A-2: Endangered Species Act Compliance

Biological Evaluation

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Texas Coastal Ecological Services Field Office
17629 El Camino Real, Suite 211
Houston, Texas 77058
281/286-8282 / (FAX) 281/488-5882

In Reply Refer To:
FWS/R2/02ETT
X00-2018-I-2140

April 15, 2019

Colonel Lars Zetterstrom
Attention: Mr. Douglas Simms, Environmental Compliance Branch
U.S. Army Corps of Engineers, Galveston District
P.O. Box 1229
Galveston, Texas 77553

Dear Colonel Zetterstrom:

Thank you for your letter dated June 26, 2018, requesting informal consultation for proposed restoration actions related to the Jefferson County Ecosystem Restoration Feasibility Study in Jefferson County, Texas (Study). The U.S. Army Corps of Engineers (Corps) submitted a request to the U.S, Fish and Wildlife Service (Service) seeking concurrence that the proposed restoration actions "may affect, but are not likely to adversely affect" the West Indian manatee *Trichechus manatus* and whooping crane *Grus Americana* pursuant to the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq*.).

The Corps made *a* "no effect" determination for the piping plover *Charadrius melodus*, rufa red knot *Calidris canutus rufa*, and nesting loggerhead *Caretta caretta*, green *Chelonia mydas*, leatherback *Dermochelys coriacea,* hawksbill *Eretmochelys imbricata*, and Kemps ridley *Lepidochelys kempii* sea turtles. The Service does not concur with no effect determinations and no further coordination or contact with the Service is necessary. However, if the project changes or additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.

The Study seeks to evaluate existing coastal habitat issues such as land loss due to erosion, subsidence, and relative sea level rise, conversion of low salinity habitats to more saline or open water habitats, and reductions in available sediments necessary to sustain coastal ecosystem processes. The Corps defines the Tentatively Selected Plan (TSP) (select measures to be put forward for additional consideration, study, refinement, and funding) restoration features as: the installation of 6,592 feet of breakwater structures and 8,421 acres of marsh restoration on state, federal, and privately owned lands of Jefferson County. The Corps assumes construction would take 60 months to complete all restoration actions; however, the Study is still subject to congressional authorization and funding and a start date has not yet been determined. The Corps concluded there is no critical habitat within the restoration action area of the Study.

Section 7 of the Act requires that all Federal agencies consult with the Service to ensure that the actions authorized, funded, or carried out by such agencies do not jeopardize the continued existence of any threatened or endangered species or adversely modify or destroy designated critical habitat of such species. The Corps proposes to implement the following voluntary conservation measures to minimize potential impacts to listed and protected species and their habitats:

General Conservation Measures

- All personnel (contractors, workers, etc.) attend a training session prior to the initiation of, or their participation in, project work activities. Training will include: 1) recognition of piping plovers, rufa red knot, West Indian manatee, sea turtles, and their habitats, 2) impact avoidance measures; 3) reporting criteria; 4) contact information for rescue agencies in the area; and 5) penalties for violating the Act. Designation of a single point of contact responsible for communicating any necessary endangered species issues to the Service through the construction period.
- Project equipment and vehicles transiting between the staging area and restoration site will be minimized to the maximum extent practicable, including but not limited to using designated routes and confining vehicle access to the immediate needs of the project.
- The contractor will coordinate and sequence work to minimize the frequency and density of vehicular traffic within and near the restoration unit(s) and limit driving to the greatest extent practicable.
- 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 the construction period.

West Indian manatee

- Qualified biologist will monitor for the presence of manatees during phases which occur in open water.
- Delineate a 50-foot radius of the work area before activities occur in open water areas. If a manatee is observed within the 50-foot radius at any time during construction, the biological monitor shall halt construction activities, including shutting down any running equipment until the animal has moved beyond the radius, either through sighting or by waiting until enough time has elapsed (approximately 15 minutes) to assume that the animal has moved beyond the buffer.
- If a manatee is sighted within 100 yards of the active work zone, vessels will operate at no wake/idle speeds.
- If siltation barriers are used, they will be made of material in which manatees cannot become entangled, should be properly secured, maintained, and regularly monitored to avoid entrapment.
- Any manatee sightings will be immediately reported to the U.S. Fish and Wildlife Service Texas Coastal Ecological Services Field Office in Houston at 281-212-1505.

Whooping crane

- Avoid construction during the wintering season of October 1 to April 15 to the extent practicable.
- If construction during the wintering season cannot be avoided, a trained biological monitor capable of identifying whooping cranes should be onsite with stop work authority.
- If a whooping crane is located within 1,000 feet of an active construction area, the monitor shall immediately stop all work. When the crane has left the 1,000-ft area on its own accord, the monitor may permit work to continue.
- If work occurs in potential habitat during the wintering season, all equipment greater than 15 feet high should be laid down at dusk and overnight so as to avoid whooping crane strikes during times of low visibility.
- If equipment cannot be laid down at dusk or overnight, then mark with flagging or something similar to avoid whooping crane strikes during low visibility.
- All whooping crane sightings should be immediately reported to the Texas Coastal Ecological Services Field Office at 281-212-1505.

Based on the project information provided, the input of species experts, and the implementation of the conservation measures for listed species identified in your request and noted in this letter, we concur with the Corps' conclusion that the proposed TSP restoration actions may affect but is not likely to adversely affect the threatened West Indian manatee and the whooping crane. No further section 7 consultation will be required unless: 1) the identified action is subsequently modified in a manner that causes an effect on a listed species or designated critical habitat; 2) new information reveals the identified action may affect federally protected species or designated critical habitat in a manner or to an extent not previously considered; 3) a new species is listed or a critical habitat is designated under the Act that may be affected by the identified action; or, 4) the project is not completed within five years from the date of this consultation.

Please note that the Service is currently evaluating the eastern black rail *Laterallus jamaicensis jamaicensis*, for listing under the Act as a threatened species. A year-round resident of the Texas coast, the black rail is a small secretive marsh bird usually found in saltgrass *Spartina* sp. marshes and may be present within the project area. If a new species is listed, the Service recommends the Corps reinitiate consultation procedures pursuant section 7 of the Act.

We appreciate your efforts to conserve these sensitive species. If you have any questions or comments, please contact staff biologist Donna Anderson at 281/286-8282 ext. 26505.

Sincerely,

Charles Ardizzone
Field Supervisor

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229

June 26, 2018

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Regional Office
Protected Resources Division
263 13th Avenue South
St. Petersburg, Florida 33701-5505

Dear Sir or Madame:

The U.S. Army Corps of Engineers (USACE) Galveston District, in partnership with Jefferson County and the Sabine Neches Navigation District, is conducting the Jefferson County Ecosystem Restoration (JCER) Feasibility Study. As part of the study process, a Tentatively Selected Plan (TSP) has been selected and the Jefferson County Ecosystem Restoration Draft Integrated Feasibility Study and Environmental Assessment (DIFR-EA) Report is being prepared for public release. The TSP, Alternative 4Abu, incorporates marsh and shoreline restoration and nourishment features which are critical to the stabilization and sustainment of marsh resources in and around Keith Lake now and into the future. A Biological Evaluation was prepared to analyze the impacts of implementing ecosystem restoration in Jefferson County, Texas (Enclosure).

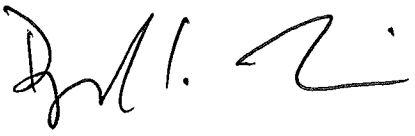
To implement this plan, borrow material would be dredged from the Sabine-Neches Waterway (SNWW) following the regular Maintenance Dredging Cycles and Plans or the SNWW Channel Improvement Project (CIP), except that dredged material would be beneficially used for marsh restoration rather than being placed in the identified placement areas. Dredging operations under both of these dredging plans have undergone formal Section 7 consultation in which Biological Opinions (BO) for each plan were issued. For maintenance dredging, the *Gulf of Mexico Regional Biological Opinion on Hopper Dredge use for Maintenance Dredging of Channels and Sand Mining by the four USACE Gulf of Mexico Districts* was issued November 19, 2003 (#F/SER/2000/01287), with several amendments since. For the SNWW CIP, a project specific BO was issued August 13, 2007 (#F/SER/2007/00954). Your agency determined that the proposed action of each of the projects were *likely to adversely affect but were not likely to jeopardize* the continued existence of loggerhead, Kemp's ridley or green sea turtle and would have *no effect* on leatherback sea turtles due to lack of suitable habitat or regular occurrence within the action areas.

USACE has determined that the proposed use of dredged material to restore marsh would not significantly modify dredging operations or induce affects to listed species or

critical habitat beyond those in which the aforementioned BOs were issued. Implementation of the TSP would not trigger re-initiation of consultation. USACE also considered an additional 10 listed or candidate species (four coral, five whale, and one fish species), within NMFS jurisdiction, for which a *no effect* determination was made due to the lack of suitable habitat or outside the species known range.

If you have any question or need additional information to conduct your review, please contact Ms. Melinda Fisher, Biologist, Environmental Compliance Branch, Regional Planning and Environmental Center at 918-669-7423 or Melinda.Fisher@usace.army.mil.

Sincerely,



Douglas C. Sims, PMP, RPA
Chief, Environmental Compliance Branch
Regional Planning and Environmental Center

Enclosure

CESWF-RPEC 07 February 2019

MEMORANDUM FOR THE RECORD

SUBJECT: Jefferson County Shoreline and Ecosystem Restoration Feasibility Study: Draft Integrated Feasibility Report and Environmental Assessment, Jefferson County, Texas – Endangered Species Act

1. PURPOSE: The purpose of this memo is to document compliance of the subject U.S. Army Corps of Engineers, Galveston District (USACE) ecosystem restoration feasibility study with the Endangered Species Act for species within the National Marine Fisheries Service (NFMS) jurisdiction.

2. BACKGROUND: A complete consultation package was submitted to NMFS on June 29, 2018. The package included a cover sheet signed by Douglas Simms on June 26, 2018, a Biological Evaluation Dated June 2018, and the integrated Feasibility Report and Environmental Assessment and all associated appendices.

   The Biological Evaluation concluded that use of dredged material to restore marsh would not significantly modify dredging operations or induce affects to listed species or critical habitat beyond those which were described in the *Gulf of Mexico Regional Biological Opinion on Hopper Dredge use for Maintenance Dredging of Channels and Sand Mining by the four USACE Gulf of Mexico Districts (GRBO)* (Consultation #F/SER/2000/01287) or the *Sabine-Neches Waterway Channel Improvement Project (SNWW CIP) Biological Opinion* (Consultation #F/SER/2007/00954). Implementation of the TSP would not trigger re-initiation of consultation under either of those BOs. An additional 10 listed or candidate species (four coral, five whale, and one fish species), within NMFS jurisdiction, were also considered in the BE that were not covered in either of the BOs. USACE made a no effect determination for all 10 species due to the lack of suitable habitat or outside the species known range.

3. COMPLIANCE GUIDANCE: Ms. Karla Reece, NMFS Branch Chief, contacted me by telephone on July 11, 2018 informing me that she had received and reviewed the consultation package. She stated that if the agency determined that the proposed action was within the parameters set forth within the GRBO or SNWW CIP, there was no need to initiate a consultation, since the project would not trigger re-initiation. I reaffirmed to her that the only modification to the actions described in either of the BOs was that the dredging pipes would lead to a marsh restoration site rather than an upland placement area or off-shore disposal site. As well, I stated that there would be no increase in dredging quantities and no change to the dredging schedules.

   Ms. Reece also stated that since there was a no effect determination for the 10 additional species, NMFS would not be providing a concurrence on the determination. It was prudent that USACE document in the project records the rationale behind the no effect determination as it will act as the official ESA consultation.

4. DETERMINATION: Ms. Reece stated that since there was no significant change to the actions described either of the two existing BOs and a no effect determination had been made for the additional 10 species, she would not issue a consultation number and there was no need for NMFS to review further. Section 7 Consultation requirements for marine species have been met for this study. NMFS will not be providing documentation of consultation, as it has been determined that the tentatively selected plan would not trigger re-initiation (re-opening) of consultation on the GRBO or SNWW CIP.

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Date: 2019.02.07 15:23:49 -06'00'

Melinda Fisher
Biologist, Environmental Branch
Regional Planning & Environmental Center

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229

June 26, 2018

Mr. Chuck Ardizzone
United States Fish and Wildlife Service
Texas Coastal Ecological Services–Houston
17629 El Camino Real, Suite 211
Houston, Texas 77058

Dear Mr. Ardizzone:

The U.S. Army Corps of Engineers (USACE) Galveston District, in partnership with Jefferson County and the Sabine Neches Navigation District, is conducting the Jefferson County Ecosystem Restoration (JCER) Feasibility Study. As part of the study process, a Tentatively Selected Plan (TSP) has been selected and the Jefferson County Ecosystem Restoration Draft Integrated Feasibility Study and Environmental Assessment (DIFR-EA) Report is being prepared for public release. The TSP, Alternative 4Abu, incorporates marsh and shoreline restoration and nourishment features which are critical to the stabilization and sustainment of marsh resources in and around Keith Lake now and into the future. Marsh measures consist of marsh restoration and/or nourishment to increase land coverage in the area and improve terrestrial wildlife habitat, hydrology, water quality, and fish nurseries. Shoreline measures include construction of rock breakwater features that would dissipate wave energies, stabilize shorelines, reduce land loss, reduce saltwater intrusion, and support reestablishment of emergent marsh along the Gulf Intracoastal Waterway shoreline through retention of sediments.

A Biological Evaluation was prepared to analyze the impacts of implementing ecosystem restoration in Jefferson County, Texas (Enclosure). We request initiation of informal consultation under Section 7(a)(2) of the Endangered Species Act for the JCER Feasibility Study (Consultation Code: 02ETTX00-2018-SLI-1096). Based on the enclosed analysis, USACE has determined that the TSP *may affect, but is not likely to adversely affect* the West Indian Manatee because all effects to the species and its habitat would be insignificant and/or discountable. USACE has also determined that the action would have *no effect* on piping plover, rufa red knot, or nesting loggerhead, green, hawksbill, and Kemp's ridley sea turtles or their habitat while on land due to lack of suitable habitat and/or use of the action area. No critical habitat is present. We request your concurrence with this determination.

If you have any question or need additional information to conduct your review, please contact Ms. Melinda Fisher, Biologist, Environmental Compliance Branch, Regional Planning and Environmental Center at 918-669-7423 or Melinda.Fisher@usace.army.mil.

Sincerely,

Douglas C. Sims, PMP, RPA
Chief, Environmental Compliance Branch
Regional Planning and Environmental Center

Enclosure

From: Fisher, Melinda CIV USARMY CESWF (US)
To: "Anderson, Donna"
Subject: Jefferson County ER Updated Biological Evaluation
Date: Monday, November 26, 2018 1:35:00 PM
Attachments: A2_JCER Biological Evaluation_4Abu_Clean.docx
A2_JCER Biological Evaluation_4Abu_track_changes.docx
4Abu_MarshUnits.cpg
4Abu_MarshUnits.dbf
4Abu_MarshUnits.prj
4Abu_MarshUnits.sbn
4Abu_MarshUnits.sbx
4Abu_MarshUnits.shp
4Abu_MarshUnits.shp.xml
4Abu_MarshUnits.shx

Donna,

I have revised the JCER Biological Evaluation per our previous conversations. I attached a track change and clean version so you can easily find where I made changes.

Also, the GIS layer I sent you a week ago for the marsh restoration appears to have been modified. I was reviewing the layer for something else this morning and realized the copy I sent you is the version without USFWS lands. The recommended plan does include the USFWS lands, so you will want to use the attached file instead of the one I sent previously. I guess that's what I get for having too many files. Ugh...

