ANNUAL SEA TURTLE MONITORING REPORT
GALVESTON DISTRICT
FISCAL YEAR 1996

INTRODUCTION

This report is submitted in fulfillment of requirements of the Endangered Species Act and the Section 7 Consultation - Biological Opinion, dated September 22, 1995, concerning channel maintenance dredging using a hopper dredge. Specifically, this report, summarizing hopper dredging operations in Fiscal Year (FY) 1996 within the Galveston District, is submitted in compliance with reasonable and prudent measure No. 8 - Reporting.

The following three hopper dredging projects were completed in FY 96.

Freeport Harbor - Entrance Ch.	Sep. 26, 1995 - Jan. 16, 1996
Sabine Neches Waterway - Sabine Pass Outer Bar Ch.	Jan. 23, 1996 - Apr. 26, 1996
Freeport Harbor - Entrance Ch.	Jun. 27, 1996 - Aug. 5, 1996

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 underlying 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 cutterhead 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, 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 cutterhead 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 in themselves 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 exclusively to maintain entrance channels in the Galveston District.

The Galveston District will attempt to schedule hopper dredging operations during the 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.

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 would be screened. The configuration and location of the screens depends upon the construction of the dredge. The 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 at the end of every load, 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. Specimens were then 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.

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 1996. These are the *Atchafalaya, Ouachita,* and *Wheeler*. A description of the screening systems follows.

Atchafalaya.

This dredge is equipped with one draghead on the starboard side, with a rigid deflector. Two snorkels were fitted on top of the draghead. The inflow pipe is located on the port side of the hopper. The inflow screening consists of two lateral screened areas inside the pipe. These screens have mesh size of 4" x 4" and have hatch openings on top of the pipe. Observers open up hatches and crawl inside the pipe for cleaning. At the end of the inflow pipe is a lander with 4" x 4" mesh screening. The screen is 49" in height and 67" in width, providing 100% inflow screening. No material was pumped through the overflow discharge pipe without first passing through these screens.

Ouachita.

Inflow screening consists of 4" X 4" steel mesh welded in place across the aft end of each of three landers, which are the flared ends of the discharge pipes. Observers gained access to the areas behind the lander screens via a ladder. The primary point of overflow is a large funnel-shaped skimmer, which is raised or lowered to control water depth in the hopper. Steel grating with 4" X 4" openings was set into the mouth of the skimmer to screen and collect samples from the overflow. The secondary points of overflow are the port and starboard overboard discharge pipes which periodically shunt seawater overboard when the dredge is maneuvering and not pumping dredged material into the hopper. These pipes were fitted with heavy, steel mesh baskets with openings of 4" X 4".

Wheeler.

One-hundred percent inflow screening is accomplished by four discharge boxes, two forward and two aft. Heavy duty steel bars make up a 4" X 4" mesh. The aft boxes are equipped with a door so that debris can be easily removed. The forward cages are constructed so that debris can be thrown over the top screen. Also present, are four lateral screens inside the pipe; two on each side, these screens, however, cannot be safely inspected. One of the unique features of this dredge is the presence of a third, center dragarm.

PROJECTS

Freeport Harbor - Entrance Channel.

On September 26, 1995, the contract hopper Dredge *Atchafalaya* began work on the Entrance Channel of the Freeport Harbor Channel Project. Contract specifications required dredging an estimated 1,959,000 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 September 26, 1995, and was completed on January 16, 1996. The *Atchafalaya* worked until November 19, during which a total of 973 loads of dredged material was collected and placed into Placement Area No. 1. This dredge was replaced by the *Ouachita* on November 21, and worked until completion of the project. This dredge collected 792 loads. Dredging was performed between Stations -180+00 and 0+00 in the Entrance Channel, and 0+00 to 40+00 in the Jetty Channel. A total of 2,674,026 CY of material was excavated from within the channel.

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 and were contracted by Gulf Coast Trailing Co., the dredging contractor.

During the performance of this dredging by the *Atchafalaya*, one turtle encounter was documented. This encounter occurred on October 9, in load no. 254, and involved a loggerhead.

Water temperatures were taken in conjunction with the screen and draghead monitoring. The water seemed to be well mixed, as the surface and below mid-depth temperatures were nearly identical. These temperatures ranged from 13°C to 28°C. The single turtle take occurred when the water temperature was about 26°C.

Throughout the duration of dredging, bridge watch observations included about 212 sightings of bottlenose dolphins (*Tursiops truncatus*), and one sighting of a loggerhead sea turtle.

The material dredged consisted of primarily clay with silt, and sand. Non-biological samples commonly included wood, netting, rocks, monofilament fishing line, plastic bags, and cable, along with other debris. The most common biological samples were comprised of various species of fish, rays, blue crabs, shrimp, whelks, whelk eggs, eels, moonsnails, pen shells, gorgonians, seagrass, bryozoans, mud worms, other crab species, and jellyfish.

One of the recurring difficulties experienced by the observers involved the excessive amounts of clay that were often dredged. The clay was taken as cohesive masses which often clogged the screening and made cleanup physically difficult and time-consuming.

Sabine Neches Waterway - Sabine Pass Outer Bar Channel.

On January 23, 1996, the Government-owned hopper dredge *Wheeler* began work on the Sabine Pass Outer Bar, and Sabine Bank Channels of the Sabine-Neches Waterway Project. Dredging specifications required dredging an estimated 6,302,000 CY of shoal material. The required depth of dredging was -44 feet MLT, with 2 feet of allowable overdepth dredging.

