

**FINAL REPORT
TO
NATIONAL FISH AND WILDLIFE FOUNDATION**

Right Whale Disentanglement Response Enhancement
#2005-0326-002

July 31st 2007

INTRODUCTION

A National Fish and Wildlife Foundation (NFWF) grant proposal seeking funding to improve right whale disentanglement response efforts in the Southeastern United States by facilitating collaboration and training among responders was submitted and funded. Funds supported efforts to disentangle and biopsy whales during the 2005-2006 right whale calving season. A no cost extension was sought and granted which allowed remaining funds to be applied to disentanglement and biopsy efforts during the 2006-2007 calving season. This report covers activities for both seasons.

METHODS AND RESULTS

Equipment and Supplies

A response truck to move equipment, boats, and personnel to launch points for disentanglement response was purchased and outfitted. Prior to the award, NFWF asked the FWC to seek another funder for part of the cost of the truck. FWC approached Harbor Branch Oceanographic Institute who supplied \$10,000 towards the purchase (Appendix 1). Supplies purchased included an outboard motor for a small combat inflatable, biopsy crossbow, digital camera and lens, helmet camera, survival suits, and satellite phone.

Disentanglement Standby

Coastwise Consulting was subcontracted which based Chris Slay and the R/V Jupiter in Fernandina Beach from January 6, 2006 to March 6, 2006. Slay provided right whale disentanglement stand-by, biopsy sampling, and training of FWC and Georgia Department of Natural Resources (GDNR) personnel. A progress report on these activities was submitted to FWC (Appendix 2). Additionally, Slay provided training on implantable VHF tags to FWC and GNDR staff. A white paper on this alternative tag design was produced and submitted (Appendix 3).

NFWF Final Report Cont.
Disentanglement Responses

2005-2006 Calving Season

Eg# 3445

During the morning of December 3, 2005 the WT-GDNR aerial survey team located an entangled right whale off Brunswick, GA. GDNR staff responded by vessel and successfully removed a large portion of the approximately 400 feet of trailing line and attached a telemetry buoy to the whale. On December 4, 2005 the FWC aerial survey team relocated the entangled whale off St. Augustine, FL but due to diminishing daylight a vessel response was delayed until the following day. On the morning of December 5, 2005 the FWC aerial survey team began searching for the entangled whale in the Daytona Beach area. Provincetown Center for Coastal Studies (PCCS) staff and FWC staff staged a vessel response in the FL RHIB out of Ponce Inlet. The FWC aerial survey team located the whale approximately seven miles off Daytona Beach and stood by the whale and FL RHIB until additional staff from PCCS, NOAA, FWC, and GDNR arrived via the USCG cutter Kingfisher. The effort on December 5, 2005 was hindered by high winds and rough seas, but generated information on the entanglement as well as the removal of additional trailing line. The whale then headed north and was next encountered on January 12, 2006. The disentanglement team departed out of Beaufort, NC on the USCG cutter Elm. During this effort, the trailing line parted and separated the telemetry buoy from the whale, removing additional trailing line. Approximately 20 feet of trailing line remained on the whale at that point but has since been sighted by the New England Aquarium in the Great South Channel and appears to have shed the life-threatening portion of the gear.

Unidentified Whale

On December 20, 2005 an entangled right whale was reported to the USCG by a commercial shrimping vessel off Ponte Vedra Beach, FL. Aerial photos taken by FWC were unable to confirm the presence or absence of an entanglement. A vessel response consisting of FWC, GDNR, and NOAA fisheries staff was mounted. Based on the photographs from the FWC aerial survey team and the observations of the team on the vessel, the whale was thought to be not entangled.

Eg# 3346 "Kingfisher"

On January 8, 2006 the FWC aerial survey team observed and photographed juvenile whale Eg# 3346 "Kingfisher." Kingfisher was the target of a large scale disentanglement effort during the 2003-2004 calving season and since then has been observed with only a portion of remaining gear wrapped around his right flipper. The FWC aerial survey team sighted Kingfisher four times throughout the 2005-2006 calving season. He appeared to be in good health and his entanglement status is classified by PCCS as "monitor."

