

**Documenting interactions between pilot whales and the pelagic longline fishery in the
Cape Hatteras Special Research Area**

Preliminary Cruise Report

September 2006

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Project Background:

Attempts to reduce the frequency of interactions between pilot whales and longline fishing gear by the Pelagic Longline Take Reduction Team (PLTRT) are hampered by a lack of information regarding the nature, timing and cause of these interactions. In this project, we plan to use an integrated series of techniques to characterize interactions between pilot whales and the pelagic longline fishery, including observations made by fishermen, researchers and observers. This work addresses research priorities identified both by the NC Sea Grant RFP and the PLTRT.

Our current information base is inadequate to formulate effective mitigation strategies. For example, we do not know how pilot whales detect longline gear, how they interact with the gear, or when interactions occur during fishing operations (while the gear is soaking or during haul-back). We plan to investigate which acoustic cues pilot whales use to detect longline vessels, document when interactions occur during the fishing process and make a preliminary assessment of the efficacy of potential mitigation measures.

Objectives:

The objective of this project is to characterize the nature and timing of pilot whale interactions with pelagic longline fishing gear by: (1) conducting visual and acoustic monitoring of pilot whales from an independent research vessel in the Cape Hatteras Special Research Area (CHSRA); (2) working directly with longline fishermen to examine interactions using acoustic recording equipment; and (3) facilitating data collection and synthesis by fishermen. In addition, we intend to collect skin samples from pilot whales to determine which of the two species (long-finned or short-finned pilot whales) interacts with longline gear, and obtain photo-identification images to determine patterns of residency within the CHSRA and to investigate whether particular individuals consistently engage in depredation.

Methods:

To prepare for this initial phase of field work, we attended a meeting of longline fishermen, NMFS personnel and other individuals in Wanchese, NC during June 2006 to learn about fishing operations and to present our research plan. We also received the locations of pilot whale sightings and their interactions with longline gear from the NMFS/SEFSC Laboratory in Miami to identify areas of pilot whale concentrations within the CHSRA.

In our first phase of field work, we contracted the R/V *Stellwagen*, a 70' independent research vessel operated by Ocean Works Group, Inc., to locate groups of pilot whales within the CHSRA, make acoustic recordings of pilot whales and other species to ground-truth appropriate settings for the acoustic recorders, and collect skin samples and photo-identification images for species identification. In addition, we met with several longline fishermen who agreed to deploy T-POD acoustic recorders on their gear.

We operated out of Wanchese, NC from September 2 – 7, 2006, conducting visual surveys for marine mammals at a speed of approximately 8 knots. We focused all survey efforts inside the CHSRA. During surveys, three observers used Fujinon binoculars and searched the port, starboard and center quadrants from the flying bridge of *Stellwagen*, at an eye height of approximately 23 feet. The center observer also served as data recorder. Six observers worked in 30 minute shifts, rotating through these three positions. We recorded time on effort, any change in sea state or environmental conditions, and changes in survey transect lines. When we observed marine mammals, we broke from the transect line and approached the group for species identification. At each sighting, we recorded the position of the vessel, water depth, group size and activity, and the distance and bearing of the group to our vessel. When we identified pilot whales (and when sea state conditions allowed) we deployed a 17' Whaler with a Honda 50 hp four-stroke outboard engine to: (1) record the vocalizations of pilot whales; (2) obtain biopsy samples and photographs of the dorsal fins of pilot whales to determine species identity. For the latter work, we followed the “Photographic and biopsy protocols for pilot whale species identification” developed by Brenda Rone from UMass-Boston and Richard Pace, of the Northeast Fisheries Science Center. The acoustics team was deployed first to make recordings, and when an adequate sample of recordings was made, they returned to the *Stellwagen*, to switch with the biopsy team. Observers aboard the *Stellwagen* helped direct the Whaler towards the pilot whales.

