

ANNUAL SEA TURTLE MONITORING REPORT
GALVESTON DISTRICT
FISCAL YEAR 1995

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) 1995 within the Galveston District, is submitted in compliance with reasonable and prudent measure No. 8 - Reporting.

The following six hopper dredging projects were completed in FY 95.

Freeport Harbor - Entrance Ch.	Aug. 3, 1994 - Nov. 27, 1994
Sabine Neches Waterway - Sabine Pass Outer Bar Ch.	Sep. 1, 1994 - Oct. 30, 1994
Brazos Island Harbor - Entrance Ch.	Jan. 24, 1995 - Feb. 26, 1995
Galveston Harbor and Channel - Entrance Ch.	Jan. 5, 1995 - Feb. 3, 1995
Christi Ship Channel - Entrance Ch.	Aug. 9, 1995 - Sep. 18, 1995
Galveston Harbor and Channel - Entrance Ch.	Jul. 30, 1995 - Sep. 21, 1995

Maintenance of the Freeport Harbor project, which has a dredging cycle of approximately one year, was began, again, on September 26, 1995. This project will be discussed in the FY 96 report.

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

ANNUAL SEA TURTLE MONITORING REPORT (Cont'd)

GALVESTON DISTRICT - FISCAL YEAR 1995

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 capabilities 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 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.

ANNUAL SEA TURTLE MONITORING REPORT (Cont'd)

GALVESTON DISTRICT - FISCAL YEAR 1995

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. Copies of daily and weekly summaries were provided with the preliminary reports, previously submitted.

SCREEN CONFIGURATIONS

Turtle monitoring activities were conducted aboard three different hopper dredges during FY 1995. These are the *Ouachita*, the *McFarland*, and the *Wheeler*. A description of the screening systems follows.

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".

ANNUAL SEA TURTLE MONITORING REPORT (Cont'd)
GALVESTON DISTRICT - FISCAL YEAR 1995

McFarland.

All points of inflow were screened by a large rectangular cage, into which all material flows after exiting the discharge pipe. The cages were approximately 4' X 12' and 6' deep. Construction was of steel rods forming a 4" X 4" mesh. One cage was located at each of the two discharge pipes. Access to the cages was via a hatch in the deck.

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.

Maintenance dredging on this project was conducted during the period August 3, 1994 to November 27, 1994. The contract hopper dredges *Atchafalaya*, and *Ouachita* removed approximately 2,599,267 cubic yards (CY) of material between stations -210+00 and 59+62.49.

Informal consultation was conducted prior to this dredging. No turtle observers, inflow screening or draghead deflectors were utilized, since there was no requirement to do so. No turtle encounters were reported during this work.

Sabine Neches Waterway - Sabine Pass Outer Bar Channel.

Maintenance dredging on this project was conducted during the period September 1, 1994 to October 30, 1994. The contract hopper dredge *Padre Island* removed approximately 2,899,203 CY of material between stations 0+000 to 5+000, and 10+000 to 15+000.

Informal consultation was conducted prior to this dredging. No turtle observers, inflow screening or draghead deflectors were utilized, since there was no requirement to do so. No turtle encounters were reported during this work.

ANNUAL SEA TURTLE MONITORING REPORT (Cont'd)
GALVESTON DISTRICT - FISCAL YEAR 1995

Galveston Harbor and Channel - Entrance Channel.

Maintenance dredging on this project was conducted during the period January 5, 1995 to February 3, 1995. The contract hopper dredge *Wheeler* removed approximately 971,797 CY of material between stations 56+000 and 30+676.

Informal consultation was conducted prior to this dredging. No turtle observers, inflow screening or draghead deflectors were utilized, since there was no requirement to do so. No turtle encounters were reported during this work.

Brazos Island Harbor - Entrance Channel (BIH).

Maintenance dredging on this project was conducted during the period January, 24, 1995 to February 26, 1995. The contract hopper dredge *Ouachita* removed approximately 755,301 CY of material between stations 0+000 to -13+000.

