

Final Performance Report

Award Number: NA11NMF4720240

Establish WAVE in the Northeast Region of the US: Whale Abundance in the Mid-Atlantic, Vessel strike impacts, and the value of Education on commercial whale watching vessels in the Northeast Region.

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1. Quantifying Level A harassment for various viewed species, particularly humpback whales in the northeast and bottlenose dolphins in the Mid-Atlantic

Evaluate non-lethal collision rates of humpback whales.

No changes were made to the report since it was submitted for the 12 month progress report in October and, therefore, it has not been resubmitted with the Final Performance Report.

Bottlenose dolphins were not considered in this study. WDC does not have a sufficient data set of dolphin images from the mid-Atlantic to undergo a comparable scary based study, as was done on Gulf of Maine humpbacks, to analyze non-lethal injuries as a measure of harassment of these animals. A better measure of harassment of wild dolphins would be to consider potential habitat shifts or behavioral changes (Buckstaff 2004, Mattson et al. 2005). Collecting these data would require significant effort and funds beyond the scope of this grant.

The humpback whale non-lethal scar study was presented as a poster in November, 2012 at the American Cetacean Society's 2012 conference: "Whales and Humans: A Conflicted Relationship." The report, as submitted to NOAA in October, has been reviewed by Dr. Michael Moore (WHOI¹), Dr. Damon Gannon (Bowdoin College) and is currently being reviewed by Dr. Jooke Robbins (PCCS¹) and Allison Henry (NEFSC¹). Upon completion and incorporation of these edits, this study will be submitted to a journal for publication. Journals currently being considered for peer reviewed publication include: Marine Mammal Science, Human-Wildlife Interactions, Plos One and others. Further, a request has been submitted to Dr. Teri Rowles, Coordinator, NOAA's Marine Mammal Health and Stranding Program (MMHSRP), to verify any reports of humpback whale vessel strikes since 1998.

Rake marks (injuries resulting from orca teeth) were not attributed to the sharp force trauma data. According to Steiger et al. (2008), rake marks are defined as a set of 3 or more parallel lines or marks in close proximity. Bite marks measured on a turtle carapace in a case where an orca attack was witnessed were recorded as being spaced at 2.5cm (Pittman and Dutton 2004). While propeller marks are also defined by a parallel wound pattern with evenly spaced slashes, the spacing between the slashes is significantly larger in propeller injuries as compared to rake marks. Rommel et al. (2007) described cut spans from small vessels and personal watercraft (<4.9m) at a distance of 6.4-8.9 cm, over twice the span of orca teeth. In regard to shark scavenging, Bornatowski et al. (2012) reported that large shark scavenging on living humpback whales was rare (<1%). Additionally, shark bites on large whales tend to be jagged and semi-circular (Taylor et al. 2013) and therefore generally inconsistent from vessel strike injuries.

We believe that the results of this study demonstrate a need for further outreach to vessels beyond those engaged in whale-watching. It is our intention to continue this study to determine the vessel size class that is most likely causing these injuries, and provide recommendations to NOAA, based on these findings. However, anecdotal observations suggest that vessels engaged in fishing are operating in relatively close proximity to humpback whales as frequently as, if not more than, those engaged in whale watching. In July 2012, WDC made recommendations to NOAA's National Marine Fisheries Service (NMFS) regarding vessels engaged in fishing for blue fin tuna (BFT). WDC requested that NOAA consider marine mammal impacts when it revised the management plan for BFT fishing. We believe that all vessels, including those engaged in fishing for BFT, should be minimally subject to the Northeast Regional Whale Watching Approach and Departure Procedures for operating in the vicinity of whales. We urged NOAA prohibit vessels engaged in fishing for BFT from dragging or trolling gear within 100 yards of whales and dolphins. We also urged that NOAA consider that reporting incidental interactions with whales and dolphins, by the BFT fleet, be a condition of permitting and failure to comply result in revocation of permits.

For non-permitted vessels, WDC and NOAA's See A Spout, Watch Out! program has been a useful mechanism for



outreach but is in need of funding to continue. A request for funding was submitted to the Hollings Ocean Awareness Trust Fund in October. Announcements of successful awards will be provided in early 2013. While the program is voluntary, we believe that incentives could be developed to increase participation, such as partnering with corporate sponsors to offer specific benefits to those that have completed the program.

In all cases, a monitoring program must be included.

Bornatowska, Hugo, L. L. Wedekina³, M.I R. Heithaus^a, M. C. Marcondes^a, and M. R. Rossi-Santosa^a. 2012. Shark scavenging and predation on cetaceans at Abrolhos Bank, eastern Brazil. *Journal of the Marine Biological Association of the United Kingdom*. (92):08:1767-1772.