While at dock in Wanchese awaiting good weather conditions, we met with pelagic longline fishermen to discuss deploying acoustic recorders (T-PODs) on their gear. T-PODs detect and record the occurrence of echolocation clicks, but must be programmed to record species-specific data. This species-specific information must be obtained with more elaborate recording systems. These units provide information on when during the fishing process interactions occur with pilot whales. The units are retrieved at the end of each trip and the data are downloaded at the Duke Marine Lab. The fishermen also agreed to complete data sheets to record information on the deployment of the T-PODs, and on the occurrence of pilot whale interactions.

Results to Date:

We departed Wanchese on September 3rd, at 08:43, and began observations at 11:55 AM. We returned to Wanchese on September 4th at 19:15, due to deteriorating weather conditions. We waited at port for conditions to improve on September 5 - 6th, but Hurricane Florence passed offshore creating large swells. These conditions would have prevented deployment of the Whaler from the *Stellwagen*, so we decided to postpone our remaining survey effort until the spring.

During our two days of survey effort, we made three sightings of pilot whales within the CHSRA, all in water depths greater than 200m. We also encountered several other species of cetaceans, as well as a number of loggerhead and leatherback turtles (see Appendix 1 and Figures 1 and 2). We were able to approach, record, photograph, and collect skin samples from pilot whales in each of the three encounters. There were no longline vessels working in proximity to us during these two days, so we were not able observe or record whales in association with fishing gear.

Figure 1. Tracklines for R/V *Stellwagen* and sighting locations of animals observed on September 3, 2006, during pilot whale surveys in the Cape Hatteras Special Research Area.