Humpback

Late in the afternoon on March 25, 2006 FWC received a report of an entangled whale in the vicinity of Flagler Beach, FL. The FWC aerial survey team responded to the location and verified the presence of an entangled humpback whale with commercial line

NFWF Final Report Cont.

and buoys around the tail stock. The humpback was slow moving and remained at or near the surface of the water; however, a vessel response was not underway due to diminishing daylight. Once on the ground, the FWC team forwarded the photographs to NOAA and PCCS and a plan was devised for a disentanglement attempt the following day to be led by FWC. On the morning of March 26, 2006 the FWC coastal aerial survey team began searching for the entangled whale in the area between Flagler and Daytona Beach. During that time, a recreational vessel spotted the whale and contacted the USCG. The aerial survey team went to the location of the whale and stood by during the disentanglement response until redirected. FWC, GDNR, and NOAA Fisheries staff launched out of Ponce Inlet and arrived on scene quickly. After deploying a telemetry buoy, photographing the whale, carefully assessing the entanglement, and consulting with PCCS staff, the team successfully cut and pulled the gear free from the whale. Although the whale appeared emaciated and had a pronounced spinal curvature near the tail stock, after the successful disentanglement it slightly picked up speed and spyhopped once before swimming away. For detailed report on this event see Appendix 4.

2006-2007 Calving Season

BK01SEUS06

On January 15, 2007 an entangled right whale, BK01SEUS06, was spotted off Brunswick, GA. GDNR first responders were able to remove some trailing line from the whale and attach a telemetry buoy that same day. The following day FWC staff joined with GDNR and NOAA Fisheries staff to further document and assess the entanglement by vessel. Several attempts to cut the gear free were unsuccessful. Further documentation was obtained on January 24, 2007 in Onslow Bay, NC. At this time additional trailing gear and the telemetry buoy were removed and the status of this entanglement was changed to “monitor”. On April 26, 2007 BK01SEUS06 was sighted near the Great South Channel and appeared to be gear free

Eg# 3346 “*Kingfisher*”

On February 27, 2007 FWC staff responded by vessel to further document Kingfisher’s health status and entanglement. All sighting data and photographs were forwarded to NOAA Fisheries, PCCS, and the New England Aquarium (NEA). Analysis of the photographs revealed Kingfisher to be in good health and his entanglement status continues to be classified by PCCS as “monitor.”

Biopsy Sample Collection

Under the guidance and training of subcontractor, Chris Slay, the FWC-GDNR biopsy team planned to conduct biopsy cruises on every good weather day between January 5, 2006 and March 2, 2006. Biopsy samples were collected under permit number 775-1600-10 issued to NMFS-NEFSC and permit number 665-1652-00 issued to NEA. Calves, juvenile adults, and previously undarted adult right whales were targeted for sampling. In general, the FWC team worked within the area outside the St. Johns River (Jacksonville, FL). The biopsy team collaborated with the aerial survey teams to speed up reaction time to sighted whales and minimize aerial survey assistance.

NFWF Final Report Cont.

Once the biopsy team arrived at the sighting location, the first priority was to take photographs in order to document the individual identification of the whale(s). FWC and GDNR staff received training on the best methods for operating the boat around the whales in order to obtain the photographs and skin sample. Each whale photographed was assigned a field ID and the initial/final sighting time, location, and behaviors were recorded. Staff were coached in obtaining the sample via a crossbow and the time and location of the biopsy sample collections were recorded. Ideally the biopsy sample contained both skin and blubber. Both samples were labeled using the whale's field ID and date. The samples and associated data were forwarded to Trent University and NOAA Fisheries (skin), Woods Hole Oceanographic Institute (blubber), and NEA (photographs) to be processed and archived.

The skin samples will be used to generate information on kinship, individual gender and identification, stock identity, and genetic variability within the population. The blubber portion of the samples will be used to determine contaminant levels and to gain information about feeding ecology and nutritional condition.

