



US Army Corps
of Engineers®
Galveston District

BIOLOGICAL ASSESSMENT
for
Houston Ship Channel Expansion Channel
Improvement Project,
Harris, Galveston, and Chambers Counties, Texas

Draft Integrated Feasibility Report–Environmental Impact
Statement

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1.0 INTRODUCTION

1.1 PURPOSE OF THE BIOLOGICAL ASSESSMENT

This Biological Assessment (BA) has been prepared to fulfill the U.S. Army Corps of Engineers (USACE), Galveston District requirements as outlined under Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended. This assessment is required by the USACE action for the improvements to the Houston Ship Channel (HSC) navigation system proposed by the Tentatively Selected Plan (TSP) to address deep draft navigation problems under the Houston Ship Channel Expansion Channel Improvement Project (HSC ECIP) Federal feasibility study, as this study and TSP are considered a major Federal action under ESA. Figure 1 illustrates the TSP. Currently, the study will have completed the TSP Milestone phase of the Specific, Measurable, Attainable, Risk-Informed, and Timely (SMART) planning process, where policy recognizes that there will be a certain level of uncertainty in the size and final make-up of the TSP. Several aspects of the TSP will be refined through more detailed economic analysis, engineering and cost data, and refinement of design. Refinement of measures may result in optimizing the size, shape and more detailed location of measures that comprise the TSP. Some measures may be shown to not be economically justified during more detailed economic analysis. Therefore, the maximum and minimum range of potential impacts given the range of potentially viable sizes have been analyzed for NEPA purposes in the Draft Integrated Feasibility Report and EIS (IFR-EIS) for this study, and has been considered in this BA.

Because the feasibility and cost of dredge material placement are highly dependent on the specifics of the channel modifications, are very quantity and distance dependent, and in the highly developed region of the study very location dependent, a specific dredge material placement plan will be developed in the next planning phase. The next planning phase takes place after the release of the Draft IFR-EIS and this Draft BA and includes the refining of the TSP. The Final BA will be updated for inclusion in the Final IFR-EIS to incorporate assessment of the dredge material placement plan effects on Federally-listed species. For this Draft BA, the effects of the TSP channel modifications, and use of the existing upland confined placement areas, beneficial use sites, and ocean dredged material disposal site (ODMDS) have been assessed.

This BA evaluates the potential impacts the proposed action may have on federally listed threatened and endangered species identified by the U.S. Fish and Wildlife Service (USFWS) for Chambers, Galveston, and Harris Counties, Texas and the National Marine Fisheries Service (NMFS) for the State of Texas. Species included in this BA (Table 1-2) were identified from lists obtained from databases managed by the USFWS and NMFS (USFWS 2017; NMFS 2017). Additional federally protected species are listed by the Texas Parks and Wildlife Department (TPWD) as potentially occurring in Chambers, Galveston, and Harris Counties. However, these additional species are not covered in this BA as they were not identified on the lists obtained from the databases managed by the jurisdictional Federal agencies (USFWS and NMFS).

The bald eagle has been delisted from the Federal list of threatened and endangered species in 2007. The bald eagle still remains federally protected under both the Bald and Golden Eagle Protection Act (16

United States Code (U.S.C. 668-668c) and the Migratory Bird Treaty Act [16 U.S.C. 703-712]. The bald eagle is not included in this BA as they are no longer protected under the ESA.

The brown pelican was removed from the Federal list of endangered and threatened species on December 17, 2009 (74 *Federal Register* 59443), but still receives protection under the Migratory Bird Treaty Act and the Lacey Act (16 U.S.C. 3371-3378). The brown pelican is not included in this BA as they are no longer protected under the ESA.

The red knot has recently been listed. The red knot is a medium size shorebird. The red knot is not expected to be found within the TSP footprint since it consists of open water near developed land or active dredged material placement areas with armored shorelines lacking natural shore accretion. Four invertebrate coral species have been recently been listed by NMFS: lobed star, mountainous star, boulder star, and elkhorn coral. None of the coral species are expected within the project area.

