

DRAFT FINAL REPORT

**THE MONITORING AND MITIGATION OF IMPACTS
TO PROTECTED SPECIES DURING BEACH RESTORATION
AT LONGBOAT KEY, FLORIDA**

Submitted To:

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Submitted By:

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INTRODUCTION

Coastwise Consulting, Incorporated (CCI) assisted Manson Construction Company in formulating and implementing all steps necessary to protect wildlife resources, especially endangered and threatened species, during dredging operations for beach restoration at Longboat Key in Manatee County, Florida. The most commonly encountered endangered or protected species in this area are the loggerhead sea turtle (*Caretta caretta*) and West Indian manatee (*Trichechus manatus*). Several other protected species encountered there include the Kemp's ridley (*Lepidochelys kempi*), green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*) and leatherback (*Dermochelys coriacea*) sea turtles, as well as the recently listed small-tooth sawfish (*Pristis pectinata*).

While several cetacean species may be encountered, principally the bottlenose dolphin (*Tursiops truncatus*), none of the activities undertaken by Manson Construction Company had a documented impact on marine mammals. The operators of all dredges and support vessels will be thoroughly briefed on manatee behavior and biology, as well as, the mandated modes of vessel/dredge operation in manatee habitat.

Hopper dredging was closely monitored for indications that any of the listed species were impacted and all indications were documented.

A day prior to dredging and during all dredging operations, a sea turtle relocation trawler (modified shrimp boat) worked 24-hours per day, trawling, capturing and relocating turtles from the dredge site to reduce the likelihood of turtle mortality associated with dredging activity.

METHODOLOGY, Hopper Dredge Monitoring

During dredging operations endangered species observers, approved by the National Marine Fisheries Service, lived aboard the dredges, monitoring every load dredged, 24-hours per day for impacts to endangered and protected species, particularly sea turtles.

Rigid turtle deflectors were installed on the dragheads before work began and all points of inflow were screened before the observers boarded the dredges. Inflow occurs on the Manson dredges at the end of four pipes, two of which empty into the forward section of the hopper, port and starboard, and two of which discharge at the aft end of the hopper, port and starboard. Cages are attached directly to the ends of the discharge pipes and are constructed of steel bar-stock, welded in a grid pattern, with openings of approximately 4" x 4". Observers gain access into the top of these cages through hinged trap doors. The aft walls of the cages are hinged and can be opened by hydraulic rams in order to clear the cages of debris after inspection by observers.

Observers cleaned and inspected this screening, around-the-clock, in order to document any evidence of turtle take. Before cleaning and inspecting the screens, the observer checked the dragheads and turtle deflectors. Load sheets were completed at the end of each load cycle, detailing everything found in the screening or the dragheads, as well as the condition of the screens and the deflectors. Also recorded were the start, end and pump times for each load, the specific location of the dredging area, the type of material being dredged, weather, tide and water temperature data.

Observers maintained a bridge watch for protected species and kept a logbook of all sightings of turtles and marine mammals. The bridge watch logbook noted the date, time, location, species, number of animals, distance and bearing from dredge, direction of travel and any other information available on all sightings. Daily reports and Weekly Summaries were filed with Manson.

Turtle takes were, or samples thereof, were photographed, measured, described on data collection sheets and disposed of. An injured turtle rescued through sea turtle relocation trawling was sent to Mote Marine Laboratory personnel for rehabilitation. All turtles taken on the dredge were sampled for genetic analyses. The protocol for biopsy sampling is attached as Appendix 1.

RESULTS, Monitoring

The Manson dredge *Bayport* dredged and placed sand on beaches in the Manatee County. The Manson dredge *Newport* and the subcontracted B+B Dredging dredge *Atchafalaya* transferred sand from shallow areas of the borrow sites and placed the material where it could be readily collected and pumped ashore by the *Bayport*. The *Atchafalaya* was not monitored by Coastwise but was on-site for approximately 15 day, 04/10/06 – 04/25/06(?).

The *Bayport* began dredging on 06/03/05 and completed the project on 07/05/06 with significant interruptions in digging, > 48 hours, for hurricanes, maintenance, and considerations. The dredge *Newport* worked at borrow sites for Longboat Key, dredging sand in shallow areas and placing it where it could be efficiently collected and pumped ashore by the *Bayport*. This accounts for the high number of loads per day dredged by the *Newport*. Typically the *Bayport* might dredge and pump 2-3 loads per day while the *Newport* might relocate 20 loads per day.