During the 2005-2006 calving season FWC staff conducted 16 biopsy cruises which resulted in 14 biopsy samples collected and 58 whales photographed (not unique individuals). Of the 14 biopsy samples collected, five were of calves and nine were of juvenile whales. Medical biopsy samples were also collected from entangled juvenile right whale Eg# 3445 on December 12, 2005 and an entangled juvenile humpback whale on March 26, 2006. Biopsy samples of entangled whales were collected under the direction and authority of NOAA Fisheries and PCCS. During the 2006-2007 calving season FWC and GDNR staff collaborated on an additional 27 biopsy cruises which resulted in 20 biopsy samples and approximately 120 whales photographed (not unique individuals). All 15 permitted right whale calf takes were used during the 2006-2007 calving season. Of the remaining five biopsy samples two were from adult females and three were from juvenile whales. In total, 43 biopsy cruises were conducted, 34 biopsy samples were collected, and approximately 180 whales were photographed (not unique individuals) during the 2005-2006 and 2006-2007 calving seasons.

CONCLUSIONS

With the funding support from this grant FWC has built a diverse team of disentanglement responders as well as a cache of essential disentanglement equipment. The past two calving seasons have given FWC staff the opportunity to develop the skills necessary to handle large whale disentanglement events. In addition, FWC and GDNR staff have built the foundation of a cooperative biopsy effort in the Southeast U.S. (SEUS). Continued partnership between FWC, GDNR, NFWF, and NOAA Fisheries is essential to allow the growth of programs such as these, improve protective measures for right whales in the SEUS, and assist in the continued survival of the North Atlantic right whale.

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION



RODNEY BARRETO
Miami

SANDRA T. KAUPE
Palm Beach

H.A. "HERKY" HUFFMAN
Enterprise

DAVID K. MEEHAN
St. Petersburg

KATHY BARCO
Jacksonville

RICHARD A. CORBETT
Tampa

BRIAN S. YABLONSKI
Tallahassee

KENNETH D. HADDAD, Executive Director
VICTOR J. HELLER, Assistant Executive Director

Fish and Wildlife Research Institute
(727) 896-8626 Fax: (727) 823-0166

Stephen D. McCulloch
Executive Director
Division of Marine Mammal Research and Conservation Program
Harbor Branch Oceanographic Institution
5600 U.S. 1 North
Ft. Pierce, Florida 34946

July 8, 2005

RE: Request for Funding from HBOI's Protect Florida Whales Specialty Plate

Dear Mr. McCulloch:

Each winter, critically endangered North Atlantic right whales migrate to Florida to give birth in our relatively warm and calm nearshore waters. The coastal waters of Georgia and Florida are the only known calving and nursery area for these whales whose numbers have been reduced to around 300 individuals. Cooperative scientific monitoring of the calving area documented 28 newborn right whales last winter making this one of the best calving years on record. This good news is tempered by the fact that collisions with ships and entanglement in fishing gear are leading causes of death and represent a significant impediment to recovery for these whales. Last winter, our staff assisted in the successful disentanglement of a right whale named "Yellowfin" (photo below), and provided photo-documentation of two other entangled whales for use in disentanglement action plans.



Appendix: 1
Stephen D. McCulloch
Page 2 of 2
7/8/2005

For the past ten years, the Commission's Right Whale Project has been assisting the effort to locate, document and remove fishing gear from right whales that are discovered in the calving area entangled. To further aid this recovery effort, we recently submitted a grant proposal to the National Fish & Wildlife Foundation (NFWF) asking for funding to "Enhance Right Whale Disentanglement Response in Southeast US". Among other things, our proposal detailed the need for a response truck to move equipment, boats and personnel to the launch point of a disentanglement response. The proposal has received favorable reviews from the granting agency, the NFWF/NOAA Atlantic Coastal States Cooperative Planning for Right Whale Recovery, but they have asked us to seek another funder for all or part of the cost of the truck (\$30,000).

FWRI and HBOI enjoy a long history of collaboration and sponsorship of research related to marine resources issues in Florida. Research topics have ranged from ichthyofaunal assessment to red tide toxicology to dolphin disease research to drug discovery and we would be pleased to receive HBOI sponsorship through its Protect Florida Whales Specialty Plate. Funding from the license plate could become an important component of our right whale disentanglement strategy. Recognition of HBOI and promotion of the specialty plate would be accomplished through lettering and logos placed on the response truck. NFWF has indicated that we have until August 30, 2005 to raise the funds.

Thank you for your consideration. Please contact me at 727.896.8626 or tom.pitchford@myfwc.com should you have any questions.

