

FINAL REPORT
TO
NATIONAL FISH AND WILDLIFE FOUNDATION

Monitoring North Atlantic Right Whales off the Coasts of
South Carolina and Georgia
2004-2005

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Submitted by:

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Introduction

The North Atlantic right whale, *Eubalaena glacialis*, is listed as a federally-protected endangered species under the Endangered Species Act, in addition to being protected by the Marine Mammal Protection Act. There are estimated to be approximately 300 individuals remaining in the population, and recent data suggest that the population has been declining at a rate of 2.4% since 1991. An increase in calving intervals also heightens the effects of each birth and mortality on the survival of the species. A slow reproductive rate is further hindered by human-related mortality, the largest known threat to the species, including ship impacts and entanglement in fishing gear (NMFS 1991). It is essential that mitigation measures are enacted quickly and efficiently to minimize human-related mortality, particularly in the calving grounds of the Southeast United States (SEUS).

Right whales are slow moving, especially when accompanied by a calf, and are often not easily seen at the water's surface due to the lack of a dorsal fin. These factors make them vulnerable to ship strikes, especially in areas of increased vessel traffic and dredging activities. The winter calving grounds off Georgia and northern Florida have been designated as critical habitat for right whales in the SEUS. An Early Warning System (EWS) was created to alert military and commercial vessels transiting the critical habitat area of the presence of right whales. The region just north of the critical habitat, including northern Georgia and South Carolina, has long been believed to be an important migratory route. However, recent survey effort and photo-identification data has suggested that some individuals utilize this area not only as a migratory route, but as a residency area as well. Resource managers are currently unsure about the extent or the importance of this southern mid-Atlantic region to the reproducing population. In addition, continuing mortality from ship strikes and gear entanglement in the mid-Atlantic region is of concern to researchers and managers. It is presently undecided whether to include this area as part of the Southeast or the mid-Atlantic management units when making conservation decisions. The purpose of this aerial survey effort is to provide more complete information to allow these important management questions to be answered.

By providing more complete aerial survey coverage of the entire Georgia/South Carolina area, researchers will develop a better understanding of the residency areas utilized by calving females and other members of the population. The question has frequently been raised as to whether the SEUS critical habitat should be expanded to include more of the Georgia coast, or whether the mid-Atlantic should be designated as an additional critical habitat area during specific times of the year. Through this multi-year study we hope to provide managers with a more thorough understanding of right whale distribution and residency in the region to assist with time-critical management decisions.

This study will also serve as an aid to the research being conducted by NOAA Fisheries to test the feasibility of using passive acoustic monitoring devices, or pop up buoys, to detect the presence of right whales in the Southeast/mid-Atlantic areas. The aerial survey team will essentially be used to substantiate the data collected by these passive devices by visually detecting the presence of right whales in the area during a survey, and comparing sightings observed to right whale locations detected by the passive detection devices.

Methods

Study Area

The South Carolina (SC) survey season began on 01 December, 2004 and concluded on 14 April, 2005. The SC survey area for the 2004/2005 season extended from North Myrtle Beach, SC to the northern end of Sapelo Island, GA. The survey area was divided into three sections: northern, middle and southern. The northern area extended from North Myrtle Beach, SC to Cape Romain, SC and consisted of sixteen southeast/northwest transect lines of varied lengths (35.1 - 35.3 nm) which were flown at approximately 4 nm intervals. The middle area extended from Cape Romain, SC to Fripp Island, SC and consisted of sixteen southeast/northwest transect lines of varied lengths (35.3 - 35.4 nm) which were also flown at approximately 4 nm intervals. The southern section extended from Hilton Head Island, SC to Sapelo Island, GA and consisted of fourteen east/west transect lines of varied lengths (11.7 – 29.0 nm) which were flown at 3 nm intervals (Figure 1). The northern and middle transit lines were flown in a southeast/northwest direction as opposed to the east/west direction of the southern section in order to cover a larger bathymetric range as well as to provide visual data to substantiate the acoustic data collected by passive detection devices located in the area. A complete northern survey consisted of 563.4 nm of trackline flown. A complete middle survey consisted of 565.2 nm of trackline flown. A complete southern survey consisted of 323.5 nm of trackline flown (Table 1). These totals do not include miles flown in transit to, from, and between transect lines. The survey aircraft departed from East Cooper Airport in Mt. Pleasant, SC each day. After completing half of the survey lines for the day, the plane would break for fuel and to provide a break for observers to avoid observer fatigue. When flying in the northern section, the plane would refuel at Georgetown Airport in Georgetown, SC. In the middle section the plane would refuel at East Cooper Airport. In the southern section, the plane would refuel at Hilton Head Airport in Hilton Head, SC. The plane returned to East Cooper Airport at the end of each normal survey day. Without whale sightings, a complete northern survey took approximately 7.7 hobbs hours to finish, a complete middle section took approximately 7.6 hours, and a complete southern section took approximately 5.8 hours. This includes transit times to and from the airports.

Table 1. South Carolina survey transects for the 2004-2005 calving season.