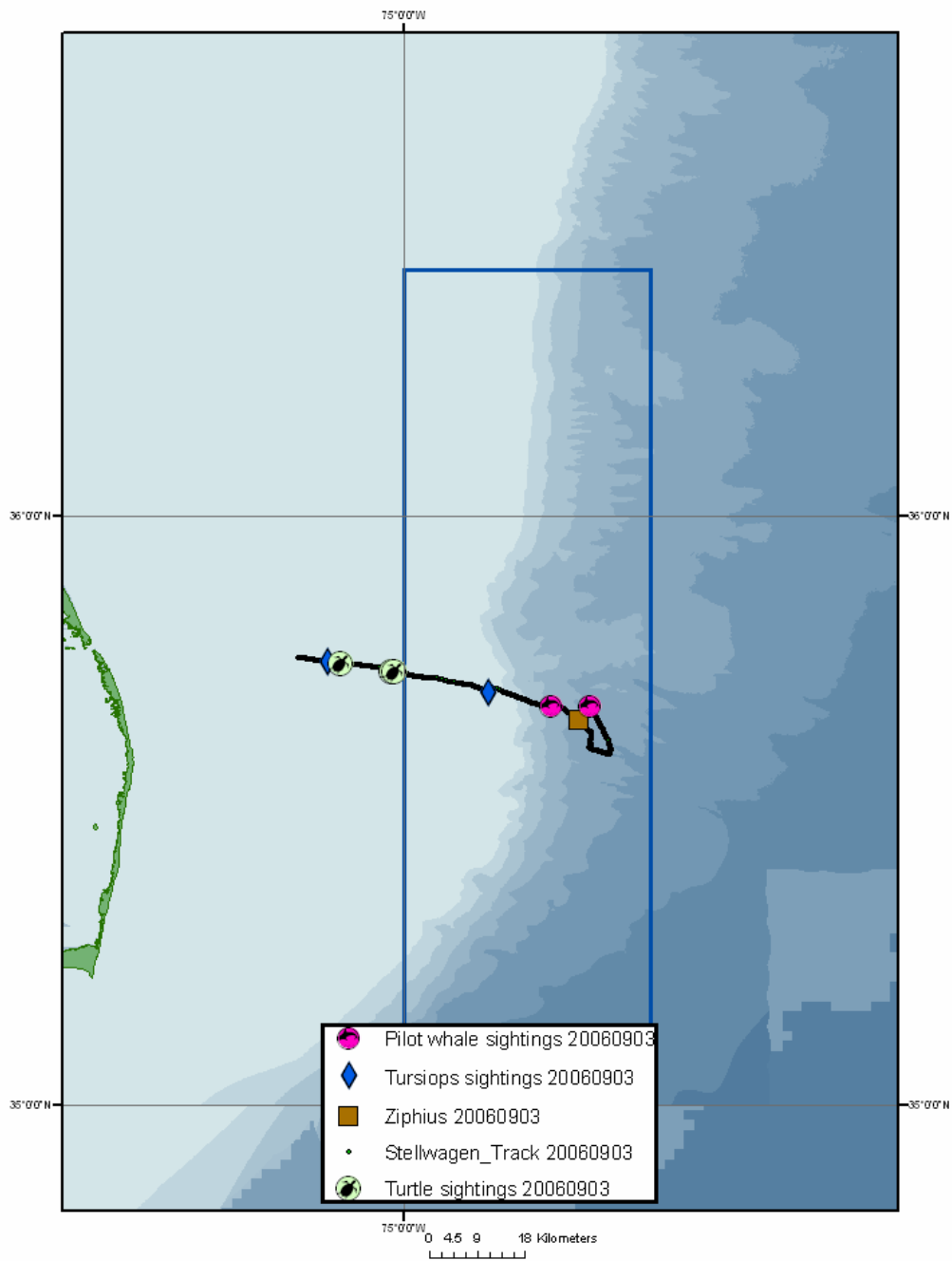
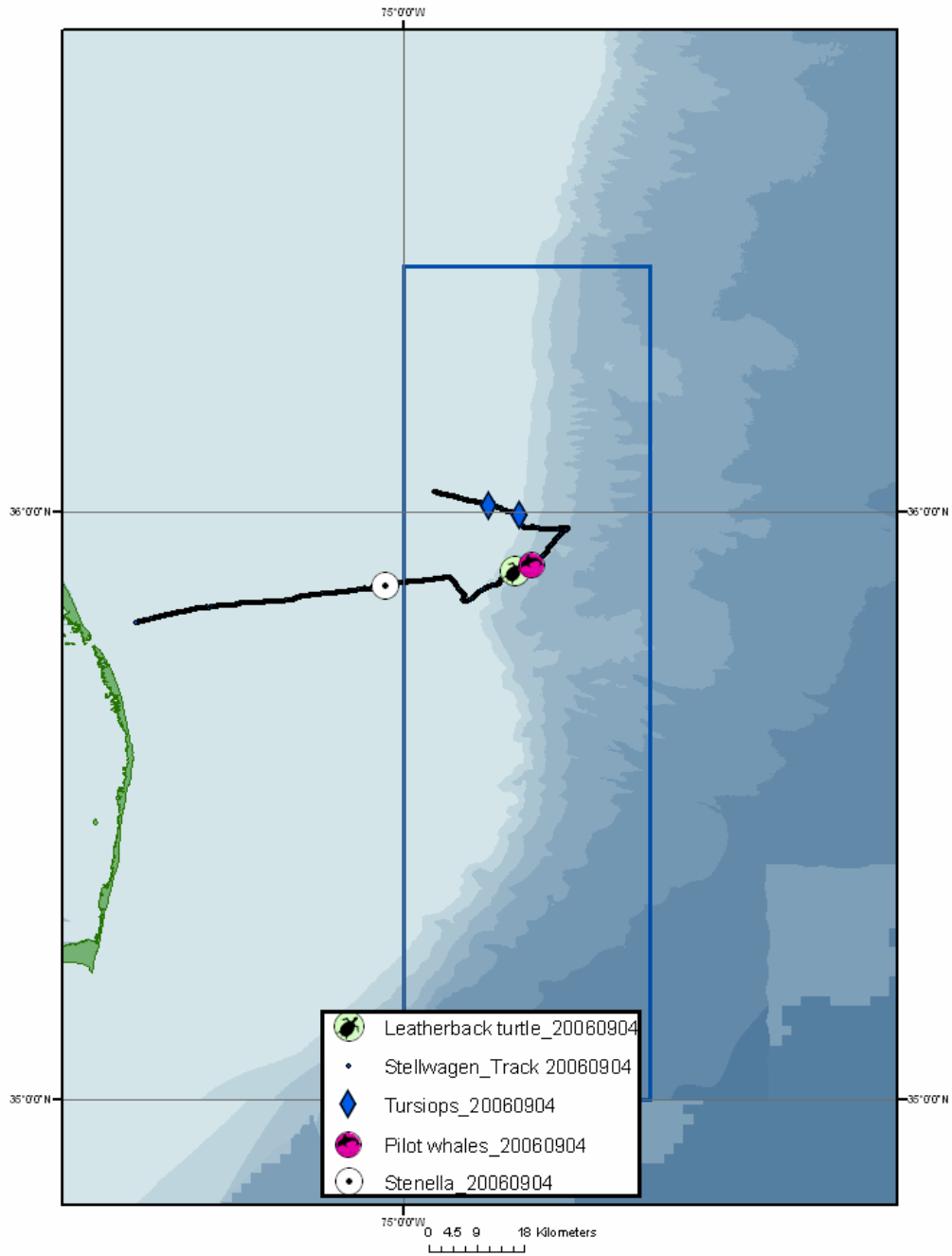


