

**TRAWL CAPTURE OF SEA TURTLES FOR RELOCATION FROM
DREDGING AREAS**

FINAL REPORT

**BROWNSVILLE SHIP CHANNEL
Maintenance Dredging**

W912HY-04-C-0007



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Trawling performed under permits:
NOAA National Marine Fisheries Service Federal Endangered Species Permit # 1380
Texas Parks and Wildlife Department Permit SPR-0602-225

Introduction

Sea-going hopper dredges are the most efficient type of equipment for dredging unprotected offshore channels and borrow areas. They are used in every major navigation channel in the southeastern United States, as well as for beach restoration throughout the region. Maintenance of these entrance channels is necessary for the operation of military and commercial ship traffic (Dickerson 1992; Henwood 1988; Nelson 1994). Restoration of beaches is often mandated by local economic necessities.

Sea turtles are entrained and killed by hopper dredges. The Endangered Species Act of 1973 (ESA) was established to "provide a program for the conservation of ... endangered species and threatened species". The National Marine Fisheries Service (NMFS) is responsible for administering the ESA for all Federal actions that may impact threatened and endangered species at sea. Section 7 of the ESA requires that any action authorized or funded by a Federal agency is not likely to jeopardize the existence of a species listed as threatened or endangered or adversely effect habitat, which has been designated "critical" to the survival of listed species. In response to the NMFS Biological Opinion (BO) regarding hopper dredging, the U.S. Army Corps of Engineers, the Federal agency which authorizes and funds channel dredging, has implemented measures to monitor and reduce the take of sea turtles during this activity. State and private entities generally follow federal guidelines regarding when conducting channel and beach restoration projects, often going beyond federally prescribed measures.

Observer programs have been mandated that place biologists aboard dredges to monitor impacts to sea turtles and marine mammals. Additionally, relocation trawling responds directly to the NMFS BO to reduce impact to sea turtle populations. Shrimp trawlers have been successfully used to capture sea turtles for research for over 20 years. The capture of turtles for relocation is primarily for the purposes of reducing sea turtle mortality associated with hopper dredging. The efficacy of this approach may vary with geographic location of the channel and surrounding habitat, trawl equipment tuning and the location of the release site relative to the channel (Slay and Frick, unpub. data, 2000; Nelson et al. 1994; Standora *et al.* 1993), but it is generally agreed that there is measurable benefit to turtles by removing them from a channel being dredged, decreasing the likelihood that the turtles will be entrained and killed. In optimal circumstances, every turtle "taken" by a trawler engaged in this activity during a dredging project may represent a turtle not "taken" by the dredge(s). Needless to say, being "taken" by the trawler is beneficial to the turtle and the population to which it belongs.

USACE, Galveston District, has been particularly proactive by requiring 24-hour trawling in conjunction with almost all of the hopper dredging projects on the Texas coast.

Methods

Coastwise Consulting conducted trawling using methods developed by the USACE Waterways Experiment Station, Vicksburg, MS. Methods and equipment were standardized including data sheets, nets, trawling direction relative to tidal flows, length

of station, length of tow, and number of tows per station. Data on each tow was recorded using standard data sheets. The trawler was equipped with two 60 foot trawl nets constructed from 8 inch mesh (stretch) fitted with mud rollers and floats as specified in the attached description. The physical length of each tow may varied, as dictated by the course of the dredge and other large vessel traffic in the area but the temporal length of the tows was strictly limited. The paired net tows were conducted using repetitive 30 minute (total time) tows in the channel. Tows were directed in the area of a channel where dredge activity was focused. The imperative of relocation trawling is to reduce the potential for turtle mortality associated with dredging.

Positions at the beginning and end of each tow were determined from GPS and Loran positioning equipment. Tow speed was recorded at the approximate midpoint of each tow. Water temperature measurements were taken at the water surface and at mid-depth twice each day. Weather conditions were recorded from visual observations and instruments on the trawler. Weather conditions recorded included air temperature, wind velocity and direction, sea state-wave height, and precipitation. High and low tides were also recorded, as well as tidal stages associated with each tow.

Captured turtles were photographed, measured and tagged with inconel tags. Then the turtles were relocated and released. Every effort was made to maximize trawl effort in the section of the channel that was being dredged. Given the limited water depth surrounding the channel, this required constant communication between the trawler and the dredge.