Track Line	Length(nm)	Latitude West	Longitude West	Latitude East	Longitude East
1	29	31 34.8	-81 7.8	31 34.8	-80 34.2
2	28.1	31 37.8	-81 7.2	31 37.8	-80 34.2
3	28.1	31 40.8	-81 7.2	31 40.8	-80 34.2
4	27.3	31 43.8	-81 6.0	31 43.8	-80 34.2
5	28.1	31 46.8	-81 3.0	31 46.8	-80 30.0
6	25.5	31 49.8	-81 0.0	31 49.8	-80 30.0
7	26.4	31 52.8	-80 57.0	31 52.8	-80 25.8
8	23.8	31 55.8	-80 54.0	31 55.8	-80 25.8
9	26.3	31 58.8	-80 51.0	31 58.8	-80 25.8
10	18.8	32 01.8	-80 48.0	32 01.8	-80 25.8
11	19.4	32 04.8	-80 45.0	32 04.8	-80 22.2
12	16.8	32 07.8	-80 42.0	32 07.8	-80 22.2
13	14.2	32 10.8	-80 39.0	32 10.8	-80 22.2
14	11.7	32 13.8	-80 36.0	32 13.8	-80 22.2
15	35.4	32 20.4	-80 27.0	31 53.4	-80 0.0
16	35.4	32 24.6	-80 25.2	31 57.6	-79 58.2
17	35.4	32 29.4	-80 23.4	32 2.4	-79 56.4
18	35.4	32 30.0	-80 18.0	32 3.0	-79 51
19	35.3	32 32.4	-80 13.8	32 5.4	-79 46.8
20	35.3	32 34.2	-80 9.6	32 7.2	-79 42.6
21	35.3	32 36.0	-80 4.8	32 9.0	-79 37.8
22	35.3	32 37.2	-79 59.4	32 10.2	-79 32.4
23	35.3	32 39.6	-79 55.8	32 12.6	-79 28.8
24	35.3	32 42.6	-79 52.8	32 15.6	-79 25.8
25	35.3	32 45.6	-79 49.2	32 18.6	-79 22.2
26	35.3	32 48.0	-79 45	32 21.0	-79 18.0
27	35.3	32 51.0	-79 42.0	32 24.0	-79 15.0
28	35.3	32 53.4	-79 37.8	32 26.4	-79 10.8
29	35.3	32 58.2	-79 36.6	32 31.2	-79 9.6
30	35.3	33 1.2	-79 33.6	32 34.2	-79 6.6
31	35.3	33 0.6	-79 26.4	32 33.6	-78 59.4
32	35.3	33 1.2	-79 21.0	32 34.2	-78 54.0
33	35.3	33 6.0	-79 19.2	32 39.0	-78 52.2
34	35.3	33 7.8	-79 15.0	32 40.8	-78 48.0
35	35.2	33 10.8	-79 11.4	32 43.8	-78 44.4
36	35.2	33 16.2	-79 10.8	32 49.2	-78 43.8
37	35.2	33 21.0	-79 9.0	32 54.0	-78 42.0
38	35.2	33 25.8	-79 7.2	32 58.8	-78 40.2
39	35.2	33 29.4	-79 4.8	33 2.4	-78 37.8
40	35.2	33 32.4	-79 1.2	33 5.4	-78 34.2
41	35.2	33 36.0	-78 58.8	33 9.0	-78 31.8
42	35.2	33 39.0	-78 55.2	33 12.0	-78 28.2
43	35.2	33 42.0	-78 52.2	33 15.0	-78 25.2
44	35.2	33 45.0	-78 48.6	33 18.0	-78 21.6
45	35.1	33 47.4	-78 44.4	33 20.4	-78 17.4
46	35.1	33 49.2	-78 40.2	33 22.2	-78 13.2