Please let me know if you need anything else. Thanks!!
Melinda

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Melinda Fisher
Wildlife Biologist
Regional Planning & Environmental Center (RPEC)
Environmental Compliance Branch
Technical Section
Office: 918-669-7423
Cell: 918-953-9534

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Jefferson County Ecosystem Restoration Feasibility Study

Biological Evaluation for Federally-Listed Threatened and Endangered Species

November 2018

Prepared by:

United States Army Corps of Engineers
Regional Planning and Environmental Center

US Army Corps of Engineers ®
Galveston District

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Contents

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1.0 INTRODUCTION

This Biological Evaluation (BE) has been prepared in accordance with requirements outlined under Section 7 of the Endangered Species Act (ESA). Section (7)(a)(2) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that are proposed or listed as endangered or threatened, as well as their designated critical habitat, if applicable. This BE demonstrates the proposed action is in compliance with Section 7, which assures that, through consultation with the US Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), Federal actions do not jeopardize the continued existence of any threatened, endangered or proposed species, or result in the destruction or adverse modification of critical habitat.

1.1 Study Background

The purpose of this BE is to address the effect of the Jefferson County Ecosystem Restoration (JCER) Feasibility Study's Tentatively Selected Plan (TSP) (or proposed action) on ESA-listed species and their designated critical habitat. The US Army Corps of Engineers (USACE) intends to seek authorization to fund and execute the action described below, pursuant to Section 110 of the Rivers and Harbors Act of 1962 and Resolution 2620 from the House of Representatives Committee on Transportation and Infrastructure entitled "Sabine Pass to Galveston Bay, Texas." USACE is the lead Federal agency for the proposed project and will oversee compliance with applicable federal laws and regulations required for the project as well as protection measures for sensitive biological resources.

The purpose of the study is to evaluate existing coastal habitat problems and identify implementable solutions to restore degraded habitats in Jefferson County, Texas. Specific study problems include:

- Land loss due to erosion, subsidence, and relative sea level change (RSLC) threatens the geomorphic structure and hydrologic function of the coastal shoreline and inland marsh systems.
- Altered hydrologic conditions are contributing to the conversion of low salinity coastal habitats (e.g. freshwater and intermediate marsh) to those that survive under more saline conditions (e.g. brackish and saline marshes) or open water.
- Longshore sediment transport is significantly reduced, limiting the sustainability of the coastal ecosystem.

The TSP includes key restoration features to restore and sustain the form and function of the coastal system along the eastern boundary of Jefferson County, Texas. Implementation of the TSP has the potential to impact the following ESA-listed species that occur in the area: piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), whooping crane (*Grus americana*), West Indian manatee (*Trichechus manatus*), loggerhead sea turtle (*Caretta caretta*), green sea turtle (*Chelonia mydas*), Hawksbill sea turtle (*Eretmochelys imbricata*), and Kemp's Ridley sea turtle (*Lepidochelys kempii*). An additional 11 species were identified as potentially occurring in the action area including four coral species, dwarf sea horse (*Hippocampus zosterae*), five whale species, and leatherback sea turtle (*Dermochelys coriacea*); however, these species' known range or preferred habitat is outside the action area. No critical habitat for any of the species exists within the action area.

1.2 Consultation History

Significant coordination with USFWS, NMFS, Texas Parks and Wildlife Department (TPWD), Environmental Protection Agency (EPA), and Texas General Land Office (GLO) has occurred since the start of the study. Coordination has included: problem and opportunity development; contributing to identifying restoration measures and priority restoration locations; describing the existing, future without- and future with-project condition; and review of benefit and impact analyses. Each of the listed agencies were involved in developing assumptions and assigning values for the Wetland Value Assessment community model that was used to predict future conditions with and without restoration measures. The following documents coordination with USFWS and NMFS regarding ESA and general resource agency coordination for dredging operations in the SNWW and on the JCER feasibility study:

- November 19, 2003 – Biological Opinion (BO) issued for regular maintenance hopper dredging of navigation channels and offshore sand mining for beach restoration/nourishment activities in the US Gulf of Mexico by USACE's Jacksonville, Mobile, New Orleans, and Galveston Districts and its effects on 13 species and one critical habitat within the NMFS jurisdiction. The BO covers maintenance dredging activities within the SNWW. (Consultation Number F/SER/2000/01287)
- August 13, 2007 – BO issued by NMFS for impacts associated with the proposed widening and deepening of the SNWW associated with five sea turtle species. (Consultation Number F/SER/2007/00954)
- December 19, 2016 – Official species list requested and received (Consultation Code: 02ETTX00-2017-SLI-0367).
- May 2, 2017 – Resource agency scoping meeting, part 1. Present study background and work completed to date. Solicit input on initial array of restoration measures, identify areas of concern, and seek input on existing and future conditions in the study area. Identification of measures and priority locations that would increase suitable habitat for T&E species.
- May 30, 2017 – Resource agency scoping meeting, part 2. Identify and screen potential restoration locations and identify alternative screening criteria.
- June 5, 2017 – Resource agency workshop. Further screening of measures and identification of where measures should occur.
- October 24, 2017—Resource agency site visit.
- October 26-27, 2017 – Resource agency workshop. Collaboration to identify assumptions for the Wetland Value Assessment (WVA) model and assignment of the values for each variable in the model.
- January 12, 2018 – Telephone conversation with Donna Anderson (USFWS) regarding impacts of TSP on red knot and piping plover. Discussed that impacts to sea turtles would only be in her jurisdiction when they are on land and would fall to NMFS while in the water. She recommended we incorporate mitigation measures, such as seasonal timing restrictions and BMPs established for construction activities for each of the species, to reduce impacts to a level

that would probably be less than “likely to adversely affect” for the two avian species and the five species of sea turtles while they are on the beach.

- January 18, 2018 – Telephone conversation with Karla Reece (NMFS) regarding impacts of TSP on sea turtles and West Indian manatee. She informed me about the Gulf of Mexico Regional Biological Opinion on Hopper Dredging. The BO covers all regular dredging activities in which the SNWW was included. Discussed the applicability of using GRBO and SNWW CIP BO to show compliance with ESA. Assuming all actions described in the BOs remain valid and JCER would not introduce a new technique or location for dredging, the BOs should be sufficient to remain compliant.

- March 30, 2018—Updated Official Species List requested and received for the focused study area. (Consultation Code: 02ETTX00-2018-SLI-1096)

- May 17, 2018—Telephone conversation with Donna Anderson regarding effects to piping plover, red knot, West Indian Manatee, and sea turtles in light of the changed alternative which no longer includes restoration along the beach. It was agreed that due to the lack of beach restoration, there would be no affect to piping plover, red knot, or any of the sea turtles.

- August 22, 2018—E-mail communication with Donna Anderson requested inclusion of whooping crane as a species for consideration in the BE based on individuals from an experimental population in Louisiana that could occur in the project area.

- September 27, 2018—E-mail communication with Donna Anderson and USFWS refuge managers updating the status of the project. During the Agency Decision Milestone meeting, alternative 4Abu was endorsed as the recommended plan, with one modification. The vertical team requested the study team remove the proposed outyear marsh nourishment at year 30. This was a result of a policy disparity between adaptively responding to known future conditions and policy which defines outyear actions. USACE does not believe this impacts the effects determination in this BE; it simply means that no work would be done at year 30, therefore, no additional impacts beyond those realized during initial construction.

- November 1, 2018—Telephone communication with Donna Anderson regarding effects to whooping crane. USFWS stated that even though the birds entering the project area are from an non-essential experimental population (NEP), the birds are afforded full protection by ESA as a threatened species because they are outside the experimental population delineated boundaries. USFWS stated that NLAA was reasonable and requested some conservation measures be incorporated into the plan. The conservation measures were reasonable and incorporated into this BE.

2.0 DESCRIPTION OF THE ACTION AND ACTION AREA

This section describes the proposed action including the benefits and impacts associated with implementing the action and a description of the action area. The information contained here is a summary of the overall project and impacts. Additional information, specifically in regards to benefits and impacts can be found in the Draft Integrated Feasibility Report and Environmental Assessment (DIFR-EA).

2.1 Description of the Action

Alternative 4Abu was chosen as the tentatively selected plan (the plan) based on preliminary analyses because it meets the study objectives, reasonably maximizes benefits for the associated costs, and includes key restoration features to restore and sustain the form and function of the coastal system in a portion of the study area. This plan incorporates marsh and GIWW shoreline restoration features which are critical to the stabilization and sustainment of the critical marsh resources now and into the future. Marsh measures consist of marsh restoration and/or nourishment to increase land coverage in the area and improve terrestrial wildlife habitat, hydrology, water quality, and fish nurseries. Shoreline measures include construction of rock breakwater features that would mitigate some effects of ship wake induced erosion along the GIWW. The structures dissipate wave energies, stabilize shorelines, reduce land loss, reduce saltwater intrusion, and support reestablishment of emergent marsh along the GIWW shoreline through retention of sediments.

Measures for this alternative would be constructed on lands owned by TPWD JD Murphree Wildlife Management Area (WMA), USFWS McFaddin National Wildlife Refuge (NWR), and private lands (Table 1).

Table 1. Scale and scope of 4Abu measures in Comparison to Land Ownership

Ownership	Marsh Measures (acres)	Shoreline Measures (linear feet)
JD Murphree WMA	5,365	6,592
McFaddin NWR	683	0
Private	2,373	0

Alternative 4Abu measures and the accompanying Monitoring and Adaptive Management Plan have been developed to a feasibility level of design (i.e. estimates, design level that is not detailed enough for construction) based on currently available data and information developed during plan formulation. There is significant institutional knowledge regarding the construction of the restoration measures; therefore, there is minimal uncertainty from a construction standpoint. Uncertainties relating to measure design and performance are mainly centered on site specific, design-level details (e.g. exact sediment quantities, invasive species removal needs, extent of erosion control needs, construction staging area locations, pipeline pathways, timing and duration of construction, engineering challenges, etc.), which would be addressed during the pre-engineering and design phase (PED).

A Monitoring and Adaptive Management Plan has also been developed for 4Abu which provides a coherent process for making decisions in the face of uncertainty and increases the likelihood of achieving desired project outcomes based on the identified monitoring program. The Monitoring and Adaptive Management Plan addresses uncertainties associated with ecosystem function and how the ecosystem components of interest will respond to the restoration efforts in light of changing conditions (e.g. sea-level change is different than anticipated) or new information (e.g. surveys indicate the design needs modification in order to function properly).

Marsh Measures

Marsh restoration measures involve placement of borrow material dredged from the Sabine-Neches Waterway (SNWW) into these locations. Material placed into the marsh would have similar properties to the existing native material. Under the existing and projected future dredging cycles, there is sufficient quantities of suitable material available to meet all restoration needs without seeking other borrow sources (e.g. off-shore, upland placement areas).

4Abu would restore and nourish approximately 8,421 acres of technically significant marsh habitat surrounding Keith Lake in Jefferson County, Texas. Within each of the five marsh restoration units, material dredged from the SNWW would be hydraulically pumped into open water and low lying areas assuming that 65% of the restoration unit will have a post-construction settlement target elevation of +1.2 feet mean sea level (MSL). As necessary, earthen containment dikes would be employed to efficiently achieve the desired initial construction elevation. Dikes would be breached following construction to allow dewatering and settlement to the final target marsh elevation.

All marsh restoration locations would have one future renourishment cycle. For purposes of the study, renourishment is assumed to occur at year 30 based on the intermediate SLC curve; however, actual timing will be part of the adaptive management strategy and dependent on observed local sea level change conditions. Subsequent marsh renourishment would employ similar techniques and specifications as developed for the initial construction except that the target elevation would be +2.2 feet MSL (based on current water levels). Similar to the timing of renourishment, the elevation may be modified depending on observed local sea level change conditions. It is estimated that 6.7 million cubic yards (MCY) of dredged material would be required to initially restore the 8,421 acres of marsh and an additional 3.7 MCY would be required for renourishment.

Following marsh restoration actions, non-native/undesirable species monitoring would be implemented. If species are found, measures would be taken to stop or slow the expansion of the species within the restoration units.

Shoreline Measures

GIWW armoring would involve constructing 6,592 linear feet of breakwater structures. The structures would be built in shallow water (<3 feet deep) along the southern edge of the GIWW, at varying distances from the shoreline and where soils are conducive to supporting the weight of the stone without significant subsidence. The distance from the shoreline would be determined during PED, after site specific surveys have been completed, but sufficiently offset from the boundaries of the GIWW navigation channel to ensure continued safe navigation.

The design would be a trapezoidal structure built of rock up to a height of +3.0 MSL, which will yield approximately 1-1.5 feet of rock exposed above the mean high tide level. Other approximate features of the design include a 5-foot wide crown, a 1.5:1 slope, and a base that is roughly 29 feet wide. The base of the structure would be on filter cloth ballasted to the water bottom to secure placement and prevent displacement of the outboard edges. The number of openings and width of each would be determined during PED and dependent on the location of major channel entrances or access points required for fishery access or circulation. Initially, constructing the 6,592 linear feet of breakwaters would require 672,384 cubic feet of material which equates to about 39,800 tons of rock. It is anticipated that the breakwaters would need to be raised at least two times throughout the 50-year period of analysis to keep up with relative sea level change and remain effective. For purposes of the study materials would need to be added in year 15 (6,000 tons of rock) and year 25 (4,000 tons of rock), but timing and quantities could vary depending on observed local conditions and identified need to continue functioning as designed.

Equipment Needs and Access Routes

Sediment transport equipment would most likely include hopper or cutterhead dredges, pipelines (submerged, floating, and land) and booster pumps. Heavy machinery would be used to move sediment and facilitate construction. Heavy equipment could include bulldozers, front-end loaders, track-hoes, marshbuggy, track-hoes, and backhoes. For GIWW armoring construction, rock would be purchased from a commercial quarry and transported to the site by barge, where it would then be placed by crane or hopper barge. Various support equipment would also be used, such as crew and work boats, trucks, trailers, construction trailers, all-terrain vehicles, and floating docks and temporary access channels to facilitate loading and unloading of personnel and equipment.

A conceptual design of potential pipeline routes and staging areas has been identified (Figure 2). Identification of actual staging areas, pipeline routes, and placement of floatation docks would occur during PED. Each disturbance for access and staging would be placed outside of environmentally sensitive areas to the greatest extent practicable and utilize areas already disturbed when possible (e.g. stage on existing well pad sites or mowed/pastured private lands). All ground disturbance for access and staging areas would be temporary and fully restored to result in no permanent loss.

Timing

Timing of initial construction of this project is dependent on a number of factors including: timing of authorization, duration of pre-engineering and design phase, identification of a cost-share sponsor, and Federal- and non-federal funding cycles. It was assumed that construction would take 60 months to complete all restoration actions, in which it was assumed that only one restoration unit would be undertaken at a time. For the GIWW armoring, it was assumed that dune construction and beach nourishment would occur simultaneously.

Implementation of the marsh restoration measures is highly dependent on dredging cycles. Currently, seasonal timing restrictions related to Endangered Species Act compliance includes a seasonal dredging window for hopper dredge use between December 1 and March 31, unless work outside this window cannot be completed, in which NMFS would need to approve the deviation. Hopper dredges would be used for dredging offshore areas of the entrance channel to just inside the jetties. Non-hopper dredges

(e.g. cutterhead pipeline dredges) may be used from April to November. This type of dredge would be used anywhere else within the SNWW.

