Draft Environmental Assessment

The Federal Assumption of Maintenance of the Jacintoport Channel as Part of the Houston Ship Channel Project

Harris County, Texas

United States Army Corps of Engineers
Galveston District

August 2012

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ACRONYM LIST

ACRES	Assessment, Cleanup, and Redevelopment Exchange System
AIRS	Aerometric Information Retrieval System
AOM	Assumption of Maintenance
BMP	Best Management Practice
BU	Beneficial Use
CEQ	Council on Environmental Quality
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CMP	Coastal Management Program
CO	Carbon Monoxide
CWA	Clean Water Act
CY	Cubic Yards
DA	Department of Army
dB	Decibel
dBA	A-weighted Decibel
DMMP	Dredge Material Management Plan
E	Endangered
EA	Environmental Assessment
EFH	Essential Fish Habitat
EO	Executive Order
ERL	Effects Range Low
ERM	Effects Range Median
ER	Engineer Regulation
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FR	Federal Register
ft/yr	Feet/Year
GBANS	Galveston Bay Area Navigational Study
GBEP	Galveston Bay Estuary Program
GMRMC	Gulf of Mexico Regional Management Council
HFO	Houston Fuel Oil
HFOTCO	Houston Fuel Oil Terminal Company
HGNC	Houston-Galveston Navigational Channel
HSC	Houston Ship Channel
HTRW	Hazardous, Toxic, and Radioactive Wastes
HUD	U.S. Department of Housing and Urban Development
Inbesa	Inbesa American, Inc.

ACRONYM LIST (Continued)

LRR	Limited Reevaluation Report
mg/m^3	Milligrams per Cubic Meter
MLT	Mean Low Tide
MOA	Memorandum of Agreement
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
NRCS	Natural Resource Conservation Service
O_3	Ozone
PA	Placement Area
PCB	Polychlorinated Biphenyl
PCPI	Per Capita Personal Income
PCS	Permit Compliance System
PHA	Port of Houston Authority
PHA Plan	PHA Dredge Disposal Plan
PM-10	Particulate Matter <10 micrometers
PM-2.5	Particulate Matter < 2.5 micrometers
ppm	Parts per Million
ppt	Parts per Trillion
RADINFO	Radiation Information Database
RCRAInfo	Resource Conservation and Recovery Act Information
ROI	Region of Influence
RSLR	Relative Sea Level Rise
SO_2	Sulfur Dioxide
SOF	Statement of Findings
T&E	Threatened or Endangered
TCEQ	Texas Commission on Environmental Quality
TCOON	Texas Coastal Ocean Observation Network
TPWD	Texas Parks and Wildlife Department
TRI	Toxics Release Inventory
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WRDA	Water Resources and Development Act

1.0 INTRODUCTION

The purpose of this Environmental Assessment (EA) is to present the potential effects, beneficial and adverse, resulting from the Proposed Action, Federal assumption of maintenance (AOM) for the Jacintoport Navigation Channel (hereafter Jacintoport Channel). The Jacintoport Channel is located in Channelview, Harris County, Texas, and west of the Federal Houston Ship Channel (HSC) (Figure 1-1). The Jacintoport Channel provides access to the Jacintoport Terminal, owned by the Port of Houston Authority (PHA), and the privately-owned Inbesa American, Inc. (Inbesa) and Houston Fuel Oil (HFO) Terminals (Figure 1-2). The Jacintoport Channel also includes the Jacintoport Plateau which is located along the southwestern mouth of the Jacintoport Channel (Figure 1-3) (U.S. Army Corps of Engineers [USACE] 1986).

The Federal AOM presumes that the Jacintoport Channel will be federally-maintained to an average operating depth of 40 feet mean low tide (MLT), plus 2 feet of advanced maintenance. The Federal AOM would require an approximate 3 to 5 year dredge cycle (similar to existing practice) in order to maintain the operating depth of 40 feet MLT, thus resulting in no major reduction in the capacity of Jacintoport Channel, no changes in the composition of vessels calling on the terminals, and no associated impacts on transportation costs. The frequency of dredging will be determined by the rate of sedimentation and availability of funding.

1.1 Project History

The Jacintoport Channel, originally constructed by the USACE, is currently maintained by the PHA. The original Department of Army (DA) Permit 18576 (USACE 1988) was issued to the PHA authorizing hydraulic dredging for the Jacintoport Channel. The first amendment, Permit 18576(01) (USACE 1994), extended the time of the project to 1998, while increasing the depth of maintenance from 38 to 40 feet MLT. The second amendment, Permit 18576(02) (USACE 1997), extended the timeframe for completion of work to December 2004 and authorized use of Lost Lake as a dredge material placement area (PA). In 2006, a third amendment, Permit No. 18576 (03), added mechanical, water injection, and silt blade dredging as approved methods of maintenance over a 10-year time period, along with the authorization to place dredged material from the Jacintoport Channel into the Peggy Lake and Alexander Island PAs (USACE 2006a). On September 20, 2011, Permit No. 18576(03) was reissued as Permit No. SWG-1995-02296. This was necessary to update the permit drawings to ensure a clear, concise and accurate baseline of permitted work that would be assumed under Federal maintenance dredging.

In accordance with the Implementation Guidance for the Maintenance of Navigational Channels-Section 5001 of the Water Resources Development Act of 2007 (WRDA 2007 and USACE, 2008), resumption of maintenance is Federally authorized for specific listed projects, as requested from non-Federal interests, including the AOM for Jacintoport Channel, Texas (USACE, 2009). The Federal AOM for Jacintoport Channel was initiated by a December 2007 memorandum from the PHA to the U.S. Army Corps of Engineers (USACE) for "Request for Assumption of Maintenance for Jacintoport Channel and Bayport Cruise Channel and Turning Basin" (PHA 2007a).

The Texas Commission on Environmental Quality (TCEQ) has reviewed the application for Amendment of Permit 18576(03), Public Notice, Statement of Findings (SOF) (June 7, 2006), and Addendum to SOF (TCEQ 2006), and has subsequently issued a certification that "there is reasonable assurance that the project will be conducted in a way that will not violate water quality standards." The TCEQ has additionally reviewed the proposed action from the PHA (PHA 2006a) for consistency with the goals and policies of the Texas Coastal Management Program (CMP), as set forth in Regulation 31 TAC §505.30 of the Coastal Coordination Council, and attests to consistency with the CMP.

Section 101(a)(30) of the WRDA of 1996 authorized deepening of the HSC to 45 feet MLT. There are several non-Federal channels that branch off of the Federal HSC, which were constructed and maintained by the PHA or other private interests. Section 5001 of WRDA 2007 directs the USACE to evaluate a Federal AOM for the non-Federal Jacintoport Channel (USACE 2009a).

The main portion of the Jacintoport Channel is maintained to a depth of 40 feet MLT, with the Jacintoport Plateau maintained to a depth of 39 feet MLT. The Jacintoport and Inbesa Terminal berthing areas are currently at depths of 40 feet MLT and 34 feet MLT, respectively. The northern side (100 feet) of the Jacintoport Channel is maintained to a depth of 45 feet MLT from the entrance to approximately Station 29+00, and is used for access to the HFO Terminal (Figure 1-3). The HFO berthing area is also maintained to a depth of 45 feet MLT.

Based on dredging documents received from the PHA, Jacintoport Channel maintenance dredging occurs approximately every 3 to 5 years, including Jacintoport Channel and Plateau, and the Jacintoport and Inbesa Terminals. Records indicate that the last dredging event occurred in August 2012. The HFO Terminal is dredged by HFO more frequently than the rest of the Jacintoport Channel. The HFO also dredges portions of the main Jacintoport Channel to 45 feet MLT as needed.

Dredged Material Disposal Areas:

Dredged material from the Jacintoport Channel is placed in the Lost Lake PA (see Figure 1-1) as authorized by USACE Section 10/404 Permit 18576(02) (USACE 1997). Lost Lake PA is the closest PA to Jacintoport Channel, approximately 3 miles east from Jacintoport Terminal. Peggy Lake PA is the second closest approved PA (Permit 18576[03]) (USACE 2006a) to the Jacintoport Terminal. On occasion, dredge material from Jacintoport has been placed in the Peggy Lake PA. The PHA Plan indicates that Lost Lake PA is 607 acres in total area, with an interior area of 570 acres. In 2009, the interior elevation of the Lost Lake PA was 21.8 feet. The levee elevation is currently being raised to 36 feet and will be raised to an elevation of 42 feet in 2040 (PHA 2007b). Based on estimated sedimentation rates, the Lost Lake PA is anticipated to provide a remaining capacity of approximately 8.2 million CY by 2029; enough capacity to continue receiving the dredge material from Jacintoport Channel for the 20-year Dredge Material Management Plan (DMMP) period.

1.2 Location of the Project Study Area

The Jacintoport Channel is located in Channelview, Harris County, Texas, and intersects with the HSC approximately 4,000 feet west of San Jacinto State Park, and approximately 17 miles east of downtown

Houston (see Figure 1-1). The Jacintoport Channel is approximately 4,100 feet long and 200 feet wide, containing three berthing areas. The Jacintoport Terminal is located on the north side of the Jacintoport Channel and has three docks with a berthing area 90 feet wide and 2,000 feet long. The Inbesa Terminal on the south side of the Jacintoport Channel has a berthing area 110 feet wide and 1,480 feet long, and the HFO Terminal to the northeast has a berthing area with three docks. The Jacintoport Plateau is located at the southern mouth of the Jacintoport Channel. Ships often extend into the Jacintoport Plateau for turning in to and out of Jacintoport Channel; however, the Jacintoport Plateau was originally constructed to prevent pressure waves from reflecting off the western channel slope and pushing ships into the HFO Terminal berthing area to the east (see Figure 1-3).

1.3 Proposed Action

The Proposed Action or the Federal AOM represents a future condition where Jacintoport Channel would be Federally maintained to an average operating depth of 40 feet MLT, plus 2 feet of advanced maintenance. The Proposed Action presumes the USACE would accept the AOM responsibilities for select segments of Jacintoport Channel. This channel area is estimated to shoal evenly at a sedimentation rate of 0.67 feet per year (ft/yr), thus accumulating approximately 26,000 cubic yards of material annually. Under the Federal AOM, approximately 78,000 cubic yards would typically be dredged from the Jacintoport Channel every 3 years in order to maintain the operating depth of 40 feet MLT; thus resulting in no major reduction in the capacity of Jacintoport Channel, no changes in the composition of vessels calling on the terminals, and no associated impacts on transportation costs.

Dredged material from Jacintoport Channel is currently placed in the Lost Lake PA; the Lost Lake PA would continue to be used to place dredged material for the Proposed Action. The Lost Lake PA has sufficient capacity for the placement of material dredged from the Jacintoport Channel, as determined using the 50-Year Plan Spreadsheets in the PHA long term placement plan (PHA 2007b) and, therefore, would not require additional construction or expansion activities within the Lost Lake PA. Hydraulic (cutterhead) dredging is anticipated as the most likely dredge methodology. The current permit (18576[03]) for maintenance dredging of Jacintoport Channel also authorizes mechanical, water injection, and silt blade dredging as approved methodologies. This permit additionally authorizes dredged material placement into the Lost Lake PA through 2016.

1.4 Purpose and Need

The USACE Galveston District is responsible for the Federally-authorized HGNC, and specifically the HSC, to its authorized dimensions to ensure proper navigation of the waterway. The Federal AOM of additional segments (i.e. Jacintoport Channel) of the HSC would extend the current maintenance dredging responsibilities of the USACE. The purpose and need for this project is derived from an analysis of vessel transits, cargo tonnage, and terminal facilities. In 2007, the Jacintoport and Inbesa Terminals imported a total of 817,321 tons and exported 703,776 tons. The majority of imports are bulk metals/ores, and the majority of exports are agricultural/textiles or petroleum products. This action will provide safe and reliable waterborne access to the Jacintoport Channel and terminals.

1.5 Report Organization

This EA will be organized into 12 major sections, including this introduction (Section 1.0). Section 2.0 describes all alternatives considered for the project. Section 3.0 discusses the environmental resources potentially affected by the project. Section 4.0 discusses the environmental consequences for each of the viable alternatives. Section 5.0 discusses mitigation and Section 6.0 discusses the cumulative impacts. Section 7.0 discusses the relationship of the project to other Federal projects. Compliance with planning and environmental requirements is discussed in Section 8.0. Section 9.0 presents a summary of the potential impacts from the two alternatives analyzed and how each affects the environmental resources in the project area. Sections 10.0 and 11.0 present a list of the persons involved in preparation of the document and a list of the references cited in the document, respectively. Pertinent correspondence generated during preparation of this EA can be found in the appendices.

2.0 PROJECT ALTERNATIVES

The following sections describe the project alternatives considered to meet the defined purpose and need for the project and carried forward for further analysis in the EA. Section 2.1 provides a description of Alternative 1, or No Action Alternative. Section 2.2 provides a description of Alternative 2, or the Proposed Alternative. No additional alternatives have been developed or considered and eliminated from further consideration.

2.1 Alternative 1 – No Action Alternative (No Federal Assumption of Maintenance)

The No Action Alternative presumes there would be no Federal AOM for Jacintoport Channel. The Channel is estimated to shoal evenly at a sedimentation rate of 0.67 ft/yr, accumulating approximately 2 feet of sediment (78,000 cubic yards) every 3 years. Without Federal AOM, the PHA would continue maintaining the Jacintoport Channel on its current dredging cycle of every 3 to 5 years. The last non-Federal maintenance dredging of the Jacintoport Channel occurred in 2012 to a depth of 40 feet MLT, plus 2 feet of advanced maintenance, and represents the current existing condition. Without performing any regular maintenance dredging, the Jacintoport Channel has been estimated to shoal to a depth of 34 feet MLT by the year 2024. Any lesser depth would cause a major reduction in the capacity of Jacintoport Channel, cause changes in the composition of vessels calling on the terminals, and result in unreasonable transportation costs.

2.2 Alternative 2 – Proposed Alternative (Federal Assumption of Maintenance)

The Proposed Alternative or the Federal AOM, represents a future condition where the Jacintoport Channel would be Federally maintained to an average operating depth of 40 feet MLT, plus 2 feet of advanced maintenance. Only the 40 foot MLT channel depth was considered for Federal AOM because the 45-foot MLT depth is only used by vessels accessing the HFO Terminal, and any benefits for depths below 40 feet MLT would accrue to a single private user. The Proposed Alternative, therefore, presumes the USACE accepts AOM responsibilities for select segments of Jacintoport Channel (Figure 1-3). The Federal AOM would resume a typical dredge cycle of every 3 to 5 years, in order to maintain the navigable depth of 40 feet MLT, resulting in no major reduction in the capacity of Jacintoport Channel, no changes in the composition of vessels calling on the terminals, and no associated impacts on

transportation costs. The frequency of dredging will be determined by the rate of sedimentation and availability of funding.

2.3 Summary

Alternative 1 (No Action Alternative) and Alternative 2 (Proposed Alternative) have been carried forward for analysis. The No Action Alternative presumes that there would be no Federal AOM for Jacintoport Channel, and therefore the PHA would continue maintaining the Jacintoport Channel on its current dredging cycle of every 3 to 5 years. The Proposed Alternative presumes that there would be a Federal AOM where Jacintoport Channel would be Federally maintained to an average operating depth of 40 feet MLT, plus 2 feet of advanced maintenance on a similar dredge cycle. The sole difference, therefore, between Alternatives 1 and 2 is the ownership of the dredge maintenance responsibility.

Dredged material from the Jacintoport Channel for Alternatives 1 and 2 would be placed in the Lost Lake PA, which is the closest authorized PA to the Jacintoport Channel (see Figure 1-1). The Lost Lake PA has sufficient capacity for placement of material dredged from the Jacintoport Channel, as determined in the 50-Year Plan Spreadsheets in the PHA Plan (PHA 2007b), and would not require additional construction or expansion activities.

3.0 AFFECTED ENVIRONMENT

3.1 Project Area

This section of the EA describes the natural and human environment that exists within the project area, and the potential impacts of the No Action Alternative and the Proposed Alternative outlined in Section 2.0 of this EA. The project area for this project is the Jacintoport Channel which is located in Channelview, Harris County, Texas, and meets with the larger HSC approximately 4,000 feet west of San Jacinto State Park. The project area is approximately 17 miles east of downtown Houston, Texas. The Jacintoport Channel is approximately 4,100 feet long, with an average width of 200 feet. The main channel is maintained to a depth of 40 feet MLT (see Figure 1-3). The Jacintoport Plateau, located at the western side of the Jacintoport Channel where it meets the HSC, is maintained to a depth of 39 feet MLT. The Jacintoport Channel provides access to the Jacintoport, Inbesa and HFO Terminals. The northern side of the Jacintoport Channel from the entrance to Station 29+000 is privately maintained at a depth of 45 MLT to allow access to oil tankers berthing at the HFO Terminal.

Only those parameters that have the potential to be affected by any of the alternatives are described, as per the Council on Environmental Quality (CEQ) guidance (40 Code of Federal Regulations [CFR] 1501.7 [3]). Some topics are limited in scope due to the lack of direct effect from the proposed project on the resource, or because that particular resource is not located within the project area. Resources dismissed from further discussion are:

Climate

The proposed project would neither affect nor be affected by the climate.

Wild and Scenic Rivers

The proposed project would not affect any stretch of river designated as wild and scenic.

Airports and Aviation

The three public use airports within closest proximity to the project area are La Porte Municipal Airport (~22 miles), Baytown Airport (~15 miles), and William P. Hobby Airport (~26 miles). None are located within the 5-mile approach, departure, and circling radius of the project area.

Floodplains

The proposed project does not occur within a Federal Emergency Management Agency Flood Hazard Zone.

3.2 Physical Environment

3.2.1 Topography and Soils

The project area is located within the Gulf Coastal Plain of Texas. The typical topography surrounding the Jacintoport Channel consists of flat low-lands with an elevation only reaching 25 to 30 feet in the highest areas. The project area is heavily industrialized where waterways have been created over years of extensive dredging and widening.

Soils present within the project area include Ijam soils, Harris clay, and Verland silty clay loam (NRCS 2009). The majority of the project corridor consists of Ijam soils, which are alkaline, nearly level, clayey soils on coastal flats. These soils formed in alkaline to saline clayey sediment that was dredged or pumped from the floods of rivers, bayous, bays, or canals during the construction or maintenance of waterways. Ijam soils are very poorly drained to ponded. Surface runoff and permeability are very slow, and the available water capacity is medium. These soils are not suitable for cultivation (USDA 1979). Harris clay occurs within marshy areas from sea level to 10 feet above sea level. Harris clay is very poorly drained, moderately saline to strongly saline, and floods frequently, but does not pond (NRCS 2009). Verland silty clay loam occurs in gently sloping low coastal uplands between 20 and 100 feet above sea level, has a 0 to 1 percent slope, has very slow permeability, is somewhat poorly drained, and does not experience flooding or ponding.

3.2.2 Geology

The coastal plain near the Gulf of Mexico is located within the Gulf Coast geosyncline, a major center of sediment deposition since the middle to late Jurassic Period. More than 30,000 feet of sedimentary deposits dip toward the Gulf in this area. The geology of the project area is characterized as Quaternary-aged (Recent and Holocene) alluvium containing thick deposits of clay, silt, sand, and gravel overlying the Pleistocene-aged Beaumont Formation. These formations consist mainly of stream channel, point bar, natural levee, marsh, and backswamp deposits associated with former and current river channels and bayous. The alluvium outcrops in a zone that is approximately 70 to 90 miles wide, which parallels the

Texas coastline. The underlying Beaumont Formation is estimated to be less than 1,000 feet thick, and consists primarily of clay, silt, sand, and gravel (Barnes 1975).

Subsidence in the area occurs as sudden sinking or gradual downward settling of land with little or no horizontal motion. It is caused by surface faults and is intensified and/or accelerated by subsurface mining or pumping of oil and/or groundwater. Rapid subsidence has been seen in the area due to groundwater withdrawal. Estimated subsidence in the project area was approximately 10 feet between 1906 and 1978 (Harris Galveston Subsidence District 2009). Conversely, localized subsidence has been observed to lessen and diminish altogether as groundwater, oil, and gas pumping has decreased or ceased (Holzer and Gabrysch 1982; Verbeck and Clanton 1981); there has been less than 1 foot of subsidence in the project area between 1978 and 2000 (Harris Galveston Subsidence District 2009).

The network of dredged navigation channels, principally the HGNC, the Gulf Intracoastal Waterway, and the industrial and urban land uses surrounding the project area, has replaced the natural coastal features. The bathymetry of the project area has been modified by human activity due to channel dredging. The project area is adjacent to Buffalo Bayou, which is dredged as part of the Bayou Reach of the HSC, and water depths are currently maintained by the USACE to 45 feet MLT.

3.2.3 Dredging and Dredged Material Placement

Maintenance dredging in the Jacintoport Channel occurs approximately every 3 to 5 years; this includes the Jacintoport Channel and Plateau, and the Jacintoport and Inbesa Terminals. The last dredging event took place in August 2012. The HFO Terminal is dredged directly by HFO more frequently than the rest of the Jacintoport Channel. HFO also dredges portions of the main Jacintoport Channel to 45 feet MLT, as needed. A summary of historical dredging activity for the Jacintoport Channel area and reaches is provided in Table 1.

Material dredged from the Jacintoport Channel is placed within Lost Lake PA as authorized by USACE Permit as described in previous sections. The Lost Lake PA is the closest permitted PA to the Jacintoport Channel, at a distance of approximately 3 miles east of the Channel. The Lost Lake PA is 607 acres in total area, with an interior area of 570 acres. In 2009, the interior elevation of the PA was 21.8 feet. The levee elevation is currently being raised to 36 feet and will be raised to an elevation of 42 feet in 2040.

The PHA Plan shows that 350,000 CY of material from non-Federal sources will be placed in Lost Lake PA every 3 years. The Lost Lake PA will have an estimated remaining capacity of approximately 8.2 million CY by the year 2029.

3.2.3.1 Sedimentation Rates and Dredging Frequency

Sediment accumulation rates were estimated based on the last (August 14, 2006) dredging event. Based on discussions with the PHA, dredging takes place in the Jacintoport Channel every 3 to 5 years. The areas of the Jacintoport Channel, Plateau and berthing areas were evaluated and the amount of dredged material removed from each area during the last dredge event was then divided over 4 years to estimate the sedimentation rates within the Jacintoport Channel. Since the Jacintoport Channel configuration is

not expected to change and sea level rise is not expected to have significant impacts, it is anticipated that sedimentation rates in the Jacintoport Channel will remain relatively constant (PHA 2006b).

Table 1: Summary of Historical Dredge Activity

Date	Area/Reaches Dredged	Estimated Dredge Quantity (CY)	Dredge Quantity to Invoice (CY)
1988	Jacintoport Channel and Facility Dock (Jacintoport Wharf)	117,657	113,076
1990/91	Station 30+00 to 42+74.15	78,000	NA
1991	to Peggy Lake	NA	70,592
1994	Maintenance Jacintoport Slip (channel and dock)	98,000	NA
1995	Widen Slip entrance (plateau)	110,000	NA
1996	Maintenance Channel & Jacintoport and Inbesa Terminals	144,473	184,991
1996	Widening of Channel Entrance	110,000	105,951
1996	HFO Dock 1 & 2 and part channel	35,000	NA
	Dock 1	NA	20,361
	Dock 2	NA	18,778
1997	Cargill Berths at Jacintoport	58,097	58,097
2000	Maintenance Jacintoport	90,000	56,350
2000/01	Maintenance Jacintoport Flare	50,252	50,252
2006	Jacintoport Channel	NA	72,829
2006	Jacintoport Plateau	NA	14,373
2006	Jacintoport Dock	NA	23,515
2006	Care Dock 1	NA	6,881
2006	Care Dock 2	NA	9,680
2006	Inbesa Dock	NA	3,921
2006/07	Maintenance Jacintoport Channel and Berthing Areas and Care 1 & 2 Docks	132,000	127,278
2006/07	Inbesa Dock	2,425	3,921

Source: URS 2010

Because the historic dredging information could include various inaccuracies, a range of sedimentation rates were analyzed. A low estimate, best estimate, and high estimate were chosen based on the historic dredging information. In addition, the HGNC Preliminary Assessment sedimentation volumes for the HSC Bayou Reach were reviewed. The range of sedimentation rates in the HGNC Preliminary Assessment in the vicinity of the Jacintoport Channel was 0.50 to 2.0 ft/yr. The following range of values has been selected to evaluate future sedimentation based on the historic dredging information. Estimates include: Low estimate of 0.50 ft/yr, best estimate of 0.67 ft/yr, and a high estimate of 2.0 ft/yr.