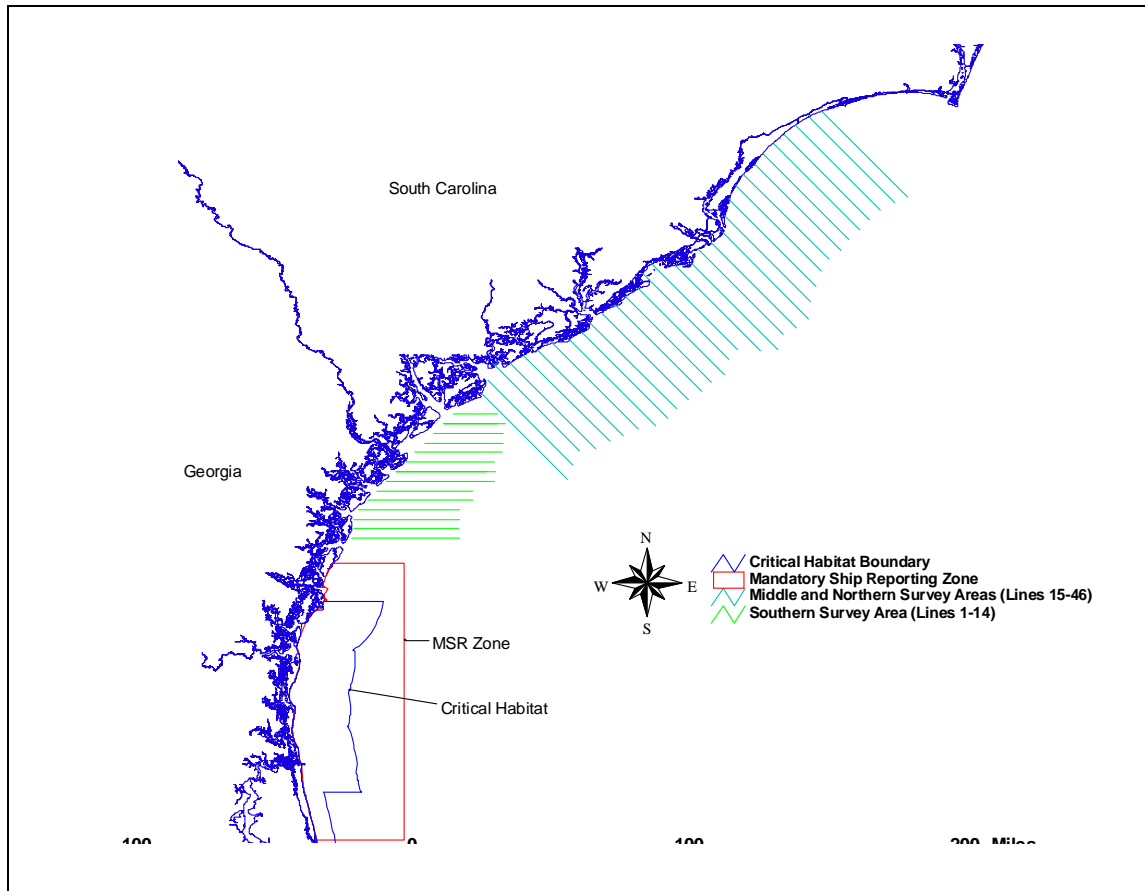


Figure 1. Map of SC survey tracklines flown from 01 December 2004 through 14 April 2005.

Aerial Surveys

Surveys were scheduled to be flown daily from 15 November 2004 through 14 April 2005, weather permitting, under VFR (visual flight rules) conditions. Due to a delay in funding and permit paperwork, surveys began on 01 December 2004. Surveys were conducted in a Cessna 337 Skymaster aircraft owned and operated by Orion Aviation. The aircraft was equipped with Global Positioning System (GPS), navigation aids, radar, aviation VHF radio, marine VHF radio, a life raft, PFDs, survival suits, flares, EPIRB, and a satellite telephone. Additionally, individually registered GPIRBs, knives, and streamers were issued to the observers. Flight protocols also included mandatory PFD usage on all flights, and the wearing of Nomex flight suits. All observers were also required to complete emergency egress training prior to the start of the survey season.

Surveys were flown at an altitude of 1000 ft (303 m) and at a ground speed of 100 knots. The surveys were typically flown north to south with the western waypoint of the most northern trackline of the section acting as the start point. However, the section flown, the start point and direction of flight was determined daily, based on weather conditions throughout the survey area and other survey factors. Spreading survey effort equally amongst the survey areas was also a factor. Conditions necessary for survey flight included a minimum ceiling of 455m, visibility greater than 2nm, wind speed less than 21 knots, and Beaufort sea state of 5 or less. The survey crew consisted of a pilot and co-pilot and two observers. The observers were positioned on either

side of the aircraft behind the pilot and co-pilot seats. All events, sightings, and changes in physical conditions were recorded on a laptop computer, positioned in front of and between the two observers, using Logger 2000, a software program designed for marine data entry. To minimize time spent looking away from the window, when an event occurred the right observer recorded the time and position of the event on the computer while the left observer recorded the time and pertinent event information into a handheld digital voice recorder. Time, location, number, and species of all large whales were recorded. In addition, all types of large vessels (over 33m in length) observed in the survey area were recorded. Sighting angles for the vessels were recorded using a digital inclinometer. When there was no inclinometer on the plane, sighting distance for large vessels was estimated by the observers. Sighting distance for all large whales was calculated from overhead GPS locations. When a right whale was observed, a GPS position was recorded along the trackline at the point of observation. The survey aircraft then broke track and flew directly over the right whale to obtain a GPS location. The aircraft also circled over each right whale encountered to obtain photographs. The circling for photographic documentation was generally limited to 15 minutes for each sighting, with a maximum of 30 minutes during special circumstances. After right whales were documented the aircraft returned to the trackline at the point of departure to continue the survey.

Determination of Sighting Distance from the Trackline

Sighting distance from the trackline for observed right whales was calculated whenever possible, using the lat/long position on the trackline perpendicular to the position of the whale sighting ($lat_1, long_1$), and the lat/long exact overhead position of the right whale ($lat_2, long_2$). The whale's distance in nautical miles from the trackline was determined by subtracting the distance between the two latitude positions, as 1 minute of latitude=1nm in the study area. The sighting distance from the trackline of large vessels was determined using angles obtained from a digital inclinometer at the time of the vessel's sighting.

Notification of Right Whale Sighting Information

Upon completing data collection for each right whale sighting, the aircraft would immediately attempt to contact Fleet Area Control and Surveillance Facility (FACSFACJAX) at Naval Air Station Jacksonville. This was usually accomplished via satellite phone. The plane would either call the designated ground contact for the day to have them relay the information to FACSFACJAX via phone or the plane would contact FACSFACJAX directly. If either of these methods were unsuccessful, the information was telephoned in immediately after the survey aircraft was on the ground. Information, including date, time, latitude and longitude, direction of movement if applicable, and number of animals and age class, was reported to the dispatcher. FACSFACJAX has the capability to contact all military ships and aircraft almost instantaneously with right whale location information. In addition, the facility notifies all other military and non-military interests via an alphanumeric pager system (Taylor and Brooks 2002). This includes all aerial survey teams, ship channel pilots, USCG NAVTEX, and state agencies. They receive notification of all incoming right whale sightings in near real-time via an alphanumeric pager. This supports real time notification of right whale presence to ships in hopes of eliminating right whale deaths due to ship strike. It also allows aerial survey teams to verify sightings reported from other sources such as military ships and aircraft.

Photographic Identification

Right whales are identified by the patterns of cornified skin primarily located on the top of the head between the tip of the rostrum and the blowhole (Payne et al. 1983; Kraus et al. 1986). Photographs of these right whale callosity patterns and other features, including scars, are used for identification and the cataloging of individual right whales. The right whales observed during the SC aerial surveys were photographed in order to identify individual animals.