Figure 1. Alternative 4Abu Action Area

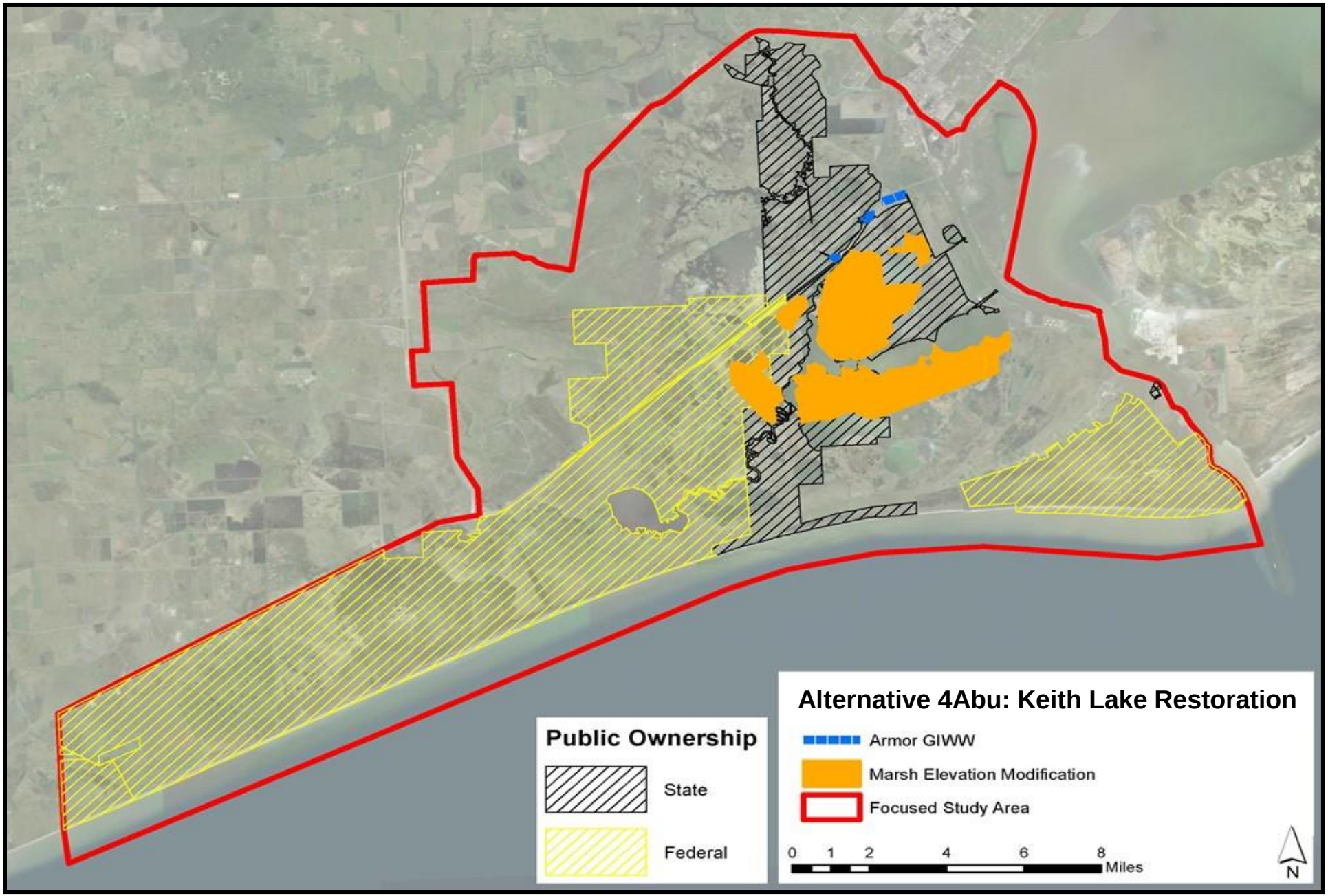
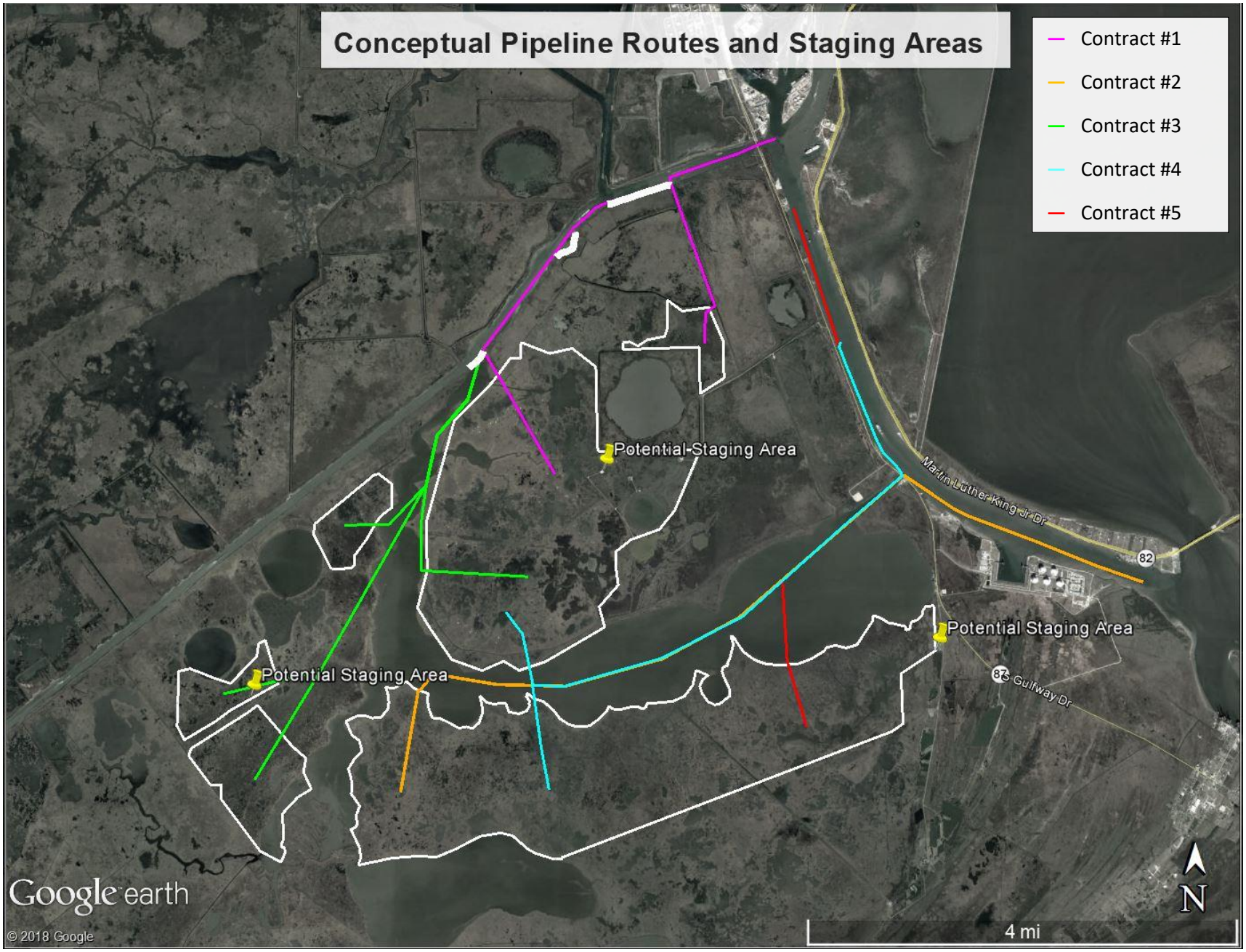


Figure 2. Conceptual Design of Pipeline Routes and Staging Areas.



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2.1.1 Benefits of the Action

The unconfined placement of dredged material in marsh restoration units and along the shoreline would have a net beneficial effect on the environment. A total of 8,421 acres of marsh habitat would be restored by reducing the extent of open water in the restoration unit to less than 35 percent of the unit. This value has been identified as providing optimal marsh habitat in southeast Texas. As well, increasing available sediment in the marsh units is expected to increase the potential for accretion into the future by supporting an assemblage of desired vegetative species. Once vegetative species composition is restored, the value of the marsh habitat to avian, terrestrial, and aquatic wildlife and fish is expected to increase by providing higher quality nesting, foraging, roosting, and nursery habitat.

Along the GIWW shoreline, approximately 1.25 miles of rock breakwaters would be constructed along the south bank in places where breakwaters do not currently exist. The breakwaters allow for the stabilization and protection of the existing shoreline and also support the reestablishment of intertidal emergent vegetation along the shoreline through retention of sediments and reduced land loss. Under the existing condition, the rate of loss is approximately 4 feet per year, which translates to approximately 260 acres of interior marsh that would be protected and improve with implementation of the breakwaters. Additionally, breakwaters are expected to improve overall water quality with reduced saltwater intrusion and turbidity, and may decrease operations and maintenance costs of the GIWW by reducing the amount of dredging. Overall, emergent shoreline habitats and interior marshes are expected to improve thereby supporting a more diverse and productive habitat for aquatic and terrestrial species. The breakwater structure itself can provide additional aquatic habitat by facilitating formation of a reef to support a greater abundance and diversity of aquatic species. Rock substrate is expected to also provide benefits to some aquatic species by providing them a refuge from predation.

To determine the habitat value of implementing restoration actions, the WVA Coastal Marsh (Version [V] 2.0) model was used to calculate the future without- and future with-project condition of the restoration units. The WVA methodology is similar to the USFWS Habitat Evaluation Procedures (HEP), in that habitat quality and quantity are measured for baseline conditions and predicted for FWOP and FWP conditions. Instead of the species-based approach of HEP, the WVA models use an assemblage of variables considered important to the suitability of a given habitat type for supporting a diversity of fish and wildlife species.

WVA models operate under the assumption that optimal conditions for fish and wildlife habitat within a given coastal wetland type can be characterized, and that existing or predicted conditions can be compared to that optimum to provide an index of habitat quality. Habitat quality is estimated and expressed through the use of a mathematical model developed specifically for each habitat type. Each model consists a list of variables that are considered important in characterizing fish and wildlife habitat. To determine the FWOP and FWP habitat function, the variables in each model were modified to reflect anticipated future conditions based on historic monitoring and data results and best professional judgment. The model then determines the assumed relationship between habitat qualities (Suitability Indices) based on a specified Suitability Index graph for each variable. The model then uses a mathematical formula that combines the Suitability Indices for each variable into a single value for wetland habitat quality, termed the Habitat Suitability Index (HSI).

Data for the model runs primarily came from GIS exercises analyzing land cover change over time, vegetative cover, width/length/area, etc.; from existing monitoring such as salinity and shoreline

change; and existing data collected during the Sabine Pass to Galveston Bay, Texas Coastal Storm Risk Management and Ecosystem Restoration Feasibility Study or Sabine-Neches Waterway Channel Improvement Project (SNWW CIP). Future with- and future without-project conditions were run in 10 year increments. Modeling results indicate that implementation of 4Abu would result in a net increase of 6,897 average annual habitat units (AAHUs) of marsh.

2.1.2 Impacts of the Action

Direct and indirect impacts associated with implementing the TSP are temporary in nature and limited in scope. Construction activities would contribute the greatest impacts to the environment and could include: localized effects to water quality, including increased turbidity and total suspended sediments, organic enrichment, reduced dissolved oxygen, elevated carbon dioxide levels, and decreased light penetration, among others; habitat removal and/or fragmentation; temporary habitat avoidance because of increased noise, dust generation, vibrations, and overall lower quality habitat; losses of slow moving and less mobile species (small mammals, aquatic invertebrates, benthic species, mussels, smaller/younger fish, and herptofauna); temporary changes in hydrologic flow; and temporary loss of recreation opportunities. The level and duration of the impacts is dependent on the final design of each restoration measure, type of equipment used, and duration of construction activities. However, it is anticipated that once construction is complete, temporary impacts related to construction activities would cease.

Although marsh restoration would result in the loss of approximately 65 percent of the open water in the restoration units, wildlife species currently utilizing this habitat would not be expected to be adversely affected. Wildlife species currently utilizing the shallow open water and vegetated shoreline habitat in the restoration units are highly mobile allowing them to relocate into adjacent open water habitats outside the restoration units. The conversion of open water to marsh habitat is generally considered a benefit to aquatic species.

Under alternative 4Abu, breakwaters would convert inland open water habitat to a hardened structure thereby reducing available habitat for aquatic species and resulting in the loss of immobile species. However, these impacts would have an overall minimal impact to fisheries and aquatic populations in the area and would in the long-term protect adjacent habitat that aquatic species depend on for survival that would be lost in the future if the measures were not implemented. As well, the structures would be designed in such a way as to not hinder movement of aquatic species.

Implementation of 4Abu would have temporary, localized adverse impacts during construction, with some loss of less mobile species and 4.5 acres of habitat conversion due to construction of the breakwater structures. However, the overall benefits of implementing the action alternatives far outweigh any temporary or permanent loss realized during construction. Restoration of marsh and shoreline areas would have a long-term, beneficial impact to most aquatic and terrestrial habitats and their associated species because of an overall net increase in habitats.

2.2 Description of the Action Area

Jefferson County is found in southeast Texas bounded on the north by Pine Island Bayou, on the northeast by the Neches River, and on the east by Sabine Lake and the mouth of the Sabine River, a natural outlet called Sabine Pass.

The action area lies within the Gulf Prairie and Marsh ecological region, which extends along the Texas Gulf Coast from the Sabine River south to the Rio Grande (Gould et al. 1960). The prominent features of this coastal ecosystem include tidal, micro-tidal, and freshwater coastal marshes; bays and lagoons which support seagrass beds, tidal flats and reef complexes; barrier islands; tallgrass prairie with small depressional wetlands, and forest riparian corridors, oak mottes and coastal woodlots, and dense brush habitats. Wetland habitats provide important wintering and migration stopover habitat for migratory birds including Central Flyway waterfowl, shorebirds, wading birds, and waterbirds. A string of refuges and wildlife management areas (WMAs) along the coast serve as critical staging areas for waterfowl migrating to and from Mexico (TPWD 2013, USFWS 2013).

Natural forces, which shape the system include dominant south to southeast winds, tropical weather systems, and a substantial rainfall of over 60 inches per year. Flooding and freshwater inflows are key systemic processes, which buffer salinity and provide nutrients and sediments to extensive estuary in the Sabine region. While highly impacted by human activities, this ecosystem remains very productive for a wide variety of fish and wildlife.

The Sabine estuary and extensive coastal wetlands in Jefferson County are vital habitat for 75 percent of the fish and shellfish species found in the Gulf of Mexico. Marshes are a major wintering area for waterfowl of the central flyway. On average, 1.3 to 4.5 million ducks, or 30 to 71 percent of the total flyway population, winter annually on the Texas Gulf coast (Stutzenbaker and Weller 1989). This area also winters 90 percent of the snow, Canada, and greater white-fronted geese in the Central Flyway. On average, 180,000 pairs of colonial-nesting waterbirds nest annually in Texas coastal habitats.

2.2.1 Biological Communities in the Action Area

On a finer scale, the study area lies within the bio-geographic region known as the Chenier Plain. Geographically, the Chenier Plain region extends from Vermillion Bay in southwestern Louisiana to East Galveston Bay in southeast Texas. The Chenier Plains were once actual shoreline that ran parallel to the Gulf of Mexico or as alluvial deposits at the mouths of rivers. The Chenier Plain is characterized by a prograding coastline replenished by sediments carried to the Gulf of Mexico initially by the Mississippi River and subsequently the Atchafalaya and other rivers. A distinguishing feature of the region are the "cheniers." Cheniers were formed when coastal processes accreted and eroded along the shore over time creating the alternating ridges separated by marshlands. The higher cheniers support woody vegetation, hence the name chenier, a French word for "place of oaks." Mudflats, which are isolated from the Gulf waters, support diverse freshwater coastal habitats. The study area supports the largest remaining cheniers in Texas.

Three main biological communities exist in the action area including: beaches and dunes, coastal marshes, and aquatic habitats.

2.2.1.1 Beach and Dune

The current beach communities include a primary and secondary dune complex that is leeward of the unvegetated, beach sands of the shoreline. The primary dunes, located immediately landward of the beach, are taller and offer more protection from wind and hurricane storm surge than the secondary dunes. The secondary dunes, which are landward of the primary dunes, are not as tall and are more densely vegetated. Typical plant species of the primary dunes include sea oats (*Uniola paniculata*), bitter

panicum (*P. amarum*), Gulf croton (*Croton punctatus*), beach morning glory (*Ipomea pes-caprae* var. *emarginata*), and fiddleleaf morning glory (*I. stolonifera*). Secondary dune species include marshhay/wiregrass, seashore dropseed (*Sporobolus virginicus*), seashore saltgrass, pennywort (*Hydrocotyle bonariensis*), and partridge pea (*Chamaecrista fasciculata*) (Britton and Morton, 1989; USFWS, 1998). Swales that occur between or within the primary and secondary dune complexes may support brackish-to-intermediate marsh vegetation. The ridge and swale topography of the Chenier Plain represents ancient beach systems. These occur behind the active beach system and exhibit alternating, linear, upland/transitional, and wetland features. The Gulf beach and dune in the action area is heavily eroded and virtually nonexistent in places (e.g., Texas Point) where saline marshes can occur on the coastline.