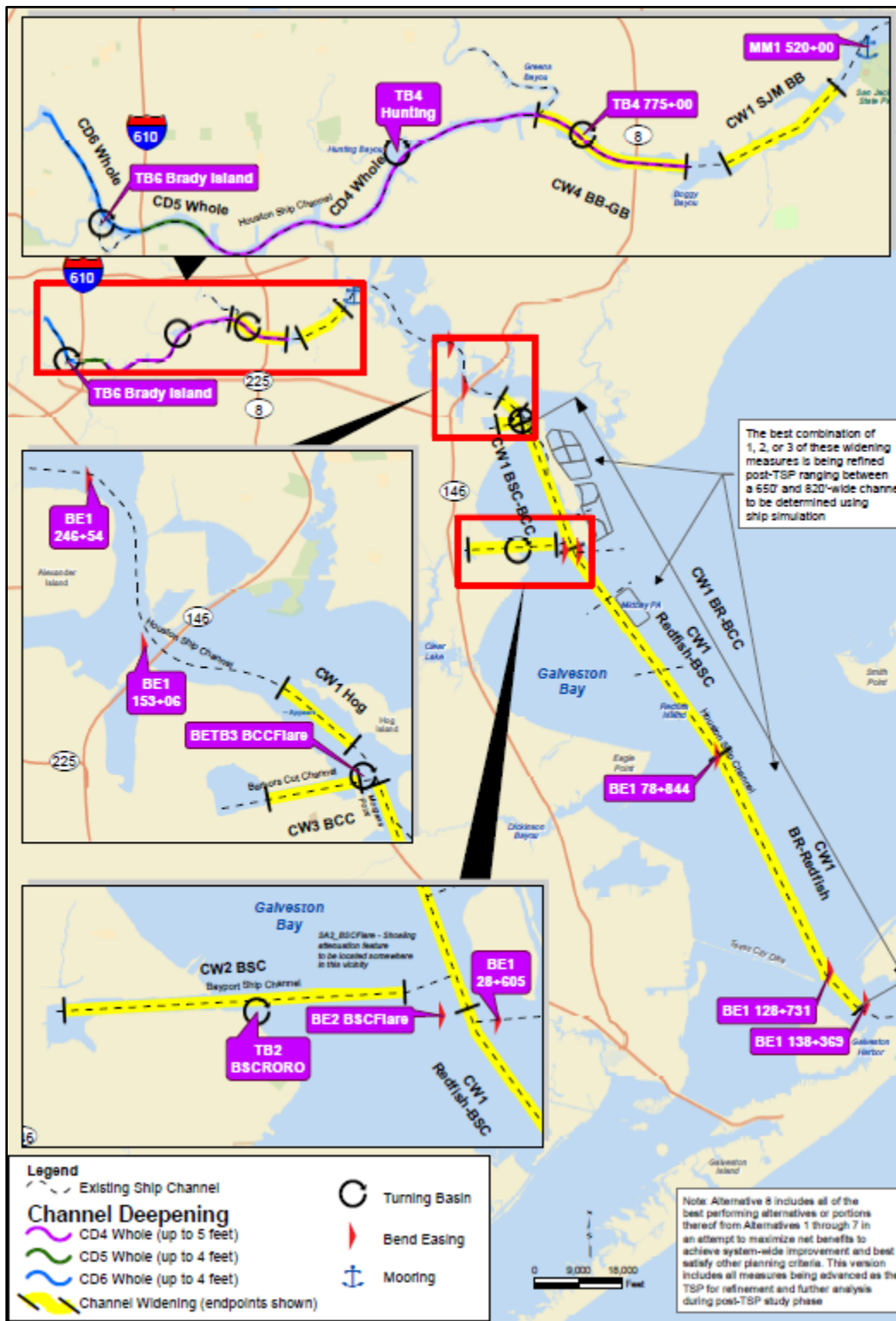


Figure 1 – Conceptual Map of the Tentatively Selected Plan

Table 1-1 – Federally-Listed Threatened and Endangered Species in Chambers, Galveston, and Harris Counties, Texas

Common Name	Scientific Name	USFWS ¹ County by County List and IPaC List ³	NMFS ² List for State of Texas
Birds			
Attwater's Greater Prairie-Chicken ⁴	<i>Tympanuchus cupido attwateri</i>	E	NA
Eskimo curlew ⁵	<i>Numenius borealis</i>	E	NA
Piping Plover	<i>Charadrius melodus</i>	T, CH ⁶	NA
Red Knot	<i>Calidris canutus rufa</i>	T	NA
Invertebrates			
Lobed star coral	<i>Orbicella annularis</i>	NA	T
Mountainous star coral	<i>Orbicella faveolata</i>	NA	T
Boulder star coral	<i>Orbicella franksi</i>	NA	T
Elkhorn coral	<i>Acropora palmata</i>	NA	T, CH ⁶
Mammals			
Fin whale	<i>Balaenoptera physalus</i>	NL	E
Sei whale	<i>Balaenoptera borealis</i>	NL	E
Sperm whale	<i>Physeter macrocephalus</i>	NL	E
West Indian manatee	<i>Trichechus manatus</i>	E	E
Reptiles			
Loggerhead sea turtle	<i>Caretta caretta</i>	T	T, CH ⁷
Green sea turtle	<i>Chelonia mydas</i>	NL	T
Hawksbill sea turtle	<i>Eretmochelys imbricata</i>	E	E
Leatherback sea turtle	<i>Dermochelys coriacea</i>	E	E, CH ⁶
Kemp's Ridley sea turtle	<i>Lepidochelys kempii</i>	E	E
Plants			
Texas prairie dawn	<i>Hymenoxys texana</i>	E	NA

