ANNUAL SEA TURTLE MONITORING REPORT
MAINTENANCE DREDGING

GALVESTON DISTRICT
FISCAL YEAR 2007

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INTRODUCTION

This report is submitted in fulfillment of requirements of the Endangered Species Act and the Section 7 Consultation - Biological Opinion concerning Dredging of Gulf of Mexico Navigation Channels and Sand Mining ("Borrow") Areas Using Hopper Dredges by COE Galveston, New Orleans, Mobile, and Jacksonville Districts (Consultation Number F/SER/2000/01287) dated November 19, 2003. Specifically this report, summarizing hopper dredging operations in Fiscal Year (FY) 2007 within the Galveston District, is submitted in compliance with reasonable and prudent measure No. 9 - Reporting.

The following three hopper maintenance dredging projects were completed in FY 2007.

Freeport Harbor (FH)	October 7, 2006 - February 20, 2007
Brazos Island Harbor (BIH)	February 20, 2007 - March 15, 2007
Corpus Christi Ship Channel (CCSC)	February 24, 2007 - May 23, 2007

The following project began in FY 2007 and continued in FY 2008, but a significant amount of work was accomplished during FY 2007.

Galveston Channel (GALV)	September 12, 2007 - September 30, 2007

The use of hopper dredges to maintain these navigation projects is necessary because of three factors: safety, weather conditions and productivity. These factors are closely interrelated; however, the emphasis is placed on safety. The nearshore Gulf of Mexico is characterized by a wide shallow shelf. The Sabine-Neches Waterway, for example, extends about 22 miles into the Gulf. A cutterhead dredge operating offshore would require a pipeline length that could extend for several miles.

The dredges operating in these channels must be highly mobile to rapidly maneuver out of the way of other vessels. Pipeline cutterhead dredges are not self-propelled, and are held into position with spuds. Furthermore, the swing of the cutterhead is controlled by cables attached to the cutterhead arm. These cables are anchored along the outer limits of the channel to be dredged. Prior to moving the dredge, tenders must raise the anchors, and a towboat must be fastened to the dredge. These characteristics prevent the pipeline dredge from quickly moving out of the channel when other

vessels approach. From a practical standpoint, dredges are generally not relocated for normal ship traffic; rather, dredging may be interrupted, but the dredge remains a stationary obstruction in half of the channel. This situation is encountered in inland bays. The use of hopper dredges in the Gulf avoids such a stationary obstruction.

Weather conditions also affect the safety of the dredge and crew. Pipeline dredges were not designed to operate in open-sea conditions. Due to the reasons stated above, these dredges cannot rapidly demobilize in harsh weather. The pipelines used to transport the dredged material to the placement sites would also be highly susceptible to breaking during rough weather. Even in relatively sheltered bays, cutterhead dredges often stop dredging in rough weather, and during frontal passages. During these periods, only water is pumped to keep tension on the pipelines to prevent breaking. In the open Gulf of Mexico, this precaution would not be effective, even if it were possible to leave the dredge offshore. During relatively calm weather conditions, only the largest cutterhead dredges would be able to operate efficiently. Sea swells make it difficult to control the depth of the cutterhead; consequently, this affects the dredging operation. To illustrate this point, in 1977, a 27-inch diameter pipeline cutterhead dredge sank near the jetties while dredging the Entrance Channel of the Port Mansfield project. A frontal passage caused large waves, which battered the dredge, breaking the spud used to secure the vessel. Water entered the dredge through cable ports faster than it could be pumped out. A 27-inch dredge is one of the largest dredges commonly used within the Galveston District.

Productivity of the dredging operation is important because the purpose of dredging is to remove shoals and provide a safe depth for waterborne traffic. The use of pipeline dredges in the open Gulf would result in frequent relocations, or other interruptions, due to weather and traffic conditions. Consequently, it would take longer to remove shoals, which present a hazard to safe navigation. The longer the time to remove the shoals, the longer a dredge must be on site to maintain the channel. The presence of the dredge and pipeline, themselves, present an obstruction to safe navigation. For these reasons, hopper dredges are used to maintain deep-draft entrance channels in the Galveston District.