2.2.1.2 Coastal Marshes (Wetlands)

The study area contains a highly diverse coastal wetland community. Vegetative communities found within the area are indicative of saline, brackish, intermediate, and freshwater wetlands/marshes. Coastal marsh habitats provide important functions of improving water quality in the estuarine ecosystem, providing flood control benefits, and buffering inland habitats from tropical storm-generated tidal surges. In addition, marshes are extremely biologically productive and diverse and provide detrital input, which is the basis for the estuarine food chain.

Salt marsh in the study area is restricted to a narrow zone immediately adjacent to the shoreline of the Gulf of Mexico and associated bays. Salt marsh has the greatest daily tidal fluctuation of the four marsh types and has a well-developed drainage system. Water salinity averages 18 parts per thousand (ppt), which leads to a marsh type that supports the least diverse vegetation. Salt marshes are typically dominated by smooth cordgrass/oystergrass (*Spartina alterniflowa*) and are often accompanied by seashore saltgrass (*Distichlis spicata*), blackrush (*Juncus romerianus*), saline marsh aster (*Aster tenuifolius*), and marshhay cordgrass. The dominant species in high salt marsh areas, which are subjected to less-frequent tidal inundation, is glasswort (*Salicornia spp.*).

Brackish marshes (salinity range of 5.0 to 18.0 ppt with an average of about 8.0 ppt) grade inland from salt marsh and are found at the fringes of large water bodies and behind the beach barriers. This marsh type is also subjected to daily tidal action, but also receives some freshwater influence, and its water depths normally exceed that of salt marsh. Water salinity ranges from 5.0 to 18.0 ppt with an average of about 8.0 ppt. Plant diversity is greater than that of salt marsh. The dominant species in low brackish marsh is saltmarsh bulrush (*Scirpus robustus*), while seashore saltgrass and marshhay cordgrass are co-dominant species in high brackish marsh.

Intermediate marshes are subjected to periodic pulses of salt water and maintain a year-round salinity in the range of 3 to 4 ppt. They grade inland from brackish marsh and dominate interior marshes. The diversity and density of plant species are relatively high with marshhay cordgrass the most dominant species in high marshes. Co-dominant species in low marsh are seashore paspalum (*Paspalum vaginatum*), Olney bulrush (*S. americanus*), California bulrush/giant bulrush (*S. californicus*), and common reedgrass/Roseau cane (*Phragmites australis*); bulltongue (*Sagittari lancifolia*) and sand spikerush (*Eleocharis montevidensis*) are also frequent. Submerged aquatics such as pondweeds (*Potamogeton spp.*) and southern waternymph (*Najas guadalupensis*) are abundant in intermediate marsh.

Freshwater marshes lie between the intermediate marsh and the rice prairies and dominate in upstream reaches of the Neches River. This marsh type is normally free of tidal influence and has year-round average water salinity of 0.5 to 1.0, and rarely increases above 2.0 ppt, with slow drainage. The greatest diversity of plants is supported by fresh marsh, with local species composition governed by frequency and duration of flooding, topography, substrate, hydrology, and salinity. Co-dominant species in low marsh are maidencane (*Panicum hemitomon*), giant cutgrass (*Zizaniopsis milacea*), and bulltongue. Co-dominant species in high marsh are squarestem spikerush (*E. quadrangulata*) and marshhay cordgrass. Many submerged and floating-leafed plants are present in this marsh type. Other characteristic species include American lotus (*Nelumbo lutea*), watershield (*Brasenia screben*), duckweed (*Lemna spp.*), and fanwort (*Cabomba caroliniana*).

The full continuum of marsh types supports highly diverse and productive biological communities, and conservation of biological diversity in the study area is dependent on maintaining this continuum of wetland habitats. Plant and animal diversity is greater in the fresh and intermediate marshes than in the brackish and saline types. Intermediate marsh receives the highest use of any of the marsh types by wintering and migrating waterfowl and many wading bird species. Fresh, intermediate, and brackish marshes are extremely important to migratory waterfowl.

2.2.1.3 Aquatic Habitats

Large estuarine aquatic habitats are present in the Sabine Lake and Sabine Pass area. All aquatic/open water areas of the region contain essential fish habitat (EFH), which is considered necessary for spawning, breeding, feeding, or growth to maturity of species managed by Regional Fishery Management Councils, as described in a series of Fishery Management Plans, pursuant to the Magnuson-Stevens Fishery Conservation and Management Act. The categories of EFH that occur within the study area include estuarine emergent marsh, estuarine submerged aquatic vegetation (SAV), estuarine hard bottom, and estuarine mud/soft bottoms. The action area also contains EFH for:

- Larval, juvenile, and adult: Brown Shrimp (*Penaeus aztecus*), white shrimp (*P. setiferus*), red snapper (*Lutjanus campechanus*), lane snapper (*L. synagris*), greater amberjack (*Seriola dumerili*) and cobia (*Rachycentron canadum*).
- Juvenile: vermillion snapper (*Rhomboplites aurorubens*), Warsaw grouper (*Epinephelus nigritus*), and Wenchman snapper (*Pristipomoides aquilonaris*)
- Juvenile and adult: red drum (*Sciaenops ocellatus*), Almaco jack (*Seriola rivolana*), gray triggerfish (*Balistes capriscus*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*S. maculatus*), gulf stone crab (Menippe adina), gag grouper (*Mycteroperca microlepis*) and scamp (*Mycteroperca phenax*); and,
- Adult: gray snapper (*L. griseus*).

The categories of EFH that occur within the study area include:

- Estuarine Areas: estuarine emergent marsh, submerged aquatic vegetation (SAV), hard bottom, and mud/soft bottoms; and
- Marine Areas: Water column, vegetated bottoms, non-vegetated bottoms.

3.0 LISTED SPECIES AND CRITICAL HABITAT IN THE ACTION AREA

Eighteen ESA-listed, candidate or proposed for listing species have been identified in the 2017 Planning Aid Report (PAL), in the USFWS Official Species List dated March 30, 2018, and/or on the NMFS Texas' Threatened and Endangered Species List. There is no critical habitat designated in the action area. See Appendix A.

Table 2. ESA-listed Species Identified by USFWS or NMFS as Potentially Occurring in the Action Area

Species	Scientific Name	Jurisdiction	Status
Birds			
Piping Plover	*Charadrius melodus*	USFWS	Threatened
Rufa Red Knot	*Calidris canutus rufa*	USFWS	Threatened
Whooping Crane	*Grus americana*	USFWS	Endangered/ Threatened for the Non-Essential Population
Corals			
Elkhorn coral	*Acropora palmata*	NMFS	Threatened
Lobed star coral	*Orbicella annularis*	NMFS	Threatened
Mountainous star coral	*O. faveolata*	NMFS	Threatened
Boulder star coral	*O. franksi*	NMFS	Threatened
Fish			
Dwarf seahorse	*Hippocampus zosterae*	NFMS	Candidate
Mammals			
Sei whale	*Balaenoptera borealis*	NMFS	Endangered
Bryde's Whale	*B. edeni*	NFMS	Proposed Endangered
Fin whale	*B. physalus*	NMFS	Endangered
Humpback whale	*Megaptera novaeangliae*	NMFS	Endangered
Sperm whale	*Physeter macrocephalus*	NMFS	Endangered
West Indian Manatee	*Trichechus manatus*	UFWS/NMFS	Threatened
Reptiles			
Loggerhead sea turtle	*Caretta caretta*	USFWS/NMFS	Threatened
Green sea turtle	*Chelonia mydas*	USFWS/NMFS	Threatened
Leatherback sea turtle	*Dermochelys coriacea*	USFWS/NMFS	Endangered
Hawksbill sea turtle	*Eretmochelys imbricata*	USFWS/NMFS	Endangered
Kemp's Ridley sea turtle	*Lepidochelys kempii*	USFWS/NMFS	Endangered

To assess the status of species in the action area and potential impacts of the action on ESA-listed species, several sources were consulted including: literature review of scientific data; interview of recognized experts on listed species including local and regional authorities and Federal (USFWS and NMFS) and State (TPWD) wildlife personnel; on-site inspections; and compiled lists of ESA-listed species. Significant literature sources consulted include the USFWS and NMFS species specific webpages, Federal status reports and recovery plans, TPWD species occurrence and monitoring reports, peer-reviewed journals, and other standard references.

3.1 Piping Plover

Piping plover is in the family Charadriidae, which is the second-largest family of shorebirds. Piping plovers are small, stocky shorebirds, typically about seven and a quarter inches long, with a wing span of 14 to 15.5 inches. Wintering piping plover feed on a variety of invertebrates such as marine worms, amphipods, and terrestrial and benthic insects (Elphick at al 2001), but diet varies by ecosystem and habitat. Polychaete worms and surface dwelling arthropods such as amphipods and insects are particularly important food sources. (USFWS 2008)

Status

USFWS listed the piping plover (*Charadrius melodus*) on 11 December 1985 (50 FR 50726) as endangered in its breeding range and threatened throughout the remaining range. In the action area, piping plovers are listed as threatened.

Major threats to wintering piping plover that were identified at the time of listing included destruction or modification of beach and littoral habitat and human disturbance. Human-caused disturbance factors that may affect the survival of piping plover or utilization of wintering habitat include recreational activities, inlet and shoreline stabilization projects, dredging of inlets that can affect spit formation, beach maintenance and renourishment, and pollution. In some areas, natural erosion of barrier islands may also result in habitat loss. The construction of houses and commercial buildings on and adjacent to barrier beaches results in increased human disturbance and habitat loss.

Range and Habitat

Piping plovers breed in three areas in North America: the Great Plains, the Great Lakes, and the Atlantic Coast. They typically inhabit shorelines of oceans, rivers, and inland lakes. Nest sites include sandy beaches, especially where scattered tufts of grass are present; sandbars; causeways; bare areas on dredge-created and natural alluvial islands in rivers; gravel pits along rivers; silty flats; and salt-encrusted bare areas of sand, gravel, or pebbly mud on interior alkali lakes and ponds (Haig and Elliot-Smith 2004).

Migration to winter areas begins in late summer and continues through the fall. Piping plovers begin arriving on their wintering ground in late July, although most wintering birds arrive at the Texas coast in August and September. They begin leaving the wintering grounds in late February and by mid-May, almost all wintering birds have left the Texas coastal area for their nesting grounds. Because birds may cross over from the Gulf or Atlantic coasts, birds on Texas wintering grounds may be from any of the three breeding areas. (USFWS 2008)

Wintering habitat along the Texas coast can be broadly characterized as emergent tidal or washover areas that are unvegetated to sparsely vegetated with wet to saturated soils in close proximity to water

(Zonick 2000). Wintering plover use coastal areas on the mainland and habitats on barrier islands, both on the bay side (i.e. bayshore habitats) and on the ocean side (i.e. ocean beaches). Bayshore tidal sand and algal flats are primary areas used by plovers, but oceanside beaches, washover passes, and mainland tidal mud flats provide essential secondary habitat when bayshore tidal flats are submerged. Important components of the beach/dune ecosystem include surf-cast algae for feeding of prey; sparsely vegetated backbeach (beach area above mean high tide seaward of the dune line, or in cases where no dune exists, seaward of a delineating feature such as a vegetation line, structure, or road) for roosting and refuge during storms; and spits (a small point of land, especially sand running into water), salterns (bare sand flats in the center of mangrove ecosystems that are found above mean high water and are only irregularly flushed with sea water), and washover areas for feeding and roosting (USFWS 2003).

Occurrence in the Action Area

Approximately 35 percent of the known global population of piping plovers winter along the Texas Gulf Coast, where they spend 60 to 70 percent of the year. Within and near the action area, piping plover can be observed in small numbers during the winter feeding on invertebrates along exposed mudflats of the bayous and along the shoreline of Anahuac NWR during extremely low tides. During the spring and fall migration, piping plovers have been known to occur in very small numbers along the beaches of Jefferson County. This stretch of shoreline is highly erosive and very narrow, so large concentrations are unlikely (USFWS 2001a).

There is no designated critical habitat in the action area; however, critical habitat exists less than 0.5 miles east of Texas Point along the beaches of Calcasieu Parish, Louisiana. Critical habitat was designated along the entire shoreline from the east side of Sabine Pass (Texas-Louisiana border) east approximately 16 miles to the west end of Constance Beach. Critical habitat in this area includes the land from the seaward boundary of mean low low water (MLLW) to where densely vegetatedhabitat begins and where the constituent elements no longer occur.

3.2 Red Knot

The rufa red knot (red knot) is a medium-size shorebird about 9 to 11 inches in length. The red knot is a specialized molluscivore, eating hard-shelled mollusks, sometimes supplemented with easily accessed and/or shallow-buried softer invertebrate prey, such as shrimp- and crab-like organisms, marine worms, and horseshoe crab (*Limulus polyphemus*) eggs (Piersma and van Gils 2011). Mollusk prey are swallowed whole and crushed in the gizzard (Piersma and van Gils 2011). Foraging activity is largely dictated by tidal conditions, as the red knot rarely wades more than 0.8 to 1.2 inches and cannot effectively dig deeper than 0.8 to 1.2 inches. It has been reported that Coquina clams (*Donax variabilis*) serve as a frequent and often important food resource for red knots along Gulf beaches.

Status

There are six recognized subspecies of red knots (*Calidris canutus*), and on December 11, 2014, the USFWS published a final rule in the Federal Register listing the rufa subspecies of red knot (*Calidris canutus rufa*) as a threated species under ESA (79 FR 73705—73748). Each subspecies is believed to occupy separate breeding areas, in addition to having distinctive morphological traits (i.e. body size and

plumage characteristics), migration routes, and annual cycles. No critical habitat has been proposed or designated for the red knot.

The rufa red knot subspecies is threatened due to loss of both breeding and nonbreeding habitat; potential for disruption of natural predator cycles on breeding grounds; reduced prey availability throughout the nonbreeding range; and increasing frequency and severity of asynchronies in the timing of the birds' annual migratory cycle relative to favorable food and weather conditions. Main threats to the rufa red knot in the United States include: reduced forage base at the Delaware Bay migration stopover; decreased habitat availability from beach erosion, sea level rise, and shoreline stabilization in Delaware Bay; reduction in or elimination of forage due to shoreline stabilization, hardening, dredging, beach replenishment, and beach nourishment in Massachusetts, North Carolina, and Florida; and beach raking which diminishes red knot habitat suitability. (USFWS 2014)

Range and Habitat

The red knot breeds in the central Canadian Arctic, primarily in Nunavut Territory, Canada, but with some potential breeding habitat extending into the Northwest Territories. Breeding territories are located inland, but near arctic coasts, and foraging areas are located near nest sites in freshwater wetlands (Niles et al. 2008). Breeding occurs in June when favorable conditions exist and snow-free habitat is available. Nests are found on dry, slightly elevated tundra sites, often on windswept slopes with little vegetation.

The red knot migrates annually between its breeding grounds in the Canadian Arctic and several wintering regions, including the Southeast United States, the Northeast Gulf of Mexico, northern Brazil, and Tierra del Fuego at the southern tip of South America. Departure from the breeding grounds begins in mid-July and continues through August. Red knots tend to migrate in single-species flocks usually with more than 50 birds per flock.

Red knots make one of the longest distance migrations known in the animal kingdom, traveling up to 19,000 miles annually, and may undertake long flights that span thousands of miles without stopping. Because stopovers are time-constrained, red knots require stopovers rich in easily digested food to achieve adequate weight gain (Niles et al. 2008) that fuels the next leg of migratory flight and, upon arrival in the Arctic, fuels a body transformation to breeding condition (Morrison 2006).