¹USFWS 2017a, USFWS 2017b, USFWS 2017c

²NOAA/NMFS 2017

³USFWS 2017d

⁴Listed only within USFWS 2017d

⁵Listed only with the USFWS County-by-County, USFWS 2017a, USFWS 2017b, USFWS 2017c

⁶Critical Habitat is listed, but not present within the project study area

⁷Critical habitat is listed for Gulf of Mexico that includes the offshore disposal area ODMDS No. 1

1.2 DESCRIPTION OF THE PROPOSED PROJECT AND EXISTING HABITATS

Proposed Project Description

The proposed project is the Tentatively Selected Plan (TSP) for this study, which is considered a major Federal action for purposes of the Section 7. The TSP is located within the HSC navigation system that traverses Galveston Bay to the tidal portions of the San Jacinto River and Buffalo Bayou in Galveston, Chambers, and Harris Counties, Texas. The HSC is currently maintained by the USACE to depths of -37.5 feet to -46.5 feet mean low lower water (MLLW) [-36 to -40 feet mean low tide (MLT)] plus between one to two feet of advanced maintenance and two feet of allowable overdepth. Currently, the

majority of the HSC is 530 feet wide through its length in the Bay, with some relatively short discontinuous sections of 600 feet and 700 feet-wide channel between Morgans Point and the Battleship Texas, and a narrowing down above that from 530 feet to 400 feet, down to 300 feet wide. The side channels to the HSC, the Bayport Ship Channel (BSC) and Barbours Cut Channel (BCC) have been recently deepened to match the -46.5 ft MLLW depth of the HSC, and widened to address navigation deficiencies and inefficiencies associated with the current vessel fleet and berths, with the BSC widened to between 350 and 400 feet wide, and the 300 foot-wide BCC shifted 75 feet northward. The TSP proposes a variety of measures to modify the HSC, BSC and BCC, summarized as follows:

- Widen the HSC channel and ease bends of the HSC in Galveston Bay to provide a wider channel in the range of 650 feet to 820 feet wide.
- Widen three segments in the HSC above Morgans Point to address places where the channel narrows down from its existing widths.
- Deepen the HSC above Boggy Bayou by between 4 and 5 feet
- Provide a mooring basin and mooring piles (dolphins) on the HSC near the San Jacinto Monument.
- Build a new turning basin and expand 2 existing ones in the HSC above Beltway 8.
- Widen the BSC to approximately 455 feet, expand the existing flare at its confluence with the HSC, and provide a turning basin at the entrance to the landcut.
- Provide a shoaling attenuation feature (e.g. groin) to be planned in the next phases when a hydrodynamic and sediment transport model is ready.
- Widen the BCC to approximately 455 feet, and expand the existing flare in combination with providing a turning basin, at its confluence with the HSC.

Figure 1 shows a conceptual map that illustrated the measures that make up the TSP. As discussed at the beginning of this BA, the study is at a point where the TSP will be refined in the next planning phase and may change the size or inclusion of some measures that make up the TSP. Specific design details will be developed in later planning phases, and the Preconstruction Engineering Design (PED) phase once the final TSP is approved. Therefore, construction techniques and details can only be discussed generally at this point.

The channel modifications of the TSP would be constructed by dredging to widen and deepen channels, and expand or build the various turning basins and mooring basin. The depths of widened features would be in the range of -41.5 feet to -46.5 feet Mean Lower Low Water (MLLW). The TSP would be constructed primarily using hydraulic dredging to remove new work material and hydraulically pump it via pipelines to placement sites to be selected in detail in the next planning phase. It is anticipated that some dredging using trailing suction hopper dredges would also be used to remove softer new work materials more suitable for that type of dredge. This dredged material would be transported to the

