

EARLY WARNING SYSTEM

New England Aquarium 2009 FINAL REPORT

Aerial Surveys to Reduce Ship/Whale Collisions
in the Calving Ground of the North Atlantic Right Whale
(*Eubalaena glacialis*)

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TABLE OF CONTENTS

INTRODUCTION	3
METHODS	6
Aerial Surveys.....	6
Notification of Sightings to Agencies.....	8
Photographic Identification.....	9
Distribution	10
Sighting Distance.....	10
Demographics	11
Calving Intervals and Rates	11
Associations and Behaviors	11
Vessel Sightings.....	12
Automatic Identification System (AIS)	13
EWS RESULTS.....	14
Survey Effort.....	14
Sightings and Photo-identification.....	14
Sighting Distances	16
Demographics	16
Calving Intervals and Rates	17
Associations	17
Vessel Sightings.....	18
Vessel/Whale Interactions	18
Mortalities and Injuries.....	19
Entanglement	19
Injuries	21
Additional Mortalities:.....	23
TABLES AND FIGURES	24
Table 1. NEA Aerial Survey Effort (including contingency surveys)	24
Table 2. NEA Aerial Contingency Survey Effort	24
Table 3. NEA Aerial Survey Right Whale Sighting Frequency	25
Table 4. Calving Intervals for 2009 season M/C pairs	26
Table 5. NEA Aerial Survey Vessel/Whale Interactions	27
Table 6. Entanglement, Injury and Additional Mortality	33
Entanglements	33
Injury	34
Additional Mortalities	34
Figure 1. Central EWS Survey Area.	35
Figure 2. Central EWS Contingency Survey Areas.	36
Figure 3. Whale Alert Geographic Bins Map	37
Figure 4. NEA Aerial Survey Effort	38
Figure 5. NEA Aerial Survey Right Whale Sightings Events	39
Figure 6. NEA Aerial Survey Right Whale Sighting Events by Month	40
Figure 7. NEA Aerial Survey Effort in trackline nmi displayed in 5 day blocks.	41

Figure 8.	Temporal Occurrence of Right Whales for NEA Aerial Surveys displayed in 5 day blocks. Total numbers include individuals, mothers, and calves.	41
Figure 9.	Whales per nmi trackline of NEA Aerial Survey Effort displayed in 5 day blocks	42
Figure 10.	Temporal Occurrence of Right Whales: Mom/calf pairs vs. individuals during NEA Surveys displayed in 5 day blocks.	42
Figure 11.	NEA Aerial Survey Sighting Distances (n=299)	43
Figure 12.	NEA Aerial Survey Sighting Distances with Beaufort Sea State Considered (n=299)	43
Figure 13.	Demographic Structure of the EWS Area for all Non-Calf Right Whales	44
Figure 14.	Association Types for all Right Whales Sighted by EWS Aerial Survey Teams	45
Figure 15.	AIS Data for Commercial Shipping Traffic Density (including tugs, dredges and some pilot boats).	46
Figure 16.	AIS Data for Commercial Tanker and Cargo Traffic Density	47
Figure 17.	AIS Data for Average Traffic Speed (including tugs, dredges and some pilot boats)	48
Figure 18.	AIS Data for Average Traffic Speed of Commercial Tanker and Cargo Vessels	49
Figure 19.	Ship Traffic (not required to carry AIS) Recorded Visually during NEA Aerial Surveys	50
Figure 20.	Right Whale 2009 Calf of #2145 documented on 09 February 2009 by NEA Aerial Survey Team	51
Figure 21.	Right Whale 2009 Calf of #2660 documented on 12 February 2009 by NEA Aerial Survey Team	51
DISCUSSION		52
ABBREVIATIONS		56
UNITS OF MEASURE.....		57
DEFINITION OF TERMS		58
REFERENCES CITED.....		60
ACKNOWLEDGEMENTS.....		61
APPENDIX 1.....		62
APPENDIX 2.....		63

