

PRELIMINARY REPORT

Documenting right whale (*Eubalaena glacialis*) behavior over rocky bottom in inshore waters of the Gulf of Maine.

FUNDING SOURCE

National Fish and Wildlife Foundation
Risk of right whale entanglement (ME) #2006-0093-006
Maine Department of Marine Resources
NFWF Large Whale Cooperative Management Plan (ME) - III

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DATES: June and July 2007

Project Objective: The well defined focus of this project is to quantify entanglement risk as a function of depth for right whales in New England inshore fishing areas, especially over rocky bottom. There were several elements to this project: First was to survey a large area of inshore waters of the Gulf of Maine from Jeffrey's Ledge to Mt. Desert Rock. During these surveys observations were made of marine mammals, fishing gear and vessel traffic. The observer efforts and photo id were supervised by Monica Zani from the New England Aquarium. The second element to this project was to place a Dtag on a right whale in these waters. (see methods for Dtag information). The last objective was to deploy four pinger buoys (see methods for pinger buoy information) this would give us an underwater GPS location of the whale while the Dtag was on and allow us to see what the whales location and altitude off the bottom was over and extended period of time. The R/V STELLWAGEN would then confirm bathymetry with onboard echo sounder to verify actual depth.

Methods:

Dtag

Pinger buoys for the NFWF experiment

Mark Johnson, 26 April 2007

Overview

The pinger buoys are a critical part of a short term tracking system for tagged northern right whales and will be deployed in a field effort beginning 7th June, 2007. The goal of the field experiment is to study the foraging movements of right whales along the Maine coast and to identify risk factors for entanglement in fishing gear. Of special interest is the behavior of whales foraging near the sea floor where there is a risk they may become entangled in ground lines between lobster traps. Previous tag results and surface observations suggest that whales do on occasion forage near or on the sea floor. However, uncertainty in both the local bathymetry and the positions of tagged whales makes these data only suggestive. Here we aim to produce precise geo-referenced tracks for tagged right whales and compare these to high resolution bathymetry obtained from contemporary surveys. As the whales will be submerged when the greatest positional accuracy is required, an acoustic tracking method is required and we propose to implement this with a quantity of autonomous GPS-synchronized pinger buoys distributed around the tagged whale.



Dtag Information and history

The original DTAG was designed in 1999 and has been used successfully on more than 20 campaigns. The weight and size of the device (about 600 g and 45 cm in length) make it well-suited to baleen and sperm whales but restrict its application to larger species. In 2002, in an effort to expand the range of species accessible for tagging, and taking advantage of improved technology, we designed a smaller and more capable tag. The DTAG2 is about one half of the volume and weight of the original tag. However it has more than 12 times the recording capacity as well as substantially improved dynamic range and sensor sensitivity. High quality audio can be recorded at sampling rates up to 192 kHz and a loss-less compression algorithm effectively multiplies the memory capacity (currently 6.6 GBytes) by a factor of 4. Up to 4 hydrophones can be recorded simultaneously enabling on-animal acoustic arrays for determining the direction of arrival of sounds. The new tag design is self-contained and so is easier to use than DTAG1, but it is also modular: new sensors can be added to the tag with minimal re-work and the memory capacity can be readily expanded. A new packaging method has been developed to enhance the pressure tolerance of the device for deep diving animals and the tag has been tested successfully to a depth of 2200 m. In tandem, a new attachment system has been developed using 4 small custom-designed suction cups to enhance stability and longevity.

To date, the DTAG2 has been used on 16 field experiments and has been applied to 10 species of marine mammal including 2 species (*Mesoplodon densirostris* and *Ziphius cavirostris*) never previously tagged. The average carry times vary with species but are more than twice the average for DTAG1. The high frequency recording capability and small footprint of the DTAG2 make it well-suited to use on beaked whales and other small odontocetes. The two DTAG devices have now been in use for 5 years and we have amassed a substantial archive of data spanning 11 species and including more than 65 sperm whales, 66 northern right whales, 16 beaked whales and 54 pilot whales. Recognizing the value of this archive, we are committed to maintaining it and increasing its accessibility.