existing approved ODMDS No. 1, located at the Entrance Channel (reference Figure 2). Both types of dredging would be used to maintain the channels long term, deposited at the selected placement sites. Other types of work expected would be installing sheet piling and mooring dolphins. Sheet piling would be limited to a few areas where existing shoreline and bank would be supported where channel slopes are intended to be dredged steeper to minimize land impacts. Currently these area are limited to the land cut north shore along the Bayport Ship Channel (BSC) [Figure 1, bottom inset], the north shoreline along the Barbours Cut Channel (BCC) [Figure 1, middle inset], along a short stretch of the HSC at Morgans Point (Figure 1, middle inset), and at the expansion of the existing Brady Island Turning Basin (Figure 1, top inset). Mooring dolphins would be limited to the mooring measure near the San Jacinto State Park (Figure 1, top inset) and would consist of multi-pile dolphin platforms with driven pilings. The construction for the channel modifications would be accessed by water via a dredge. Construction for the moorings would also be accessed by water. Construction for sheet piling has not been determined, but could be either by the adjacent shore or by water. The project will not be constructed until the study and TSP are approved, and Congress appropriates funding for this project. Construction is expected to last several years. Further details of construction would be determined at a later planning phase of the study.

The TSP will impact oyster reef that has accreted extensively along the HSC and BSC, and will require mitigation. A mitigation plan is provided in Appendix Q of the DIFR-EIS sent with the Draft BA, detailing the reef impacts, mitigation proposed, and candidate mitigation locations. The mitigation will require construction of between approximately 427 and 632 acres of restored reef based on habitat modeling, by beneficially using dredged new work material to build a 1 foot or greater relief off of the bay bottom and capping it with a veneer of suitable cultch material to naturally recruit reef. The candidate sites are shown in Figure 1 of the Mitigation Plan, and specific site(s) will be selected from among these or others that emerge from public and agency input during the public and agency review period for this Draft IFR-EIS. Final mitigation amounts will be determined following refinements to the TSP and habitat modeling to account for those changes.

As discussed at the beginning of this BA, the study is at a point where the TSP will be refined in the next planning phase and may change the size or inclusion of some measures that make up the TSP. The Planning Development team (PDT) has identified a conservative range of channel widths, which widening the HSC in Galveston Bay is the largest component of the TSP. Primarily, the size of measures is expected to be refined to a smaller size following ship simulations to aid refinement. Because feasibility and cost for dredge material placement are highly dependent on the specifics of the channel modifications, is very quantity and distance dependent, and in this highly developed region, very location dependent, specific dredge material placement planning will be performed once the TSP has been refined in the next planning phase. A Dredged Material Management Plan (DMMP) will be developed in the next planning phase. However, it is the PDT's intention to use existing PAs used to maintain the current HSC system as much as possible. Given the existing capacities, it is expected that some new placement features will be needed for long term maintenance of the revised channels. The planning will include consideration of beneficial use (BU) features and upland placement as the previous project to modify the HSC system did. This BA includes the review of the existing upland confined placement areas, beneficial use (BU) marsh cells and islands, and one existing ocean dredged material disposal site (ODMDS), Table 1-2 and Figure 2. Once a DMMP is developed, this BA will be reviewed and revised as necessary to incorporate any new placement sites.

The action area is generally the area of dredging, the dredge pipelines, and the PAs that would accept the material. It will consist of the existing PAs listed in Table 1-2 and any new placement features determined for the DMMP developed in the next planning phase. The action area regarding indirect effects from turbidity from dredging is expected to be less than 1,000 meters, considering the literature for studies that have examined turbidity plume dispersal through detailed monitoring studies. These studies are discussed in Section 2.1.5.1, Water Quality, of Appendix G in the DIFR-EIS.

The purpose of the feasibility study is to evaluate Federal interest in alternative plans (including the No-Action Plan) for reducing transportation costs and addressing navigation safety issues on the HSC system and assess the effects of the alternatives on the natural system and human environment, including the economic development of existing inefficiencies. The study is being conducted to address problems with deep draft navigation in the HSC system to ensure these ship channels can more efficiently and more safely handle current and future vessel sizes and traffic, both of which have increased due to trends in the shipping industry, regional growth, and national and global demand for products and cargo originating or shipping through Houston.