Results

Trawling was conducted as a proactive measure to relocate sea turtles during dredging operations at the Brownsville Ship Channel. The area that was dredged and trawled is that section of the channel that reaches landward from Brazos Santiago Pass, across the lower end of Laguna Madre. This section is approximately 2 nautical miles long (N 26° 03 x W097° 10). Water temperature in this area ranged from 18°-21°C during the course of this project.

Trawling began at 0928 hours local time, 12/01/03, 13 hours prior dredging, and continued until 1840 hours local time on 12/18/03, approximately 13 hours after the cessation of dredging at Brownsville. Over the course of these 18 days, 438 tows were made and 13 green sea turtles, *Chelonia mydas*, were successfully relocated. All turtles were captured and tagged in the dredging area. No turtles were injured or recaptured. All but one of the turtles was relatively small, with the mean straight-length carapace measurement being 46.2cm (range 27.6cm – 107.1cm). Excluding the largest measurement, the mean carapace length drops to 41.1 cm.

During this period the dredge Dodge Island dug 82 loads and documented 3 turtle takes, all green sea turtles, *Chelonia mydas*, all with straight carapace lengths between 34 and 36 centimeters.

DATA FOR TURTLES CAPTURED AT BROWNSVILLE
DEMBER 2003

12/02/03 L Tag SSX 337 R Tag SSX338

Tow	START	Lat	Long	END	Lat	Long	Tide L	Tide H	Stage
22	1132	26 03.96	097 10.05	1200	26 02.88	097 11.60	0403	1146	H

H2O Temp	Depth (m)	Substrate	Wind	Wave	Species	SCL	Release Lat	Release Long
18.9	11.5	Mud/Sand	SW 10	0.2M	C. mydas	107.1cm	26 04.39	097 02.85

12/03/03 L Tag SSX339 R Tag SSX340

Tow	START	Lat	Long	END	Lat	Long	Tide L	Tide H	Stage
51	1125	26 02.78	097 11.83	1155	26 03.79	097 10.23	0506	1246	Flood

H2O Temp	Depth (m)	Substrate	Wind	Wave	Species	SCL	Release Lat	Release Long
18.9	11.5	Mud/Sand	SE 20	0.7M	C. mydas	55.8cm	26 03.34	097 02.92

12/07/03 L Tag SSX857 R Tag SSX875

Tow	START	Lat	Long	END	Lat	Long	Tide L	Tide H	Stage
165	0631	26 03.95	097 10.01	0701	26 02.69	097 11.79	0915	1656	Ebb

H2O Temp	Depth (m)	Substrate	Wind	Wave	Species	SCL	Release Lat	Release Long
18.9	11.5	Mud/Sand	S 10	0.2M	C. mydas	35.8cm	26 03.28	097 01.99

12/07/03 L Tag SSX318 R Tag SSX344

Tow	START	Lat	Long	END	Lat	Long	Tide L	Tide H	Stage
169	1320	26 03.96	097 10.04	1350	26 02.71	097 11.79	0915	1656	Flood

H2O Temp	Depth (m)	Substrate	Wind	Wave	Species	SCL	Release Lat	Release Long
19.4	11.5	Mud/Sand	SW 10	0.2M	C. mydas	37.1cm	26 03.27	097 02.84

12/08/03 L Tag RRN751 R Tag RRN752

Tow	START	Lat	Long	END	Lat	Long	Tide L	Tide H	Stage
198	1455	26 02.77	097 11.84	1525	26 03.89	097 10.08	1020	1752	Flood

H2O Temp	Depth (m)	Substrate	Wind	Wave	Species	SCL	Release Lat	Release Long
20.0	11.5	Mud/Sand	S 25	1.0M	C. mydas	49.1cm	26 04.22	097 02.80

12/10/03 L Tag RRN753 R Tag RRN754

Tow	START	Lat	Long	END	Lat	Long	Tide L	Tide H	Stage
259	1740	26 02.85	097 11.86	1810	26 03.68	097 10.43	1201	1810	Flood

H2O Temp	Depth (m)	Substrate	Wind	Wave	Species	SCL	Release Lat	Release Long
18.3	11.5	Mud/Sand	N 25	1.0M	C. mydas	39.6cm	26 04.56	097 01.90