3.2.4 Hydrology and Drainage

In the project area, winds can significantly alter the mean diurnal tide, which is approximately 0.7 feet during winter; strong north winds from cold fronts can lower water surfaces by up to 2 feet below MLT. Conversely, water levels can rise up to 15 feet during tropical storms and hurricanes.

The average Gulf tide is 1.45 feet (closest Gulf station – Galveston Pleasure Pier; Texas Coastal Ocean Observation Network [TCOON 2009]), but the tide range may vary substantially, taking into account the astronomical and wind factors. The nearest TCOON observation station to the project area is the Battleship Texas State Park Station, located approximately 1 mile northeast of the project area. This station collected water-level data from May 2002 to September 2008. The average daily water-level range recorded between those dates was approximately 1.7 feet (with a standard deviation of approximately 0.5 feet); the average monthly water-level range was approximately 4.2 feet.

There is limited flow and current information available for the Jacintoport Channel. No flow data have been collected concerning locations near the Jacintoport Channel, given that the nearest gauge is located upstream within Buffalo Bayou and, therefore, is not relevant to this location. The TCOON stations are designed to measure water levels and provide meteorological information, but do not measure currents. The TCOON station at Morgan's Point is used by the HSC pilots in determining the water level when bringing vessels into the HSC and Jacintoport Channel (USACE 2010a).

3.2.5 Climate and Relative Sea Level Rise

The climate of the project area is humid subtropical. Mean daily temperatures in the town of Channelview, Texas, range from 51° F in January to 84° F in July and August. The average rainfall is 51.9 inches, with monthly precipitation ranging from 2.9 inches in March to 6.5 inches in June (Countrystudies 2010).

The National Oceanic and Atmospheric Administration (NOAA) monthly mean sea level data from Galveston Pier 21, from approximately 1910 to 2009 with the average seasonal cycle removed, shows an average sea level rise of 0.021 ft/yr (+/- 0.00092 feet). At this long-term rate, the rise over the 50-year period of study would be approximately 1.05 feet. The sea level rise predicted using the USACE models for relative sea level rise (RSLR) from 2010 to 2060 (EC 1165-2-211) is 1.43 feet using Curve I, 2.04 feet using Curve II, and 2.66 feet using Curve III (USACE 2010a).

The sedimentation rates calculated for the historic period and the estimates of future vertical sedimentation rates in the HGNC Preliminary Assessment are generally on the order of 0.5 to 2 ft/yr. On this basis, the direct effect of RSLR will be on the order of 1 to 10 percent of the vertical sedimentation rate. This is likely much less than the overall uncertainties in the calculated vertical sedimentation rates.

3.2.6 Water and Sediment Quality

The TCEQ has classified major surface waters of Texas as "segments" for the management of water quality and for the designation of site-specific uses and criteria. This management encompasses 1) the

assessment of in-stream water quality, 2) the issuance of permits to discharge into state waters, and 3) the potential allocation of funding. Furthermore, this classification system assists in ensuring compliance with state and Federal requirements. Accordingly, the Jacintoport Channel and the surrounding waters of the Lost Lake PA are contained within the State of Texas designated San Jacinto River Basin, and more specifically, within the surface water segment described as SegID 1006: "Houston Ship Channel Tidal." The Houston Ship Channel Tidal segment is described as "from the confluence with the San Jacinto River in Harris County, to a point immediately upstream of Greens Bayou in Harris County, including tidal portions of tributaries." The Houston Ship Channel Tidal segment is classified as a tidal stream of 25.6 miles in length (TCEQ 2009) and includes the Jacintoport Channel and Lost Lake PA study area.

Water and sediment quality within the Jacintoport Channel project area have been impacted by a long history and co-existence with the petrochemical industry. In spite of this history, specific information and data describing water and sediment quality specific to the project area have been sparse. Water, sediment, and elutriate samples are typically collected and subjected to chemical and grain-size analyses in support of dredge maintenance activities. An elutriate test is often performed to simulate sediment/water mixing at the time of dredging in order to provide an estimate of dissolved contaminants (measured analytes) potentially reentering the water column at the PA site.

3.2.6.1 Water Quality

The 2008 Texas Water Quality Inventory provides site-specific water and fish tissue sampling for various subsections of the Houston Ship Channel Tidal segment. In general, the 2008 water quality report identifies the number of samples which have "exceeded" the screening levels for various chemical and biological measures. The following constituents were found in numerous samples exceeding (high, unless otherwise indicated) the screening levels for the Houston Ship Channel Tidal segment: dissolved oxygen (low), pH (low), lead, mercury, *Enterococcus* spp., ammonia, Chlorophyll-a (low), nitrate, orthophosphorus, and total phosphorus. Other chemicals of concern which were monitored in fish tissue and/or water samples, and were suspect for bioaccumulation in fish tissue, and found to have numerous screening level exceedances included: polychlorinated biphenyls (PCBs), chlordane, dieldrin, dioxin, and heptachlor epoxide. Total suspended solids are typically monitored during dredging activities, but not necessarily monitored as a routine or standard practice by TCEQ apart from such activities (TCEQ 2009).

The Texas Department of State Health Services (DSHS) has historically issued advisory warnings for people to limit their consumption of spotted seatrout (*Cynoscion nebulosus*) and catfish **(***Ictalurus punctatus*) from Galveston Bay. A 2008 advisory warning was issued after a 2-year study demonstrated elevated levels of a variety of toxins, including dioxins and PCBs, in the tissue of seatrout and catfish (DSHS 2008).

3.2.6.2 Sediment Quality

The 2008 Texas Water Quality Inventory also provided site-specific sediment sampling for various subsections of the Houston Ship Channel Tidal segment and identified samples which have "exceeded" the screening levels of various chemical and biological measures. The following constituents were found

in numerous samples exceeding (high, unless otherwise indicated) the screening levels for sediments within the Houston Ship Channel Tidal segment: 1,3-dichlorobenzene, acenaphthene, acenaphthylene, anthracene, benz(a)-anthracene, benzo(a)pyrene, bis(2-ethyl-hexyl)phthalate, chromium, chrysene, copper, dibenz(a,h)-anthracene, fluoranthene, flourene, hexachlorobutadiene, mercury, naphthalene, nickel, phenanthrene, pyrene, and zinc (TCEQ 2009).

Sediment samples were collected and analyzed as part of the dredging Permit 18576(03) requirement (USACE 2006a). Preliminary sampling found elevated copper levels from two of nine sampling locations. Through follow-up testing, these levels proved to be within acceptable limits, deeming the original measurement as a statistical outlier. Table 2 includes the analytical data for the original nine sediment samples collected on 22 June 2006. Mercury and copper were detected above their respective Effects Range Low (ERL) and Effects Range Median (ERM) values at Station JP002.

Table 2: Concentrations of Detected Compounds (Dry Weight) in Sediment Samples (22 June 2006)

Parameter	Units	NOAA ERL	NOAA ERM	JP001	JP002	JP003	JP004	JP005	JP006	JP007	JP008	JP009
Mercury	µg/kg	150	710	185	**932**	367	232	215	158	145	126	244
Arsenic	mg/kg	8.2	70	6.08	6.93	5.27	4.64	4.22	3.64	4.61	3.90	3.21
Cadmium	mg/kg	1.2	9.6	0.341	1.13	0.364	0.323	0.271	0.235	0.291	0.268	0.288
Chromium	mg/kg	81	370	19.7	74.6	19.0	15.7	13.8	11.7	15.3	12.4	11.9
Copper	mg/kg	34	270	33.3	**546**	27.8	19.1	15.9	12.9	19.6	13.9	11.2
Lead	mg/kg	46.7	218	21.9	75.1	27.4	22.4	20.2	40.1	21.9	17.2	25.1
Nickel	mg/kg	20.9	51.6	12.3	34.1	13.6	12.2	11.0	9.46	11.9	10.6	8.70
Silver	mg/kg	1.0	3.7	0.229	0.393	0.227	0.195	0.170	0.138	0.194	0.160	0.141
Zinc	mg/kg	150	410	101	145	99.9	82.3	71.7	52.3	80.5	62.0	53.6
Bis (2-ethylhexyl) phthalalte	µg/kg	--	--	U	U	U	U	U	U	U	96	U
Total Organic Carbon	wt%	N/A	N/A	1.31	2.00	1.21	1.12	0.831	0.728	0.957	0.886	0.808
Percent Moisture	wt%	N/A	N/A	55.8	61.5	56.9	55.2	51.9	40.9	54.0	51.5	44.3
Total Solids	wt%	N/A	N/A	45.9	41.5	43.1	45.5	48.8	51.4	46.5	50.7	54.8
Total Volatile Solids	wt%	N/A	N/A	1.28	2.89	2.42	1.22	2.08	2.42	1.09	2.15	2.08

µg/kg - micrograms/kilogram
mg/kg – milligrams/kilogram
wt% - weight percentage
N/A – Comparative value not available
J – Analyte detected below reporting limit
U – Analyte not detected

Table 2 includes the analytical data for the confirmation sampling event, which included one sample location (JP002) from the preliminary sampling event and five additional sample stations. Although copper, lead, nickel, and zinc results exceeded the NOAA ERL, all of the results were less than their respective NOAA ERM values.

The PHA's Environmental Affairs Department concluded that the independent sampling and analyses of the sediment locations by Benchmark Ecological Services, Inc. and e-Lab (Tables 2 and 3) confirmed the

PHA had no reservations regarding dredge material placement into a PHA-owned/operated dredge placement area (Lost Lake) from these sampling locations (PHA 2006b and PHA 2006c). Further, the TCEQ reviewed the PHA application for Amendment of Permit 18576(03) and subsequently issued a certification that states "there is reasonable assurance that the project will be conducted in a way that will not violate water quality standards." It is reasonable to anticipate that sediment quality measurements performed by the USACE in support of the Federal AOM of Jacintoport Channel would result in similar findings.

Table 3: Concentrations of Detected Compounds (Dry Weight) in Sediment Samples (24 July 2006)

Parameter	Units	NOAA ERL	NOAA ERM	JP002	JP010	JP011	JP012	JP013	JP014
Arsenic	mg/kg	8.2	70	5.93	5.28	5.42	7.28	5.56	6.13
Cadmium	mg/kg	1.2	9.6	0.384 J	0.271 J	0.24 J	0.774 J	0.209 J	0.331 J
Chromium	mg/kg	81	370	28.2	20.6	21.2	37.2	21.0	34.1
Copper	mg/kg	34	270	29.0	32.9	**43.9**	31.2	27.9	22.6
Lead	mg/kg	46.7	218	**48.0**	45.3	27.5	**65.4**	24.0	43.4
Nickel	mg/kg	20.9	51.6	20.0	12.9	14.5	**22.3**	13.1	14.8
Silver	mg/kg	1.0	3.7	0.0932 J	0.0469 J	0.0502 J	0.172 J	0.038 J	0.0813 J
Zinc	mg/kg	150	410	**190**	82.0	107	**156**	100	97.7
Percent Moisture	%	N/A	N/A	62.4	55.2	62.1	58.2	57.4	55.3

mg/kg – milligrams/kilogram N/A – Comparative value not available
% - percent J – Analyte detected below reporting limit

3.3 Biological Resources

The greater Galveston Bay region lies within the Western Gulf Coastal Plain of the U.S. The Jacintoport Channel and the greater HSC, however, reside within and can be locally characterized by two important ecological designations: 1) terrestrially by the "Gulf Coast Prairies and Marshes," Natural Region of Texas (Texas Parks and Wildlife Department [TPWD] 1984) and 2) aquatically by the San Jacinto River Basin (watershed), specifically by the water body segment described as Houston Ship Channel Tidal (TCEQ 2010).

The Jacintoport Channel and the greater HSC are heavily industrialized where the waterways have been created over years of extensive dredging and widening and, therefore, resemble few characteristics of their natural indigenous state.

3.3.1 Vegetation

There is little to no remaining wetland vegetation associated within the immediate vicinity of the Jacintoport Channel and terminal areas due to predominantly hardened shorelines. No vegetation, including wetlands, are located within the footprint of the Jacintoport Channel A variety of vegetation species do exist on the shores of other areas within close proximity to the project area. These vegetation types generally include commonly associated plants, such as big cordgrass (*Spartina cynosuroides*), widgeongrass (*Ruppia maritima*), bulrush (*Scirpus* spp.), seashore paspalum (*Paspalum vaginatum*), and common reed (*Phragmites australis*) (TPWD 1984). Vegetation types found within San Jacinto State

Historic Site, which is located approximately 4,000 feet from the Jacintoport Channel, includes native coastal tall grass prairie, tidal marsh, and bottomland forests.

The Lost Lake PA provides a potential area sizeable enough to support both emergent and submerged wetland vegetation and associated habitat. This area is periodically disturbed by routine deposition of dredged material from maintenance of the HSC, Jacintoport Channel and other non-federal dredging. Aerial photographs indicate that pioneer herbaceous species generally revegetate this area after deposition. The vegetation present at any given time is a direct result of the most recent dredging placement activity, frequency, and current elevation of the PA.

3.3.2 Aquatic and Terrestrial Habitats

Both aquatic and terrestrial habitats are located within and near the project area. Aquatic habitats include tidal marshes, un-vegetated open water, and the unconsolidated benthic sediments associated with the Channel. The Lost Lake PA provides potential terrestrial habitat and roosting areas for numerous bird species.

3.3.3 Wildlife Resources

A variety of water birds and other waterfowl inhabit and utilize surrounding area resources of the San Jacinto River Basin and constitute the predominant wildlife of the region. Birds common to the greater Galveston Bay ecosystem include: the double-crested cormorant (*Phalacrocorax auritus*), white ibis (*Eudocimus albus*), great blue heron (*Ardea herodias*), little blue heron (*Egretta caerulea*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), tricolored heron (*Egretta tricolor*), white pelican (*Pelecanus erythrorhynchos*), royal tern (*Thalasseus maximus*), Forster's tern (*Sterna forsteri*), laughing gull (*Leucophaeus atricilla*), herring gull (*Larus argentatus*), ring-billed gull (*Larus delawarensis*), and black skimmer (*Rynchops niger*) (U.S. Fish and Wildlife Service [USFWS] 2009a).

A number of other bird species use southern Texas as a flyover and resting area on return trips from more southern wintering grounds. Warblers, tanagers, orioles, and vireos are among the familiar passerines, as well as a variety of duck, goose, loon, and grebe species. Although there are few natural areas at the Jacintoport Channel project site, the Lost Lake PA provides potential habitat and roosting areas for many of the previously mentioned bird species. No substantiating bird use data for Lost Lake PA are currently available.

3.3.4 Fisheries and Essential Fish Habitat

3.3.4.1 Fisheries

Fisheries resources potentially found in the waters of the Jacintoport Channel, the greater HSC, and northern reaches of the Galveston Bay area include popular sport fishing of species including red drum (*Sciaenops ocellatus*), spotted seatrout, black drum (*Pogonias cromis*), southern flounder (*Paralichthys lethostigma*), star drum (*Stellifer lanceolatus*), and spot (*Leiostomus xanthurus*). Other common fishes of the region include the gafftopsail catfish (*Bagre marinus*), striped mullet (*Mugil cephalus*), sheepshead

(*Archosargus probatocephalus*), Atlantic croaker (*Micropogonia undulates*), hardhead catfish (*Arius felis*), and the bay anchovy (*Anchoa mitchilli*) (Galveston Bay Estuary Program [GBEP] 2009).

Shellfish resources include the blue crab (*Callinectes sapidus*), a variety of shrimp species (*Penaeus* spp.), and American oyster (*Crassostrea virginica*). It is not uncommon to have fishery and shellfish "seafood consumption advisories" for many species of the HSC due to the bioaccumulation of toxins (GBEP 2009). Dioxin is one such compound found in area fishery specimens that has been analyzed. Dioxin is a generic term commonly used for a suite of toxic and environmentally persistent compounds (GBEP 2009).

3.3.4.2 Benthos

Benthic macroinvertebrate and microbial communities are well established in the HSC, and scientists have developed biological indicators utilized to track future environmental changes. Monitoring results have demonstrated that these communities exhibit abundances, diversity, and composition which are consistent with a chemically and/or physically disturbed environment (i.e., dredging maintenance) (Galveston Bay Information Center 1997).

3.3.4.3 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act Reauthorization (16 United States Code [U.S.C.] 1801-1882) provided added measures to describe, identify, and minimize adverse effects on essential fish habitat (EFH) (50 CFR Part 600). The Gulf of Mexico Regional Management Council (GMRMC) retains the responsibility for management of EFH species in Texas, Louisiana, Mississippi, and Florida. By definition, EFH includes those waters and substrate necessary for fish and shellfish spawning, breeding, feeding, and growth through maturity. "Waters" include aquatic areas and associated physical, chemical, and biological properties currently or historically utilized by the fisheries. "Substrate" includes any sediment, hard bottom, structures underlying the waters, and associated biological communities (U.S. Department of Commerce 2007). Those activities potentially impacting EFH may result in either direct (e.g., physical disruption) or indirect (e.g., loss of prey species) effects, and can be site-specific, habitat-wide, cumulative, and/or synergistic effects.

According to the Biogeography Branch of the GMFMC, EFH has been designated for species within the region included in the Jacintoport Channel vicinity, and may include the red drum, brown shrimp (*Penaeus aztecus*), gulf stone crab (*Menippe adina*), pink shrimp (*Penaeus duorarum*), Spanish mackerel (*Scomberomorus maculatus*), and white shrimp (*Penaeus setiferus*) (GMFMC 2009). Details regarding specific habitat requirements for each of these species follow in Table 4.

3.3.5 Threatened and Endangered Species

The USFWS and the NMFS co-share the responsibility for administration of the ESA. Within the ESA, a species may be listed as either threatened or endangered (T&E). "Threatened" indicates that a species is likely to become endangered within the foreseeable future; "Endangered" indicates that a species is in danger of extinction throughout all or within a significant portion of its range. All species of plants and

animals, except pest insects, are eligible for listing as T&E species.

Candidate species are those plants and animals for which the USFWS has gathered sufficient information on their biological status and threats in order to propose them as endangered or threatened under the ESA. The development of a proposed listing regulation, however, is precluded by other higher priority listing activities. The NMFS (with jurisdiction over most marine species) defines candidate species more broadly, to include those species whose status is of concern, but more information is needed before they can be proposed for listing. The largetooth sawfish (*Pristis pristis*) has been identified as a Candidate Species in Texas, but is not expected to be found in the Jacintoport Channel and Lost Lake PA study area.

Table 4: Habitat Requirements of Species with EFH in the Project Study Area

Species	Location/Distribution
Red Drum	Red drum commonly occur in all of the Gulf's estuaries, but also occur in a variety of habitats, ranging from depths of about 130 feet offshore to very shallow estuarine waters; the GMRMC considers all estuaries to be EFH for the red drum. Estuaries are important for both habitat requirements and for dependence on prey species which include shrimp, blue crab, striped mullet, and pinfish. Schools are common in the deep Gulf waters, with spawning occurring in deeper water near the mouths of bays and inlets and on the Gulf side of the barrier islands. Red drum are associated with a variety of substrate types including sand, mud, and oyster reefs.
Brown Shrimp	Brown shrimp are most abundant in central and western Gulf of Mexico and found in estuaries and offshore waters to 360 feet with the post-larval individuals typically occurring within estuaries. Post-larval individuals and juveniles are associated with shallow vegetated habitats, but are also found over silty-sand; non-vegetated mud bottoms are preferred. Adults typically occur outside of bay areas in marine waters extending from mean low tide to the edge of the continental shelf and areas associated with silt, sand, and sandy substrates.
Gulf Stone Crab	Adults burrow under rock ledges, coral heads, dead shell, or grass clumps; burrows may extend 50 inches into the substrate of seagrass flats and tidal channels. Juveniles do not dig burrows, but will hide on/in shell bottoms, sponges, *sargassum* mats, channels, and deep grass flats. Larvae are planktonic and drift with the water currents. Adults and juveniles are hardy and tolerate most environmental extremes; larvae require warm water (30° C) and high salinity (30-35 ppt).
Pink Shrimp	Juveniles inhabit most estuaries in the Gulf of Mexico and are commonly found in estuarine areas with sea grass. Post-larval individuals, juveniles, and sub-adults may prefer coarse sand/shell/mud mixtures. Adults inhabit offshore marine waters, with the highest concentrations in depths of 30 to 144 feet, and use estuaries from the larval stage until the species matures to the late juvenile stage.
Spanish Mackerel	Pelagic species are found in neritic waters and along coastal areas, inhabiting the estuarine areas; especially higher salinity areas, during seasonal migrations. Spanish mackerel are rare and infrequent inhabitants of Gulf estuaries, where spawning occurs offshore from May to October. Nursery areas are in estuaries and coastal waters year-round. Larvae are found offshore over the inner continental shelf, most commonly in water depths less than 150 feet. Juveniles are found offshore, in beach surf, and occasionally in estuarine habitat; juveniles prefer marine salinity and clean sand substrate.
White Shrimp	White shrimp are offshore and estuarine dwellers; pelagic or demersal depending on their life stage. Eggs are demersal and larval stages are planktonic, and both occur in nearshore marine waters. Post-larvae become benthic upon reaching the nursery areas of estuaries, seeking shallow water with muddy sand bottoms that are high in organic detritus. Juveniles move from the estuarine areas to coastal waters as they mature. The adults are demersal and generally inhabit nearshore Gulf of Mexico waters in depths less than 100 feet on soft mud or silty bottoms.

Source: GMFMC 2010

The ESA provides for the protection of T&E species and their habitats by prohibiting the "take" of listed species. Take has been defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." Further regulations have defined "harm" as: "An act which actually kills or injures wildlife. Such an act may include significant habitat modification or

degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering." (USFWS 2009b).

State wildlife organizations have and exercise the ability to provide additional jurisdiction and protection to species within their statewide boundaries. The Texas Parks and Wildlife Department (TPWD) has established a list of species (TPWD 2010) that are threatened (likely to become endangered) and endangered (threatened with statewide extinction) (TPWD 2007). The potential occurrence of several state and Federally listed T&E species has been identified for Harris County, Texas. Species likely to occur specifically within the Jacintoport Channel project area were further evaluated. These species have been compiled from both Federally-listed (USFWS 2009c and NMFS 2010) and state-listed (TPWD 2010) sources in Table 5 (table citations of species do not indicate confirmed existence).

Table 5: Federal and State Protected Species Potentially Occurring in the Jacintoport Channel Project Area, Harris County, Texas

Common Name	Scientific Name	Federal Listing Status	State Listing Status
	Birds		
American peregrine falcon	*Falco peregrinus anatum*	Not Listed	Threatened
Bald eagle	*Haliaeetus leucocephalus*	Not Listed	Threatened
Brown pelican	*Pelecanus occidentalis*	Not Listed	Endangered
Peregrine falcon	*Falco peregrinus*	Not Listed	Threatened
White-faced ibis	*Plegadis chihi*	Not Listed	Threatened
White-tailed hawk	*Buteo albicandatus*	Not Listed	Threatened
	Fish		
Smalltooth sawfish	*Pristis pectinata*	Endangered	Endangered
	Mollusks		
Sandbank pocketbook	*Lampsilis satura*	Not Listed	Threatened
Texas pigtoe	*Fusconaia askewi*	Not Listed	Threatened
	Reptiles		
Alligator snapping turtle	*Macrochelys temminckii*	Under Review	Threatened
Green sea turtle	*Chelonia mydas*	Threatened	Threatened
Hawksbill sea turtle	*Eretmochelys imbricate*	Endangered	Endangered
Kemp's Ridley sea turtle	*Lepidochelys kempii*	Endangered	Endangered
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	Endangered
Loggerhead sea turtle	*Caretta caretta*	Threatened	Threatened
	Plants		
Texas prairie dawn	*Hymenoxys texana*	Endangered	Endangered

Source: USFWS 2009c, NMFS 2010, TPWD 2010

A Biological Assessment (BA) has been prepared (Appendix A) that addresses the distribution and potential impact on Federally listed T&E species. Potential habitat occurs within the Jacintoport Channel and the Lost Lake PA for several of the T&E species (Table 5) based on actual species occurrence in similar habitats of the surrounding areas. The smalltooth sawfish has been found to occur in the lower, more saline waters of Galveston Bay. The Sandbank pocketbook and Texas pigtoe have been observed in the San Jacinto River, but primarily within areas with good current flow (i.e. velocity and volume). The avian T&E species identified for potential occurrence, however, would find little feeding, roosting, or other suitable habitat resources on the Lost Lake PA, but are known to feed on fish prey in the waters surrounding the HSC (TCEQ 2009). Sea turtles are unlikely to be found in the upper reaches of the Jacintoport Channel, but have been observed in the lower areas of the HSC.

