Galveston Island Coastal Erosion
CAP 204 Project

Environmental Appendix C DRAFT

Gulf of Mexico
Galveston, Texas

July 2022

US Army Corps
of Engineers ®
Galveston District

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IT'S ISLAND TIME

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Appendix C-1 Fish and Wildlife Coordination Act

Fish and Wildlife Coordination Act

for

Galveston Island Coastal Erosion CAP 204 Project

Galveston, Texas

The U.S. Fish and Wildlife Service has been coordinated with regarding compliance with the Fish and Wildlife Coordination Act. A Coordination Act Report will be placed here when available.

Appendix C-2 Biological Opinion

Fish and Wildlife Service Biological Opinion

for

Galveston Island Coastal Erosion CAP 204 Project

Galveston, Texas

FWS Consultation No: 02ETTX00-2018-F-2491

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
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-F-
2491

June 17, 2019

Colonel Lars N. Zetterstrom
U.S. Army Corps of Engineers
Galveston District
Attn: Regulatory Branch, Steven Walls
P.O. Box 1229
Galveston, Texas 77553-1229

Consultation No. 02ETTX00-2018-F-2491

Dear Colonel Zetterstrom:

This transmits the United States (U.S.) Fish and Wildlife Service's (Service) biological opinion (BO) on the proposed re-issuance of the U.S. Army Corps of Engineers (Corps) permit SWG-2007-01025 for the Park Board of Trustees of the City of Galveston (Galveston Park Board) to perform beach nourishment on Galveston Island, in Galveston County, Texas. Specifically, this BO addresses the effects of the proposed permit action on the endangered Kemp's ridley sea turtle *Lepidochelys kempii*, threatened piping plover *Charadrius melodus*, and the threatened red knot *Calidris canutus rufa*, in accordance with Section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. §1531 et seq.). Your letter dated August 28, 2018 requesting formal consultation was received on August 30, 2018.

The Corps determined that actions of the proposed project would have no effect on the threatened West Indian Manatee *Trichechus manatus,* the endangered Attwater's greater prairie chicken *Tympanuchus cupido attwateri,* and the endangered leatherback sea turtle *Dermochelys coriace.* No coordination or contact with the Service is necessary for no effect determinations. However, based on a review of project specifics, Service files, status of these species, conversations with species experts, and implementation of the conservation measures as documented in this BO, the Service concurs with the Corps determination that associated on-shore actions of the proposed project may affect, but are not likely to adversely affect the endangered green sea turtle *Chelonia mydas*, the endangered hawksbill sea turtle *Eretmochelys imbricate*, and the threatened loggerhead sea turtle *Caretta caretta* or adversely modify piping plover critical habitat unit TX-34.

This BO is based on information provided in Corp's Biological Assessment (BA), dated August 2018, consultation documents, meetings, telephone conversations, e-mails with project proponents, field investigations, correspondence with Service biologist and species experts, and other sources of information. A complete administrative record of this consultation is on file at the Texas Coastal Ecological Services Field Office (TXESFO) in Houston, Texas.

BIOLOGICAL OPINION

CONSULTATION HISTORY

July 17, 2018	Preliminary meeting involving the Service, Corps, Galveston Parks Board and their representatives Atkins consultants to discuss project.
August 30, 2018	Service received a letter from the Corps, dated August 28, 2018, initiating formal Section 7 consultation for SWG-2007-01025, along with a BA dated August 2018, evaluating potential impacts to listed species.
September 17, 2018	Meeting with Corps, Galveston Park Board, and Atkins to discuss BA and process for BO.
September 27, 2018	Service received an email from the Corps regarding correcting discrepancies in the original cover letter, dated August 28, 2018, correcting consultation determinations to match the BA.
October 14, 2018	Service received an email stating borrow "area 1" removed from project plans.
November 5, 2018	Email exchange between the Corps and Service, which provided consultation number and formal consultation timeline.
November 27, 2018	Conference call involving the Corps, Atkins, and Service to discuss data submitted from Atkins regarding piping plovers and red knots.
November 28, 2018	Email submitted from the Corps, clarifying definitions for nourishment sites locations.
November 29, 2018	Draft conservation measures and draft reasonable and prudent measures sent to the Corps for review.
December 04, 2018	Meeting with Corps, Galveston Park Board, Atkins, and the Texas General Land Office to discuss draft conservation measures and draft reasonable and prudent measures.
December 19, 2018	Meeting between National Marine Fisheries Service - Galveston Lab and the Service to discuss sea turtle stranding occurrences on Galveston Island.

February 7, 2019	Meeting with Corps and Atkins to discuss sea turtle stranding information and associated Section 7 determinations.
February 22, 2019	Email sent to Corps with revised BO timeline due to Federal government shutdown/furlough.
February 28, 2019	Email exchange between the Corps and Service with revised Section 7 determinations.
March 12, 2019	Email exchange between the Corps and the Service with 2nd revision of Section 7 determinations.
March 13, 2019	Email exchange between Atkins and the Service regarding additional information for Dellanera beach nearshore placement area.
April 29, 2019	Site visit and evaluation of proposed sand source property for piping plover and red knot suitable habitat.
May 8, 2019	Draft BO sent to Corps for review.

DESCRIPTION OF PROPOSED ACTION

The proposed issuance of permit SWG-2007-01025 would authorize the Galveston Park Board to perform beach nourishment activities along approximately 81,454 linear feet (LF) of beachfront on the west end of Galveston Island, beginning at the western terminus of the Galveston seawall and extending west to the eastern boundary of Galveston Island State Park (approximately 30,603 LF) then from the western edge of Jamaica Beach to the west end of Pointe West Subdivision at Salt Prairie Drive (approximately 50,851 LF).

Beach quality sand used for beach nourishment activities would be obtained from multiple sand sources along and adjacent to Galveston Island. Project maps are provided in the BA, dated August 2018. The methods used for removal of sand from the borrow site and subsequent placement within the project area would include: 1) use of a hydraulic dredge to excavate the sand, which would then be pumped through pipes to a temporary dredge material placement area (DMPA) on the beach at Apffel Park, dewatered, and subsequently trucked to the nourishment area; 2) use of a hydraulic dredge to obtain the sand, then pumped through a temporary pipeline and placed directly on the beach; or 3) use of a hopper dredge to excavate the sand, which would then be pumped through temporary pipelines and transported directly onto the beach nourishment area. The pipelines used to transport the sand could be either upland, submerged or a combination of both. The upland pipelines would run parallel to the beach from Apffel Park to the west end of the seawall. In addition, sand placement may be hauled via truck from upland sand sources to beach nourishment locations and distributed using various types of heavy equipment as described in Section 1.2 of the BA.

The temporary DMPA will be constructed only if dredged material is to be trucked to the beach nourishment area. The DMPA will consist of a temporary containment levee that will allow the sediment to separate from the water before it is used for nourishment. The water will then be returned to the Gulf of Mexico as effluent. The temporary pipeline routes would run near the highest point of the un-vegetated beach and near the base of the seawall, and/or be submerged off-shore 1,000' to 2000' parallel to the shoreline then routed perpendicular to the beach, to the nourishment locations. The discharge point would be relocated as sections of beach nourishment are completed.

For the purposes of this biological opinion, maintenance activities refer to the addition of beach quality sand, as needed, in high erosion areas within the action area during the term of the permit. However, grooming and/or raking the nourished beach are not considered maintenance activities as identified above, and the effects of these activities were not evaluated by the Corps and have not been addressed in this BO.

Beach nourishment activities will occur on an as needed basis as described in the BA. The Corps permit, if issued, would be valid for five years. Likewise, this BO is only valid for five years from the date of the Service's signature. Any changes, additions or modifications to the permit, or any work conducted by the applicant or others in addition to the permitted activities, are not covered by this biological opinion. If activities are to continue beyond the expiration date of the Corps permit (SWG-2007-021025), the Galveston Parks Board would need to file for an extension of the permit and the Corps will need to re-initiate consultation pursuant to Section 7 of the Act with the Service.

It is important to note that this biological opinion only evaluates the effects of the proposed on-shore permit actions on those species under the Service's jurisdiction. A Memorandum of Understanding (MOU) was signed on July, 18, 1977 acknowledging joint administration of the Act by the Service and the National Marine Fisheries Service (NMFS) in regards to sea turtles. The MOU outlines jurisdiction for sea turtles under the Act and states" The Service shall have sole jurisdiction over sea turtles, including parts or products, when on land and National Marine Fisheries Service (NMFS) shall have sole jurisdiction over sea turtles, including parts or products when in the marine environment" (NMFS and Service 1977). Therefore, only those proposed actions that take place on land (beach sand placement, the temporary DMPA, and the land-based pipeline) were evaluated for effects to sea turtles. The Corps is working with NMFS to evaluate the effects of the proposed dredging and submerged pipeline on sea turtles in the water.

Action Area

The action area includes approximately 15 linear miles of beach and shallow water proposed for nourishment along west Galveston Island, from the western terminus of the seawall extending west to the eastern boundary of Galveston Island State Park (30,603 linear feet) then from the western edge of Jamaica beach to the west limits of Pointe West Subdivision at Salt Prairie Drive (50,851 linear feet), all proposed and authorized borrow sources, and includes the areas along Apffel Park as described in the BA dated August 2018.

Barrier Island Dynamics
The beaches of Gulf coastal barrier islands are highly dynamic systems that are shaped by the natural forces of the wind, waves, and sea. As a result, these beaches constantly change shape (i.e., width, slope, etc.) and position (i.e., retreat, erode, or accrete) over-time. Human actions can further alter the conditions of these beaches.

On abbreviated time scales (i.e., days, months, years, etc.), the ever-changing forces of the waves and currents (including longshore) can transport sediment onto the beach, laterally among beaches (i.e., longshore transport), or remove sediment from the beach. Episodic weather events (e.g., tropical storms, hurricanes, etc.) can cause erosion and alter sediment transport dynamics along the coast, but they can also wash sand towards the mainland (over wash) causing increases in beach width (Britton and Morton 1989, Gibeaut et al., 2000).

On a long-term scale (i.e., tens to thousands of years), ongoing sea-level rise drives beaches landward by eroding sand from the shore face and moving it landward (Anderson 2007). Where sea-level rise is constant, the width and profile of the beach is usually maintained during this migration. However, where the rate of sea-level rise changes or where human actions interfere with natural coastal processes of sediment transport (e.g., jetties, channels, etc.) and landward migration (e.g., seawalls, homes), the shoreline may begin to erode over the long-term (Anderson 2007). Geologists estimate that sea-level has risen at a rate of 0.022 feet per year over the last century along the upper Texas coast and that this rate will only increase under future global warming scenarios (Gibeaut et al. 2000). Furthermore, they estimate that long-term shoreline retreat has occurred at rates between 3 and 15 feet per year along the upper-Texas coast (Gibeaut et al. 2000, Anderson 2007).

Conservation Measures

When used in the context of the ACT, "conservation measures" represent actions pledged in the project description, correspondence and/or meetings that the action agency or the applicant will implement to further the conservation or recovery of the species under review. Such measures should be closely related to the action and should be achievable within the authority of the action agency. Since conservation measures are part of the proposed action, their implementation is required under the terms of the consultation. The Corps and the Park Board have proposed the following conservation measures to avoid and minimize impacts to listed species:

Training and Monitoring

1) The Galveston Park Board in coordination with the Corps and other project proponents will ensure crew chiefs, supervisors, and wildlife monitors attend training prior to the initiation of, or their participation in, project work activities. A Qualified biologist will conduct training and the scope of training will include 1) recognition of sea turtles, piping plovers and red knots, their habitats, and tracks 2) avoidance and minimization measures 3) reporting criteria and 4) contact information for different rescue agencies in the area; by use of the wildlife monitoring checklist (Appendix B of the BA dated 2018 and attached to BO).

2) Training will include a half-day training session coordinated by the Galveston Parks Board through the Corps, the Service, or the Padre Island National Seashore, on identification of sea turtles, nesting sea turtles, and bird identification. Documentation of this training, including a list of attendees, will be submitted to the Corps and the Service prior to the start of each nourishment project in the permit area and as new members are trained.

3) A minimum of one qualified wildlife monitor will be assigned to each active work area. The wildlife monitor will inspect the active work areas prior to the start of work and continuously throughout the work day. Wildlife monitor qualifications will be submitted to the Corps and the Service prior to start of each nourishment project.

4) The Galveston Park Board will provide the Corps with the name of a single point of contact (POC) responsible for communicating with the crew and the wildlife monitor(s) and reporting on endangered species issues during the project. The wildlife monitor(s) will be on-site to ensure listed species are not affected by beach nourishment activities.

5) Prior to the start of work, the Galveston Park Board will ensure that the wildlife monitor(s) inspect the beach adjacent to and along work areas before work begins each morning. Wildlife monitors will communicate all activities to the POC and the POC will coordinate that information with the Corps and Service as required.

6) Prior to the start of work each day, all contractors, work crews, drivers, etc., will attend a brief training on the recognition of sea turtle, piping plovers, red knots, and their habitats and updated on the previous days encounters, if any, with nesting or injured wildlife.

Piping Plovers and Red Knots - wintering season begins July 15 extending through May 15

7) The POC and/or wildlife monitor(s) will be on-site to ensure piping plovers and red knot are not affected by beach nourishment activities. The POC and/or monitor(s) will ensure that loafing and/or resting piping plovers and red knots are not in the project area during nourishment activities.

8) The POC and/or monitor(s) will check under and around vehicles and heavy equipment before they are moved. The POC and/or monitor(s) should be aware that piping plovers and red knots are especially vulnerable during periods of cold temperature, inclement weather, and when roosting at night. Construction workers will immediately notify the POC and/or monitor(s) if listed species occur in the immediate project area. If a piping plover and/or red knot are found in the active work area, work will be stopped within an area specified by the POC and/or the wildlife monitor until the bird(s) leaves the construction site. Equipment will remain powered off

until the bird(s) has left. If the bird does not relocate (e.g., injured bird), the Service will be contacted to solicit additional guidance.

9) Disturbed areas of the beach (e.g., ruts, tread marks) will be smoothed out and loosened upon the completion of each work day.

10) Prior to the construction of the DMPA at Apffel Park, the Galveston Park Board, in coordination with the Corps, will contact the Service to evaluate the area for piping plover and red knot use. Additional minimization guidance may be provided from the Service at this time.

Sea Turtles - peak nesting season begins March 15 extending through October 1

11) Placement of sand for beach nourishment will be conducted, when possible, outside of the sea turtle nesting season (March 15 to October 1).

12) The Galveston Park Board, in coordination, with the Corps, will ensure that daily turtle patrols of the proposed beach nourishment area by the wildlife monitor are conducted before beginning beach nourishment activities each day and continuously throughout the work day.

13) If a sea turtle or nest is located or identified, the siting will be documented on the Wildlife Monitoring Checklist to be provided by the Galveston Park Board (attached), and beach nourishment activities will immediately cease within 100 feet of the nest or turtle. The monitor will then call 1-866-TURTLE5 (1-866-887-8535) and notify the Service, Texas Coastal Ecologist Services Field Office (TCESFO), at 281-212-1512 (Moni Belton). Additional numbers can be found on the Wildlife Monitoring Checklist.

14) All turtles, turtle nests, or turtle eggs found during beach nourishment activities will be safeguarded until they can be re-located by properly permitted individual(s).

Construction, Equipment, and Designated Work Area

15) Beach nourishment activities will be conducted mechanically by means of trucks, front-end loaders, bulldozers, cranes, and/or UT/ATVs. Other equipment could include a dredge pipe, booster pumps, generators, lighting, and fuel trucks.

16) Materials and equipment required for the project will be staged in upland areas and transported as needed to the proposed work sites. Staging areas will be designated before work begins and will be solely within the construction footprint. Equipment may be fenced within these staging areas.

17) Construction vehicles will access the beach from public roads closest to the work sites to reduce the unnecessary vehicle traffic on the beach. Drive-overs, to facilitate ingress and egress from work sites, will be constructed of beach-quality sand.

18) Ingress/egress routes will be flagged/marked with wooden laths/stakes to ensure that work activities remain within the approved project area. These items will be removed once work is completed in designated areas.

19) The contractor will coordinate and sequence the work to minimize the frequency and density of vehicular traffic on the beach to the greatest extent practicable. Construction crews and vehicles will avoid the swash zone and the wrack line closest to the swash zone when possible. The swash zone is defined as the area of the beach intermittently covered and uncovered by wave run-up. The wrack line is defined as vegetative area made up of but not limited to sargassum, shell hash, vegetation, and some light trash and litter.

20) Sand material placement areas will be confined to a maximum 1,000-foot long segment within the active work corridor. Active vehicle access corridors could include up to an additional 2000 feet. Work activities will run parallel with the shoreline along the work corridor and active work area and will shift linearly along the work corridor as sections of the berm template are completed to allow for birds to migrate to undisturbed portions of the beach.

21) The ends of the 1,000-foot long segment or between groin jetty sections within the active work area will be clearly marked with orange wooden barricades (or other temporary barriers) for the duration of project construction. Barricades will be shifted down the active work area as work is completed.

22) The number of vehicles transiting from upland areas to the project sites will be kept to a minimum. All vehicles will use the same pathways and access will be confined to the closest access point to the immediate work area. Construction/nourishment activities will occur from the landward side of the beach nourishment area whenever possible.

23) Vehicles will adhere to a reduced speed of 15 miles per hour, the speed limit already prescribed for Texas beaches in the Texas Transportation Code #545.352(b)(5).

24) The 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.

Beach Quality Sand and Placement

25) Only sand that meets the specifications of the local beach quality sand (e.g., grain size, color, composition and mineralogy) will be used for beach nourishment activities. The Texas General Land Office provides Beach/Dune guidelines for placing sand and material seaward of the dune protection line in the Texas Administrative Code (TAC 2019); specifically, in 31TAC § 15.4 (c)(2) and (3). These rules specifically prohibit the placement of sand, soil, sediment or dredged is of an unacceptable mineralogy or grain size when compared to natural or native sediments found on the site. These rules also provide that material intended for beach placement must not contain hazardous substances as found in Volume 40 of the Code of Federal Regulations, Part 302.4.

26) Sand will be placed and maintained at a gradual slope to minimize scarping.

27) After project construction in an active work zone is complete for the day the project site will be graded, and all vehicular ruts removed.

Post Construction and Public Outreach

28) Prior to beach nourishment activities, public outreach will be initiated to educate surrounding residents about the project and piping plovers, red knots, and sea turtles. Public education signs will be installed at beach access points within the action area along Galveston Island.

29) Post construction, the Galveston Park Board will monitor changes to the project area and/or species usage so that potential adverse effects from construction can be identified.

STATUS OF THE SPECIES AND CRITICAL HABITAT

Five species of sea turtles are found in U.S. waters and nest on U.S. beaches. These include the leatherback, hawksbill, loggerhead, green and Kemp's ridley sea turtles. The leatherback, hawksbill and green sea turtles rarely nest in the southeastern U.S., but offshore waters are important feeding, resting, and migratory corridors. All are known to nest in Texas. The Kemp's ridley are known to nest in the vicinity of the proposed action area. The Texas sea turtle nesting season is from March 15 to October 1 each year. In addition, Kemp's ridley, loggerhead, green, and hawksbill sea turtles are occasionally found stranded along the beachfront, usually within the sargassum wrack line.

Kemp's Ridley Sea Turtle

Species Description

The Kemp's ridley sea turtle was listed as endangered throughout its entire range on July 28, 1978 (43 FR 32800). Kemp's ridleys are the smallest of the sea turtles, reaching about 2 feet

(0.6 meters) in length and can weigh up to100 pounds (45 kilograms). The adult has an unusually broad, heart-shaped, keeled upper shell that is serrated behind the bridge or midsection, almost as wide as it is long, and is usually olive-gray. The upper shell has five pairs of scales or plates along the sides. In the bridge hooking the lower shell to the upper shell, there are four infra-marginal plates, each perforated by a pore. The lower shell is a light, yellowish color. The head has two pairs of prefrontal scales. The Kemp's ridley has a triangular-shaped head with a somewhat hooked beak with large crushing surfaces. Juveniles have a dark-charcoal colored shell that changes to olive-green or gray with age.

Critical Habitat
Critical habitat has not been designated for this species.

Distribution and Abundance
Kemp's ridleys occur in the Gulf of Mexico and along the Atlantic coast of the U.S., with nesting locations concentrated on coastal areas of Rancho Nuevo, Mexico. Approximately 99.9 percent of known nests are found on the coastal beaches of Tamaulipas and Veracruz, with approximately 21,000 nests protected in 2011. In 2017, approximately 27,000 nest were documented with 353 in Texas, 24,586 in Tamaulipas, and 2,000 located in Veracruz, Mexico (Gaskil 2018). Nesting decreased along the Texas coast to 250 in 2018 (Dr. D. Shaver, National Park Service, pers. comm 2018).

Habitat
Habitat includes areas that shelter the turtle from high winds and waves, with forage areas that include seagrass, oyster reefs, sandy bottoms, mud bottoms, and rock outcroppings. Their diet consists primarily of crabs, shrimp, snails, sea urchins, sea stars, fish and occasionally marine plants (TPWD 1995). Preferred habitat for this species is shallow coastal and estuarine waters and occurs in the bays on the middle and upper Texas coast with regularity.

Life History
Nesting occurs primarily on beaches around Rancho Nuevo, Tamaulipas, Mexico, from April to June each year; however, Kemp's ridley nests have been recorded in Mexico as early as March and as late as August (Gaskil 2018). During preferred nesting conditions, which are precipitated by strong winds, the females come ashore, often in groups called "arribadas." Kemp's ridleys are predominately daytime nesters. Although some females breed annually, this species is considered to nest biannually and may nest as many as three times in a single season (Service and NMFS 2011), producing an average of 2.5 clutches. Clutch size averages between 100-110 eggs. Hatchlings emerge after approximately 50 days of incubation. Sexual maturity is believed to be reached between 10 to 15 years of age. Some fidelity to nesting sites has been shown by Kemp's ridleys, both within one nesting season, and between nesting seasons (PIAS 2018; Burchfield, et. al. 2002). If conditions are unsuitable on a nesting beach or the female is disturbed, she may return to the water and attempt to nest elsewhere within several kilometers of the first site. The disturbance could also cause her to switch nesting beaches entirely (Dr. D. Shaver, National Park Service, PIAS 2018). After the nesting season, adults migrate to feeding areas in the Gulf of Mexico and remain there until the next reproductive season. Hatchlings that successfully emerge from the nest and enter the ocean are essentially pelagic for approximately two years (Ernst et. al. 1994).

Population Dynamics
Kemp's ridley sea turtle numbers have precipitously declined since 1947, when more than 40,000 nesting females were estimated in a single arribada (Service and NMFS 2011). The nesting population produced a low of 702 nests in 1985 (Service and NMFS 2011). Since the mid-1980s, the number of nests laid in a season has been steadily increasing, primarily due to nest protection efforts and implementation of regulations requiring the use of turtle excluder devices (TEDs) in commercial fishing trawls. Today, the population of Kemp's ridleys appears to be in the early stages of recovery, as can be seen along the Texas Coast (PAIS 2018)

Reasons for Listing/Threats to Survival
Several factors contributed to the decline of sea turtle populations along the Atlantic and Gulf coasts, including commercial over-utilization of eggs and turtle parts, incidental catches during commercial fishing operations, disturbance of nesting beaches by coastal housing, marine pollution, and entanglement and ingestion of debris (Service and NMFS 2011). Additional threats are expanding human populations adjacent to important nesting beaches, degradation of coastal foraging habitats, and the potential effects of global warming on sex ratios (NMFS and Service 2007).

Recovery Efforts
Conservation efforts to lessen threats include protection of major nesting beaches, use of TEDs in commercial fishery trawls, regulations for limiting incidental take among fisheries, and management of favorable coastal and marine habitat (NMFS and Service 1991b). Each year, Kemp's ridley nests at Rancho Nuevo and other major nesting beaches in the Mexican states of Tamaulipas and Vera Cruz. They are actively protected from human and mammalian predation, resulting in increased hatching success rates.

In 1978, a cooperative project involving the National Park Service's Padre Island National Seashore (PAIS), NMFS, the Service, the Texas Parks and Wildlife Department, the Gladys Porter Zoo (Brownsville, TX), and Mexican federal and state agencies was initiated to re-establish a nesting colony of Kemp's ridley sea turtles in the U.S. Eggs were collected in Mexico from 1978 to 1988 and transported to PAIS for incubation. Hatchlings were released onto the beach, allowed to enter the water, and then immediately recaptured and raised in "head start" facilities in Galveston, Texas for approximately 9 to11 months before being released into the Gulf of Mexico.

In 1986, the National Park Service initiated a program to detect, monitor, and protect sea turtle nests at PAIS. Detection involves patrols to look for nesting activity, public education, and investigation of reports from patrols, beach workers, and the public. Patrol efforts involving multiple federal, state, local, university and non-governmental agencies are now conducted on most Texas beaches from April 1 to July 15 each year.