Informal consultation was conducted prior to this dredging. Initially, no turtle observers, inflow screening or draghead deflectors were utilized, since there was no requirement to do so. During the course of this dredging, two non-lethal takes of green turtles (*Chelonia mydas*) were observed by the dredge crew, but were not reported to Galveston District Headquarters. Subsequently, strandings of turtle carcasses suspected to be taken by the hopper dredge washed ashore in the vicinity of the dredging project. This prompted a resumption of consultation. Consequently, inflow screening and turtle observers were required with the condition that if further turtle takes occurred, draghead deflectors would then be required. On February 18, 1995, turtle monitoring by NMFS-approved observers commenced. On February 19, a lethal take of a green turtle was documented. The surface water temperature at the time of this take was 19.0E C. No water column temperature was taken. On February 20, draghead deflectors were deployed. On February 22, a second documented green turtle take occurred. The surface water temperature at the time of this take was 18.5E C. This turtle was injured and brought to the Gladys Porter Zoo in Brownsville, Texas for possible rehabilitation. The fate of this turtle is unknown. On February 26, the final day of dredging, a lethal take of a sub-adult Kemp's ridley turtle (*Lepidochelys kempi*) was documented. The surface water temperature was 19.5E C.

Bridge watch observations consisted of occasional sightings of small pods of 5-10 bottlenose dolphins (*Tursiops truncatus*). This was the only marine mammal species sighted.

The material dredged consisted of primarily silt and clay. Discarded monofilament fishing line was sampled on nearly every load, along with other debris. The most common biological samples were comprised of skates and blue crabs.

ANNUAL SEA TURTLE MONITORING REPORT (Cont'd)
GALVESTON DISTRICT - FISCAL YEAR 1995

Christi Ship Channel - Entrance Channel.

The Government-owned hopper Dredge *Wheeler* conducted maintenance dredging within the Entrance Channel of the Corpus Christi Ship Channel Project. Dredging began on August 9, 1995 and was completed on September 18, 1995. A total of 530 loads of dredged material was collected and placed into Placement Area No. 1. Dredging was performed between Stations 80+00 and 210+00 in the Outer Bar Channel, 38+00 to 55+00 in the Jetty Channel, and -29+00 to -38+03 in the Inner Basin. A total of 724,339 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 subcontract to Espey, Huston & Associates, Inc.

During the performance of this dredging, two turtle encounters were documented. The first occurred on September 14, and involved a Kemp's ridley. This encounter was not lethal, and was not associated with excavation of sediments, therefore is not considered to be an incidental take. The turtle somehow managed to get caught in a structure that supports the center dragarm, as it was being raised in preparation for the discharge cycle. At the placement area, the dragarm was lower slightly and the turtle was allowed to swim away with no apparent injuries. The second encounter was the lethal take of a loggerhead (*Caretta caretta*), and occurred on September 16, in load No. 4 of that day.

This was the first dredging project performed by the *Wheeler* using the rigid draghead deflectors, screening and turtle observers. There were some minor glitches in the system, such as failures in some of the screening bars on the draghead, also, some hatches were difficult to operate. Repairs, or other measures were taken to temporarily rectify these difficulties. However, none were of such severity that the ability to document turtles takes was affected. As the dredging progressed, the dredge crew became accustomed to the presence of the observers, and refinements were made to facilitate the observer program.

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 28EC to 31EC.

Throughout the duration of dredging, bridge watch observations included 405 sightings of bottlenose dolphins and two sightings of unidentified sea turtles. The turtles were observed within the land-locked segment of the channel, one near the Coast Guard station, and the other near the dock associated with the University of Texas Marine Science Institute.

ANNUAL SEA TURTLE MONITORING REPORT (Cont'd)
GALVESTON DISTRICT - FISCAL YEAR 1995

The material dredged consisted of primarily silt, sand and clay. Discarded monofilament fishing line was sampled in nearly every load, along with other debris. The most common biological samples were comprised of catfish and other species of fish, several species of rays, blue crabs, sea stars, eels, whelks, sargassum, old turtle bones and other species of crabs.

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. Attempts were made to remove this clay with fire hoses, however this proved to be ineffective during most attempts. Attempts were also made to remove the material with shovels, this also proved to be futile. The most effective means for clearing the screens of the clay was to flush them with the dredge pumps.

Based on this dredging project, some improvements to the screening were envisioned. These changes are anticipated to facilitate cleaning of the screens and help the observer program operate more smoothly. Some of these changes will be implemented during future dredging.

Galveston Harbor and Channel - Entrance Channel.

The Government-owned hopper Dredge *McFarland* performed maintenance dredging within the Inner Bar Channel of the Galveston Harbor and Channel Project. Dredging began on July 30, 1995 and was completed on September 21, 1995. A total of 275 loads of dredged material was collected and placed into Placement Area No. 1. Dredging was performed between Stations 21+912.87 and 4+649.75. A total of 261,221 CY of material was excavated from within the channel prism. An unspecified quantity of material was also excavated from below project depth.

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 subcontract to Espey, Huston & Associates, Inc.