3.3.6 Invasive Species

Within the project area and the HSC vicinity, numerous invasive plants and animals may be found, including fire ants (*Solenopsis wagneri*), grass carp (*Ctenopharyngodon idella*), nutria (*Myocaster coypus*), hydrilla (*Hydrilla verticillata),* water hyacinth (*Eichhoria crassipes),* Chinese tallow (*Triadica serbifera*), salt cedar (*Tamarix* spp.), and Brazilian pepper (*Schinus terebenthifolius*) (U.S. Department of Agriculture [USDA] 2010).

All of these species pose concerns. The encroachment of fire ants into estuarine ecosystems poses an increasing threat to colonial nesting bird populations. Grass carp are voracious herbivores, and they have the ability to decimate aquatic vegetation from large areas. Nutria are large rodents that feed on the roots and rhizome of marsh vegetation and can strip vegetation from marshes. Both hydrilla and water hyacinth are aquatic plants that proliferate quickly, often out-competing native aquatic plants, and congesting recreational waterways. Chinese tallow, salt cedar, and Brazilian pepper are terrestrial plants that can out-compete native terrestrial plants within uplands or wetlands and alter the viability of habitats.

3.4 Human Environment

3.4.1 Existing Facilities and Utilities Systems

The Jacintoport Terminal on Jacintoport Channel is owned and operated by the PHA, a public entity chartered by the State of Texas. The Jacintoport Terminal is located on a 125-acre tract on the north side of the HSC near Channelview, Harris County, Texas. The terminal includes three berths, a paved cargo marshaling area, and two large transit sheds. The transit sheds include covered rail areas and truck bays (PHA 2009b).

Two privately-owned facilities are also accessed via the Jacintoport Channel: the Houston Fuel Oil Terminal Company (HFOTCO) and the Inbesa Terminal. The HFOTCO is the U.S. Gulf Coast's largest black oil facility and has been storing, blending, and moving residual oil for carbon black manufacturers, refineries, bunker suppliers, and oil traders since 1979. Starting in 1992, HFOTCO began storing and delivering crude oil and feedstock to area refineries (HFOTCO 2009). The Inbesa Terminal is a privately-owned facility which handles steel imports (Inbesa 2001).

3.4.2 Air Quality

The U.S. Environmental Protection Agency (USEPA) established National Ambient Air Quality Standards (NAAQS) for specific pollutants determined to be of concern with respect to the health and welfare of the general public. Ambient air quality standards are classified as either "primary" or "secondary." The major criteria pollutants or pollutants of concern are: carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 microns (PM-10), particulate matter less than 2.5 microns (PM-2.5), and lead. The NAAQS represent the maximum levels of background pollution that are considered safe, within an adequate margin of safety, to protect the public health and welfare.

Areas that do not meet these NAAQS are called non-attainment areas; areas that meet both primary and secondary standards are known as attainment areas. The Federal Conformity Final Rule (40 CFR Parts 51 and 93) specifies criteria or requirements for conformity determinations for Federal projects. The Federal Conformity Rule was first promulgated in 1993 by the USEPA, following the passage of amendments to the Clean Air Act in 1990. The rule mandates that a conformity analysis be performed when a Federal action generates air pollutants in a region that has been designated a non-attainment or maintenance area for one or more NAAQS.

A conformity analysis is the process used to determine whether a Federal action meets the requirements of the Federal Conformity Rule. It requires the responsible Federal agency to evaluate the nature of a proposed action and the associated air pollutant emissions, and calculate emissions as a result of the proposed action. If the emissions exceed established limits, known as *de minimis* thresholds, the proponent is required to implement appropriate mitigation measures.
The TCEQ has adopted EPA's NAAQS as Texas' criteria pollutants. Areas that failed to meet Federal standards for ambient air quality are considered non-attainment. TCEQ and EPA consider Harris County a severe non-attainment area for O_3 (USEPA 2010b).

3.4.3 Noise

As a general rule of thumb, noise generated by a stationary noise source, or "point source," will decrease by approximately 6.0 dBA over hard surfaces and 9.0 dBA over soft surfaces for each doubling of the distance. For example, if a noise source produces a noise level of 85 dBA at a reference distance of 50 feet over a hard surface, then the noise level would be 79 dBA at a distance of 100 feet from the noise source, 73 dBA at a distance of 200 feet, and so on. To estimate the attenuation of noise over a given distance the following equation is utilized:

Equation 1: $dBA_2 = dBA_1 - 20 \log (d_2/d_1)$

Where:

dBA_2 = dBA at distance 2 from source (predicted)
dBA_1 = dBA at distance 1 from source (measured)
d_2 = Distance to location 2 from the source
d_1 = Distance to location 1 from the source
Source: California Department of Transportation 1998

The Jacintoport Channel, where dredging activities will occur, is located within an industrial area with no residential or other sensitive noise receptors within 4,000 feet. The dredge materials would be pumped and piped to the Lost Lake PA which is located approximately 2.5 miles from the mouth of Jacintoport Channel. The dredge materials would travel (via pipeline) along the north bank of the Federal HSC toward the Lost Lake PA. The Battleship Texas State Historic Park and San Jacinto State Park are located on the south bank relative to the pathway to the Lost Lake PA. The channel is approximately 1,500 feet wide and if the pipe and pumps used to transport the dredge materials are located near the north

bank, there would be at least 1,200 feet between the pipeline corridor and the banks of the state parks. The San Jacinto State Park is 1,700 feet at its closest point from the Lost Lake PA (see Figure 1-1).

3.4.4 Traffic and Transportation

The Jacintoport Channel, Terminals, and Lost Lake PA are adjacent and connected to the Federally-maintained HSC which is the primary shipping channel connecting Houston-area shipyards to the Gulf of Mexico (see Figure 1-1). The Jacintoport Terminal has maintained commercial cargo operations since the 1990s, and is surrounded by and adjacent to many other commercial and industrial shipping and cargo operations. On the mainland, the Jacintoport Terminal area is accessible from Interstate I-10, which runs east to west, and Beltway 8, which runs north to south. Jacintoport Boulevard connects Beltway 8 to the terminal area. A railroad system also runs adjacent to the Jacintoport Terminal area providing rail access.

3.4.5 Land Use

General land use within the Jacintoport Terminal area is considered urban development, consisting of industrial shipping, commercial, and navigational-related businesses. There are no apparent residential or civic buildings on the Jacintoport peninsula. The Lost Lake PA contains emergent herbaceous wetlands along with several barren land areas.

Prime and Unique Farmland

Prime farmland is defined as land that provides the "best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion". Unique Farmland is further defined "land other than prime farmland, that is used for the production of specific high-value food and fiber crops; such as, citrus, tree nuts, olives, cranberries, fruits, and vegetables" (Natural Resources Conservation Service [NRCS] 2009). No prime or unique farmlands have been identified within the Jacintoport Channel or Lost Lake PA study area, as none of the soils are considered prime or unique farmland soils (NRCS 2009).

3.4.6 Cultural Resources

A search of the Texas Historical Sites Atlas disclosed one previously recorded archeological site, 41HR424, located within the project area. Site 41HR424 is the remains of the San Jacinto Ordnance Depot. The Jacintoport Channel was originally created as part of the San Jacinto Ordnance Depot (41HR424) which was constructed between 1941 and 1942 as a part of the pre-World War II mobilization effort. The depot consisted of an administration area onshore along DeZavala Road, two large areas for storage and destruction of ordnance, a small compound of buildings at DeZavala Point, and a railroad transfer station and wharf complex at a large slip cut into the north bank of Buffalo Bayou (Foster and Schmidt 1998). In the 1960s, the facility was closed and sold to private interests. In 2005, the PHA hired PBS&J to conduct thorough historic research and field documentation on the San Jacinto Ordnance Depot as a part of the Beltway 8 Dredged Material Placement Area Project (Foster et al. 2007). Based on this research, the USACE recommended site 41HR424 ineligible for listing on the National Register of

Historic Places (NRHP) in a letter to the State Historic Preservation Officer (SHPO) dated March 13, 2007. The SHPO concurred with the recommendation by letter dated April 13, 2007.

The San Jacinto Monument is an octagonal obelisk (567.31 feet) located on the HSC in La Porte, Harris County, Texas. The monument apex holds a 220-ton star that commemorates the site of the Battle of San Jacinto, the decisive battle of the Texas Revolution. The monument was constructed between 1936 and 1939, and dedicated on April 21st, 1939. The monument was first renovated in 1983 and again in 1990 to include the San Jacinto Museum of History and the Jesse H. Jones Theatre for Texas Studies at its base. After further renovations in 1995, a complete renovation was performed from 2004 through 2006. Constituting the world's tallest monumental column, it is now part of the San Jacinto Battleground State Historic Site. On December 19, 1960, the San Jacinto Battlefield (including the San Jacinto Monument) was designated as a National Historic Landmark and listed in the NRHP.

3.4.7 Socioeconomics

3.4.7.1 Population and Demographics

According to the 2000 Census (U.S. Census Bureau 2000a), a total of 29,685 people live in Channelview, Harris County, Texas. The racial mix consists predominantly of Caucasians and people of Hispanic or Latino origin (Table 6). The remainder are divided among African Americans, Native Americans, Asians, and people claiming to be some other race or two or more races (U.S. Census Bureau 2000a).

Table 6: Population and Race*

Geographic Region	Total Population	Race							
		White (%)	African American (%)	Native American (%)	Asian (%)	Native Hawaiian or other Pacific Islander (%)	Some Other Race (%)	Two or more Races (%)	Hispanic or Latino Origin of any Race (%)
Texas	20,851,820	71.0	11.5	<1	2.7	<1	11.7	2.5	32.0
Harris County	3,400,578	58.7	18.5	<1	5.1	<1	14.2	3.0	32.9
Channelview	29,685	63.1	13.0	<1	2.0	<1	18.3	2.9	37.1

*Based on the 2000 Census

Source: U.S. Census Bureau 2000a.

3.4.7.2 Income and Poverty Levels

The median household income in 1999 for Channelview was $42,968 (U.S. Census Bureau 2000a). This was slightly higher than the 1999 median household income for Harris County ($42,598), Texas ($39,927) and the Nation ($41,994) (U.S. Census Bureau 2000a). The estimated number of people of all ages living in poverty for Channelview was 4,060 in 1999 (Table 7). This represented 13.7 percent of the city, which was lower than the estimated 15 percent of Harris County and the state population, but slightly higher than the 12.4 percent of the Nation's population that lived in poverty (U.S. Census Bureau 2000a). In Channelview in 1999, 1,735 individuals, or 17.3 percent of the children under the age of 18 in

the city, were living in poverty (U.S. Census Bureau 2000a). The percentage of children under 18 years old living in poverty in the State of Texas was 20.2 percent.

Table 7: Poverty and Median Income (1999)

Region	Number in Poverty of All Ages	Percentage in Poverty	Median Income (dollars)
Nation	281,421,906	12.4	41,994
Texas	3,117,609	15.4	39,927
Harris County	503,234	15.0	42,598
Channelview	4,060	13.7	42,968

Source: U.S. Census Bureau 2000a

The total number of jobs in Harris County in 2007 was 24,615, an increase of 33 percent over the 1997 number of 18,390 (Bureau of Economic Analysis 2010). In 2008, Harris County had a per capita personal income (PCPI) of $47,788. The Harris County PCPI ranked 6th of 254 counties in the State of Texas, and was 126 percent of the state average of $37,809, and 119 percent of the National average of $40,166. The average annual growth rate of Harris County's PCPI from 1998 to 2008 was 4.2 percent. This average annual growth rate was higher than the growth rate for the state (4.1 percent) and the Nation (4.0 percent). In 2008, Harris County had a total personal income of $190,226,395. The Harris County total personal income ranked 1st in the State and accounted for 20.7 percent of the Texas state total (Bureau of Economic Analysis 2010).

3.4.8 Hazardous, Toxic, and Radioactive Wastes

A Hazardous, Toxic, and Radioactive Waste (HTRW) preliminary desktop assessment was conducted for the proposed project. The assessment methodology was designed to identify known and potentially unknown HTRW sites that could cause a release to the environment, endanger human health, and impact project costs and schedules. The methodology included a database search and review of aerial photos and maps.

The EPA online *Enviromapper* (USEPA 2009) is a comprehensive database that was used to search for HTRW sites. *Enviromapper* searched multiple USEPA databases including the following: the *Aerometric Information Retrieval System* (AIRS); the *Assessment, Cleanup, and Redevelopment Exchange System* (ACRES); the *Comprehensive Environmental Response, Compensation, and Liability Information System* (CERCLIS); the *Permit Compliance System* (PCS); the *Radiation Information Database* (RADINFO); the *Resource Conservation and Recovery Act Information* (RCRAInfo); and the *Toxics Release Inventory* (TRI).

Searches of these databases indicated that all three terminals surrounding the Jacintoport Channel are HTRW sites, as well as other facilities in the surrounding area. The PCS database lists both the HFO Terminal and the Jacintoport Terminal as facilities that have been issued permits to discharge wastewater into rivers. HFO Terminal West is included in the AIRS system, which tracks air pollutants produced by stationary sources within the United States; HFO Terminal West is also listed in the TRI database. The TRI database contains information about chemicals which are being used, manufactured, treated, transported, or released to the environment. Additionally, HFO Terminal West and Inbesa Terminal are listed in the RCRAInfo database as hazardous waste handlers.

The San Jacinto River Waste Pits is a superfund site occupying 3.5 acres, located on the western bank of the San Jacinto River, immediately north of the I-10 Bridge. The site is bounded on the south by I-10, on the east by the San Jacinto River main channel, and on the north and west by shallow water off the River's main channel. The site consists of three former disposal pits, which historically received wastes from paper mill activities. The property is currently inactive, and portions of the original pits are underwater. Contaminated sediments extending at least 0.5 miles in length lie within the San Jacinto River.

Due to the San Jacinto River Waste Pits Site location partially in the San Jacinto River, area permitted activities issued under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers & Harbors Act of 1899 (RHA) may impact the Site. Effective November 1, 2009, all permit applicants and existing permittees within the area of concern must conduct certain sampling events to ensure that any activities conducted, especially activities involving dredging or disposal of dredged materials, do not impact the site investigation and cleanup. The verification of such sampling events and adherence to the process will be completed by TCEQ (USACE 2009b). Additionally, all work in the San Jacinto River Waste Pits Area of Concern, authorized under a Nationwide Permit, requires a waiver from the District Engineer prior to starting work in jurisdictional areas (USACE 2010b).

3.4.9 Environmental Justice

Executive Order (EO) 12898 (Federal Action to Address Environmental Justice in Minority and Low-Income Populations) requires that an analysis be performed to address the potential for the proposed project (Federal AOM of the Jacintoport Channel) to have a disproportionate, adverse impact on minority or low income populations in the vicinity of the project area. To support such an analysis, data from the 2000 Census was searched for Channelview, Harris County, Texas. The ethnicity profile for the population derived from this census may be characterized as White (63.1 percent), African American (13.0 percent), American Indian (0.5 percent), Asian (2.0 percent), Native Hawaiian (0.1 percent), Hispanic (37.1 percent), and Other (18.3 percent) (U.S. Census Bureau 2000a). The percentage of families living below the poverty level was 11.5 percent for 2000, which is comparable to the Texas state percentage (12 percent), but higher than the Nation (9.2 percent). The median household income for Channelview in 2000 ($42,968) was higher than both Texas ($39,927) and the Nation ($41,994) (U.S. Census Bureau 2000b).

3.4.10 Visual and Aesthetic Resources

The Jacintoport Channel is located adjacent to the Federally-maintained HSC and provides access to the Jacintoport, Inbesa, and HFO Terminals. The Jacintoport Terminal has conducted commercial cargo operations since the 1990s and is surrounded by and adjacent to many other commercial and industrial shipping and cargo operations. The Lost Lake PA, 3 miles from the Jacintoport Channel, is located within the Federally-maintained HSC. The HSC has numerous terminals and berthing locations and serves as a conduit for ocean going vessels between the Houston area shipyards and the Gulf of Mexico. Historical development associated with the commercial and industrial shipping and cargo operations within the Jacintoport Channel area and the greater HSC have permanently altered the visual and aesthetic landscape of Buffalo Bayou.

3.4.11 Recreational Resources

Two well known recreational resources are located within the vicinity of the Jacintoport Channel and Lost Lake PA project area. The River Terrace Park is located to the east of Jacintoport Channel and immediately north of Lost Lake PA, across the San Jacinto River. The River Terrace Park provides temporary restrooms, picnic facilities, a basketball court playground, paved trails, a boat ramp, pavilion, multi-purpose fields, and tennis courts.

The TPWD's San Jacinto State Park includes the Battleground State Historic Site consisting of the Battleground, Monument and Battleship TEXAS. The park is located just south and east of the Jacintoport Channel, to the south of the HSC and the Lost Lake PA. See Section 3.4.6 - Cultural Resources, for greater details on the historical and cultural significance of the San Jacinto Monument.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Project Area

The Jacintoport Channel was originally constructed (4,100 feet long and 200 feet wide) by the USACE and is currently maintained by the PHA. The Jacintoport Channel provides access to the Jacintoport Terminal, owned by the PHA, and the privately-owned Inbesa and HFO Terminals (Figure 1-2).

Potential environmental impacts resulting from executing the No Action Alternative (no Federal AOM) and the Proposed Alternative (Federal AOM) are discussed herein. Both the No Action Alternative (PHA maintained) and the Proposed Alternative (Federal AOM) represent a condition where Jacintoport Channel would be maintained to an average operating depth of 40 feet MLT, plus 2 feet of advanced maintenance, on a dredging cycle of every 3 to 5 years. The sole difference between the Alternatives is the ownership of the dredge maintenance responsibility.

The potential environmental impacts resulting from the implementation of the Alternatives are anticipated to be mutually consistent and virtually identical, since dredging activities would occur in a similar manner and frequency, and dredged material placement would occur at the same location. As such, the following environmental consequences section will provide a single, consolidated description of the ongoing impacts for the existing project for each of the environmental resource areas.

4.2 Physical Environment

4.2.1 Topography and Soils

The volume and frequency of dredged material placement at the Lost Lake PA would remain consistent with current levels. Since existing soils within the Lost Lake PA include dredged material from Jacintoport Channel, placement of dredged material would not adversely impact the project area. No additional impacts to the soils surrounding the Jacintoport Channel are anticipated from continued dredging maintenance. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.2.2 Geology

The Lost Lake PA has historically received dredged materials from the Jacintoport Channel. Continued maintenance dredging of the Jacintoport Channel and placement of dredged material at the Lost Lake PA are not anticipated to adversely impact the geology of the project area. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.2.3 Dredging and Dredged Material Placement

Continued dredge maintenance would maintain the Jacintoport Channel at an operating depth of 40 feet MLT, plus 2 feet of advanced maintenance. The Jacintoport Channel is projected to shoal evenly at a sedimentation rate of 0.67 ft/yr. Maintenance of the Jacintoport Channel on the 3 to 5 year cycle is projected to provide safe and reliable waterborne access to the Jacintoport Channel. No adverse impacts associated with dredging or dredge placement are anticipated from continued dredge maintenance.

The PHA Plan indicates that Lost Lake PA is 607 acres in total area, with an interior area of 570 acres. In 2009, the interior elevation of the Lost Lake PA was 21.8 feet. The levee elevation is currently being raised to 36 feet and will be raised to an elevation of 42 feet in 2040 (PHA 2007b). Based on estimated sedimentation rates from the HGNC Preliminary Assessment, the Lost Lake PA is anticipated to provide a remaining capacity of approximately 8.2 million CY by 2029; enough capacity to continue receiving the dredge material from Jacintoport Channel for the 20-year Dredge Material Management Plan (DMMP) period. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.2.4 Hydrology and Drainage

Annual sedimentation rates of 0.67 ft/yr may gradually shoal the Jacintoport Channel between dredging cycles. Continued dredge maintenance on a 3 to 5 year dredge cycle would maintain the Jacintoport Channel at an average annual operating depth of 40 feet MLT. Extending a dredge cycle to a 5 year interval (worst case) may potentially have a temporary effect on the tidal exchange and hydrological patterns within the Jacintoport Channel. Although minimal temporary effects on Jacintoport Channel hydrology and drainage may be experienced towards the end of the 5 year cycle, these patterns would remain consistent with current conditions. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.2.5 Climate and Relative Sea Level Rise

Maintenance dredging would not impact the climate or sea level rise within the project area. However, the continual rise in the sea level observed within the vicinity of the project area is anticipated to have some beneficial impacts. With an increasing sea level, the amount of required maintenance dredging would decrease due to the increase in water depth. The increase in sea level is not expected to affect the capacity of the PA and is not expected to require any levee modifications to the PA. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.2.6 Water and Sediment Quality

Water and sediment quality within the Jacintoport Channel project area have been impacted by a long history and co-existence with the petrochemical industry. The 2008 Texas Water Quality Inventory provided water and sediment sampling analysis results for various subsections of the Houston Ship Channel Tidal segment. Accordingly, these analytical results demonstrated and characterized the HSC water and sediment quality with analytes (chemicals of interest) which routinely "exceeded" the screening levels of various chemical and biological measures.

Water and elutriate samples have not been identified from former maintenance dredging or permitting activities for the Jacintoport Channel project area. Since elutriate analyses are performed to estimate dissolved contaminants potentially reentering the water column from dredged material placement, it is reasonable to anticipate that the contaminants from the sediment sample analyses would provide a close approximation of the contaminants from a future elutriate test. Drainage from dredged material placement within the Lost Lake PA via the outfalls may result in temporary and localized increases in turbidity near the immediate PA perimeter. Established vegetation within the PA is anticipated to naturally filter and aid in decreasing the suspended solids prior to exiting the PA outfall sites.

A preliminary evaluation of Section 404(b)(1) Guidelines has been conducted (Appendix C) and detailed descriptions of erosion and sediment control methods, as well as Best Management Practices (BMPs), have been specifically identified for maintenance dredging activities (TCEQ 2007a and TCEQ 2007b). With the adherence to mitigation, BMPs, and scientific study results (described in Section 3.2.6), no permanent or long significant term impacts on water or sediment quality are anticipated for the Jacintoport Channel or the Lost Lake PA as a result of the proposed Federal AOM dredging activities on a 3 to 5 year dredge cycle. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.3 Biological Resources

4.3.1 Vegetation

Currently, the Lost Lake PA is periodically disturbed by the deposition of dredged material; aerial photographs indicate that pioneer herbaceous species generally revegetate this area after deposition. The vegetation present at any given time is a direct result of the most recent dredging placement activity, frequency, and current elevation of the island. No impacts on vegetation in the Jacintoport Channel are anticipated since no channel widening would occur.