During a right whale sighting, the left observer recorded all sighting information into the voice recorder and entered the sighting positions into the computer. If possible, the observer also sketched the right whales being photographed, including callosity patterns and body scarring, and recorded observed behaviors. The aircraft would circle at an altitude of 1000 ft (303m) over the animal(s) while the right observer photographed the animals through the co-pilot's sliding window, or through the right observer window which could be opened. Photographs were taken of callosity patterns and any body scarring using Canon D60 and Canon 20D digital cameras with a fixed 300 mm image stabilizing lens. All the photographs obtained during the season were compared against each other and against the New England Aquarium's catalog of North Atlantic right whales in order to determine the probable number of individual right whales encountered during the 2004/2005 SC survey season. Preliminary photo analysis by the SC Wildlife Trust team and initial verification by New England Aquarium has been completed and all photographs taken during the 2004/2005 season have been forwarded to the researchers at the New England Aquarium for final confirmation.

Results

Aerial Surveys

A total of 75 South Carolina Right Whale (SCRW) surveys were flown during the 136 available survey days of the 2004-2005 right whale calving season (Table 2). On 17 February 2005, two partial surveys were conducted due to inclement weather; one in the middle section in the morning and one in the southern section in the afternoon. A total of 424.4 hours of hobbs time was logged for the SCRW surveys, averaging 6.4 hours of hobbs time per survey in the northern section, 5.6 hours in the middle, and 4.9 hours in the southern. A total of 9477.1 nautical miles (nm) of trackline were flown in the northern section, 10016.9 nm in the middle, and 6033.7 nm in the southern, giving an overall total of 25526.7 nm. Over 14998 nm (58.7%) of this total were flown in a sea state of 3 or less: 6696.4 nm (70.6%) in the northern section, 5179.6 nm (51.7%) in the middle, and 3123.2 nm (51.8%) in the southern. The northern survey area was completed 11 times during the season and partially completed 11 times. The middle survey area was completed on nine survey days and partially completed on 17 days. The southern survey area was also completed nine times and partially completed 19 times. The 47 partial SCRW flights were largely due to factors such as weather and sea state conditions. On two occasions partial surveys were conducted due to airplane technical problems. Days with no survey effort in the SCRW survey area were primarily due to unacceptable weather conditions. We did not fly on 06 January 05 due to a required rest day for the pilots.

There were four flights involving entangled or possible entangled whales. On 08 December 2004, we flew a dedicated search along the coast from Hilton Head, SC to Wilmington, NC searching for a reported but unverified entangled right whale. On 30 December 2004, we flew a

dedicated search for a known entangled right whale whose satellite telemetry plot indicated that it was near the Charleston Harbor channel. We located the animal and stayed with it until cleared to leave by the disentanglement team. On 31 December 2004, we broke from our southern survey lines to assist the disentanglement team working to the east of our area. Once cleared by the team after verifying that there was no remaining gear on the animal, we returned to complete our survey area. On 12 January 2005, we flew a dedicated search to verify a report from the previous day of an entangled whale, unknown species, off of Pawley's Island, SC. During transit to the area an updated location report was received. We located the animal and confirmed the sighting as right whale #1970 and her calf. Neither animal showed signs of entanglement. The initial entanglement report indicated only one animal and, though not confirmed, the description indicated that it was a humpback whale. Therefore, we continued to search the surrounding area for the possible humpback whale until we lost visibility due to fog.

Table 2: Survey effort for the SCRW surveys conducted from 01 December 2004 to 14 April 2005.

Date	Survey Area	Complete Surveys	Partial Surveys	Survey Hobbs Time	Total trackline miles flown	Trackline miles flown in Beaufort SS \leq 3	Number of whales seen	Comments
2-Dec-04	N	1		7.8	563.4	128.8	0	no GPS
3-Dec-04	M		1	2.6	151.7	1.6	0	no GPS
4-Dec-04	S	1		6.4	323.5	270.5	2	
5-Dec-04	M		1	7.4	494.6	494.6	1	
6-Dec-04	N	1		7.8	563.4	544.5	0	
7-Dec-04	M		1	4.8	203.4	50.4	3	
8-Dec-04	N		1	6.7	281.4	281.4	0	
9-Dec-04	S		1	3.1	131	25.7	0	
12-Dec-04	M		1	4.1	282.8	25	2	no GPS after 12:58
16-Dec-04	N		1	8.2	494	212.6	5	
17-Dec-04	S	1		7.7	323.5	20.7	1	no GPS
18-Dec-04	M	1		7.8	565.2	399.9	0	
19-Dec-04	S		1	3	121.4	0	0	
21-Dec-04	N	1		7.5	563.4	211.3	0	
22-Dec-04	S	1		7.3	323.5	175.7	3	
24-Dec-04	S		1	2.8	74.5	0	0	
28-Dec-04	M	1		7.4	565.2	0	0	
29-Dec-04	N	1		7.8	563.4	385.4	0	
30-Dec-04	M		1	5.5	212	202	2	
31-Dec-04	S	1		7.7	323.5	323.5	3	
1-Jan-05	N	1		7.6	563.4	548.8	0	
2-Jan-05	M		1	7	533.8	262.9	0	
3-Jan-05	S	1		7.9	323.5	304.6	8	
4-Jan-05	S		1	3.1	38.7	38.7	2	
5-Jan-05	N		1	3.9	282	210.8	0	