Sincerely,

Thomas D. Pitchford
Associate Research Scientist
Fish and Wildlife Research Institute

cc: Shirley Pomponi
Gil McRae
Alan Huff
Elsa Haubold
Leslie Ward

COASTWISE CONSULTING

173 Virginia Avenue

Athens, GA 30601

706-543-6859

Progress Report

Submitted to:

FL Fish and Wildlife Conservation Commission

Fish and Wildlife Research Institute

6134 Authority Ave

Jacksonville, FL 32221

904-573-4905

Stand-by for Disentangling Right Whales in the Calving Ground

Chris Slay of Coastwise Consulting was available for a disentanglement response during the 2006 calving season. Each day the biopsy team was on the water for training the team members were equipped with disentanglement gear for a response. No entangled whales were sighted in the SEUS during this time period.

Training FWC Personnel in Biopsy Darting Techniques

During the 2006 season, biopsy samples were collected under permit number 775-1600-10 issued to NMFS-NEFSC and permit number 665-1652-00 issued to NEA. Calves, juvenile adults, and previously undarted adult right whales were targeted for sampling this season. Under the guidance and training of subcontractor, Chris Slay of Coastwise Consulting, the FWRI biopsy team planned to conduct biopsy cruises on every good weather day during the 2006 calving season. In general, the FWRI team worked the area outside the St. Johns River (Jacksonville, FL) departing from the Sisters Creek Boat Ramp. Occasionally, the biopsy team departed from ramps in Fernandina or Brunswick, GA depending on where whales were anticipated to be sighted. The cruises generally began between 1000 hrs and 1200 hrs in order to give the aerial survey team time to reach the St. Johns River area. The biopsy team tracked south along with the aerial survey team in order to speed up reaction time to sighted whales and minimize aerial survey assistance.

Once the biopsy team responded to a sighting, the first priority was to take photographs in order to document the individual identification of the whale(s). The biopsy team approached the whale(s) from behind using a slow and steady pace in order to pull alongside the whale(s). Photographs were taken from a distance of 50 meters or less using a Canon EOS D60 Digital SLR camera equipped with a Canon EF 70-200mm f/2.8L IS USM or a Canon EF 300mm f/4.0L IS USM lens. Ideally, the biopsy team obtained left and right side head shots before darting. Each whale photographed was assigned a field ID (A-Z) and the initial/final sighting time, location, and behaviors were recorded. In addition, the time and location of the biopsy sample collections were recorded.

The same type of vessel approach used for photography was applied for the biopsy darting attempts. Biopsy samples were collected from a distance of 15-50 feet using a crossbow (FWRI) or longbow (Chris Slay) with specially designed biopsy arrows. A buoyant hard foam collar at the end of the arrow shaft prevented penetration beyond the skin blubber interface and a small steel cylindrical biopsy tip in front of the collar (7 mm in diameter) collected a core sample of whale skin. The preferred target area for sample collection was the flank about the middle of the whale's body. Ideally the sample contained both skin and blubber. The blubber was separated from the skin and then frozen. The skin sample was scored with a scalpel blade and then placed in a small tube with DMSO. Both samples were labeled using the whale's field ID and date i.e. "A" 09 FEB 2006. The samples and associated data were sent to Dr. Moira Brown at

Appendix: 2

the New England Aquarium and will be forwarded to Trent University (skin) and Woods Hole Oceanographic Institute (blubber) to be processed and archived.

Season Summary (Table 1 and Table 2)

During the 2006 calving season FWRI staff conducted 16 biopsy cruises which resulted in 58 whales photographed and 14 biopsy samples collected (Table 8). Of the 14 biopsy samples collected, five were of calves and nine were of juvenile whales. Biopsy samples were also collected from entangled juvenile right whale Eg# 3445 and an entangled juvenile humpback whale.