Since 1996, some turtles experimentally imprinted to Padre Island or otherwise head-started have returned to PAIS and the nearby vicinity to lay eggs (Shaver 1997, 1998, 1999a, 1999b; Shaver and Caillouet 1998). However, the majority of Kemp's ridley sea turtles that nest in Texas each year are from wild stock.

Piping Plover

For the purpose of this action, discussions will be focused on the Texas wintering piping plover population and its designated critical habitat.

Species Description
The piping plover was federally listed as endangered in the Great Lakes watershed, and as threatened elsewhere in its range, on January 10, 1986 (50 FR 50726). The piping plover is a small North American shorebird approximately 7 inches (17.7 centimeters) long with a wingspread of about 15 inches (38.1 centimeters). Breeding birds have white under parts, light beige back and crown, white rump, and black upper tail with a white edge. In flight, each wing shows a single, white wing stripe with black highlights at the wrist joints and along the trailing edges. Breeding plumage characteristics are a single black breast band, which is often incomplete, and a black bar across the forehead. The black breast band and brow bar are generally more pronounced in breeding males than females. The legs and bill are orange in summer, with a black tip on the bill (Service 2003).

Critical Habitat
Critical habitat on the wintering grounds was designated July 10, 2001 (66 FR 36038). That designation included 137 areas along the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas, to provide sufficient wintering habitat to support the piping plover at the population level and geographic distribution necessary for recovery of that species. A total of approximately 165,211 acres (66,881 hectares) and/or 1,798.3 miles (2,891.7 kilometers) were designated. There were 37 critical habitat units [approximately 62,454 acres (25,285 hectares), 797.3 miles (1,283.8 kilometers)] designated in Texas. These areas were believed to contain the essential physical and biological elements for the conservation of wintering piping plovers, and the physical features necessary for maintaining the natural processes that provides appropriate foraging, roosting, and sheltering habitat components.

The primary constituent elements for critical habitat are found in geologically dynamic coastal areas that contain intertidal ocean-facing and bay shoreline beaches and flats (between annual low tide and annual high tide); associated dune systems and flats above annual high tide; and seasonally-emergent sand bars, mud flats, and oyster reefs. The primary constituent elements for the wintering population of the piping plover are (Service 2015):

1) Intertidal sand beaches, including sand flats or mudflats, between annual low tide and annual high tide, with no or very sparse emergent vegetation for feeding. In some cases, these flats may be covered or partially covered by a mat of blue-green algae.

2) Un-vegetated or sparsely vegetated sand, mud, or algal flats above annual high tide for roosting. Such sites may have debris or detritus, and may have micro-topographic relief offering refuge from high winds and cold weather.

3) Surf-cast algae for feeding.

4) Sparsely vegetated back beach, which is the beach area above mean high tide seaward of the dune line; or in cases where no dunes exist, seaward of a delineating feature such as a vegetation line, structure, or road. Back beach areas are used by plovers for roosting and refuge during storms.

5) Spits, especially sand, running into water for foraging and roosting.

6) Un-vegetated wash over areas with little or no topographic relief for feeding and roosting. Wash over areas are formed and maintained by the action of hurricanes, storm surges, or the extreme wave actions.

7) Natural conditions of sparse vegetation and little or no topographic relief mimicked in artificial habitat types (e.g. dredge spoil sites).

Distribution and Abundance

Piping plovers breed only in North America within three geographic regions that encompass three distinct breeding populations: the Northern Great Plains, the Great Lakes, and the Atlantic Coast. The winter ranges of the different breeding populations overlap, making it impossible to distinguish the source population of a wintering bird unless it has been banded or marked on the breeding grounds. The piping plover's primary winter range is along the Atlantic and Gulf coasts from North Carolina to Mexico, and into the Bahamas and West Indies (Service 1985). Southward migration to the wintering grounds along the southern Atlantic coast and Gulf of Mexico shoreline extends from late July, August, and September. Individuals can be found on their wintering grounds throughout the year, but sightings are rare in May, June, and early July (Service 2003).

Habitat

In most areas, wintering piping plovers depend on a mosaic of sites distributed through the landscape, as the suitability of a particular site for foraging or roosting is dependent on local weather and tidal conditions (Drake 1999). Plovers move among sites as environmental conditions change. In general, wintering piping plovers forage mostly on benthic invertebrates, insects, and crustaceans found within the intertidal areas of ocean beaches, wash over areas with no or very sparse emergent vegetation, mudflats, sandflats, wrack lines; and shorelines of coastal ponds, lagoons or salt marshes. Roosting areas may be un-vegetated or sparsely vegetated and may have debris, detritus, or micro-topographic relief offering refuge to plovers from high winds and cold weather.

Life History

Behavioral observations of piping plovers on the wintering grounds suggest that they spend the majority of their time foraging (Nicholls and Baldassarre 1990, Drake 1999, Service 2003). In general, wintering piping plovers forage mostly on benthic invertebrates, insects, and crustaceans found within the intertidal areas of ocean beaches; wash over areas with no or very sparse emergent vegetation, mudflats, sandflats, wrack lines; and shorelines of coastal ponds, lagoons or salt marshes. Roosting areas may be un-vegetated or sparsely vegetated and may have debris,

detritus, or micro-topographic relief offering refuge to plovers from high winds and cold weather. When not foraging, plovers undertake various maintenance activities such as roosting, preening, bathing, aggressive encounters (with other piping plovers and other species), and moving among available habitat locations (Zonick and Ryan 1996). Individual plovers tend to return to the same wintering sites year after year (Nicholls and Baldassarre 1990, Drake 1999, Service 2003).

Population Dynamics

The Texas coast is a major wintering area for piping plovers, and may provide habitat for about 55 percent of birds found during winter censuses (Nicholls and Baldassarre 1990, Haig and Plissner 1993, Drake 1999, Elliott-Smith et. al. 2009). Since piping plovers spend 55 to 80 percent of their annual cycle associated with wintering areas, factors that affect their wellbeing on the wintering grounds could substantially affect their survival and recovery (Service 1996). A consistent finding of all analyses of the demographic factors affecting the persistence and/or extinction of piping plover populations is that vulnerability to extinction is greatly increased by even small declines in survival rates (Melvin and Gibbs 1994; Plissner and Haig 2000a) Modeling by Melvin and Gibbs (1994), for example, postulated approximately four-fold increases in the likelihood of extinction of the Atlantic Coast piping plover population when survival rates of adults and juveniles declined by as little as 5 and 10 percent, respectively, and other parameters were constant.

Reasons for Listing/Threats to Survival

Threats to piping plover populations and habitat are similar on the breeding and wintering ranges. Habitat destruction and degradation are pervasive and have reduced physically suitable habitat. Human disturbance and predators further reduce breeding and wintering habitat quality and affect survival. Contaminants, as well as genetic and geographic consequences of small population size, pose additional threats to piping plover survival and reproduction (Service 2003).

A variety of human-caused disturbance factors have been noted that may affect plover survival or utilization of wintering habitat. Those factors include human disturbance such as recreational activities, inlet and shoreline stabilization projects, dredging of inlets that can affect spit formation, beach maintenance and nourishment, and pollution (Nicholls and Baldassarre 1990, Haig and Oring 1985, Haig and Plissner 1993). In some areas, natural erosion of barrier islands may also result in habitat loss.

Recovery Efforts

The Atlantic Coast Piping Plover Recovery Plan (Service 1996) calls for the protection of all known wintering habitat by preventing habitat degradation and disturbance, including direct and indirect impacts of shoreline stabilization, navigation projects, development, disturbance by recreationists and their pets, and contamination and degradation due to oil or chemical spills. Factors that must be considered include: (1) disturbance depleting the birds' energy reserves, and (2) effects on prey availability that may last long after the completion of a given action. The Great Lakes and Northern Great Plains Piping Plover Recovery Plan (Service 1988) and the Recovery Plan for the Great Lakes Piping Plover (Service 2003) also call for protecting

wintering piping plovers and managing their habitats to promote survival and recovery.

Adult survival is key to the continued and long-term existence of the piping plover and to stepwise improvement toward meeting its recovery criteria. Protecting the wintering grounds allows adult piping plovers to maintain adequate body reserves so they survive the winter and can migrate back to nest in the spring. Broad management actions on the wintering grounds include protection of resting areas, designation of important shorebird wintering sites and regular shorebird surveys.

Red Knot

Species Description
There are six recognized subspecies of red knots (*Calidris canutus*), and on December 11, 2014, the Service published the final rule listing the rufa subspecies of red knot (*Calidris canutus rufa*) as a threatened species under the Act; that rule became effective on January 12, 2015. (Throughout this document, the "rufa red knot" will be referred to as the "red knot" unless there is specific reference to a distinct subspecies.) For the full, detailed discussion of the entire life history and biology of the species, please reference the Service's final rule for the listing of the species (Service 2014) and its supplemental document, *Rufa Red Knot Background Information and Threats Assessment*.

The red knot is a medium-sized shorebird about 9 to 11 inches in length. The red knot is easily recognized during the breeding season by its distinctive rufous (red) plumage. Nonbreeding plumage is dusky gray above and whitish below. Juveniles resemble nonbreeding adults, but the feathers of the scapulars and wing coverts are edged with white and have narrow, dark bands, giving the upperparts a scalloped appearance (Davis 1983).

Critical Habitat
Critical habitat has not been designated for this species.

Distribution and Abundance
The red knot's range spans 40 states, 24 countries, and their administrative territories or regions extend from their breeding grounds in the Canadian Arctic to migration stopover areas along the Atlantic and Gulf coasts of North America to wintering grounds throughout the Southeastern U.S., the Gulf coast, and South America (reaching as far south as Tierra del Fuego at the southern tip of South America). In Delaware Bay and Tierra del Fuego, the era of modern surveys for the red knot and other shorebird species began in the early 1980s. Systematic red knot surveys of other areas began later, and for many portions of the knot's range, available survey data are patchy. Prior to the 1980s, numerous natural history accounts were available and provide mainly qualitative or localized population estimates. Nonetheless, a consistent narrative emerges across many historical accounts that red knots were extremely abundant in the early 1800s, decreased sharply starting in the mid-1800s, and may have begun to recover by the mid-1900s. Most writers agree the cause of that historical decline was intensive sport and market hunting. It is unclear whether the red knot population fully recovered its historical numbers following the period of unregulated hunting (Harrington 2001).

Habitat

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 (Kalasz 2012 pers. comm.; Niles 2012 pers. comm.). The supra-tidal (above the 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 knots' use of such artificial habitats.

In North America, red knots are commonly found along sandy, gravel, or cobble beaches, tidal mudflats, salt marshes, peat banks, and shallow coastal impoundments, ponds, and lagoons along the Atlantic coast (Cohen et al. 2010; Cohen et al. 2009; Niles et al. 2008; Harrington 2001; Truitt et al. 2001). In Florida, the birds also use mangrove and brackish lagoons. 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. Red knots also show some fidelity to particular migration staging areas between years (Duerr et al. 2011; Harrington 2001).

Life History

Little information is available about nonbreeding red knots. Unknown numbers of nonbreeding red knots remain south of the breeding grounds during the breeding season, and many, but not all, of these red knots are 1-year-old (i.e., immature) birds (Niles et al. 2008). Nonbreeding red knots, usually individuals or small groups, have been reported during June along the U.S. Atlantic and Gulf coasts, with smaller numbers around the Great Lakes and Northern Plains in both the United States and Canada (eBird.org 2012). There is also little information on where juvenile red knots spend their winter months (Service and Conserve Wildlife Foundation of New Jersey 2012), and there may be at least partial segregation of juvenile and adult red knots on the wintering grounds. All juveniles of the Tierra del Fuego wintering region are thought to remain in the Southern Hemisphere during their first year of life, possibly moving to northern South America, but their distribution is largely unknown (Niles et al. 2008). Because there is a lack of specific information on juvenile red knots, the Service uses the best available data from adult red knots to draw conclusions about juvenile foraging and habitat use.

Population Dynamics

Localized and regional red knot surveys have been conducted across the subspecies' range with widely differing levels of geographic, temporal, and methodological consistency. Available survey data are presented in detail in the Service's supplemental document to the December 11, 2014, final rule, *Rufa Red Knot Background Information and Threats Assessment* (Service 2014). However, some general characterizations of the available data are noted as follows:

- No population information exists for the breeding range because, in breeding habitats, red knots are thinly distributed across a huge and remote area of the Arctic. Despite some

localized survey efforts, (e.g., Bart and Johnston 2012; Niles et al. 2008), there are no regional or comprehensive estimates of breeding abundance, density, or productivity (Niles et al. 2008).

- Few regular surveys are conducted in fall because southbound red knots tend to be less concentrated than during winter or spring.
- Some survey data are available for most wintering and spring stopover areas. For some areas, long-term data sets have been compiled using consistent survey methodology.
- Because there can be considerable annual fluctuations in red knot counts, longer-term trends are more meaningful. At several key sites, the best available data show that numbers of red knots declined and remain low relative to counts from the 1980s, although the rate of decline appears to have leveled off since the late 2000s.
- Inferring long-term population trends from various national or regional datasets derived from volunteer shorebird surveys and other sources, NPS (2013), Andres (2009) and Morrison et al. (2006) also concluded that red knot numbers declined, probably sharply, in recent decades.

Reasons for Listing/Threats to Survival

The Service has determined that the red knot is threatened due to loss of both breeding and nonbreeding habitat; likely effects related to disruption of natural predator cycles on the breeding grounds; reduced prey availability throughout the nonbreeding range; and increasing frequency and severity of asynchronies (''mismatches'') in the timing of the birds' annual migratory cycle relative to favorable food and weather conditions. Main threats to the 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. These and other threats in Canada and South America are detailed in the final listing rule (Service 2014). Unknown threats may occur on the breeding grounds.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all federal, state, or private actions in the action area; the anticipated impacts of all proposed federal actions in the action area that have undergone formal or early Section 7 consultation; and the impact of state and private actions that are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

Status of the Species within the Action Area

The action area includes approximately 81,454 linear feet (LF) of beachfront on the west end of Galveston Island, beginning at the western terminus of the Galveston seawall and extending west to the eastern boundary of Galveston Island State Park (approximately 30,603 LF) then from the western edge of Jamaica Beach to the west end of Pointe West Subdivision at Salt Prairie Drive (approximately 50,851 LF) on Galveston Island, Galveston County, Texas.

Kemp's Ridley Sea Turtle

The majority of Kemp's ridley sea turtles nest on the coastal beaches of the Mexican states of Tamaulipas and Veracruz, although a very small number of Kemp's ridleys consistently nest along the Texas coast. Historic nesting frequency on the south Texas coast is poorly known and only six Kemp's ridley sea turtles were documented prior to 1979 (Shaver and Caillouet 1998). However, 1,185 Kemp's ridley nests were found on the Texas coast between 1979 and 2011(Dr. D. Shaver, National Park Service, pers. comm 2011). An additional 78 have been documented from 2012 to 2018 along the upper Texas Coast.

In 2002, Kemp's ridley sea turtles were documented nesting on Galveston Island and surrounding areas on the upper Texas coast, defined as the area from Matagorda Peninsula northward to Sabine Pass. In every subsequent year, Kemp's ridleys have nested on the upper Texas coast. In 2018, 250 Kemp's ridley nests were found in Texas, 15 of which were on the upper Texas coast with 2 of those occurring along Galveston Island. (Shaver 2018).

There have been 86 Kemp's ridley sea turtle nests recorded on Galveston Island since 2002, with the highest count of 15 in 2011 and lowest being zero in 2016 (Shaver 2018, PAIS 2018). The number of turtle nests that have occurred in the area proposed for beach nourishment in the proposed project area since 2012 is three. The entire 15-mile area proposed for beach nourishment is considered suitable habitat for nesting Kemp's ridley sea turtles.

Piping Plover

The piping plover is a regular winter resident along the upper Texas coast (Haig and Oring 1985, Haig and Plissner 1993). Piping plovers begin arriving in July; however, late-nesting birds on the breeding grounds can arrive as late as September. A few individuals can be found throughout the year but sightings are rare in late May, June, and early July. They begin leaving in late February to migrate back to the breeding sites, and by late May most birds have left (Haig and Elliott-Smith 2004).

Piping plovers may use the 15 miles of beach proposed for nourishment for foraging, resting or loafing. The western portion of the project located near San Luis Pass is designated critical habitat for the wintering piping plover (Texas Unit-34). Piping plovers use this critical habitat unit for foraging, resting and sheltering.

The exact number of piping plovers that winter in Texas and on Galveston Island is unknown. However, an international piping plover winter census counted 1,904 wintering piping plovers in Texas in 1991, 1,333 in 1996 and 1,042 in 2001 (Haig and Plissner 1993, Plissner and Haig 2000b, Haig et. al. 2005). In 2006, a range-wide census was again conducted for breeding and wintering plovers. The 2006 wintering census consisted of one-time counts by qualified observers during a designated two-week period of time (January 23-February 6, 2006). The 2006 wintering piping plover census recorded a total of 3,884 individual plovers range-wide, with 2,090 individuals recorded in Texas and 114 individuals recorded on the west end of

Galveston Island (Elliott-Smith et. al. 2009). The 2011 International Piping Plover Census (IPPC) recorded only 30 piping plovers on the east end of Galveston Island located and none along the west end. Although official numbers were low, weather conditions during the IPPC could have had an effect on the counts, and may not be indicative of actual piping plover activity on the island. In 2016, thirteen individuals were documented along the west end during IPPC census. Ebird observations for the piping plover document a range from one individual up to 25 individuals in one location. (Ebird 2018).

It is important to note that the presence or absence of piping plovers at any given location or time of year cannot be determined by this type of census, which is limited to a single observation within a specific period of time. Piping plovers may occur throughout the action area in varying numbers and concentrations depending on annual population fluctuations, time of year, and local weather and tidal conditions.

The entire 15-mile area proposed for beach nourishment is considered suitable habitat for wintering piping plovers.

Piping Plover Critical Habitat Unit TX-34

Piping Plover critical habitat unit TX-3, San Luis Pass, is located within and adjacent to the far western portion of the project area extending from the west side of Pointe West Subdivision towards San Luis Pass. The landward boundary is the line indicating the beginning of dense vegetation, and the gulf side boundary is the mean lower low water (MLLW).

Red Knot

Except for localized areas, there have been no long-term systematic surveys of red knots in Texas or Louisiana, and no information is available about the number of knots that winter in northeastern Mexico. From survey work in the 1970s, Morrison and Harrington (1992, p. 77) reported peak winter counts of 120 red knots in Louisiana and 1,440 in Texas, although numbers in Texas 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 and 2,500 red knots along the coasts of Texas and Louisiana, respectively, between January and June over the period from1980 to 1996, but these figures could include spring migrants. Morrison *et al.* (2006, p. 76) estimated only about 300 red knots winter along the Texas coast, based on surveys in January 2003 (Niles *et al.* 2008, p. 19). Higher counts of roughly 700 to 2,500 knots have been made on Padre Island, Texas, during October, which could include wintering birds (Newstead *et al.* 2013, p. 54; Niles *et al.* 2009, p. 1). There are no current estimates for the size of the Northwest Gulf of Mexico wintering group as a whole (Mexico to Louisiana). The best available current estimates for portions of this wintering region are about 2,000 in Texas (Niles 2012a), or about 3,000 in Texas and Louisiana, with about half in each State and movement between them (C. Hunter pers. comm. September 20, 2012).

Assessing the number of red knots within the action area during winter and migration periods is difficult as there is human disturbance throughout the year and the number of birds utilizing the area varies daily, monthly, seasonally, and from year to year. The number of red knots that

winter in Texas and on Galveston Island is unknown. Ebird observations for the red knot document a range from one individual up to 19 individuals in one location. (Ebird 2018).

The entire 15-mile area proposed for beach nourishment is considered suitable habitat for wintering red knots.

Red Knot Critical Habitat
No critical habitat is designated for the red knot

Factors Affecting Species Environment within the Action Area

Galveston Island is a barrier island located along the upper Texas coast in the Gulf of Mexico. Barrier islands are traditionally dynamic systems, with wind, waves, storms, tidal and longshore currents moving sand along the beach (Britton and Morton 1989). A wide range of past, present and ongoing beach disturbance activities occur within the proposed action area. As storms and hurricanes have eroded Galveston beaches, nourishment activities have attempted to widen them. Nourishment activities can change the sediment color and composition, and may alter coastal processes. Beach nourishment occurred in the action area, albeit on a smaller scale, in 2003 under a previous Corps permit. Beach scraping and raking has increased in frequency in recent years; beach cleaning can artificially steepen beaches, and change sediment distribution patterns. Artificial dune systems are often constructed and maintained to protect beachfront structures. Excessive recreational use of beaches and flats may make these habitats unsuitable to the species that use these areas.

Residential development and recreational activities such as walking, jogging, walking unleashed pets, and operating vehicles on the beach increases the potential for wintering piping plovers to be impacted by loss of habitat, or could cause interference in roosting, resting and foraging activities. These types of activities could also disrupt sea turtle nesting habitat and activities.

Summary
Nesting Kemp's Ridley sea turtles, wintering piping plovers and red knots are known to occur in the action area. Galveston Island has been experiencing increased erosion in recent years, which was exacerbated by the recent hurricanes. Disturbances such as beach nourishment and beach raking are relatively common in the action area.

EFFECTS OF THE ACTION

Under section 7(a) (2) "effects of the action" refers to the direct and indirect effects of an action on a species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action. The effects of the proposed action are added to the environmental baseline to determine the future baseline that serves as the basis for the determination in this biological opinion. The impacts discussed below are the Service's evaluation of the direct and indirect effects of the proposed action. Indirect effects are those caused by the proposed action that occur later in time, but are still reasonably certain to occur (50 CFR 402.02). The Service has determined that there are no interrelated or interdependent actions apart from the action under consideration.

Kemp's Ridley

Beneficial Effects
Beach nourishment on approximately 15 miles of beach could provide additional nesting habitat for Kemp's Ridley sea turtles, particularly in light of the severe erosion that occurred in the action area as a result of Hurricane Ike in 2008 and Hurricane Harvey in 2017. In addition, the project would provide an opportunity to educate the public on the importance of beach habitats for nesting sea turtles.

Direct Effects
Schroeder (1994) found that even under the best of conditions, experienced sea turtle nest surveyors can misidentify about seven percent of nesting attempts as false crawls, in which a female turtle comes ashore to nest but returns to the water without digging a nest or laying eggs. Weather, tides, and off-road recreational vehicle tracks can obscure sea turtle tracks, especially after night nesting and before morning surveys. Turtle patrollers and/or monitors locate nests primarily by searching for the tracks left in the sand and locating females during their nesting activity. However, nesting turtles do not always leave visible tracks on the beach, particularly in areas with very hard packed sand, very soft and blowing sand, and thick seaweed. The passage of heavy equipment or construction vehicles could remove sea turtle tracks, making it difficult for the monitor to find a nest for investigation and protection. Therefore, even when turtle monitors are employed, sea turtles, hatchlings or eggs could be harmed by construction activities.

Burial of Sea Turtles, Eggs, or Hatchlings
Deposition of sand for beach nourishment on approximately 15 miles of beach could harm adult female sea turtles that attempt to nest in the action area during nourishment activities, but remain undetected by sea turtle monitors and/or construction crews. Likewise, undetected nests could be buried by sand resulting in crushing of eggs or hindering hatchlings from climbing out of the nest and reaching the ocean. Burying nests and the associated reduced hatching and emergence success are known impacts to sea turtle reproduction (Crain et al. 1995).

Collisions with Heavy Equipment and Vehicles
Operation of heavy equipment on the beach can crush nesting turtles, stranded turtles, hatchlings, and eggs (Mann 1977; NMFS and Service 1991a, 1991b, 1992, 1993; Ernest et al. 1998). Sea turtles on the beach at some stage of nesting may be difficult to see, and may be hit by vehicles or heavy equipment. Hatchlings may emerge at night or early in the morning from in-situ nests missed by sea turtle monitors. Because of their extremely small size, live hatchlings on the beach during the day are vulnerable to being run over.

Compaction of Undetected Nests
Mann (1977) reported that driving directly above incubating egg clutches can cause sand compaction, which may decrease nest success and directly kill pre-emergent hatchlings and eggs potentially by physical crushing or collapse of the nest chamber. Vehicles can also compact the sand, making it more difficult or impossible for nesting turtles to excavate a nest cavity. This can lead to increased false crawls and nests with shallow egg chambers (Fletemeyer 1996).

Compaction could also make it more difficult for hatchlings to emerge from an undetected nest.

Many factors, including speed, weight, and size of the vehicle, the timing of the event with respect to the incubation period, the depth of the eggs/hatchlings (below grade) at the time of impact, and the physical characteristics of the nest itself, will influence whether or not, and the extent to which, mortality or injury occurs. Further, there is no established relationship between the cumulative number of times a particular nests has been run over and the extent and duration of the mortality or injury event. Also confounding this analysis are other factors that may affect the viability of any particular sea turtle nest. For example, tidal inundation, storm events, predation, and accretion/erosion of sand could negatively influence a sea turtle nest deposited in areas where beach driving also occurs (NMFS and Service 1991a; 1991b; 1992; 1993).