The Galveston District endeavors to schedule hopper-dredging operations during the recommended December 1 through March 31 window, wherever feasible. However, it is impossible to schedule all hopper-dredging projects during this time frame, due to the availability of the hopper dredge fleet. Hopper dredging priorities are developed in concert with other Corps of Engineers Districts that conduct these operations along the Atlantic and Gulf Coasts. The priorities are determined after considering the dredging needs and resident sea turtle populations within the various Districts.

TURTLE MONITORING PROGRAM

A result of the consultation process was the requirement to document turtle takes by the dredges. In order to accomplish this task, before hopper dredging operations commenced, they were equipped such that all inflows and overflows (where feasible) would be screened. The configuration and location of the screens depends upon the construction of the dredge. The starting mesh size of this screening is 4-inches by 4-inches. Additionally, around-the-clock monitoring by NMFS-approved turtle inspectors was conducted to identify any turtles or turtle parts that were caught on these screens. Draghead deflectors were also deployed to deflect any turtles that may happen to be in, or near, the path of the draghead during excavation. The design of the deflectors is such that a sediment riffle is created ahead of the draghead, cushioning any contact with turtles thereby preventing injuries.

The observers inspected and cleaned all inflow and overflow screening at the end of each load. Dragheads and deflectors were also inspected immediately after each load, and dredge personnel were informed if repairs were necessary. Data sheets were completed daily, detailing all biological samples and debris found in the screening and dragheads. The observers also recorded the start, end, and discharge times for each load, the specific location of the dredging area, the type of material being dredged, weather, tide and water temperature data, the condition of the screening, and any other pertinent information. Any sea turtle encounters or takes were described on a separate incident report form. Additionally, all incidents were photographed and diagrams were made of the specimen sampled. Dead specimens were frozen until all concerned parties were notified. These specimens were provided to authorized researchers, or weighted with scrap iron and disposed of at the dredged material placement site, thereby ensuring that these same samples would not wash ashore or be taken again by the dredge. Live injured turtles were taken to a rehabilitation facility for treatment and observation.

A bridge watch for sea turtles and marine mammals was maintained during all daylight hours, except when the observer was off the bridge, cleaning and inspecting the screens and dragheads. All sightings of cetaceans and sea turtles were recorded in a bridge watch logbook.

SCREEN CONFIGURATIONS

Turtle monitoring activities were conducted aboard three different hopper dredges during FY 2007 these include the *Columbia, Padre Island* and *Glenn Edwards*. These vessels were required to have rigid draghead deflectors, and 100% inflow screening or overflow screening with openings starting at 4" x 4."

PROJECTS

Freeport Harbor - Entrance and Jetty Channels

On October 7, 2006 the contract hopper dredge *Columbia* began work on the Entrance and Jetty Channels of the Freeport Harbor Project. Contract specifications required dredging an estimated 1,445,000 cubic yards (CY) of shoal material. The required depth of dredging was 49 feet below Mean Low Tide (MLT, Corps of Engineers Datum), with 2 feet of allowable overdepth dredging along the Entrance Channel and 47 feet MLT with 2 feet of overdepth along the Jetty Channel.

Dredging began on October 7, 2006, and was completed on February 20, 2007. Dredging operations were continuous during this time period. A total of 1,334 loads of dredged material were collected and deposited into Placement Area No. 1-A. Dredging was performed between Stations 95+67 along the Jetty Channel and (-)210+00 along the Outer Bar Channel. A total of about 2,516,000 CY of material was excavated from this project.

The dredges were initially equipped with rigid draghead turtle deflectors, and 100% inflow screening with a 4-inch square mesh. NMFS-approved turtle observers provided 24-hour/day monitoring of dragheads and screens for each load cycle. The observers were employed by East Coast Observers, Inc. and Coastwise Consulting under subcontract to the dredging contractor, B+B Dredging Co.

