surveys the work areas for wintering piping plovers and red knots, between the dates of 15 July through 15 May. Surveys will take place prior to morning construction activities and will include looking under equipment and vehicles. The monitor(s) will also be onsite to ensure that loafing or resting piping plovers and red knots are not in the project area during project activities. Because piping plovers and red knots are especially vulnerable during periods of cold temperatures and when they are roosting at night, extra care will be taken during these times.
- If a piping plover or red knot is found in an active construction area, work will be stopped within an area specified by the monitor until the bird(s) leave the construction site. If the bird does not relocate (e.g., injured bird), the USFWS will be contacted to solicit additional guidance.

Justification:

The shore face at McFaddin NWR consists generally of clay overlain by a thin sand veneer. In recent history, the beach ridge separating the Gulf from interior marshes was sufficiently high preventing sea water inundation from the GOM, with the exception of storm surge episodes associated with significant tropical storms or hurricanes. The frequency of such inundation was on the order of years to a decade or more.

In a 2014 study, the TGLO noted that full recovery from Hurricane Ike is not expected. This is partly due to lack of natural sediment input and significant transport of sand away from critically eroding areas. The thin sand veneer is not expected to recover, leaving this section of the shoreline more susceptible to ongoing erosion. During the 7-year study period, the cumulative shoreline change in this region was a recession of 141 feet and a rate of change equal to 20 feet per year. Likewise, decimation of the dune system has accelerated shoreline retreat from historic rates around -20 feet per year, to as much as -40 feet per year in places. Hurricane Ike flattened much of the remaining beach ridge separating the GOM from the interior marshes, moving a significant amount of sand outside the active profile either seaward onto the submerged continental shelf or landward into the marsh. The loss of sand from the active beach system has eroded the dune crest, thus reducing elevations to the extent sea water now routinely inundates the formerly fresh and brackish marsh in the Refuge interior. Without beach re-nourishment, the results will be marsh loss on a massive scale and Gulf shoreline retreat measured in miles, rather than in feet, until it eventually reaches the GIWW.

In response to mounting threats against the marsh, a protection project was developed by the USFWS, in conjunction with Jefferson County and the TGLO, to restore the dune ridge and replenish the beach. The proposed beach re-nourishment will result in the protection of approximately 20 miles of McFaddin NWR shoreline from high tide events and low to mid energy storm events.

Not completing this project will result in the conversion of tens of thousands of acres of refuge habitat into salt marsh and likely open water habitat. In recent years, more than 200 acres of marsh habitat have been lost annually. The berm currently being constructed will help marsh recovery and decelerate marsh die off. However, in order for McFaddin NWR to benefit from the maximum armoring potential, the Chenier beach ridge needs to be restored as well. Without the combination of both efforts, increased salinities will ultimately have significant negative impacts to most coastal marsh species. These will be especially evident in estuarine fisheries species, as water conditions deteriorate in one of the largest estuaries on the Texas coast.

Cascading effects, including reduced biomass production, collapse of the root zone leading to shallow surface subsidence, and loss of organic soils will rapidly convert to open water. Aquatic habitats will decline in value as increased salinities levels remain. Open water areas will increase in size, leading to increased turbidity and loss of aquatic vegetative communities. As emergent marsh communities are lost in the conversion of marsh to open water, species utilizing the interior marshes will be displaced to more suitable habitat, if available. In addition to hundreds of acres per year converting to open water at the Gulf shoreline, the interior of the marsh will open up and eventually connect to the GOM. Examples of this progression are evident in Southern Louisiana.

If no action is taken, beach, dune, wetland, and shoreface habitat would continue to be lost due to shoreline retreat, continued loss of sand from the littoral system, and seawater inundation into the Refuge marshes. Additionally, this would increase the likelihood of dune ridge overwashes, based on the low elevations of these decimated structures. These overwashes may, in turn, create breaches in the clay core berm under construction, as well as turning the adjacent areas immediately seaward of the berm into barren salt flats due to hypersaline conditions.

In the long-term, socioeconomic conditions within the surrounding community would ultimately be affected without protective action. Loss of potential revenue related to: diminished duck hunting opportunities associated with waterfowl habitat loss; lost refuge fishing opportunities, in both quality and diversity, from salt water intrusion, as well as lost surf fishing opportunities due to coastal habitat loss; and impacted birder habitat and birding venues along the coast for many visitors seeking to view birds passing through along their migratory paths. According to the USFWS (2012), the average amount spent annually per-person for hunting and fishing recreation was \$1,262.00 and \$2,484.00, respectfully. Impacts to the fisheries community would negatively affect both recreational and commercial fishing sectors of the environment. With annual visitation rates to the refuge of over 122,000, including approximately 4,600 hunters and over 25,000 fishermen, negative impacts to the local community could be significant.