Dredge Days

<i>Bayport</i>	06/02/05 – 08/24/05	
	09/01/05 – 09/11/05	
	09/30/05 – 10/19/05	
	10/26/05 – 03/10/06	
	04/26/06 – 07/05/06	
Total Days		322 Dredge Days
Total Loads		866 Loads

<i>Newport</i>	08/06/05 – 08/25/05	
	08/31/05 – 09/03/05	
Total Days		24 Dredge Days
Total Loads		487 Loads

During this 13 month project, approximately 346 “dredge days” were logged by the Manson dredges, completing 1,353 loads. Only two sea turtle takes were documented, both on the *Bayport*. A high water temperature of 31 C was recorded at the dredge site. The low was 16 C. During final 8 months of this project, the sea turtle relocation trawler captured and removed 129 sea turtles from the dredging areas, logging 5,247 tows.

We are confident that this result accurately reflects the actual take level. The screening was well constructed and maintained and the Manson personnel on the *Bayport* and shore-side engineers were always cooperative and proactive regarding the work of the observers.

Longboat Key Dredge Takes

Date	Load	Start Time	End Time	Lat	Long	H2O Temp	Species	Comments
11/4/05	325	2250	0054	27°31.92	82°46.52	24.4	C. caretta	Fresh piece of carapace and small portion of vertebral column recovered from inflow. Carapace fragment 52cm x 25cm.
1/25/06	543	1706	1857	27°32.0	82°46.5	16.6	C. mydas	Fresh head and front flippers recovered from inflow.

SEA TURTLE RELOCATION TRAWLING

Introduction

Shrimp trawlers have been successfully used to capture sea turtles for research and relocation for over 20 years. The *research* motivation for the trawl capture of turtles is usually to provide a means for attaching tags to non-nesting turtles. The capture of turtles using shrimp trawlers for the purpose of *relocation* is usually associated with hopper dredging. The imperative of relocation trawling is to reduce the potential for turtle mortality associated with dredging.

During the past 10 years Coastwise Consulting has conducted over 1100 days of live-capture trawling at the port entrances and beach borrow sites near Norfolk, VA, Atlantic Beach and Wilmington, NC, Murrell’s Inlet and Charleston, SC Savannah, Brunswick and Kings Bay Naval Base, GA, Jacksonville, Cape Canaveral, Cocoa Beach, West Palm, Naples, Longboat Key, Destin and Pensacola, FL, Mobile, AL, Pascagoula and Gulfport, MS, the MRGO and the Cameron, LA and Sabine Pass, Galveston, Freeport and Brownsville, TX.

Over 450 turtles have been captured, tagged, relocated and released with less than 3% recaptures and no injuries or mortalities associated with trawling activity. We have captured all sea turtle species native to North American waters including loggerheads, Kemp's ridleys, greens, hawksbills and leatherbacks. We have also successfully relocated Atlantic and Gulf Sturgeon.

Methods

Coastwise Consulting conducts trawling using methods developed by the USACE Waterways Experiment Station. Turtles are captured with trawl nets in the dredge area prior to and/or during dredging operations. Methods and equipment are standardized including data sheets, nets and length of tow time. Data on each tow is recorded using standard data sheets. The trawler is equipped with two 60 foot trawl nets constructed from 8 inch mesh (stretch) fitted with mud rollers and floats as specified by the USACE (see Appendix 3).

Trawling is targeted at the active dredging site within the channel or borrow area. The physical length of each tow may vary as dictated by large vessel traffic in the area or by the size and configuration of the borrow site but the temporal length of the tows is always strictly limited to 42 minutes (total time).

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

Captured turtles are photographed, measured, biopsied for genetics (see Appendix 2), epibionts present are recorded and each turtle is tagged. One inconel tag is applied on each front flipper, on the second or third proximal scutes, along the trailing edge of the flippers. Turtles are then relocated at least 3 nautical miles from the dredge site in a direction that provides for the least likelihood of recapture.

All work in Florida waters is performed under NOAA National Marine Fisheries Service Federal Endangered Species Permit # 1380 and Florida Fish and Wildlife Conservation Commission Marine Turtle Permit #097.