During the performance of this dredging, one loggerhead turtle take was experienced. This take occurred on November 14 in load 384. The surface water temperature was about 20.0°C.

Coordination was conducted with the Sea Turtle Stranding and Salvage Network (STSSN). There were no reports of stranded turtles that bore injuries that might be consistent with a hopper dredge encounter.

Material dredged consisted mostly of mud and clay. Occasionally, the clay clogged the screens, but it didn't seem to present such a problem that the screen mesh size needed adjustment. Clogging that was experienced on this job also did not approach the level of difficulty frequently reported during previous dredging operations in this channel.

Brazos Island Harbor - Jetty Channel

On February 20, 2007, the contract hopper dredge *Padre Island* began emergency dredging on the Jetty Channel of the Brazos Island Harbor (BIH) Project. Contract specifications required dredging an estimated 500,000 cubic yards (CY) of shoal material. The required depth of dredging was 46 feet below MLT, with 2 feet of allowable overdepth dredging.

Dredging began on February 20, 2007, and was completed on March 15, 2007. Dredging operations were continuous during this time period. A total of 171 loads of dredged material were collected and deposited into the nearshore berm at Placement Area 1A. Dredging was performed between Stations -0+600 and -4+600. A total of 443,000 CY of material was excavated from this project.

The dredge was equipped with rigid draghead turtle deflectors, and 100% inflow screening with a 4-inch square mesh. NMFS-approved turtle observers provided 24-hour/day monitoring of dragheads and screens for each load cycle. The observers were employed by East Coast Observers, Inc. under subcontract to the dredging contractor, Great Lakes Dredge and Dock Co.

During the performance of this dredging, six lethal turtle takes were experienced, five greens and one loggerhead. The first take occurred on February 22 in load 21, the second was on March 1 in load 74, the third was on March 6 in load 102, the fourth take occurred March 12 in load 154, the fifth take was a loggerhead on March 14 in load 167, and the sixth occurred on March 15 in load 169. The surface water temperature during these takes was about 17.8° - 20.6°C. On February 21, some decomposed parts of a turtle were retrieved. The conjecture is that this was a loggerhead, but was not considered to be a dredge-related death.

The carcasses of these turtles were retained on the dredge until dredging operations were almost completed. On March 15, they were transferred to the Coastal Studies Laboratory of the University of Texas – Pan American, on South Padre Island where they were to be used for research purposes.

Relocation trawling was conducted on a 24-hour daily basis prior to, and during dredging operations. Trawling operations were initiated on February 18, after the third dredge take, a contract option was exercised to add an additional trawler. The second trawler commenced work on March 10. Both trawlers worked on a 24-hour daily basis. Operation of these vessels was coordinated to provide better channel coverage, and provide opportunity to release captured turtles while maintaining continuous trawling by at least one boat. None of the dredge takes occurred while

captured turtles were being transported for release. A total of 996 tows were conducted. During this effort 65 turtles were tagged and relocated; all but one were green turtles, the other was a Kemp's ridley. There were two recaptures from this project, both were green turtles. Additionally, one of the relocated green turtles was previously tagged in August 2006, as part of a university research effort.

Coordination was conducted with the Sea Turtle Stranding and Salvage Network (STSSN). There were no reports of stranded turtles that bore injuries that might be consistent with a hopper dredge encounter.

There were several occasions when the screens were reported as kept open as a result of debris and clay clogging the inflow screening. But, the mesh size was not adjusted and 100 percent overflow screening was maintained.

Corpus Christi Ship Channel

On February 24, 2007, the contract hopper dredge *Columbia* began work on the Entrance Channel of the Corpus Christi Ship Channel Project. Contract specifications required dredging an estimated 1,096,000 cubic yards (CY) of shoal material. The required depth of dredging was 49 feet below MLT, with 2 feet of allowable overdepth dredging.