Continued use of the Lost Lake PA does not alter the current condition or vegetative communities; therefore, no adverse impacts on vegetation are anticipated for the Lost Lake PA as a result of continued dredge maintenance activities. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.3.2 Aquatic and Terrestrial Habitats

Several aquatic and terrestrial habitats are located within and near the project area and include tidal marshes, water within the Channel, and the sediment and hard bottom structures associated with the Channel. The Lost Lake PA provides potential terrestrial habitat and roosting areas for numerous bird species. Aquatic and terrestrial habitats within the project area would experience short term impacts as a result of the continuing dredge maintenance activities. Maintenance dredging removes sediment within the Jacintoport Channel and would result in short term impacts on the sediment structure. The impacts would be short term given that the Jacintoport Channel continues to accumulate sediment at a rate of 0.67 ft/yr.

The water column within the Jacintoport Channel may experience a temporary increase in suspended solids during maintenance dredging activities; however, water quality would be monitored during dredging and only temporary impacts are anticipated. Placement of dredged material in the Lost Lake PA would result with potential impacts on the terrestrial habitat. The Lost Lake PA historically experiences episodic growing phases for vegetation based on the dredging placement activity and frequency, and/or island elevation. Placement of dredged material on the Lost Lake PA could potentially result in loss of vegetation to localized areas, until the habitats become reestablished over time. No permanent adverse impacts, however, to aquatic or terrestrial habitats are anticipated from continuing dredge maintenance activities. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.3.3 Wildlife Resources

A variety of water birds and other waterfowl species inhabit and utilize the surrounding area resources of the San Jacinto River Basin and constitute the predominant wildlife. The mobility of birds allows for their avoidance of the area during dredge activities. Additionally, no seasonal roosting activities for bird species have been identified for the Lost Lake PA. Continued dredge maintenance would not result in impacts on wildlife resources within or near the project area. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.3.4 Fisheries and Essential Fish Habitat

Fisheries

Dredging activities have the potential to cause a suspension of sediments, and thus, an increase in turbidity for the affected water column. Increased turbidity along with the suspended sediments can affect fish behavior such as feeding, avoidance, territoriality, and homing behavior. Studies have shown that particular levels of increased turbidity caused pronounced behavioral changes in prey reaction and predator avoidance. Wilber and Clarke (2001) found that suspended sediments result in increased cough reflexes, erratic swimming activity, pronounced gill flaring, and changes in territoriality. Studies have also demonstrated that tolerance to suspended sediments in the water column differs with fish species and size class (O'Conner et al. 1976). Suspended sediments and increased turbidity are generally temporary conditions during the time of dredging, where the swimming mobility of fishes allows for easy avoidance

and rapid return to an impacted area (Nelson and Pullen 1988). Particular groups of fishes are known to return to disturbed areas in a relatively short period of time (24 hours) after the disturbance activities have ceased (Oliver et al. 1977).

Erosion and sediment control methods, as well as BMPs, have been specifically identified for maintenance dredging activities (TCEQ 2007a and TCEQ 2007b). With the adherence to mitigation and BMPs, no permanent or long term impacts on fisheries are anticipated for the Jacintoport Channel or the Lost Lake PA as a result of continued dredge maintenance activities. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

Benthos

Benthic macroinvertebrate and microbial communities are well established in the HSC, and are subject to regular and frequent perturbations of suspension, burial, and relocation from routine maintenance dredging activities. Monitoring results have demonstrated that these communities exhibit abundances, diversity, and composition which are consistent with chemically and/or physically disturbed environments (i.e., dredging maintenance) (Galveston Bay Information Center 1996). Due to the disposal of dredge material onto an authorized PA (Lost Lake), many or most of these benthic macroinvertebrate and microbial organisms are likely to perish. Some, however, may become reestablished communities or reenter the water column via controlled (BMP) elutriate runoff. Studies have demonstrated (Nelson and Pullen 1988) that macro-invertebrate communities reestablish to original diversity and abundance status rapidly due to their generally short life cycle, high reproductive rates, and motile recruitment from adjacent communities. No permanent or long term impacts on macroinvertebrate or benthic communities of the Jacintoport Channel or the Lost Lake PA are anticipated as a result of the continued dredge maintenance activities. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

Essential Fish Habitat

Juvenile shrimp, blue crab, and larval and juvenile red drum may forage on the macroinvertebrates within the project area. The total bottom surface area impacted during the maintenance dredge activities with respect to other available adjacent foraging areas is quite small. The mobility of all of the above EFH for fish and shellfish species affords opportunities for rapid and temporary relocation to abundant nearby food sources. Any potential impacts to these EFH species as a result of the continued dredge maintenance activities are anticipated to be minor and temporary. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.3.5 Threatened and Endangered Species

Due to the upper reach location of the Jacintoport Channel, regular or incidental utilization of these waters by sea turtles is unlikely. No impacts on sea turtles are anticipated for the Jacintoport Channel or the Lost Lake PA as a result of the continued dredge maintenance activity. No requirements to exercise dredging windows are anticipated due to the relative absence of T&E species.

Although identified in Harris County, Texas, it is very unlikely that suitable habitat conditions occur at

the Lost Lake PA for the Texas prairie dawn. Similarly, greater habitat suitability would be afforded the smalltooth sawfish in lower, more saline waters of Galveston Bay. The Sandbank pocketbook and Texas pigtoe have been observed in the San Jacinto River, but their existence in the Jacintoport Channel is doubtful due to this area's insignificant current flow (i.e. velocity). The avian T&E species identified for potential occurrence in the project area would find little feeding, roosting, or other suitable habitat resources on the Lost Lake PA, but could find occasional fish prey in the waters surrounding the Jacintoport Channel. Dredge equipment presence and noise, along with localized suspended sediments could potentially and temporarily promote avoidance and discourage these species from utilizing the Jacintoport Channel and the Lost Lake PA areas during ongoing maintenance activities. Overall, the continued maintenance dredging of the Jacintoport Channel would have no effect on Federally listed T&E species potentially occurring in the vicinity of the Jacintoport Channel and at the Lost Lake PA. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.3.6 Invasive Species

Invasive species typically thrive in disturbed environments. Further placement of dredge material at the Lost Lake PA may contribute additional or larger disturbed areas, providing opportunity for additional invasive species to establish. Upon project completion, the Lost Lake PA would provide a sizeable area to potentially support both emergent and submerged wetland vegetation and associated habitat. In addition, this area may be readily colonized by other invasive species such as fire ants, Chinese tallow, and Brazilian pepper. However, disturbance is already common within and near the project area and continued use of the Lost Lake PA for dredge maintenance activities does not alter its current condition; therefore, no permanent impacts or additional establishment of invasive species are anticipated. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.4 Human Environment

4.4.1 Existing Facilities and Utilities Systems

The continued dredge maintenance activities on the current dredging cycle of every 3 to 5 years is not anticipated to impact the existing facility or utility systems within the project area. The facilities surrounding the Jacintoport Channel would continue to operate under current conditions. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.4.2 Air Quality

Temporary and minor increases in air pollution would occur from the use of dredge equipment (combustible emissions). Combustible emission calculations were determined for standard construction equipment, such as suction dredgers and diesel generators, as well as vessel mobilization of equipment to distribute dredge materials at the Lost Lake PA. Equipment such as excavators, backhoes, and front end loaders would also be required. Assumptions were made regarding the type of equipment, the total number of days each piece of equipment would be used, and the number of hours per day each type of equipment would be used. USEPA's NONROAD6.2 Model (USEPA 2005), as recommended by

USEPA's Procedures Document for National Emission Inventory, Criteria Air Pollutants, 1985-1999 (USEPA 2001), was used to calculate emissions from construction equipment.
Construction workers would temporarily increase the combustible emissions in the air shed during their commute to and from the project area. Similarly, emissions from delivery trucks would contribute to the overall air emission budget. Air emissions from delivery trucks and construction commuters traveling to the job site, were calculated using the USEPA MOBILE6.2 Model (USEPA 2005, 2005a, 2005b and 2005c). The construction emissions were calculated in the air emission analysis and included in the total emission estimates found in Table 8. Details of the analyses are presented in Appendix D.

Several sources contribute to the total air impacts of the construction project. The air calculations in Table 8 included emissions from:

1. Combustible engines of dredging and construction equipment.
2. Construction workers commuting to and from work.
3. Supply trucks delivering materials for construction.

Table 8: Harris County Total Air Emissions (Tons/Year) from Construction Activities vs. *de minimis* Levels

Pollutant	Total (Tons/Year)	*de minimis* Thresholds (Tons/Year)
CO	12.34	N/A
VOCs	3.22	25
NOx	17.97	25
PM-10	1.96	N/A
PM-2.5	1.91	N/A
SO_2	2.40	N/A

Source: *De minimis* thresholds are from 40 CFR 51.853; results are Gulf South Research Corporation model projections. N/A = Not applicable, Harris County is in non-attainment for ozone; NOx and VOCs are ozone precursor molecules and are criteria pollutants for ozone.

As can be seen from the tables, air emissions from the construction activities would not exceed *de minimis* thresholds and, thus, would not require a conformity determination. During the dredging activities, proper and routine maintenance of all construction equipment would ensure that emissions are within the design standards of the equipment. As there are no violations of air quality standards and no conflicts with the state implementation plans, there would be only minor, temporary, and insignificant impacts on air quality as a result of continued dredge maintenance activities. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.4.3 Noise

Noise emissions would be produced during dredging activities and transportation of the dredge materials to the Lost Lake PA. SVT Engineering Consultants (SVT 2009) reported that Cutter Suction Dredges produced noise emissions of 87 dBA at 50 feet from the source. Dredge slurries would be transported by 27-inch pipes and electric pumps powered by diesel generators. The diesel generators are known to produce noise emissions of 81 dBA at 50 feet from the source (Federal Highway Administration [FHWA] 2007). Table 9 describes noise emissions and

their rates of attenuation, at various distances, for the dredge and generators typically used in dredging projects.

Table 9: A-Weighted (dBA) Sound Levels of Dredging Equipment and Modeled Attenuation at Various Distances[1]

Noise Source	50 feet	300 feet	500 feet	1000 feet	2000 feet
Cutter Suction Dredge	87	72	67	61	55
Generator for Dredge Materials	81	66	61	55	49

Source: FHWA 2007, SVT 2009, and Gulf South Research Corporation

1. The dBA at 50 feet is a measured noise emission (SVT 2009 and FHWA 2007). The 300- to 2000-foot results are Gulf South Research Corporation modeled estimates.

Dredging Noise Emissions

Assuming a noise emission scenario of 87 dBA for dredging activities, the noise model projected that noise levels of 87 dBA from a point source (i.e., dredge) would have to travel 200 feet before the noise would attenuate to a normally acceptable level of 75 dBA. At 640 feet from the point source, noise would attenuate to acceptable levels of 65 dBA. At 1,600 feet from the point source, noise would attenuate to unacceptable levels of 57 dBA (the noise criteria for state parks). The location of the dredging project corridor is over 4,000 feet from the Battleship Texas State Historic Park, which is the closest sensitive noise receptor. There are no residential homes or other sensitive receptors near the dredge corridor.

Assuming a conservative scenario of 81 dBA for diesel generators used to run electric pumps that transport dredge materials, the noise model projected that noise levels of 81 dBA from a point source (i.e., diesel generators) would have to travel 100 feet before the noise would be attenuated to a normally acceptable level of 75 dBA. At 320 feet from the point source, noise would attenuate to acceptable levels of 65 dBA. At 790 feet from the point source, noise would attenuate to acceptable levels of 57 dBA, the noise criteria for state parks.

Again, the closest sensitive noise receptor to the dredging project corridor is the Battleship State Historic Park, which is over 4,000 feet away. Several pumps and generators would be located off the north bank of the HSC to push dredge materials through the pipeline 3 miles to the Lost Lake PA. The closest sensitive noise receptors to the pipeline corridor are the two state parks across the HSC approximately 1,200 feet away. The noise emissions from the dredge and generators that power the pumps would attenuate to levels below noise criteria thresholds before they reached sensitive receptors. Therefore, noise impacts from the continued dredge maintenance activities on the current 3 to 5 year cycle would be temporary (i.e. 3 to 4 week dredge cycle) and less than significant. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.4.4 Traffic and Transportation

Continued dredge maintenance activities would beneficially impact the project corridor by maintaining the Jacintoport Channel at an average operating depth of 40 feet MLT, plus 2 feet of advanced maintenance, which will provide reliable and safe navigational access to the port facilities and terminals. Temporary impacts to the marine-based traffic within the Jacintoport Channel would occur during dredging activities as stationary dredging vessels would be present within the Jacintoport Channel. Caution while navigating around the stationary dredging vessels would be required. No impacts on land-based traffic or transportation are anticipated. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.4.5 Land Use

General land use within the Jacintoport Terminal area would not be affected by continued dredge maintenance. It is anticipated that land use would continue to consist of industrial shipping and commercial navigation-related businesses. The historical placement of dredged material within the Lost Lake PA would continue and would not impact land use within the PA. Therefore, no impacts on land use are anticipated from the continued dredge maintenance activities on the current 3 to 5 year dredge cycle.

Continued dredge maintenance activities would not affect any prime and unique farmlands, as none of the soils found within the project vicinity are considered prime or unique farmland soils (NRCS 2009). Thus, the activities associated with this project would be in compliance with the Farmland Protection Policy Act (7 CFR 4201-4209 Part 658.2) and would not require completion of a Farmland Conversion Impact Rating assessment. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.4.6 Cultural Resources

No impacts to cultural resources are anticipated to occur as a result of the continued dredge maintenance since channel depth would not be increased. Jacintoport Channel would continue to be maintained at an average operating depth of 40 feet MLT, plus 2 feet of advanced maintenance, and the Lost Lake PA would continue to serve as the dredged material placement area. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.4.7 Socioeconomic Resources

Continued dredge maintenance activities will provide reliable and safe navigational access to the port facilities and terminals, while promoting continued terminal business operations, and enhancing the socioeconomic stability of the area. Therefore, beneficial impacts on the socioeconomics within the project area would continue to occur, with funding shifting from local to national sources. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.4.8 Hazardous, Toxic, and Radioactive Wastes (HTRW)

Due to historic and routine maintenance dredge operations occurring in the Jacintoport Channel area, and given the subsequent placement of these materials within the Lost Lake PA, it is not anticipated that continued dredge maintenance would contribute to any potential HTRW release to the environment, specifically the Jacintoport Channel or the Lost Lake PA. Additionally, no impacts on HTRW listed sites are anticipated. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.4.9 Environmental Justice

The continued dredge maintenance activities would not change the existing environmental justice conditions. Due to the distribution of the minority and low income population in the project area, the continued dredge maintenance activities for the Jacintoport Channel and the Lost Lake PA would not result in a disproportionate, adverse impact on minority or low income populations. As such, no adverse effects on environmental justice are anticipated to occur. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.4.10 Visual and Aesthetic Resources

Adverse impacts to visual and aesthetic resources due to continued dredge maintenance activities would be minimal and temporary. The Jacintoport Channel and the Lost Lake PA are surrounded by and adjacent to many other commercial and industrial shipping and cargo operations which have previously impacted the visual and aesthetic resources of the area. The current dredging activities are consistent with historic and routine maintenance operations within the Jacintoport Channel. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

4.4.11 Recreational Resources

Continued dredge maintenance activities are not anticipated to impact the recreational activities associated with the River Terrace Park or the San Jacinto State Park. Due to the purely commercial nature and associated port operations conducted at the Jacintoport Terminal, it is unsuitable for recreational boating or fishing to occur within the Jacintoport Channel waters. It is possible, however, that recreational boating activities around the Lost Lake PA may be temporarily inconvenienced due to the presence of dredging equipment and dredge material placement activities. The dredge maintenance activities typically last 3 to 4 weeks every 3 years. As such, no long-term impacts on recreational resources (or public safety or awareness) within the Jacintoport Channel or Lost Lake PA are anticipated. The Proposed Alternative would have the same impacts, with no additional impacts, as the No Action Alternative.

5.0 MITIGATION

No permanent, adverse impacts on significant resources have been identified as a result of the dredge maintenance activities associated with either the No Action Alternative or the Proposed Alternative;

therefore, no mitigation actions are proposed. BMPs will be implemented as standard operating procedures during all dredging activities to minimize the potential impacts on the human and biological environments. Additionally, erosion and sediment control methods specifically identified for maintenance dredging activities will be utilized (TCEQ 2007a and TCEQ 2007b).

6.0 CUMULATIVE IMPACTS

This section of the EA addresses the potential cumulative impacts associated with implementation of the Proposed Alternative and other projects/programs that are planned for the study area. The CEQ has defined cumulative impacts as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or persons undertake such action. Cumulative impacts can result from "individually minor but collectively significant actions taking place over a period of time" (40 CFR Part 1508.7). This section follows the guidance provided by the CEQ's *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ 1997), and *Memorandum and Guidance on the Consideration of Past Actions in Cumulative Effects Analysis* (CEQ 2005). An evaluation of other regionally similar actions or actions potentially resulting in adverse impacts or beneficial effects on similar regional resources that have occurred in the past, currently underway, or planned for the foreseeable future must, therefore, be considered.

From the Chairman of the CEQ to the Heads of Federal Agencies (CEQ 2005), the CEQ made clear its interpretation that "…generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions…" and that the "…CEQ regulations do not require agencies to catalogue or exhaustively list and analyze all individual past actions."

The proposed Federal AOM activities are anticipated to result in both adverse and beneficial impacts on the surrounding physical, biological, and human environments. Potential adverse impacts resulting from the proposed Federal AOM activities would include temporary and localized effects on water quality, aquatic habitats (benthic communities), fisheries, and EFH due to the potential increase in water column turbidity and increased sedimentation to the surrounding channel bottom. Additionally, temporary and localized impacts (displacement) on wildlife (bird) resources are expected in the vicinity of the study area due to the presence of construction equipment and dredging activities at Lost Lake PA. Marine navigation and shipping commerce may also be temporarily affected by the stationary dredging maintenance equipment. Impacts on recreational fishing and boating activities, however, are anticipated to be minimal. All adverse impacts that are anticipated to potentially occur due to the Federal AOM would be minimal and temporary, therefore, effects on the environmental resources are not expected to be significant.

Beneficial impacts as a result of the Federal AOM activities are anticipated to enhance the economic productivity of the shipping commerce business and thus increase the socioeconomics of the surrounding area. The Federal AOM would reduce delays in maintenance dredging cycles and avoid additional light loading of deep draft vessels. More fully loaded vessels equate to lower transportation costs and decreased cost per tonnage of transported cargo.

A long history of numerous and similar actions or actions potentially resulting in adverse impacts or beneficial effects on similar regional resources has occurred in the past within the Jacintoport study area and HSC. These actions primarily included activities associated with navigational channel improvements and/or maintenance at various segments of the HSC. Navigational channel improvements have involved dredging activities which have produced material that could be used beneficially for the creation of marsh. Numerous projects within the HSC have resulted in construction of PAs, which also serve as beneficial use (BU) sites, thus enhancing the overall biological productivity of the area. Past actions have also continued to enhance the economic productivity of the shipping commerce business and increase the socioeconomics of the surrounding area.

Current and future dredging and dredge maintenance projects within the HSC have included the Texas City Channel Deepening Project, Shoal Point Container Terminal Project, Bayport Container Terminal Project, Cedar Bayou Navigation Channel Project, Bayport Flare Widening, Pix Bayou Navigational Channel, HGNC Project, and Port of Galveston Expansion Project. The following descriptions provide an abbreviated project summary of each:

- Texas City Channel Deepening Project: Deepening of the current 40-foot channel to 45 feet and maintaining the current 400-foot bottom width for approximately 7 miles of channel, including the Texas City Channel Turning Basin. Approximately 1,162 acres of bay bottom was impacted; however, the bay bottom was replaced with 999 acres of emergent marsh, benefiting fisheries and the aquatic environment (USACE 2007).

- Shoal Point Container Terminal Project: Phase I included the construction of an access road, a 125-acre container yard, and two berths with associated dredging. Phase II doubled the size with a second 125-acre container yard, two berths, a turning basin, and deepening of the Texas City Channel. Phase III included building a 150-acre container yard and the final two berths. Full build-out of the facility is proposed for 2016. A 45-acre intertidal marsh area will be constructed as mitigation for the loss of approximately 13.3 acres of saltwater wetland during the project's construction (USACE 2002).

- Cedar Bayou Navigation Channel Project: USACE maintains the lower 3 miles of the channel at a depth of 10 feet and a width of 100 feet. This project created a channel of the same dimensions above the currently maintained channel to State Highway 146 (UASCE 2005).

- Bayport Container Terminal Project: Project included plans for container terminals and cruise ship facilities, ultimately encompassing 1,100 acres for a container terminal complex including wharves, container yards, intermodal yards, and ancillary facilities, as well as 7,000 feet of wharves and berths for the container facility and 5,000 feet of wharves and berths for the cruise operations. Dredging activities would impact 127.3 acres of submerged bay bottom and 2.2 acres of intertidal flats and shallow bay bottom; however, dredged material will be utilized to create approximately 200 acres of intertidal marsh. A 173.5 acre mitigation site will be utilized to compensate for the 146.4 acres of freshwater wetland lost as a result of the project. The mitigation will also include the preservation of a 456-acre tract at Banana Bend of the San Jacinto

River and a 500-acre tract of primarily coastal prairie within the floodway or floodplain of the Cypress Creek Watershed (USACE 2003).

- Proposed Bayport Flare Bend Easing Project: Planning stage where dredging to widen the turn from the HSC into the Bayport Channel would result in additional new work and maintenance dredged material that would be placed in upland confined PAs or BU sites within the Galveston Bay area.

- Proposed Bayport Channel Deepening and Widening Project: USACE permit application under evaluation where the existing 300-foot-wide by 40-foot-deep MLT channel would be deepened to 45 feet MLT and widened by up to 100 feet on the north side of the existing channel. Dredged material from the proposed project would be used beneficially to create/nourish intertidal marsh, if practicable or placed in existing upland confined PAs.

- Pix Bayou Navigational Channel: USACE AOM evaluation project in Chambers County, Texas, located in the southeastern portion of Trinity Bay by the USACE to determine whether maintenance is economically justified and environmentally acceptable.

- HGNC Project: The dredged material placement plan in the 1995 Supplemental Environmental Impact Statement recommended that dredged material from the 45-foot MLT HGNC deepening and widening project be used beneficially for the construction of BU sites within Galveston Bay area. The authorized HGNC Project provided for the creation of approximately 4,250 acres of BU intertidal salt marsh, a 6-acre bird habitat and nesting island, and 118 acres of oyster reef mitigation in Galveston Bay over the course of the 50-year plan.

- Galveston Harbor Channel Extension: Planning stage where channel improvements would deepen the 40-foot MLT Galveston Harbor Channel from Station 20+000 (near POG Pier 38) to Station 22+571 (near the Pelican Island Bridge) to 45 feet MLT. No channel widening would be necessary as a result of the deepening within the current project footprint. The proposed project, would be consistent with the newly deepened -45 feet MLT Galveston Harbor Channel dimensions. All dredged and maintenance material would be placed in existing confined upland PAs.

- Port of Galveston Expansion Project: The Port of Galveston revamped its dilapidated Pier 25 warehouse into a cruise terminal in 2002. Renovations included modifying 100 feet of wharf facilities and constructing access/circulation roads for passenger pickup and drop-off. The new terminal added 80,000 square feet to Galveston's cruise complex, and the extended wharf facilities completed a 2,000-foot-long berth capable of handling two cruise ships at once. A second phase of development involved imploding a 236-foot-high headhouse and demolishing numerous reinforced-concrete silos to make room for the Port's expansion program. Almost 100 percent of the rubble and scrap metal from the demolition was recycled or reused. In November 2003, a $9-million revamp of Terminal No. 1 expanded the existing dock, and designed and constructed other facility projects to increase efficiency and enhance passenger comfort and

safety. All of the expansion projects were planned to accommodate larger cruise ships in the future, with capacities up to 3,500 passengers. The expansion project helped the Port continue its phenomenal growth, accrue benefits to the local and state economy, and take a leadership position in the cruise industry (NCPPP 2004).