Appendix: 2

Table 1: 2005-2006 FWRI Right Whale Biopsy Daily Summary

Crew	Vessel	Departure Time (L)	Departure Port	Return Time (L)	Beaufort	Number of Groups visited	Number of whales photographed	Number of Samples		
								Calf	Mom	Other Adult
C.Slay, A.Garrett, K.Jackson	NOAA RHIB	1130	St.John's River	1530	2	1	2	1		
C.Slay, A.Garrett	NOAA RHIB	1100	St.John's River	1800	2	3	6	1		
C.Slay, A.Garrett, K.Jackson	NOAA RHIB	1030	St.John's River	1630	2	1	2			
C.Slay, A.Garrett, K.Jackson	NOAA RHIB	1120	St.John's River	1445	3	0	0			
C.Slay, A.Garrett, Mark Dodd (GDNR)	NOAA RHIB	1030	St.John's River	1630	2	1	2			
C.Slay, A.Garrett	NOAA RHIB	1035	St.John's River	1700	2	1	1			
C.Slay, A. Garrett, Elsa Haubold (FWRI), Leslie, Ward (FWRI)	NOAA RHIB	1015	St.John's River	1500	3	1	3+			
T.Pitchford, A.Garrett, C.Slay	NOAA RHIB	1030	St.John's River	1645	2	1	2			
C.Slay, A.Garrett, A.Wong, K.Jackson	NOAA RHIB	1100	St.John's River	1430	2-3	1	2			
C. Slay, T. Pitchford, J. Gwaltney (RIWH Obs)	NOAA RHIB	1335	St.John's River	1645	2-3	0	0			
C. Slay, T. Pitchford, A. Garrett, Clay George (GDNR), Leigh Younger (GDNR)	GDNR "Hurricane"	1010	Brunswick	1730	2	3	8	1		5
C. Slay, A. Garrett, T. Pitchford, Mark Dodd (GDNR)	NOAA RHIB	1037	Fernandina (worked Brunswick Channel)	1745	1-3	2	21			3
C. Slay, Joe Thompson (Friend of Slay)	Jupiter	1200	Fernandina	1850	2-3	2	2	1		
C. Slay, A. Garrett, T. Pitchford, Andy Stamper (Disney DVM), Mike Walsh (Seaworld DVM)	NOAA RHIB	1130	Fernandina	1830	3	0	0			
C. Slay, T. Pitchford, Clay George (GDNR), Leigh Younger (GDNR), Tricia Naessig (WT Survey Team)	GA RHIB	1018	Brunswick	1730	1-3	2	4	1		1
C. Slay, T. Pitchford, K. Jackson, A. Wong, Cherie Keller (FWRI)	NOAA RHIB	1015	Fernandina	1350	2-4	0	0			

Appendix: 2

Table 2: Biopsy Samples

Field ID	Darting location			Darted By	Comments on Sample	Sample Distribution	Comment
	Time (L)	Latitude	Longitude				
B	1342	30 28.9331	81 08.8100	C.Slay	Skin and blubber	Trent/NMFS	Mom is 2791
F	1736	30 20.1232	81 18.0429	C.Slay	Skin and blubber	Trent/NMFS	Mom is 1817
N	1602	31 03.1935	81 12.7126	A. Garrett	Skin	Trent	Juvenile
A	1113	31 00.35	81 21.7	A. Garrett	Skin	Trent	Juvenile
B	1114	31 00.35	81 21.7	C.Slay	Skin	Trent	Juvenile
C	1210	31 00.7951	81 20.3380	A. Garrett	Skin	Trent	Juvenile
D	1245	31 00.16	81 18.95	A. Garrett	Skin	Trent	Juvenile
F	1251	31 00.09	81 18.88	A. Garrett	Skin	Trent	Juvenile
G	1612	30 52.13	81 03.44	A. Garrett	UNK		1950
H	1612	30 52.13	81 03.44	C.Slay	Skin and blubber	Trent/NMFS	Mom is 1950
O	1618	31 03.4919	81 14.0203	A. Garrett	Skin	Trent	Juvenile
P	1620	31 03.5284	81 14.0601	A. Garrett	Skin	Trent	Juvenile
Q	1652	31 03.7174	81 14.8192	C.Slay	UNK		Juvenile
B	1806	30 46.1	81 21.7	C.Slay	Skin and blubber	Trent/NMFS	Mom is 1821
B	1447	30 43.5075	81 06.5633	C.Slay	Skin	Trent	Mom is 1151
D	1650	31 06.8141	81 11.8294	T. Pitchford	Skin	Trent	Juvenile

FINAL REPORT

**IMPLANTABLE VHF-RADIO TAGS
FOR USE IN DISENTANGELING RIGHT WHALES**

Submitted To:

Florida Fish and Wildlife Conservation Commission
Fish and Wildlife Research Institute
6134 Authority Avenue
Jacksonville, FL 32221



Photo taken by FWC under permit number 932-1489

Submitted By:

Coastwise Consulting, Inc.
173 Virginia Avenue

Athens, GA 30601
706-543-6859

**AN IMPLANTABLE VHF-RADIO TAG
FOR USE IN DISENTANGELING RIGHT WHALES**

The entanglement of northern right whales in fishing gear and other man-made material is a major problem for the survival of this species. Other than ship strikes, entanglement kills more right whales than any other known cause of mortality. The synthetic net and rope predominant in most fisheries and the enhanced fleet and gear mobility have worsened the problem of large whale entanglement, particularly among northern right whales (Clapham *et al.*, 2002, Knowlton, pers. comm.). As research efforts have expanded in right whale habitats, entanglements are more likely to be reported.

However, the successful disentanglement of right whales remains a difficult goal to achieve. A key element to success is the ability to track an animal over days or weeks, providing for repeated attempts by rescue teams. Currently, the most often employed tool for this is a large buoy tethered to the entangling lines on a whale. This has proved hugely successful in some cases and the buoy allows for the use of both satellite-linked tags for long-term tracking and VHF-radio tags for precise location information necessary for rescue team response. These buoys, however, are potentially physiologically stressful, adding extra drag to an already stressed animal. And without the VHF-radio tags, the satellite tags would not provide accurate enough or timely enough information to allow a rescue team to locate an entangled whale without extensive visual searches by air or water, which is not a practical approach.

In some cases a VHF-radio tag alone may be a good alternative to tethered tags. However, some entangled right whales carry no trailing line to provide an attachment for a tethered buoy. When entangled right whales are near the coast, or are not moving great distances, or when a buoy attached to entangling lines may exacerbate an entanglement by cinching lines through the forces of hydrodynamic drag, it may be preferable to implant a VHF-radio tag.

Implantable VHF-Radio Transmitters (IRTs) have been developed and tested (Hain *et al.*, 1999) and could be provided to the Disentanglement Network to allow for the tracking of entangled whales that are not easily or safely tracked with tethered buoy tags. In September 1999, an IRT tag was implanted into an entangled right whale (# 2710) and allowed for relocating this whale 19 days after it was implanted. The tag was still transmitting 32 days later.

The implantable VHF-radio transmitter is cylindrical, approximately 7-9 cm in length, 1.9 cm in diameter (Figure 1). They are deployed using archery equipment (Figure 2). Only the antenna and <1cm of the aft end of the tag protrudes from the surface of the animal (Figures 3 and 4), reducing the potential for tag failure due to damage sustained from body contact between whales.

Using implantable IRTs to relocate entangled right whales may greatly increase the success of disentanglement efforts when no other means of tag attachment is possible or safe.

Appendix: 3



Figure 1: IRT tag and antenna



Figure 2: Archery equipment (crossbow) with IRT tag on arrow

Appendix: 3



Figure 3: IRT tag implanted into sample whale skin and blubber
Sample skin and blubber are from a North Atlantic right whale calf
Skin and blubber collected under permit number: 932-1489-07