During both the northbound (spring) and southbound (fall) migrations, red knots use key staging and stopover areas to rest and feed. Major spring stopover areas along the Atlantic coast include Río Gallegos, Península Valdés, and San Antonio Oeste (Patagonia, Argentina); Lagoa do Peixe (eastern Brazil, State of Rio Grande do Sul); Maranhão (northern Brazil); the Virginia barrier islands (United States); and Delaware Bay (Delaware and New Jersey, United States) (Cohen et al. 2009; Niles et al. 2008). Important fall stopover sites include southwest Hudson Bay (including the Nelson River delta), James Bay, the north shore of the St. Lawrence River, the Mingan Archipelago, and the Bay of Fundy in Canada; the coasts of Massachusetts and New Jersey and the mouth of the Altamaha River in Georgia, United States; the Caribbean (especially Puerto Rico and the Lesser Antilles); and the northern coast of South America from Brazil to Guyana (Schneider and Winn 2010, Niles et al. 2008). However, large and small groups of red knots, sometimes numbering in the thousands, may occur in suitable habitats all along the Atlantic and Gulf coasts from Argentina to Canada during migration (Niles et al. 2008). Red knots occur primarily along the coasts during migration; however, small numbers of red knots are

reported annually across the interior United States (i.e. greater than 25 miles from the Gulf of Mexico or Atlantic Coast) during spring and fall migration.

Red knots are restricted to the ocean coasts during winter from December to February, but may be present in some wintering areas as early as September or as late as May. Wintering areas for the red knot include the Atlantic coasts of Argentina and Chile (particularly the island of Tierra del Fuego that spans both countries), the north coast of Brazil (particularly in the State of Maranhão), the Northwest Gulf of Mexico from the Mexican State of Tamaulipas through Texas (particularly at Laguna Madre) to Louisiana, and the Southeast United States from Florida (particularly the central Gulf coast) to North Carolina (Niles et al. 2008). Smaller numbers of knots winter in the Caribbean, and along the central Gulf coast (Alabama, Mississippi), the mid-Atlantic, and the northeast United States.

Habitats used by red knots in migration and wintering areas are generally coastal marine and estuarine habitats with large areas of exposed intertidal sediments. In many wintering and stopover areas, quality high-tide roosting habitat (i.e. close to feeding areas, protected from predators, with sufficient space during the highest tides, free from excessive human disturbance) is limited. The supra-tidal (above high tide) sandy habitats of inlets provide important areas for roosting, especially at higher tides when intertidal habitats are inundated (Harrington 2008). In some localized areas, red knots will use artificial habitats that mimic natural conditions, such as nourished beaches, dredged spoil sites, elevated road causeways, or impoundments; however, there is limited information regarding the frequency, regularity, timing, or significance of red knot's use of such artificial habitats. Along the Texas coast, red knots forage on beaches, oyster reefs and exposed bay bottoms and roost on high sand flats, reefs, and other sites protected from high tides.

Except for localized areas, there have been no long-term systematic surveys of red knots in Texas or Louisiana. From survey work in the 1970s, Morrison and Harrington (1992) reported peak winter counts of 1,440 red knots in Texas, although numbers between December and February were typically in the range of 100 to 300 birds. Records compiled by Skagen et al. (1999) give peak counts of 2,838 red knots along the coast of Texas between January and June from 1980 to 1996, but these figures could include spring migrants. During the Christmas Bird Count of 2017, the nearest recorded observance was on Pelican Island at Galveston Bay where only one individual was reported. Other locations where the species was observed include: Powderhorn (53 individuals), Port Aransas (71 individuals), Mad Island Marsh—Matagorda County (4 individuals), Kennedy County Wind Turbines (18 individuals), and Flour Bluff in Corpus Christi (4 individuals).

Occurrence in the Action Area

Specifically within the action area, there have been no confirmed records of red knots in the action area or Jefferson County. However, suitable habitat exists, albeit not high quality, in and near the action area, so there is potential for the species to occur. Any occurrence would be expected to be in very small numbers.

3.3 Whooping Crane

The whooping crane (*Grus americana*) is the tallest North American bird with males approaching 1.5 meters in height, is snowy white with black primary feathers on the wings, and a bare red face and crown. Whooping cranes form monogamous pairs for life and all whooping cranes return to the same

breeding territory in Wood Buffalo National Park, in Canada to nest in late April or May. Whooping cranes return to wintering grounds of Aransas NWR by late October to mid-November where they migrate singly, in pairs, in family groups or in small flocks and remain until March or April.

Whooping cranes are omnivorous and forage by probing and gleaning foods from soil, water, and vegetation. Summer goods include dragonflies, damselflies, other aquatic insects, crayfish, clams, snails, grasshoppers, cricket, frogs, mice, voles, small birds, minnows, reptiles, and berries. During the winter in Texas, they eat a wide variety of plan and animal foods, with blue crabs, clams, and berries of Carolina wolfberry (*Lycium carolinianum*) being predominant in the diet. Foods taken at upland sites include acorns, snails, crayfish, and insects. Waste grains, such as barley and wheat, form an important part of the diet during the spring and fall migrations (Lewis 1995, Campbell 2003, Canadian Wildlife Service [CWS] and USFWS 2007).

Status

The whooping crane was federally listed as endangered on March 11, 1967 (32 FR 4001). Critical habitat has been designated in Aransas, Calhoun, and Refugio counties in Texas, and includes the Aransas National Wildlife Refuge. There is no critical habitat in or near the vicinity of the project area.

The main factors for the decline of the whooping crane were loss of habitat to agriculture (hay, pastureland, and grain production), human disturbance of nesting areas, uncontrolled hunting, specimen and egg collection, collisions with power lines, fences, and other structures, loss and degradation of migration stopover habitat, disease such as avian cholera, predation, lead poisoning, and loss of genetic diversity. Biological factors, such as delayed sexual maturity and small clutch size, prevent rapid population recovery. Drought during the breeding season presents serious hazards to the species. Exposure to disease is a special problem when large numbers of birds are concentrated in limited areas, as often happens during times of drought (Lewis 1995, Campbell 2003, CWS and USFWS 2007).

Range and Habitat

Whooping cranes were originally found throughout most of North America. In the nineteenth century, the main breeding area was from the Northwest Territories to the prairie provinces in Canada, and the northern prairie states to Illinois. Only four populations of whooping cranes exist in the wild, the largest of which is the Aransas-Wood Buffalo population, which breeds in isolated marshy areas of Wood Buffalo National Park in Canada's Northwest Territories. Each fall, the entire population of whooping cranes from this national park migrates some 2,600 miles (4,183 kilometers) primarily to the Aransas NWR and adjacent areas of the central Texas coast in Aransas, Calhoun, and Refugio counties, where it overwinters in oak savannahs, salt marshes, and bays (USFWS 1995). During migration they use various stopover areas in western Canada and the American Midwest. The three other wild populations have been introduced: an eastern population that migrates between Wisconsin and Florida and two non-migratory populations, one in central Florida, the other in Louisiana.

The natural wild population of whooping cranes spends its winters at Aransas NWR, Matagorda Island, Isla San Jose, portions of Lamar Peninsula, and Welder Point on the east side of San Antonio Bay (CWS and USFWS 2007). The main stopover points in Texas for migrating birds are in the central and eastern Panhandle (USFWS 1995).

USFWS reintroduced a non-essential experimental population (NEP) to Vermillion Parish in southwestern Louisiana in 2011. The reintroduced population was designated as NEP under section 10(j) of the Endangered Species Act of 1973 (ESA), as amended. A NEP population is a reintroduced population believed not be essential for the survival of the species, but important for its fully recovery and eventual removal from the endangered and threatened list. Since 2011, 10-16 hatched juveniles have been released annually at White Lake Wetlands Conservation Area, and in 2016 a new release area was added 19 miles to the south at Rockefeller Wildlife Refuge. The NEP is approximately 175 miles from the action area.

Nesting habitat in northern Canada is in poorly drained region of freshwater marshes and wet prairies interspersed with numerous potholes and narrow-wooded ridges. Whooping cranes use a variety of habitats during migration, including freshwater marshes, wet prairies, inland lakes, small farm ponds, upland grain fields, and riverine systems. Shallow flooded palustrine wetlands are used for roosting, while croplands and emergent wetlands are used for feeding. Riverine habitats, such as submerged sandbars, are often used for roosting. The principal winter habitat in Texas is brackish bays, marshes, and salt flats, although whooping cranes sometimes feed in upland sites characterized by oak mottes, grassland swales, and ponds on gently rolling sandy soils (Lewis 1995, Campbell 2003, CWS and USFWS 2007).

Occurrence in the Action Area

Members of the NEP population are known to use typical marsh habitat along with rice and crawfish fields year round in Orange and Jefferson counties and could be potentially found within the action area.

3.4 Elkhorn Coral

Elkhorn coral was listed as threatened on May 9, 2006 (71 FR 26852). It is found on coral reefs in southern Florida and the Bahamas, and throughout the Caribbean. Its northern limit is Biscayne National Park, Florida. This species is particularly susceptible to damage from sedimentation.

The action area is not located within the historical range of this species, nor does suitable habitat exist in or near the action area.

3.5 Star Corals

The three star coral species (lobbed, mountainous, and boulder) were all listed threatened on October 10, 2014 (79 FR 53851). Prior to 1990, the three species were considered one species, (*Montastraea annularis*). However, the *M. annularis* was broken into the three sibling species based on behavioral, biochemical, and morphological criteria. The three species are often grouped as a species complex. The species complex has been found at depths to 295 feet (90 meters) throughout the wider-Caribbean (i.e. the tropical and sub-tropical waters of the Caribbean Sea, western Atlantic Ocean and Gulf of Mexico), specifically Puerto Rico, Belize, the Florida Keys, Mexico, and the US Virgin Islands.

The action area is outside each of the species' known range and, therefore, they are not expected to be found in the action area.

3.6 Dwarf Seahorse

The dwarf seahorse was listed as a candidate for listing May 4, 2012 (77 FR 26478). The dwarf seahorse's distribution ranges across the sub-tropical northwest Atlantic occurring in insular locations, including Bermuda, the Bahamas, and Cuba; along Atlantic continental shorelines from northeast Florida through the Florida Keys; and in the Gulf of Mexico south to the Gulf Campeche (Bruckner et al. 2005). The dwarf seahorse's habitat is restricted almost completely to seagrass canopies.

Although Texas has been identified as within the species range, seagrass canopies do not occur in sufficient capacity within the action area; therefore, it is highly unlikely that the dwarf seahorse would occur in the action area.

3.7 Whales

NMFS identified three endangered whales and one candidate species as potentially occurring in the Gulf of Mexico including: sei whale (*Balaenoptera borealis*), Bryde's whale (*B. edeni*), fin whale (*B. physalus*), and sperm whale (*Physeter macrocephalus*). Each of these whales can be found in the warmer waters of the Gulf of Mexico on the continental shelf edge and slope. They are usually observed in deeper waters of oceanic areas far from the coastline.

The action area is located on land and only extends out as far as the shallow nearshore waters. Therefore, suitable habitat does not exist in or near the action area.

3.8 West Indian Manatee

Manatees are large, elongated marine mammals with paired flippers and a large, spoon-shaped tail. They can reach lengths of over 14 feet and weights of over 3,000 pounds. Manatees are herbivores that feed opportunistically on a wide variety of submerged, floating, and emergent vegetation.

Status

USFWS listed the West Indian manatee as endangered on March 11, 1967 (32 FR 4001) and later received protection under ESA in 1973. On May 5, 2017, the species was reclassified from endangered to threatened because the endangered designation no longer reflected the status of the species at the time of reclassification (82 FR 16668). Critical habitat for the Florida manatee subspecies (*Trichechus manatus latirostris*) was designated in 1976 (41 FR 41914).

The major threats faced by manatees today are many fold. Collisions with watercraft account for an average of 24-30 percent of the known manatee deaths in Florida annually. Deaths attributed to water control structures and navigational locks represent four percent of known deaths.

There are also threats to their habitat as a result of intensive coastal development throughout much of the manatee's range. As well, the availability of warm-water refuges for manatee is uncertain if minimum flows and levels are not established for the natural springs on which many manatees depend and as deregulation of the power industry in Florida occurs. There are also threats from natural events such as red tide and cold events. (USFWS 2001b)

Range and Habitat

The West Indian manatee was historically found in shallow coastal waters, bays, lagoons, estuaries, rivers, and inland lakes throughout much of the tropical and sub-tropical regions of the New World Atlantic, including many of the Caribbean islands. However, at the present time, manatees are now rare or extinct in most parts of their former range. Today, manatees occur primarily in Florida and southeastern Georgia, but individuals can range as far north as Rhode Island on the Atlantic coast (Reid 1996) and as far west as Texas on the Gulf coast.

Manatees live in marine, brackish, and freshwater systems in coastal and riverine areas throughout their range. Preferred habitats include areas near the shore featuring underwater vegetation like seagrass and eelgrass. They feed along grass bed margins with access to deep water channels, where they flee when threatened. Manatees often use secluded canals, creeks, embayments, and lagoons, particularly near the mouths of coastal rivers and sloughs, for feeding, resting, cavorting, mating, and calving (Marine Mammal Commission 1986). In estuarine and brackish areas, natural and artificial fresh water sources are sought by manatees.

When ambient water temperatures drop below 68 degrees Fahrenheit in autumn and winter, manatees aggregate within the confines of natural and artificial warm-water refuges or move to the southern tip of Florida (Snow 1991). Most artificial refuges are created by warm-water outfalls from power plants or paper mills. The largest winter aggregations are at refuges in Central and Southern Florida. The northernmost natural warm-water refuge used regularly on the west coast is at Crystal River and at Blue Springs in the St. Johns River on the east coast. Most manatees return to the same warm-water refuges each year; however, some use different refuges in different years and others use two or more refuges in the same winter (Reid and Rathbun 1986, Reid et al. 1995). Many lesser known, minor aggregation sites are used as temporary thermal refuges. Most of these refuges are canals or boat basins where warmer water temperatures persist as temperatures in adjacent bays and rivers decline.

As water temperatures rise manatees disperse from winter aggregation areas. While some remain near their winter refuges, others undertake extensive travels along the coast and far up rivers and canals. On the east coast, summer sightings drop off rapidly north of Georgia (Lefebvre et al. 2001) and are rare north of Cape Hatteras (Schwartz 1995); the northernmost sighting is from Rhode Island (Reid 1996). On the west coast, sightings drop off sharply west of the Suwannee River in Florida (Marine Mammal Commission 1986). Rare sightings also have been made in the Dry Tortugas (Reynolds and Ferguson 1984) and the Bahamas (Lefebvre et al. 2001).

During the summer, manatees may be commonly found almost anywhere in Florida where water depths and access channels are greater than 1 to 2 meters (O'Shea 1988). Manatees can be found in very shallow water. In warm seasons, they usually occur alone or in pairs, although interacting groups of five to ten animals are not unusual.

Occurrence in the Action Area

The West Indian manatee historically inhabited the Laguna Madre, the Gulf, and tidally influenced portions of rivers. It is currently, however, extremely rare in Texas waters and the most recent sightings are likely individuals migrating or wandering from Mexican waters. Historical records from Texas waters include Cow Bayou (in the action area), Sabine Lake (adjacent to the action area), Copano bay, the

Bolivar Peninsula, and the mouth of the Rio Grande (Schmidly 2004, Würsig 2017). In May 2005, a live manatee appeared in the Laguna Madre near Port Mansfield (Blankinship 2005) several hundred miles south of the action area. Due to the species' extreme rarity in the action area, its presence is highly unlikely; however, with historic records from Cow Bayou and Sabine Lake, it cannot be ruled out with certainty that the species could not occur in the action area.

3.9 Loggerhead Sea Turtle

The loggerhead sea turtle is a medium to large turtle. Adults are reddish-brown in color and generally 31 to 45 inches in shell length with the record set at more than 48 inches. Loggerheads weigh between 170 and 350 pounds with records set at greater than 500 pounds. Loggerhead turtles are essentially carnivores, feeding primarily on sea urchins, sponges, squid, basket stars, crabs, horseshoe crabs, shrimp, and a variety of mollusks. Adults are primarily bottom feeders, although they will also eat jellyfish and mangrove leaves obtained while swimming and resting near the sea surface. Presence of fish species, such as croaker in stomachs of stranded individuals may indicate feeding on the by-catch of shrimp trawling (Landry 1986). Young feed on prey concentrated at the surface, such as gastropods, fragments of crustaceans, and sargassum.