From a NEPA standpoint, proposed Federal AOM of the Jacintoport Channel would have the same impacts, with no additional impacts, as the No Action Alternative. The project is located an area that has undergone extensive channel construction and maintenance dredging in the past as well as urban, industrial and commercial development. As such, the area is considered a disturbed area with little to no vegetated shoreline and poor quality benthic and open water habitats compared to other areas of Galveston Bay. Each of these projects considered in this evaluation of cumulative impacts would have similar environmental resources and potential associated impacts. Impacts associated with these current and future dredging and dredge maintenance projects include adverse effects on submerged bottoms and temporary and localized impacts on water quality, oyster reef, aquatic habitats, and wildlife. Beneficial effects of several projects have included a net increase in more productive salt marsh habitat throughout the region through the development of BU sites. The maintenance of safe and reliable shipping routes as a result of these projects has benefited the socioeconomics of the surrounding communities including increasing employment opportunities.

There have been significant changes to the HSC and surrounding environments, including wetland loss and changes to associated habitats since the 1950s. Planned future projects, along with additional urbanization and industrialization along the HSC, will cause continued pressure on these habitats. Management and mitigation efforts are in place, however, to preserve, restore, and create valuable habitat that would promote sustainability of the regional ecosystems, despite continuing influences of development. Historical water quality problems have been an issue for the western urban tributaries of Galveston Bay, including the Jacintoport Channel project area. Water quality impacts associated with the continuing dredging activities throughout the project area are anticipated to result in localized and temporary increases in turbidity and sedimentation. Cumulatively, the current and future projects, along with continuing urbanization, have the potential for water quality impacts on the receiving water bodies (Galveston Bay) resulting from wastewater discharges and stormwater runoff. However, continued implementation of BMPs for managing and controlling project-specific water quality effects, along with urban stormwater runoff, are anticipated to minimize any adverse impacts on regional water quality and aquatic resources.

The analyses of the cumulative impacts concludes that reasonable avoidance and protection of regional environmental resources are afforded by the strict mitigation and BMPs employed by the environmental stewards (USACE, PHA, TCEQ, TPWD, NMFS, etc.) associated with maintenance dredging projects in Texas. In conclusion, the anticipated adverse impacts to human health and the environment from continued maintenance of the Jacintoport Channel under Federal authority would be minimal and would not significantly contribute to the cumulative effects of past, present and future projects within the project vicinity

7.0 RELATIONSHIP OF PROJECT TO OTHER FEDERAL PROJECTS

This EA is closely related to the Galveston Bay Area Navigational Study (GBANS) and its associated Final Feasibility Report and Final EIS published by the District in July 1987 (USACE 1987). The GBANS investigated the need for deep draft navigational improvements on the HSC, the HSC ancillary channels, and the Galveston Channel through the widening and deepening of the HSC and deepening of the Galveston Channel. These improvements are evaluated under the HGNC study and are described in the accompanying Limited Reevaluation Report (LRR). The SEIS for the HGNC study was prepared by the District in November 1995 and provided environmental analysis for the LRR (USACE 1995). The HGNC project was a multipurpose project designed to provide navigation improvements to the HGNC and to provide environmental restoration through beneficial uses of dredged materials. The recommended plan from the LRR consisted of deepening and widening the HSC to 45 feet and 530 feet respectively, for most of its length. The environmental restoration plan in the SEIS includes incorporating the beneficial uses of dredged material, providing for creation of 4,250 acres of marsh and one bird island, restoration of existing bay islands, construction of boater cuts, and construction of an offshore BU site. The Proposed Alternative is also related to the proposed Federal AOM for the Bayport Ship Channel. Another Federal project related to the HGNC Project was Barbour's Terminal Channel. The purpose of the project was to mine new work material from the Channel to repair levees at Spillman's Island PA and to construct levees for the creation of BU Cell M5/M6 at Atkinson Island (USACE 2006b).

8.0 COMPLIANCE WITH PLANNING AND ENVIRONMENTAL REQUIREMENTS

The planning of the proposed project is in accordance with the "USACE Campaign Plan" goals. Plan formulation has been based on collaboration with partners and stakeholders. Potential direct and indirect effects inside and outside the project areas have been considered. Risk and uncertainty have been considered in evaluating alternatives, which are discussed in this document. The Proposed Alternative has been selected based on interdisciplinary coordination that utilizes the best professional and technical expertise available during the planning process.

Further, this EA has been prepared to satisfy the requirements of all applicable environmental laws and regulations. Preparation was in accordance with the CEQ's implementing regulations for NEPA, *40 CFR Parts 1500 – 1508*, and the USACE Engineer Regulation (*ER) 200-2-2*, Environmental Quality: Procedures for Implementing NEPA. The planning and implementation of the proposed project is consistent with the USACE Environmental Operating Principles.

The following list of applicable environmental laws and regulations were considered in the planning of this project, and their status of compliance to each.

National Environmental Policy Act: This environmental assessment has been prepared in accordance with CEQ's implementing regulations for NEPA. The environmental and social consequences of the Proposed Action have been analyzed in accordance with NEPA and presented in the assessment.

Fish And Wildlife Coordination Act: Coordination among the USFWS, NMFS, TPWD, and the TCEQ will be conducted. A copy of this draft EA will be provided to these agencies and information returned by these agencies on fish and wildlife, and water resources will be considered in the development of the final EA. Further, a Planning Aid Letter was received (Appendix H), serving to finalize the USFWS comments and recommendations regarding the Jacintoport Channel.

Endangered Species Act: A BA has been prepared to support the USACE coordination of the draft EA's Proposed Action with the USFWS and the NMFS regarding threatened, endangered or proposed species and their critical habitats in the project area. The USACE requested information on listed species that may occur in the project area from the USFWS and NMFS by letters dated March 29, 2010. The USFWS and the NMFS provided the requested responses on April 08, 2010 and January 2010, respectively. The BA concluded that the Proposed Action would not result in any significant adverse impacts on Federally listed threatened or endangered species (Sections 3.3.5 and 4.3.5). The BA and correspondence with the USFWS and NMFS regarding the BA are provided in Appendix A.

Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA): Amendments to the MSFCMA established procedures for identifying EFH and required interagency coordination to further the conservation of Federally-managed fisheries. The NMFS further requires that any Federal agency that authorizes, or proposes to authorize, funds or undertakes an activity that could adversely affect EFH be subject to an EFH consultation. No significant impacts on living marine resources or EFH are anticipated as a result of the Proposed Action (Sections 3.3.4 and 4.3.4). Comments from the NMFS regarding fisheries and EFH will be included in Appendix F.

Clean Water Act: The Proposed Action was analyzed pursuant to Section 404(b)(1) of the Clean Water Act and this analysis is included in Appendix C. Coordination with the TCEQ will be pursued. The TCEC is responsible for the issuance of the state water quality certification pursuant to Section 401 of the Clean Water Act. A copy of the state water quality certification will be included in Appendix C of the final EA.

National Historic Preservation Act: Compliance with the NHPA requires identification of all properties in the project area listed on, or eligible for listing on, the NRHP. For any adversely affected properties, mitigation measures must be developed in coordination with the SHPO and the Advisory Council on Historic Preservation. No listed properties nor properties eligible for listing have been identified within the vicinity of the project area. Coordination with the SHPO has been initiated, seeking concurrence with a determination that cultural resources will not be impacted by the Proposed Alternative activities. A copy of the SHPO letter will be included in Appendix E of the final EA.

Coastal Barrier Resources Act: This Act was established to minimize the loss of human life, wasteful Federal expenditures, and damage to wildlife and natural resources associated with coastal barriers. Coastal barriers are defined as "bay barriers, barrier islands, and other geological features composed of sediment that protect landward aquatic habitats from direct wind and waves." Further, the Federal government discourages development on designated undeveloped coastal barriers by restricting certain

Federal financial assistance, including USACE development projects. The Proposed Action activities are not located on a designated, undeveloped coastal barrier and, therefore, this Act does not apply.

Coastal Zone Management Act: This Act requires that all project activities resulting in potential land-use changes be conducted in accordance with approved state (Texas) coastal zone management programs. Any project that is located in, or which may affect land and water resources in the Texas coastal zone and that requires a Federal license or permit, or is a direct activity of a Federal agency, or is Federally funded must be reviewed for consistency with the Texas Coastal Management Plan (TCMP). The Proposed Action activities do occur within the coastal boundary defined by the TCMP; as such, a CZMA consistency review has been prepared (Appendix B). The USACE has determined that the proposed project would not adversely impact these resource areas, and that the proposed activities are consistent with the goals and policies of the TCMP to the maximum extent practicable.

Clean Air Act: NAAQS have been established by the EPA to protect public health and welfare. The State of Texas has adopted these standards as the air quality criteria for the state. The Proposed Action is located in Harris County which is a non-attainment area for ozone. Emissions from the continued dredging activities are not considered regionally significant (Sections 3.4.2 and 4.4.2; Appendix D).

Executive Order 11990 (Protection of Wetlands): The Proposed Alternative has been analyzed for compliance with Executive Order 11990. Where the Lost Lake PA project area does contain wetlands, it has been established for and serves as a dedicated upland confined PA. Wetlands outside the project area are not affected by the Proposed Alternative activities. As such, the Proposed Alternative is in compliance with this Order (Sections 3.2 and 4.2).

Executive Order 11988 (Floodplain Management): Federal agencies are directed to evaluate the potential effects of proposed actions in floodplains. Although the Proposed Alternative is located within a floodplain, the maintenance dredging activities would not cause increased flooding in developed areas, nor contribute to increased future flooding.

Council on Environmental Quality (Memorandum; Prime or Unique Farmlands): The Proposed Alternative has been evaluated (Sections 3.4.5 and 4.4.5) with regard to its location and potential impacts on prime and unique farmland. The Proposed Alternative would not impact any lands considered prime or unique farmlands, as none of the soils found within the project vicinity are considered prime or unique farmland soils.

Executive Order 12898 (Environmental Justice): Federal agencies are required to identify and address (as appropriate) disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. As such, Federal agencies are directed to achieve environmental justice to the greatest extent practicable and permitted by law. The Proposed Alternative would not have a disproportionately adverse impact on minority or low-income population groups within the project area (Sections 3.4.9 and 4.4.9).

9.0 CONCLUSIONS

The Proposed Alternative or the Federal AOM represents a future condition where Jacintoport Channel segments will be Federally maintained to an average operating depth of 40 feet MLT, plus 2 feet of advanced maintenance. The Proposed Alternative, therefore, presumes the USACE assumes AOM responsibilities for the Jacintoport Channel. The Federal AOM would require an approximate 3 to 5 year dredge cycle in order to maintain the navigable depth of 40 feet MLT; thus resulting in no major reduction in the capacity of Jacintoport Channel, no changes in the composition of vessels calling on the terminals, and no associated impacts to transportation costs.

In summary, the Federal AOM of the Proposed Alternative is anticipated to result in minimal, localized and temporary adverse effects on the surrounding environment. No significant impacts on the environment within the Jacintoport Channel and Lost Lake PA study area are anticipated. Therefore, preparation of an Environmental Impact Statement is not required. Table 10 summarizes the findings of this EA.

Table 10: Summary Matrix of Potential Impacts

Affected Environment Resource Areas	Alternative 2 – Federal AOM (Proposed Alternative)
Topography and Soils	No adverse impacts on the soils on the Lost Lake PA due to placement of dredged material.
Geology	No direct impacts would occur.
Dredging and Dredged Material Placement	Beneficial impact by maintaining the operating depth of the Jacintoport Channel. Maintenance of the depth provides for safe and reliable marine access to the terminals surrounding the Jacintoport Channel. No impacts on the Lost Lake PA.
Hydrology and Drainage	No direct impacts would occur.
Climate and Relative Sea Level Rise	No direct impacts to climate or relative sea level rise would occur. Indirect impact on the proposed project due to the natural rise in sea level. A rise in sea level would reduce the amount of required maintenance dredging.
Water and Sediment Quality	Temporary impacts on water quality due to an increase in total suspended solids during dredging activities.
Vegetation	No adverse impacts would occur.
Aquatic and Terrestrial Habitats	Temporary impacts on aquatic habitat due to removal of sediment within the Jacintoport Channel and increases in suspended solids during dredging activities. Temporary impacts on terrestrial habitat on the Lost Lake PA due to dredge material placement.
Wildlife Resources	No direct impacts would occur.
Fisheries and Essential Fish Habitat	Temporary impacts on fisheries due to increased turbidity. Temporary impacts on benthic macroinvertebrate and microbial communities, and essential fish habitat.
Threatened and Endangered Species	May affect, but not likely to adversely affect sea turtles. No impact on the remaining species.
Invasive Species	Temporary impact by contributing additional or larger disturbed areas with the placement of dredge material on the Lost Lake PA thus providing opportunity for additional invasive species to establish.
Existing Facilities and Utilities Systems	No direct impacts would occur.
Air Quality	Short-term minor impacts on air quality would occur during dredging. Indirect impacts from vehicle emissions due to anticipated increases in worker usage and fueling.
Noise	Minor temporary increases in noise would occur during dredging activities. Minor increases in ambient noise levels due to increased personnel.
Transportation	Temporary impact on marine-based traffic during dredging operations.
Land Use	No direct impacts would occur.
Cultural Resources	No direct impacts would occur.
Socioeconomic Resources	Beneficial impact by ensuring stability to shipping industry and shipping-related employment.
Hazardous, Toxic, and Radioactive Waste	No direct impacts would occur.
Environmental Justice	No direct impacts would occur.
Visual and Aesthetic Resources	Minor direct impact on aesthetic and visual resource of the vicinity during dredging activities.
Recreational Resources	Minor temporary impact on recreational resources surrounding the Lost Lake PA during dredging activities.

10.0 LIST OF PREPARERS

The following people were primarily responsible for preparing this EA.

Name	Agency/Organization	Discipline/Expertise	Experience	Role in Preparing EA
Andrea Catanzaro	USACE, Galveston District	NEPA Compliance and Environmental Studies	18 years of experience in natural resources, NEPA compliance, and environmental studies	USACE Environmental Lead
Jerry Androy	USACE, Galveston District	Cultural Resources	15 years of archeological, historic, and cultural resource studies	USACE Cultural Resource Lead
Brian Mehok	URS Group Inc.	NEPA Compliance, Natural Resources, Environmental Studies	7 years of experience in natural resources, NEPA compliance, and environmental studies	Environmental Task Leader and EA Technical review
Dennis Peters	Gulf South Research Corporation	NEPA Compliance, Natural Resources, Environmental Studies	29 years of experience in natural resources, NEPA compliance, and environmental studies	Project Manager and EA preparation
Sherry Ethell	Gulf South Research Corporation	Natural Resources	19 years of experience in natural resources and NEPA studies	EA preparation and technical review
Steve Kolian	Gulf South Research Corporation	Environmental Science	12 years of experience in environmental studies	EA preparation
Carey Perry	Gulf South Research Corporation	Natural Resources	3 years of experience in natural resources	EA preparation
Chris Cothron	Gulf South Research Corporation	GIS/graphics	3 years of experience in GIS/Graphics	GIS/Graphics

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Figures

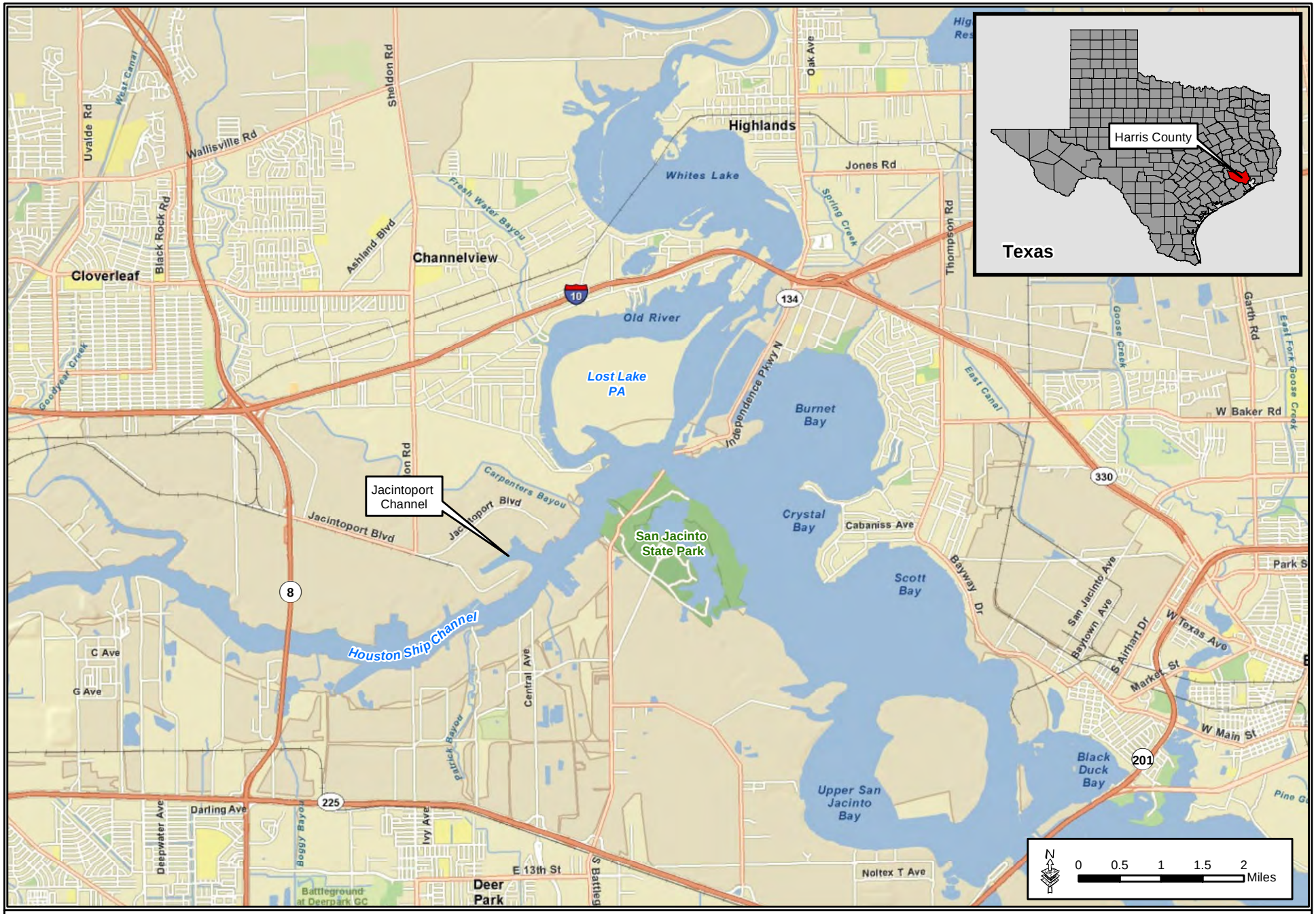


Figure 1-1. Vicinity Map

Figure 1-2: Jacintoport Channel and Terminal Facilities

Source: US Army Corps of Engineers, Galveston, TX, 8/18/2011

Figure 1-3: Jacintoport Channel Area Subject to Federal Assumption of Maintenance

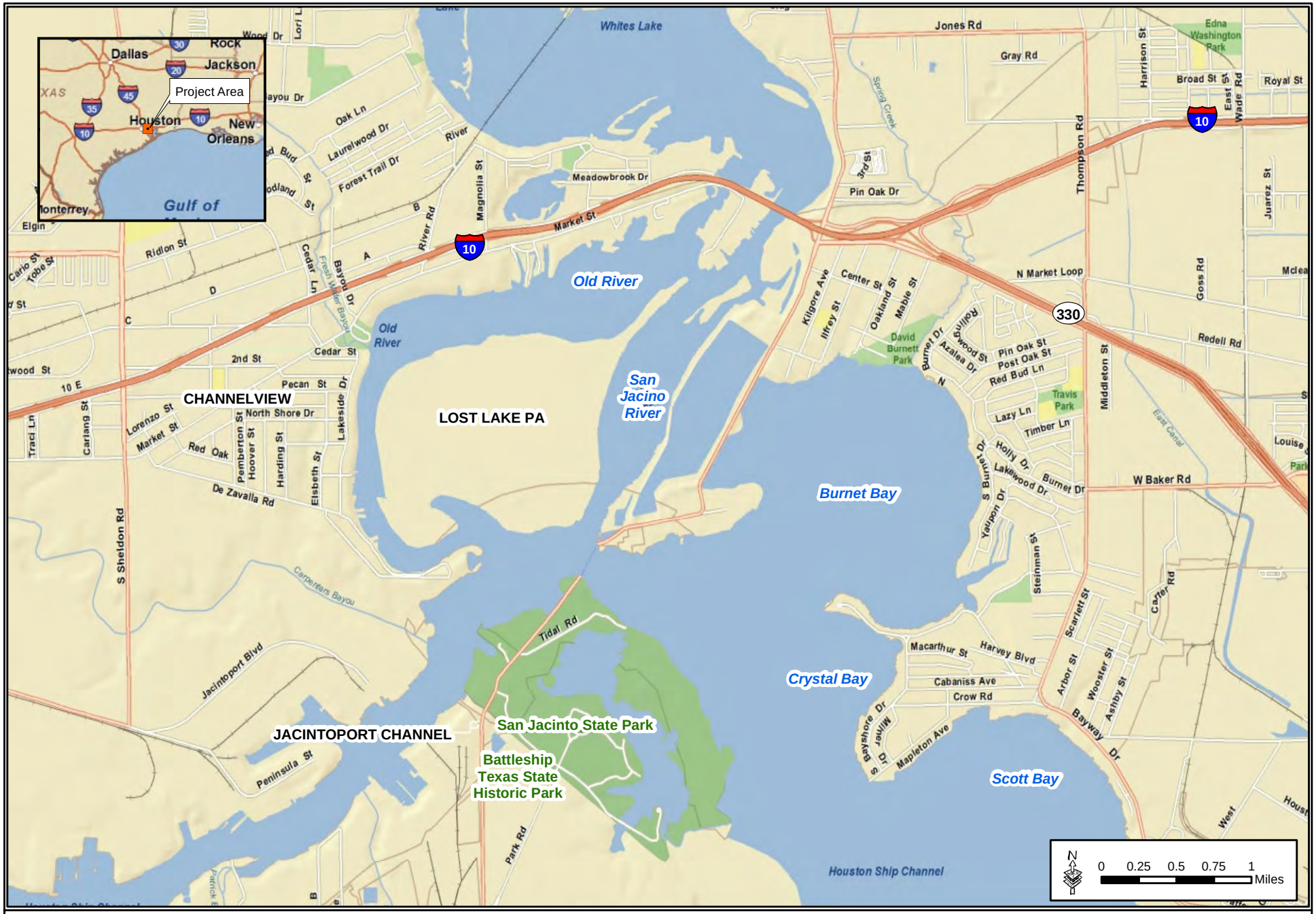
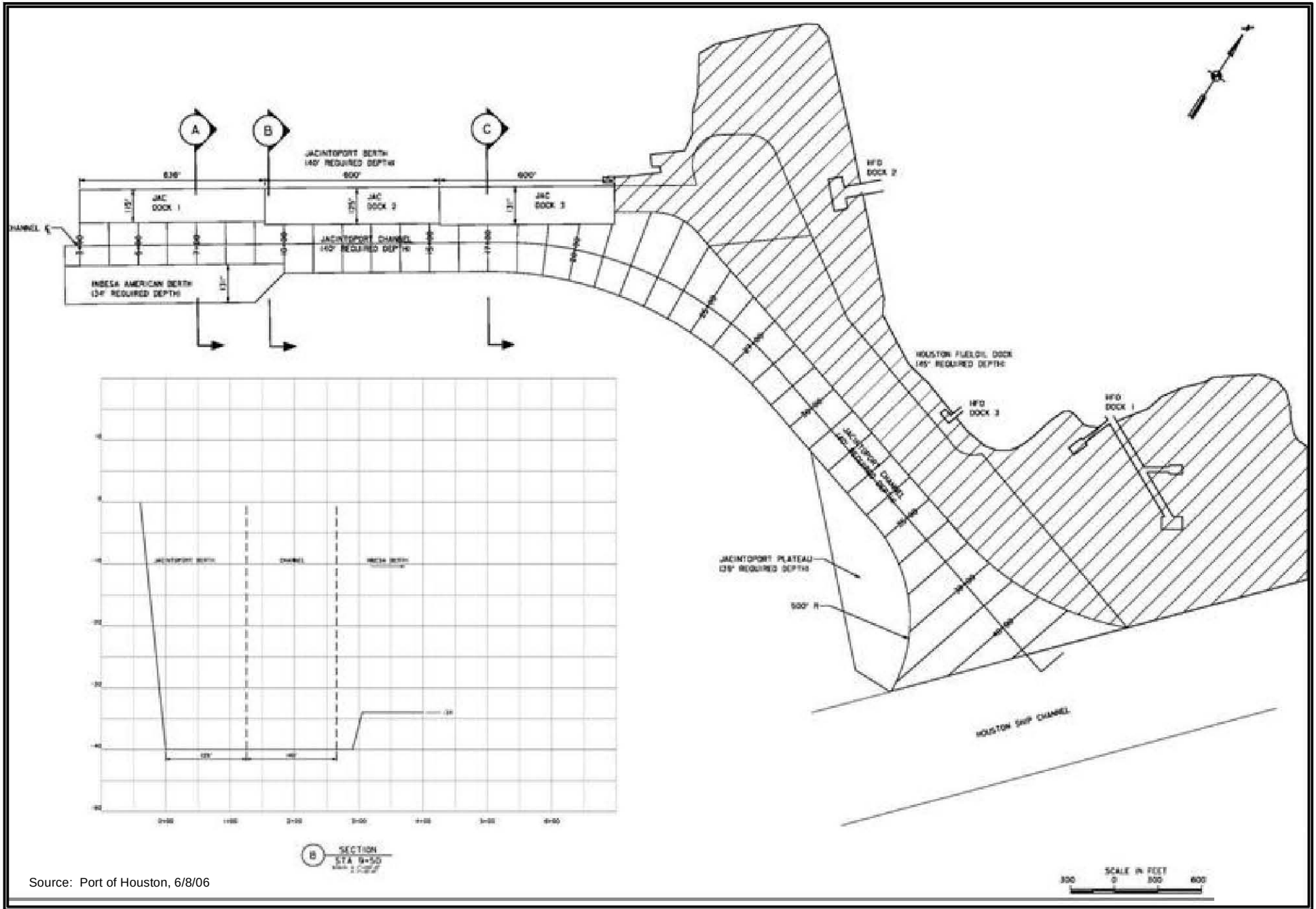