Figure 2. Tracklines for R/V *Stellwagen* and sighting locations of animals observed on September 4, 2006, during pilot whale surveys in the Cape Hatteras Special Research Area.



We made acoustic recordings of pilot whales on both days. After analysis of these recordings, we were able to select the appropriate settings for the T-POD recorders to correctly detect pilot whale echolocation clicks.

We collected six biopsy samples during this initial phase of field work: two samples on September 3rd and four samples on September 4th. We followed the NOAA/NMFS-SEFSC's protocol for biopsy sampling and handling. Individual pilot whales exhibited a low response to the biopsy sampling. Photographs were obtained of all individuals sampled and all six had distinctive dorsal fins. We have provided the skin samples to Dr. Patricia Rosel (NMFS) for genetic analysis. We took approximately 590 dorsal fin images for photo-identification. The image below shows a biopsy sample taken from a pilot whale.



We provided a set of T-PODs to Captain Dewey Hemilright of the F/V *Tar Baby*, on September 7th. Captain Hemilright deployed a pair of T-PODs on his gear for two sets. Captain Hemilright devised a system for attaching the T-PODs to the end buoy drops of the mainline and was able to deploy and retrieve the recorders with his fishing gear. We retrieved the recorders on September 12th, and gave Captain Hemilright additional recorders to deploy on his next trip. Table 2 summarizes the data recorded by the T-PODs for the two sets. Captain Hemilright notified us that he had observed pilot whales around his gear, and gave us the heads of two tuna that had been depredated by pilot whales (see the photos below). The depredation of the tuna was consistent with that documented by fisheries observers from the NMFS Pacific Islands Fisheries Science Center in Honolulu. Captains of the longline vessels F/V *Watersport* and F/V *Rebound* have also agreed to deploy T-PODs on their gear.

Table 2. Summary of T-POD deployment on the F/V *Tar Baby* in September, 2006.

Set	T-Pod	Date Deployed	Time Deployed	Date Retrieved	Time Retrieved	Whales Detected	Whales Detected	Whales Detected	Depredation?
1	614	7-Sep-06	17:48	7-Sep-06	23:44	No			
1	607	7-Sep-06	19:19	8-Sep-06	3:17	19:25-19:30	20:49-20:55	21:42-22:06	Yes
2	607	8-Sep-06	17:46	8-Sep-06	22:09	18:20-19:01			
2	614	8-Sep-06	19:04	9-Sep-06	1:07	No			

Future work:

Throughout the fall, winter and spring we will work with fishermen to deploy T-POD recorders on their gear. If possible, we will place an observer aboard a longline vessel to make concurrent visual observations and obtain high-quality acoustic recordings of interactions between pilot whales and longlines. Unfortunately, however, many vessels in the North Carolina pelagic longline fleet are too small to accommodate an observer. We will also ask skippers to place another type of acoustic data logger (LARS-HF units) on their longline gear. We plan to provide digital cameras to fishermen deploying the recorders, so that they can document any evidence of previous entanglement on the pilot whales that interact with their gear.