Status

USFWS listed the loggerhead sea turtle as threatened throughout its range on July 28, 1978 (43 FR 32808). Although the loggerhead is the most abundant sea turtle species in US coastal waters (NMFS 2006), the decline of the species, like that of most sea turtles is the result of overexploitation by man, inadvertent mortality associated with fishing and trawling activities, and natural predation. The most significant threats to its population are coastal development, commercial fisheries and pollution (NMFS 2006)

Range and Habitat

Loggerhead sea turtles occur throughout the temperate and tropical regions of the Atlantic from Nova Scotia to Argentina, Gulf of Mexico, Pacific and Indian oceans (although it is rare in eastern and central Pacific), and the Mediterranean (Iverson 1986). This species may be found hundreds of miles out to sea, as well as in inshore areas such as bays, lagoons, salt marshes, creeks, and the mouths of large rivers. Loggerhead sea turtles are considered turtles of shallow water. Juvenile loggerheads are thought to utilize bays and estuaries for feeding, while adults prefer water less than 165 feet deep (Nelson 1986).

Adults occupy various habitats from turbid bays to clear waters of reefs. Sub-adults occur mainly in nearshore and estuarine waters, while hatchlings move directly to the sea after hatching, and often float in masses of sargassum. They remain associated with sargassum for as long as 3 to 5 years (NFMS and USFWS 1991a).

In the continental US, loggerheads nest along the Atlantic coast from Florida to as far north as New Jersey (Musick 1979) and sporadically along the Gulf Coast. In recent years, a few have nested on barrier islands along the Texas coast. Nesting usually occurs on open sandy beaches above the high-tide mark and seaward of well-developed dunes. They nest primarily on high-energy beaches on barrier islands adjacent to continental land masses in warm-temperate and subtropical regions. Steeply sloped beaches with gradually sloped offshore approaches are favored. In Florida, nesting on urban beaches was

strongly correlated with the presence of tall objects (trees or buildings), which apparently shield the beach from city lights (Solmon et al. 1995).

Occurrence in the Action Area

The loggerhead is the most abundant turtle in Texas marine waters, preferring shallow inner continental shelf waters, and occurring only very infrequently in the bays. It often occurs near offshore oil rig platforms, reefs, and jetties. Loggerheads are probably present year-round but are most noticeable in the spring when a favored food item, the Portuguese man-of-war (*Physalia physalis*), is abundant. Loggerheads constitute a major portion of the dead or moribund turtles washed ashore (stranded) on the Texas coast each year.

There are several nests that have been recorded along the Texas coast. In 1999, two loggerhead nests were confirmed in Texas, while in 2000, five loggerhead nests were confirmed. Since 2000, up to five nests per year have been recorded from the Texas coast. Like the worldwide population, the population of loggerheads in Texas has declined. (USACE 2011)

Documented records of loggerheads exists from Jefferson County, TX (Dixon 2000). There is potential for the species to occur in the action area.

3.10 Green Sea Turtle

Green turtles are the largest of all the hard-shelled sea turtles, but have a comparatively small head. Adult turtles are unique among sea turtles in that they only eat plants; they are herbivorous, feeding primarily on seagrasses and algae. While juveniles consume some invertebrates including seagrasses, macroalgae and other marine plants, mollusks, sponges, crustaceans, and jellyfish (Mortimer 1982).

Status

The green sea turtle was listed on July 28, 1978, as threatened except for in Florida and the Pacific Coast of Mexico (including the Gulf of California) where it was listed as endangered (43 FR 32808). In 1998, NMFS designated critical habitat to include the coastal waters around Culebra Island, Puerto Rico (63 FR 46693). On May 6, 2016, NMFS and USFWS revised the listing to identify 11 green sea turtle distinct population segments (DPS) worldwide. The proposed DPS would list the North Atlantic DPS as threatened.

The principal cause of the historical, worldwide decline of the green turtle is long-term harvest of eggs and adults on nesting beaches and juveniles and adults on feeding grounds. These harvests continue in some areas of the world and compromise efforts to recover the species. Other threats include incidental capture in fishing gear, primarily gillnets, but also in trawls, traps and pots, longlines, and dredges, as well as nesting habitat loss and disturbance from recreational use of beaches, development, erosion, and vegetation changes. Green turtles are also threatened, in some areas of the world especially in Hawaii and Florida, by a disease known as fibropapillomatosis, or “tumor” infections.

Range and Habitat

The green sea turtle is a circumglobal species in tropical and subtropical waters. In the US, it occurs in Atlantic waters around the US Virgin Islands, Puerto Rico, and continental US from Massachusetts to Texas. Major nesting activity occurs on Ascension Island, Aves Island (Venezuela), Costa Rica, and in

Suriname. Relatively small numbers nest in Florida, with even smaller numbers in Georgia, North Carolina, and Texas (NFMS and USFWS 1991b, Hirth 1997).

The green turtle primarily utilized shallow habitats such as lagoons, bays, inlets, shoals, estuaries, and other areas with an abundance of marine algae and seagrasses. Hatchlings often float in masses of sea plants (e.g. rafts of sargassum) in convergence zones. Coral reefs and rocky outcrops near feeding pastures often are used as resting areas.

Terrestrial habitat is typically limited to nesting activities (Balazs 1980) that occur during the summer from June to September. They prefer high energy beaches with deep sand, which may be coarse to fine, with little organic content. Most green sea turtles nest in Florida and in Mexico and nests in Texas are rare (Shaver and Amos 1988). More recently, green turtle nests were documented in Texas, of which all but one were from Padre Island National Seashore. In 2012, six green turtle nests were reported from Padres Island National Seashore and two from South Padre Island.

Occurrence in the Action Area

There are no nesting records of green sea turtles in Jefferson County; however, there are records of green sea turtles foraging in Jefferson County (Dixon 2000); therefore the species could occur in the action area.

3.11 Leatherback Sea Turtle

Leatherback sea turtles are named for their appearance. They do not have shells as other sea turtles do. Instead, their backs are covered by a slate black to bluish-black leathery skin with irregular white or pink patches. They are the largest turtles in the world, reaching over 6 feet in length and weigh 650-1,200 pounds (NPS 2013). Despite their large size, the diet of leatherbacks consists largely of jellyfish and sea squirts. They also consume sea urchins, squid crustaceans, fish, blue-green algae, and floating seaweed (NFWL 1980).

Status

The leatherback sea turtle was listed as endangered throughout its range on June 2, 1970 (35 FR 8495), with critical habitat designated at Sandy Point, St. Croix in the US Virgin Islands on March 23, 1979 (44 FR 17710). NMFS established a leatherback conservation zone extending from Cape Canaveral to the Virginia-North Carolina border and includes all inshore and offshore waters.

Leatherback sea turtles face threats on both nesting beaches and in the marine environment. The greatest causes of decline and the continuing primary threats to leatherbacks worldwide are long-term harvest and incidental capture in fishing gear. Harvest of eggs and adults occurs on nesting beaches while juveniles and adults are harvested on feeding grounds. Incidental capture primarily occurs in gillnets, but also in trawls, traps and pots, longlines, and dredges. Additionally, leatherbacks are threatened by the existence of marine debris such as plastic bags and balloons, which they often consume after mistaking them for their preferred prey, jellyfish.

Range and Habitat

The leatherback sea turtle is mainly pelagic, inhabiting the open ocean, and seldom approaches land except for nesting (Eckert 1992). It is most often found in coastal waters only when nesting or when

following concentrations of jellyfish (TPWD 2006), when it can be found in inshore waters, bays, and estuaries. The leatherback typically nests on beaches with a deepwater approach (Pritchard 1971). It dives almost continuously, often to great depths.

The leatherback is probably the most wide-ranging of all sea turtle species. It occurs in the Atlantic, Pacific and Indian Oceans, as far north as British Columbia, Newfoundland, Great Britain, and Norway; as far south as Australia, Cape of Good Hope, and Argentine; and in other water bodies such as the Mediterranean Sea (NFWL 1980). Leatherbacks nest primarily in tropical regions with major nesting beaches in Malaysia, Mexico, French Guiana, Suriname, Costa Rica, and Trinidad (Ross 1982). Leatherbacks nest only sporadically in some of the Atlantic and Gulf states of the continental US, with one nesting reported as far north as North Carolina (Schwartz 1976). In the Atlantic and Caribbean, the largest nesting assemblages occur in the US Virgin Islands, Puerto Rico, and Florida (NMFS 2006).

The leatherback migrates farther and ventures into colder water than any other marine reptile. Adults appear to engage in routine migrations between boreal, temperate, and tropical waters, presumably to optimize both foraging and nesting opportunities. During the summer, leatherbacks tend to occur along the East Coast of the US from the Gulf of Main south to the middle of Florida.

Apart from occasional feeding aggregations reported off Port Aransas in December 1956 (Leary 1957), or possible concentrations in the Brownsville Eddy in winter (Hildebrand 1983), leatherbacks are rare along the Texas coast, tending to keep deeper offshore waters where their primary food source, jellyfish, occurs. In the Gulf, the leatherback is often associated with two species of jellyfish including the cabbagehead (*Stomolophus sp.*) and the moon jellyfish (*Aurelia sp.*) (NMFS and USFWS 1992).

According to USFWS (1981), leatherbacks have never been common in Texas waters. No nests of this species have been recorded in Texas for at least 70 years (NPS 2006). The last two, one from the late 1920s and one from the mid-1930s, were both from Padre Island (Hildebrand 1982, Hildebrand 1986).

Occurrence in the Action Area

There are no nesting records of leatherback sea turtles in Jefferson County. Due to the species preference for deep marine waters, it is highly unlikely that the species would occur in the action area.

3.12 Hawksbill Sea Turtle

The hawksbill sea turtle is a small to medium-sized marine turtle with an elongated oval shell with overlapping scutes on the carapace, a relatively small head with a distinctive hawk-like beak, and flippers with two claws. An adult may reach up to 3 feet in length and weigh up to 300 pounds, although adults more commonly average about 2.5 feet in length and typically weigh around 176 pounds. While the species is omnivorous, it prefers invertebrates, especially encrusting organisms, such as sponges, tunicates, bryozoans, mollusks, corals, barnacles, and sea urchins. Pelagic species consumed jellyfish and fish, and plant material such as algae, sea grasses, and mangroves, have been reported as food items for this turtle (Mortimer 1982). The young are reported to be somewhat more herbivorous than adults (Ernst and Barbour 1972).

Status

The hawksbill sea turtle was federally listed as endangered on June 2, 1970 (35 FR 8495) with critical habitat designated in Puerto Rico on May 24, 1978 (43 FR 22224). In 1998, NMFS designated additional critical habitat near Isla Mona and Isla Monito, Puerto Rico, seaward to 3.9 miles (63 FR 46693—46701).

The greatest threat to this species is harvest to supply the market for tortoiseshell and stuffed turtle curios (Meylan and Donnelly 1999). Hawksbill shell (bekko) commands high prices. Japanese imports of raw bekko between 1970 and 1989 represented the loss of more than 670,000 turtles. The hawksbill is also used to manufacture leather oil, oil, perfume, and cosmetics (NMFS 2006).

Other threats include destruction of breeding locations by beach development, incidental take in lobster and Caribbean reef fish fisheries, pollution by petroleum products (especially oil tanker discharges), entanglement in persistent marine debris (Meylan 1992), and predation on eggs and hatchlings.

Range and Habitat

Hawksbill generally inhabit coastal reefs, bays, rocky areas, passes, estuaries, and lagoons, where they occur at depths of less than 70 feet. Like some other sea turtle species, hatchlings are sometimes found floating in masses of marine plants (e.g. sargassum rafts) in the open ocean (NFWL 1980). Hawskbills reenter coastal waters when they reach a carapace length of approximately 7.9 to 9.8 inches. Coral reefs are widely recognized as the resident foraging habitat of juveniles, subadults, and adults. This habitat association is undoubtedly related to their diet of sponges, which need solid substrate for attachment. Hawksbills also occur around rocky outcrops and high-energy shoals, which are optimum sites for sponge growth. In Texas, juvenile hawksbills are often associated with stone jetties (NMFS 2006).

Terrestrial habitat is typically limited to nesting activities. The hawksbill, which is typically a solitary nester, nests on undisturbed, deep-sand beaches, from high-energy ocean beaches to tiny pocket beaches about 10 feet wide bound by crevice of cliff walls. Typically, the sand beaches are low energy, with woody vegetation, such as sea grape (*Coccoloba uvifera*), near the waterline (NRC 1990).

The hawksbill is circumtropical, occurring in tropical and subtropical seas of the Atlantic, Pacific, and Indian oceans (Witzell 1983). This species is the most tropical of all marine turtles, although it does occur in many temperate regions. The hawksbill sea turtle is widely distributed in the Caribbean Sea and western Atlantic Ocean, with representatives of at least some life history stages regularly occurring in southern Florida and the northern Gulf (especially Texas), south to Brazil (NMFS 2006).

In the continental US, the hawksbill largely nests in Florida where it is sporadic at best (NFWL 1980). A major nesting beach exists on Mona Island, Puerto Rico and elsewhere in the western Atlantic, hawksbills nest in small numbers along the Gulf Coast of Mexico, the West Indies, and along the Caribbean coasts of Central and Southern America (Musick 1979).

Texas is the only state outside of Florida where hawkbills are sighted with any regularity. Most of these sightings involve posthatchlings and juveniles, and are primarily associated with stone jetties. These small turtles are believed to originate from nesting beaches in Mexico (NMFS 2006). On June 13, 1998, the first hawksbill nest was recorded on the Texas coast near Padre Island National Seashore. This nest remains the only documented hawksbill nest on the Texas coast (NPS 2006, Shaver 2006).

Occurrence in the Action Area

There are no records of hawksbill nesting or occurrence in Jefferson County (Dixon 2000); juveniles could be present within the Gulf of Mexico from April through August. The action area supports marginal nesting habitat. The species has potential to occur in the focused study area although it is not expected to be common.

3.13 Kemp's Ridley Sea Turtle

The Kemp's ridley sea turtle is the smallest of the sea turtles, with adults reaching about 2 feet in length and weighing up to 100 pounds. The species has a triangular-shaped head and a slightly hooked beak with large crushing surfaces. The turtle's diet consists mainly of swimming crabs, but may also include fish, jellyfish, sea stars, snails, bivalves, shrimp, sea urchins, an array of mollusks, and occasional marine plants (NMFS et al. 2011).

Status

Kemp's ridley sea turtle was listed as endangered throughout its range on December 2, 1970 (35 FR 18320). Populations of the species have declined since 1947, when an estimated 42,000 females nested in one day (Hildebrand 1963), to a total nesting population of approximately 1,000 in the mid-1980s. The decline of the species was primarily due to human activities including collection of eggs, fishing for juveniles and adults, killing adults for meat and other products, and direct take for indigenous use.

Threats affecting Kemp's ridley are often specific to life stages and the habitats where they occur. On the shoreline (nesting beach) threats to the species include: illegal harvest; beach cleaning; human presence during recreation or construction; recreational beach use; beach vehicular driving; construction activities such as beach nourishment, shoreline stabilization, and development; energy exploration, development and removal; ecosystem alterations such as beach erosion, vegetation composition changes, and invasive species; pollution from oil spills, exposure to toxins and chemicals from illegal dumping and garbage, and light; predation; and disease (NMFS et al. 2011).

In open water, sea turtles caught in commercial and recreational fisheries are often injured or killed. Of all commercial and recreational fisheries in the US, shrimp trawling has had the greatest effect on the status of sea turtle populations, followed by dredges, longlines, nets, and traps/pots. Entanglement in fishing gear can lead to abrasions, restrictions, tissue necrosis, and drowning. Turtles are also susceptible to illegal harvest and boat strikes while in the water (NMFS et al. 2011).