Figure 1-4: Jacintoport Channel Area Including the Lost Lake PA

Figure 1-5: Jacintoport Channel Area Including the Lost Lake PA



Source: Port of Houston, 6/8/06

Figure 1-6: Jacintoport Channel Cross-sectional Area to be Dredged

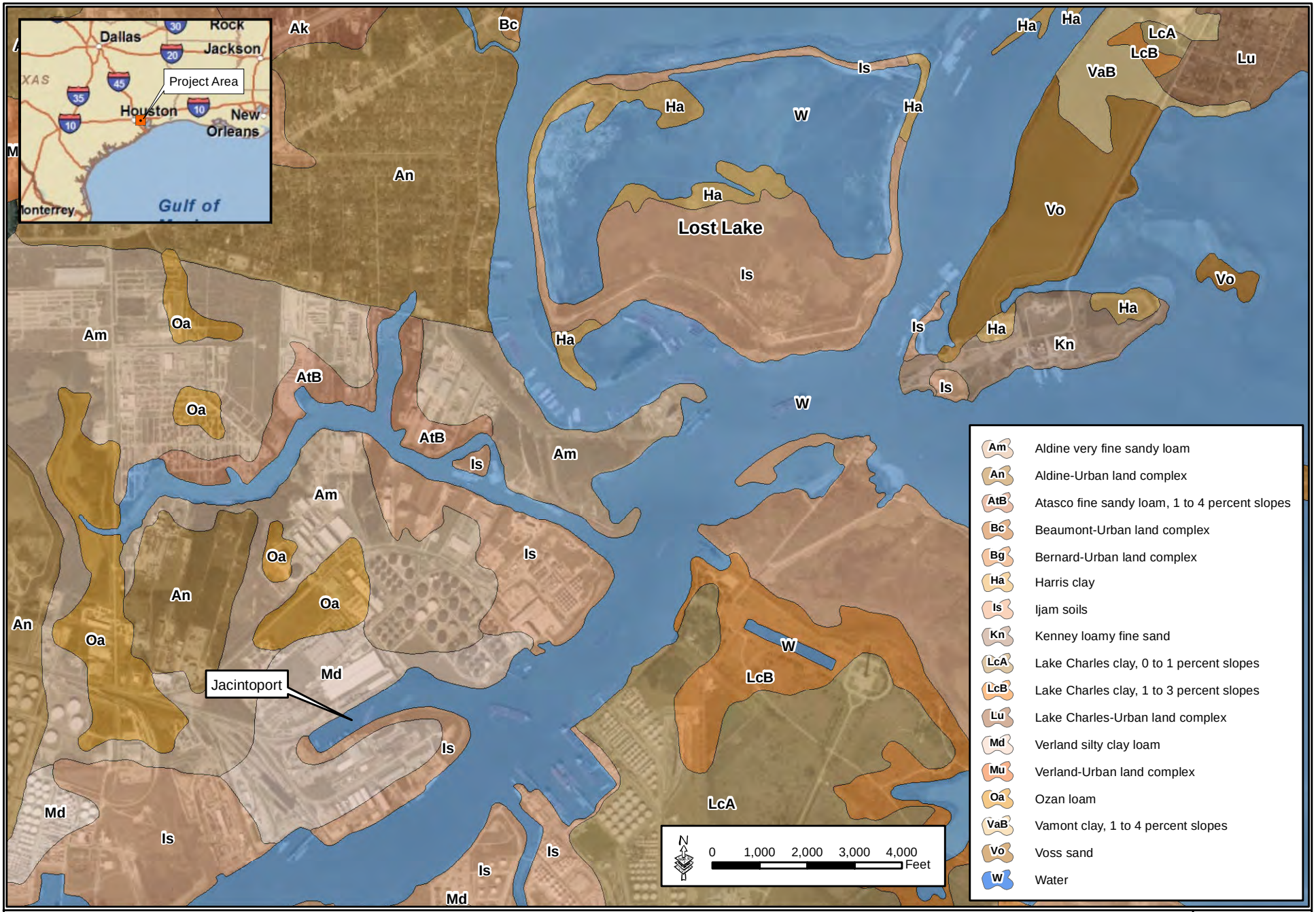


Figure 3-1: Soils Map

GSRC

April 2010

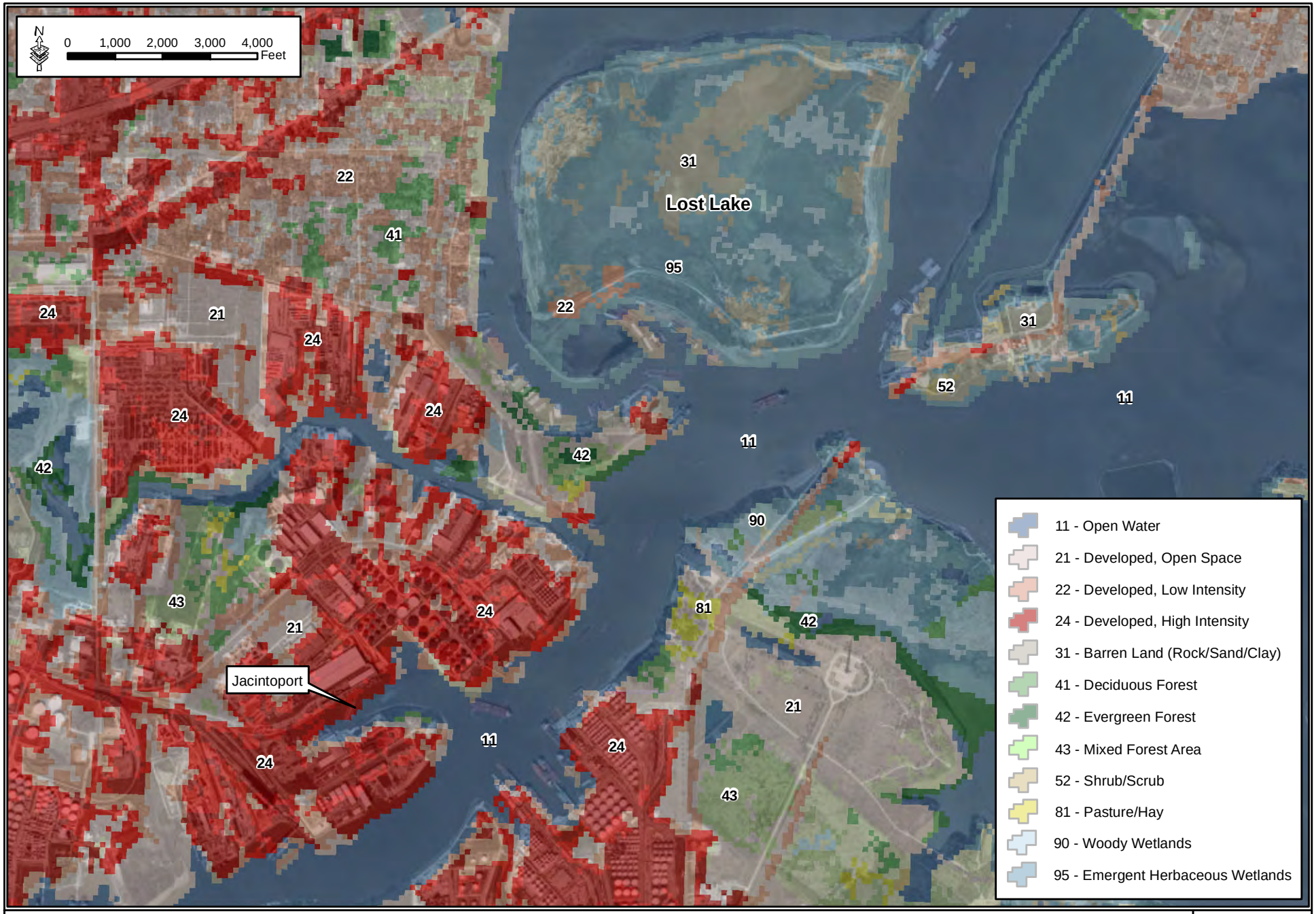


Figure 3-2: Land Use Map

GSRC

April 2010

Appendix A

Biological Assessment and Endangered Species Act Consultation

[Supplemental Documents to be Added]

Biological Assessment

United States Army Corps of Engineers
Galveston District
PO Box 1229
Galveston, Texas 77550

September 2010

TABLE OF CONTENTS

LIST OF TABLES

1.0 INTRODUCTION

1.1 Purpose of the Biological Assessment

This Biological Assessment (BA) has been prepared to fulfill the Unites States Army Corps of Engineers (USACE), Galveston District, requirements as outlined under Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended. The Federal assumption of maintenance (AOM) of the Jacintoport Channel as part of the Houston Ship Channel Project is the proposed project requiring the assessment. Section 5001 of the Water Resources Development Act of 2007 authorizes the Federal AOM for Jacintoport Channel following a request from a non-Federal interest. It requires that the Assistant Secretary of the Army for Civil Works (ASA/CW) makes a determination that such maintenance is economically justified and environmentally acceptable. Additionally, the ASA/CW must also determine that the channel was constructed in accordance with applicable permits and appropriate engineering and design standards.

This BA evaluates the potential impacts that the proposed Federal AOM may have on Federally listed threatened and endangered species identified by the United States Fish and Wildlife Service (USFWS) for Harris County, Texas, and the National Marine Fisheries Service (NMFS) for the State of Texas, respectively. The species identified in this BA (Table 1) have been compiled from both Federally-listed and state-listed sources (USFWS 2009c, NMFS 2010, TPWD 2010) (table citations of species do not indicate confirmed existence).

Table 1: Federally Protected Species Potentially Occurring in the Jacintoport Channel Project Area, Harris County, Texas

Common Name	Scientific Name	Federal Listing Status
Birds		
American Peregrine Falcon	*Falco peregrinus anatum*	Not Listed
Bald Eagle	*Haliaeetus leucocephalus*	Not Listed
Brown Pelican	*Pelecanus occidentalis*	Not Listed
Peregrine Falcon	*Falco peregrinus*	Not Listed
White-faced Ibis	*Plegadis chihi*	Not Listed
White-tailed Hawk	*Buteo albicandatus*	Not Listed
Fish		
Smalltooth Sawfish	*Pristis pectinata*	Endangered
Mollusks		
Sandbank Pocketbook	*Lampsilis satura*	Not Listed
Texas Pigtoe	*Fusconaia askewi*	Not Listed
Reptiles		
Alligator Snapping Turtle	*Macrochelys temminckii*	Under Review
Green Sea Turtle	*Chelonia mydas*	Threatened
Hawksbill Sea Turtle	*Eretmochelys imbricate*	Endangered
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	Endangered
Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered
Loggerhead Sea Turtle	*Caretta caretta*	Threatened
Plants		
Texas Prairie Dawn	*Hymenoxys texana*	Endangered

Source: USFWS 2009c, NMFS 2010

1.2 Description of the Proposed Project and Existing Habitats

1.2.1 Proposed Project Description

The Proposed Action, or the Federal AOM, represents a future condition where Jacintoport Channel segments will be Federally maintained to an average operating depth of 40 feet mean low tide (MLT), plus a 2 foot advanced maintenance dredge depth (total 42 feet MLT). The Proposed Action presumes the USACE accepts the maintenance responsibilities for select segments of Jacintoport Channel. This channel area is estimated to shoal evenly at a sedimentation rate of 0.67 feet per year, thus accumulating approximately 2 feet of sediment every 3 years. The Federal AOM would require an approximate 2 year dredge cycle in order to maintain the average depth of 42 feet MLT; thus resulting in no major reduction in the capacity of Jacintoport Channel, no changes in composition of the vessels calling on the terminals, and no associated impacts to transportation costs.

The Lost Lake Placement Area (PA) is the Federally authorized dredged material PA for the proposed action, where dredged material from Jacintoport Channel is currently placed. The Lost Lake PA is the closest PA to Jacintoport Channel; approximately 3 miles east from the Jacintoport Terminal. The Lost Lake PA has sufficient capacity for the placement of material dredged from the Jacintoport Channel, as determined in the 50-year plan spreadsheets in the Port of Houston Authority (PHA) long term placement plan (PHA 2007) and therefore, would not require additional construction or expansion activities within the Lost Lake PA.

Hydraulic (cutterhead) dredging has been identified as the Proposed Project dredge methodology and is frequently used in other areas of the Houston Shipping Channel (HSC). The current permit (18576[03]) for maintenance dredging of Jacintoport Channel authorizes mechanical, water injection, and siltblade dredging as approved methodologies. This permit additionally authorizes dredged material placement into the Lost Lake PA through 2016.

1.2.2 Existing Habitats

Both aquatic and terrestrial habitats are located within and near the project area. Aquatic habitats include: tidal marshes, water within the channel, and the sediment and hard bottom structures associated with the channel. The project area is located within the Gulf Coast Prairies and Marshes Natural Region of Texas (TPWD 1984). However, there is little to no remaining wetland vegetation associated within the immediate vicinity of the Jacintoport Channel due to predominantly hardened shorelines. The Lost Lake PA provides potential terrestrial habitat and roosting areas for numerous bird species.

2.0 STATUS OF THE LISTED SPECIES LIKELY TO OCCUR IN THE PROJECT AREA

The sea turtle is most likely to occur within the project area. Other species listed in Table 1 are not likely to occur in the vicinity of the project area due to lack of suitable habitat (Texas prairie dawn, Hawksbill sea turtle, Leatherback sea turtle) and known range limits (Smalltooth sawfish). There is no designated critical habitat for any of the listed species within the project area. Descriptions of the species most likely to occur within the project area follow.

2.1 Sea Turtles

Sea turtles have the potential to occur within the project area. Five sea turtle species are Federally-listed for Harris County, however only 3 turtle species have the potential for occurring within the project vicinity: Kemp's Ridley sea turtle, loggerhead sea turtle, and green sea turtle. The hawksbill and leatherback sea turtles are not likely to occur within the project area due to a lack of suitable habitats. Hawksbill sea turtles live in clear offshore waters of mainland and island shelves and prefer coral reef formations (TPWD 2007a). Leatherback sea turtles prefer the open ocean and frequently descend into deep waters from 650 to 1,650 feet in depth and are therefore unlikely to occur within the project vicinity due to a lack of suitable habitat (TPWD 2009a).

2.1.1 Reasons for Status

The decline of sea turtle species is primarily due to human activities, including the direct harvest of adults and eggs and incidental capture in commercial fishing operations (USFWS 2009c). Other threats include: loss or degradation of nesting habitat from coastal development and beach armoring, disorientation of hatchlings by beachfront lighting, excessive nest predation by native and non-native predators, degradation of foraging habitat, marine pollution and debris, watercraft strikes, and/or incidental take from channel dredging and commercial fishing operations (USFWS 2009b).

2.1.2 Habitat

Kemp's Ridley sea turtle's primary habitat is the nearshore and inshore shallow waters of the northern Gulf of Mexico. Feeding primarily occurs near the bottom. Hatchlings drift on the surface in the open ocean and later move to shallow waters of bays, lagoons, or deeper ocean water (TPWD 2009b). Kemp's Ridleys are often found in salt marsh habitats due to their preference for nesting beaches backed up by extensive swamps or large bodies of open water with seasonal narrow ocean connections (USFWS 2009a).

Loggerhead sea turtle habitat includes a variety of environments including brackish waters of coastal lagoons and river mouths. During their dormant winter period, they remain buried in the mud at the bottom of sounds, bays, and estuaries. Only minor and solitary nesting have been observed along the coasts of the Gulf of Mexico. The majority of the nesting beaches are located in the southeastern U.S. along the Atlantic coast of Florida, North Carolina, South Carolina, and Georgia (TPWD 2009c).

Green sea turtles migrate from nesting areas to feeding grounds, which may be thousands of miles away. They typically feed in shallow water areas inside reefs, bays, and inlets which are abundant with seagrasses or algae (USFWS 2009b). Most green sea turtles migrate along the coast, but some populations are known to migrate across the ocean. Green sea turtles prefer to nest on beaches which are surrounded by seawater maintaining a temperature greater than 25 ° C (TPWD 2007b).

2.1.3 Range

Kemp's Ridley sea turtles are generally found in the Gulf of Mexico with juveniles found in the northern Gulf of Mexico between Texas and Florida. Juveniles are also found along the eastern coast of the United States as far north as Nova Scotia, Canada (TPWD 2009b). Most Kemp's Ridleys nest on the coastal

beaches of the Mexican states of Tamaulipas and Veracruz, although a very small number of Kemp's Ridleys nest consistently at Padre Island National Seashore, in southeast Texas (USFWS 2009a).

Loggerhead sea turtles occur throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. The majority of the nesting occurs on the western rims of the Atlantic and Indian Oceans (USFWS 2010). Within the United States, the majority of the nesting beaches are located along the Atlantic coast of Florida, North Carolina, South Carolina, and Georgia (TPWD 2009c). Adult loggerheads are known to make considerable migrations between foraging areas and nesting beaches. During non-nesting years, adult females from United States beaches are distributed in waters off the eastern United States and throughout the Gulf of Mexico, Bahamas, Greater Antilles, and Yucatán (USFWS 2010).

Green sea turtles are found worldwide in tropical and subtropical waters. The majority of the green sea turtle nesting colonies in the Atlantic occur on Ascension Island, Aves Island, Costa Rica, and Surnam. In the United States, small numbers of nests can be found in the U.S. Virgin Islands, Puerto Rico, Georgia, South Carolina, North Carolina, Florida, and the Gulf of Mexico (TPWD 2007b).

2.1.4 Distribution in Texas

The Kemp's Ridley sea turtle migrates along the Texas coast and commonly utilizes Texas bays and estuaries to feed on crab, shrimp, other invertebrates, and occasionally marine plants. The primary nesting beach for the Kemp's Ridley is near Rancho Nuevo, Tamaulipas, Mexico. An increasing number of nests, however, have been found along the southern Texas coast (TPWD 2009b). According to personal communications with Donna Shaver of the United States National Park Service (NPS) at Padre Island National Seashore, 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 only an occasional visitor to the Texas coast and may enter Texas bays and estuaries to feed. Only minor and solitary nesting has been observed along the coasts of the Gulf of Mexico (TPWD 2009c). Only one nest has been documented since 1999 between both Bolivar Peninsula and Galveston Island (USACE 2010).

Small numbers of green sea turtle nests can be found on the beaches along the Gulf of Mexico. Green sea turtles could also potentially migrate from nesting areas to feeding grounds along the Texas coastal area. Feeding grounds would include areas abundant with seagrasses or algae such as the shallow waters of bays and inlets (TPWD 2007b).

2.1.5 Presence in Project Area

Suitable nesting habitat for the Kemp's Ridley, loggerhead, and green sea turtles does not exist within the project area. The Galveston Bay area which is located south of the project area may be considered suitable feeding habitat for all three sea turtles. Therefore, all three sea turtles may be found within the project corridor as transient species.

3.0 EFFECTS ANALYSIS

3.1 Sea Turtles

Potential habitat for the Kemp's Ridley, loggerhead, and green sea turtles exists south of the project area along the Texas coast. Since the project area is located within the upper reaches of the HSC, it is unlikely that the sea turtles will utilize these waters on a regular or incidental basis. Hydraulic (pipeline/cutterhead) dredging is anticipated as the most likely dredge method for the continued maintenance of the Jacintoport Channel. Hydraulic dredges are not know to take turtles, and NMFS (2007) Therefore, due to the location of the project area in the upper reaches of the HSC where sea turtles are unlikely to be encountered, and with the anticipated use of hydraulic dredges performing future maintenance dredging, the USACE concludes that the project would have no affect, the Kemp's Ridley, loggerhead, and green sea turtles.

Effect Determination: *No affect.*

4.0 SUMMARY

The proposed project will have no affect on Federally listed threatened and endangered species identified in this BA.

5.0 LITERATURE CITED

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

REPLY TO
ATTENTION OF

March 29, 2010

Environmental Section

David M. Bernhart
Assistant RA for Protected Resources
Southeast Regional Office
National Marine Fisheries Service
263 13th Avenue South
St. Petersburg, FL 33701

Dear Mr. Bernhart:

This letter is in regard to the proposed Federal assumption of maintenance of the Jacintoport Channel as part of the Houston Ship Channel in Galveston Bay. The proposed project location, which is in Harris County, Texas, is shown on the enclosed figure. To facilitate compliance with the requirements of Section 7, subsection (a)(2) of the Endangered Species Act Amendments of 1978, a list of any species which is listed or proposed to be listed, that may be present in the area of the proposed action is requested.

If you or your staff have any questions regarding this activity, please contact Steve Ireland at (409) 766-3131.