Entrapment of Hatchlings in Vehicle Tire Ruts and Berms
It is reported that vehicular ruts and berms create obstacles for hatchlings moving from the nest to the ocean. Upon encountering a vehicle rut, hatchlings may be disoriented along the vehicle track rather than crossing over it to reach the water. Hatchlings become diverted not because they cannot physically climb out of the rut (Hughes and Caine 1994), but because the sides of the track cast a shadow and the hatchlings lose their line of sight to the ocean horizon. Hatchlings detoured along vehicle ruts are at greater risk to vehicles, predators, fatigue and desiccation. If trapped for a period of time, this could cause them to weaken, become inverted, or succumb due to predation, disorientation, crushing, or dehydration (Hosier et al.1981; Fletemeyer 1996; Ernest et al. 1998). The depth and slope of the ruts influence the amount of impact, with deeper and more steeply sloped ruts causing a greater impact. Hosier et al. (1981) found that 3.9 to 5.9 inch (10 to 15 centimeter) deep tracks may serve as a significant impediment to loggerhead hatchlings. Berms may also create a barrier for adult nesting turtles causing and adverse effect by making them come ashore to nest and then abandon the nesting attempt or choose a less than suitable nesting area.

Vibration and Noise Impacts on Adults and/or Eggs
Vibrations and noise caused by heavy equipment, construction vehicles or temporary pipelines on the beach could frighten nesting turtles, harassing them, and possibly leading to a false crawl (NMFS and Service 1991a, 1991b, 1992; Ernest et al. 1998). Vibrations could also harm incubating eggs, but these effects are difficult to assess due to a lack of scientific data.

Lighting
Work lights can disorient loggerhead sea turtles that nest at night, possibly leading to an increase in false crawls. Lights can also disorient Kemp's ridley and loggerhead hatchlings from undiscovered nests; they could crawl in the wrong direction rather than enter the sea. This can make hatchlings more vulnerable to crushing, predation, and dehydration (NMFS and Service 1991a, 1991b; Fletemeyer 1996). Adult Kemp's ridley sea turtles are primarily daytime nesters, thus artificial work lights used at night should not affect them.

Pipeline
Even though the proposed pipelines are temporary, pipelines can cause nesting habitat to become inaccessible due to the pipeline acting as a barrier. Egg mortality can be increased where sea turtles are forced to nest in less suitable habitat due to the presence of barriers (Witherington et al. 2003). Both adults and hatchlings can be trapped behind the pipeline preventing them from reaching the ocean

Indirect Effects
Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur.

Change in Beach Sediment Composition
Sediments surrounding the egg chamber largely influence the incubation environment of the clutch. Temperature, moisture content, and gas exchange, all extremely important factors in the development of sea turtle embryos, are influenced by sediment characteristics (Ackerman et al. 1985). Thus, hatching success, emerging success, sex ratios, and hatchling fitness (size and vitality) may be different in compact sediments than in more loosely configured sediments of comparable grain size. Minute changes in the composition of beach sediment may affect sea turtle nesting frequency and success. Over time, these types of changes could result in the nourished beach becoming less suitable for use by nesting sea turtles and/or negatively impact the eggs and hatchlings.

Increased Beach Use and Residential Development
Beach nourishment in the action area would result in a wider beach profile, which would almost certainly encourage public use. This would increase the number of beach visitors to the area, increase recreational use in the action area (increasing vehicles, pedestrians, pets, and predators), and possibly expand beach grooming practices into additional areas. Beach maintenance activities such as raking and blading can modify sea turtle habitat by compacting the sand, and creating ruts, berms and escarpments.

Piping Plover and Red Knot

Piping plovers and red knots exhibit similar foraging and roosting behaviors and utilize similar coastal habitats. The factors affecting these species within the action are similar for both species; therefore, the following sections discuss the mutual effects of the action to both species.

Beneficial Effects
The project would provide an opportunity to educate the public on the importance of beach habitats for wintering piping plovers and red knots, primarily through the development and implementation of a public outreach program by the Galveston Park Board.

Direct Effects
Harm and Harassment from Construction Activities
Heavy equipment, construction vehicles, construction personnel, and temporary pipelines placed and operated on the beach could pose a hazard to roosting piping plovers and red knots, especially during cold temperatures or at night. The deposition of sand on approximately 15 miles of beach, the installation/removal of the temporary pipeline, and the construction of the DMPA at Apffel Park would temporarily affect the suitability of this area for wintering piping plovers and red knots. Benthic invertebrate and crustacean communities that these birds forage on would be temporarily disrupted, and the noise, human activity, and lighting associated with nourishment activities would result in harassment of the plovers and red knots.

Indirect Effects

Increased Public Use

Beach nourishment in the action area would result in a wider beach profile, which would almost certainly encourage public use. This would increase the number of beach visitors to the area, increase recreational use in the action area (increasing vehicles, pedestrians, pets, and predators), and possibly expand beach grooming practices into additional areas. Beach maintenance activities such as raking and blading can modify wintering piping plover and red knot habitat by removing debris, affecting prey species, and providing additional vehicle access points to the beach.

Summary

The proposed action has the potential to adversely affect the Kemp's ridley, migrating and wintering piping plover and their critical habitat, and migrating and wintering red knots within the action area. The construction activities may lead to temporarily diminished quantity and quality of sea turtle nesting habitat, feeding and roosting habitats for piping plovers and red knots within the action area. However, the proposed project could benefit Kemp's ridley sea turtles by providing additional nesting habitat, and could benefit sea turtles, wintering piping plovers and red knots through public education and outreach. However, direct effects may occur from burial of sea turtles, eggs, or hatchlings; collisions with heavy equipment or vehicles; compaction of undetected nests; vibration and noise impacts on adults and/or eggs; entrapment of hatchlings in vehicle tire ruts and berms; and lighting. Indirect effects to Kemp's ridley may occur from changes in beach sediment composition, and increased public use. Direct effects to piping plovers and red knots may occur in the form of harassment due to construction activities, and indirect effects could result from increased public use.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the Act.

Beach nourishment in the action area would result in a wider beach profile, which would almost certainly make development or re-development in nearby upland areas more desirable. Additional development or other activities occurring within the action area may occur with or without Federal authorization. Continued development may further increase public users to the area (increasing vehicles, pedestrians, pets, and predators) which will have associated effects to listed species within the action area. Increased lighting from development may affect sea turtle nesting habitat on the beachfront; increased predators associated with people may affect wintering piping plovers.

We reasonably expect future state, local, or private entities to nourish segments of the beach that narrow or become degraded in the future. However, because beach nourishment activities require permitting by the U.S. Army Corps of Engineers, these actions are likely to require Section 7 consultation between the Corps and the Service and do not fall under the definition of future state, tribal, local, or private actions.

CONCLUSION

After reviewing the current status of the Kemp's ridley sea turtle, the piping plover and the red knot; the environmental baseline for the action area; the effects of the issuance of Department of Army permit SWG-2007-01025; and the cumulative effects; it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Kemp's ridley sea turtle, the piping plover and the red knot.

Kemp's Ridley Sea Turtle

The Service finds that the proposed action is not likely to jeopardize the Kemp's ridley sea turtle for the following reasons:

1. Although the number of Kemp's ridley nests in Texas has steadily increased in recent years, the majority of Kemp's ridley sea turtles continue to nest on beaches in the Mexican states of Tamaulipas and Vera Cruz. The number of Kemp's ridley nests found in Texas (12 on the upper Texas coast in 2017 and 15 in 2018), is significantly lower than the number of nests in Mexico (approximately 24,000 in 2017).

2. The conservation measures proposed by the Corps and the Galveston Park Board will reduce the likelihood that nesting Kemp's ridleys, their eggs or hatchlings are harmed during beach nourishment activities.

Piping Plover and Red Knot

The Service finds that the proposed action is not likely to jeopardize the wintering piping plover and Red Knot for the following reasons:

1. Beach nourishment activities would result in temporary harassment of piping plovers and red knots in and adjacent to the action area. Feeding opportunities would be temporarily disrupted due to benthic invertebrate and crustacean community loss. Invertebrate populations may take up to one year to fully recover. However, the proposed action would not permanently alter the suitability of these areas for the species.

2. The conservation measures proposed by the Corps and the Galveston Park Board will reduce the likelihood that wintering piping plovers are harmed during beach nourishment.

The conclusions of this biological opinion are based on full implementation of the project as described in the "Description of the Proposed Action" section of this document, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined

as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued to the Galveston Park Board, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the Galveston Park Board to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps and the Galveston Park Board must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE ANTICIPATED

Kemp's Ridley Sea Turtle

Based on the information within our files and within the BA (including the conservation measures proposed by project proponents), the Service anticipates that 2 adult Kemp's ridley sea turtle and eggs or hatchlings from 4 sea turtle nests will be taken directly as a result of this action. Specifically, incidental take resulting from this project is expected to be in the form of harm and/or harassment from:

1. Disruption of breeding activities from noise, vibrations, heavy machinery and human presence on the beach.

2. Entrapment of adults and hatchlings in trenches and vehicle ruts and trenches.

3. Crushing, collision, and burial of sea turtles and/or nests and compaction of sand over nest with heavy equipment.

The Service anticipates that the incidental take of sea turtle hatchlings and/or eggs from these effects will be difficult to detect for the following reason(s):

1. Turtle nests are difficult to find. Natural factors, such as rainfall, wind, and tides and human-caused factors, such as pedestrian traffic, may obscure crawls, resulting in nests being destroyed because they were missed during monitoring surveys.

2. The total number of hatchlings and eggs per undiscovered nest is unknown.

3. The reduction in percent hatching and emerging success per nest over an undisturbed nest site is unknown.

4. An unknown number of females may avoid the project beaches and be forced to nest in less optimal areas.

Piping Plover and Red Knot

The Service anticipates harassment, in the form of noise and human disturbance, of 25 piping plovers and 19 red knots due to beach nourishment and construction activities action over the 5-year term of the permit. Effects on these species are expected to be temporary and non-lethal. Incidental take associated with this project is expected to be in the form of harm and/or harassment from:

1. Disruption of feeding and sheltering behaviors resulting from noise, vibrations, heavy machinery and human presence on the beach.

2. Reduction in feeding and sheltering opportunities or capabilities due to the loss and/or degradation of foraging and roosting habitat.

3. Temporary or permanent reduction in survivability of wintering piping plovers and red knots resulting from the lost and/or degradation of foraging and roosting habitat.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service has determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of nesting and hatchling Kemp's ridley sea turtles, non-breeding piping plovers and red knots in the proposed Galveston Park Board beach nourishment project within the action area:

1) Implement all conservation measures in the BO, permit application and/or project plans.
2) Ensure that all parties involved in the project (i.e., contractors, work crews, monitors, etc.) fully understand the endangered species protection measures detailed in the incidental take statement

3) Prevent and/or reduce escarpment formations.
4) Indiscriminately leave wrack/sargassum in place for roosting and/or foraging piping plovers and red knots if possible.
5) Establish and implement a protocol to notify the Texas Coastal Ecological Service Field Office [TXCESFO (Houston office)] immediately of direct take of sea turtles, hatchlings, sea turtle eggs, or nests.
6) Notify TXCESFO in 2 weeks prior to the initiation and upon completion of work activities.
7) Submit an annual report describing beach nourishment locations, activity type, and "look this up on current report sheet".

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Corps and the Galveston Park Board shall comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline reporting or monitoring requirements. These terms and conditions are non-discretionary.

Sea Turtles and Piping Plovers and Red Knots

1) As detailed in the project description the Corps and Galveston Park Board will implement measures to avoid and minimize impacts to sea turtles, piping plovers and red knots. Conservation measures will be implemented and made part of the Corps permit.

2) Galveston Park Board in coordination with the Corps shall insure that contractors, work crews, and the sea turtle, piping plover and red knot monitors shall be properly trained to identify sea turtles, piping plovers and red knots prior to the commencement of work each time work is to be conducted.

3) Notify TXCESFO in writing two weeks prior to initiation of construction activities and within two weeks following the completion of project construction. Upon completion of the project, a report describing any deviations from the description of the proposed action (see description of proposed action section above), conservation measures implemented during project activities, the success of such measures, any incidents that may have occurred, and any recommendations on improvements to those measures shall be submitted to TXCESFO. Reports should be sent to U.S. Fish and Wildlife Service, ATTN: Field Supervisor, 17629 El Camino Real Suite 211, Houston, Texas 77058.

4) In the event that activities result in the direct take (killing, harming, or maiming) of a sea turtle, hatchlings, or eggs, the person(s) responsible for monitoring sea turtles shall notify TXCESFO (281/286-8282, 281/212-1512) and Dr. Donna

Shaver (National Park Service/PAIS), and the Texas Sea Turtle Stranding Coordinator (361/949-8173, ext. 226). The Corps and other project proponents will develop a standard methodology for notifying the aforementioned contacts. The handling of dead or stranded sea turtles found during the monitoring program will be established by the Sea Turtle Coordinator and the Service.

5) Provide updated summary table to the TXCESFO by December 31st of each year. The summary table should include, location of activities, conservation measures implemented, success of such measures, species take, incidences, and any recommendations on improvements to those measures (example attached).

These reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

For the benefit of nesting sea turtles and wintering piping plovers, the Service recommends the following:

1. Work with the Service to design and fund a research program to determine the long-term effects of beach nourishment activities on sea turtle nesting success and/or wintering piping plover critical habitat components. This includes annual beach (sand survey) monitoring, and 1-year post-nourishment threatened and endangered species monitoring to provide data that indicates the completed project is species impact neutral.

2. Work with the Service to develop a plan to monitor and survey benthic organism recovery associated with beach nourishment activities along Galveston Island.

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in your request for issuance of SWG-2007-01025 As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded;

(2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The Service appreciates the Corps' efforts to identify and minimize effects to listed species from this project. For further information, please contact staff biologist Moni Belton at 281/212-1512. Please refer to the consultation number Consultation No. 02ETTX00-2018-F-2491 in future correspondence concerning this project.

Sincerely,

Chuck Ardizzone
Field Supervisor

cc: Steve Walls, Corps of Engineers, Galveston District
cc: Rhonda Gregg-Hirsch, Atkins
cc: Reuben Trevino, Galveston Parks Board

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WILDLIFE MONITORING CHECKLIST

Project Name: _____

Objective: Report sightings of protected species- piping plover, red knot, and various species of sea turtles (dead or alive), hatchlings, tracks, eggs or nests. In addition to reporting any birds observed injured or nesting.

DO NOT DISTURB OR TOUCH A SEA TURTLE, PIPING PLOVER OR RED KNOT.

Date:_ Start Time:____am/pm Finish Time:__am/pm

Weather: ☐ Sunny ☐ Fair ☐ Partly Cloudy ☐ Cloudy ☐ Windy ☐ Calm ☐ Rain

Reach of Beach Monitored:___

Observations:

- ☐ Piping Plover; ☐ Not Present in area ☐ Foraging ☐ Roosting (resting)
- ☐ Red Knot; ☐ Not Present in area ☐ Foraging ☐ Roosting (resting)
- ☐ Injured Birds (any species) ☐ Not Present in area ☐ Foraging ☐ Roosting (resting)
- ☐ Nesting Birds (any species) ☐ Nest location identified and reported

- **To report injured Piping Plover, Red Knot and/or any species of injured or nesting bird, Call U.S. Fish and Wildlife Service (281) 212-1512** if on upper Texas coast and **361-994-9005** if on lower Texas coast.

- ☐ Sea Turtle; Species common name(s):_____
- ☐ Leaving Water ☐ Entering Water ☐ Laying Eggs ☐ Dead on Beach
- ☐ Metal Flipper Tag Identification:_____(Letters and/or Numbers);
  - Take Photographs, **Call 1-866-TURTLE5 (1-866-887-8535)** for Instructions,
  - Await Arrival of Officials.

- ☐ Living Tissue Tag (White Mark on one Scute of Shell); Take Photographs,
  - Call **1-866-TURTLE5 (1-866-887-8535)** for Instructions, Await Arrival of Officials.

- ☐ If Laying Eggs; Turtle is Facing ☐ North ☐ South ☐ East ☐ West,
  - Mark Nest(do not penetrate sand), Call **1-866-TURTLE5 (1-866-887-8535)** for Instructions,
  - Take Photographs, Time/clock Laying Event, Await Arrival of Officials.

- ☐ Hatchlings; Take Photographs, Call **1-866-TURTLE5 (1-866-887-8535)** for instructions
  - Await Arrival of Officials, Guard Against Predators.

- ☐ Tracks; Measure Width:_____, Take Photographs,
  - Call **1-866-TURTLE5 (1-866-887-8535)** for Instructions, Await Arrival of Officials.

- ☐ Eggs/Nest; Mark Nest(do not penetrate sand), **Call 1-866-TURTLE5 (1-866-887-8535)** for Instructions,
  - Take Photographs, Await Arrival of Officials.

- ☐ Stranded Marine Mammals if observed call Texas Marine Mammal Stranding Network at
  - **1-800-9MAMMAL (1-800-962-6625)** for instructions.

- ☐ No Sightings; None of the Above.

Additional Comments:

_____

Special Note: All sea turtles, piping plovers and red knots are protected by law as threatened or endangered species. No one, unless permitted, can remove sea turtle eggs, handle turtles, or disturb any of these species. Otherwise, one may be liable to fines up to $20,000 and criminal sentencing.

*Monitor Name:*_____ *Telephone:*_____

Please Print Clearly (Area Code) and Phone Number

Example: Annual Summary Table

Galveston Park Board of Trustees
U.S. Army Corps of Engineers
Beach Nourishment / Dune Restoration
Permit Summary Table 2014 – 2019 Authorization Period

U.S. Army Corps of Engineers Permit Number:	**SWG-2007-01025**
U.S. Army Corps of Engineers Authorization Date:	May 6, 2014
U.S. Army Corps of Engineers Permitted Authorization Term:	Five (5) Years
U.S. Army Corps of Engineers Permitted Activities Date Range:	May 6, 2014 to December 31, 2019
U.S. Army Corps of Engineers Authorized Permit Area:	Galveston Island, Texas from the western terminus of the Galveston seawall to the eastern boundary of Galveston Island State Park

Annual Report of Activities USACE Permit #SWG-2007-01025

Year	Species Trainer / Subject	Date	Location- Lat / Lon- Volume	Project Sponsor(s)	Dates of Construction	Construction Activities	Conservation Measures Implemented	Success	Species Take	Incidents (Construction / Project Related)	Improvements
							Yes or No	Yes or No	Number		
2014 05/06 to 12/31/2014			Dellanera Park / Seascape / End of Seawall Total Project ~113,000 yd^3	Galveston Park Board, FEMA, City of Galveston, City of Galveston IDC, Texas General Land Office	Begin at Upland Sand Source 11/28/2014. Begin beach work 12/01/2014	Beach Nourishment, dune restoration, vegetation planting, dune walkover	**Yes** USACE authorized Special Conditions were followed	Yes	0	Debris found in material	Park Board staff monitor beach area, implement daily patrols and removal of foreign material.
2015 01/01 to 12/31/2015			(Continuation) Dellanera Park / Seascape / End of Seawall- Total Project ~113,000 yd^3	Galveston Park Board, FEMA, City of Galveston, City of Galveston IDC, Texas General Land Office	(Continued) 01/01/2015 to 03/15/2015	Beach Nourishment, dune restoration, Vegetation planting, dune walkover	**Yes** USACE authorized Special Conditions were followed	Yes	0	Injured Gannett washed ashore- not project related	Bird transported for medical assistance. Park Board staff monitoring beach post construction for debris, continued daily patrols
2016 01/01 to 12/31/2016	Dr. Metz Seaturtles / birds	March 31, 2016	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2017 01/01 to 12/31/2017			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2018 01/01 to 12/31/2018			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2019 01/01 to 12/31/2019			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix C-3 Clean Water Act Compliance

Clean Water Act Compliance

for

Galveston Island Coastal Erosion CAP 204 Project

Galveston, Texas

Water Quality Certification Request

Section 404(b)(1) Guidelines

TCEQ Tier II Analysis

Pre-Filing Record

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

July 8, 2022

Ms. Jenna Lueg
Texas Commission on Environmental Quality
Water Quality Assessment Section, MC 150
P.O. Box 13087
Austin, Texas 78711-3087

Dear Ms. Lueg,

The U.S. Army Corps of Engineers Galveston District (USACE), in partnership with the City of Galveston, is conducting the Galveston Island Coastal Erosion, Galveston, TX continuing authorities study as authorized by Section 204 of the Water Resources Development Act of 2016. The study purpose is to determine interest in beneficially using dredged material for coastal storm risk management on Galveston Island beaches to benefit coastal communities and public infrastructure.

A Draft Detailed Project Report and Environmental Assessment (DDPR-EA) has been prepared to present the findings and recommendations and disclose the potential impacts to the human and natural environment if the Tentatively Selected Plan (TSP) is implemented. The TSP, Alternative 2, involves placing dredged material along 1.7 miles at Bermuda Beach seaward of the line of vegetation. Material would by hydraulically dredged and pumped to the beach through a series of submerged or floating pipelines, then shaped into the template beach profile using heavy equipment (e.g., bulldozers).

The USACE requests a water quality certification (WQC) for the TSP. Impacts to surface waters are addressed in the enclosed Section 404(b)(1) analysis and the TCEQ Tier II Certification Questionnaire and Alternative Analysis Checklist and in the DDPR-EA which can be viewed on the Galveston website at:

https://www.swg.usace.army.mil/Business-With-Us/Planning-Environmental-Branch/Documents-for-Public-Review/

Pursuant to the recent changes to the WQC process, a pre-filing meeting request was accepted by your office on December 14, 2021 (Enclosure). Additionally, a Joint Public Notice is being published on July 15, 2022, and will begin a 30-day public review period. Upon completion of the comment period, any comments received will be forwarded to your office.

If you have any questions or need additional information to conduct your review, please contact Dr. Raven Blakeway, Biologist, Environmental Branch, Regional Planning and Environmental Center at 409-790-9058 or Raven.Blakeway@usace.army.mil.

Sincerely,

Jeffery F. Pinsky
Chief, Environmental Branch
Regional Planning and Environmental Center

Enclosure (3)

EVALUATION OF SECTION 404(b)(1) GUIDELINES (SHORT FORM)

Galveston Coastal Erosion, Galveston, TX

GUIDELINE COMPLIANCE:

1. Review of Compliance (230.10(a)-(d))		
A review of the proposed project indicates that:	Yes	No*
a. The placement represents the least environmentally damaging practicable alternative and, if in a special aquatic site, the activity associated with the placement must have direct access or proximity to, or be located in the aquatic ecosystem, to fulfill its basic purpose (if no, see section 2 and information gathered for EA alternative).	X	
b. The activity does not appear to:		
1) Violate applicable state water quality standards or effluent standards prohibited under Section 307 of the Clean Water Act;	X	
2) Jeopardize the existence of Federally-listed endangered or threatened species or their habitat; and	X	
3) Violate requirements of any Federally-designated marine sanctuary (if no, see section 2b and check responses from resource and water quality certifying agencies).	X	
c. The activity will not cause or contribute to significant degradation of waters of the U.S., including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values (if no, see values, Section 2)	X	
d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem (if no, see Section 5)	X	

Reference: various sections of Chapter 4 of the Draft Detailed Project Report and Integrated Environmental Assessment (DDPR-EA) and Appendix C.

2. Technical Evaluation Factors (Subparts C-F)	Not Applicable	Not Significant	Significant*
a. Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)		X	
1) Substrate impacts		X	
2) Suspended particulates/turbidity impacts		X	
3) Water column impacts		X	
4) Alteration of current patterns and water circulation		X	
5) Alteration of normal water fluctuation/hydroperiod		X	
6) Alteration of salinity gradients		X	
b. Biological Characteristics of the Aquatic Ecosystem (Subpart D)		X	
1) Effect on threatened/endangered species and their habitat		X	
2) Effect on the aquatic food web		X	
3) Effect on other wildlife (mammals, birds, reptiles, and amphibians)		X	

c. Special Aquatic Sites (Subpart E)		X	
1) Sanctuaries and refuges	X		
2) Wetlands	X		
3) Mud flats	X		
4) Vegetated shallows	X		
5) Coral reefs	X		
6) Riffle and pool complexes	X		
d. Human Use Characteristics (Subpart F)		X	
1) Effects on municipal and private water supplies	X		
2) Recreational and commercial fisheries impacts		X	
3) Effects on water related recreation		X	
4) Aesthetic impacts		X	
5) Effects on parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves	X		

* Where a 'Significant' category is checked, add an explanation below.

List Appropriate References: Chapter 4 of the DDPR-EA.

During dredging and construction activities, localized effects on water quality are expected, e.g., increased turbidity and total suspended sediments, organic enrichment, reduced dissolved oxygen, elevated carbon dioxide levels, water temperature changes, and decreased light penetration. During dredging and construction, localized water quality perturbations can adversely affect biota, particularly primary producers, suspension/filter feeders, and visual feeders. Any such direct adverse effects on water quality and indirect negative impacts on biota would be temporary and localized. Following dredging and construction activities, water quality in the localized impact area would return to pre-construction conditions.