Range and Habitat

Kemp's ridleys inhabit shallow coastal and estuarine waters, usually over sand or mud bottoms. Models indicate that the most suitable habitats are less than 32 feet (10 m) in bottom depth with sea surface temperatures between 71.6° and 89.6°F (22° and 32°C) (Coyne et al. 2000). Kemp's ridleys utilize seagrass beds, mud bottom, and live bottom substrates as important developmental habitats (Schmid and Barichivich 2006). Post-nesting Kemp's ridleys travel along coastal corridors that are generally shallower than 164 feet (50 m) in bottom depth (Schmid and Barichivich 2006). Females lay their eggs on coastal beaches where they incubate eggs in sandy nests. After embryonic development, the hatchlings emerge and swim offshore into deeper, ocean water where they feed and grow until returning at a larger size to nearshore coastal habitats. This life history is characterized by three basic

ecosystem zones: (1) terrestrial zone (supralittoral) – the nesting beach where both oviposition and embryonic development occur; (2) neritic zone – the nearshore (including bays and sounds) marine environment (from the surface to the sea floor) where water depths do not exceed 200 meters, including the continental shelf; and (3) oceanic zone – the vast open ocean environment (from the surface to the sea floor) where water depths are greater than 650 feet (200 meters) (NMFS et al. 2011).

Kemp's ridleys nest on beaches from April to July. Nesting is essentially limited to the beaches of the western Gulf of Mexico, primarily in Tamaulipas, Mexico. Nesting also occurs in Veracruz and a few historical records exist for Campeche, Mexico (Marquez 1994). Nesting also regularly occurs in Texas and infrequently in a few other US states. However, historic nesting records in the US are limited to south Texas (Hildebrand 1963). Several scatted isolated nesting attempts have occurred from North Carolina to Colombia.

Kemp's ridley occurs in Texas in small numbers and in many cases may well be in transit between crustacean-rich feeding areas in the northern Gulf and breeding grounds in Mexico. It has nested sporadically in Texas over the last 50 years. The number of nestings have increased over the last couple of decades (NPS 2012 and 2013), although some of these nests were from headstarted ridleys. The majority of Kemp's ridley nests recorded in Texas were at the Padre Island National Seashore (PINS) (Shaver 2006). Such nestings, together with the proximity of the Rancho Nuevo rookery, probably account for the occurrence of hatchlings and subadults in Texas.

Occurrence in the Action Area

Of all sea turtles potentially present within the action area, the Kemp's ridley has the highest potential for occurrence based on habitat requirements and research. The upper Texas and Louisiana coasts are important foraging and inter-nesting habitats for the species. Satellite-tracking studies conducted by Texas A&M University at Galveston on the Kemp's ridleys nesting on Bolivar, Galveston, and Surfside beaches indicate that nesters remain in near-shore waters of the upper Texas coast during their 3.5 month-long nesting season (April through mid-July) (Seney and Landry 2008).

There are historical records of Kemp's ridley nesting on Jefferson County beaches. In recent years, the nearest recorded nesting event occurred at Bolivar in Galveston Bay, approximately 40 miles from the action area. Sabine Pass is a known foraging area frequented by neritic juveniles (Schmid and Barichivich 2005 and 2006). Kemp's ridley turtles are likely to forage in the project area, but nesting is not probable under the current conditions.

4.0 EFFECTS OF THE PROPOSED ACTION

Eleven species that were identified on at least one of the three sources sought during species identification were determined to not be present in the study area because their known range does not overlap the action area or suitable habitat does not exist in the action area (Table 3). Therefore, the proposed action would have no effect on the 11 species and will not be discussed in further detail.

Table 3. ESA-listed species which are not expected to occur in the action area.

Species	Effect Determination	Justification
Elkhorn coral	No effect	Outside the species known range
Lobed star coral	No effect	Outside the species known range
Mountainous star coral	No effect	Outside the species known range
Boulder star coral	No effect	Outside the species known range
Dwarf seahorse	No effect	Outside the species known range
Sei whale	No effect	Species requires deep marine water habitat, which is not available in the action area.
Bryde's Whale	No effect	Species requires deep marine water habitat, which is not available in the action area.
Fin whale	No effect	Species requires deep marine water habitat, which is not available in the action area.
Humpback whale	No effect	Species requires deep marine water habitat, which is not available in the action area.
Sperm whale	No effect	Species requires deep marine water habitat, which is not available in the action area.
Leatherback sea turtle	No effect	Species prefers deep marine water habitat, which is not available in the action area.

This BE will only address activities that would occur after the material has been dredged (e.g. transportation of dredged material, placement of material, construction activities, plantings, invasive species removal, etc.). Because this project would not require additional dredging cycles or locations from the operations described in the GRBO, the analyses completed for that Biological Assessment (BA) and associated BO are sufficient for the dredging portion of this project. If the SNWW CIP is implemented, the associated BA and BO executed as part of the feasibility study would also be sufficient to address ESA-listed species for dredging actions as part of the SNWW CIP.

For the GRBO and SNWW CIP BO, NMFS determined that the proposed action of each of the projects were *likely to adversely affect but were not likely to jeopardize* the continued existence of loggerhead, Kemp's ridley or green sea turtle and would have *no effect* on leatherback sea turtles or West Indian manatee due to lack of suitable habitat or regular occurrence within the action areas. Conservation measures and an incidental take statement were issued for the four turtle species with each BO. Any

dredging operations that would occur for this project would be subject to conservation measures and terms and conditions identified in the GRBO or SNWW CIP BO. The BO that will be applicable will be dependent upon which project authority and the purpose of dredging (i.e. regular maintenance or widening/deepening).

4.1 Piping Plover and Rufa Red Knot

Because both of the species share very similar foraging and roosting behaviors and share similar coastal habitats within the action area, the effects of the action on the two species is expected to be very similar and will, therefore, be discussed together.

Marsh restoration and GIWW armoring activities would occur more than three miles north of the beach/dune ecosystem. It is unlikely that any construction activities would affect piping plover or red knot from a noise disturbance or habitat avoidance standpoint, since no individuals have been documented foraging in marsh areas. No dredged disposal placement areas, which are sometimes used by both species, would be affected by restoration measures. None of the landscape features attractive to plovers are present in or adjacent to where restoration activities would occur; therefore, implementation of the proposed action would have ***no effect*** on the piping plover or rufa red knot.

4.2 Whooping Crane

Attempts would be made to avoid construction from October 1 through April 15 when birds are most likely to be present. If construction must be completed during this time in order to take advantage of the dredging windows, potential impacts to whooping cranes include noise disturbance during foraging activities or habitat avoidance while construction equipment is operating. Impacts to the species would cease after construction is complete. It is highly unlikely that mortality of any individuals were to occur during construction due to their ability to avoid the construction area. However, additional voluntary conservation measures have been incorporated into the plan and are described in section 5.2.

Implementation of this plan will indirectly contribute to recovery of the species through marsh restoration and protection from future development. The International Recovery Plan lists several recovery actions including protecting wintering habitat to accommodate expanding crane populations (CWS and US Fish and Wildlife Service 2007), which is already evidenced by the presence of NEP birds in the study area. By restoring marsh habitat at least two identified recovery actions have been addressed (1.5.3.6—Better manage deposition of dredge material, 1.5.5—Create wetland habitat). In general, marsh restoration actions would be beneficial to the whooping crane through an increase in quality foraging habitat and at some point in the future could serve as a wintering site.

The only individuals that are likely to occur in the action area are members of the NEP population. Usually, NEP populations are treated as “threatened” species except that the ESA’s section 7 consultation regulations do not apply. However, since the birds are crossing out of the NEP boundaries, the birds are afforded full ESA protection as endangered, which includes complying with Section 7 consultation regulations. Therefore, USACE has determined the proposed action ***may affect, but is not likely to adversely affect*** the whooping crane because the temporary adverse impacts are anticipated to be insignificant and discountable, especially since conservation measures have been incorporated into the plan, and the overall beneficial impacts would far outweigh any negative impacts.

4.3 West Indian Manatee

The proposed action would not alter marine habitats or food sources, such as seagrass or other aquatic food plants, in the action area. In the rare instance that the manatee could occur in the action area, in-water work during placement of pipelines, operation of watercraft to move material or equipment, etc. could impact manatees. Impacts could include temporary habitat avoidance, exposure to underwater sound, and visual disturbances, which would all cease after construction is complete. The most extreme impact could include entrapment and/or collision with pipes, silt barriers, pumps, placement equipment, support watercraft or other in-water construction equipment. Although this is unlikely due to the extremely rare occurrence of West Indian manatee in the action area, conservation measures are being incorporated into the plan to avoid harassment and take of manatee, see Section 5.1.

Due to the rarity of the manatee in the action area and the conservation measures that would be implemented, implementation of the action ***may affect, but not adversely affect*** the West Indian manatee.

4.4 Sea Turtles

Under the proposed action, no Gulf of Mexico shoreline work is proposed; therefore, there would be ***no effect*** to nesting loggerhead, green, hawksbill, and Kemp's ridley sea turtles or their habitat while on land.

Construction activities from setting pipelines and movement of personnel and equipment during dredging activities could create activity, noise and vibrations that the species find undesirable. Sea turtles are highly mobile and will likely avoid the area due to any project activity and noise. Likewise there is sufficient nearshore habitat that temporary avoidance of the area would not be expected to affect foraging ability. Normal behavior patterns of sea turtles are not likely to be significantly disrupted because of the short-term localized nature of the action and the ability of sea turtles to avoid the immediate area. All of these potential impacts were addressed in the GRBO and SNWW CIP BO. Despite some minor changes in placement of dredged material location (i.e. marsh restoration units instead of upland PAs or offshore locations), which affects location of placement pipes and the movement of personnel and equipment, the impacts described here versus in either of the BOs are not greater than described and consulted on. Therefore, the GRBO and SNWW CIP BO would cover these impacts.

5.0 VOLUNTARY CONSERVATION MEASURES AND MONITORING

5.1 General Conservation Measures

The following conservation measures would be incorporated into operations for the protection of all listed species:

- All personnel (contractors, workers, etc.) will attend training sessions prior to the initiation of, or their participation in, project work activities. Training will include: 1) recognition of piping plovers, rufa red knot, West Indian manatee, and sea turtles, their habitat, and sign; 2) impact avoidance measures; 3) reporting criteria; 4) contact information for rescue agencies in the area; and 5) penalties of violating the ESA.
- Project equipment and vehicles transiting between the staging area and restoration site will be minimized to the extent practicable, including but not limited to using designated routes and confining vehicle access to the immediate needs of the project.
- The contractor will coordinate and sequence work to minimize the frequency and density of vehicular traffic within and near the restoration unit(s) and limit driving to the greatest extent practicable.
- 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 the construction period.

5.2 Whooping Crane

The following conservation measures would be implemented to minimize the potential for adverse effect to whooping crane:

- Seasonal timing restriction between October 1 and April 15 in which construction should be avoided if at all possible.
- If the seasonal timing restriction cannot be avoided:
    - A biological monitor qualified in identifying whooping cranes and with stop work authority will be on site while construction is in progress.
    - A 1,000 foot-radius of the work site would be delineated before work begins. If a whooping crane is observed within the 1,000-foot radius, the biological monitor shall halt construction activities, including shutting down any running equipment until the bird has vacated the radius.
    - If construction equipment is over 15 feet tall, the equipment must be laid down at dusk.

5.3 West Indian Manatee

The following conservation measures would be implemented to minimize the potential for adverse effects to manatees:

- Qualified biologists will monitor for the presence of manatee during phases which involve open water areas capable of supporting manatees.
- Before activities occur in open water areas, a 50-foot radius of the work area should be delineated. If a manatee is observed within the 50-foot radius, the biological monitor shall halt construction activities, including shutting down any running equipment until the animal has moved beyond the radius, either through sighting or by waiting until enough time has elapsed (approximately 15 minutes) to assume that the animal has moved beyond the buffer.
- If a manatee is sighted within 100 yards of the active work zone, vessels will operate at no wake/idle speeds.
- If siltation barriers are used, they will be made of material in which manatees cannot become entangled, should be properly secured, and regularly monitored to avoid entrapment. Barrier should not impede manatee movement.
- Any manatee sightings will be immediately reported to the U.S. Fish and Wildlife Service Houston Ecological Services Office.

No additional monitoring would be required pre- or post-construction, due to the extremely low potential for the species to occur in the action area.

5.4 Sea Turtles

Under GRBO and SNWW CIP BO, the following reasonably and prudent measures/terms and conditions were incorporated into the final BOs. Each of these have largely been incorporated in USACE regulatory and civil works projects throughout the Gulf for more than a decade. These measures include use of temporal dredging windows, when possible; intake and overflow screening; use of sea turtle deflector dragheads; observer reporting requirements; and sea turtle relocation/abundance trawling. These measures would be incorporated during any dredging activities that would occur in the SNWW and for which dredged material could be beneficially used for this project.

6.0 CONCULSION

Based upon the findings of this BE, USACE has made the following effects determination for species that were identified as occurring or potentially occurring in the action area:

Species	Scientific Name	Jurisdiction	Effect Determination
Birds			
Piping Plover	*Charadrius melodus*	USFWS	No effect
Red Knot	*Calidris canutus rufa*	USFWS	No effect
Whooping Crane	*Grus americana*	USFWS	No effect
Corals			
Elkhorn coral	*Acropora palmata*	NMFS	No effect
Lobed star coral	*Orbicella annularis*	NMFS	No effect
Mountainous star coral	*O. faveolata*	NMFS	No effect
Boulder star coral	*O. franksi*	NMFS	No effect
Fish			
Dwarf seahorse	*Hippocampus zosterae*	NFMS	No effect
Mammals			
Sei whale	*Balaenoptera borealis*	NMFS	No effect
Bryde's Whale	*B. edeni*	NFMS	No effect
Fin whale	*B. physalus*	NMFS	No effect
Humpback whale	*Megaptera novaeangliae*	NMFS	No effect
Sperm whale	*Physeter macrocephalus*	NMFS	No effect
West Indian Manatee	*Trichechus manatus*	UFWS/NMFS	NLAA
Reptiles			
Loggerhead sea turtle	*Caretta caretta*	USFWS/NMFS	**On land:** No effect **In water:** LAA*
Green sea turtle	*Chelonia mydas*	USFWS/NMFS	**On land:** No effect **In water:** LAA*
Leatherback sea turtle	*Dermochelys coriacea*	USFWS/NMFS	No effect
Hawksbill sea turtle	*Eretmochelys imbricata*	USFWS/NMFS	**On land:** No effect **In water:** LAA*
Kemp's Ridley sea turtle	*Lepidochelys kempii*	USFWS/NMFS	**On land:** No effect **In water:** LAA*

NLAA= Not likely to adversely affect **LAA***= Likely to adversely affect, covered by GRBO or SNWW CIP BO

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Appendix A: Species List Request

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Texas Coastal Ecological Services Field Office
17629 El Camino Real #211
Houston, TX 77058
Phone: (281) 286-8282 Fax: (281) 488-5882
http://www.fws.gov/southwest/es/TexasCoastal/
http://www.fws.gov/southwest/es/ES_Lists_Main2.html

In Reply Refer To: March 30, 2018
Consultation Code: 02ETTX00-2018-SLI-1096
Event Code: 02ETTX00-2018-E-02286
Project Name: Jefferson County Ecosystem Restoration Feasibility Study

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The U.S. Fish and Wildlife Service (Service) field offices in Clear Lake, Tx, and Corpus Christi, Tx, have combined administratively to form the Texas Coastal Ecological Services Field Office. A map of the Texas Coastal Ecological Services Field Office area of responsibility can be found at: http://www.fws.gov/southwest/es/TexasCoastal/Map.html. All project related correspondence should be sent to the field office responsible for the area in which your project occurs. For projects located in southeast Texas please write to: Field Supervisor; U.S. Fish and Wildlife Service; 17629 El Camino Real Ste. 211; Houston, Texas 77058. For projects located in southern Texas please write to: Field Supervisor; U.S. Fish and Wildlife Service; P.O. Box 81468; Corpus Christi, Texas 78468-1468. For projects located in six counties in southern Texas (Cameron, Hidalgo, Starr, Webb, Willacy, and Zapata) please write: Santa Ana NWR, ATTN: Ecological Services Sub Office, 3325 Green Jay Road, Alamo, Texas 78516.