Table 1-2 – Existing Placement Areas Proposed for Use for the TSP

Name	Type
ODMDS No. 1	Ocean Dredged Material Disposal Site
Bolivar 288-acre marsh	Beneficial Use Marsh Cell
Bolivar Marsh Cells 1 through 3	Beneficial Use Marsh Cell
Redfish Island	Beneficial Use Island
Mid Bay PA	Upland Placement
PA 14	Upland Placement
PA 14/15 Connection (partially built)	Upland Placement
PA 15	Upland Placement
M11 (future)	Beneficial Use Marsh Cell
M10	Beneficial Use Marsh Cell
M 7/8/9	Beneficial Use Marsh Cell
Cell M5/M6	Beneficial Use Marsh Cell
M1/M2	Beneficial Use Marsh Cell
NW	Beneficial Use Marsh Cell
M3	Beneficial Use Marsh Cell
M4	Beneficial Use Marsh Cell
Spilmans Island	Upland Placement
Alexander Island	Upland Placement
Peggy Lake	Upland Placement
Goat Island	Beneficial Use Island
Lost Lake	Upland Placement
East Clinton	Upland Placement
West Clinton	Upland Placement
Rosa Allen	Upland Placement
House-Stimson	Upland Placement
Glendale	Upland Placement
Filter Bed	Upland Placement

Existing Habitat

The existing environment within the proposed project footprint is composed of the existing channel, the adjacent shallow estuarine waters with a few very small areas of developed, urbanized land with armored shoreline and various existing upland, offshore, and beneficial use disposal areas. Relevant natural resources data was reviewed to determine if natural resources may be located in or around the project area. Geographic Information Systems (GIS) data obtained from the Texas Parks and Wildlife Department and the Texas General Land Office (TxGLO) indicate oyster reefs within the proposed TSP footprint lining the HSC from approximately Redfish Reef to Morgans Point. For terrestrial areas where the TSP footprint overlaps land, a combination of TPWD Natural Resources Information System and 2014 aerial imagery were reviewed to confirm the urbanized nature of impacts on or near land.

Of the species listed in Table 1-1, sea turtles are most likely to occur in and around the project area. Other species listed are not likely to occur in the vicinity of the project due to lack of suitable habitat or the area is beyond their known range limits. There is no designated critical habitat for any of the listed species within the TSP channel footprint. However, there is designated critical habitat for the Piping plover approximately 1.5 to 2 miles from the southern end of the project limits at Bolivar Roads (Texas Units 35 Big Reef south side of Bolivar Roads and 36 Bolivar Beach, north side of Bolivar Roads). Both critical habitat areas are along the Gulf of Mexico side of either Galveston Island or Bolivar Peninsula with no direct impacts by the proposed TSP project footprint. Also, critical habitat for the Loggerhead turtle (Sargassum habitat) was designated in 2014 for the offshore waters of the Gulf of Mexico (LOGG-S-2 Gulf of Mexico Sargassum) that includes an existing ocean dredge disposal site (ODMDS No. 1). ODMDS No. 1 is approximately 6 miles from the proposed TSP's southern limit (Figure 2). ODMDS No. 1 disposal site is currently permitted for placement of maintenance material from of a lower segment of the HSC, and would be considered for use in maintaining TSP features in the same approved segment of the HSC.

LOGG-S-2 Gulf of Mexico Sargassum critical habitat contains only Sargassum habitat (Federal Register 2014). The Sargassum habitat is for the developmental and foraging for young loggerhead where surface waters form accumulation of floating material, especially Sargassum. The physical or biological features that support this habitat are (i) Convergence zones, surface-water downwelling areas, the margins of major boundary currents (Gulf Stream), and other locations where there are concentrated components of the Sargassum community in water temperatures suitable for the optimal growth of Sargassum and inhabitation of loggerheads; (ii) Sargassum in concentrations that support adequate prey abundance and cover; (iii) Available prey and other material associated with Sargassum habitat including, but not limited to, plants and cyanobacteria and animals native to the Sargassum community such as hydroids and copepods; and (iv) Sufficient water depth and proximity to available currents to ensure offshore transport (out of the surf zone), and foraging and cover requirements by Sargassum for post-hatchling loggerheads, i.e., >10 m (>32.8 feet) depth. The Sargassum habitat is dynamic and large areas may not contain densities of Sargassum to that would concentrate loggerhead turtles. It is not necessary that the primary constituent elements of Sargassum habitat be present in the critical habitat area at all times.

The proposed TSP project footprint does not involve habitat required for terrestrial (e.g. piping plover) or oceanic species (e.g. fin, sei, or sperm whales, coral). Fin whales are found in deep, offshore waters and feed on krill, small schooling fish (e.g., herring, capelin, and sand lance), and squid. Fin whales can

be found in social groups of 2-7 whales, NOAA 2017a. Fin whales have been documented to occur within the Gulf of Mexico, but are generally anti-tropical distribution centered in the temperate zones NOAA 2010a.

Sei whales prefer subtropical to sub polar waters on continental shelf edge and slope worldwide and observed in deeper waters of oceanic areas far from the coastline NOAA 2017b. Sei whales are look similar in appearance to Bryde's whales and they also tend not to enter semi-enclosed water bodies, such as the Gulf of Mexico NOAA 2011. Sei whales feed primarily on calanoid copepods with secondary preference for krill.