12/11/03 L Tag RRN755 R Tag RRN756

Tow	START	Lat	Long	END	Lat	Long	Tide L	Tide H	Stage
276	0830	26 03.90	097 10.10	0830	26 03.15	097 11.41	1250	1906	Ebb

H2O Temp	Depth (m)	Substrate	Wind	Wave	Species	SCL	Release Lat	Release Long
18.3	11.5	Mud/Sand	SE 15	0.3M	C. mydas	41.5cm	26 04.86	097 01.97

12/12/03 L Tag RRN757 R Tag RRN758

Tow	START	Lat	Long	END	Lat	Long	Tide L	Tide H	Stage
312	1635	26 02.81	097 12.00	1705	26 03.50	097 10.76	1330	1936	Flood

H2O Temp	Depth (m)	Substrate	Wind	Wave	Species	SCL	Release Lat	Release Long
18.9	11.5	Mud/Sand	SW 10	0.2M	C. mydas	48.2cm	26 05.10	097 02.31

12/13/03 L Tag RRN759 R Tag RRN760

Tow	START	Lat	Long	END	Lat	Long	Tide L	Tide H	Stage
342	1545	26 03.57	097 10.67	1610	26 02.82	097 11.88	1420	2016	Flood

H2O Temp	Depth (m)	Substrate	Wind	Wave	Species	SCL	Release Lat	Release Long
18.3	11.5	Mud/Sand	N 20	0.5M	C. mydas	38.9cm	26 04.44	097 02.92

12/14/03 L Tag RRN761 R Tag RRN762

Tow	START	Lat	Long	END	Lat	Long	Tide L	Tide H	Stage
355	0415	26 03.85	097 10.20	0445	26 03.10	097 11.59	0906	1515	Flood

H2O Temp	Depth (m)	Substrate	Wind	Wave	Species	SCL	Release Lat	Release Long
18.2	11.5	Mud/Sand	SE 15	0.3 M	C. mydas	35.3cm	26 04.16	097 02.17

12/17/03 L Tag RRN763 R Tag RRN764

Tow	START	Lat	Long	END	Lat	Long	Tide L	Tide H	Stage
409	0540	26 02.87	097 11.81	0610	26 03.51	097 10.72	0444	0927	Flood

H2O Temp	Depth (m)	Substrate	Wind	Wave	Species	SCL	Release Lat	Release Long
18.0	11.5	Mud/Sand	N 15	0.2M	C. mydas	27.6m	26 04.02	097 01.91

12/17/03 L Tag RRN765 R Tag RRN766

Tow	START	Lat	Long	END	Lat	Long	Tide L	Tide H	Stage
412	0738	26 03.93	097 10.50	0808	26 03.08	097 11.46	0444	0927	Flood

H2O Temp	Depth (m)	Substrate	Wind	Wave	Species	SCL	Release Lat	Release Long
18.0	11.5	Mud/Sand	N 15	0.2M	C. mydas	56.8m	26 04.03	097 01.92

12/17/03 L Tag RRN767 R Tag RRN768

Tow	START	Lat	Long	END	Lat	Long	Tide L	Tide H	Stage
425	1938	26 03.83	097 10.23	2008	26 03.10	097 11.45	1520	2115	Flood

H2O Temp	Depth (m)	Substrate	Wind	Wave	Species	SCL	Release Lat	Release Long
18.0	11.5	Mud/Sand	N 15	0.2M	C. mydas	28.1m	26 05.89	097 02.34

Discussion

The section of Brownsville Ship Channel crossing Laguna Madre is obviously a preferred habitat for small juvenile green turtles. Care must be taken when dredging this channel. Trawling proved to be an integral part of getting this section deepened, which was a crucial step in maintaining safe passage for ship traffic at this port. Through rigorous monitoring of the dredged material, 3 green turtles were known to have been taken. However, without the trawling relocation effort, that figure could have been much higher.

The help and cooperation of the USACE, Galveston District, South Area Office and Great Lakes Dredge & Dock Company, particularly the captain and crew of the Dodge Island, is greatly appreciated by Coastwise Consulting and those living aboard the trawler Two Didos for the duration of this work. Galveston District's commitment to conservation is evident through the support of such work.