ANNUAL SEA TURTLE MONITORING REPORT
HOUSTON-GALVESTON NAVIGATION CHANNELS
NEW-WORK DREDGING
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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, dated December 7, 1998, concerning Deepening of Galveston Bay Entrance Channel (Houston-Galveston Navigation Channels Project) Using A Hopper Dredge. Specifically this report, summarizing hopper dredging operations in Fiscal Year (FY) 1999, is submitted in compliance with reasonable and prudent measure No. 9 - Reporting.

The following two new-work dredging projects were undertaken in FY 1999.

Entrance Channel Extension	Dec 8, 1998 – Feb 14, 1999
Jetty and Entrance Channels	Sep 3, 1999 – Sep 30, 1999

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. 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, 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 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 deep-draft entrance channels in the Galveston District.

Due to the quantity of material required to be dredged from this project, it is not feasible to perform all the work within the recommended December 1 through March 31 time frame due to the availability of the hopper dredge fleet. Hopper dredging priorities are developed in concert with other Corps 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. The Inshore segment extending from Bolivar Roads to the end of the jetties, however, will be performed between November 15 and April 15, as required by Reasonable and Prudent Measure No. 2 of the Biological Opinion.

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 depended upon the construction of the dredge. Contract work began with a mixed-mesh configuration. The mesh size of the lower one-foot of the inflow screen was 6"x 6", the remaining screening mesh was 4"x 4". 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 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. 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.

PROJECTS

Entrance Channel Extension

On December 8, 1998, the contract hopper dredge, *Stuyvesant* began work on the Entrance Channel Extension of the Houston-Galveston Navigation Channels (H-GNC) Project. Contract specifications required dredging an estimated 3,516,300 cubic yards (CY) of new-work clay 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 began on December 8, 1998, although the work was not completed, the dredge left the site on February 14, 1999. So far, a total of 350 loads of dredged material were collected and placed into the nearshore berm in Placement Area No. 2. Hopper dredging was performed between Stations 56+000 and 76+000 along the Extended Entrance Channel. A total of 3,199,401 CY of material was excavated from this project.

The dredge was equipped with rigid draghead turtle deflectors, and 100% overflow screening with a 4-inch square mesh. Work began with 100% inflow screening through a 6" x 6" mesh along the lower one-foot of the inflow cage and a 4" x 4" mesh along the remainder of the cage. The stiff clay that was dredged severely clogged and damaged the screens and cage. This resulted in a decrease in productivity of the dredging operation. On December 9th, after it became evident that the situation would not improve, the screens were fully opened. Even with the screens opened, the clay continued to clog the inflow cages. Despite these difficulties, 100% overflow, and the use of the draghead deflector continued.

Other difficulties were encountered with use of the draghead deflector. It was constructed with a solid plate along the bottom surface, but not a solid surface on the top. The clay accumulated within lateral reinforcement plates, resulting in excessive weight which led to winch failures. The contractor proposed a modification to the construction, which involved replacing the solid bottom plate with a 4" x 4" mesh. This modification would not have affected the ability to deflect turtles, and was approved.

The NMFS-approved turtle observers were employed by Coastwise Consulting, Inc. under subcontract to the dredging contractor, Bean-Stuyvesant. These observers provided 24-hour/day monitoring of dragheads and screens for each load cycle. During the performance of this dredging, one Kemp's ridley sea turtle take was documented. This take occurred on January 4th in load No. 153.

Coordination with the Sea Turtle Stranding and Salvage Network (STSSN) suggests a possibility that two stranding deaths may have been caused by an encounter with the hopper dredge, based on the kinds of injuries observed. Both such strandings were green turtles. The first stranding occurred on December 12, 1998, and was found on the beach approximately 5.2 miles west of the north jetty. The second stranding was found on February 25, approximately 0.5 miles east of San Luis Pass, or about 26 miles west of the north jetty. A copy of these stranding reports was previously furnished.