INTRODUCTION

Approximately 400-450 North Atlantic right whales (*Eubalaena glacialis*)¹ remain in the world, despite international protection since 1935 and federal protection since 1970. Failure of North Atlantic right whales to show signs of recovery can be attributed to several factors, including the effects of human activity on mortality rates. Vessel strikes account for the largest number of confirmed deaths. Of the 83 known right whale mortalities documented from 1970 through July 2009, at least 28 (34%) were due to collisions with vessels and 10 (12%) were due to entanglements (Knowlton and Kraus, 2001; NMFS Stock Assessment Report, 2008; New England Aquarium unpublished data). In addition, serious injuries caused by human activity in some cases can lead to the animal's demise (Knowlton and Kraus, 2001). A recent analysis of the 25 year right whale database (1980-2004) indicates a median population growth rate of about 1% (Pace et al., 2007) which is likely due to an increase in calf numbers since 2001. Yet, the authors also note that the population has "almost no capacity to absorb additional mortality, and growth would benefit greatly if mortalities from ship strikes and entanglements were reduced."

Waters adjacent to the coasts of Georgia (GA) and the east coast of Florida (FL) support the only known calving area for this small population and were designated a critical habitat in 1994 under the Endangered Species Act (59 FR 28793). The majority of calving events occur off of the coastal waters of northern FL, and southern GA, supported by initial sightings of new born calves in this region. However, calving may occur as far north as North Carolina (NC) based on a small number of mothers seen with very young calves at their first sighting of the season in that region. Pregnant female right whales typically arrive in the SEUS area beginning in December to give birth and depart the habitat by late February to mid March to head for the feeding grounds off the Northeast U.S. (NEUS). On rare occasions sightings of right whales have been documented in the calving area outside of this timeframe with one as early as September and another as late as July.

Vessel traffic within the SEUS calving ground is considerable. Three major shipping channels transect the right whale high density area between Brunswick, GA and St. Augustine, FL. These channels serve three commercial shipping ports and two military bases. The Brunswick channel, at the northern end of the critical habitat extends eight nautical miles (nmi) (14.6 kilometers (km)) offshore and serves the port of Brunswick, GA. The channel centered in the area at the GA/FL border is the St. Marys entrance channel, which runs 14 nmi (25.9 km) offshore and serves the Kings Bay Naval Submarine Base, as well as the port of Fernandina Beach, FL. The southern-most channel is the St. Johns River entrance channel, which runs four nmi (7.28 km) offshore and serves the port of Jacksonville, FL and Mayport Naval Base. This is by far the busiest channel in the area with all forms of large vessel traffic, including container ships, car carriers, tankers, bulk freighters, tug and tows and cruise ships as well as U.S. Coast

¹ North Atlantic Right Whale Report Card. North Atlantic Right Whale Consortium. November 2008.

Guard (USCG) and U.S. Navy (USN) vessels. Commercial vessel traffic in this federally designated critical habitat has increased substantially since the 1950's (Knowlton, 1997). Port expansions and diversions of military traffic to local bases closed elsewhere augment this trend. Based out of many small inlets and harbors along the coast, commercial fishing, charter and recreational vessels increase the traffic utilizing and transiting the area dramatically.

The Brunswick and St. Marys River Entrance channels are dredged almost annually while dredging of the St. Johns River Entrance channel is less frequent to maintain required depths. This occurs during the winter to avoid impacts to sea turtles that frequent the area in summer. Dredged material is usually removed from channels and carried to offshore disposal sites using ocean-going hopper dredges. These vessels work continuously, often making many transits between channels and disposal sites throughout a 24-hour period. Consequently, dredging activities substantially increase the vessel traffic in the vicinity of channels and within the calving area.