During the performance of this dredging, a total of three sea turtle takes were observed, all of which were Kemp's ridleys. The first take occurred on August 15, in load No. 93. The second turtle was taken on August 31, in load No. 180. There is reason to believe that this second take is not associated with excavation of material, rather, it was taken from within the water column due to a system failure that resulted in the inability to turn off the port-side dredge pump. This pump continued to run during transit to the placement area. This failure was rectified prior to dredging the next load. The third turtle was taken on September 4, in load No. 205.

ANNUAL SEA TURTLE MONITORING REPORT (Cont'd)
GALVESTON DISTRICT - FISCAL YEAR 1995

Water temperatures were taken in conjunction with the screen and draghead monitoring. The surface temperature ranged between 82EF and 86EF (27.8EC and 30.0EC), while below mid-depth temperatures ranged from 81EF to 85EF (27.2EC to 29.4EC).

Throughout the duration of dredging, bridge watch observations included 53 sightings of bottlenose dolphins and one sighting of a Kemp's ridley swimming in the vicinity of the ship's bow. This turtle soon dove and swam away. The dolphins were observed mainly playing in the dredge's bow wakes.

The material dredged consisted primarily of silt, sand and clay. Discarded monofilament fishing line and creosote-treated wood was sampled in many loads, along with other debris. The most common biological samples were comprised of catfish and other species of fish, skates, blue crabs, eels, whelks, sargassum, bryozoans, squid, stone crabs, and assorted fish parts. Generally, there was a dearth of biological samples collected in the dredging loads.

As with the *Wheeler*, a recurring problem experienced by the observers on this dredge involved the excessive amount of clay that was dredged. The clay was taken as cohesive masses which often clogged the screening and made cleanup physically difficult and time-consuming. A fire hose was the method of choice for trying to remove this material from the screens.

One of the major difficulties encountered during this dredging project involved the efforts to maintain the draghead firmly on the bottom of the channel. The dredging contract states: "The work shall be so conducted as to provide a channel with a fairly smooth bottom surface with no excessively deep trenches of pronounced ridges." In actuality, the pre-dredging bottom contours were not flat, rather, there were some troughs, as well as, small holes that were deeper than the specified dredging depth. The master of the dredge made extraordinary efforts to maintain the draghead firmly on the bottom, even over the deeper holes. The dredge was also operated, such that, dredging was conducted along straight lines. Consequently, the channel was dredged deeper than the specified depth. Furthermore, some of the dredging paths were traversed repeatedly, resulting in increasingly deeper cuts. The clay material that was observed, and that caused so much difficulty for the turtle observers, is due to the dredging of this virgin material. This also resulted in the additional time needed to keep the dredge on site, thus increasing the exposure between the dredge and any turtles that happen to be in the channel. It is also possible that turtles would be in the resulting trenches, making them more vulnerable to entrainment by the dredge.

Based upon the experience gained from the work of the *McFarland*, on future dredging projects within the Galveston District, the dredge masters will be instructed to excavate material following wavy paths within the channels, instead of straight lines. This will greatly reduce the probability of dredging the same path repeatedly. The masters will also be instructed to make

ANNUAL SEA TURTLE MONITORING REPORT (Cont'd)
GALVESTON DISTRICT - FISCAL YEAR 1995

every reasonable effort to maintain the draghead firmly on the bottom, but not to dig in holes or other areas that are deeper than the specified project depth.

COSTS

The costs incurred in performing the turtle monitoring program during FY 1995 include the costs for equipping the dredge *Ouachita* with screens and draghead deflectors, as well as down time needed to install this equipment. The costs for the BIH project also included NMFS-approved observers. Prior to dredging within the Galveston District, both the *McFarland*, and the *Wheeler* had been equipped with the necessary screening and draghead deflectors. The costs to the District for these dredges 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 1995.

DREDGE	COST OF MONITORING
<i>Ouachita</i> at BIH	\$113,021.00
<i>Wheeler</i> at Corpus Christi	\$22,041.00
<i>McFarland</i> at Galveston	\$28,830.00
District labor	\$8,194.60
TOTAL	\$172,086.60

SUMMARY

Fiscal Year 1995 was the first year during which hopper dredges working within the Galveston District were monitored for turtle takes. During the year, six maintenance dredging projects were performed by hopper dredges. Turtle monitoring was required only on the latter three projects. Below is a table summarizing lethal turtle encounters.

PROJECT	SPECIES TAKEN		
	<i>Chelonia mydas</i>	<i>Lepidochelys kemp</i> i	<i>Caretta caretta</i>
Brazos Island Harbor	2	1	0
Corpus Christi Ship Ch.	0	0	1
Galveston Harbor and Ch.	0	3	0
TOTALS	2	4	1