Date	Survey Area	Complete Surveys	Partial Surveys	Survey Hobbs Time	Total trackline miles flown	Trackline miles flown in Beaufort SS \leq 3	Number of whales seen	Comments
7-Jan-05	M	1		7.5	565.2	565.2	0	
8-Jan-05	S		1	3.4	114.7	114.7	0	
9-Jan-05	N		1	2	15	0	0	
11-Jan-05	M		1	4.2	282.4	157.7	2	
12-Jan-05	N		1	2.1	26.7	26.7	2	
13-Jan-05	S		1	3.8	107.2	62.1	3	
19-Jan-05	M	1		7.6	565.2	112.8	0	
20-Jan-05	N		1	7.6	492.8	300.8	4	
21-Jan-05	S	1		7.2	323.5	212.1	5	
22-Jan-05	S		1	3.9	200.9	60.4	0	
24-Jan-05	M		1	4.1	282.8	174.9	0	
25-Jan-05	N	1		7.4	563.4	484	0	
26-Jan-05	S		1	4.2	213.3	32.3	0	
31-Jan-05	S		1	1.6	25.9	0	0	
7-Feb-05	S		1	5.6	268.4	36.2	0	
8-Feb-05	M		1	4.3	282.8	256.7	0	
9-Feb-05	N	1		7.8	563.4	563.4	0	
11-Feb-05	S		1	3.3	100.4	0	0	
12-Feb-05	M		1	6.9	496.3	37.2	0	
13-Feb-05	N		1	4.2	281.4	281.4	0	
14-Feb-05	S		1	4.6	157.4	16.8	4	
17-Feb-05	M		1	2.6	189.2	13.7	0	
17-Feb-05	S		1	4.2	166.1	140	2	
18-Feb-05	N		1	2.3	14	0	0	
19-Feb-05	S	1		6.2	323.5	278.1	3	
20-Feb-05	M	1		7.4	565.2	441.1	0	
22-Feb-05	S		1	6.2	307.4	49	0	
3-Mar-05	S		1	5.9	309.5	181.3	0	
4-Mar-05	M	1		7.7	565.2	137.3	0	
6-Mar-05	S	1		6.8	323.5	220.8	2	
7-Mar-05	M		1	4.1	242.4	69.1	2	
9-Mar-05	M	1		7.7	565.2	315.6	0	
10-Mar-05	N		1	7.8	550.9	228.1	0	
14-Mar-05	M		1	4.2	235	65.7	0	
19-Mar-05	S		1	5.4	295.8	130.7	0	
20-Mar-05	M	1		8.2	565.2	250.2	2	
21-Mar-05	N	1		8	563.4	166.9	2	
22-Mar-05	M		1	3.9	265	90.8	0	
24-Mar-05	N		1	7.8	559.5	190.1	0	
29-Mar-05	S		1	3.9	166.1	52.9	0	

Date	Survey Area	Complete Surveys	Partial Surveys	Survey Hobbs Time	Total trackline miles flown	Trackline miles flown in Beaufort SS \leq 3	Number of whales seen	Comments
30-Mar-05	N	1		7.7	563.4	532.4	0	
31-Mar-05	M		1	4	282.8	260.7	0	
4-Apr-05	S	1		6	323.5	258.4	0	
5-Apr-05	M	1		7.8	565.2	565.2	0	
6-Apr-05	N	1		7.8	563.4	563.4	0	
7-Apr-05	S		1	3.3	157.4	4.4	0	
8-Apr-05	M		1	3.1	227	83.6	0	
9-Apr-05	S		1	3.6	166.1	88.6	0	
10-Apr-05	M		1	3.4	266.1	170.7	0	
11-Apr-05	N	1		7.2	563.4	563.4	0	
12-Apr-05	N		1	4	282	272.2	0	
Total		29	47	424.4	25527.7	14999.2	65	

Right Whale Sightings and Identifications

Thirty-seven right whale sightings were documented on the SCRW surveys, consisting of 44 animals (Figure 2). Eleven cow/calf pairs, 12 single animals, and 14 groups of two or more adult/juvenile right whales were documented. Two sightings resulted in no photographic documentation of an animal due to its elusive behavior. Preliminary photo analysis by the SC Wildlife Trust team and verification by New England Aquarium has resulted in the identification of 7 individual cow/calf pairs and 18 individual adult/juvenile whales which account for 51 of the 65 animals sighted during the season (Table 3). Twelve individual whales have not been identified at the time of this report. All right whale identification information included in this report should not be considered confirmed until the New England Aquarium completes the confirmation process. Locations of the 37 SCRW right whale sightings by month are depicted in Figure 3.

Table 3: SCRW right whale sightings from 01 December 2004 through 14 April 2005.

Sighting #	Month	Day	Year	Time (L)	Survey Name	DecLat	DecLong	RIWHLetter	EGNO	NRWNumber
1	12	04	2004	14:02	SCRW041204	31.700	-81.015	A	1245	NRW05002
2	12	04	2004	14:02	SCRW041204	31.700	-81.015	B		NRW05002
3	12	05	2004	12:33	SCRW041205	32.470	-79.810	A	2040	NRW05004
4	12	07	2004	9:34	SCRW041207	32.463	-79.757	A	NO PHOTO	NRW05008
5	12	07	2004	12:09	SCRW041207	32.809	-79.574	B	1246	NRW05011
6	12	07	2004	12:09	SCRW041207	32.809	-79.574	C	CALF	NRW05011
7	12	12	2004	13:22	SCRW041212	32.282	-80.179	A	2790	NRW05014
8	12	12	2004	13:22	SCRW041212	32.282	-80.179	B	BK24	NRW05014
9	12	16	2004	11:08	SCRW041216	33.404	-78.769	A	1970	NRW05016
10	12	16	2004	11:08	SCRW041216	33.404	-78.769	B	CALF	NRW05016
11	12	16	2004	13:48	SCRW041216	33.228	-78.930	C	2790	NRW05017