Most of our remaining field work will be conducted in a ten-day research cruise aboard the R/V *Stellwagen* during the spring of 2007. We will co-ordinate with fishermen and the NMFS to schedule the spring cruise so that we will have a high probability of locating pilot whales near active fishing vessels. During this cruise, we hope to: (1) record the vocalizations of pilot whales in the vicinity of longline gear; (2) conduct standardized behavioral observations of pilot whale groups around longline gear, using focal follow techniques to document their response to the sounds of vessels setting and hauling gear; (3) obtain acoustic recordings of pelagic longline vessels during setting and haul-back for future playback experiments; (4) test the detection range of the T-PODs; and (5) obtain a larger sample of biopsy samples of pilot whales interacting with longlines to determine species identity. We will also continue to obtain images of pilot whales within the CHSRA and begin compiling a catalog of individual whales.

Conclusions:

Although the duration of our field work was limited by weather, we were extremely pleased to have worked out successful protocols for sampling pilot whales within the CHSRA and to have successfully deployed T-PODs on pelagic longlines in this area. We are looking forward to a productive field season in the spring of 2007.

Acknowledgements:

We thank: Mr. Willie Etheridge for dock space, assistance and encouragement; Captain Dewey Hemilright for deploying T-PODs; Lance Garrison, Vicki Cornish and Laura Engleby for data and advice; Keith Mullin and Kathy Foley for help with the biopsy permit; Nick Tregenza and David Mann for the acoustic recorders; Laela Sayigh for acoustic recording equipment; Richard Pace for the photographic protocol; Patty Rosel and Erin LaBrecque for help with the biopsy

protocol; and Larry Hansen and Annie Gorgone for the loan of biopsy gear. We acknowledge Nelson Beideman, who encouraged us to work co-operatively with the pelagic longline fleet and helped to design this research program. This work was funded by NOAA, NC Sea Grant and the Consortium for Wildlife Bycatch Reduction.



Photographs of tuna heads showing evidence of depredation by pilot whales.

Appendix 1. Sightings of marine mammals and sea turtles during surveys of the Cape Hatteras Special Research Area made during September, 2006.

Date	Species	Group size
9/3/2006	<i>Tursiops truncatus</i> (Bottlenose dolphin)	10
9/3/2006	<i>Caretta caretta</i> (Loggerhead turtle)	1
9/3/2006	<i>Caretta caretta</i> (Loggerhead turtle)	1
9/3/2006	<i>Caretta caretta</i> (Loggerhead turtle)	1
9/3/2006	<i>Caretta caretta</i> (Loggerhead turtle)	1
9/3/2006	<i>Tursiops truncatus</i> (Bottlenose dolphin)	25
9/3/2006	<i>Globicephala spp</i> (Pilot whale)	15
9/3/2006	<i>Ziphius cavirostris</i> (Cuvier's beaked whale)	2
9/3/2006	<i>Globicephala spp</i> (Pilot whale)	15-20
9/3/2006	Unidentified rorqual whale	1
9/4/2006	<i>Tursiops truncatus</i> (Bottlenose dolphin)	20
9/4/2006	<i>Tursiops truncatus</i> (Bottlenose dolphin)	25
9/4/2006	<i>Globicephala spp</i> (Pilot whale)	6
9/4/2006	<i>Dermochelys coriacea</i> (Leatherback turtle)	1
9/4/2006	<i>Stenella frontalis</i> (Spotted dolphin)	150
9/4/2006	<i>Caretta caretta</i> (Loggerhead turtle)	1

Cruise participants and responsibilities:

Alex Loer	Captain-R/V Stellwagen
Jim Moir	Mate-R/V Stellwagen, logistics, small boat driver, visual search
Andy Read	Chief Scientist, observer
Todd Chandler	Biopsy sampler, observer
Lynne Williams	Acoustic recordings, observer
Danielle Waples	Photographic identification, observer
Kim Urian	Data Manager, photographic identification, observer
Leigh Torres	Photographic identification, observer

Permits:

This research was conducted under General Authorization Number 808-1584-01 from the NMFS held by Dr. Read, allowing the close approach to marine mammals for research purposes. Todd Chandler is authorized conduct biopsy sampling for the Southeast Fisheries Science Center under MMPA Permit No. 779-1633-02.