Dredging and placement of dredged material would smother and terminate immobile benthic organisms and cause mobile benthos to abandon the borrow and beneficial use areas. Functional recovery of benthic fauna is expected to occur within 1-3 years[1] at the borrow and beneficial use sites.

Aquatic organisms thrive in foreshore and nearshore zones of the beach, where sediments are frequently inundated by water, providing a critical nursery and feeding habitat for many fish species. Daily flooding by saltwater and moderate- to high- energy waves prohibit plant growth aside from inconspicuous algae in these zones. Backshore areas, those at or just above the high tide zone, are exposed to harsh conditions including fluctuations in temperature and salinity, that preclude habitation by few animals and no plants. The wrack zone, the transition between dry beach and surf zone, provides a reservoir of water and food for cryptic nocturnal feeders or species that feed during high tide (e.g., crabs, spiders, beetles), and is characterized by an abundance of arthropods and worms. The wrack zone is a prime foraging habitat for shorebirds. The beneficial use of dredged material for beach nourishment would increase suitable habitat for aquatic organisms in these zones and improve shorebirds' foraging habitat, resulting in no net loss. The material would be consolidated to 1.75 miles of beachfront on Galveston Island

[1] De La Cruz, S.E.W., Woo, I., Hall, L., Flanagan, A., Mittelstaedt, H. 2020. Impacts of periodic dredging on macroinvertebrate prey availability for benthic foraging fishes in central San Francisco Bay, California: U.S. Geological Survey Open-File Report 2020-1086. https://doi.org/10.3133/ofr20201086

following dredging. Temporary sand training dikes would be used to contain slurry discharge parallel to the shore. Bulldozers would shape dredged material once on the beach along the proposed work area. Upon construction completion, the work area would be restored to pre-construction contours, thereby developing foreshore, nearshore, and wrack zones that would enable aquatic organisms and shorebird access. Beach nourishing is expected to have a higher ecological value than open water because of its benefits to terrestrial and aquatic organisms.

3. Evaluation of Dredged or Fill Material (Subpart G)	
a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material (check only those appropriate)	
1) Physical characteristics	X
2) Hydrography in relation to known or anticipated sources of contaminants	X
3) Results from previous testing of the material or similar material in the vicinity of the project	X
4) Known, significant sources of persistent pesticides from land runoff or percolation	X
5) Spill records for petroleum products or designated (Section 311 of Clean Water Act) hazardous substances	X
6) Other public records of the significant introduction of contaminants from industries, municipalities, or other sources	X
7) Known existence of substantial material deposits of substances that could be released in harmful quantities to the aquatic environment by man induced discharge activities	X

3. Evaluation of Dredged or Fill Material (Subpart G) (continued)	**Yes**	**No**
b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredged or fill material is not a carrier of contaminants or that levels of contaminants are substantively similar at extraction and placement sites and not likely to degrade the placement sites, or the material meets the testing exclusion criteria.	X	

Sediment dredged from the Galveston Harbor and Channel (GHC) would be beneficially used to complete beach nourishment. Sediment placed on the beach would be configured with beach-quality sand, consistent in grain size, color, and composition as the existing beach sediment. Historical beneficial use beach nourishment projects, using material from GHC, demonstrated sand compatibility. Material from GHC has been evaluated using bioassay and bioaccumulation procedures. The chemical and grain size analyses, solid phase bioassays, and bioaccumulation assessments indicated that the GHC material was clean and did not require treatment.

Sediment samples from the Texas Coastal Sediment Geodatabase (TxSed), compiled by the Texas General Land Office (GLO), were analyzed to review spatial variation, and estimate the median grain size (D_{50}) of native sediment. The calculated D_{50} (18 beach and 22 nearshore samples) was 0.156 mm and 0.094 mm for beach and nearshore samples, respectively. The shape of the existing cross-shore (depth of closure) profiles in the proposed project area indicate a theoretical D_{50} range of 0.07-0.1 mm. Theoretical D_{50} ranges are consistent with calculated D_{50}, suggesting the dredged material is sufficient for beach nourishment based on the beach equilibrium profile theory or the balance between erosion and accretion. Calculated D_{50} is influenced by sampling location, which can often be biased towards larger grain sizes (e.g., coarse sand). Natural coastal processes distribute/sort sediment along a cross-shore profile,

driven by the fall velocity (i.e., transport of suspended sediments) of sediment particles, predominantly controlled by respective grain size. These coastal processes lead to consistently poorly graded sediment. The coarsest sand is concentrated along the surf/swash zone, and finer particles are distributed seaward by waves/current or landward to dunes via aeolian processes[2]. Sediment samples for grain size analyses are often collected in the surf/swash zone, thus biased towards larger/coarser sand.

In 2017, the U.S. Army Corps of Engineers completed a contaminant assessment report for Galveston and Houston Ship channels in compliance with EPA Ocean Dumping Regulations (40 CFR Part 227 Subpart B). Elutriate exceeded the EPA acute Water Quality Criterion (Criterion Maximum Concentration [CMC]) for ammonia during the assessment. While the exceedance would not provoke a water quality violation, the dilution required to meet the CMC was 1.44. The suspended particulate phase concentration fell below 1% within 150 minutes (2.5 hours) after discharge using a dilution curve, affording sufficient time to meet the ammonia CMC within the 4-hour requirement by RIA. Based on these results, the limiting permissible concentration for liquid and suspended particulate phases is completed, indicating no toxicity to sensitive marine water-column organisms is expected during placement. Further, no special handling or management is required during discharge.

4. Placement Site Delineation (230.11(f))	
a. The following factors, as appropriate, have been considered in evaluating the placement site:	
1) Depth of water at the placement site	X
2) Current velocity, direction, and variability at the placement site	X
3) Degree of turbulence	X
4) Water column stratification	X
5) Discharge vessel speed and direction	X
6) Rate of discharge	X
7) Fill material characteristics (constituents, amount, and type of material, settling velocities)	X
8) Number of discharges per unit of time	X
9) Other factors affecting rates and patterns of mixing (specify)	

4. Placement Site Delineation (230.11(f)) (continued)	**Yes**	**No**
b. An evaluation of the appropriate factors in 4a above indicates that the placement site and/or size of mixing zone are acceptable.	X	

5. Actions to Minimize Adverse Effects (Subpart H)	**Yes**	**No**
All appropriate and practicable steps have been taken, through application of recommendations of 230.70-230.77 to ensure minimal adverse effects of the proposed discharge.	X	

List actions taken:

[2] Benedet, L., Finkl, C.W., Campbell, T., Klein, A. 2004. Predicting the effect of beach nourishment and cross-shore sediment variation on beach morphodynamic assessment. *Coastal Engineering*, 8-9:51, p. 839-861. https://doi.org/10.1016/j.coastaleng.2004.07.012

1) Would utilize the best available practical techniques and BMPs during dredging and construction activities to avoid and minimize potential temporary and long-term adverse impacts. Such as maintaining a work area that remains aesthetically attractive and free of floating or piled debris and trash, storing fuels and other hazardous materials in locations that would not introduce to surface waters if spilled, and using silt curtains when appropriate to minimize the movement of sediments, etc.

2) The movement of heavy equipment and support vehicles would utilize the placement of pipeline corridors to the greatest extent possible. Staging areas, access corridors, and general ground disturbance not related to restoration would use the smallest footprint possible to maintain a safe work environment.

3) Only clean fill material (dredged material or stone) free of contaminants would be placed in the restoration area. Placed dredged material will be of such composition that will not adversely affect the receiving waters; biological, chemical, or physical properties.

6. Factual Determination (230.11)	**Yes**	**No***
A review of appropriate information as identified in items 2-5 above indicates that there is minimal potential for short- or long-term environmental effects of the proposed discharge as related to:		
a. Physical substrate at the placement site (review Sections 2a, 3, 4, and 5 above)	X	
b. Water circulation, fluctuation and salinity (review Sections 2a. 3, 4, and 5)	X	
c. Suspended particulates/turbidity (review Sections 2a. 3, 4, and 5)	X	
d. Contaminant availability (review Sections 2a. 3, and 4)	X	
e. Aquatic ecosystem structure and function (review Sections 2b and c, 3, and 5)	X	
f. Placement site (review Sections 2, 4, and 5)	X	
g. Cumulative impacts on the aquatic ecosystem	X	
h. Secondary impacts on the aquatic ecosystem	X	

7. Evaluation Responsibility
a. This evaluation was prepared by: **Raven Blakeway** Position: **Biologist,** Regional Planning and Environmental Center

8. Findings (Select One)	**Yes**
a. The proposed placement site for discharge of or fill material complies with the Section 404(b)(1) Guidelines.	X
b. The proposed placement site for discharge of dredged or fill material complies with the Section 404(b)(1) Guidelines with the inclusion of the following conditions: N/A	
c. The proposed placement site for discharge of dredged or fill material does not comply with the Section 404(b)(1) Guidelines for the following reason(s): 1) There is a less damaging practicable alternative 2) The proposed discharge will result in significant degradation of the aquatic ecosystem	

3) The proposed discharge does not include all practicable and appropriate measures to minimize potential harm to the aquatic ecosystem	
_____ Date	_____ Jeffrey F. Pinsky Chief, Environmental Branch Regional Planning and Environmental Center

NOTES:

* A negative, significant, or unknown response indicates that the permit application may not comply with the Section 404(b)(1) Guidelines.

Negative responses to three or more of the compliance criteria at the preliminary stage indicate that the proposed projects may not be evaluated using this "short form" procedure.

Use care in assessing pertinent portions of the technical information of items 2a-e before completing the final review of compliance.

A negative response to one of the compliance criteria at the final stage indicates that the proposed project does not comply with the Guidelines. If the economics of navigation and anchorage of Section 404(b)(2) are to be evaluated in the decision making process, the "short form" evaluation process is inappropriate.

SUPPORTING DOCUMENTATION

Project Description

The U.S. Army Corps of Engineers, Galveston District (USACE), in partnership with the Galveston Island Park Board of Trustees of the City of Galveston, is examining the potential of beneficially using sand material generated during routine maintenance dredging operations of the Galveston Harbor and Channel (GHC) to nourish beach on the west end of Galveston Island. Galveston Island is a placement site candidate for beach nourishment under the Corps of Engineers' beneficial use of dredge material program (§204). This Federally authorized project would not induce additional dredging beyond the Federal Standard.

The project is located on Galveston Island, a barrier island between the Gulf of Mexico and the Texas mainland, 51 miles southeast of Houston, Texas. The proposed project is located in Galveston Island's center, parallel to FM 3005, extending from 8 Mile Road southwest to 13 Mile Road (Figure 1). Two alternatives are proposed for nourishment at the study location, in which placement would occur seaward of the vegetation line. Alternative 2 extends southwest from south of Sunbather Lane to 11 Mile Road, while Alternative 3 extends southwest from Hershey Beach to Fidler Crab Lane (Figure 1).

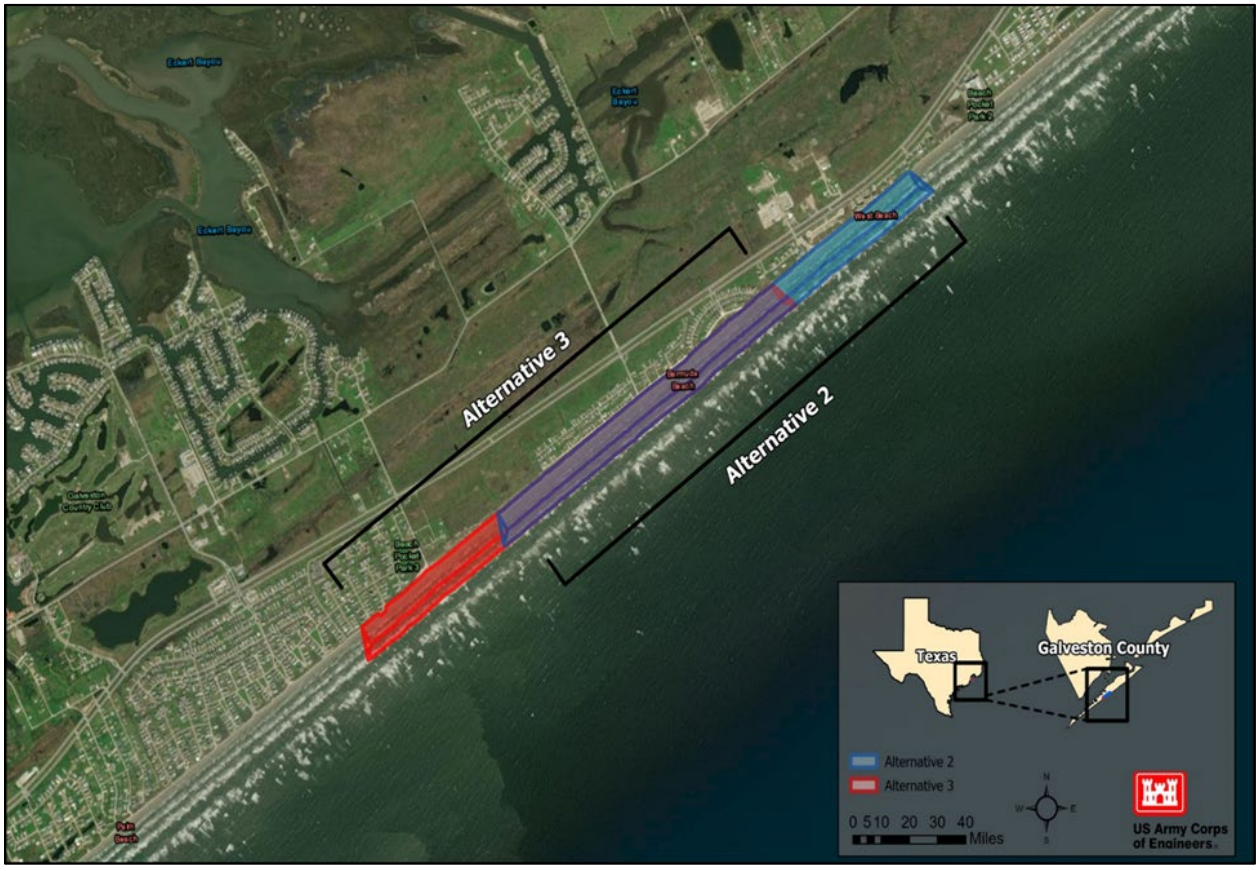

Figure 1 Study Location with proposed project alternatives in blue (Alternative 2) and red (Alternative 3). The overlap between alternatives is shown in purple.

Alternative 2 was chosen as the Tentatively Selected Plan (TSP). Dredge material is brought to the west end of Galveston Beach by hopper dredge and pumped by a pipeline for beach placement (Figure 2). Alternative 2 involves beneficially using dredged material to nourish approximately 1.7 miles of beachfront on Galveston Island at Bermuda Beach seaward of the vegetation line beginning south of Sunbather Lane and stretching southwest, terminating before 11 Mile Road. Approximately 530,000 cubic yards of beach quality sand would be deposited and leveled on the beach.

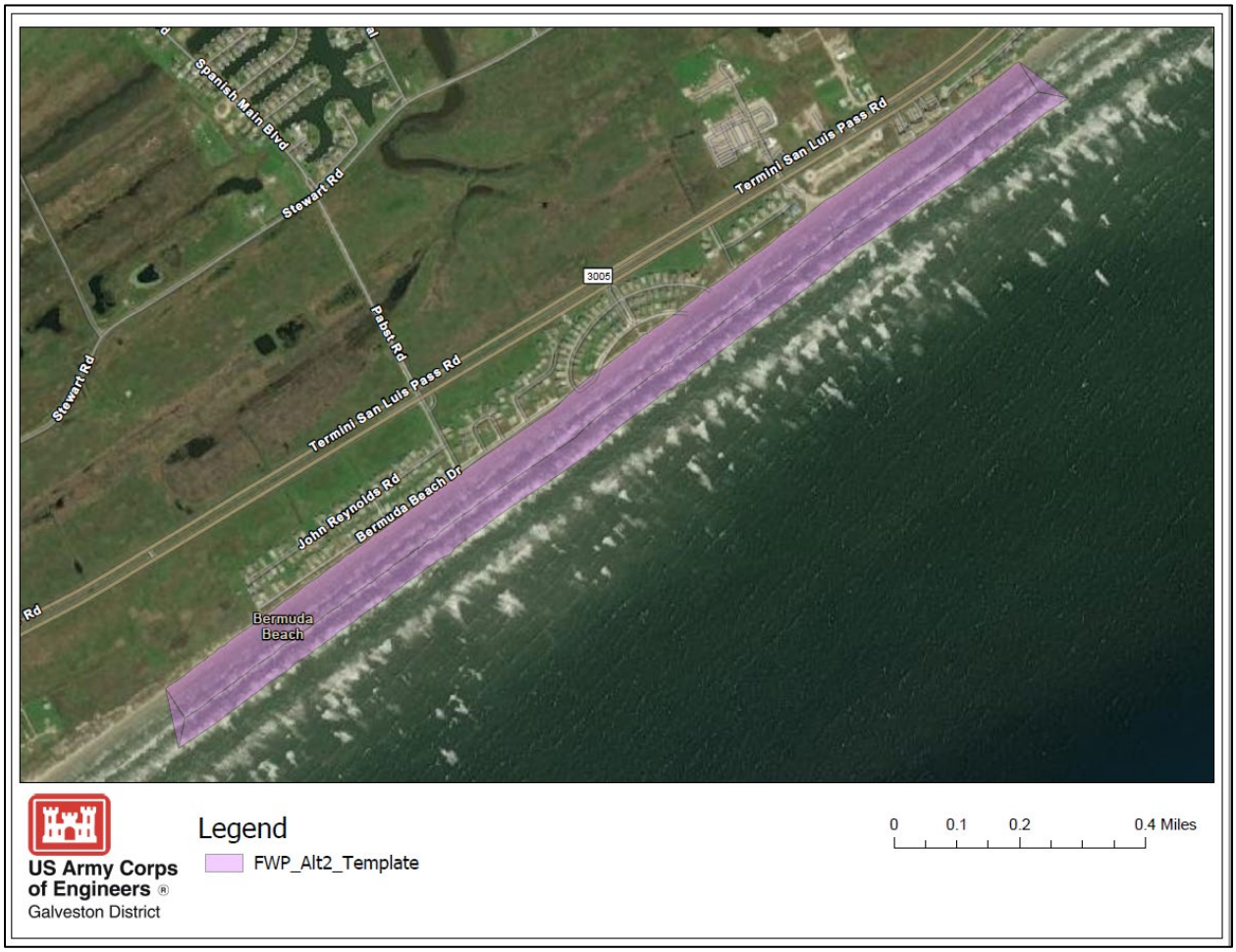

Figure 2 Project area for Alternative 2

Nourishment would be accomplished by hydraulically dredging material from GHC with a hopper dredge, pipelining the material to the beach, and using heavy equipment (e.g., bulldozers, loaders) to shape the fill on the beach into the design template (Figure 3). Any slurry discharge from the pipeline would be contained parallel to the shore using temporary sand training dikes. The dimensions of the nourished sections would include a 300-foot added berm width at +4.0 feet NAVD88 to minimize scarping, followed by a 180-foot seaward 1:20 slope to tie into the existing profile (Figure 3). Nourishment activities would be divided into multiple confined cells along the proposed area, in which shaping of the dredged material will be restricted to a single cell until completion. After construction is complete, project sites would be restored to pre-construction slope/contours.

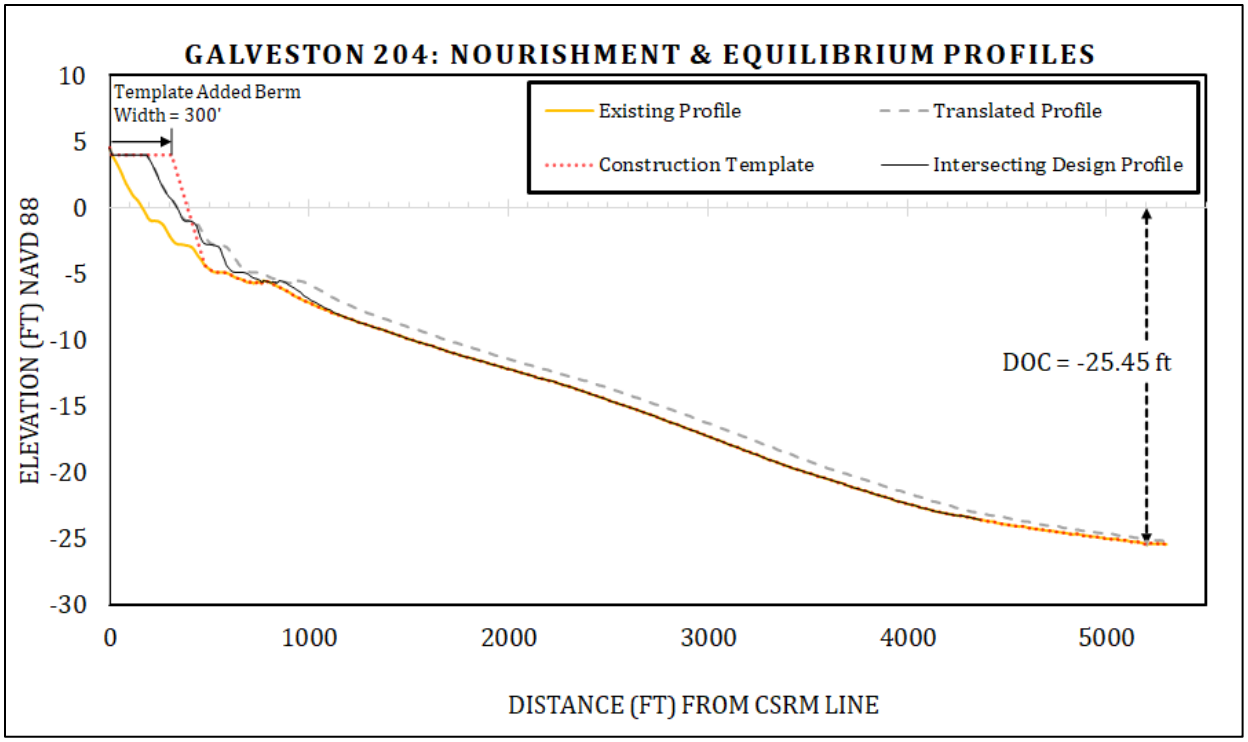

Figure 3 Profiles of the existing beach and design template for nourishment based on beach equilibrium concepts as the distance from Coastal Storm Risk Management Line (CSRM)

The TSP integrates watershed purposes of recreation, erosion protection, and critical habitat provision for migratory birds, foraging seabirds, and nesting sea turtles. It was determined to be feasible, environmentally acceptable, and economically justified based on currently available data and information developed during plan formulation, and significant institutional knowledge of beach nourishment activities. There is minimal uncertainty given available data and institutional knowledge form a construction perspective. However, uncertainties exist on site-specific, design-level details (e.g., exact sediment quantities, the extent of erosion control needs, construction staging locations, pipeline pathways, and duration of construction), which would be addressed during the pre-engineering and design phase. Additional plan details are provided in the DDPR-EA and the Engineering Appendix of the DDPR-EA (Appendix A).

Beach Placement

Material placement on the beach would involve pumping sediment directly onto the site by a dredge with pump-off capabilities. A pipeline would be routed from the dredge anchor point (i.e., pump-out location) in offshore waters (approximately 30-foot water depth) to the beach nourishment location. The pipe would be mobilized in segments of varying length (mean 40 feet) and diameter (mean 24-30 inches). Pipeline configuration would be proposed by the contractor based on performance and site conditions, then approved by USACE prior to implementation. The in-water configuration could entail a submerged pipeline, anchored by the density of the material or secured by physical means, or a floating pipeline on the surface. Pipeline configuration on the beach would be placed seaward of the vegetation line and foredune with discharges directed into the placement area. The pipe would be periodically added and removed as sections are completed. Mobilizing the pipeline requires heavy equipment and

vessels to transport and connect pipe segments from the dredge anchor point to the nourishment location.

The pipeline's construction disturbance area varies depending on pipe size (diameter and length). When identifying the pipeline route, USACE would consider site content and environmental features to minimize the environmental impact of construction activities. Once heavy equipment is on the beach and the pipeline is configured, operations are generally confined to the vicinity of the mean high-water line, away from dune vegetation. However, heavy equipment is temporarily operated throughout the width of the beach during active nourish placement to manage the outflow of sediment and construct target elevations for the appropriate beach profile.

Typically, the beach nourishing process involves bulldozers and occasionally backhoes to distribute sand from the outflow of the pipeline. The dredged material exits the pipe as a sand slurry, which is defused as it is released from the terminal pipe to reduce the flow velocity onto the beach. Dikes are constructed on one or two sides of the affluent area to extend the settlement of suspended solids to reduce nearshore turbidity. As sand releases from suspension, bulldozers and backhoes distribute it evenly to prevent future ponding and erosion, ensure proper coverage of cell units, and conform to the engineered beach template.