Sighting #	Month	Day	Year	Time (L)	Survey Name	DecLat	DecLong	RIWHLetter	EGNO	NRWNumber
12	12	16	2004	14:49	SCRW041216	33.103	-79.024	D	2601	NRW05018
13	12	16	2004	14:49	SCRW041216	33.103	-79.024	E	2413	NRW05018
14	12	17	2004	15:24	SCRW041217	32.190	-80.430	A	1140	NRW05020
15	12	22	2004	9:16	SCRW041218	31.580	-81.080	A	BK25	NRW05023
16	12	22	2004	9:16	SCRW041218	31.580	-81.080	B	BK10	NRW05023
17	12	22	2004	11:05	SCRW041218	31.720	-80.880	C	1315	NRW05024
18	12	30	2004	9:56	SCRW041230	32.692	-79.564	A	3314	NRW05021
19	12	30	2004	12:05	SCRW041230	32.442	-80.053	B	2614	NRW05039
20	12	31	2004	9:51	SCRW041231	32.082	-80.535	A	1012	NRW05041
21	12	31	2004	9:51	SCRW041231	32.082	-80.535	B	CALF	NRW05041
22	12	31	2004	11:15	SCRW041231	32.088	-80.010	C	3314	n/a
23	01	03	2005	9:15	SCRW050103	32.129	-80.583	A	2145	NRW05063
24	01	03	2005	9:15	SCRW050103	32.129	-80.583	B	2145's yrlng	NRW05063
25	01	03	2005	9:56	SCRW050103	32.080	-80.553	C	NO PHOTO	NRW05067
26	01	03	2005	9:56	SCRW050103	32.080	-80.553	D		NRW05067
27	01	03	2005	9:58	SCRW050103	32.086	-80.558	E		NRW05067
28	01	03	2005	9:58	SCRW050103	32.086	-80.558	F		NRW05067
29	01	03	2005	9:58	SCRW050103	32.086	-80.558	G		NRW05067
30	01	03	2005	11:49	SCRW050103	31.879	-80.811	H	1315	NRW05071
31	01	04	2005	12:52	SCRW050104	31.886	-80.857	A	2145	NRW05077
32	01	04	2005	12:52	SCRW050104	31.886	-80.857	B	2145's yrlng	NRW05077
33	01	11	2005	10:55	SCRW050111	32.673	-79.664	A	1240	NRW05114
34	01	11	2005	10:55	SCRW050111	32.673	-79.664	B	CALF	NRW05114
35	01	12	2005	11:51	SCRW050112	33.435	-79.095	A	1970	NRW05131
36	01	12	2005	11:51	SCRW050112	33.435	-79.095	B	CALF	NRW05131
37	01	13	2005	9:54	SCRW050113	32.024	-80.610	A	2145	NRW05140
38	01	13	2005	9:54	SCRW050113	32.024	-80.610	B	2145 Yrlng	NRW05140
39	01	13	2005	9:59	SCRW050113	32.039	-80.589	C	1308	NRW05141
40	01	20	2005	9:28	SCRW050120	33.484	-79.067	A	1970	NRW05153
41	01	20	2005	9:28	SCRW050120	33.484	-79.067	B	1970 CALF	NRW05153
42	01	20	2005	12:52	SCRW050120	33.474	-79.088	A	1970	NRW05153
43	01	20	2005	12:52	SCRW050120	33.474	-79.088	B	1970 CALF	NRW05153
44	01	21	2005	9:52	SCRW050121	31.670	-80.682	A		NRW05158
45	01	21	2005	9:52	SCRW050121	31.670	-80.682	B		NRW05158
46	01	21	2005	9:52	SCRW050121	31.670	-80.682	C		NRW05158
47	01	21	2005	13:55	SCRW050121	32.031	-80.587	D	2223	NRW05161
48	01	21	2005	13:55	SCRW050121	32.031	-80.587	E	CALF	NRW05161
49	02	14	2005	9:39	SCRW050214	32.031	-80.784	A	1334	NRW05264
50	02	14	2005	9:39	SCRW050214	32.031	-80.784	B	CALF	NRW05264
51	02	14	2005	11:18	SCRW050214	31.887	-80.836	A	2040	NRW05270
52	02	14	2005	11:18	SCRW050214	31.887	-80.836	B	CALF	NRW05270
53	02	17	2005	12:30	SCRW050217	31.582	-81.091	A	1334	NRW05312
54	02	17	2005	12:30	SCRW050217	31.582	-81.091	B	CALF	NRW05312

Sighting #	Month	Day	Year	Time (L)	Survey Name	DecLat	DecLong	RIWHLetter	EGNO	NRWNumber
55	02	19	2005	9:33	SCRW050219	32.012	-80.396	A	BK25	NRW05332
56	02	19	2005	9:33	SCRW050219	32.012	-80.396	B	2541?	NRW05332
57	02	19	2005	9:33	SCRW050219	32.012	-80.396	C		NRW05332
58	03	06	2005	15:23	SCRW050306	32.115	-80.361	A		NRW05491
59	03	06	2005	15:23	SCRW050306	32.115	-80.361	B	2753	NRW05491
60	03	07	2005	11:00	SCRW050307	32.517	-80.114	A		NRW05498
61	03	07	2005	11:02	SCRW050307	32.518	-80.102	B		NRW05499
62	03	20	2005	13:33	SCRW050320	32.370	-79.860	A	1158	NRW05525
63	03	20	2005	13:33	SCRW050320	32.370	-79.860	B	2425	NRW05525
64	03	21	2005	9:20	SCRW050321	32.862	-79.085	A	1158	NRW05527
65	03	21	2005	9:20	SCRW050321	32.862	-79.085	B	2425	NRW05527

As of May 2005, a total of 109 individual right whales (including 28 cow/calf pairs) have been identified in the Southeast US, though photo-analysis is still pending and this is a minimum estimate of individuals. It is important to note that at least 13 of the mothers observed during the 2004/2005 season last gave birth 3 years ago, in 2002.