Dredging began on February 24, 2007, and was completed on May 23, 2007. A total of 670 loads of dredged material were collected and deposited into Placement Area No. 1. Dredging was performed between Stations 840+00 to 210+00 along the Outer Bar Channel. A total of 954,566 CY of material were excavated from this project.

The dredge was equipped with rigid draghead turtle deflectors, and 100% inflow screening with a 4-inch square mesh. NMFS-approved turtle observers provided 24-hour/day monitoring of dragheads and screens for each load cycle. The observers were employed by Coastwise Consulting, Inc. under a subcontract to the contractor, Sunset Marine, Inc.

Relocation trawling was initiated on March 19, 2007, and was performed on a 24-hour daily basis during dredging operations. A total of 1,515 tows were conducted. During this effort, 37 turtles were tagged and relocated; this total included 24 Kemp's ridleys; 12 loggerheads; and one green turtle.

During the performance of this dredging, four turtle takes were experienced, two loggerheads and two greens. The first take was a loggerhead and occurred on April 15, in load No. 362; the second take occurred on April 17, in load No. 382. Takes three and four were green turtles taken on May 13 in load No. 571, and May 18 in load No. 621, respectively. Both of the greens were alive and appeared to be well except for minor injuries. They were transported to a rehabilitation facility for care and observation, but the turtle from May 13 died several days later. The water temperature during the loggerhead takes was about 21.1°C, whereas the temperature during the green turtle takes was 26.0 to 26.5°C.

Coordination was conducted with the Sea Turtle Stranding and Salvage Network (STSSN). There were five reports of stranded turtles that bore injuries that might be consistent with a hopper dredge encounter: three Kemp's ridley, one loggerhead, and one green.

Galveston Harbor and Channel - Galveston Channel

On September 12, 2007 the contract hopper dredge *Glenn Edwards* began work on the Galveston Channel of the Galveston Harbor and Channel Project. Contract specifications required dredging an estimated 2,068,000 cubic yards (CY) of shoal material. The required depth of dredging was 40 feet below Mean Low Tide (MLT, Corps of Engineers Datum), with 1 foot of allowable overdepth dredging.

The timeframe covered by this report is September 12, 2007 to September 30, 2007. Dredging operations were continuous during the time period. A total of 117 loads of dredged material were collected and deposited into Placement Area No. 1. Dredging was performed between Stations 2+500 and 22+544 along the Channel. A total of about 670,000 CY of material was excavated from this project.

The dredges were equipped with rigid draghead turtle deflectors, and 100% inflow screening with a 4-inch square mesh. NMFS-approved turtle observers provided 24-hour/day monitoring of dragheads and screens for each load cycle. The observers were employed by Coastwise Consulting under subcontract to the dredging contractor, Manson Construction Co.

During the performance of this dredging, no turtle takes were experienced. The surface water temperature ranged from about 27.0°C to 30.0°C.

Coordination was conducted with the Sea Turtle Stranding and Salvage Network (STSSN). There were no reports of stranded turtles that bore injuries that might be consistent with a hopper dredge encounter.

Material dredged consisted mostly of mud and silt with some clay

COSTS

The costs incurred in performing the turtle-monitoring program during FY 2007 include the costs for equipping and maintaining screens and draghead deflectors on contractor dredges, as well as providing NMFS-approved observers and relocation trawling. In addition to the direct costs are District costs for administration and oversight. Below is a table depicting the costs for FY 2007. However, costs not included in this discussion are unquantifiable costs associated with decreased dredging efficiency which may result from the use of the draghead deflectors, and downtime experienced during cleaning of excessively fouled screens. Estimates of these increased costs are anticipated by the potential contractors during the preparation of bids, and there is no way to determine the actual value of these costs.