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 often identical, however there were observations when the below-depth temperature was warmer and cooler than the surface. The variations between surface and below mid-depth varied from less than 1°C to several degrees C. Surface temperatures ranged from 11.7°C to 21.0°C, while below mid-depth temperatures ranged from 11.7°C to 22.0°C. The single turtle take occurred when the below mid-depth temperature was about 12.7°C. The water was experiencing a period of cooling in late December and early January. It is possible that this turtle was migrating to warmer, deeper waters.

Throughout the duration of dredging, bridge watch observations included occasional sightings of bottlenose dolphins (*Tursiops truncatus*), and one possible sighting of a pilot whale.

Since this is primarily new-work dredging, the material dredged consisted of predominantly clay, along with sand, silt, and old shell deposits. Non-biological samples commonly included wood, along with other miscellaneous debris. The most common biological samples were comprised of various species of fish, rays, skates, crabs, shrimp, jellyfish, and, eels.

Jetty and Entrance Channels

On September 3, 1999, the contract hopper dredge, *Manhattan Island* began work on the Nearshore reach of the Entrance Channel (Stations 34+000 to 56+000). Contract specifications required dredging an estimated 3,422,900 CY of new-work clay material. The required depth of dredging was 49 feet below Mean Low Tide (MLT, Corps of Engineers Datum), with 2 feet of allowable overdepth.

The dredge was equipped with rigid draghead turtle deflectors, and 100% overflow screening with a 4-inch square mesh. Work began with 100% inflow screening through a 6" x 6"

mesh along the lower one-foot of the inflow cage and a 4" x 4" mesh along the remainder of the cage. The stiff clay that was dredged severely clogged and damaged the screens and cage. This resulted in a decrease in productivity of the dredging operation. On September 7th, after it became evident that the situation would not improve, the screens were fully opened. Even with the screens opened, the clay continued to clog the inflow cages. Despite these difficulties, 100% overflow, and the use of the draghead deflector continued.

On September 21, the hopper dredge *Eagle I* began work. This dredge began work without inflow screens.

The NMFS-approved turtle observers were employed by Coastwise Consulting, Inc. under subcontract to the dredging contractor, Bean-Stuyvesant. These observers provided 24-hour/day monitoring of dragheads and screens for each load cycle. During the performance of this dredging, one green sea turtle take by the *Manhattan Island* was documented. This take occurred on September 29th in load No. 223. This turtle was found alive and intact; only minor injuries were apparent. It, however, died prior to transport to a rehabilitation facility. The water temperature was 24.4°C.

Coordination was conducted with the Sea Turtle Stranding and Salvage Network (STSSN). To date, there have been no reports which suggest the possibility that stranding deaths may have been caused by an encounter with a hopper dredge.

Since this work is still in progress, it will be discussed in more detail in the FY 2000 report.

COSTS

The costs incurred in performing the turtle-monitoring program for the H-GNC Project during FY 1999 include the costs for equipping and maintaining screens and draghead deflectors on contractor-owned dredges, as well as providing NMFS-approved observers. In addition to the direct costs are District costs for administration and oversight. Below is a table depicting the costs for FY 1999. 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. The costs for the Jetty and Entrance Channel are based on completion of 7% of the total project during FY 99.

PROJECT	COST OF MONITORING
Entrance Ch. Extension	$100,000.00
Jetty and Entrance Ch.	4,900.00
District labor	7,343.00
TOTAL	$112,243.00

SUMMARY

During Fiscal Year 1999, new-work dredging in two reaches of the H-GNC Project was conducted by hopper dredges. Following is a table summarizing lethal turtle encounters.

INCIDENTAL TAKES OF SEA TURTLES

H-GNC NEW-WORK DREDGING

FY 99

Date Taken	Project	Dredge	Channel Reach	Water Temp. (°C)	Species and Authorized Incidental Take per Fiscal Year			
					Kemp's ridley 5	Loggerhead 5	Green 2	Hawksbill 1
4 Jan 1999	H-GNC	*Stuyvesant*	29°17'84"N 94°37'74"W	12.7	1			
29 Sep 1999	H-GNC	*Manhattan Island*	29°19'N 94°39'W	24.4			1	
TOTAL TAKE					1	0	1	0
ALLOWABLE TAKE REMAINING					4	5	1	1