During the 1994 calving season (December 1993 through March 1994), the first comprehensive aerial surveys, referred to as the Early Warning System (EWS) surveys, were conducted to locate right whales and provide whale detection and reporting services to mariners in the calving ground, including the USN, U.S. Army Corps of Engineers (USACE) and USCG; port authorities and harbor pilots. These groups use the sighting information in their efforts to avoid collisions with right whales.

From 1994 to 2002, the New England Aquarium (NEA) EWS surveys covered the majority of the high-density area and provided daily coverage of the three shipping channels within it. Prior to the start of the 2003 calving season, surveys in the SEUS were redesigned to allow for more daily coverage of a larger area. Beginning in the 2003 season (December 2002), the NEA EWS surveys were extended from 15-20 nmi eastward to 30-35 nmi (54.8-63.9 km) from the coast and reduced in latitudinal range. The area includes the St. Marys River Entrance and the St. Johns River Entrance. This redesigned survey area flown by NEA is referred to as the Central EWS (CEWS) survey area. To the north, Wildlife Trust, GA (WTGA) conducts similar surveys that represent the Northern EWS surveys (NEWS). Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute (FWC) conduct surveys in the southern section of the calving area (Southern EWS, SEWS) (Figure 1). In addition, the Wildlife Trust, South Carolina (WTSC) performs aerial surveys off the coast of South Carolina (SC) and northern GA which is outside of the EWS parameters.

At the advent of the 2004 calving season, survey aircraft and crew for EWS surveys were held to newly imposed federal standards. Survey aircrafts were all certified under 14 CFR, Part 135 (airline, aircraft less than 10 seats). In addition, pilots and observers underwent intense pre-season training that included emergency-egress. Pilots also attended Federal Aviation Administration (FAA) Part 135 ground school and passed all associated check rides. A second pilot in command (SIC) was also added to each survey flight to ensure a higher safety margin during survey operations. The addition of a second pilot limited data recording during the surveys that were conducted in a Cessna

337 as the number of science crew was reduced from three to two persons due to weight and balance constraints. For this reason all surveys flown since 2004 have been conducted without a dedicated data recorder.

This report describes the results of right whale aerial survey effort data gathered by the NEA aerial survey team during the 2008-2009 EWS season (01 December 2008 – 31 March 2009), subsequently referred to as the EWS 2009 season. The area predominantly covered by the NEA aerial survey team was the CEWS survey area. In order to provide more accurate and comprehensive conclusions, this report also references right whale identification and sighting data collected throughout the region by other aerial survey teams, as well as by organizations involved in various events such as unusual sightings, entanglements, carcass retrieval or necropsies. For the purpose of this report, when referring to the “SEUS region”, this is inclusive of the WTSC and EWS survey areas, and does not include sightings from further north of the WTSC area or further south of the SEWS survey area. The EWS area describes the NEWS, CEWS and SEWS areas covered by WTGA, NEA and FWC respectively.

USACE, USCG and USN provide the funding for CEWS surveys with support from the National Oceanic and Atmospheric Administration’s National Marine Fisheries Service (NOAA Fisheries Service).

METHODS

Aerial Surveys

CEWS surveys were flown daily from December 1, 2008 through March 31, 2009 during the 2009 calving season. The surveys were conducted in the area from the southern end of Cumberland Island, GA, approximately 6.5 nmi (12 km) north of the St. Marys River entrance (30° 50.0N), to Jacksonville, FL, approximately 6.5 nmi (12 km) south of the St. Johns River entrance (30° 17.0N), from the shoreline to 30-35 nmi (54.8-63.9 km) offshore. Twelve east/west transect lines were flown perpendicular to the coast at 3 nmi (5.5 km) intervals with a western limit of 0.5 nmi (0.9 km) off the shoreline (Figure 1). A total of 406 trackline nmi (761 km) were flown during each complete survey.