Field Work Summary:

Field work was conducted in the Gulf of Maine from June 9-July 10, 2007. Visual observations were conducted aboard the R/V STELLWAGEN, a 70' vessel. Dtagging was performed from a 23' hard bottom inflatable. During this time the vessel logged approximately 1,000 nautical miles (nm) of on-effort survey. The field team included: vessel Captain, tag boat driver, deck hand, 3 to 4 observers (one observer was a representative from Maine DMR) and two engineers from Woods Hole Oceanographic Institute (WHOI). The over all weather was exceptional during our field work and we were able to get our 18 scheduled working days in over a 28 day period. Three observers worked in rotation every two hours. Observers were stationed port and starboard on the flying bridge of the STELLWAGEN with a height of eye of 25'. Observers scanned the surface of the water out to the horizon and entered all sightings of marine mammals, fishing gear buoys, vessel traffic and environmental conditions into a laptop computer on the flying bridge. Environmental conditions were recorded at one half hour intervals and included visibility, Beaufort sea state, cloud cover, wind speed and wind direction. In addition, fishing gear was recorded as low, medium and high density. The computer was also logging GPS survey effort data and pinger buoy location data. During the field work one aerial survey was flown by the National Marine Fisheries Service (NMFS) on July 2, 2007. The aerial survey was flown at an altitude of 750 ft, a speed of 100 knots and trackline spacing of 3 nm. A rectangular grid (chart 1) was flown to confirm if observations from the Stellwagen were accurately summarizing the marine mammal abundance of the study area. . The conclusion from the aerial survey was, YES, the shipboard observers and the aerial observers were recording the same distribution and abundance of large whales. This conclusion allowed us to conclude that our survey effort was efficient.

During the field work three sightings of right whales were recorded in the study area. A right whale mother/calf pair at: 44-04.5N X 67-54.3W 6/16/07 was documented by the Bar Harbor Whale Watch on 6/16/2007 16:00. The observation team aboard the R/V STELLWAGEN identified and photo-documented a mother/calf pair at: 44-15.6N X 67-23.8W on July 1, 2007. The aerial survey team also photo-documented one mother/calf pair at: 44-23.62N X 67-02.3W 7/2/07 on July 2, 2007 . Of the mother/calf right whale pairs known to be in the area, none were “taggable” under the federal permit for this research. Observations indicated that right whales were in the area for short periods of time (~ 48 hours). In addition, the survey documented numerous fin and humpback whales in the area and a considerable amount of fishing gear: very heavy saturation inside the 3 mile fishing zone and a considerable amount of gear outside of three miles.

SightingID	EGLetter	ContributorsLetter	Time	Day	Month	Year	Latitude
	A	A	1120	1	7	2007	44 14.225
	B	n/a	1120	1	7	2007	45 14.225

Longitude	Area	Obs	Platform Type	Image Type	Mud	Darted	SAG
67 24.821	GOM	WHOI-PT	SHIP	DIGITAL	N	N	N
68 24.821	GOM	WHOI-PT	SHIP	DIGITAL	N	N	N

Association Type	Comments	Photographer	Frame #s
2	W/CALF, CUR	MAZ	DSC008, DSC009, DSC0016-DSC0019
2	CALF W/ MOM, CUR	MAZ	DSC001-DSC007, DSC0010-DSC0015, DSC0020





Project Summary:

1) The project offered a concentrated survey effort for right whales during the four week time frame. During this timeframe a 1,000 nm of survey effort was conducted. It was concluded that right whales, including mother/calf pairs come into the inshore waters of the GOM over rocky bottom but on a limited basis during the months surveyed. It appears that they are traveling through the area and only stay for a limited time. However, given the small number of right whales in the North Atlantic and the occurrence of mother calf pairs, it is not possible to rule out this habitat as posing insignificant entanglement risk.

2) These areas have not been extensively surveyed for right whales on an annual basis.. Whale watch boats and other recreational vessels provide a good source of sighting reports but only during summer months and good sighting conditions.. There isn't a good ground truthing as to when whales come into the area and how long they stay. Not enough is known about the use of this habitat to state statistically how the likelihood of finding right whales there varies with time.

3) There are numerous other species in the area including fin and humpback whales and Maine DMR feels it would be important to look at their interaction in the water column in relationship to fishing gear too.

Therefore we propose another field season to search for all of these species in the inshore rocky habitat, and to tag any sighted there.

FIELD PERSONAL:

Alex Loer – R/V STELLWAGEN Captain and project coordinator
Alessandro Bocconcelli – WHOI – Marine Operations
Dr. Mark Johnson – WHOI – Dtag and Pinger Buoy Engineer
Erik Dawe WHOI – Dtag Engineer
Erin Summers – Maine DMR local coordinator and marine mammal observer
Monica Zani – Lead observer and photo id New England Aquarium

Additional Observers:

Dr. Susan Parks, Stacie Koslovsky, Peter Nilsson, Loraine Bisson

Additional Field support:

Sean Sullivan, Matt Weingartner

We would also like to acknowledge the following people for their support:

Tim Cole, NMFS, Aerial Surveys
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Richard Merrick, NMFS
Amada Hansen, Woods Hole Oceanographic Institution
Tom Hurst, Woods Hole Oceanographic Institution
Dr. Sean Todd, College of the Atlantic/Allied Whale
Maine Lobstermen's Association

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