The construction zone, consisting of the active nourishment area and heavy equipment, is encompassed by a 500-1,000-foot fenced buffer. Stakes mark the cell unit, and elevation requirements are reviewed before sand placement. As target elevations are achieved in a cell unit, construction mobilizes to the next station. Sand would not be placed in multiple cell units concurrently. Once a nourishment area is completed (generally 500-1,000-foot acceptance sections), stakes are removed from the beach and the area is restored to pre-construction conditions.

Throughout the pumping process, the contractor would be required to inspect the pipeline route to verify the pipe's integrity and fix any leaks/disruptions. During construction operations, vehicles (e.g., pickup trucks, all-terrain vehicles) and heavy equipment (e.g., bulldozers, backhoes) may traverse the beach; however, construction activities are prohibited within existing dune vegetation or other environmentally sensitive locations identified prior to construction.

Sediment

Sediment placed on the beach would be configured with beach quality sand, consistent in grain size, color, and composition as the existing beach sediment and absent of hazardous contaminants. Historical beneficial use beach nourishment projects, using material from GHC, demonstrated sand compatibility concerning grain size and organic content. Material from GHC has been evaluated using bioassay and bioaccumulation procedures. The chemical and grain size analyses, solid phase bioassays, and bioaccumulation assessments indicated that GHC material was clean and did not require treatment.

Timing

The proposed action would be authorized for a single placement. GHC maintenance dredging occurs every two years or every odd fiscal year; thus, this project's earliest available dredge cycle

would appear in the fiscal year 2023. Hopper dredging and beach nourishment would be targeted to occur between December 1 and March 31, when sea turtle abundance is lowest throughout Gulf coastal waters. However, the project timeline is constrained by dredge vessel availability which could result in construction activities occurring outside the target window. Placement operations are anticipated to occur 18-24 hours per day. Project construction duration cannot increase beyond the estimated length of time it would take to bring material at a rate of 0.063 days per 10,000 cubic yards or equivalent, including dredging, transport, and discharge.

Description of the Discharge Site(s)

Approximately 1.7 miles of beachfront on Galveston Island at Bermuda Beach, beginning just south of Sunbather Lane and stretching southwest, stopping just short of 11 Mile Road would be nourished with dredged material seaward of the vegetation line. Approximately 530,000 cubic yards of beach quality sand would be obtained from the GHC, an authorized Federal project, during routine maintenance dredging operations and deposited on the beach.

The project area is exposed to oceanographic processes including tides, currents, and wave action as described in the DIFR-EA. The daily mean tidal range along the project area is 0.8 feet, with more considerable variations dependent on the wind that can depress (up to 4 feet) or raise (spring tides) surface water elevations. Currents are affected by many different physical forces and characteristics. In Galveston, currents change seasonally, in which currents move southwest (i.e., the same direction as net longshore current) in non-summer months and shift to the opposite direction in summer months[3]. The predominant wave direction is from the southeast, though the direction and magnitude can shift seasonally.

The project area can occasionally be used by various marine and terrestrial fauna for resting, nesting, and foraging; however, abundance and diversity are low given the exposure to physical processes. A complete description of species commonly found in the project area can be found in the DDPR-EA.

[3] Johnson, D.R. 2008. Ocean Surface Current Climatology in the Northern Gulf of Mexico. *Gulf Coast Research Laboratory*. Ocean Springs, MS.

Texas Commission on Environmental Quality
Tier II Analysis

Galveston Coastal Erosion, Galveston, TX

401 CERTIFICATION QUESTIONNAIRE

The following questions are included on the Texas Commission on Environmental Quality (TCEQ), Tier II 401 Certification Questionnaire. The responses provided seek to show implementing the Tentatively Selected Plan (TSP) for the Galveston Coastal Erosion, Galveston, TX section 204 continuing authorities program study will avoid adverse impacts during construction and upon completion of the project.

I. Water quality impacts

A. *Describe BMPs to control short-term and long-term* ***turbidity and suspended solids*** *in the waters being dredged and/or filled. Describe the type of sediment (sand, clay, etc.) that will be dredged or used for fill. Note: the return water from the upland placement of hydraulically dredged material will be required to meet the permit limit of 300 mg/L total suspended solids.*

Water in and around the surf zone (project area) regularly exceeds the Total Suspended Solids (TSS) threshold under natural conditions. USACE is requesting a waiver from the TCEQ standard threshold of dredged effluent to (i.e., <300 milligrams per liter) in areas where nourishment activities occur. The material dredged and placed within the project area consists of beach-quality sand, free of contaminants.

B. *Describe measures that will be used to* ***stabilize disturbed soil areas****, i.e., dredge material mounds, recently constructed levees or berms, and construction sites, during and after construction. Special construction techniques intended to minimize soil or sediment disruption should also be described.*

A dewatering structure consisting of sand sourced from a specific beach cell will be constructed, creating an impoundment between the dry beach and the dewatering structure to facilitate dewatering. Once dewatered, the beach quality sand will be distributed evenly to prevent future ponding and erosion, ensure proper coverage of cell units, and conform to the engineered beach template. Once construction has completed, the dewatering structure will be removed or distributed throughout the placement area.

C. *Describe any methods used to **test the sediments for contamination**, especially when dredging will occur in areas with a potential to be contaminated i.e., downstream of wastewater outfalls, waterbodies listed for contaminated sediments in the CWA 3030(d) list, or within an Area of Concern of a Superfund site.*

USACE has a significant repository of water and sediment chemistry data and elutriates data that elucidate water-soluble constituents released during dredging and placement. Based on available data, there is no indication of current water or elutriate contaminant problems known from the dredged site, Galveston Harbor and Channel (GHC). Geotechnical investigations were performed on sand collected from GHC to ensure color, grain size, and composition were compatible with the placement site and met the USACE criteria for beach quality sand.
In 2017, USACE completed a contaminant assessment report for the Galveston Ship Channel in compliance with EPA Ocean Dumping Regulations (40 CFR Part 227 Subpart B). The limited permissible concentration for liquid and suspended particulate phases was determined, indicating no toxicity or contamination to sensitive marine water column organisms.

II. Disposal of waste materials

A. *Describe the methods for disposing of materials recovered from the removal or destruction of existing structures.*

Not Applicable. Implementation of the action would not involve removing or destroying existing structures.

B. *Describe the methods for disposing of sewage generated during construction. If the proposed work establishes a business or a subdivision, describe the method for disposing of sewage after completing the project.*

Not applicable. No sewage would be generated during construction, and the proposed project does not involve constructing a business or subdivision.

C. *For marinas, describe plans for collecting and disposing of sewage from marine sanitation devices. Also, discuss provisions for the disposing of sewage generated from day-to-day activities.*

Not Applicable. Implementation of the action would not involve constructing or using a marina(s).

ALTERNATIVES ANALYSIS CHECKLIST

I. Alternatives

A. *How could you satisfy your needs in ways which do not affect surface water in the State?*

The action aims to nourish beaches along Galveston Island through the beneficial use of dredge material to naturally protect adjacent coastal properties from storm surges and coastal erosion. This intent can only be achieved by conducting work within surface waters in the State, specifically along the beaches and in the nearshore environment.

B. *How could the project layout onsite be designed to avoid and minimize impacts to surface water in the State?*

The chosen alternative does not avoid impacts to surface water in the State. This alternative was selected because it met the purpose and need for the action (i.e., beneficial use of dredged material). Although there are temporary adverse impacts to surface waters, the long-term benefits of restoring coastal habitats and enhancing coastal erosion protection outweigh any temporary impacts by increasing the habitat quality and functionality of the project area. The adverse effects anticipated from this action are minimal and brief.

C. *How could the project footprint be reduced to avoid and minimize impacts to surface water in the State?*

Reducing the project footprint would result in less dredged material being beneficially used for nourishment purposes. This would result in sediment being removed from the sediment budget of the west beach on Galveston Island, as it would instead be disposed of in an offshore disposal site. Reducing the project footprint would effectively eliminate the beneficial use of dredged material and the purpose of this action.

D. *What offsite locations were considered as an alternative for the project site?*

Not Applicable. No offsite locations were considered for this project as this does not provide beneficial use of dredged material.

E. *What are the consequences of not building the project (no-build alternative)?*

Without action, marine influences and other natural and human factors, such as subsidence, sea level change, navigation channels, oil and gas development, industry growth, and population increases would result in continued coastal habitat loss in the study area. Beach erosion and damage to homes and infrastructures would be unabated. This alternative does not prevent coastal erosion damages and risks to life and property at Galveston Island.

II. Comparison of Alternatives

A. *How do the costs compare for each alternative?*

Alternatives went through a cost-benefit and risk analysis. Two were considered cost-effective and the best-buy plan, i.e., there were no other plans that provided the same level of benefit for a lower cost. The alternatives (Alternatives 2 and 3) are differentiated by respective location; however, Alternative 2 has the most significant excess benefits over cost and is the most efficient, acceptable plan.

B. *What are the logistical (location, access, transportation, etc.) limitations for each alternative?*

Additional alternatives beyond the initial array were not logistically feasible due to economic, environmental, and engineering concerns with the placement of dredged material or because it did not meet the project's scope of beneficial use.

C. *What are the technological limitations for each alternative?*

Not applicable. There are no technological limitations for the alternatives considered.

D. *Are there other reasons why an alternative was not considered feasible?*

Tthere are no other reasons why other alternatives were not considered feasible.

E. *Please provide a comparison of each alternative considered using each of the criteria above.*

No alternatives beyond the initial array were considered in plan formulation involving non-surface water locations. The cost-benefit analysis for the alternatives were given full consideration (Table 1). Plans are considered cost-effective if the benefits outweigh the costs. The most beneficial strategy is that which provides the greatest benefits at the lowest costs. Of the six plans (including the no action alternative) evaluated, two plans, were identified as cost effective.

Table 1 Preliminary results of cost-benefit analysis. Both plans are considered cost effective. The asterisk (*) highlights the most beneficial strategy.

Plan	Annual Cost ($1000)	Annual Benefit ($1,000)	Benefit-Cost Ratio
Alternative 2	$10,752	$2,704	5.6*
Alternative 3	$10,932	$2,516	5.2

F. *Please explain how the preferred alternative is the least damaging practicable alternative.*

Temporary adverse impacts are expected with this alternative; however, the long-term benefits of restoring coastal habitats and enhancing coastal erosion protection outweigh any temporary effects by improving habitat quality and functionality for the project area. Best management practices (BMPs) will be followed to minimize adverse impacts and reduce damages (see the response to G below). Alternative 2 will have identical negative impacts as the No Action

Alternative due to dredging activities that would already occur. However, the No Action Alternative would not use dredged material for beach nourishment, instead be deposited offshore. Because the purpose is to use dredged material for beneficial use, Alternative 2 was identified as the least damaging alternative for this action.

G. *If all impacts to jurisdictional surface water in the State cannot be avoided, please explain how the remaining impacts will be minimized?*

Impacts to State surface waters will be minimized using best management practices (BMPs) during dredging and construction activities. These BMPs will include, but are not limited to:

- Use of silt fencing to limit soil migration and water quality degradation.
- Refueling and maintaining vehicles and equipment in designated areas to prevent accidental spills and potential contamination of water sources and the surrounding soils.
- Limiting the idling of vehicles and equipment to reduce emissions.
- Limiting ground disturbance necessary for staging areas, access routes, pipeline routes, etc., to the smallest size required to safely operate during construction and restoring staging areas and access routes to result in no permanent loss.
- Minimizing project equipment and vehicles transiting between the staging area and restoration site to the greatest extent practicable, including but not limited to using designated routes, confining vehicle access to the immediate needs of the project, and coordinating and sequencing work to minimize the frequency and density of vehicular traffic.
- Minimizing the use of construction lighting at night and when in use, directing lighting toward the construction activity area and shielding from view outside of the project area to the maximum extent practicable.

[Non-DoD Source] RE: Galveston Coastal Erosion, Galveston, TX -- Pre-filing Notification

401CERTS <401CERTS@tceq.texas.gov>

Tue 12/14/2021 8:09 PM

To: Fisher, Melinda CIV USARMY CESWF (USA) <Melinda.Fisher@usace.army.mil>

Thanks Melinda. Prefiling meeting request received. I'll be assigning this to staff soon and will let you know who it gets assigned to.

Thanks,

Peter Schaefer

Peter Schaefer, Team Leader
Standards Implementation Team (MC 150)
Water Quality Assessment Section
Water Quality Division, TCEQ
email: *peter.schaefer@tceq.texas.gov*
phone: 512-239-4372
fax: 512-239-4420

From: Fisher, Melinda CIV USARMY CESWF (USA) <Melinda.Fisher@usace.army.mil>
Sent: Monday, December 13, 2021 2:20 PM
To: 401CERTS <401CERTS@tceq.texas.gov>
Subject: Galveston Coastal Erosion, Galveston, TX -- Pre-filing Notification

To Whom It May Concern,

Please accept this notification of our intent to file for a Water Quality Certification next month. The 401 State Certification Pre-Filing Meeting Request Form is attached. If you need anything else or would like to schedule a meeting, please let me know.

Note: This is a Civil Works Continuing Authorities Program Study, therefore there will not be a USACE regulatory permit number assigned.