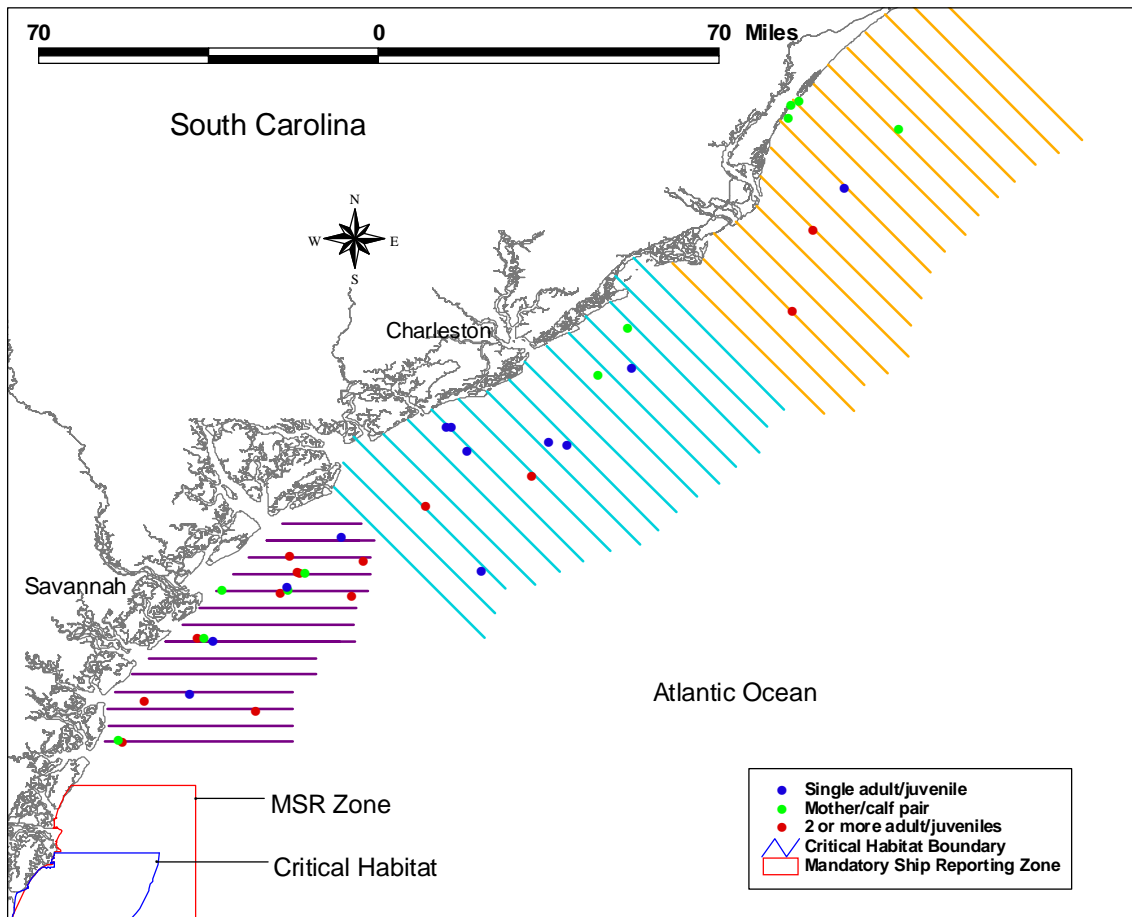


Figure 2. Right whale sightings documented during the 2004/2005 SCRW right whale aerial surveys.

Sightings of note in the SCRW study area included EGNO 1970 and her calf, who were documented four times from 16 December 2004 through 20 January 2005. This animal was sighted only by the SCRW survey team during the 2004-2005 calving season, and was sighted only in the northern survey area. This animal was also sighted by a University of North Carolina survey team during 2001 in the northern South Carolina region. This indicates that some right whales may have a residency pattern much further north than previously documented. In addition, EGNO 2145 and her yearling were sighted three times over ten days in the SCRW survey area, and were not seen by survey teams further south. Eighty-eight percent of all sightings occurred during December 2004 and January 2005 (Figure 3). This may indicate that as animals start to migrate north towards the end of the calving season they move very quickly through the area, making it difficult for survey crews to locate them.