Sincerely,

Carolyn Murphy

Carolyn Murphy
Chief, Environmental Section

Enclosure

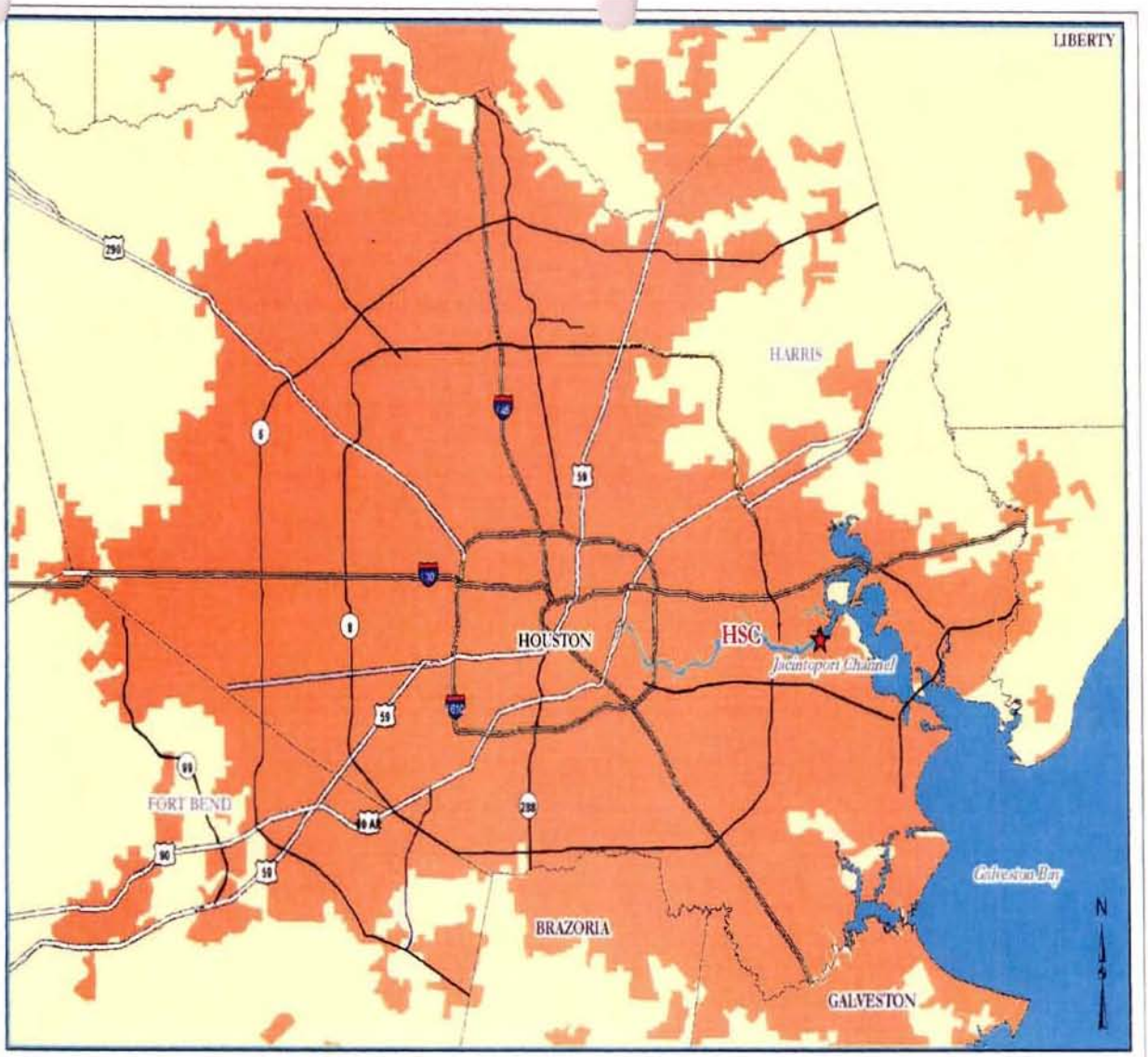


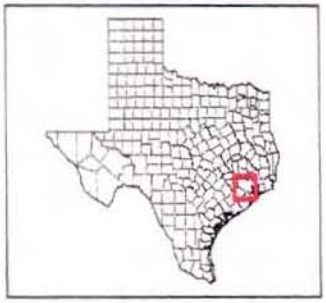
Figure 1: General Location Map

Legend

- ★ Jacintoport Channel
- County Boundary
- Urbanized Areas

Major Roadways

- Interstate
- US Highway
- State Highway



Sources:
- -Texas Natural Resources Information System
- -Texas General Land Office
- -Texas Water Development Board
- -United States Geological Survey

0 5 10 Miles

Ireland, Steven K SWG

From: Teletha Mincey [Teletha.Mincey@noaa.gov]
Sent: Thursday, April 08, 2010 12:16 PM
To: Ireland, Steven K SWG
Subject: Maintenance of Jacintoport Channel, Harris County, TX
Attachments: Texas.pdf

Hello Steven,

In response to the COE's letter dated March 29, 2010, referencing subject-matter, attached is a listing of species under the jurisdiction of the National Marine Fisheries Service.

Teletha

Endangered and Threatened Species and Critical Habitats
under the Jurisdiction of the NOAA Fisheries Service

Texas

Listed Species	Scientific Name	Status	Date Listed
Marine Mammals			
blue whale	*Balaenoptera musculus*	Endangered	12/02/70
finback whale	*Balaenoptera physalus*	Endangered	12/02/70
humpback whale	*Megaptera novaeangliae*	Endangered	12/02/70
sei whale	*Balaenoptera borealis*	Endangered	12/02/70
sperm whale	*Physeter macrocephalus*	Endangered	12/02/70
Turtles			
green sea turtle	*Chelonia mydas*	Threatened[1]	07/28/78
hawksbill sea turtle	*Eretmochelys imbricata*	Endangered	06/02/70
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered	12/02/70
leatherback sea turtle	*Dermochelys coriacea*	Endangered	06/02/70
loggerhead sea turtle	*Caretta caretta*	Threatened	07/28/78
Fish			
smalltooth sawfish	*Pristis pectinata*	Endangered	04/01/03

Designated Critical Habitat
None

Species Proposed for Listing
None

Proposed Critical Habitat
None

[1] Green turtles are listed as threatened, except for breeding populations of green turtles in Florida and on the Pacific Coast of Mexico, which are listed as endangered

Texas

Candidate Species[2]	Scientific Name
largetooth sawfish	*Pristis pristis*

Species of Concern[3]	Scientific Name
Fish	
dusky shark	*Carcharhinus obscurus*
largetooth sawfish	*Pristis pristis*
night shark	*Carcharhinus signatus*
saltmarsh topminnow	*Fundulus jenkinsi*
sand tiger shark	*Carcharias taurus*
speckled hind	*Epinephelus drummondhayi*
Warsaw grouper	*Epinephelus nigritus*
Invertebrates	
ivory tree coral	*Oculina varicosa*

[2] The Candidate Species List has been renamed the Species of Concern List. The term "candidate species" is limited to species that are the subject of a petition to list and for which NOAA Fisheries Service has determined that listing may be warranted (69 FR 19975).

[3] Species of Concern are not protected under the Endangered Species Act, but concerns about their status indicate that they may warrant listing in the future. Federal agencies and the public are encouraged to consider these species during project planning so that future listings may be avoided.

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

REPLY TO
ATTENTION OF

March 29, 2010

Environmental Section

Mr. Steve Parris
Field Supervisor
U.S. Fish and Wildlife Service
17629 El Camino Real, Suite 211
Houston, Texas 77058

Dear Mr. Parris:

This letter is in regard to the proposed Federal assumption of maintenance of the Jacintoport Channel as part of the Houston Ship Channel in Galveston Bay. The proposed project location, which is in Harris County, Texas, is shown on the enclosed figure. To facilitate compliance with the requirements of Section 7, subsection (a)(2) of the Endangered Species Act Amendments of 1978, a list of any species which is listed or proposed to be listed, that may be present in the area of the proposed action is requested.

If you or your staff have any questions regarding this activity, please contact Steve Ireland at (409) 766-3131.

Sincerely,

Carolyn Murphy

Carolyn Murphy
Chief, Environmental Section

Enclosure

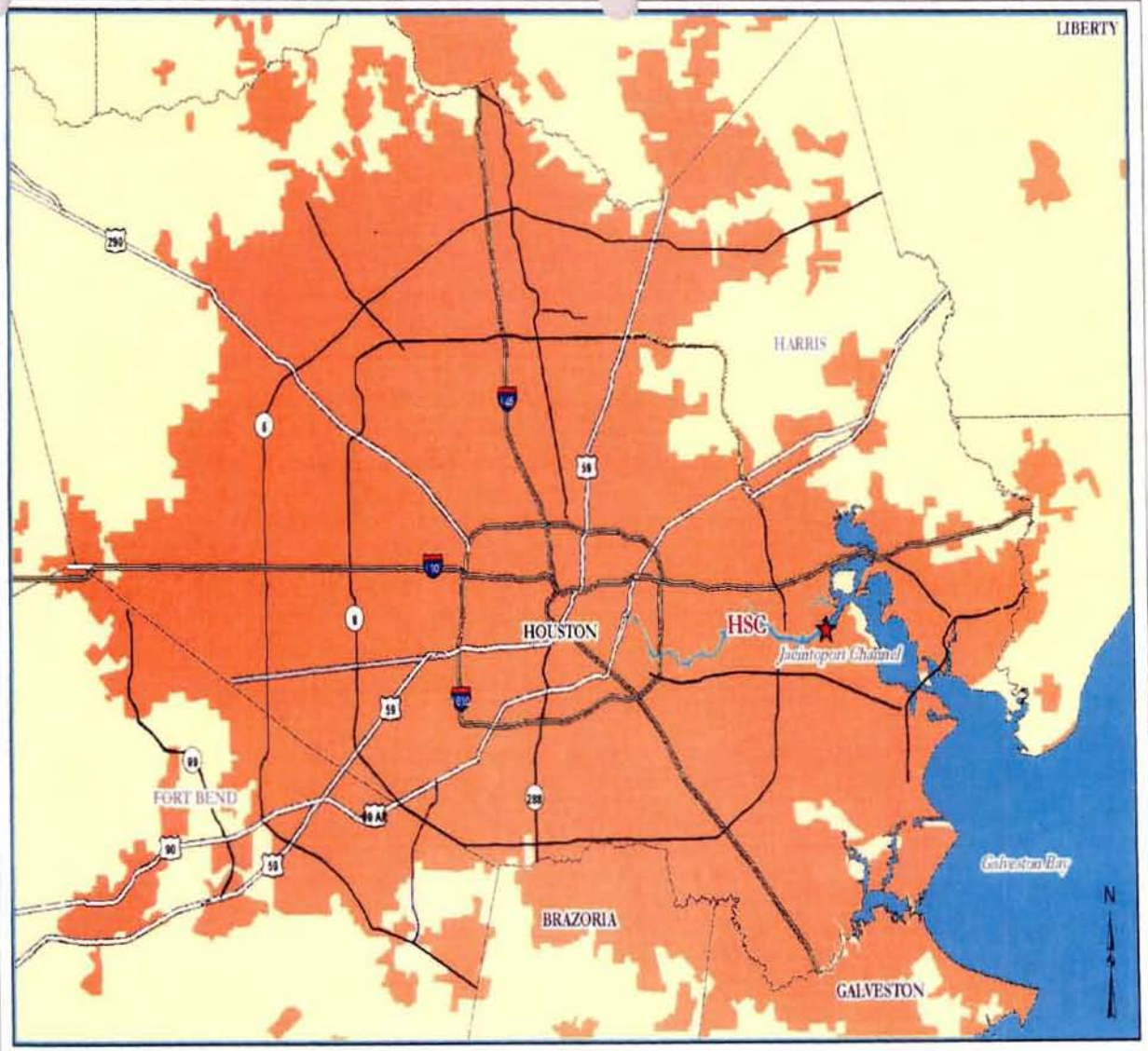


Figure 1: General Location Map

Legend

- ★ Jacintoport Channel
- County Boundary
- Urbanized Areas

Major Roadways

- Interstate
- US Highway
- State Highway

Sources:
-Texas Natural Resources Information System
-Texas General Land Office
-Texas Water Development Board
-United States Geological Survey

0 5 10 Miles

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Division of Ecological Services
17629 El Camino Real #211
Houston, Texas 77058-3051

January 2010

Thank you for your request for threatened and endangered species information in the Clear Lake Ecological Services Field Office's area of responsibility. According to Section 7(a)(2) of the Endangered Species Act and the implementing regulations, it is the responsibility of each Federal agency to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any federally listed species.

Please note that while a Federal agency may designate a non-Federal representative to conduct informal consultation or prepare a biological assessment, the Federal agency must notify the U.S. Fish and Wildlife Service (Service) in writing of such designation. The Federal agency shall also independently review and evaluate the scope and contents of a biological assessment prepared by their designated non-Federal representative before that document is submitted to the Service.

A county by county listing of federally listed threatened and endangered species that occur within this office's work area can be found at http://www.fws.gov/southwest/es/EndangeredSpecies/lists/ListSpecies.cfm. You should use the county by county listing and other current species information to determine whether suitable habitat for a listed species is present at your project site. If suitable habitat is present, a qualified individual should conduct surveys to determine whether a listed species is present.

After completing a habitat evaluation and/or any necessary surveys, you should evaluate the project for potential effects to listed species and make one of the following determinations:

- **No effect** – the proposed action will not affect federally listed species or critical habitat (i.e., suitable habitat for the species occurring in the project county is not present in or adjacent to the action area). No coordination or contact with the Service is necessary. However, if the project changes or additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.

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

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

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

The Service's Consultation Handbook is available online to assist you with further information on definitions, process, and fulfilling Endangered Species Act requirements for your projects at http://endangered.fws.gov/consultations/s7hndbk/s7hndbk.htm.

If we can further assist you in understanding a federal agency's obligations under the Endangered Species Act, please contact Moni Belton, David Hoth, Charrish Stevens, Arturo Vale or Catherine Yeargan at 281/286-8282.

Sincerely,

Stephen D. Parris

Stephen D. Parris
Field Supervisor, Clear Lake Field Office

Appendix B

Coastal Zone Management Act Consistency Determination

COMPLIANCE WITH GOALS AND POLICIES – SECTION 501.25(a)-(f)
THE FEDERAL ASSUMPTION OF MAINTENANCE OF THE JACINTOPORT CHANNEL AS PART OF THE HOUSTON SHIP CHANNEL PROJECT

HARRIS COUNTY, TEXAS

Section 501.25 Dredging and Dredged Material Disposal and Placement

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

Compliance: The proposed project would deposit dredged material in Lost Lake Placement Area (PA). Lost Lake PA is the closest authorized PA to the Jacintoport Channel, at a distance of approximately 3 miles. The placement of this material has avoided and minimized adverse effects to coastal waters, submerged lands, critical areas, coastal shore areas, and Gulf beaches by placing material in an area that has historically been used for dredged material placement.

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

Compliance: No water quality standards would be violated by this project. Temporary elevations in turbidity may be caused as a result of dredging activities; however, given the turbid nature of the Channel, it is not anticipated these elevations would have a detrimental effect to fish and wildlife values within the project vicinity.

(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: "Critical area," per Texas Natural Resources Code, §33.203(8), means a coastal wetland, an oyster reef, a hard substrate reef, submerged aquatic vegetation, or a tidal sand or mudflat. The Jacintoport Channel and the greater Houston Ship Channel (HSC) are heavily industrialized where the waterways have been created over years of extensive dredging and widening, and therefore resemble few characteristics of their natural indigenous state.

(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;

Compliance: No practicable alternative exists that would have fewer adverse effects on coastal waters, submerged lands, critical areas, coastal shore areas, and Gulf Beaches. The proposed project footprint is located in an area that has been disturbed by previous dredging activities and a PA that has historically been used for dredged material placement.

(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

Compliance: All practicable steps have been taken to minimize adverse effects on these resources.

(C) significant degradation of critical areas under §501.23(a)(7)(E) of this title would result.

Compliance: No significant degradation of critical areas would result from this project. The Jacintoport Channel is heavily industrialized where the waterways have been created over years of extensive dredging and widening, and therefore resemble few characteristics of their natural indigenous state.

(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: The project has overriding importance to the public and national interest because it would allow for the uninterrupted maintenance of and safe commercial navigation conditions within the Jacintoport Channel which provides access to Jacintoport Terminal, owned by the Port of Houston Authority and two privately owned terminals, Inbesa American, Inc. and Houston Fuel Oil.

(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 paragraph where appropriate and practicable.

Compliance: Adverse effects of dredging as described in this Environmental Assessment (EA) have been minimized as described under "Compliance" for Paragraph (a2) of this section. The project has been sited and sized to optimize plan performance while minimizing environmental impacts and cost.

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

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

Compliance: Discharge has been confined to the Lost Lake PA to minimize impacts to benthic habitat. No permanent or long-term impacts are anticipated.

(B) locating and designing projects to avoid adverse disruption of water inundation patterns, water circulation, erosion and accretion processes, and other hydrodynamic processes;

Compliance: The project is not anticipated to have adverse effects to water inundation patterns, water circulation, erosion and accretion processes, or 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;

Compliance: Dredging activities will occur within the current dimensions of Jacintoport Channel with no anticipated changes in the depth or width. Dredged material will be placed in the Lost Lake PA which has historically been used for dredged material placement.

(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;

Compliance: The proposed project has been sized to maximize Channel depth for maintenance of the Channel, while minimizing environmental impacts. Placement of dredge material on the Lost Lake PA will not require any new construction or expansion over the 20-year period of Federal AOM.

(E) discharging materials at sites where the substrate is composed of material similar to that being discharged;

Compliance: Material would be discharged at a site of comparable substrate. All dredged material for the proposed project will be deposited at the Lost Lake PA.

(F) locating and designing discharges to minimize the extent of any plume and otherwise control dispersion of material; and

Compliance: Placement has been designed to minimize environmental impacts.

(G) avoiding the impoundment or drainage of critical areas.

Compliance: There would be no impoundment or drainage of critical areas.

(2) 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 physicochemical 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 adding chemical flocculants to enhance the deposition of suspended particulates in confined disposal areas,

Compliance: Maintenance dredged material complies with applicable standards for sediment toxicity. Recent sediment studies within the HSC have found elevated copper levels from two of nine sampling locations within the Jacintoport Channel; however, follow-up testing proved levels to be within acceptable limits and therefore deeming the original measurement as a statistical outlier. Additional sediment samples were collected from locations surrounding the Houston Fuel Oil Terminal. The Port of Houston Authority's EAD reviewed the sample results and did not object to the placement of dredge material from the sampled locations into a designated PA.

(3) 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 resist 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: Dredged material will be placed in a confined PA with properly maintained levees.

(4) 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: Effluent from the Lost Lake PA would be controlled to minimize the introduction of total suspended solids (TSS) into the receiving water.

(5) Adverse effects from dredging and dredged material disposal or placement operations can be minimized by adopting 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 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: Best management practices would be implemented during maintenance dredging and placement of dredged material activities to minimize impacts. Additionally, personnel will be properly trained in dredging and dredged material placement operations.

(6) Adverse effects on plant and animal populations from dredging and dredged material disposal or placement can be minimized by:

(A) avoiding changes in water current and circulation patterns that would interfere with the movement of animals;

Compliance: Changes to water current and circulation patterns would be localized, minimal, and would not adversely 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;

Compliance: Maintenance dredged material from the HSC, Jacintoport Channel and other sources is routinely placed into the Lost Lake PA. Disturbance is already common within and near the project area and continued use of Lost Lake PA for Federal assumption of maintenance does not alter its current condition; therefore, no permanent or additional establishment of invasive species as a result of the proposed Federal assumption of maintenance is anticipated.

(C) avoiding sites having unique habitat or other values including habitat of endangered species;

Compliance: The potential for federally endangered or threatened species to be found within the project area is remote due to the lack of suitable habitat. A biological assessment has been prepared for the proposed project (Appendix A). The proposed will have no effect on federally endangered or threatened 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;

Compliance: The Jacintoport Channel is highly industrialized and the maintenance dredging material is not a desirable source for beneficial uses. Dredged materials will be placed in the Lost Lake PA which has historically been used for dredged material placement.

(E) using techniques that have been demonstrated to be effective in 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;

Compliance: Approved techniques for maintenance dredging of the Jacintoport Channel maintenance include mechanical, water injection, and siltblade dredging. Dredging activities will occur within the current dimensions of the Jacintoport Channel with no anticipated changes in the depth or width. Dredged materials will be placed in the Lost Lake PA which has historically been used for dredged material placement.

(F) timing dredging and dredged material disposal or placement activities to avoid spawning or migration seasons and other biologically critical time periods; and

Compliance: If construction occurs during a biologically critical time period, additional resource agency coordination of construction would be undertaken, especially to ensure compliance with the Federal law.

(G) avoiding the destruction of remnant natural sites within areas already affected by development.

Compliance: The proposed project is in an area already disturbed industrial and urban development as well as years of extensive construction and maintenance dredging work; the Lost Lake PA has historically been used and continues to be used as an active confined PA for the HSC, Jacintoport Channel and other dredging work.

(7) 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;

Compliance: There will be no aesthetic impacts from the proposed project. Impacts to water quality would be temporary and minimal in nature.

(B) selecting sites which are not valuable as natural aquatic areas;

Compliance: The proposed project is in an area already disturbed industrial and urban development as well as years of extensive construction and maintenance dredging work; the Lost Lake PA has historically been used and continues to be used as an active confined PA for the HSC, Jacintoport Channel and other dredging work.

(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

Compliance: The proposed project is located in a highly industrialized area of the Jacintoport, Inbesa and HFO Temrmials and the HSC that is subject to traffic of large cargo ships and tankers. Therefore, it is unlikely and unsuitable for recreational boating or fishing to occur within the Jacintoport Channel. It is possible, however, that limited water-based recreational and guide fishing activities may occur in the waters of the San Jacinto River around the Lost Lake PA. Dredge placement activities into the Lost Lake PA are on-going and routine and the proposed project will not impact the minimal amount of water-based recreational activities that may occur.

(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: The project would not increase incompatible human activity or require frequent dredge or fill maintenance activities in remote fish and wildlife areas.

(8) 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 crossings, 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 subparagraph if such data and information is produced and evaluated in compliance with §501.15(b)(1) of this title (relating to Policy for Major Actions).

Compliance: No new channels or basins would be constructed as part of the proposed project.

(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 paragraph (1) of this subsection unless modified in design, size, use, or function.

Compliance: The Lost Lake PA will not be modified in design, size, use, or function, and therefore would comply with requirements of paragraph (1) of this subsection.

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

Compliance: The Jacintoport Channel is highly industrialized and the maintenance dredging material is not a desirable source for beneficial uses.

(1) If the costs of the beneficial use of dredged material are 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, flood 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.

Compliance: The dredged materials from the proposed project are not a desirable source for beneficial uses. The Lost Lake PA is the closest site to the Jacintoport Channel, provides the lowest dredging costs, and requires no new construction or expansion over a 20-year period. By placing

the Jacintoport Channel maintenance material at the Lost Lake PA, additional environmental impacts are not anticipated.

(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 waste 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.

Compliance: The Jacintoport Channel maintenance dredging is not a desirable source of material for beneficial uses.

(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 paragraph (a) of this subsection, preference will be given to the greatest extent practicable to disposal in:

(1) contained upland sites;

(2) other contained sites; and

(3) open water areas of relatively low productivity or low biological value.

Compliance: The dredged material would be placed in the Lost Lake PA which is fully confined.

(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 defines the location of the boundary or boundaries affected by the deposition of the dredged material.

Compliance: No new sites will be created as a result of this project.

[TCMP Consistency Concurrence Letter to be Added]

Appendix C

Clean Water Act Section 404(b)(1) Analysis (Short Form)

And Section 401 Water Quality Certification

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

THE FEDERAL ASSUMPTION OF MAINTENANCE OF THE JACINTOPORT CHANNEL AS PART OF THE HOUSTON SHIP CHANNEL PROJECT HARRIS COUNTY, TEXAS

	YES	NO*
1. Review of Compliance (230.10(a)-(d)		
A review of the proposed project indicates that:		
a. The placement represents the least environmentally damaging practicable alternative and, if in a special aquatic site, the activity associated with 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 307of 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**	

	Not Applicable	Not Significant	Significant
2. Technical Evaluation Factors (Subparts C-F) (where a 'Significant' category is checked, add explanation below)			
a. Physical and chemical characteristics of the aquatic ecosystem (Subpart C)			
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)			
1) Effect on threatened/endangered species and their habitat		**X**	
2) Effect on the aquatic food web		**X**	
3) Effect on the other wildlife (mammals, birds, reptiles and amphibians)		**X**	

	Not Applicable	Not Significant	Significant
2. Technical Evaluation Factors (Subparts C-F) (where a "Significant" category is checked, add explanation below)			
c. Special aquatic sites (Subpart E)			
1. Sanctuaries and refuges	**X**		
2. Wetlands/Tidal marsh		**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)			
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**	

	YES
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	
5) Spill records for petroleum products or designated (Section 311 of Clean Water Act) hazardous substances	
6) Other public records of significant introduction of contaminants from industries, municipalities, or other sources	
7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities	
List appropriate references: USACE, 2006. Permit No. 18576 (03); Amendment	

	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**	

	Yes
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	
2) Current velocity, direction, and variability at placement site	
3) Degree of turbulence	
4) Water column stratification	
5) Discharge vessel speed and direction	
6) Rate of discharge	
7) Fill material characteristics (constituents, amount, and type of material, settling velocities)	**X**
8) Number of discharges per unit of time	
9) Other factors affecting rates and patterns of mixing (specify)	

List appropriate references:

	Yes	No
b. An evaluation of 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)		
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:

	Yes	No
6. Factual Determination (230.11)		
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)	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: Andrea Catanzaro
b. Position: Environmental Lead/Biologist

	Yes
8. Findings	
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:	
List of conditions:	
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.	