Thanks!
Melinda

~~~~~~

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

Texas Commission on Environmental Quality
401 State Certification Pre-filing Meeting Request Form

Why is this Pre-Filing Meeting Request Required? The U.S. Environmental Protection Agency published its Clean Water Act Section 401 Certification Rule in the Federal Register on July 13, 2020. It took effect on September 11, 2020. The federal rule requires all project applicants to submit a Pre-filing Meeting Request to the state certifying authority, the Texas Commission on Environmental Quality (TCEQ), at least 30 days prior to submitting a Section 401 Water Quality Certification Request (Certification Request). The TCEQ has prepared this Pre-filing Meeting Request form to help project applicants comply with the new 401 Certification Rule requirements.

Next Steps: The TCEQ will review your request for a Pre-filing Meeting to determine whether it is necessary or appropriate for your specific project, though actually conducting a Pre-filing Meeting is optional. Completing this form will help with the TCEQ's determination. Thank you for using this form.

1. Please submit this request form and a project location map to 401Certs@tceq.texas.gov.

2. If a Pre-filing Meeting is determined to be necessary by either the applicant or the TCEQ, the meeting will be scheduled to discuss the project.

3. If you do not receive a response to your request for a pre-filing meeting, after at least 30 days, you may submit the certification request to the TCEQ if a Section 401 certification is required for your project. Projects that require state certification are 1) all individual permit U.S. Army Corps of Engineer 404 permit applications and, 2) individual conditional certifications for the return water of Nationwide Permit 16.

For more information: EPA's 401 rule: https://www.epa.gov/cwa-401/final-rule-clean-water-act-section-401-certification-rule

Project Information

Project Name: **Galveston Coastal Erosion, Galveston, TX**
Project Applicant
Name: Melinda Fisher
Organization: US Army Corps of Engineers, Galveston District
Phone no.: 918-953-9534
Email: melinda.fisher@usace.army.mil
Consultant
Name: --
Organization: --
Phone no.: --
Email: --
Project Location *(Note: Please attach a project location map when submitting this form)*
Address: (nearest) 4120 Hershey Beach Dr (start) / 4226 Ghost Crab Ln (end)
City: Galveston, TX 77554
County: Galveston

Texas Commission on Environmental Quality
401 State Certification Pre-filing Meeting Request Form

Latitude/Longitude of project location: 29° 12'41.21" N 94° 55'08.49" W

Brief Project Description

The proposed action involves beneficially using dredged material to nourish approximately 8,976 linear feet (1.75 miles) of beachfront on Galveston Island at Bermuda Beach between Hershey Beach Drive and Ghost Crab Lane. Approximately 530,000 cubic yards of beach quality sand would be obtained from the Galveston Harbor and Channel (GHC), an authorized Federal project, during routine maintenance dredging operations and would not induce additional dredging beyond the Federal Standard.

Nourishment would be accomplished by hydraulic dredge, pipelines to the beach, and heavy equipment (bulldozers and loaders) shaping the fill on the beach. Temporary sand-training dikes would be used to contain the slurry discharge parallel to the shore. Once the sand is pumped onto the beach, bulldozers would shape the fill into the design template. The nourished sections would consist of a nearly horizontal 300-foot wide berm at +4.0 feet NAVD88 to minimize scarping, followed by a 180-foot seaward slope constructed at 1 on 20 to tie into the existing profile (Figure 5). Beach nourishment activities will be broken down and divided into multiple confined cells along the proposed work area. Work will begin in an individual cell and continue until that cell is completed. Beach quality sand will not be placed in multiple cells/areas at the same time. After construction is complete, all project sites would be restored to pre-construction slope or contours and all ruts leveled.

Please provide the type of federal permit for which the applicant is seeking state 401 certification. Please include a federal permit number if available.

No Federal Permit, this is a Civil Works Feasibility Study.

Jurisdictional Impacts

Fill/Excavate	Wetland (Cowardian Class), Seagrass, Oyster	Acres	Stream (linear feet)		
			intermittent	*perennial*	*tidal*
Example. Fill	Example. Palustrine Emergent Wetland (PEM)	Example. 3			
Example. Fill			Example. 300	Example. 100	
Fill	Marine Intertidal Unconsolidated Shore (M2USP/M2USN)	41.83			
Fill	Marine Subtidal Unconsolidated Bottom (M1UBL)	122.5			

Best Management Practices (BMPs) to be implemented:

1. Best available practical techniques and BMPs would be utilized during dredging and construction activities to avoid and minimize potential temporary and long-term adverse impacts, such as maintaining a work area that remains aesthetically attractive free of floating or piled debris and trash, storing fuels and other hazardous materials in locations which would not be introduced to surface waters if spilled, using silt curtains when appropriate to minimize movement of sediments, etc.
2. Movement of heavy equipment and support vehicles would utilize placement pipeline corridors to the greatest extent possible. Staging areas, access corridors, and general ground disturbance not related to restoration would utilize the smallest footprint possible to maintain a safe work environment.
3. Placed dredged material will be of beach quality sand consistent in grain size, color, and composition and free of contaminants, so that the composition will not adversely affect the biological, chemical or physical properties of the receiving waters.
4. Regular inspection of the pipeline route to check and fix pipe leaks.
5. No driving or construction activity is permitted within existing dune vegetation or other environmentally sensitive locations identified prior to construction.

Texas Commission on Environmental Quality
401 State Certification Pre-filing Meeting Request Form

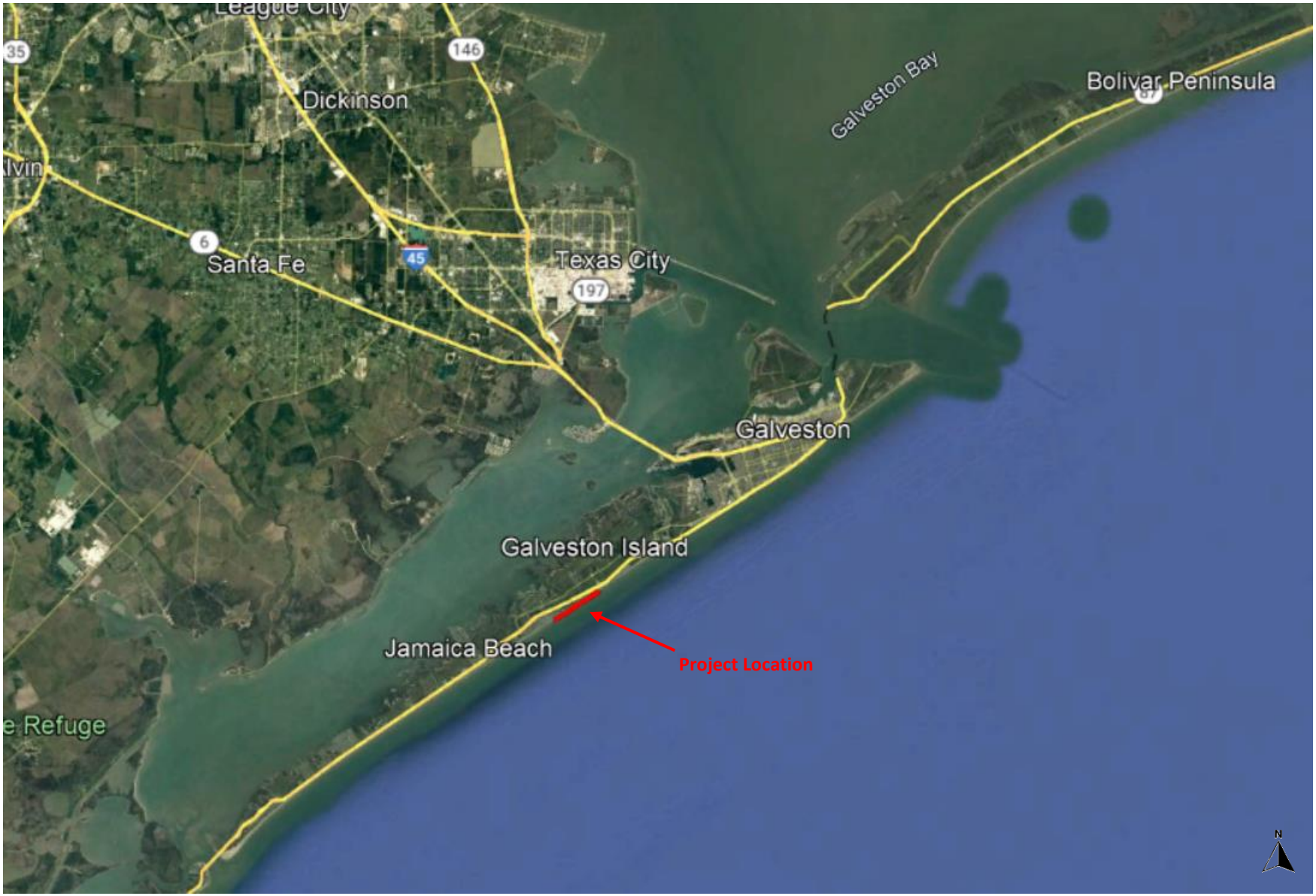

Figure 1. Overview of project location

September 30, 2021

Figure 2. Sheet 1 of Project Location

Figure 3. Sheet 2 of Project Location

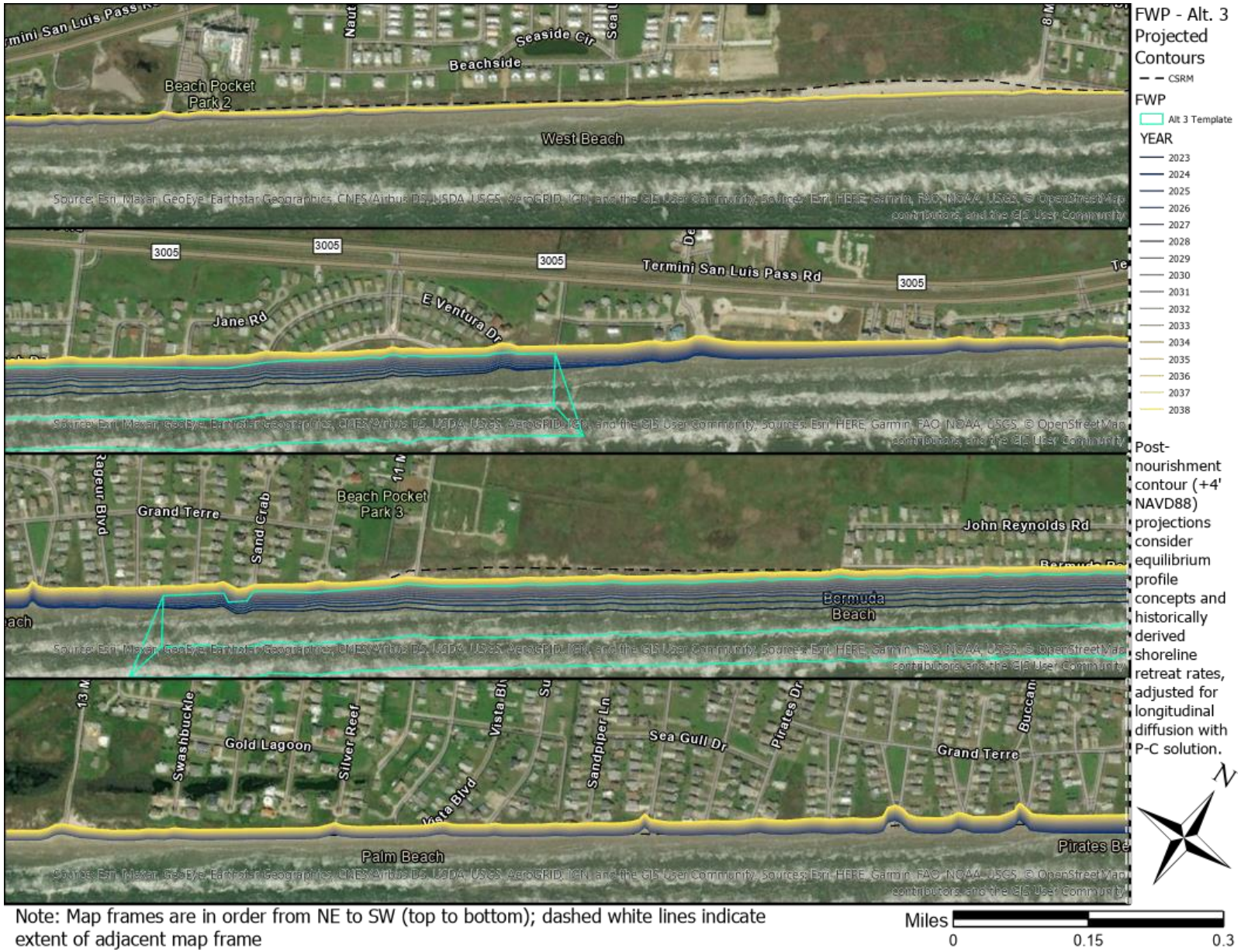

Figure 4. Post-nourishment contour (+4' NAVD88) projections based on historic equilibrium profile concepts.

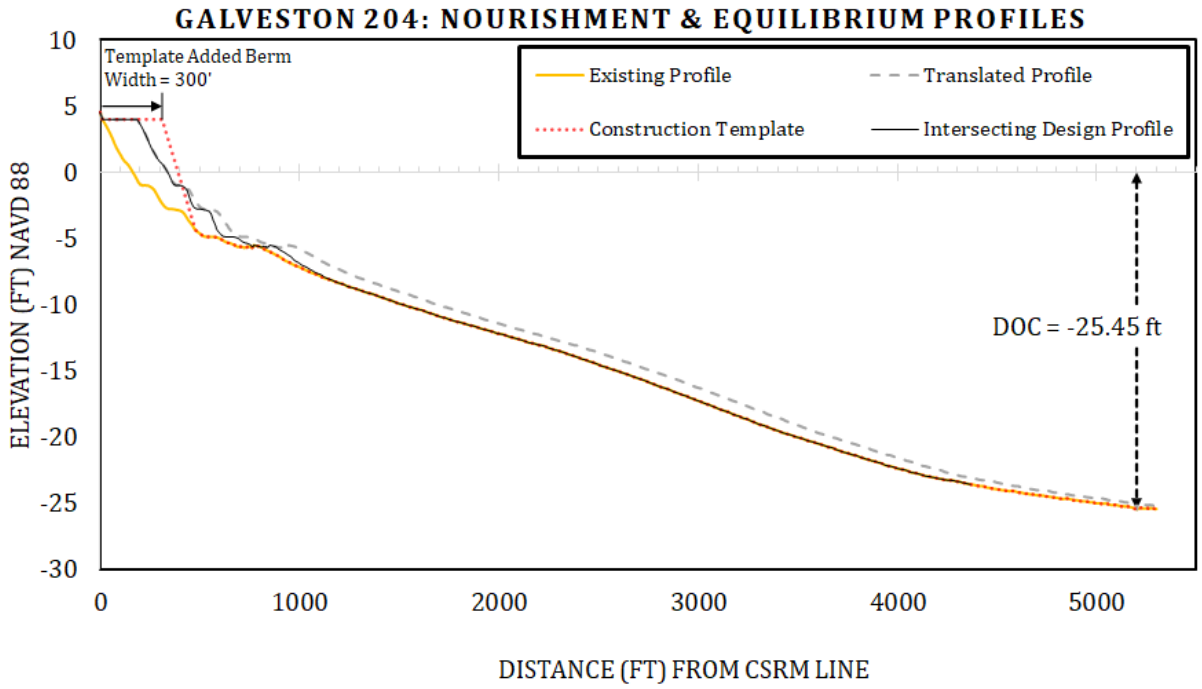

Figure 5. Existing and design profiles based on beach equilibrium concepts

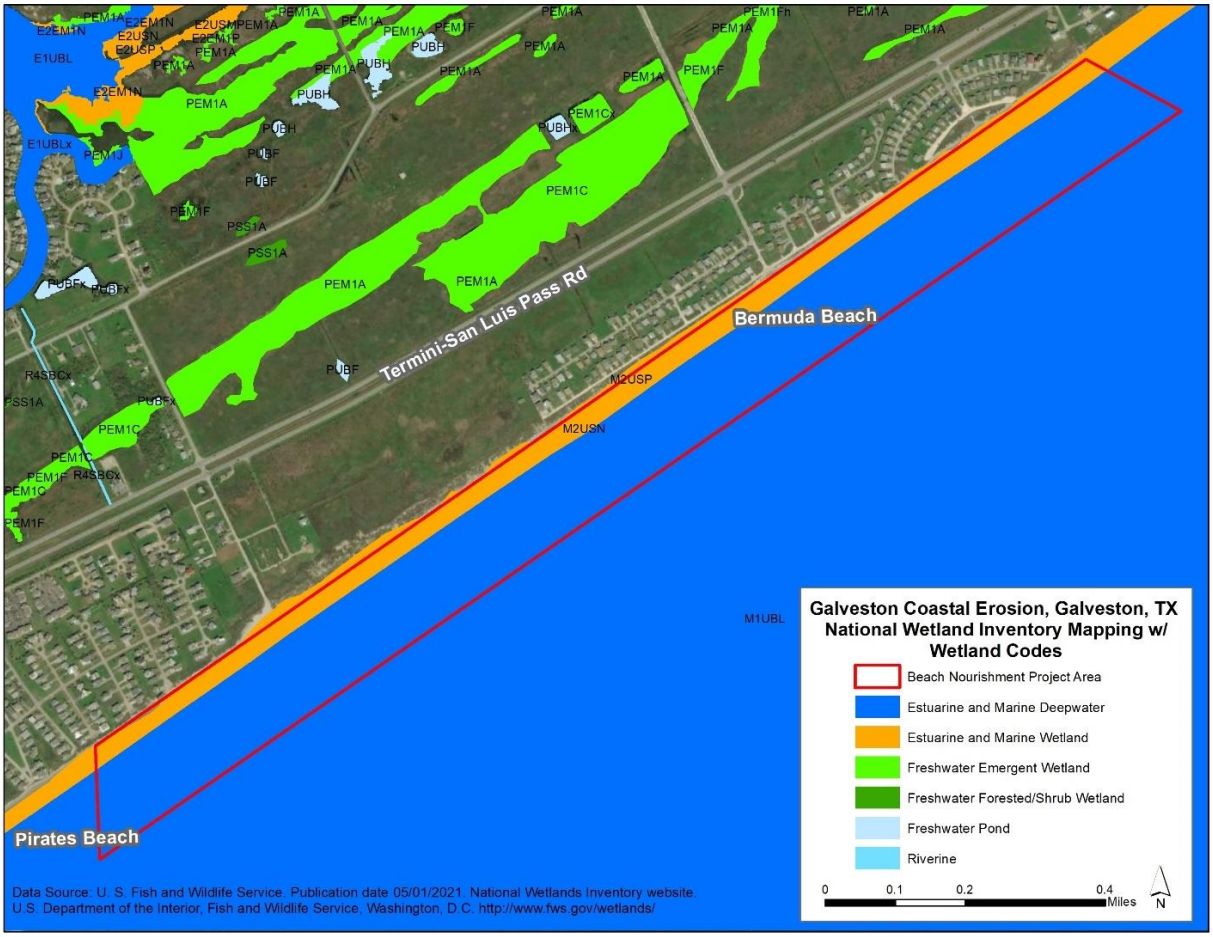

Figure 6. National Wetland Inventory Mapping of the Project Area

Appendix C-4 Coastal Zone Management Act Compliance

Coastal Zone Management Act Compliance

for

Galveston Island Coastal Erosion CAP 204 Project

Galveston, Texas

Consistency Review Request

Consistency Determination

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

July 8, 2022

Ms. Leslie Koza
Texas General Land Office
Federal Consistency Coordinator
PO Box 12873
Austin, Texas 78711-2873

Dear Ms. Koza,

The U.S. Army Corps of Engineers Galveston District (USACE), in partnership with the City of Galveston, is conducting the Galveston Island Coastal Erosion, Galveston, TX continuing authorities study as authorized by Section 204 of the Water Resources Development Act of 2016. The study purpose is to determine interest in beneficially using dredged material for coastal storm risk management on Galveston Island beaches to benefit coastal communities and public infrastructure.

A Draft Detailed Project Report and Environmental Assessment (DDPR-EA) was prepared to present the findings and recommendations and disclose the potential impacts to the human and natural environment if the Tentatively Selected Plan (TSP) is implemented. The TSP, Alternative 2, involves placing dredged material along 1.7 miles at Bermuda Beach seaward of the line of vegetation. Material would be hydraulically dredged and pumped to the beach through a series of submerged or floating pipelines, then shaped into the template beach profile using heavy equipment (e.g., bulldozers). The DDPR-EA can be viewed on the Galveston District website at:

https://www.swg.usace.army.mil/Business-With-Us/Planning-Environmental-Branch/Documents-for-Public-Review/

Pursuant to the Coastal Zone Management Act of 1972 (Public Law 92-583, 15 CFR §930.34(a)), the USACE has prepared a consistency determination report for the TSP (Enclosure). The report documents no adverse impacts to the 16 Coastal Natural Resource Areas, of which ten occur in the project area. Additionally, consistency with the four enforceable policies that apply to this project has been demonstrated.

The USACE has concluded that the project complies with the Texas Coastal Management Program and will be conducted in a manner consistent with all rules and regulations of the program. Please accept this letter and enclosed report as a formal request to initiate the consistency review process.

If you have any questions or need additional information to conduct your review, please contact Dr. Raven Blakeway, Biologist, Environmental Branch, Regional Planning and Environmental Center at 409-790-9058 or Raven.Blakeway@usace.army.mil.

Sincerely,

Jeffrey F. Pinsky
Chief, Environmental Branch
Regional Planning and Environmental Center

Enclosure (1)

Galveston Island Coastal Erosion, Galveston, Texas

Texas Coastal Management Plan Consistency Determination

June 2022

US Army Corps of Engineers ®
Galveston District

Prepared by:
United States Army Corps of Engineers Regional Planning and Environmental Center

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TABLE OF CONTENTS

INTRODUCTION

The U.S. Army Corps of Engineers, Galveston District (USACE), in partnership with the Galveston Island Park Board of Trustees of the City of Galveston, is examining the potential of beneficially using sand material generated during routine maintenance dredging operations of the Galveston Harbor and Channel (GHC) to nourish beach on the west end of Galveston Island. Galveston Island is a placement site candidate for beach nourishment under the Corps of Engineers' beneficial use of dredge material program (§204). This Federally authorized project would not induce additional dredging beyond the Federal Standard.

The project is located on Galveston Island, a barrier island between the Gulf of Mexico and the Texas mainland, 51 miles southeast of Houston, Texas. The proposed project is located in Galveston Island's center, parallel to FM 3005, extending from 8 Mile Road southwest to 13 Mile Road (Figure 1). Two alternatives are proposed for nourishment at the study location, in which placement would occur seaward of the vegetation line. Alternative 2 extends southwest from south of Sunbather Lane to 11 Mile Road, while Alternative 3 extends southwest from Hershey Beach to Fidler Crab Lane (Figure 1).

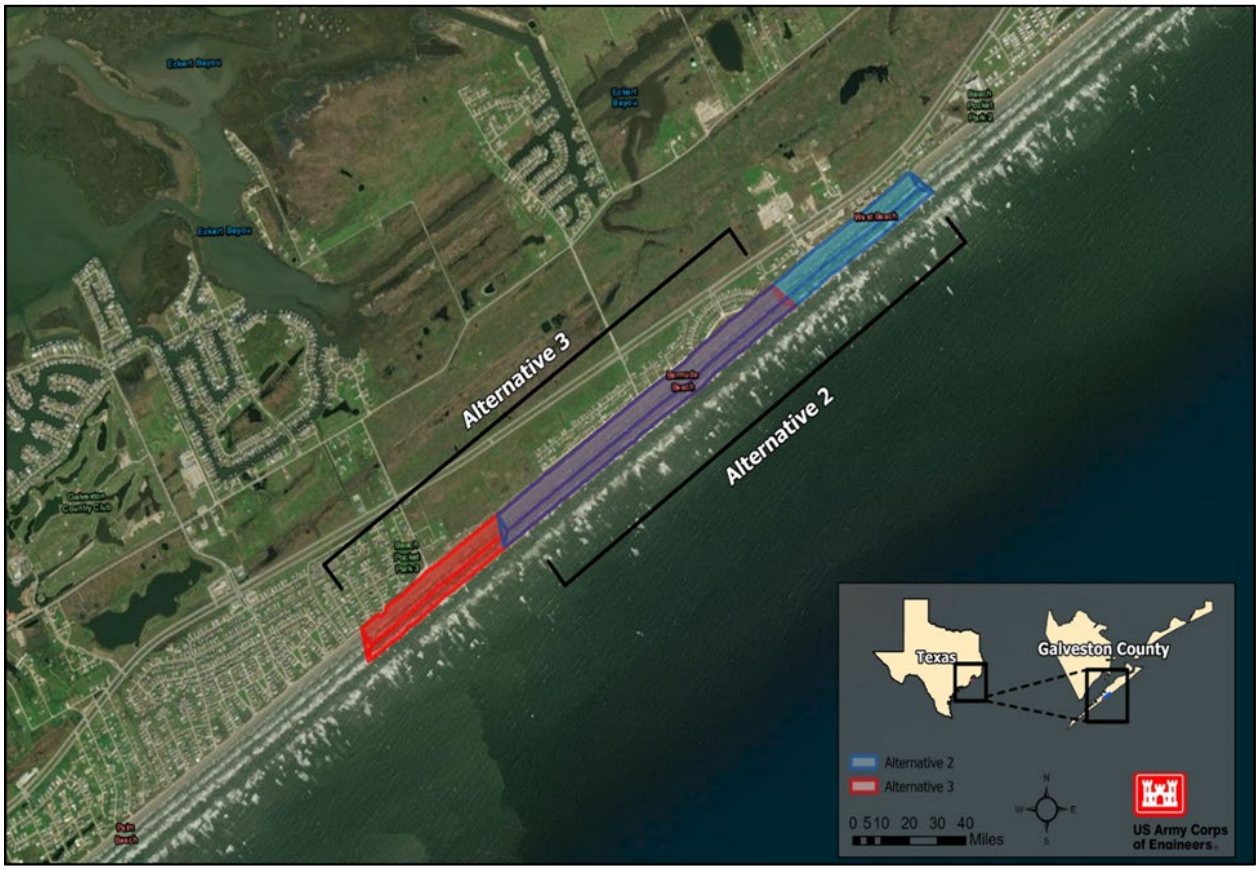

Figure 1 Study Location with proposed project alternatives in blue (Alternative 2) and red (Alternative 3). The overlap between alternatives is shown in purple.

Alternative 2 was chosen as the Tentatively Selected Plan (TSP). Dredge material is brought to the west end of Galveston Beach by hopper dredge and pumped by a pipeline for beach

placement (Figure 2). Alternative 2 involves beneficially using dredged material to nourish approximately 1.7 miles of beachfront on Galveston Island at Bermuda Beach seaward of the vegetation line beginning south of Sunbather Lane and stretching southwest, terminating before 11 Mile Road. Approximately 530,000 cubic yards of beach quality sand would be deposited and leveled on the beach.

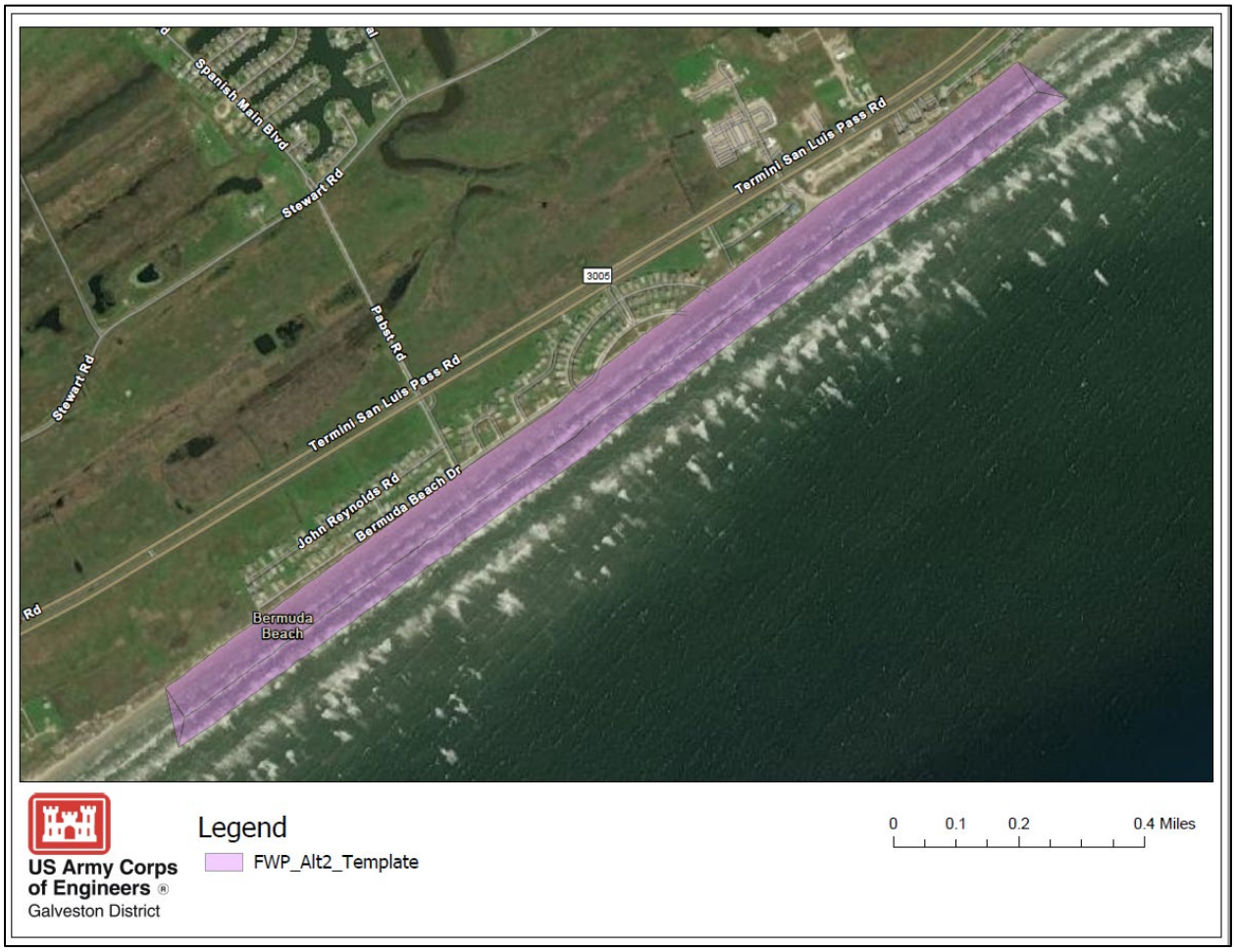

Figure 2 Project area for Alternative 2

Nourishment would be accomplished by hydraulically dredging material from GHC with a hopper dredge, pipelining the material to the beach, and using heavy equipment (e.g., bulldozers, loaders) to shape the fill on the beach into the design template (Figure 3). Any slurry discharge from the pipeline would be contained parallel to the shore using temporary sand training dikes. The dimensions of the nourished sections would include a 300-foot added berm width at +4.0 feet NAVD88 to minimize scarping, followed by a 180-foot seaward 1:20 slope to tie into the existing profile (Figure 3). Nourishment activities would be divided into multiple confined cells along the proposed area, in which shaping of the dredged material will be restricted to a single cell until completion. After construction is complete, project sites would be restored to pre-construction slope/contours.

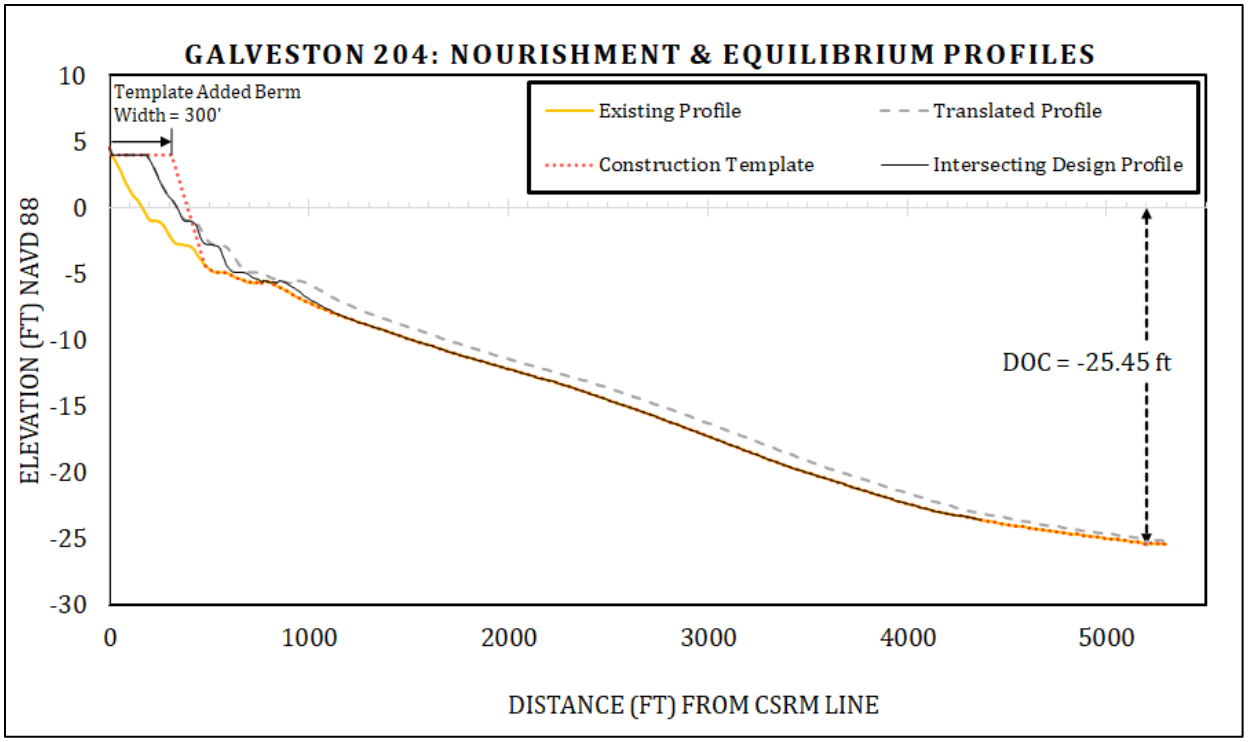

Figure 3 Profiles of the existing beach and design template for nourishment based on beach equilibrium concepts as the distance from Coastal Storm Risk Management Line (CSRM)

The TSP integrates watershed purposes of recreation, erosion protection, and critical habitat provision for migratory birds, foraging seabirds, and nesting sea turtles. It was determined to be feasible, environmentally acceptable, and economically justified based on currently available data and information developed during plan formulation, and significant institutional knowledge of beach nourishment activities. There is minimal uncertainty given available data and institutional knowledge form a construction perspective. However, uncertainties exist on site-specific, design-level details (e.g., exact sediment quantities, the extent of erosion control needs, construction staging locations, pipeline pathways, and duration of construction), which would be addressed during the pre-engineering and design phase. Additional plan details are provided in the DDPR-EA and the Engineering Appendix of the DDPR-EA (Appendix A).

Beach Placement

Material placement on the beach would involve pumping sediment directly onto the site by a dredge with pump-off capabilities. A pipeline would be routed from the dredge anchor point (i.e., pump-out location) in offshore waters (approximately 30-foot water depth) to the beach nourishment location. The pipe would be mobilized in segments of varying length (mean 40 feet) and diameter (mean 24-30 inches). Pipeline configuration would be proposed by the contractor based on performance and site conditions, then approved by USACE prior to implementation. The in-water configuration could entail a submerged pipeline, anchored by the density of the material or secured by physical means, or a floating pipeline on the surface. Pipeline configuration on the beach would be placed seaward of the vegetation line and foredune with discharges directed into the placement area. The pipe would be periodically added and

removed as sections are completed. Mobilizing the pipeline requires heavy equipment and vessels to transport and connect pipe segments from the dredge anchor point to the nourishment location.

The pipeline's construction disturbance area varies depending on pipe size (diameter and length). When identifying the pipeline route, USACE would consider site content and environmental features to minimize the environmental impact of construction activities. Once heavy equipment is on the beach and the pipeline is configured, operations are generally confined to the vicinity of the mean high-water line, away from dune vegetation. However, heavy equipment is temporarily operated throughout the width of the beach during active nourish placement to manage the outflow of sediment and construct target elevations for the appropriate beach profile.

Typically, the beach nourishing process involves bulldozers and occasionally backhoes to distribute sand from the outflow of the pipeline. The dredged material exits the pipe as a sand slurry, which is defused as it is released from the terminal pipe to reduce the flow velocity onto the beach. Dikes are constructed on one or two sides of the affluent area to extend the settlement of suspended solids to reduce nearshore turbidity. As sand releases from suspension, bulldozers and backhoes distribute it evenly to prevent future ponding and erosion, ensure proper coverage of cell units, and conform to the engineered beach template.

The construction zone, consisting of the active nourishment area and heavy equipment, is encompassed by a 500-1,000-foot fenced buffer. Stakes mark the cell unit, and elevation requirements are reviewed before sand placement. As target elevations are achieved in a cell unit, construction mobilizes to the next station. Sand would not be placed in multiple cell units concurrently. Once a nourishment area is completed (generally 500-1,000-foot acceptance sections), stakes are removed from the beach and the area is restored to pre-construction conditions.

Throughout the pumping process, the contractor would be required to inspect the pipeline route to verify the pipe's integrity and fix any leaks/disruptions. During construction operations, vehicles (e.g., pickup trucks, all-terrain vehicles) and heavy equipment (e.g., bulldozers, backhoes) may traverse the beach; however, construction activities are prohibited within existing dune vegetation or other environmentally sensitive locations identified prior to construction.

Sediment

Sediment placed on the beach would be configured with beach quality sand, consistent in grain size, color, and composition as the existing beach sediment and absent of hazardous contaminants. Historical beneficial use beach nourishment projects, using material from GHC, demonstrated sand compatibility concerning grain size and organic content. Material from GHC has been evaluated using bioassay and bioaccumulation procedures. The chemical and grain size analyses, solid phase bioassays, and bioaccumulation assessments indicated that GHC material was clean and did not require treatment.

Timing

The proposed action would be authorized for a single placement. GHC maintenance dredging occurs every two years or every odd fiscal year; thus, this project's earliest available dredge cycle would appear in the fiscal year 2023. Hopper dredging and beach nourishment would be targeted to occur between December 1 and March 31, when sea turtle abundance is lowest throughout Gulf coastal waters. However, the project timeline is constrained by dredge vessel availability which could result in construction activities occurring outside the target window. Placement operations are anticipated to occur 18-24 hours per day. Project construction duration cannot increase beyond the estimated length of time it would take to bring material at a rate of 0.063 days per 10,000 cubic yards or equivalent, including dredging, transport, and discharge.

CONSISTENCY WITH THE TEXAS COASTAL MANAGEMENT PROGRAM

Transportation to and placement of the dredged material in the nourishment units will be analyzed in this document for consistency with the Texas Coastal Management Program (TCMP) policies. Dredging is not assessed in this document as it was evaluated in the Final Environmental Assessment of the Galveston Harbor Channel (GHC) Extension Feasibility Study (USACE 2016). GHC dredging and placement activities have been identified as consistent with the policies of the TCMP. The proposed actions would not exceed the dredging needs described in the GHC, or the Federal standard.

Impacts on Coastal Natural Resource Areas

Potential impacts and methods to minimize or avoid those impacts to Coastal Natural Resource Areas (CNRA's) listed in 31 Texas Administrative Code (TAC) §501.3 are addressed below. Implementation of this project would have beneficial and less than adverse impacts on ten of the 16 CRNAs. Negative impacts are expected to be localized and short-term, returning to baseline conditions after construction ceases, while beneficial impacts are localized and long-term.

Coastal Shore Areas

A coastal shore area is defined as all areas within 100 feet landward of the highwater mark on state submerged land. The Galveston Island beach selected for dredge placement is a coastal shore area. Project implementation is expected to have localized, beneficial impacts on the coastal area as nourishment would enhance the function of the coastal system by reducing erosive forces and stabilizing the shoreline to improve the protection of adjacent infrastructure.

Coastal Waters

Coastal waters are defined as water in the open Gulf of Mexico and/or under tidal influence. Temporary and localized negative impacts on coastal waters in and around the surf zone of the project area are anticipated to occur because of dredging and placement activities, including the release of suspended solids, increased turbidity, and movement of tidal sand. Impacts are expected to be less than adverse because they are localized and temporary, only lasting while active placement and sediment shaping are ongoing. Between pump-out cycles and after construction is complete, baseline conditions would return.

Critical Dune Area

A critical dune area is defined as a protected sand dune complex on the Gulf shoreline within 1,000 feet of mean high tide designated by the land commissioner under Section 63.121 of the Texas Natural Resources Code. Further, the City of Galveston established a Dune Conservation Area along the Galveston coastline, which is defined as areas along Galveston's Gulf Coast where beachfront dunes naturally occur, restored dunes may be located, and lands within 25 feet of the north toe of existing or restored dunes. Project implementation is expected to have temporary and less than adverse impacts to critical dune areas as all construction activities would occur seaward of dunes and the line of vegetation. Additionally, construction equipment would utilize existing roads and traffic corridors to transport heavy equipment to the project area. Following completion of placement activities, habitat would be restored to pre-existing conditions. This project is expected to have long-term, beneficial impacts on critical dune areas. The beach

profile is being constructed to promote natural dune formation following criteria described in the City of Galveston's Erosion Response Plan (COG 2012).

Critical Erosion Area

A critical erosion area is defined as a coastal area that is experiencing historical erosion, according to the most recently published data of the Bureau of Economic Geology (BEG) of the University of Texas at Austin, that the commissioner finds to be a threat to public health, safety, and welfare; public beach use or access; general recreation; traffic safety; public property or infrastructure; private commercial or residential property; fish or wildlife habitat; or an area of regional or national importance. According to the City of Galveston's Erosion Response Plan, coastal erosion, storm events, and coastal construction projects have strongly influenced diminishing conditions along the Galveston coastline (COG 2012). Significant portions of the Galveston coastline, particularly beaches west of Stewart Road, experience an average erosion rate of >8 feet per year. According to data from the BEG, the proposed project area erodes four to six feet per year (COG 2012). This erosion rate, combined with other stressors such as storms and coastal development, impedes the ability of dune systems to protect the shoreline and landward infrastructure. This project would provide long-term, beneficial impacts to coastal erosion areas through beach nourishment activities that attempt to reduce coastal storm damage risks. Project implementation would reduce erosion rates in the project area by constructing a beach profile to promote natural dune formation following the criteria described in COG (2012).

Gulf Beach

A Gulf beach is defined as a beach bordering the Gulf of Mexico that is 1) located inland from the mean low tide line to the natural line of vegetation bordering the seaward shore of the Gulf of Mexico, or 2) part of a contiguous beach area to which the public has a right of use or easement. Long-term beneficial impacts are expected in the project area and beyond the boundaries of the project area. The introduction of sediments to create a more comprehensive beach profile would offer localized benefits by attenuating wave energies and reducing erosion into the dry beach and dune areas while protecting infrastructure behind dunes. Implementation would offer benefits beyond the project area as the additional sediments would contribute to sediment availability for longshore transport, allowing natural renourishment of other Gulf beach locations.

Special Hazard Areas

Special hazard areas are designated by the Administrator of the Federal Insurance Administration under the National Flood Insurance Act as having special flood, mudslide or mudflow, or flood-related erosion hazards and shown on a flood hazard boundary map or flood insurance rate map as Zone A, AO, A1-30, AE, A99, AH, VO, V1-30, VE, V, M, or E. The project area is designated within the 1% annual chance coastal floodplain and has a VE designation on the Federal Emergency Management Agency Flood Maps for Galveston County, Texas. This project is expected to provide long-term, beneficial impacts through coastal storm damage risk reduction in the special hazard area proposed for nourishment activities. Project implementation would reduce flooding by creating a more comprehensive beach profile that allows for wave attenuation further seaward of infrastructure. Placement activities would not change the base of floodplain elevation and thus would not cause property reclassification as a

non-hazard zone. Additionally, the project is not expected to induce the development of special hazard areas or be a factor in determining building requirements in the future. This project would be one-time nourishment, only providing benefits for up to 16 years. Placement activities would not protect against higher storm surge events, as this is a one-time placement, and no permanent, hardened structures are being installed.

Submerged Land

Submerged land is defined as land located under waters under tidal influence or under waters of the open Gulf of Mexico, without regard to whether the land is owned by the state or a person other than the state. The Texas General Land Office Coastal Resources online mapping tool defines Galveston Island beaches as submerged lands. Project implementation is expected to have temporary, localized, and less than adverse impacts on submerged lands. A pipeline would be constructed to move dredged material from offshore locations to a placement site on the beach. Pipeline configuration could entail a submerged pipeline, anchored by the density of the material, or secured by physical means, that would temporarily impact submerged lands. Mobilizing the pipeline requires vessels to transport and connect pipe segments from the dredge anchor point to the nourishment location, which would also temporarily affect submerged lands. These impacts are expected to be temporary because pre-existing conditions of submerged lands would be restored upon project completion. The City of Galveston and the Texas General Land Office will enter into an agreement that will allow the General Land Office to provide USACE with an Authorization of Entry to access the beach and submerged lands.

Tidal Sand or Mud Flat