Lastly, Refuge visitors would endure long-term negative impacts to wildlife recreational programs on McFaddin NWR if no action is taken to re-nourish the beach. The conversion of habitat and the effect on wildlife species diversity would ultimately decrease the quality of the wildlife dependent recreation. Waterfowl hunting would ultimately decline as the coastal marsh fragments convert to open water habitat and submerged aquatic vegetation disappears. Fishing on the refuge would likely experience short term positive impacts as additional habitat (open water) is created, but would collapse as open water habitat become more common. This open water habitat is the least used of any of the coastal fisheries habitat present on the Gulf Coast.

Wildlife observation and photography would likely experience short term positive impacts as additional habitat (open water) is created adjacent to McFaddin NWR roads, however, long term impacts would be negative as habitat is converted to open water.

Signatures: Project Leader: _____

Refuge Supervisor: _____

Concurrence: Regional Chief _____

Regional Director: _____

Mandatory 10-yr Re-evaluation Date: _____

References:

- Anders, F.J., and S.P. Leatherman. 1987. Disturbance of beach sediment by off-road vehicles. *Environmental Geology and Water Sciences* 9:183-189.
- BOEM. 2012. Environmental Assessment for the Issuance of a Non-Competitive Negotiated Agreement for the use of Outer Continental Shelf Sands for the Cameron Parish Shoreline Restoration Project (CS-33).
- Crain, D.A., A.B. Bolten, and K.A Bjorndal. 1995. Effects of Beach Nourishment on Sea Turtles: Review and Research Initiatives. *Restoration Ecology*. Vol 3, No 2, pp 95-104.
- Ernest, R.G., and R.E. Martin. 1999. Martin County Beach Nourishment Project Sea Turtle Monitoring and Studies, 1997 Annual Report and Final Assessment. Ecological Associates, Inc., Jensen Beach, Florida. 96pp.+ appendices.
- Gallaher, A.A. 2009. The Effects of beach nourishment on sea turtle nesting densities in Florida. Doctoral Dissertation. <http://nsgl.gso.uri.edu/flsgp/flsgpy09003.pdf>. Accessed January 4, 2016.
- Gosselink, J.G., C.L. Cordes, and J.W. Parsons. 1979. An Ecological Characterization Study of the Chenier Plain Coastal Ecosystem of Louisiana and Texas. 3rd Volume. U.S. Dept. of the Interior, U.S. Fish and Wildlife Service, Office of Biological Services. Slidell, LA. USFWS/OBS – 78/9 through 78/11.
- Nairn, R., Q. Lu, and S. Langendyk. 2005. A Study to Address the Issue of Seafloor Stability and the Impact on Oil and Gas infrastructure in the Gulf of Mexico. OCS Study MMS 2005-043. USDOJ, MMS, Gulf of Mexico OCS Region.
- National Marine Fisheries Service (NMFS). 2009. Loggerhead Sea Turtle (*Caretta caretta*) 2009 Status Review Under the U.S. Endangered Species Act.
- Niles, LJ, Sitters, HP, Dey, AD, Atkinson, PW, Baker, AJ, and 17 others. 2008. *Status of the Red Knot (Calidris canutus rufa) in the Western Hemisphere*. Studies in Avian Biology No. 36. Cooper Ornithological Society. 1-185.
- Rabon, D. and A. Hecht. 2005. Beach stabilization and piping plovers: Overview of conservation issues and implications for ESA Section 7 consultation. Proceedings of the Symposium on the Wintering Ecology and Conservation of Piping Plovers. http://www.fws.gov/raleigh/species/es_pipl_proc.html. Accessed January 4, 2016.
- Schlacher, T.A., and L.M.C. Thompson. 2008. Physical impacts caused by off-road vehicles (ORVs) to sandy beaches: Spatial quantification of car tracks on an Australian barrier island, *Journal of Coastal Research* 24:234-242.

- Tarr, N.M. 2008. Fall migration and vehicle disturbance of shorebirds at South Core Banks, North Carolina. North Carolina State University, Raleigh, NC.
- Texas Parks and Wildlife Department (TPWD). 2013. Salt Bayou Watershed Restoration Plan. http://tpwd.texas.gov/publications/pwdpubs/media/salt_bayou_plan.pdf
- Texas Chenier Plain Refuge Complex, Final Environmental Impact Statement, Comprehensive Conservation Plan, and Land Protection Plan. 2008. NCTC Conservation Library at: <http://digitalmedia.fws.gov/cdm/ref/collection/document/id/604>.
- U.S. Fish and Wildlife Service. 2012. USFWS 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation State Overview. http://mycountyparks.weebly.com/uploads/3/0/6/6/3066963/usfws_2012_state_overview.pdf.
- U.S. Fish and Wildlife Service. 2015a. Rufa Red Knot Ecology and Abundance Supplement to Endangered and Threatened Wildlife and Plants; Proposed Threatened Status for the Rufa Red Knot (*Calidris canutus rufa*) [Docket No. FWS-R5-ES-2013-0097; RIN 1018-AY17] (2015, January 7). Retrieved from: http://www.fws.gov/northeast/redknot/pdf/20130923_REKN_PL_Supplement02_Ecology%20Abundance_Final.pdf.