RESULTS, Trawling

Sea turtle relocation trawling began at Longboat Key on 11/07/05 and continued until the end of the project on 07/05/06, with a break when there was no dredging between 03/12/06 – 04/09/06. There were short periods, < 48 hours, when the dredge was docked for fuel, supplies or brief periods of bad weather. During the final 8 months of the Longboat Key project, trawling was conducted on over 200 days.

During this time 129 sea turtles were relocated from the dredging areas, including 74 loggerheads (*Caretta caretta*), 41 Kemps ridleys (*Lepidochelys kempi*), 12 greens (*Chelonia mydas*) and 2 hawksbills (*Eretmochelys imbricate*). Two loggerheads were sent ashore to Mote Marine Lab for rehabilitation. One has sustained propeller cuts not believed to be associated with trawling or dredging and one was severely emaciated. One captured loGgerhead had been tagged the previous year on the east coast and only two turtles were recaptured during this project.

That 129 sea turtles were removed from the active dredging sites, only two were recaptured, two turtles in need of rehabilitation were rescued and only two dredge takes occurred speaks to the efficacy of relocation trawling on this project.

See the attached Excel file for tables containing the data associated with this project.

APPENDIX 1

PROTOCOL FOR COLLECTING TISSUE FROM DEAD TURTLES FOR GENETIC ANALYSIS

Method for Dead Turtles

<<<IT IS CRITICAL TO USE A NEW SCALPEL BLADE AND GLOVES FOR EACH TURTLE TO AVOID CROSS-CONTAMINATION OF SAMPLES>>>

1. Put on a new pair of latex gloves.
2. Use a new disposable scalpel to cut out an approx. 1 cm (1/2 in) cube (bigger is NOT better) piece of muscle. Easy access to muscle tissue is in the neck region or on the ventral side where the front flippers “insert” near the plastron. It does not matter what stage of decomposition the carcass is in.
3. Place the muscle sample on a hard uncontaminated surface (plastron will do) and make slices through the sample so the buffer solution will penetrate the tissue.
4. Put the sample into the plastic vial containing saturated NaCl with 20% DMSO *(SEE BELOW)
5. Use the pencil to write the stranding ID number (observer initials, year, month, day, turtle number by day), species, state and carapace length on the waterproof paper label and place it in the vial with the sample.
EXAMPLE: For a 35.8 cm curved carapace length green turtle documented by Jane M. Doe on July 15, 2001 in Georgia, the label should read “JMD20010715-01, C. mydas, Georgia, CCL=35.8 cm”. If this had been the third turtle Jane Doe responded to on July 15, 2001, it would be JMD20010715-03.
6. Label the outside of the vial with the same information (stranding ID number, species, state and carapace length) using the permanent marker.
7. Place clear scotch tape over the writing on the vial to protect it from being smeared or erased.
8. Wrap parafilm around the cap of the vial by stretching it as you wrap.
9. Place vial within whirlpak and close.
10. Dispose of the scalpel.
11. Note on the stranding form that a part was salvaged, indicating that a genetic sample was taken and specify the location on the turtle where the sample was obtained.
12. Submit the vial with the stranding report to your state coordinator. State coordinators will forward the reports and vials to NMFS for processing and archiving.

*The 20% DMSO buffer in the plastic vials is nontoxic and nonflammable. Handling the buffer without gloves may result in exposure to DMSO. This substance soaks into skin very rapidly and is commonly used to alleviate muscle aches. DMSO will produce a garlic/oyster taste in the mouth along with breath odor. The protocol requires that you WEAR gloves each time you collect a sample and handle the buffer vials.

The vials (both before and after samples are taken) should be stored at room temperature or cooler. If you don't mind the vials in the refrigerator, this will prolong the life of the sample. DO NOT store the vials where they will experience extreme heat (like in your car!) as this could cause the buffer to break down and not preserve the sample properly.