Tidal sand is defined as a silt, clay, or sand substrate, without regard to whether it is vegetated by algal mats, that occur in intertidal areas and that are regularly or intermittently exposed and flooded by tides, including tides induced by weather. The project would result in localized, temporary, and less than adverse impacts in a tidal sand area. Disturbance to tidal sands in the project area from pipeline construction, heavy equipment (to move sediment to shape the beach profile), sand training dikes (to reduce nearshore turbidity), and the sand deposit would temporarily impact tidal sands in the project area; however, these are expected to cease upon project completion. Upon completion of placement activities, tidal sands would be restored to pre-construction conditions. Project implementation would also result in long-term, localized, beneficial impacts on tidal sand because nourishment would enhance the form and function of the area by increasing sediment inputs into the system, creating critical habitat for terrestrial and marine fauna, attenuating wave energies, and reducing erosive forces thereby protecting infrastructure.

Water of the Open Gulf of Mexico

Water of the open Gulf of Mexico is defined as water in this state, as defined by Section 26.001(5), Water Code, that is part of the open water of the Gulf of Mexico and that is within the territorial limits of the state. Temporary, localized, and less than adverse impacts to water of the open Gulf of Mexico are expected in and around the surf zone of the project area from dredging and placement activities. Placement activities would release suspended solids into Gulf of Mexico waters, increasing turbidity and decreasing water quality. Impacts on water quality are temporary as they would cease upon project completion. Effects on Gulf of Mexico waters are

expected to be less than adverse during placement activities, given the high suspended solids concentration in the project area under normal conditions. Once dredging and placement activities are concluded, Gulf of Mexico waters will return to pre-existing conditions.

Water under Tidal Influence

Water under tidal influence is defined as water in this state, as defined by Section 26.001(5), Water Code, that is subject to tidal influence according to the Texas Natural Resource Conservation Commission's stream segment map, which includes coastal wetlands. Temporary, localized, less than adverse impacts are expected in and around the surf zone of the project area from dredging and placement activities. Placement activities would release suspended solids into waters under tidal influence, increasing turbidity and decreasing water quality. Impacts on water quality are temporary as they would cease upon project completion. Effects to tidally influenced waters are expected to be less than adverse during placement activities given the high suspended solids concentration in the project area under normal conditions. Once dredging and placement activities are concluded, waters under tidal influence would return to pre-existing conditions.

Other CNRA's that would not be temporarily or permanently affected by project implementation because of the lack of the resource in the proposed area, as defined by §501.3, include coastal barriers, coastal historic areas, coastal preserves, coastal wetlands, hard substrate reefs, oyster reefs, and submerged aquatic vegetation.

Enforceable Policies

Four of the 20 enforceable policies reviewed apply to this project (Table 1).

Table 1 Coastal Management Program Enforceable Policies. Bolded terms indicate enforceable policies applicable to this project and are further discussed below.

Policy	Applicability
§ 501.15 Policy for Major Actions	N/A
§ 501.16 Policies for Construction of Electric Generating and Transmission Facilities	N/A
§ 501.17 Policies for Construction, Operation, and Maintenance of Oil and Gas Exploration and Production Facilities	N/A
§ 501.18 Policies for discharges of Wastewater and Disposal of Waste from Oil and Gas Exploration and Production Activities	N/A
§ 501.19 Policies for Construction and Operation of Solid Waste Treatment, Storage, and Disposal Facilities	N/A
§ 501.20 Policies for Prevention, Response and Remediation of Oil Spills	N/A
§ 501.21 Policies for Discharge of Municipal and Industrial Wastewater to Coastal Waters	N/A
§ 501.22 Policies for Nonpoint Source (NPS) Water Pollution	N/A
§ 501.23 Policies for Development in Critical Areas	**Yes**
§ 501.24 Policies for Construction of Waterfront Facilities and Other Structures on Submerged Lands	N/A
§ 501.25 Policies for Dredging and Dredged Material Disposal and Placement	**Yes**
§ 501.26 Policies for Construction in the Beach/Dune System	**Yes**
§ 501.27 Policies for Development in Coastal Hazard Areas	Yes

§ 501.28 Policies for Development Within Coastal Barrier Resource System Units and Otherwise Protected Areas on Coastal Barriers	N/A
§ 501.29 Policies for Development in State Parks, Wildlife Management Areas or Preserves	N/A
§ 501.30 Policies for Alteration of Coastal Historic Areas	N/A
§ 501.31 Policies for Transportation Projects	N/A
§ 501.32 Policies for Emission of Air Pollutants	**Yes**
§ 501.33 Policies for Appropriations of Water	N/A
§ 501.34 Policies for Levee and Flood Control Projects	N/A

§ 501.23 Policies for Development in Critical Areas

a) Dredging and Construction of structures in, or the discharge of dredged or fill material into, critical areas shall comply with the policies in this section. In implementing this section, cumulative and secondary adverse effects of these activities will be considered.

(1) The policies in this section shall be applied in a manner consistent with the goal of achieving no net loss of critical area functions and values.

Compliance: There is no net loss of critical area functions and values. The plan aims to restore critical areas and minimize future loss and general area degradation from irreversible cultural modifications (e.g., altered hydrologic regimen) to the coastal system.

(2) Persons proposing development in critical areas shall demonstrate that no practicable alternative with fewer adverse effects is available.

Compliance: All measures with more significant impacts were screened from further inclusion in the alternatives during plan formulation. The TSP takes advantage of sediment from existing dredging cycles from the GHC, allowing the material to be beneficially used and to remain within the system, rather than permanent removal by placement in an upland or offshore disposal site. There is sufficient material, in quantity and quality, from maintenance dredging; thus, there is no demonstrated need to do an out-of-cycle dredging operation or borrow offshore source material. The TSP was based on the critical need for nourishment and coastal storm risk reduction along this beach segment. Given the project design, with the beneficial use of dredge material (BUDM) and selecting the most critical area for nourishment, there is no practicable alternative with fewer adverse effects that provide the same risk reduction benefits.

(3) In evaluating practicable alternatives, the following sequence shall be applied:

(A) Adverse effects on critical areas shall be avoided to the greatest extent practicable.
(B) Unavoidable adverse effects shall be minimized to the greatest extent practicable by limiting the degree or magnitude of the activity and its implementation.
(C) Appropriate and practicable compensatory mitigation shall be required to the greatest extent practicable for all adverse effects that cannot be avoided or minimized.

Compliance: There are no anticipated adverse effects to critical areas per §501.3. Implementing the TSP would result in long-term, beneficial impacts on critical areas,

specifically critical dune, and erosion areas. The introduction of sediments would create a more comprehensive beach profile that offers localized benefits by attenuating wave energies and reducing erosion into critical dune areas. Nourishment would attempt to reduce coastal storm damage risks, by creating sacrificial erosion areas that protect the existing dunes and shoreline. This project would promote the natural development of critical areas by shaping placed sediment into a beach profile that stimulates natural dune formation. These beneficial impacts to critical areas are expected for at least 16 years. After this time, pre-existing conditions could revert, and shoreline loss would resume already affected areas.

(4) Compensatory mitigation includes restoring adversely affected critical areas or replacing adversely affected critical areas by creating new critical areas. Compensatory mitigation should be undertaken, when practicable, in areas adjacent or contiguous to the affected critical areas (on-site)…
(5) Mitigation banking is acceptable compensatory mitigation if use of the mitigation bank has been approved by the agency authorizing the development and mitigation credits are available for withdrawal…
(6) In determining compensatory mitigation requirements, the impaired functions and values of the affected critical area shall be replaced on a one-to-one ratio…

Compliance: There is no net loss of critical areas; therefore, no mitigation is needed. All negative impacts are temporarily occurring only during the construction periods. Long-term permanent effects are beneficial, resulting in a net increase in function and value of the critical areas.

(7) Development in critical areas shall not be authorized if significant degradation of critical areas will occur. Significant degradation occurs is:

(A) The activity will jeopardize the continued existence of species listed as endangered or threatened, or will result in likelihood of the destruction or adverse modification of a habitat determined to be a critical habitat under the Endangered Species Act, 16 United States Code Annotated, §§1531-1544;
(B) the activity will cause or contribute, after consideration of dilution and dispersion, to violation of any applicable surface water quality standards established under §501.21 of this title;
(C) the activity violates any applicable toxic effluent standard or prohibition established under §501.21 of this title;
(D) the activity violates any requirement improved to protect a marine sanctuary designated under the Marine Protection, Research, and Sanctuaries Act of 1972, 33 United States Code Annotated, Chapter 27; or
(E) taking into account the nature and degree of all identifiable adverse effects, including their persistence, permanence, areal extent, and the degree to which these effects will have been mitigated pursuant to subsections (c) and (d) of this section, the activity will, individually or collectively, cause or contribute to significant adverse effects on:
(i) human health and welfare, including effects on water supplies, plankton, benthos, fish, shellfish, wildlife, and consumption of fish and wildlife;
(ii) the life stages of aquatic life and other wildlife dependent on aquatic ecosystems, including the transfer, concentration, or spread of pollutants or

their byproducts beyond the site, or their introduction into an ecosystem, through biological, physical, or chemical processes;

(iii) ecosystem diversity, productivity, and stability, including loss of fish and wildlife habitat or loss of the capacity of a coastal wetland to assimilate nutrients, purify water, or reduce wave energy; or

(iv) generally accepted recreational, aesthetic or economic values of the critical area which are of exceptional character and importance.

Compliance: The project would not cause adverse effects on human health and welfare or any of the natural resources or systems listed above. The project does not occur in a wetland system and thus would not reduce ecosystem diversity, productivity, or the capacity of to assimilate nutrients, purify water, or reduce wave energy. The project could improve ecosystem diversity and productivity, by increasing the capacity of the tidal flat to function.

b) *The TCEQ and the RRC shall comply with the policies in this section when issuing certifications and adopting rules under Texas Water Code, Chapter 26, and the Texas Natural Resources Code, Chapter 91, governing certification of compliance with surface water quality standards for federal actions and permits authorizing development affecting critical areas; provided that activities exempted from the requirement for a permit for the discharge of dredge or fill material, described in Code of Federal Regulations, Title 33, §323.4 and/or Code of Federal Regulations, Title 40, §232.3, including…shall not be considered activities for which a certification in required. The GLO and the SLB shall comply with the policies in this section when approving oil, gas, or other mineral lease plans of operation or granting surface leases, easements, and permits and adopting rules under the Texas Natural Resources Code, Chapters 32, 33, and 51-53, and Texas Water Code, Chapter 61, governing development affecting critical areas on state submerged lands and private submerged lands, and when issuing approval and adopting rules under Texas Natural Resources Code, Chapter 221, for mitigation banks operated by subdivisions of the state.*

Compliance: A 404(b)(1) analysis has been prepared and will be submitted to TCEQ for approval.

c) *Agencies required to comply with this section will coordinate with one another and with federal agencies when evaluating alternatives, determining appropriate and practicable mitigation, and accessing significant degradation. Those agencies' rules governing authorizations for development in critical areas shall require a demonstration that the requirements of subsection (a)(1)-(7) of this section have been satisfied.*

Compliance: Coordination has been conducted with U.S. Fish and Wildlife Service, National Marine Fisheries Service, Texas Parks and Wildlife Department, Texas General Land Office, Texas Commission on Environmental Quality, and Texas Historical Commission. The Environmental Protection Agency has been notified of the project and provided opportunities to comment but has not been involved in project planning.

d) For any dredging or construction of structures in, or discharge of dredge or fill material into, critical areas that is subject to the requirements of §501.15 of this title (relating to Policy for Major Actions), data and information on the cumulative and secondary adverse affects of the project need not be produced or evaluated to comply with this section if such data and information is produced and evaluated in compliance with §501.15(b)-(c) of this title.

Compliance: The project complies with §501.15(b) – (c).

§501.25 Policies for Dredging and Dredged Material and Placement

a) Dredging and the disposal and placement of dredge material shall avoid and otherwise minimize adverse effects to coastal waters, submerged land, critical areas, coastal shore areas, and Gulf beaches to the greatest extent practicable. The policies of this section are supplement to any further restrictions or requirements relating to the beach access and use rights of the public. In implementing this section, cumulative and secondary adverse effects of dredging and the disposal and the placement of dredge material and the unique characteristics of affected sites shall be considered.

Compliance: Dredged material would be beneficially used to restore beach in an area that succumbs to high annual erosion rates, to reduce erosive forces, enhance natural dune formation, and offer protection to landward infrastructure. Placement in each restoration unit would have localized, temporary, and less than adverse effects on all natural resource areas listed in §50125 (a). Temporary impacts could include but are not limited to an increase in turbidity and suspended solids, burying/smothering of benthic organisms, movement of tidal sand, heavy equipment use, and restrictions to the use of specific areas. These are expected to be localized and restored to normal conditions once placement activities are completed.

(1) Dredging and dredged material disposal and placement shall not cause or contribute, after consideration of dilution and dispersion, to violation of any applicable surface water quality standards established under §501.21 of this title.

Compliance: Dredging activities would cause temporary, localized, and less than adverse impacts to surface water quality through increased turbidity and suspended solids, thereby degrading water quality. Water in and around the project area regularly exceeds the Total Suspended Solids (TSS) threshold, as defined by the Texas Commission for Environmental Quality (TCEQ; <300 milligrams per liter), under natural conditions. Additionally, based on available data, there is no indication of current water or elutriate contaminant problems known from the dredged site, Galveston Harbor and Channel (GHC). Previous analyses indicated no toxicity or contamination to sensitive marine water column organisms would occur due to this dredging activity.

(2) Except as otherwise provided in paragraph (4) of this subsection, adverse effects on critical areas from dredging and dredged material disposal or placement shall be avoided and otherwise minimized, and appropriate and practicable compensatory mitigation shall be required, in accordance with §501.23 of this title.

Compliance: Project implementation would not result in any long-term, permanent, or irreversible adverse effects on CNRAs and would realize a net increase in critical areas (e.g., tidal flats); therefore, no compensatory mitigation is needed. Placement of BUDM into critical areas would restore function to the affected CNRAs and improve the overall system.

(3) Except as provided in paragraph (4) of this subsection, dredging and the disposal and placement of dredged material shall not be authorized if:
(A) there is a practicable alternative that would have fewer adverse effects on coastal waters, submerged lands, critical areas, coastal shore areas, and Gulf beaches, so long as that alternative does not have other significant adverse effects;
(B) all appropriate and practicable steps have not been taken to minimize adverse effects on coastal waters submerged lands, critical areas, coastal shore areas, and Gulf beaches; or
(C) significant degradation of critical areas under §501.23(a)(7)(E) of this title would result.

Compliance: Critical and coastal shore areas would be temporarily affected by the project during construction, but not result in a long-term net loss of any of the resources that make up these areas. The project has net environmental benefits that would result from reintroducing sediments to the shoreline and widening the beach profile, which would restore the form and function of critical and coastal shore areas. Construction activities have been minimized to the greatest extent practicable, including reducing the overall construction footprint to only what is necessary and seasonal timing restrictions to avoid breeding/spawning and migrating fish and wildlife impacts to the greatest extent practicable.

(4) A dredging or dredged material disposal or placement project that would be prohibited solely by application of paragraph (3) of this subsection may be allowed if it is determined to be of overriding importance to the public and national interest in light of economic impacts on navigation and maintenance of commercially navigable waterways.

Compliance: Placement is not precluded by paragraph (3), as noted above.

b) Adverse effects from dredging and dredged material disposal and placement shall be minimized as required in subsection (a) of this section. Adverse effects can be minimized by employing the techniques in this subsection where appropriate and practicable.

(5) Adverse effects from dredging and dredge material disposal and placement can be minimized by controlling the location and dimensions of the activity. Some of the ways to accomplish this include:

Compliance: Placement of material onto the beach does not induce adverse effects. Temporary impacts associated with placement have been minimized to the greatest extent possible by employing Best Management Practices and minimization and conservation measures prescribed by TCEQ and U.S. Fish and Wildlife Services. See compliance discussions found in section (a) above.

(A) locating and confining discharges to minimize smothering of organisms;

(B) locating and designing projects to avoid adverse disruption of water inundation patterns, water circulation, erosion and accretion processes, and other hydrodynamic processes;
(C) using existing or natural channels and basins instead of dredging new channels or basins, and discharging materials in areas that have been previously disturbed or used for disposal or placement of dredged material;
(D) limiting the dimensions of channels, basins, and disposal and placement sites to the minimum reasonably required to serve the project purpose, including allowing for reasonable overdredging of channels and basins, and taking into account the need for capacity to accommodate future expansion without causing additional adverse effects;
(E) discharging materials at sites where the substrate is composed of material similar to that being discharged;
(F) locating and designing discharges to minimize the extent of any plume and otherwise dispersion of material; and
(G) avoiding the impoundment or drainage of critical areas.

Compliance: Open water impacts are minimized by placing dredge material on beaches. Can provide all dredged material requirements to implement the project through existing maintenance dredging cycles, so no modifications to the channel (e.g., widening or deepening, or more frequent dredging) are required to ensure enough sediment to implement. The project's nourishment features were designed to improve ecological functions of CNRAs, including proper drainage and suitable substrate material for species composition, and increase resiliency and sustainability to future conditions. Discharges would be confined with temporary sand training dikes to minimize release into adjacent areas. The sand training dikes would be breached after the sediments have settled and not result in any long-term impoundment or drainage changes to critical areas.

(6) Dredging and disposal and placement of material to be dredged shall comply with applicable standards for sediment toxicity. Adverse effects from constituents contained in materials discharged can be minimized by treatment of or limitations on the material itself. Some ways to accomplish this include;

(A) disposal or placement of dredged material in a manner that maintains physiochemical conditions at discharge sites and limits or reduces the potency and availability of pollutants;
(B) limiting the solid, liquid, and gaseous components of material discharged;
(C) adding treatment substances to the discharged material; and
(D) adding chemical flocculants to enhance the deposition of suspended particulates in confined disposal areas.

Compliance: Sediments dredged from the GHC have been tested for various chemical parameters of concern. Samples yielded no cause for concern, and sediments are safe for beneficial use. Additional details are provided in the DDPR-EA and Appendix C (CWA Appendix).

(7) Adverse effects from dredging and dredged material disposal or placement can be minimized through control of the materials discharged. Some ways of accomplishing this include:

(A) use of containment levees and sediment basins designed, constructed, and maintained to resists breaches, erosion, slumping, or leaching;
(B) use of lined containment areas to reduce leaching where leaching of chemical constituents from the material is expected to be a problem;
(C) capping in-place contaminated material or, selectively discharging the most contaminated material first and then capping it with the remaining material;
(D) properly containing discharged material and maintaining discharge sites to prevent point and nonpoint pollution; and
(E) timing the discharge to minimize adverse effects from unusually high water flows, wind, wave, and tidal actions.

Compliance: Small, temporary sand training dikes would be created during beach nourishment efforts to limit the movement of sediments outside the placement site. After all ground disturbing activities are complete and the site has sufficiently settled, the dike would be mechanically breached. Beach nourishment measures may have some temporary and local impacts by increasing turbidity; however, material generated from construction activities has been tested and found not to contain harmful concentrations of pollutants. Discharges would not occur during conditions involving high water flows, waves, or tidal actions.

(8) Adverse effects from dredging and dredged material disposal or placement can be minimized by controlling the manner in which material is dispersed. Some ways of accomplishing this include:

(A) where environmentally desirable, distributing the material in a thin layer;
(B) orienting material to minimize undesirable obstruction of the water current or circulation patterns;
(C) using silt screens or other appropriate methods to confine suspended particulates or turbidity to a small area where settling or removal can occur;
(D) using currents and circulation patterns to mix, disperse, dilute, or otherwise control the discharge;
(E) minimizing turbidity by using a diffuser system or releasing material near the bottom;
(F) selecting sites or managing discharges to confine and minimize the release of suspended particulates and turbidity and maintain light penetration for organisms; and
(G) setting limits on the amount of material to be discharged per unit of time or volume of receiving waters.

Compliance: All sites minimize or avoid adverse dispersal effects to the greatest extent practicable during construction. Material to be used for nourishment would be hydraulically discharged at specific discharge points. Would mechanically move the material with heavy equipment, reducing material dispersal into undesirable areas. Temporary sand training dikes would be constructed around nourishment units to limit the movement of sediments outside of the intended placement area. After all ground disturbing activities are complete and the site has

sufficiently settled, the dike would be mechanically breached. There are no sediments of concern.

(9) Adverse effects from dredging and dredged material disposal or placement operations can be minimized by adapting technology to the needs of each site. Some ways of accomplishing this include:

(A) using appropriate equipment, machinery, and operating techniques for access to sites and transport of material, including those designed to reduce damage to critical areas;
(B) having personnel on site adequately trained in the avoidance and minimization techniques and requirements; and
(C) designing temporary and permanent access roads and channel spanning structures using culverts, open channels, and diversions that will pass both low and high water flows, accommodate fluctuating water levels, and maintain circulation and faunal movement.