In addition to the CEWS survey area, when an aircraft of an adjacent EWS survey (NEWS or SEWS) was unable to fly for a period of time (due to maintenance or extended disentanglement efforts) a pre-approved contingency plan would be flown. Contingency plans were developed to ensure aerial survey coverage of port entrances in the absence of one (two-plane contingency) or two (one-plane contingency) of the EWS survey aircrafts (Figure 2). The two-plane contingency survey covers thirty transect lines shared between two aircrafts, covering an area extending from 31°26.0N, approximately 23 nmi (42.6 km) north of the Brunswick-Bar channel sea-buoy, south to 29°59.0N, approximately 25 nmi (46.3 km) south of St Johns sea-buoy. Redirected surveys for the NEA team during the two-plane contingency survey covered either the northern or southern section of this area, flying sixteen east/west transect lines perpendicular to the coast at three nmi (5.5 km) intervals from 0.5 nmi (0.9 km) off the shoreline out to 18- 29 nmi (33.3-53.7 km) from the shore. 377 trackline nmi (698 km) are covered per complete northern two-plane contingency survey, and 399 trackline nmi (739 km) are covered per complete southern two-plane contingency survey.

The one-plane contingency survey covers an area from 31°14.0N north, approximately 11 nmi (20.4 km) north of the Brunswick-Bar sea-buoy, south to 30°11.0N, approximately 13 nmi (24.1 km) south of St Johns sea-buoy. Redirected one-plane contingency surveys encompassed twenty-two east/west transect lines at three nmi (5.5 km) intervals from 0.5 nmi (0.9 km) off the shoreline out to between 14-24 nmi (25.9-44.4 km) offshore. Twenty-two tracklines cover 461 nmi (855 km) per complete one-plane contingency survey. Results provided in this report for survey effort are for NEA aerial surveys exclusively, including contingency surveys. However, when reporting on demographics, calving intervals, associations, mortality, entanglement and injury events, photographic data and event descriptions from other survey teams have been referenced in order to provide a more comprehensive assessment of the calving season.

Necessary conditions for all flights included a minimum cloud cover ceiling of 1000 feet (305 meters), visibility greater than three nmi (5.5 km) and winds 17 knots or less. Surveys were conducted in a 14 CFR Part 135 certified twin engine Cessna 337 Skymaster. The aircraft was equipped with Global Positioning System (GPS), Automated Identification System (AIS) receiver, Automatic Flight Following (AFF) transponder, full IFR (Instrument Flight Rules) instrumentation, aircraft mounted marine radio, life raft, medical kit, a waterproof handheld VHF marine radio, a registered removable 406MHz Emergency Position Indicating Radio Beacon (EPIRB), aircraft mounted 406MHz Emergency Locator Transmitter (ELT) and satellite phone.

The surveys were flown at an altitude of 1000 feet (305m) above sea level and an average air speed of approximately 100 Mph (160 km/hr). The survey team consisted of a pilot-in-command (PIC), SIC, and two observers positioned on each side of the aircraft in the rear seats. Each observer was individually equipped with, but not limited to, a Nomex ® flight suit, FAA approved survival vest, strobe light, rescue streamer, combo-edge knife and Personal Locator Beacon (PLB) with GPS. Observers scanned the water surface out to at least two nmi (3.7 km). In order to maintain standardized sighting effort, the PIC and SIC were instructed not to alert the observers to any sightings, but were allowed to report a sighting after it had been passed by the aircraft if missed by the observers.

A sighting event is defined in this report as an event at which the aircraft breaks from the trackline and a whale or group of whales are circled until they are positively identified as right whales. A single sighting event can be of a single whale or a group of whales. All right whale sightings were recorded into a digital voice recorder and entered into a computerized logging program, Logger 2000. Logger 2000 was created by International Fund for Animal Welfare (IFAW) and designed for compatibility with the Right Whale Consortium database, curated by the University of Rhode Island (URI). During surveys, Logger 2000 downloaded, at 10-second intervals; time, position (latitude and longitude), heading and aircraft speed directly from the aircraft's GPS. All downloaded data is stored in a Microsoft Access database. In addition to the automatically downloaded data, the observers manually entered information on Beaufort sea state, visibility, cloud cover, and weather. Due to the change in configuration of aircraft personnel post 2003 season, with the addition of a PIC and loss of the data recorder position, no other marine species sightings were logged during flights except large whales (humpback, pilot whales etc.) manta rays, leatherback turtles and sharks. These species were opportunistically logged because of requests by researchers, but the aircraft did not break from the trackline to confirm species identification unless a sighting was suspected to be a right whale.