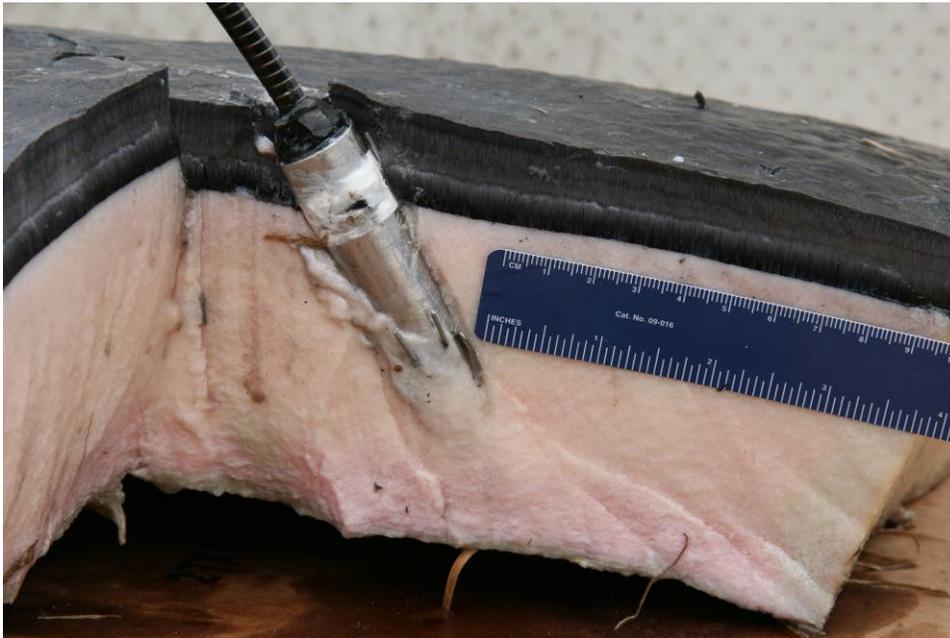


Figure 4: Cross-section of whale skin and blubber with IRT tag implanted
Sample skin and blubber are from a North Atlantic right whale calf
Skin and blubber collected under permit number: 932-1489-07

LITERATURE CITED

Caswell, H., M. Fujiwara, S. Breault. 1999. Declining Survival Probability Threatens North Atlantic Right Whale. Proceedings of the National Academy of Sciences.

Hain, J. H.W., S. L. Ellis, R. D. Kenney, C. K. Slay. 1999. Sightability of right whales in coastal waters of the southeastern United States with implications for the aerial monitoring program. Pp. 191-207, In, G.W. Garner, S.C. Amstrup, J.L. Laake, B.F.J. Manley, L.L. McDonald, and D.G. Robertson (eds.), Marine Mammal Survey and Assessment Methods. A.A. Balkema:Rotterdam, Netherlands.

Kenney, R.D., and S.D. Kraus. 1993. Right whale mortality - a correction and an update. Mar. Mamm. Sci. 9: 445-446.

Kraus, S.D. 1990. Rates and potential causes of mortality in North Atlantic right whales (Eubalaena glacialis). Mar. Mamm. Sci. 6: 278-291.

Kraus, S.D. 1985. "A review of the status of right whales (Eubalaena glacialis) in the western North Atlantic with a summary of research and management needs." National Technical Information Services Publication PB86-154143. 61p.

Kraus, S.D., M.J. Crone, and A.R. Knowlton. 1988a. "The North Atlantic Right Whale," pp. 684-698, in Chandler, W.J., ed., Audubon Wildlife Report 1988/1989. Academic Press, N.Y. 816 p.

Slay, C. K., S. D. Kraus, P. K. Hamilton, and A. R. Knowlton, L. A. Conger, 1998. Aerial Surveys To Reduce Ship Collisions With Right Whales In The Coastal Waters Of Georgia And Northeast Florida, Final Reports to the National Marine Fisheries Service, Miami, FL, 1994-1998

Slay, C. K., and S. D. Kraus, Right Whale Satellite Tagging and Habitat Use Patterns in the Coastal Waters of the Southeastern United States, Final Report to the National Marine Fisheries Service, 19

**Disentanglement Report
Humpback Whale, March 25, 2006
Flagler Beach, Florida**

Summary: Late in the afternoon on March 25, 2006 Florida Fish and Wildlife Conservation Commission (FWC) received a report of an entangled whale from the Marine Resources Council (MRC) in the vicinity of Flagler Beach. The FWC aerial survey team responded to the location and verified the presence of an entangled humpback whale with line and buoys around the tail stock. The humpback was slow moving and remained at or near the surface of the water; however, a vessel response was not underway due to diminishing daylight. Once on the ground, the FWC team forwarded the photographs to NOAA Fisheries and Provincetown Center for Coastal Studies (PCCS) and a plan was devised for a disentanglement attempt the following day. On the morning of March 26, 2006 the FWC coastal aerial survey team began searching for the entangled whale in the area between Flagler and Daytona Beach. During that time, a recreational vessel spotted the whale and contacted the USCG. The aerial survey team went to the location of the whale and stood by during the disentanglement response until redirected. FWC-Tom Pitchford and Andy Garrett, GDNR- Clay George, and NOAA Fisheries- Barb Zoodsma launched out of Ponce Inlet in the NOAA RHIB and arrived on scene quickly. After deploying a telemetry buoy, photographing the whale, carefully assessing the entanglement, and consulting with PCCS staff, the team successfully cut and pulled the gear free from the whale. Although the whale appeared emaciated and had a pronounced spinal curvature near the tail stock, after the successful disentanglement, it slightly picked up speed and spynapped once before swimming off.