Compliance: Dredged material placement into the nourishment areas would minimize impacts to the greatest extent practicable including but not limited to siting pumps and pipes outside of environmentally sensitive and critical areas where possible; utilizing existing access roads to move material, equipment and personnel; and employing Best Management Practices (BMPs) to avoid adverse impacts. During Pre-construction Engineering and Design (PED), practices to further reduce environmental impacts on all areas and resources will be considered and employed to the greatest extent practicable.

(10) Adverse effects from dredging and dredged material disposal or placement operations can be minimized by adapting technology to the needs of each site. Some ways of accomplishing this include:

(A) avoiding changes in water current and circulation patterns that would interfere with the movement of animals;
(B) selecting sites or managing discharges to prevent or avoid creating habitat conducive to the development of undesirable predators or species that have a competitive edge ecologically over indigenous plants or animals;
(C) avoiding sites having unique habitat or other value, including habitat of endangered species;
(D) using planning and construction practices to institute habitat development and restoration to produce a new or modified environmental state of higher ecological value by displacement of some or all of the existing environmental characteristics;
(E) using techniques that have been demonstrated to be effective in the circumstances similar to those under consideration whenever possible and, when proposed development and restoration techniques have not yet advanced to the pilot demonstration stage, initiating their use on a small scale to allow corrective action if unanticipated adverse effects occur;
(F) timing dredging and dredged material disposal or placement activities to avoid spawning or migration seasons and other biologically critical time periods; and
(G) avoiding the destruction of remnant natural sites within areas already affected by development.

Compliance: The project would be designed and implemented in such a way to avoid adverse impacts to plant and animal populations and their habitat to the greatest extent practicable, including but not limited to seasonal timing restrictions, using existing access roads, employing construction BMPs, siting pumps and pipes in areas that would have the slightest disturbance on the overall system, and utilizing the smallest construction footprint possible. The project is intended to enhance the natural form and function of the coastal system; therefore, all long-term impacts are expected to be beneficial by increasing suitable habitat, resiliency, and sustainability.

(11) Adverse effects on human use potential from dredging and dredged material disposal or placement can be minimized by:

(A) selecting sites and following procedures to prevent or minimize any potential damage to the aesthetically pleasing features of the site, particularly with respect to water quality;
(B) selecting sites which are not valuable as natural aquatic areas;
(C) timing dredging and dredged material disposal or placement activities to avoid the seasons or periods when human recreational activity associated with the site is most important; and
(D) selecting sites that will not increase incompatible human activity or require frequent dredge or fill maintenance activity in remote fish and wildlife areas.

Compliance: Placement of dredged material into nourishment sites may adversely impact the human environment in and around the placement sites by visually disturbing the scenic view with construction equipment and activity, increasing noise, and reducing the number of recreational opportunities. These impacts would be temporary, only lasting the time for the material to be appropriately placed and for the area to stabilize. Timing of construction is entirely dependent on dredging cycles; however, during PED, it would be advised to avoid the peak recreational seasons (spring/summer) if possible. After construction is complete, recreation and scenic value are expected to increase through increased recreational areas and opportunities (i.e., more beach=more beachgoers).

(12) Adverse effects from new channels and basins can be minimized by locating them at sites:

(A) that ensure adequate flushing and avoid stagnant pockets; or
(B) that will create the fewest practicable adverse effects on CNRAs from additional infrastructure such as roads, bridges, causeways, piers, docks, wharves, transmission line crossing, and ancillary channels reasonably likely to be constructed as a result of the project; or
(C) with the least practicable risk that increased vessel traffic could result in navigation hazards, spills or other forms of contamination which could adversely affect CNRAs;
(D) provided that, for any dredging of new channels or basins subject to the requirements of §501.15 of this title (relating to Policy for Major Actions), data and information on minimization of secondary adverse effects need not be produced or evaluated to comply with this paragraph if such data and information is produced and evaluated in compliance with §501.15(b)(1) of this title.

Compliance: The project does not include constructing new channels or basins; therefore, §501.25(8)(A-D) does not apply.

c) Disposal or placement of dredged material in existing contained dredge disposal sites identified and actively used as described in an environmental assessment or environmental impact statement issued prior to the effective date of this chapter shall be presumed to comply with the requirements of subsection (a) of this section unless modified in design, sign, use, or function.

d) Dredged material from dredging projects in commercially navigable waters is a potentially reusable resource and must be used beneficially in accordance with this policy.

(1) If the costs of beneficial use of dredged material area reasonably comparable to the costs of disposal in a non-beneficial manner, the material shall be used beneficially.

(2) If the costs of the beneficial use of dredged material are significantly greater than the costs of disposal in a non-beneficial manner, the material shall be used beneficially unless it is demonstrated that the costs of using the material beneficially are not reasonably proportionate to the costs of the project and benefits that will result. Factors that shall be considered in determining whether the costs of the beneficial use are not reasonably proportionate to the benefits include but are not limited to:

(A) environmental benefits, recreational benefits, floor or storm protection benefits, erosion prevention benefits, and economic development benefits;
(B) the proximity of the beneficial use site to the dredge site; and
(C) the quantity and quality of the dredged material and its suitability for beneficial use.

(3) Examples of the beneficial use of dredged material include, but are not limited to:

(A) projects designed to reduce or minimize erosion or provide shoreline protection;
(B) projects designed to create or enhance public beaches or recreational areas;
(C) projects designed to benefit the sediment budget or littoral system;
(D) projects designed to improve or maintain terrestrial or aquatic wildlife habitat;
(E) projects designed to create new terrestrial or aquatic wildlife habitat, including the construction of marshlands, coastal wetlands, or other critical areas;
(F) projects designed and demonstrated to benefit benthic communities or aquatic vegetation;
(G) projects designed to create wildlife management areas, parks, airports, or other public facilities;
(H) projects designed to cap landfills or other water disposal areas;
(I) projects designed to fill private property or upgrade agricultural land, if cost-effective public beneficial uses are not available; and
(J) projects designed to remediate past adverse impacts on the coastal zone.

e) If dredged material cannot be used beneficially as provided in subsection (d)(2) of this section, to avoid and otherwise minimize adverse effects as required in subsection (a) of this section, preference will be given to the greatest extent practicable to disposal in…

Compliance: Dredged material would be beneficially used to nourish the beach habitat throughout the project area; therefore, the project is consistent with §501.25(d)(1–3). Policies §501.25(c) and §501.25(e)(1–3) do not apply to this project.

f) For new sites, dredged materials shall not be disposed of or placed directly on the boundaries of submerged lands or at such location so as to slump or migrate across the boundaries of submerged lands in the absence of an agreement between the affected public owner and the adjoining private owner or owners that defined the location of the boundary or boundaries affected by the deposition of the dredged material.

Compliance: Dredged materials would not be placed directly on submerged lands. If, during PED, it is identified that placement would occur on submerged lands, appropriate real estate agreements would be drafted and in place before construction to ensure all landowners are appropriately notified and compensated for any loss or impacts.

g) Emergency dredging shall be allowed without a prior consistency determination as required in the applicable consistency rule when…

Compliance: An emergency does not exist with implementation of the project. Consistency of the project with program policy would be determined prior to project authorization.

h) Mining of sand, shell, marl, gravel, and mudshell on submerged lands shall be prohibited unless there is an affirmative showing of no significant impact on erosion within the coastal zone and no significant adverse effect of coastal water quality or terrestrial and aquatic wildlife habitat within a CNRA.

Compliance: Project activities do not involve mining for shell, marl, gravel, or mud shell; however, sand would be dredged from bay bottoms of the GHC for use in nourishment units. Dredging sand from this location has already been addressed in other documents.

i) The GLO and the SLB shall comply with the policies in this section when approving oil, gas, and other mineral lease plans of operation and granting surface leases, easements, and permits and adopting rules under the Texas Natural Resources Code, Chapter 32, 33, and 51–53, and Texas Water Code, Chapter 61, for dredging and dredge material disposal and placement TxDOT shall comply with the policies in this subchapter when adopting rules and taking actions as local sponsor of the Gulf Intracoastal Waterway under Texas Transportation Code, Chapter 51. The TCEQ and the RRC shall comply with the policies in this section when issuing certifications and adopting rules under Texas Water Code, Chapter 26, and the Texas Natural Resources Code, Chapter 91, governing certification of compliance with surface water quality standards for federal actions and permits authorizing dredging or the discharge or placement of dredged material. The TPWD shall comply with the policies in this section when adopting rules at Chapter 57 of this title (relating to Fisheries) governing dredging and dredged material disposal and placement. TPWD shall comply with the policies in subsection (h) of this section when adopting rules and issuing permits under Texas Parks and Wildlife Code, Chapter 86, governing the mining of sand, shell, marl, gravel, and mudshell.

Compliance: This project does not involve oil, gas, and other mineral lease plans of operation or granting of surface leases, easements, or permits; therefore, §501.25(i) does not apply.

§501.26 Policies for Construction in the Beach/Dune System

a) Construction in critical dune areas or areas adjacent to or on Gulf beaches shall comply with the following policies:

(1) Construction within a critical dune area that results in the material weakening of dunes and material damage to dune vegetation shall be prohibited.

(2) Construction within critical dune areas that does not materially weaken dunes or materially damage dune vegetation shall be sited, designed, constructed, maintained, and operated so that adverse "effects" (as defined in §15.2 of this title (relating to Coastal Area Planning) on the sediment budget and critical dune areas are avoided to the greatest extent practicable. For purposes of this section, practicability shall be determined by considering the effectiveness, scientific feasibility, and commercial availability of the technology or technique. Cost of the technology or technique shall also be considered. Adverse effects (as defined in Chapter 15 of this title (relating to Coastal Area Planning) that cannot be avoided shall be:

(A) minimized by limiting the degree or magnitude of the activity and its implementation;
(B) rectified by repairing, rehabilitating, or restoring the adversely affected dunes and dune vegetation; and
(C) compensated for on-site or off-site by replacing the resources lost or damaged seaward of the dune protection line.

Compliance: Localized, temporary, and less than adverse impacts are expected with nourishment activities as all dredged material placement would occur seaward of dunes and the vegetation line. Heavy equipment and construction vehicles will use established corridors and roads to avoid traffic across dune systems. The addition of sand to the existing beach profile would benefit critical dune areas as it would be constructed with a beach profile designed to promote natural dune development.

(3) Mitigation and compensation for adverse effects that cannot be avoided or minimized shall provide at least a one-to-one replacement of the dune volume and vegetative cover, and preference shall be given to stabilization of blowouts and breaches and on-site compensation.

Compliance: The project would not involve any short- or long-term adverse impacts which would require mitigation.

(4) The ability of the public, individually and collectively, to exercise its rights of use of and access to and from public beaches shall be preserved and enhanced.

Compliance: The project would temporarily restrict public access to the beach in areas of construction activities; however, it will minimize this to the best extent possible (i.e., the size of restricted construction areas) and will restore regular public access to the beach after construction activities are completed.

(5) Non-structural erosion response methods such as beach nourishment, sediment bypassing, nearshore sediment berms, and planting of vegetation shall be preferred instead of structural erosion response methods. Subdivisions shall not authorize the construction of a new erosion response structure within the beach/dune system, except as provided by subsection (b) of this section or a retaining wall located more than 200 feet landward of the line of vegetation. Subdivisions shall not authorize the enlargement, improvement, repair or

maintenance of existing erosion response structures on the public beach. Subdivisions shall not authorize the repair or maintenance of existing erosion response structures within 200 feet landward of the line of vegetation except as provided in §15.6(d) of this title (relating to Concurrent Dune Protection and Beachfront Construction Standards).

Compliance: The project does not involve the construction of any hardened structures, rather relies on non-structural measures to achieve risk reduction goals.

b) *Construction of structural shore protection projects, including geotextile shore protection projects, in critical dune areas or areas adjacent to or on Gulf Beaches shall comply with the following policies:*

(1) *The size and the length of a shore protection project shall be determined as part of a site-specific construction and maintenance plan, taking into account both technical requirements and policy issues as described under this subsection, and shall be limited to the minimum size necessary to fulfill the project's goals and purposes.*

Compliance: The size of the beach being constructed was developed using several sources of information, including size of successful past nourishment activities, rate of shoreline retreat, and beach profile criteria that promote dune formation and reduce erosive forces for the area. This project is intended to be a one-time activity to offer risk reduction for 16 years, after which time, pre-existing conditions may occur.

(2) *A shore protection project shall only be used to protect community developments, public infrastructure, and for other lawful public purposes and shall not be used solely to protect individual structures or properties. A community development may include a neighborhood or aggregation of residences or commercial structures.*

Compliance: The project indirectly protects community developments and public infrastructure by widening the beach profile to support coastal storm risk reduction. The project offers enhanced protection against erosive forces that rapidly and naturally encroach on landward infrastructure in the area. However, this does not predicate the threat of storms and/or natural disasters.

(3) *A shore protection project located parallel to the shore shall be located landward of the boundary of state-owned submerged land as determined by a coastal boundary survey conducted in accordance with Texas Natural Resources Code §33.136, and shall avoid and otherwise minimize adverse effects to dunes and dune vegetation.*

Compliance: This project would not induce short- or long-term adverse impacts on submerged lands or dunes. It would limit the short-term effects of construction activities across submerged lands and restrict it to placement and movement of pipeline equipment. All nourishment activities would occur landward of the boundary of state-owned submerged lands. Short-term impacts would cease after construction is complete. Dune systems will be avoided during construction activities with this project; instead long-term, beneficial effects are expected for dunes by building a beach profile that meets the criteria to promote natural dune growth and enhancement.

(4) To maximize the protection offered by a shore protection project, to enhance the survivability of the project, and to minimize adverse effects to natural resources, a shore protection project shall be located according to the following preferred order:

(A) In an area where a foredune ridge is present, where practicable, a shore protection project shall be located landward of the foredune ridge;
(B) Where there is no foredune ridge, a project shall be located landward of the line of vegetation, where practicable;
(C) Where it is not practicable to locate a shore protection project landward of the line of vegetation, a project shall be located at the line of vegetation; or
(D) Where there is no other practicable location, a shore protection project shall be located at the most landward point of the public beach provided that the project sponsor has provided financial assurance that the pre-project beach width will be maintained through beach nourishment.

Compliance: This project would be located seaward of the line of vegetation and would follow the current alignment of the beach and dune systems. Beach nourishment would provide long-term, beneficial protection to the dune system.

(5) A shore protection project shall not adversely affect sea turtle nesting areas or an endangered species.

Compliance: A Biological Opinion (BO) was issued by the U.S. Fish and Wildlife Services (USFWS) to permit USACE to perform beach nourishment on Galveston Island, Galveston County, TX under permit SWG-2007-01025. This BO addressed the effects on endangered Kemp's ridley sea turtles, piping plovers, and threatened red knots in accordance with Section 7 of ESA that have the potential to occur in the project area. USACE determined the proposed project would not effect the threatened West Indian Manatee, endangered Attwater's greater prairie chicken, and endangered leatherback sea turtle; thus, no coordination or contact with USFWS was necessary. USFWS concurred with USACE in their BO, dated June 17, 2019, that associated onshore activities of the proposed project may affect, but are not likely to adversely affect the endangered green sea turtle, hawksbill sea turtle, or the threatened loggerhead sea turtle. For additional details about species-specific effects, refer to the BO in the DDPR-EA (Appendix C). No long-term or permanent adverse effects are anticipated, and any short-term effects would be temporary (limited to the construction period) and less than adverse. During constructions, BMPs and conservation measures would be employed to further reduce negative impacts. After construction, placement areas are expected to increase habitat value and beneficially impact fish and wildlife species by increasing suitable foraging, nesting, and migration habitat.

(6) Shore protection projects shall not be constructed on stable or accreting beaches.

Compliance: The project area has been experiencing significant shoreline erosion at 4 to 6 feet per year. No shoreline accretion has been recorded for the project area.

(7) A shore protection project shall be designed to avoid and otherwise minimize any adverse effects to adjacent beaches or properties at either end of a project.

Compliance: The project would not adversely affect to adjacent beaches or properties. Construction activities and less than adverse impacts from project implementation are restricted to the placement area.

(8) To the extent allowed by law, a dune protection permit is required to authorize the construction of a shore protection project in the beach/dune system.

Compliance: The City of Galveston is the non-federal sponsor for the project and has attended planning meetings/discussions for placement activities. No dune protection permit is required to authorize this project, as placement activities would occur seaward of the vegetation line and are not anticipated to adversely impact the dune system.

(9) A mitigation plan shall be submitted for any adverse effects to critical dune areas as a result of the construction and presence of a shore protection project.

Compliance: The project would not adversely effect critical dune areas; therefore, a mitigation plan is not necessary.

(10)Public input shall be incorporated into a local government's review and approval of a shore protection project. Methods to obtain public input include public meetings, notices by mail to affected property owners, publication of notices in local newspapers, the Texas Register, and web sites.

Compliance: The Draft Project Report and Environmental Assessment (DPR-EA) will be released for public review 60 days after the TSP milestone meeting. A news release notifying the public of the availability of the DPR-EA will be published in local papers. Additional public input conducted by the local government is not anticipated since the project does not require a Dune Protection Permit.

(11) The success criteria for a shore protection project shall be developed by a project sponsor with consideration for the health and maintenance of the beach/dune system.

(12)The sponsor of a shore protection project shall be responsible for the ongoing maintenance of the project and, if necessary, beach nourishment and/or removal of the project.

Compliance: This is a one-time nourishment project; thus, ongoing maintenance of the project, renourishment, or removal is not expected.

(13)Sand from the beach/dune system shall not be used to fill or cover a shore protection project. Where appropriate, a shore protection project shall remain covered with sand and dune vegetation with a preference for natural dune vegetation. The sand and vegetation used to cover a shore protection project shall conform to the standards for dune restoration projects as described in §15.4 (relating to Dune Protection Standards) and §15.7, (relating to Local Government Management of the Public Beach) of this title.

Compliance: No dune construction is proposed for this project. All beach nourishment will be constructed from dredged material obtained from the Galveston Harbor Channel. The new beach profile will be constructed following criteria that promotes natural dune formation.

(14) Long-term monitoring of a shore protection project shall be required to determine the project's effect on the beach/dune system and the project's effectiveness. Prior to the construction of a shore protection project, a project sponsor shall collect scientifically valid baseline data for monitoring the line of vegetation, the extent of the dry beach, a beach profile, and any other characteristics necessary for evaluating the project's effectiveness.

Compliance: This is a one-time nourishment activity that does not require long-term monitoring.

(15) Existing public access in the area of a shore protection project shall be replicated if not enhanced. A local government shall not impair or close an existing public access point or close a public beach to pedestrian or vehicular traffic without prior approval of the GLO as required under the Open Beaches Act, Texas Natural Resource Code Annotated, Chapter 61, and the Beach/Dune rules, Chapter 15 of this title.

Compliance: Public access would remain intact, and the current use of the beach could continue, except during construction, at which time the beach would be temporarily closed for public safety. After construction, the beach would be more comprehensive and could increase public use of the area.

c) The GLO shall comply with the policies in this section when certifying local government dune protection and beach access plans and adopting rules under the Texas Natural Resources Code, Chapters 61 and 63. Local governments required by the Texas Natural Resources Code, Chapters 61 and 63, and Chapter 15 of this title (relating to Coastal Area Planning) to adopt dune protection and beach access plans shall comply with the applicable policies in this section when issuing beachfront construction certificates and dune protection permits.

Compliance: The project does not involve adopting dune protection or beach access plans, nor does it require issuing a beachfront construction certificate or dune protection permit; therefore, §501.26 (c) does not apply. Beach access for construction activities will be granted to USACE through an acquisitions process between the General Land Office and the City of Galveston.

§501.32 Policies for Emission of Air Pollutants

TCEQ rules under Texas Health and Safety Code, Chapter 382, governing emissions of air pollutants, shall comply with regulations at Code of Federal Regulations, Title 40, adopted pursuant to the Clean Air Act, 42 United States Code Annotated, §§7401, et seq, to protect and enhance air quality in the coastal area so as to protect CNRAs and promote the public health, safety, and welfare.

Compliance: The project is fully compliant with the Clean Air Act as documented in the DDPR-EA.

CONCLUSION

This project complies with the Texas Coastal Management Program and will be conducted in a manner consistent with all rules and regulations of the program.

REFERENCES

City of Galveston (COG). 2012. Erosion Response Plan: Galveston Planning and Development Regulations. City of Galveston, Galveston, TX. 37 pp.

U.S. Army Corps of Engineers (USACE) Southwest Division. 2016. Final Environmental Assessment Galveston Harbor Channel Extension Feasibility Study Houston-Galveston Navigation Channels, Texas. U.S. Department of Defense, Department of the Army, USACE Galveston District, Galveston, TX. 185 pp.