Positions were recorded for all commercial (excluding commercial fishing vessels) and military vessels, and for any other vessels that were visually estimated to be 100 ft (30.5 m) or greater in length. In addition, AIS-derived data on dynamic locations and static vessel information were collected for all vessels required to carry an AIS

transponder (Appendix 1). AIS-derived data were recorded into a separate computerized database.

When sightings of right whales occurred, the aircraft deviated from the trackline at a right angle to the sighting and flew directly over the whale(s) to obtain an exact GPS location of the whale(s). The aircraft then circled the whale(s), allowing observers to obtain photographic documentation of the individuals sighted. Data recorded per sighting included; date, time, behavior, image numbers, initial and final positions of whale(s), right whale letter for the day and photographer. The camera's digital metadata time was synchronized to the GPS, computer-logging program (Logger 2000) and digital voice recorder at the start of each survey for accuracy. After completing photographic work of each sighting, the aircraft returned to the trackline at the point of departure. These methods conformed to research protocols followed by the North Atlantic Right Whale Consortium (NARWC) as approved by NOAA Fisheries Service.

All photographic data from EWS aerial survey teams has been submitted to NARWC and continues to be processed by NEA. Results provided in this report for demographics, and associations for whales in the calving grounds are preliminary overviews and figures will change slightly as data processing is ongoing.

Notification of Sightings to Agencies

Prior to the 2009 season, the EWS survey area was subdivided into geographic sighting "bins" (Figure 3). Email distribution lists were developed for each geographic bin to notify local, state, federal, non-profit and commercial marine interests of right whale sightings via sighting alerts. Sighting bins enabled users to receive only sighting alerts that pertained to their area of interest. Sighting alerts were brief, standardized messages that included date, time, latitude and longitude, group composition (i.e how many adults and calves), and direction of movement. In the subject line, the whale(s) position was indicated as a relative bearing and distance to the nearest sea-buoy, as requested by the harbor pilots in order to make corresponding navigational alterations more efficient and timely. Because alerts were brief, users were allowed the option of receiving messages via email, pager or cellular telephone texting service.

During the EWS season, all sightings of right whales were reported directly, via satellite phone, from the survey aircraft to a NEA ground contact. The ground contact immediately emails this near real-time data to the appropriate EWS distribution list. Upon receiving a sighting alert, the USCG transmits a Broadcast Notice to Mariners over VHF marine-band radio channel 16, switching to 22 alpha. Additionally, the survey team ground contact was responsible for entering the right whale sighting information into the Mandatory Ship Reporting System (MSRS) via an internet data entry portal which ensures that ships reporting into the MSRS will be aware of the most recent right whale sightings. Sighting information consists of date, time, latitude and longitude, and remains in the MSRS for a period of 48 hours. Sightings from alternative, reliable sources

(OTHER) were entered into the MSRS, and distributed via email if verification by an aerial survey team was not possible. During periods of inclement weather when aerial survey teams were not flying, information of right whale detections from passive acoustic monitoring buoys, located to the north and south of the St Johns River entrance, were entered into the MSRS. In these cases, locations of a sighting were described as being within a range of the buoy, as opposed to a specific point due to the difficulty of localizing signal detections.