Initial Response: On March 25, 2006 at 1726 hrs FWC observers Katie Jackson and Dianna Schulte arrived on scene in Skymaster 337CH. The humpback's position at 1726 hrs was 29°26.3N 81°05.4W. There is a large white poly ball and a smaller cylindrical yellow/orange buoy adjacent to each other located directly behind the trailing edge of the fluke. The buoys seem to be very close to the whale. The whale was surfacing to breathe every 1.5-2 minutes. The whale was not staying at the surface of the water for more time than it took to take a breath, but the buoys remained at the surface the entire time we were there. The whale could freely move his pectorals, but the leading edge of his fluke was visible only once. The whale moved his pectorals up and down frequently to surface and also while he was under the surface of the water. There appears to be a thick area of line or gear/line around the peduncle about 1-2 feet ahead of the fluke insertion. There are some areas of chafing on his back behind the blowhole. The last position of the whale was at 1806 hrs at 29°25.54N 81°05.43W and it was still moving south.

Assessment/documentation: On March 26, 2006 the whale was re-located south of Ponce Inlet in Volusia County. With the USCG MLB standing by, the whale was initially approached from its left side. Once determined that there was no trailing line the RHIB approached from the rear and took up a course at the whale's right rear flank. This was then the preferred side because of the wave/wind drift. Next, the whale was approached from its right rear quarter, paralleling its course and speed, to a point abeam

Appendix: 4

of the gear. The RHIB had one engine trimmed up and turned off. Photos and video were taken. The RHIB was then maneuvered in a slow pass alongside the whale to scan body, flippers, and mouth for any sign of gear before falling off to starboard to discuss findings. The whale continued to swim in a slow southerly direction with no obvious reaction to the RHIB. Locomotion appeared to be primarily accomplished by “pec-swimming” as the flukes were generally sub-surface with little obvious up/down stroke.

Several additional closer passes as above were made to document/asses the gear and condition/behavior of the whale. A mask was donned to view the gear underwater with the snorkeler and safety working from the RHIB’s port bow. After these passes a preliminary sketch of the entanglement was made and discussed onboard and over the phone with PCCS. PCCS suggested collecting underwater video using the helmet-cam. The camera remote was attached to a pole and a two-person team aimed and recorded the gear and whale from the port bow.

Disentanglement Plan: In consultation with PCCS an initial plan to disentangle the whale in stages was discussed. The plan was stage-based and results dependent, with consultation with PCCS at each milestone. The *first stage* was to attach the telemetry buoy, which was done using a 60-foot lead clipped into an overhand knot made from a short loop of line trailing the buoys. An assessment of the tag attachment and any change in whale behavior was made before proceeding. The whale may have slowed its southerly swim speed but otherwise showed no obvious reaction to the extra drag.

Second Stage: The RHIB was maneuvered toward the whale’s right rear quadrant. A two-person team, working from the port bow, made a single cut to the line leading from the right fluke lobe to the trailing buoys. The whale did not seem to react to the cut except for a trumpet blow on its next surfacing. The RHIB fell-off to starboard to access/discuss the stage. The whale continued southerly, but was swimming slowly so that very little drag-force resistance on the trailing gear was likely. After consulting with PCCS a third stage was planned and executed.

Third Stage: The RHIB approached the telemetry buoy from behind so that it could be retrieved and the control line used to slowly maneuver the trailing gear to the whale’s left side. The control line was hand-held with one wrap around the RHIB’s tow pylon. A second person maintained the telemetry buoy and remaining coils of control line should they need to be re-deployed. As the RHIB moved to the whale’s left to provide gentle, controlled resistance, the gear came free from the whale and was retrieved. The whale did not appear to react but seemed to gain a little speed and spy-hopped once while the RHIB paralleled it for assessment and biopsy. The RHIB returned to the ramp at 16:43