8/16/2012	for
Date	CAROLYN MURPHY Chief, Environmental Section

[Section 401 Water Quality Certification & TCEQ Correspondence to be Added]

Appendix D

Air Quality Calculations

CALCULATION SHEET-COMBUSTIBLE EMISSIONS-CONSTRUCTION

Assumptions for Combustible Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/Day	Days/Yr	Total hp-Hrs
Suction Dredge	1	300	8	90	216000
Diesel Road Compactors	0	100	8	40	0
Diesel Dump Truck	0	300	8	60	0
Diesel Excavator	1	300	8	90	216000
Diesel Hole Trenchers	0	175	8	90	0
Diesel Bore/Drill Rigs	0	300	8	90	0
Diesel Cement & Mortar Mixers	0	300	8	90	0
Diesel Cranes	0	175	8	90	0
Diesel Graders	0	300	8	90	0
Diesel Tractors/Loaders/Backhoes	2	100	8	90	144000
Diesel Bull Dozers	1	300	8	90	216000
Diesel Front End Loaders	1	300	8	90	216000
Diesel Fork Lifts	0	100	8	90	0
Diesel Generator Set	4	600	8	90	1728000

Emission Factors							
Type of Construction Equipment	VOC g/hp-Hr	CO g/hp-Hr	NOx g/hp-Hr	PM-10 g/hp-Hr	PM-2.5 g/hp-Hr	SO2 g/hp-Hr	CO2 g/hp-Hr
Suction Dredge	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Trenchers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Diesel Bore/Drill Rigs	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Diesel Cement & Mortar Mixers	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTIBLE EMISSIONS-CONSTRUCTION

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC Tons/Yr	CO Tons/Yr	NOx Tons/Yr	PM-10 Tons/Yr	PM-2.5 Tons/Yr	SO2 Tons/Yr	CO2 Tons/Yr
Suction Dredge	0.105	0.493	1.307	0.098	0.095	0.176	127.585
Diesel Road Paver	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.081	0.309	1.095	0.076	0.074	0.176	127.657
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cement & Mortar Mixers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Graders	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Tractors/Loaders/Backhoes	0.294	1.303	1.146	0.217	0.211	0.151	109.669
Diesel Bull Dozers	0.086	0.328	1.133	0.079	0.076	0.176	127.657
Diesel Front End Loaders	0.090	0.369	1.190	0.083	0.081	0.176	127.633
Diesel Aerial Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	2.304	7.160	11.368	1.390	1.352	1.542	1118.370
Total Emissions	**2.960**	**9.962**	**17.239**	**1.943**	**1.889**	**2.398**	**1738.570**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/Mile	Pick-up Trucks, SUVs g/mile	Mile/Day	Day/Yr	Number of Cars	Number of Trucks	Total Emissions Cars Tns/Yr	Total Emissions Trucks Tns/Yr	Total Tns/Yr
VOCs	1.36	1.61	60	240	5	5	0.11	0.13	0.24
CO	12.4	15.7	60	240	5	5	0.98	1.25	2.23
NOx	0.95	1.22	60	240	5	5	0.08	0.10	0.17
PM-10	0.0052	0.0065	60	240	5	5	0.00	0.00	0.00
PM 2.5	0.0049	0.006	60	240	5	5	0.00	0.00	0.00
CO2	369	511	60	240	5	5	29.28	40.54	69.82

Heavy Duty Trucks-Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars Tns/Yr	Total Emissions Trucks Tns/Yr	Total Tns/Yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02
Daily Commute-New Staff Associated with Proposed Action									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	20	240	0	0	-	0.00	-
CO	12.4	15.7	20	240	0	0	-	0.00	-
NOx	0.95	1.22	20	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	20	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	20	240	0	0	-	0.00	-
CO2	369	511	20	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION

Conversion Factor:	Gms to Tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 Tons/Yr	Total CO2
VOCs	25	5.89	
NOx	311	0.17	
Total		6.06	75.89

Delivery Trucks	Conversion	Emissions CO2 Tons/Yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 Tons/Yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006

PM2.5 Emissions

PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)			**Conversion Factors**	
Duration of Construction Project	0	months	0.000022957	acres per feet
Length	0	miles	5280	feet per mile
Length (converted)	0	feet		
Width	0	feet		
Area	0.00	acres		

Staging Areas		
Duration of Construction Project		months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 Uncontrolled	**PM10 Controlled**	**PM2.5 Uncontrolled**	**PM2.5 Controlled**
Construction Area (0.19 ton PM10/acre-month)	0.00	0.00	0.00	0.00
Staging Areas	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor (0.19 ton PM10/acre-month) Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor (0.42 ton PM10/acre-month) Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier (0.1)

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 (0.5)

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS

Alternative 1 Construction Emissions for Criteria Pollutants (Tons per Year)									
Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustible Emissions	2.96	9.96	17.24	1.94	1.89	2.40	1738.57	5435.34	7173.91
Construction Site-Fugitive PM-10	NA	NA	NA	0.00	0.00	NA	NA	NA	NA
Construction Workers Commuter & Trucking	0.26	2.37	0.73	0.02	0.02	NA	69.82	233.53	303.35
Total Emissions	**3.22**	**12.34**	**17.97**	**1.96**	**1.91**	**2.40**	1808.39	5668.87	7477.26
De minimis Threshold (1)	25.00	NA	25.00	NA	NA	NA	NA	NA	NA

1. Harris County is in severe non-attainment for ozone NAQQS

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

Appendix E

Section 106 Consultation

[Supplemental Documents to be Added]

Appendix F

Additional Agency Coordination

[Supplemental Documents to be Added]

Appendix G

Public Notice, Public Comments, and District Response

[Supplemental Documents to be Added]

Appendix H

U. S. Fish and Wildlife Service Planning Aid Letter

[Supplemental Documents to be Added]

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Division of Ecological Services
17629 El Camino Real #211
Houston, Texas 77058-3051
281/286-8282 FAX: 281/488-5882

May 20, 2010

Colonel David Weston
U.S. Army Corps of Engineers
P.O. Box 1229
Galveston, TX 77553-1229

Dear Colonel Weston:

This planning aid letter serves to finalize the U.S. Fish and Wildlife Service's (Service) comments and recommendations regarding the Jacintoport Navigation Channel (Jacintoport Channel); identify and describe existing fish and wildlife resources within the proposed project area; evaluate and compare currently proposed alternatives; identify potentially significant impacts; identify modifications or alternatives which address fish and wildlife related problems, opportunities, or planning objectives; and recommend measures for resource protection early in the project planning process. This planning assistance is provided pursuant to the Fish and Wildlife Coordination Act (Act) (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and is intended to assist in the preparation of your environmental assessment. This information does not represent a final report of the Secretary of the Interior within the meaning of Section 2(b) of the Act.

Project Background

The Water Resources Development Act of 2007, specifically the Implementation Guidance for the Maintenance of Navigational Channels, allows for the resumption of maintenance from a non-Federal interest. The Port of Houston Authority (PHA) initiated the Federal Assumption of Maintenance for the Jacintoport Channel in December of 2007. The U.S. Army Corps of Engineers (Corps) Galveston District must conduct a feasibility level investigation to determine that "such maintenance is economically justified and environmentally acceptable" (Corps 2010).

Description of the Project Area

The Jacintoport Channel is located west of the Houston Ship Channel (HSC) and is approximately 4,100 feet long and 200 feet wide and contains three berthing areas (Corps 2010). The Jacintoport Terminal is located on the north side of the Jacintoport Channel and has three docks with a berthing area 90 feet wide and 2,000 feet long. The south terminal, the Inbesa Terminal, has a berthing area 110 feet wide and 1,480 feet long, while the Houston Fuel Oil (HFO) Terminal on the northeast has a berthing area with three docks. Ships often use the Jacintoport Plateau, located on the southern mouth of the Jacintoport Channel, for turning in and out; however, the Jacinto Plateau was constructed to prevent pressure waves from pushing other ships into the HFO Terminal berthing area located to the east. The main portions of the Jacintoport Channel are maintained to a depth of 40 feet mean low tide (MLT), with the Jacintoport Plateau maintained to 39 feet MLT and the berthing areas maintained to 45 feet

MLT. PHA records indicate that the Jacintoport Channel (channel, terminals and Plateau) is dredged every three to five years, with the last dredging in August of 2006. The HFO Terminal is dredged more frequently than the Jacintoport Channel and is maintained to a depth of 45 feet. While it has not been determined what method of dredging will occur, hydraulic (cutterhead) dredging methods are frequently used in other areas of the Houston Ship Channel (HSC). The current permit for maintenance of the Jacintoport Channel authorizes mechanical, water injection and siltblade dredging. However, the Corps will evaluate all dredging methods for this channel.

The Lost Lake Placement Area (PA), the closest PA to the Jacintoport Terminal, is slightly less than three miles away and receives, on average, 130,000 cubic yards of dredge material every four years from the Jacintoport Channel. The PHA has indicated that Lost Lake PA is 570 acres in size and will have a levee elevation of 42 feet and a capacity of 8.2 million cubic yards by 2029 (Corps 2010).

Alternatives Under Consideration

No Action Alternative

This Alternative presumes that there would be no Federal Assumption of Maintenance for the Jacintoport Channel. Shoaling rates have been reported to be at or near 0.67 feet per year or almost two feet every three years (Corps 2010). Without the Federal Assumption of Maintenance, the channel is expected to shoal to a depth of 34 feet MLT by 2018 (Corps 2010), which could inhibit ship transportation and reduce the capacity of the Jacintoport Channel.

Preferred Alternative

With this alternative, the Corps would assume maintenance for the Jacintoport Channel and would maintain a select segment of the channel to an operating depth of 40 feet MLT (including a two foot overdraft, for a total of 42 feet MLT). The Federal Assumption of maintenance would require a dredge cycle of every two years to maintain the depth of 42 feet. Under the Preferred Alternative, there would be no reduction in capacity of the Jacintoport Channel nor would ship traffic be inhibited.

Impacts to Environment

Wetlands

Review of aerial photography indicates that no wetlands occur within the project area and no impacts are expected as a result of the assumption of maintenance. There is little vegetation in the project area and aerial photographs indicate that it may be colonized by common grass species.

Wildlife Resources

Galveston Bay has some of the most productive marsh habitat along the Gulf coast, providing habitat for many important commercial and recreational fish species. In addition, marsh sites provide nesting areas for over 20 different colonial waterbird species. However, increases in ship wakes, subsidence, and increased salinity have impacted marsh habitat over the last 40 years, including areas in the northern reaches of Galveston Bay and in the HSC. Historically,

marshes were abundant along the HSC and in the Jacintoport Channel and fish and wildlife utilized these marshes for foraging, nesting and breeding. The Supplemental Fish and Wildlife Coordination Act Report – Houston-Galveston Ship Channels (Service 1995) and the Supplemental Fish and Wildlife Coordination Act Report – Houston-Galveston Ship Channels Barge Lane Widening (Service 2002) detail the important natural resource communities (oysters, marshes, bay bottom, colonial waterbirds and other wildlife) of Galveston Bay as well as estimating the negative and positive environmental impacts of Houston-Galveston Navigation Channel (HGNC) deepening and widening projects. Saltwater intrusion into the upper reaches of the HSC and industrial development have permanently altered the marshes and fish and wildlife use of these areas. While it is possible that some fish and wildlife species could be found in the project area, it is unlikely that the area would be utilized for any foraging, nesting or breeding activities.

The project area land use can be classified as industrial and the shoreline appears to be bulkheaded along the Jacintoport Channel. The peninsula at the entrance of the Jacintoport Channel appears to be sparsely vegetated and would provide little, if any, habitat for wildlife. Birds common to the Galveston Bay system such as double crested cormorant (*Phalacrocorax auritus*), white ibis (*Eudocimus albus*), great blue heron (*Ardea herodias*), little blue heron (*Ergretta caerulea*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), tricolored heron (*Egretta tricolor*), white pelican (*Pelecanus erythrorhychos*), royal tern (*Thalasseus maximus*), Forster's tern (*Sterna forsteri*), laughing gull (*Leucophaeus atricilla*), herring gull (*Larus argentatus*), ring billed gull (*Larus deawarensis)* and black skimmer (*Rynchops niger*) may occasionally use this area; however, shipping activities would discourage any long term usage by most species. Two colonial waterbird nesting sites (rookeries) are located approximately two miles from the Jacintoport Channel. Both of these sites are located within the park at the San Jacinto Monument and are protected from industrial use and development. Dredging activities at the project area at not anticipated to negatively impact the bird rookeries.

Fisheries

Sport fish potentially occurring within the project area include red drum (*Sciaenops ocellatus*), spotted seatrout (*Cynoscian nebulosus*), black drum (*Pogonias cromis*), southern flounder (*Paralichthys lethostigma*), star drum (*Stellifer lanceolatus*) and spot (*Leiostomus xanthurus*). Other common fishes include gafftopsial catfish (*Bagre marinus*), striped mullet (*Mugil cephalus*), sheepshead (*Archosargus probatocephalus*), Atlantic croaker (*Micropogonia undulates*), hardhead catfish (*Ariusfelis*) and bay anchovy (*Anchoa mitchilli*). Shellfish include blue crab (*Callinectes sapidus*), American oyster (*Crassostrea virginica*) and a variety of shrimp species (*Penaeus* spp.). Dredging activities cause suspension of sediments and increased turbidity in the water column and can cause temporary impacts to fish that inhabit the area. Changes in feeding, avoidance, territoriality and homing behaviors can all be affected by increased suspended sediments and turbid waters. Wilber and Clarke (2001) noted that changes in fish cough reflex, erratic swimming, pronounced gill flaring can occur due to suspended sediments. These impacts are usually temporary, as fish have the capability to leave the area and return when impacts have subsided.

Commercial and recreational fishing for fish and crabs is discouraged in the project area. Due to increased dioxin and PCB levels in fish, in 2008 the Texas Department of State Health Services issued a consumption advisory for all catfish species and spotted seatrout (Corps 2010); other portions of the HSC have been under a consumptive advisory since 1990. No long term impacts to fisheries within the project area are expected from the assumption of maintenance dredging activities.

Essential Fish Habitat

The HSC and the smaller channels that fork off it provide habitat for juvenile shrimp, blue crab, and larval and juvenile red drum. The bay bottom surface is subject to recurrent dredging activities and it is expected that these species temporarily relocate to similar habitats along the channel. Physical disturbance to existing natural bay bottoms from the dredging process was addressed in detail during the original HGNC studies. The Corps' Waterways Experiment Station conducted a 3-year study (Wilber and Clarke 1995) in which clay dredged material was placed into artificial mounds on the bay bottom. Benthic infauna, sediment grain size redistribution, and sediment profiles, including recolonization by benthic organisms, were monitored. A concurrent study by the National Marine Fisheries Service (Minello and Wooten 1994) compared benthos recolonization of the mounds with utilization of undisturbed bay bottom. The study found that all benthic community parameters had returned to pre-disposal conditions by 73 weeks post disposal, and that, in general, dredged material sediment was similar to natural sediments in supporting predator populations by 88 weeks post disposal. Based on these findings, the area along the sides of the ship channel to be dredged to a total depth of 42 feet will recolonize to its former level of marine productivity within a relatively short period of time of roughly 1.5 years. Because of this short duration for recovery, and the fact that these same areas are frequently disturbed by shipping and recreational boating activities under present conditions, no permanent or long term impacts are expected and mitigation is not recommended for this project.

Threatened and Endangered Species and Species of Conservation Concern

Our records indicate that the following delisted (DM) and endangered (E) species have been documented, or are known to occur in Harris County:

bald eagle (*Haliaeetus leucocephalus*) – DM
Texas prairie dawn-flower (*Hymenoxys texana*) – E

The bald eagle was delisted in August 2008 but is still afforded protection under the Migratory Bird Treaty Act and the Bald and Golden Eagle Act. The Texas prairie dawn-flower has very specific habitat requirements and is not expected to occur in the project area. There is no designated critical habitat for listed species in Harris County.

The Service published the *Birds of Conservation Concern 2008* (BCC) in December, 2008. The overall goal of the BCC is to accurately identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent our highest conservation priorities and to draw attention to species in need of conservation action (Service 2008). The following six species from the BCC lists may utilize the project area:

Reddish egret (*Egretta rufescens*) - coastal marshes and ponds;
American oystercatcher (*Haematopus palliatus*) - sandy beaches, mudflats, and occasionally rocky shores where mollusk prey can be found;
Gull-billed tern (*Sterna nilotica*) - sandy beaches and mudflats;
Sandwich tern (*Thalasseus sandvicensis*) - sandy beaches and mudflats;
Black skimmer (*Rynchops niger*) - sandy or gravelly bars and beaches, shallow bays, estuaries, and salt marsh pools; and
Least tern (*Sterna antillarum athalassos*) - broad, level expanses of open sandy or gravelly beach, dredge spoil and other open shoreline areas, and more rarely, inland on broad river valley sandbars

While these birds may be seen within the project area, they are unlikely to use the only remaining sparsely vegetated open area near the entrance to the channel.

The Service, in a letter to the Corps dated December 8, 2005, stated that no significant adverse effects on fish and wildlife or their habitats was expected and that we had no objection to the issuance of permits 17979 (01) and 18576 (03). Both of these permits are associated with the current project.

Summary and Recommendations

A Federal Assumption of Maintenance has been initiated by the Port of Houston and the Corps is conducting a feasibility level investigation to determine that "such maintenance is economically justified and environmentally acceptable". Review of the Corps' project documentation, aerial photographs and Service files indicate that the Preferred Alternative will not have an impact on fish and wildlife resources within the project area.

A Dredge Material Management Plan (DMMP) for the HGNC, created in 1996, identified dredge material disposal needs for the next 50 years. However, the HSC has experienced more siltation than expected and most of the 13 existing disposal areas have little remaining capacity. The Service recommends that the Corps coordinate with the HGNC Beneficial Use Group to reassess the placement needs along the HSC and update the DMMP to include material from the Jacintoport Channel.

Finally, because of the short duration for recovery from dredge activities, and the fact that these same areas are frequently disturbed by shipping and recreational boating under present conditions, no permanent or long term impacts are expected and mitigation is not recommended for this project.

We appreciate the opportunity to participate in the planning of the Jacintoport Channel project. If you have any questions or comments concerning this planning aid letter, please contact staff biologist Donna Anderson at 281/286-8282.

Sincerely,

for Stephen D. Parris
Field Supervisor, Clear Lake ES Office

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DRAFT
STATEMENT OF FINDINGS
AND
FINDING OF NO SIGNIFICANT IMPACT

FOR

THE FEDERAL ASSUMPTION OF MAINTENANCE OF THE JACINTOPORT CHANNEL AS PART OF THE HOUSTON SHIP CHANNEL PROJECT HARRIS COUNTY, TEXAS

1. Purpose. This document addresses the Federal assumption of maintenance (AOM) for the Jacintoport Navigation Channel (hereafter Jacintoport Channel). The Jacintoport Channel is located in Channelview, Harris County, Texas, and west of the Federal Houston Ship Channel (HSC). The Jacintoport Channel is currently maintained by the Port of Houston Authority (PHA) and provides access to the Jacintoport Terminal, owned by the Port of Houston Authority (PHA), as well as the privately-owned Inbesa American, Inc. (Inbesa) and Houston Fuel Oil (HFO) Terminals. The Jacintoport Channel also includes the Jacintoport Plateau which is located along the southwestern mouth of the Jacintoport Channel.

The Federal AOM presumes that the Jacintoport Channel will be federally-maintained to an average operating depth of 40 feet mean low tide (MLT), plus 2 feet of advanced maintenance. The Federal AOM would require an approximate 3 to 5 year dredge cycle (similar to existing practice) in order to maintain the operating depth of 40 feet MLT, thus resulting in no major reduction in the capacity of Jacintoport Channel, no changes in the composition of vessels calling on the terminals, and no associated impacts on transportation costs. The frequency of dredging will be determined by the rate of sedimentation and availability of funding.

This Environmental Assessment (EA) was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) and Council on Environmental Quality (CEQ) regulations to document findings concerning the environmental impacts of the proposed action.

2. Proposed Action. Proposed Action would be the Federal AOM where the Jacintoport Channel would be federally-maintained to an average operating depth of 40 feet MLT, plus 2 feet of advanced maintenance. The USACE would accept the AOM responsibilities for the Jacintoport Channel, which is currently maintained by the PHA. The Jacintoport Channel area is estimated to shoal evenly at a sedimentation rate of 0.67 feet per year (ft/yr), thus accumulating approximately 26,000 cubic yards of material annually. Under the Federal AOM, the Jacintoport Channel would be dredged every 3-5 years in order to maintain the operating depth of 40 feet MLT; thus resulting in no major

reduction in the capacity of Jacintoport Channel, no changes in the composition of vessels calling on the terminals, and no associated impacts on transportation costs.

Dredged material from Jacintoport Channel would continue to be placed in the Lost Lake PA under the Federal AOM. The Lost Lake PA has sufficient capacity for the placement of material dredged from the Jacintoport Channel, thus, no additional construction or expansion activities would be required for continued placement of dredged material from the Jacintoport Channel under the Federal AOM.

3. Coordination. A Public Notice was issued to interested parties including Federal and state agencies on August 20, 2012, which described the proposed action and announced the availability of the Draft EA. Comments on the Draft EA and the District's responses are included in Appendix G of the Final EA.

4. Environmental Effects. Galveston District has taken every reasonable measure to evaluate the environmental, social and economic impacts of the proposed project. Based on information provided in the EA and coordination with federal, state, and local agencies, temporary and permanent effects resulting from the proposed project have been indentified and can be found in Section 4 of the Final EA. The Federal AOM of the Jacintoport Channel would have minor temporary impacts to bay bottom, temporary local impacts to recreation and wildlife from construction related noise, and temporary impacts to water quality from increased turbidity. These short-term, minor impacts would be similar to the type and magnitude experienced during the current periodic routine maintenance for the existing channel. These resources are expected to recover to pre-project conditions after the work is completed. No mitigation will be required for this Proposed Action.

The proposed project is expected to contribute beneficially to navigation efficiency and is not expected to contribute negative cumulative impacts to the area. The project has been found to be consistent with the Texas Coastal Management Plan, compliant with Essential Fish Habitat (EFH), and the Texas Commission on Environmental Quality has issued a waiver of Section 401 certification for the project. A Section 404(b)(1) Evaluation (short form) of project impacts to water quality indicates the project will not adversely affect water quality. It is the District's conclusion that the proposed project will not have a significant impact on the environment or to the surrounding human population.

5. Determinations. The analysis of the environmental impacts of the proposed project is based on the accompanying Final EA. Factors considered in the review were impacts to sea level rise, vegetation, wildlife, aquatic resources including Essential Fish Habitat (EFH), threatened and endangered species and proposed piping plover critical habitat, cultural resources, socioeconomic resources, Environmental Justice, Prime and Unique Farmlands, Hazardous, Toxic, and Radioactive Wastes, air, noise, water quality, as well as alternative courses of action and cumulative impacts. The proposed project was found to be compliant with the Endangered Species Act, Clean Air Act, Clean Water Act, EFH, and the Texas Coastal Management Plan (TCMP).

6. Findings. Based on my analysis of the Final EA and other information pertaining to the proposed project, I find that Federal AOM of the Jacintoport Channel will not have a significant effect on the quality of the human environment. Galveston District reviewed the project for consistency with the goals and policies of the TCMP. Based on this analysis, I find that the proposed plan is consistent with the goals and policies of the TCMP. After consideration of the information presented in the Final EA, I have determined that an environmental impact statement is not required under the provisions of NEPA, Section 102, and other applicable regulations of the U.S. Army Corps of Engineers, and that the proposed project may be constructed.

_____ _____

(date)

Christopher Sallese
Colonel, U.S. Army Corps of Engineers,
District Engineer