Sperm whales tend to inhabit areas with a water depth of 600 m (1968 feet) or more and are uncommon in waters less than 300 m (984 feet). Their diet consists of many larger organisms that also occur deep waters of the ocean such as large squid, large demersal and mesopelagic sharks, skates, and fishes. Sperm whales are the most common large cetacean in the northern Gulf of Mexico, where it occurs in greatest density along and seaward of the 1,000 m (3,280 foot) depth contour and prefer steep rather than shallow depth gradients NOAA 2010b

The water depth of the existing ODMDS No. 1 varies from approximately 10 m (32.8 feet) to approximately 15 m (49 feet) and is located 1 to 5 miles from the beginning of the HSC. The noise from the frequent ships entering and exiting from the HSC would be another deterrent for these whales visiting the ODMDS. The bottom of the offshore disposal site is composed various silts, sands, and clays that are not suitable habitat for corals and the disposal area is periodically impacted by additional maintenance material. It is improbable that these whales would be found in the ODMDS No. 1 area and any effect to these whale species is so unrealistic its occurrence would be implausible.

For species using habitats potentially present in estuaries, the specific habitat required for regular use by most of those species is not present within the proposed project footprint. The open water of the proposed channel modifications of the TSP lack the mud and sand flat and sand spit habitat used by the Piping plover for wintering in Texas. Similarly, these and other sand beach habitat used by the Rufa Red knot for wintering and stopover habitat is not present in the proposed project footprint. The project area waters are too cold during winter months and do not contain submerged or emergent aquatic vegetation required by the West Indian manatee, limiting it to rare stray, transient occurrence in Galveston Bay. Therefore, these species are unlikely to be encountered in the project area. The lack of suitable oceanic, foraging, and nesting habitat limits the likelihood of encountering sea turtles in the TSP footprint and upland PAs and beneficial use areas. Sea turtle species are considered in more detail in the sub-sections that follow.

Though it is not likely that the five species of sea turtles, Rufa Red knot, Piping plover, or West Indian manatee would be encountered within the project footprint, their presence in the project area is possible. An advisory for construction contractors to be aware of their possible presence, and contact numbers to immediately call in case of contact with any of these species for the USFWS's Houston Coastal Ecological Services Field Office in the case of Rufa Red knot or Piping plover, or the Marine Mammal Stranding Network in the case of a turtle or manatee will be added to the USACE contract specifications for this project.

1.3 SEA TURTLES

Sea turtles may occur in the bay waters within and in the vicinity of the project area. Of the five turtle species listed by the NMFS and the USFWS, only the Kemp's ridley, green, and loggerhead sea turtles are likely to occur in the project area. The hawksbill and leatherback sea turtles are not likely to be found within the project area due to a lack of suitable habitats. Hawksbill sea turtles prefer clear offshore waters of mainland and island shelves and therefore are unlikely to occur in the project area. They are most common where coral reef formations are present (TPWD 2017d). Leatherback sea turtles primarily inhabit the upper reaches of the ocean where deep water comes to the surface (upwelling areas) and therefore are unlikely to occur in the project area. They also frequently descend into deep waters from 650 feet to 1650 feet in depth in search of their prey such as jellyfish, tunicates, squid, fish, crustaceans, algae, and floating seaweed (TPWD 2017e).

Reasons for Protected Status

The largest threat to populations of sea turtles is the alteration of the existing environment, especially their nesting grounds and direct contact with humans. Historically, turtles declined worldwide due to the harvest of both sea turtles and their eggs from nesting grounds. It is illegal to harvest sea turtles or their eggs in the United States and in many other parts of the world, although these practices do continue in some parts of the world. Sea turtles are also threatened by entanglement in commercial fishing gear, ingestion of or entanglement in marine debris, environmental contamination from industrial areas, and degradation of nesting habitat due to beach re-nourishment or beach armoring activities. The green sea turtle was designated as threatened in July 1970 and currently remains threatened in Texas. The Kemp's ridley sea turtle was designated as endangered in December 1970 and currently remains endangered in Texas. The loggerhead sea turtle was designated as threatened in July 1978 and currently remains threatened in Texas.

Habitat

Green sea turtles are found in three distinct marine habitat types: high-energy oceanic beaches, convergence zones in pelagic habitat and benthic feeding grounds in relatively shallow, protected waters (USFWS/NMFS 1991). The females deposit eggs on the high-energy beaches above the high water line. The hatchlings take refuge and feed in the convergence zones in the open ocean. The sub-adults feed on sea-grasses, coral, and rocky bottoms.