TURTLE PROTECTION COSTS

Project Name	Relocation Trawling Costs ($)	Dredge Monitoring Costs ($)	Total ($)
FH	N/A	31,160.00	31,160.00
BIH	114,500.00	12,950.00	127,450.00
CCSC	286,077.00	32,160.00	318,237.00
GALV	N/A	14,850.00	14,850.00
District labor	NA	NA	33,379.00
TOTALS	**400,577.00**	**91,120.00**	**525,076.00**

SUMMARY

During Fiscal Year 2007, four maintenance-dredging projects were conducted by hopper dredge during which 4,583,566 cubic yards of sediments were excavated. Eleven turtles were taken by the dredges, ten of which were lethal. Lethal takes consisted of four loggerheads and six greens. Two greens were captured alive, one of which died several days later.

Where implemented, relocation trawling was performed on a 24-hour daily basis during dredging operations. Two trawlers worked concurrently to provide better channel coverage during dredging at BIH. During the course of 2,511 trawls, 102 turtles were relocated; this includes 65 greens, 25 Kemp's ridley and 12 loggerheads. This total also includes two recaptures. Below is a table detailing trawling results.

RELOCATION TRAWLING

Project Name	Number of Tows	Number of Turtles Captured	Catch per Unit Effort
BIH	996	65	0.0653
CCSC	1,515	37	0.0244
TOTALS	**2,511**	**102**	**0.0406**

Coordination was conducted with the Sea Turtle Stranding and Salvage Network (STSSN). There were five reports of strandings that bore injuries that might be consistent with a hopper dredge encounter. All were found in the vicinity of the Corpus Christi Ship Channel during hopper dredging operations.

All trawling and tagging data, observer and incident reports, and stranding information can all be accessed at the USACE Sea Turtle Data Warehouse. The link is: http://el.erdc.usace.army.mil/seaturtles/list.cfm?Code=Project&Step=2&Type=SWG.

During FY 2007, the Executive Advisory Group (EAG) become involved pursuant to the "US Army Corps of Engineers Management Protocol for Effective Implementation of the National Marine Fisheries Service Regional Biological Opinion for Hopper Dredging, Gulf of Mexico." As specified in this Management Protocol, involvement of the EAG was mandated following the take of the third green turtle at BIH. The EAG continued to be involved following each subsequent green turtle take at BIH and CCSC. The purpose of the EAG is to make recommendations to the District concerning affected hopper dredging operations. The District followed all recommendations offered by the EAG.

GALVESTON DISTRICT
INCIDENTAL TAKES OF SEA TURTLES
MAINTENANCE DREDGING - FY 2007

Date Taken	Project	Dredge	Channel Reach	Water Temp. (°C)	Species and District Trigger Points per Fiscal Year (Gulfwide Pool)			
					Kemp's ridley 6 (16)	Loggerhead 12 (32)	Green 4 (11)	Hawksbill 1 (3)
14 Nov 06	FH	*Columbia*	28º 55.54'N; 95º 17.12'W	20.0		1		
22 Feb 07	BIH	*Padre Island*	Between Jetties	17.8			1	
1 Mar 07	BIH	*Padre Island*	Between Jetties	20.0			1	
6 Mar 07	BIH	*Padre Island*	Between Jetties	17.2			1	
12 Mar 07	BIH	*Padre Island*	Between Jetties	20.0			1	
14 Mar 07	BIH	*Padre Island*	Between Jetties	20.6		1		
15 Mar 07	BIH	*Padre Island*	Between Jetties	20.6			1	
15 Apr 07	CCSC	*Columbia*	27º 49.230'N; 97º 00.765'W	21.1		1		
17 Apr 07	CCSC	*Columbia*	27º 49.230'N; 97º 00.765'W	21.1		1		
13 May 07	CCSC	*Columbia*	27º 49.570'N; 97º 01.430'W	26.0			1	
17 May 07	CCSC	*Columbia*	27º 49.650'N; 97º 01.500'W	26.5			1	
TOTAL TAKE					0	4	7	0
ALLOWABLE TAKE REMAINING					6 (16)	8 (28)	-3 (4)	1 (3)