Questions:

Sea Turtle Program
NOAA/NMFS/SEFSC
75 Virginia Beach Drive
Miami, FL 33149
305-361-4207

APPENDIX 2

PROTOCOL FOR COLLECTING TISSUE FROM LIVE TURTLES FOR GENETIC ANALYSIS

Method for Live Turtles

<<<IT IS CRITICAL TO USE A NEW BIOPSY PUNCH AND GLOVES FOR EACH TURTLE TO AVOID CROSS-CONTAMINATION OF SAMPLES>>>

1. Turn the turtle over on its back.
2. Put on a new pair of latex gloves.
3. Swab the entire cap of the sample vial with alcohol.
4. Wipe the ventral and dorsal surfaces of the rear flipper 5-10 cm from the posterior edge with the Betadine/iodine swab.
5. Place the vial under the flipper edge to use the cleaned cap as a hard surface for the punch.
6. Press a new biopsy punch firmly into the flesh as close to the posterior edge as possible and rotate one complete turn. Cut all the way through the flipper to the cap of the vial.
7. Wipe the punched area with Betadine/iodine swab; rarely you may need to apply pressure to stop bleeding.
8. Use a wooden skewer to transfer the sample from the biopsy punch into the plastic vial containing saturated NaCl with 20% DMSO *(SEE BELOW)
9. Use the pencil to write the stranding ID number (observer initials, year, month, day, turtle number by day), species, state and carapace length on the waterproof paper label and place it in the vial with the sample. EXAMPLE: For a 35.8 cm curved carapace length green turtle documented by Jane M. Doe on July 15, 2001 in Georgia, the label should read "JMD20010715-01, C. mydas, Georgia, CCL=35.8 cm". If this had been the third turtle Jane Doe responded to on July 15, 2001, it would be JMD20010715-03.
10. Label the outside of the vial with the same information (stranding ID number, species, state and carapace length) using the permanent marker.
11. Place clear scotch tape over the writing on the vial to protect it from being smeared or erased.
12. Wrap parafilm around the cap of the vial by stretching it as you wrap.
13. Place vial within whirlpak and close.
14. Dispose of the biopsy punch.
15. Note on the stranding form that a part was salvaged, indicating that a genetic sample was taken and specify the location on the turtle where the sample was obtained.
16. Submit the vial with the stranding report to your state coordinator. State coordinators will forward the reports and vials to NMFS for processing and archiving.

*The 20% DMSO buffer in the plastic vials is nontoxic and nonflammable. Handling the buffer without gloves may result in exposure to DMSO. This substance soaks into skin very rapidly and is commonly used to alleviate muscle aches. DMSO will produce a garlic/oyster taste in the mouth along with breath odor. The protocol requires that you WEAR gloves each time you collect a sample and handle the buffer vials.

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APPENDIX 3: TRAWL NETS SPECIFICATIONS

DESIGN: 4 seam, 4 legged, 2 bridal trawl net

WEBBING: 4 inch bar, 8 inch stretch top - 36 gauge twisted nylon dipped side - 36 gauge twisted nylon dipped bottom - 84 gauge braided nylon dipped

NET LENGTH: 60 ft from cork line to cod end

BODY TAPER: 2 to 1

WING END HEIGHT: 6 ft

CENTER HEIGHT: Dependent on depth of trawl 14 to 18 ft

COD END: Length 50 meshes x 4" = 16.7 ft Webbing 2 inch bar, 4 inch stretch, 84 gauge braid nylon dipped, 80 meshes around, 40 rigged meshes with 1/4 x 2 inch choker rings, 1 each « x 4 inch at end cod end cover - none chaffing gear - none

HEAD ROPE: 60 ft « inch combination rope (braid nylon with stainless cable center)

FOOT ROPE: 65 ft « inch combination rope

LEG LINE: top - 6 ft, bottom 6 - ft

FLOATS: size - tuna floats (football style), diameter - 7 inch length - 9 inch, number - 12 each, spacing - center on top net 2 inches apart

MUD ROLLERS: size 5 inch diameter 5.5 inch length, number - 22 each, spacing - 3 ft attached with 3/8 inch polypropelene rope (replaced with snap on rollers when broken)

TICKLER CHAINS: NONE (discontinued- but previously used 1/4 inch x 74 ft galvanized chain)

WEIGHT: 20 ft of 1/4 inch galvanized chain on each wing, 40 ft per net looped and tied

DOOR SIZE: 7 ft x 40 inches (or 8 ft x 40 inches), Shoe - 1 inch x 6 inch, bridles - 3/8 inch high test chain

CABLE LENGTH (bridle length, total): 7/16 inch x 240-300 ft varies with bottom conditions

LAZY LINES: 1 inch nylon PICKUP LINES: 3/8 inch polypropelene

WHIP LINES: 1 inch nylon