Kemp's ridley adults are generally found in the Gulf of Mexico waters and open ocean. Juveniles are most commonly reported in the northern Gulf of Mexico between Texas and Florida. Nesting mostly occurs on sandy beaches of Mexico. The post-pelagic stages are commonly found feeding over bottoms and juveniles are frequently found feeding in bays, coastal lagoons, and river mouths (TPWD 2017b).

Loggerhead sea turtles are found in a variety of environments such as brackish waters of coastal lagoons, river mouths, and tropical and temperate waters above 50 degrees Fahrenheit. Below 50 degrees Fahrenheit, the loggerhead sea turtles may lose their ability to swim and dive (NMFS/USFWS 2008). Loggerhead sea turtles are also found in three distinct marine habitats: oceanic beaches, pelagic convergence zones, and benthic feeding grounds of shallow waters and bays (TPWD 2017c).

Range

Green sea turtles are found worldwide in tropical and sub-tropical waters. In the United States Atlantic waters, green turtles are found around the U.S. Virgin Islands, Puerto Rico, and the continental U.S. from Texas to Massachusetts. Important feeding areas for green turtles are located in and around Florida. Major Green turtle nesting beaches in the United States are found on the Atlantic beaches along the southeast coast of Florida and in smaller numbers along the beaches of Puerto Rico and the US Virgin Islands (TPWD 2017a).

Kemp's ridley sea turtles have one of the most restricted distributions of any species of sea turtle, occurring mainly in coastal areas of the Gulf of Mexico and the northwestern Atlantic Ocean. The major nesting beach for the Kemp's ridley is on the northeastern coast of Mexico near Rancho Nuevo in southern Tamaulipas (TPWD 2017b).

Loggerhead sea turtles are found worldwide throughout temperate and tropical seas. Their major nesting beaches in the United States are located primarily in the southeast along the Atlantic coasts of North Carolina, South Carolina, Georgia, and Florida (TPWD 2017c).

Distribution in Texas

In Texas, green sea turtles are primarily found in the Gulf of Mexico, and sub-adults are occasionally found feeding in shallow bays and estuaries where marine sea grasses, the turtle's principle food source, grow. The green sea turtle population in Texas once flourished but declined due to commercialized overfishing in the mid to late nineteenth century. Green sea turtles can still be found in Texas bays and estuaries but in much-reduced numbers (TPWD 2017a).

The Kemp's ridley migrates along the Texas coast and generally remains in near shore waters less than 165 feet deep to feed on shrimp, crab, and other invertebrates (TPWD 2017b). The smallest juveniles are found in shallow waters of bays or lagoons, often foraging in less than 3 feet of water, whereas larger juveniles and adults are found in deeper water. Almost the entire population of Kemp's ridley turtles nest near Rancho Nuevo, Tamaulipas, Mexico, although an increasing number of nests have been found along the Texas coast. According to information from the *Final Environmental Assessment Expansion of Placement Areas 14 and 15* (hereafter referred to as the "PAs 14 and 15 Expansion EA"), 10 Kemp's ridley nests have been documented on the Bolivar Peninsula and 37 Kemp's ridley nests have been documented on Galveston Island since 1999 (USACE 2010).

Loggerhead sea turtles are transient species along the Texas coast and in Texas bays and estuaries. Only minor and solitary nesting has been recorded along the coasts of the Gulf of Mexico. Only one Loggerhead nest has been documented since 1999 between both Bolivar Peninsula and Galveston Island (USACE 2010). The Kemp's ridley and Loggerhead sea turtle nesting occurrences have been on beach on the Gulf of Mexico side of these coastal barriers, and not on the Galveston Bay side.

Presence in Project Area

Although green sea turtle nests have not been documented on the Bolivar Peninsula or Galveston Island since 1999 (USACE 2010), and although the project area has no sea grasses, it remains possible that the green sea turtle may occur as a transient species in the project area.

It is possible that green sea turtles, Kemp's ridley sea turtles, and loggerhead sea turtles may be found in or near the project area within Galveston Bay as a transient species, since it contains and is surrounded by a warm estuarine bay. Loggerhead sea turtles are likely to be encountered in the part of the project area associated with ODMDS 1, as it is in an area of Gulf waters identified as critical habitat, as discussed in **Section 1.2**, under **Existing Habitat**. It is unlikely that leatherback or hawksbill sea turtles would be found in or near the project area, as it does not contain suitable nesting habitat for any sea turtle species.