Dredging began on January 23, 1996, and was completed on April 26, 1996. A total of 817 loads were collected during dredging between Stations 0+000 and 40+000 along the Outer Bar Channel, and 70+000 to 95+734 in the Sabine Bank Channel. A total of 3,723,835 CY of material were excavated from within the channel.

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.

No turtles were encountered during the performance of this dredging.

Water temperatures were taken in conjunction with the screen and draghead monitoring. There seemed to be an apparent stratification of the water column, as suggested by comparisons of the surface temperature with the below mid-depth temperature. During the beginning of the project the bottom temperature was about 3 to 6°C warmer than the surface temperature. This phenomenon persisted until about mid-March to early April when the temperatures were similar. After this period, and until the end of the job, the bottom temperature seemed to be about 5 to

12°C cooler than the surface temperature. Throughout the project, the surface temperature ranged form 8°C to 27°C, while the below surface temperature exhibited less variation, and ranged from 11°C to 22°C.

Throughout the duration of dredging, bridge watch observations included about 146 sightings of bottlenose dolphins.

The material dredged consisted of primarily silt, with occasional accumulations of stiff clay. Non-biological samples commonly included rope, wood, netting, rocks, along with other debris. The most common biological samples were comprised of various species of fish, rays, blue crabs, shrimp, whelks, whelk eggs, eels, moonsnails, seagrass, algae, mud worms, other crab species, jellyfish, and occasional bones and shell.

One of the difficulties experienced by the observers involved the characteristics of the clay that was occasionally dredged. The clay was taken as cohesive masses which often clogged the screening and made cleanup physically difficult and time-consuming. The dredge also often picked up abundant amounts of trash, which fouled the screens and required manual removal.

Freeport Harbor - Entrance Channel.

On June 27, 1996, the Government-owned hopper dredge *Wheeler* began work on the Entrance Channel of the Freeport Harbor Channel Project. Contract specifications required dredging an estimated 1,769,000 CY of shoal material. The required depth of dredging was -49 feet MLT, with 2 feet of allowable overdepth dredging along the Outer Bar Channel and -47 feet MLT with 2 feet of overdepth along the Jetty Channel.

Dredging began on June 27, 1996, and was completed on August 5, 1996. A total of 418 loads of dredged material was collected and placed into Placement Area No. 1-A. Dredging was performed between Stations -50+00 and 0+00 in the Outer Bar Channel. A total of 393,394 CY of material was excavated from within the channel.

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 under a subcontract with Espey, Huston, and Associates, Inc.

During the performance of this dredging, a total of four sea turtle takes were observed, all of which were loggerheads. The first take occurred on June 28, in load No. 9. The second turtle was taken on July 11, in load No. 146. The third take occurred on July 13, in load No. 171, and the fourth occurred on July 22 in load No. 283.

After completion of this maintenance project, New Orleans District furnished a copy of the As-Built shop drawings of the draghead deflectors to the draghead design team at the Waterways Experiment Station (WES), to ensure that they were constructed to design specifications. Analyses by WES indicated that the design and construction of the deflectors was adequate to protect sea turtles. They stated that a properly designed deflector is just the "framework" for removing turtles from the path of the draghead, and that operations are really the "key" to successfully protecting turtles. They indicated that the angle of the dragpipe when the draghead is in contact with the ocean floor is a paramount consideration. The captain and crew of the *Wheeler* are well aware of this operational parameter, and have endeavored to operate the dragheads accordingly. Nonetheless, the Galveston District intends to have one of the researchers from WES on board during the next dredging project to be performed by the *Wheeler*. This researcher will observe the operations and handling of the dragheads, to confirm that the turtle deflectors are used to optimal potential, and provide guidance if necessary.

Water temperatures were taken in conjunction with the screen and draghead monitoring. The water seemed to be well mixed, as the surface and below mid-depth temperatures were nearly identical. These temperatures ranged from 25°C to 31°C.

Throughout the duration of dredging, bridge watch observations included about 481 sightings of bottlenose dolphins and one sighting of a Kemp's ridley sea turtle. This turtle was observed near the north jetty.

The material dredged consisted of primarily silt, hard-packed sand and clay. Non-biological samples commonly included rope, wood, netting, rocks, along with other debris. The most common biological samples were comprised of various species of fish, rays, blue crabs, shrimp, and whelks.

One of the recurring difficulties experienced by the observers involved the excessive amounts of clay that was occasionally dredged. The clay was taken as cohesive masses which often clogged the screening and made cleanup physically difficult and time-consuming.

COSTS

The costs incurred in performing the turtle monitoring program during FY 1996 include the costs for equipping and maintaining screens and draghead deflectors on the contractor-owned dredges *Atchafalaya and Ouachita*, as well as providing NMFS-approved observers. The costs to the District for the *Wheeler* were for the observers. In addition to the direct costs are District costs for administration and oversight. Below is a table depicting the costs for FY 1996.

DREDGE	COST OF MONITORING
Atchafalaya and Ouachita at Freeport	$58,000.00
Wheeler at Sabine-Neches Waterway	$52,520.00
Wheeler at Freeport	$25,580.00
District labor	$9,527.00
TOTAL	$145,627.00

SUMMARY

During Fiscal Year 1996, three maintenance dredging projects were performed by hopper dredges. Below is a table summarizing lethal turtle encounters.

	SPECIES TAKEN		
PROJECT	*Chelonia mydas*	*Lepidochelys kempi*	*Caretta caretta*
Freeport Harbor	0	0	1
Sabine-Neches Waterway	0	0	0
Freeport Harbor	0	0	4
TOTALS	0	0	5