Maps were developed using Geographic Information System (GIS) software (ArcGIS 9.3) to display comprehensive charts of all right whale sightings within five nmi (9.3 km) of channel entrances over a three-day period of survey flights. These were distributed via email to harbor pilots in Fernandina (Cumberland Sound Pilots) and Jacksonville (St Johns Bar Pilots), USCG officers and Navy representatives.

Photographic Identification

During routine survey flights, observers attempted to obtain images of right whale callosity patterns, scars and other obvious markings, for each sighting. High-resolution digital images were obtained at an altitude of 1000 ft (305 m) using a Nikon digital D300 camera with a fixed Nikkor 300mm lens, and tele-converter. Right whale callosity patterns are used as a basis for identification and cataloging of individuals, following methods developed by Payne *et al.* (1983) and Kraus *et al.* (1986). The ability of scientists to identify individuals allows for accurate reporting of numbers of whales within the survey habitat, and prevents duplication of whales that are re-sighted within a single survey. The NEA curates the North Atlantic Right Whale Catalog (the Catalog), which includes tens of thousands of sightings from numerous research groups and individuals. One or two good quality digital images of each right whale considered to be a new individual for the season were emailed to the NEA office in Boston, Massachusetts (MA) for preliminary identification. Identifications were shared with the NEA team as well as other researchers from Associated Scientists at Woods Hole, FWC, Marineland, Marine Resources Council (MRC) and WTGA and WTSC (all of which also sent images to NEA for preliminary identifications) and the NOAA Fisheries Service Southeast Right Whale Recovery Coordinator. This allowed for a comprehensive, up-to-date tally of the number of mother/calf (M/C) pairs during the season. Intermatching of non-M/C pairs was also initiated during the season. Photographs of all individuals were downloaded at the end of the day to look for entanglement or other injuries.

During and after the field season, right whale sightings and images from all research teams and opportunistic platforms, are integrated into Digital Image Gathering and Information Tracking System (DIGITS), a web-based software system developed at NEA to facilitate the matching process of right whale sightings. Final matches to the catalog are confirmed by NEA researchers.

Distribution

Sightings of all right whales were recorded by time and location within the study area. Integration of the right whale sightings data collected during these surveys with previously collected data will help to further define high-use areas within the southeast region. All right whale sightings for the season were plotted and displayed by group size and association type (Figure 5). Sightings were plotted for the four-month long season and also plotted by month to illustrate temporal distribution (Figure 6). In addition, ship traffic density and average speeds were plotted using AIS data (Figures 15 – 18) and ship traffic recorded visually by the aerial survey team (Figure 19) in order to compare vessel density with right whale sightings.

Sighting Distance

The distance that whales were sighted from the plane for each right whale sighting event was determined post season. The distance was calculated by using the GPS-derived overhead position of the whale(s) and the exact position of where the aircraft broke from the transect line. Sighting distances were calculated by using the following calculation:

Aircraft's latitude when whale is sighted	=LAT A
Whale's latitude	=LAT B
Aircraft's longitude when whale is sighted	=LONG A
Whale's longitude	=LONG B

LAT A-LAT B =LAT C
LONG A-LONG B= LONG C

Square root of ((LAT C x LAT C) + (LONG C x LONG C)) x 60= sighting distance
(nmi)

Sighting events that occurred while the aircraft was on a designated cross-leg were included when possible. Due to the data recording limitations, not all on transect (or cross leg) sightings were included because of the inability to obtain an accurate position of where the aircraft broke from the trackline. Sighting events that occurred while the survey aircraft was not on tracklines were not included in the summary. Examples include instances when the survey team was notified of a whale via a public report and transited to the site specifically, or if subsequent whale sightings were seen at a distance when circling on original sighting.