2.0 EFFECTS ANALYSIS

2.1 EFFECTS OF THE PROPOSED ACTION ON LISTED SPECIES

The following sections provide the findings of Galveston District and species-specific avoidance, minimization, and conservation measures that support the effect determinations presented. Effect determinations are presented using the language of the ESA:

- ***No effect*** - the proposed action will not affect a federally-listed species or critical habitat;
- ***May effect, but not likely to adversely affect*** - the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable, insignificant, or completely beneficial; or
- ***Likely to adversely affect*** - adverse effects to listed species and/or critical habitat may occur as a direct result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or completely beneficial. Under this determination, an additional determination is made whether the action is likely to jeopardize the continued survival and eventual recovery of the species.

2.2 SEA TURTLES

The sea turtles that may occur in the bay waters in or near the project area are green, Kemp's ridley, and loggerhead sea turtles. Dredging for the proposed project would primarily be conducted using hydraulic cutterhead dredges, which move at sufficiently slow speeds that turtles would be able to avoid the cutterhead. Additionally, a Regional Biological Opinion (RBO), dated November 19, 2003, by the NMFS for the Galveston, New Orleans, Mobile, and Jacksonville Districts of the USACE concluded that non-hopper dredges are not known to take sea turtles. A hydraulic cutterhead dredge is a non-hopper type of dredge. There is no suitable nesting habit in the TSP, existing upland disposal or beneficial use areas. Avoidance of use of transient forage habitat in the Bay by sea turtles due to dredging noise and light would be the same impact as currently occurs during periodic maintenance dredging. This may affect but not adversely affect sea turtle species using the Bay for transient foraging habitat as plenty of directly adjacent habitat would be available during the temporary construction dredging. Given the transient use and the temporary nature of the construction, occurrence of the effect would be unlikely but possible. Hopper dredging may be used for the construction and maintenance dredging of sections where material and placement is more suitable to this type, which is anticipated to be limited to softer material and locations lower in the Bay, where material may be placed in the existing offshore disposal site ODMDS No. 1. The use of the ODMDS No. 1, could have an impact on Loggerhead turtles if the presence of Sargassum is dense enough to attract young loggerhead turtles.

However, a 2016 NMFS memo from Roy E. Crabtree dated March 4, 2016 to Alvin B. Lee, USACE, South Atlantic Division, clarifying the activities under the 2007 Gulf of Mexico Regional Biological Opinion (GRBO)(I/SER/2015/17543) with respect to the new critical habitat found for offshore ocean disposal within the boundaries of the Sargassum critical habitat (NMFS 2016):

“The placement of the dredged material may create temporary turbidity plumes that could potentially extend to the surface and interact with the Sargassum and its associated community, creating the potential to impact the following PCE: " available prey and other material associated with Sargassum habitat such as, but not limited to, plants and cyanobacteria and animals endemic to the Sargassum community such as hydroids and copepods." However, the sediments would be expected to settle quickly, and therefore interaction time with the Sargassum and materials associated with its habitat would be of very short duration and any effects would be insignificant. Thus, offshore ocean disposal is not likely to adversely affect the Sargassum critical habitat.”

Based on the March 4, 2016 GRBO, the use of ODMDS No. 1 as a disposal site may affect but would not likely adversely affect the Sargassum critical habitat area.

If hopper dredging is used, the dredging will follow the Best Management Practices (BMP) outlined in the revised Gulf of Mexico hopper dredging regional biological opinion (GRBO) from NMFS, dated January 9, 2007 (CITE). Such measures include a dedicated protected species observers, inflow and outflow screening as well as turtle deflection devices installed on dragheads, implementing strategic use of dredge pumps at the start and end of dredging operations to minimize suction from dragheads to avoid sea turtles, trawling and relocation of endangered species as necessary, and training for personnel on dredging operations that will minimize takes of sea turtles.

With the use of the above, it is anticipated that the project would not impact nesting or non-nesting sea turtles in the TSP project area, but may affect foraging loggerhead turtles in association with high densities of Sargassum within the existing loggerhead turtle Sargassum Critical Habitat area.

Effect Determination: May effect, but not likely to adversely affect.

3.0 SUMMARY

The proposed action could be expected to impact the foraging critical habitat for loggerhead turtle and the listed turtles that may be present therein. It is possible but less likely, for the proposed action to cause listed sea turtles to avoid using the warm estuarine water transient foraging habitat in Galveston Bay within and near the project area. The proposed action would not impact any other listed species or their critical habitat identified in this BA. Therefore, a determination that the proposed action may effect but is not likely to adversely affect the loggerhead turtle and its critical habitat, is anticipated.

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