The enclosed species list identifies federally threatened, endangered, and proposed to be listed species; designated critical habitat; and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project.

New information from updated surveys, changes in the abundance and distribution of species, changes in habitat conditions, or other factors could change the list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website http://ecos.fws.gov/ipac/ at regular intervals during project planning and implementation for updates to species list and information. An updated list may be

requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

Candidate species have no protection under the Act but are included for consideration because they could be listed prior to the completion of your project. The other species information should help you determine if suitable habitat for these listed species exists in any of the proposed project areas or if project activities may affect species on-site, off-site, and/or result in "take" of a federally listed species.

"Take" is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. In addition to the direct take of an individual animal, habitat destruction or modification can be considered take, regardless of whether it has been formally designated as critical habitat, if the activity results in the death or injury of wildlife by removing essential habitat components or significantly alters essential behavior patterns, including breeding, feeding, or sheltering.

Section 7

Section 7 of the Act requires that all Federal agencies consult with the Service to ensure that actions authorized, funded or carried out by such agencies do not jeopardize the continued existence of any listed threatened or endangered species or adversely modify or destroy critical habitat of such species. It is the responsibility of the Federal action agency to determine if the proposed project may affect threatened or endangered species. If a "may affect" determination is made, the Federal agency shall initiate the section 7 consultation process by writing to the office that has responsibility for the area in which your project occurs.

Is not likely to adversely affect - the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable, insignificant, or completely beneficial. Certain avoidance and minimization measures may need to be implemented in order to reach this level of effects. The Federal agency or the designated non-Federal representative should seek written concurrence from the Service that adverse effects have been eliminated. Be sure to include all of the information and documentation used to reach your decision with your request for concurrence. The Service must have this documentation before issuing a concurrence.

Is likely to adversely affect - adverse effects to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. If the overall effect of the proposed action is beneficial to the listed species but also is likely to cause some adverse effects to individuals of that species, then the proposed action "is likely to adversely affect" the listed species. An "is likely to adversely affect" determination requires the Federal action agency to initiate formal section 7 consultation with this office.

No effect - the proposed action will not affect federally listed species or critical habitat (i.e., suitable habitat for the species occurring in the project county is not present in or adjacent to the action area). No further coordination or contact with the Service is necessary. However, if the

project changes or additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.

Regardless of your determination, the Service recommends that you maintain a complete record of the evaluation, including steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related articles.

Please be advised that while a Federal agency may designate a non-Federal representative to conduct informal consultations with the Service, assess project effects, or prepare a biological assessment, the Federal agency must notify the Service in writing of such a designation. The Federal agency shall also independently review and evaluate the scope and contents of a biological assessment prepared by their designated non-Federal representative before that document is submitted to the Service.

The Service's Consultation Handbook is available online to assist you with further information on definitions, process, and fulfilling Act requirements for your projects at: http://www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf

Section 10

If there is no federal involvement and the proposed project is being funded or carried out by private interests and/or non-federal government agencies, and the project as proposed may affect listed species, a section 10(a)(1)(B) permit is recommended. The Habitat Conservation Planning Handbook is available at: http://www.fws.gov/endangered/esa-library/pdf/HCP_Handbook.pdf

Service Response

Please note that the Service strives to respond to requests for project review within 30 days of receipt, however, this time period is not mandated by regulation. Responses may be delayed due to workload and lack of staff. Failure to meet the 30-day timeframe does not constitute a concurrence from the Service that the proposed project will not have impacts to threatened and endangered species.

Proposed Species and/or Proposed Critical Habitat

While consultations are required when the proposed action may affect listed species, section 7(a)(4) was added to the ESA to provide a mechanism for identifying and resolving potential conflicts between a proposed action and proposed species or proposed critical habitat at an early planning stage. The action agency should seek conference from the Service to assist the action agency in determining effects and to advise the agency on ways to avoid or minimize adverse effect to proposed species or proposed critical habitat.

Candidate Species

Candidate species are species that are being considered for possible addition to the threatened and endangered species list. They currently have no legal protection under the ESA. If you find you have potential project impacts to these species the Service would like to provide technical

assistance to help avoid or minimize adverse effects. Addressing potential impacts to these species at this stage could better provide for overall ecosystem healh in the local area and ay avert potential future listing.

Several species of freshwater mussels occur in Texas and four are candidates for listing under the ESA. The Service is also reviewing the status of six other species for potential listing under the ESA. One of the main contributors to mussel die offs is sedimentation, which smothers and suffocates mussels. To reduce sedimentation within rivers, streams, and tributaries crossed by a project, the Service recommends that that you implement the best management practices found at: http://www.fws.gov/southwest/es/TexasCoastal/FreshwaterMussels.html.

Candidate Conservation Agreements (CCAs) or Candidate Conservation Agreements with Assurances (CCAAs) are voluntary agreements between the Service and public or private entities to implement conservation measures to address threats to candidate species. Implementing conservation efforts before species are listed increases the likelihood that simpler, flexible, and more cost-effective conservation options are available. A CCAA can provide participants with assurances that if they engage in conservation actions, they will not be required to implement additional conservation measures beyond those in the agreement. For additional information on CCAs/CCAAs please visit the Service's website at http://www.fws.gov/endangered/what-we-do/cca.html.

Migratory Birds

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions for the protection of migratory birds. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. Many may nest in trees, brush areas or other suitable habitat. The Service recommends activities requiring vegetation removal or disturbance avoid the peak nesting period of March through August to avoid destruction of individuals or eggs. If project activities must be conducted during this time, we recommend surveying for active nests prior to commencing work. A list of migratory birds may be viewed at http://www.fws.gov/migratorybirds/regulationspolicies/mbta/mbtandx.html.

The bald eagle (*Haliaeetus leucocephalus*) was delisted under the Act on August 9, 2007. Both the bald eagle and the goden eagle (*Aquila chrysaetos*) are still protected under the MBTA and BGEPA. The BGEPA affords both eagles protection in addition to that provided by the MBTA, in particular, by making it unlawful to "disturb" eagles. Under the BGEPA, the Service may issue limited permits to incidentally "take" eagles (e.g., injury, interfering with normal breeding, feeding, or sheltering behavior nest abandonment). For more information on bald and golden eagle management guidlines, we recommend you review information provided at http://www.fws.gov/midwest/eagle/pdf/NationalBaldEagleManagementGuidelines.pdf.

The construction of overhead power lines creates threats of avian collision and electrocution. The Service recommends the installation of underground rather than overhead power lines whenever possible. For new overhead lines or retrofitting of old lines, we recommend that project

developers implement, to the maximum extent practicable, the Avian Power Line Interaction Committee guidelines found at http://www.aplic.org/.

Meteorological and communication towers are estimated to kill millions of birds per year. We recommend following the guidance set forth in the Service Interim Guidelines for Recommendations on Communications Tower Siting, Constructions, Operation and Decommissioning, found online at: http://www.fws.gov/habitatconservation/communicationtowers.html, to minimize the threat of avian mortality at these towers. Monitoring at these towers would provide insight into the effectiveness of the minimization measures. We request the results of any wildlife mortality monitoring at towers associated with this project.

We request that you provide us with the final location and specifications of your proposed towers, as well as the recommendations implemented. A Tower Site Evaluation Form is also available via the above website; we recommend you complete this form and keep it in your files. If meteorological towers are to be constructed, please forward this completed form to our office.

More information concerning sections 7 and 10 of the Act, migratory birds, candidate species, and landowner tools can be found on our website at: http://www.fws.gov/southwest/es/TexasCoastal/ProjectReviews.html.

Wetlands and Wildlife Habitat

Wetlands and riparian zones provide valuable fish and wildlife habitat as well as contribute to flood control, water quality enhancement, and groundwater recharge. Wetland and riparian vegetation provides food and cover for wildlife, stabilizes banks and decreases soil erosion. These areas are inherently dynamic and very sensitive to changes caused by such activities as overgrazing, logging, major construction, or earth disturbance. Executive Order 11990 asserts that each agency shall provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial value of wetlands in carrying out the agency's responsibilities. Construction activities near riparian zones should be carefully designed to minimize impacts. If vegetation clearing is needed in these riparian areas, they should be re-vegetated with native wetland and riparian vegetation to prevent erosion or loss of habitat. We recommend minimizing the area of soil scarification and initiating incremental re-establishment of herbaceous vegetation at the proposed work sites. Denuded and/or disturbed areas should be re-vegetated with a mixture of native legumes and grasses. Species commonly used for soil stabilization are listed in the Texas Department of Agriculture's (TDA) Native Tree and Plant Directory, available from TDA at P.O. Box 12847, Austin, Texas 78711. The Service also urges taking precautions to ensure sediment loading does not occur to any receiving streams in the proposed project area. To prevent and/or minimize soil erosion and compaction associated with construction activities, avoid any unnecessary clearing of vegetation, and follow established rights-of-way whenever possible. All machinery and petroleum products should be stored outside the floodplain and/or wetland area during construction to prevent possible contamination of water and soils.

Wetlands and riparian areas are high priority fish and wildlife habitat, serving as important sources of food, cover, and shelter for numerous species of resident and migratory wildlife. Waterfowl and other migratory birds use wetlands and riparian corridors as stopover, feeding, and nesting areas. We strongly recommend that the selected project site not impact wetlands and riparian areas, and be located as far as practical from these areas. Migratory birds tend to concentrate in or near wetlands and riparian areas and use these areas as migratory flyways or corridors. After every effort has been made to avoid impacting wetlands, you anticipate unavoidable wetland impacts will occur; you should contact the appropriate U.S. Army Corps of Engineers office to determine if a permit is necessary prior to commencement of construction activities.

If your project will involve filling, dredging, or trenching of a wetland or riparian area it may require a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (COE). For permitting requirements please contact the U.S. Corps of Engineers, District Engineer, P.O. Box 1229, Galveston, Texas 77553-1229, (409) 766-3002.

Beneficial Landscaping

In accordance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping (42 C.F.R. 26961), where possible, any landscaping associated with project plans should be limited to seeding and replanting with native species. A mixture of grasses and forbs appropriate to address potential erosion problems and long-term cover should be planted when seed is reasonably available. Although Bermuda grass is listed in seed mixtures, this species and other introduced species should be avoided as much as possible. The Service also recommends the use of native trees, shrubs, and herbaceous species that are adaptable, drought tolerant and conserve water.

State Listed Species

The State of Texas protects certain species. Please contact the Texas Parks and Wildlife Department (Endangered Resources Branch), 4200 Smith School Road, Austin, Texas 78744 (telephone 512/389-8021) for information concerning fish, wildlife, and plants of State concern or visit their website at: http://www.tpwd.state.tx.us/huntwild/wild/wildlife_diversity/texas_rare_species/listed_species/.

If we can be of further assistance, or if you have any questions about these comments, please contact 281/286-8282 if your project is in southeast Texas, or 361/994-9005, ext. 246, if your project is in southern Texas. Please refer to the Service consultation number listed above in any future correspondence regarding this project.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Texas Coastal Ecological Services Field Office
17629 El Camino Real #211
Houston, TX 77058
(281) 286-8282

Project Summary

Consultation Code: 02ETTX00-2018-SLI-1096

Event Code: 02ETTX00-2018-E-02286

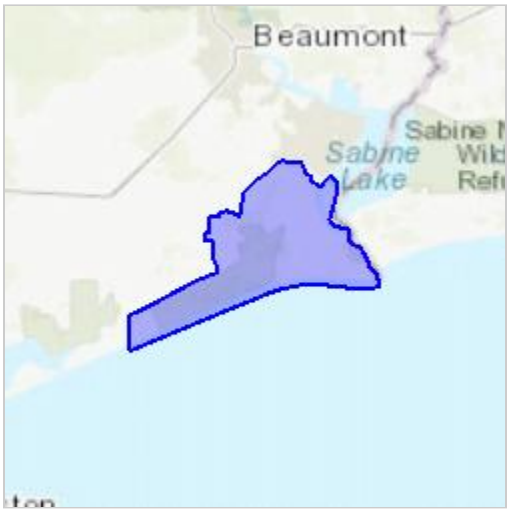
Project Name: Jefferson County Ecosystem Restoration Feasibility Study

Project Type: LAND - RESTORATION / ENHANCEMENT

Project Description: Feasibility study investigating potential ecosystem restoration within the coastal system of Jefferson County, TX. Plans incorporate marsh and shoreline restoration and nourishment features which are critical to the stabilization and sustainment of the study area now and into the future. Marsh measures consists of restoration and/or nourishment to increase land coverage in the area and improve terrestrial wildlife habitat, hydrology, water quality, and fish nurseries. Shoreline measures include restoration and/or establishment of a sustainable beach profile and dune that are critical to reduce the rate off erosion and protect adjacent wetlands and critical geomorphic features from significant weather events and salt water intrusion.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/29.71849021386834N94.02005694864323W



Counties: Jefferson, TX

Endangered Species Act Species

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
West Indian Manatee *Trichechus manatus* There is **final** critical habitat for this species. Your location is outside the critical habitat. ***This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.*** Species profile: https://ecos.fws.gov/ecp/species/4469	Threatened

Birds

NAME	STATUS
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot *Calidris canutus rufa* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened

Reptiles

NAME	STATUS
Green Sea Turtle *Chelonia mydas* Population: North Atlantic DPS No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6199	Threatened
Hawksbill Sea Turtle *Eretmochelys imbricata* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3656	Endangered
Kemp's Ridley Sea Turtle *Lepidochelys kempii* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5523	Endangered
Leatherback Sea Turtle *Dermochelys coriacea* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1493	Endangered
Loggerhead Sea Turtle *Caretta caretta* Population: Northwest Atlantic Ocean DPS There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1110	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

NOAA FISHERIES
Southeast Region
Protected Resources Division

Texas' Threatened and Endangered Species

For more information on listed species please visit:
http://www.nmfs.noaa.gov/pr/species/esa/listed.htm
http://sero.nmfs.noaa.gov/protected_resources/index.html

Marine Mammal Species	Scientific Name	Status
fin whale	*Balaenoptera physalus*	Endangered
sei whale	*Balaenoptera borealis*	Endangered
sperm whale	*Physeter macrocephalus*	Endangered
Gulf of Mexico Bryde's whale	*Balaenoptera edeni - subspecies*	Proposed - Endangered
Sea Turtle Species		
green sea turtle	*Chelonia mydas*	Threatened[1]
hawksbill sea turtle	*Eretmochelys imbricata*	Endangered
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered
leatherback sea turtle	*Dermochelys coriacea*	Endangered
loggerhead sea turtle	*Caretta caretta*	Threatened[2]
Fish Species		
oceanic whitetip shark	*Carcharhinus longimanus*	Threatened
giant manta ray	*Manta birostris*	Threatened
Invertebrate Species		
lobed star coral	*Orbicella annularis*	Threatened
mountainous star coral	*Orbicella faveolata*	Threatened
boulder star coral	*Orbicella franksi*	Threatened
elkhorn coral	*Acropora palmata*	Threatened[3]

Critical Habitat Designations

For final rules, maps, and GIS data please visit:
http://sero.nmfs.noaa.gov/maps_gis_data/protected_resources/critical_habitat/index.html

Loggerhead sea turtle: There are 38 designated marine areas that occur throughout the Southeast Region.

[1] North Atlantic and South Atlantic Distinct Population Segments.
[2] Northwest Atlantic Distinct Population Segment.
[3] Colonies located at Flower Garden Banks National Marine Sanctuary.

NOAA FISHERIES
Southeast Region
Protected Resources Division

Species Proposed for Listing Under the Endangered Species Act

Federal action agencies are encouraged to include species proposed for listing under the Endangered Species Act (ESA) in their Section 7 consultation requests. Species that are proposed for listing are those which have been found to warrant federal protection under the ESA, but a final rule formally listing the species has not yet published. By including these species in your Section 7 consultation, reinitiating consultation after the ESA listing is finalized may not be necessary.

For more information on species proposed for listing under the ESA, please visit:
http://www.nmfs.noaa.gov/pr/species/esa/candidate.htm#proposed