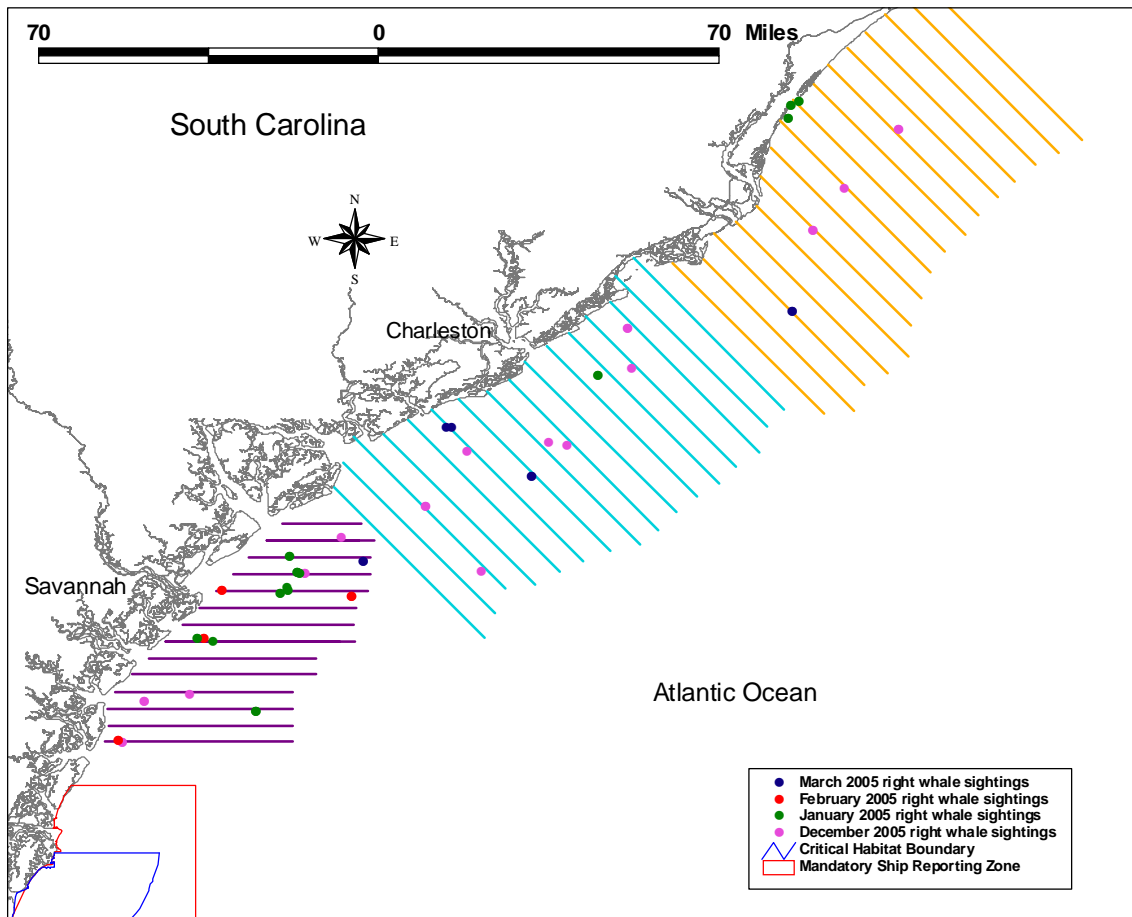


Figure 3. Right whale sightings by month in the SCRW study area from December 2004 through April 2005.

Sighting Distances for Right Whales

Sighting distances were calculated whenever possible, and the average sighting distance for all right whale sightings was 0.49 nm (SD=0.45).

Sighting Distances for Large Vessels

Sighting angles were obtained for large commercial and military ships whenever possible, and used to calculate distance from the trackline. Average distance from the trackline for large vessels with documented sighting angles was 2753.62 m (SD=3522.51).

Whale/Ship Interactions

There were no “close-call” whale/ship interactions observed within the SCRW study area.

Discussion and Recommendations

The calving ground of the Southeast United States is extremely important to the reproducing population of the North Atlantic right whale. In addition, this area is vital to military and commercial interests. Three major shipping routes cross through the designated critical habitat, and provide a constant threat to the slow-moving right whale, particularly the females and calves. Three additional shipping routes are located to the north and south of the critical habitat boundary. The Early Warning System and associated aerial surveys, communication system, and other components have greatly improved the odds of preventing or lessening the risk of ship strikes to whales while in this critical habitat. However, very little is known about right whale distribution outside the traditional survey areas. By expanding the survey areas to the north, more reliable information regarding right whale distribution and habitat use will become available, providing more protection to the right whale. The coast of South Carolina has been surveyed sporadically in the past, but by providing consistent survey effort throughout the migration and calving season valuable additional sightings and warnings to mariners were made available. In comparison to the EWS survey areas the number of sightings in the SCRW area this season (37) was low, however the numbers were much higher than expected in a region that is traditionally not considered a residency area for right whales. As evidenced by the sightings of right whale #1970 and calf on four occasions in the northernmost portion of the survey area, it is possible that this region may be important to certain individuals with site fidelity.

With the discussion of re-evaluating the boundary of the current critical habitat, the South Carolina surveys will play an important role in designating the most appropriate northern boundary for this critical management designation. In order to increase the sample size available for sighting analyses and provide a sufficient overview of the use of the area by the right whale population we recommend that surveys be continued through at least one more calving season. Ideally the surveys will begin on 15 November next season in order to catch the early southward migration of the whales into the area. Surveys should also continue through at least 15 April to document the residency time and migration routes of whales returning north.

This study is also serving as an aid to research being conducted by NOAA Fisheries to test passive acoustic monitoring devices. Our survey data will be available to ground truth right whale calls collected remotely. We will provide all data for comparison with acoustic data when it becomes available.

Large areas of the US east coast are without consistent survey effort, limiting data and protection available for the right whale. However, limitations of these aerial survey efforts must also be addressed. If the goal is to provide maximum protection for right whales, we must investigate new technologies that may provide a more reliable means for detecting and protecting right whales throughout their range. We must also pursue appropriate shipping management measures. Without moving forward on these fronts it is unlikely that we will ever reach a potential biological removal level of zero for North Atlantic right whales, as calculated by NMFS in the right whale recovery plan.

While we highly recommend identifying other methods of right whale detection and protection, we recognize that in the interim the current survey program is the most

effective method we have for protecting and documenting right whales. We highly recommend continuing SCRW surveys from 15 November 2005 through 15 April 2006.

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