Buckstaff, K.C. 2004. Effects of watercraft noise on the acoustic behavior of bottlenose dolphins, *Tursiops truncatus*, in Sarasota Bay, Florida. *Marine Mammal Science* 20,709-725.

Mattson, M., Thomas, J., Aubin, D. (2005) Effects of Boat Activity on the Behaviour of Bottlenose Dolphins (*Tursiops truncatus*) in waters surrounding Hilton Head Island, South Carolina. *Aquatic Mammals* 31:1, 133-140.

Pittman, R. and P.H. Dutton. 2004. Killer Whale Predation on a Leatherback Turtle in the Northeast Pacific. *Pacific Science* (58)3:497–498.

Rommel, S. A., Costidis, A. M., Pitchford, T. D., Lightsey, J. L., Snyder, R. D., Haubold, E. M. 2007. *Marine Mammal Science* 23(1): 110–132.

Steiger, G. H., J. Calambokidis, J. M. Straley, L. M. Herman, S. Cerchio, D. R. Salden, J. Urbán-R., J. K. Jacobsen, O. von Ziegesar, K. C. Balcomb, C. M. Gabriele, M. E. Dahlheim, S. Uchida, J. K. B. Ford, P. L. de Guevara-P., M. Yamaguchi, and J. Barlow. 2008. Geographic variation in killer whale attacks on humpback whales in the North Pacific: implications for predation pressure. *Endangered Species Research* 4:247-256.

Taylor, J. K. D., Mandelman, J. W., McLellan, W. A., Moore, M. J., Skomal, G. B., Rotstein, D. S. and Kraus, S. D. (2012). Shark predation on North Atlantic right whales (*Eubalaena glacialis*) in the southeastern United States calving ground. *Marine Mammal Science*. doi: 10.1111/j.1748-7692.2011.00542.x

¹WHOI, Woods Hole Oceanographic Institution; PCCS, Provincetown Center for Coastal Studies; NEFSC, Northeast Fisheries Science Center

2. Supplement survey data and enhance knowledge of species distribution for the mid-Atlantic by collaborating with commercial whale watching companies operating in New Jersey and Virginia.
 - a. Evaluate whether sightings data from whale watch boats can serve as a supplement to NOAA surveys in the mid-Atlantic.
 - b. Evaluate habitat use and anthropogenic risks to large whales in the mid-Atlantic.

An updated version of this report has been submitted since the 12 month progress report. We have included the final sightings for 2012 from the mid-Atlantic whale watching companies. An additional match of an individually identifiable humpback was made to Canada and has been included. Two versions of the report have been submitted, included: one in which the modifications have been highlighted for ease of the reviewer; and a second, “clean”, version without highlighting.

WDC will continue to work directly with the two companies in New Jersey and collect data during the 2013 season. The Virginia Aquarium and Marine Science Center (VAQ) Stranding and Research Team will work directly with the Virginia whale watch naturalists and collect data in 2013. Both WDC and VAQs have agreed to continue to collaborate and share data in order to continue to monitor trends in the mid-Atlantic. We believe these efforts



are a demonstrable success of the pilot program provided as a result of funds provided by NOAA.

While we believe that a a Sightings Per Unit Effort Analyses (SPUE) would be useful, we have not yet secured funds to complete such an analyses. WDC welcomes any assistance or ideas as to how we might obtain funding to complete these efforts.

WDC and VAQ are working collaboratively to submit an abstract to present these data at the 2013 Southeast and Mid-Atlantic Marine Mammal Symposium (SEAMAMMS) conference and the 2013 Northeast Region Stranding Conference.

3. Evaluate long-term effectiveness of educational programs delivered on commercial whale watching vessels.
 - a. Determine whether passengers on whale watch boats are taught, understand and retain the essential principles of ocean literacy.
 - b. Increase public understanding of the North Atlantic Ocean systems, the relationships and interactions between people, whales, oceanographic climate, and behavior and habitat management processes.
 - c. Improve teaching skills within the commercial whale watching industry, while providing access to clear scientific information and empowering the public and the industry to maintain responsible whale watching protocols.

There have been no changes made to this report since the 12 month progress report submission and, therefore, it has not been resubmitted with this Performance Report. WDC is working toward, at least one, and possibly two separate publications from this report with the intention of submitting to a journal in 2013. The articles currently being considered are to review the long term impacts of whale watching, and the perceived public value of a whale watching educational program.

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