Demographics

A preliminary analysis of the sex and age composition of the 2009 wintering population of right whales in the survey area was conducted using data from all aerial surveys in the SEUS and the existing catalog of identified right whales from the western North Atlantic. Right whales with known ages (because they were previously identified in their calving year) were classified as juveniles (1-8 yrs) or adults (≥ 9 yrs). Whales of unknown age were classified as unknown age until their ninth year in which they become classified as an adult. All calving females were classified as adults regardless of age. The sex (if known) of individuals in the catalog have been previously determined by one or all of the following methods: 1) direct observation of the genital area, 2) association with a calf, 3) by the testing of biopsy samples for a genetic marker unique to the Y chromosome (Brown *et al.*, 1994).

Calving Intervals and Rates

Reproductive female right whales (cows) in this population have been monitored since 1980, and records of calf production are documented in the North Atlantic Right Whale Catalog (Kraus *et al.*, 2001). Data collected on cows observed with calves in the monitoring area during the 2009 survey period were used to update information for the population on calving intervals, rates of reproduction, time frame and area of calving, as reflected in summaries provided in this report.

Associations and Behaviors

The survey team remained on site for each sighting until positive species identification was made, or observers were confident that species identification was not that of a right whale. During this time photographs were obtained of right whale species, and visible associations and behaviors were recorded with as much detail as possible.

The time spent at each sighting is directly correlated to the survey team's ability to make an accurate species identification and obtain photographic documentation of the event. The exception was made in the event of a vessel/whale interaction, entanglement, dead whale or other event that caused concern for the welfare of the whale(s), such as whales in a shipping channel.

Whales are considered associated if within several body lengths of each other and coordinating their movements at the surface (Hamilton, 2002). Associations are described as one of the following types (although not all are seen in the SEUS).

1. Surface Active Group (SAG)
2. M/C or Mother/Yearling pair
3. Feeding
4. Other – pairs, trios, no visible behavior, includes M/C with others if not in a SAG or feeding
5. Not associated

A selection of behaviors were also recorded when observed. Photographers attempted to capture photographic evidence of behaviors for later confirmation.

A whale or group of whales, were also given a direction of travel if whale(s) appeared to be traveling at a moderate speed, and / or if it was determined that the whale(s) had traveled a significant distance while the survey team was on site.

Vessel Sightings

Commercial and military vessels, cruise ships, and large recreational vessels visually estimated to be greater than 100 ft (30.5 m) in length were recorded into Logger 2000. Certain types of small commercial vessels (estimated to be less than 100 ft) were also recorded, including tugs, pilot boats and dredge crew and survey vessels. Vessels that are no longer recorded due to the loss of a dedicated recorder include commercial fishing vessels and all recreational vessels under 100 feet. The aircraft did not break track to investigate vessel sightings in order to maximize time available for survey effort. The position (latitude and longitude) of the aircraft was recorded when perpendicular to the vessel. Data collected for each vessel recorded includes; type of vessel, time sighted, bearing and estimated distance from the aircraft and the vessel's heading.

A vessel/whale interaction is defined as an event when the survey team visually determines that a vessel is on a course that could result in the vessel and whale(s) being less than one nmi (1.9 km) apart. Communication, when possible between survey team and vessel, is attempted in order to prevent collision or mitigate an interaction. Vessel/whale interaction scenarios vary widely and may result in vessels remaining clear of whale(s) at a distance greater than one nmi (1.9 km) or vessels approaching whale(s) within 500 yards (457.2 m). Vessel/whale interactions, when the observed vessel comes within 500 yards (457.2 m) at the closest distance to the whale(s), are defined in this report as Close Approaches. When interaction events occurred the survey team would record detailed information about the situation prior to, during, and following the point of closest distance between vessel and whale(s). Data collected includes: type of vessel, vessel's initial position and course, whale's initial position, behavior and heading,

whale's reaction (if any), closest distance between whale and vessel, radio communication (if any) between aircraft and vessel, vessel's actions (course change or speed change), final positions of whale(s) and vessel. Photo documentation and video footage were also obtained when appropriate. All Close Approach events, regardless of vessel type (commercial, military, recreational or fishing) and vessel size, were recorded in a separate database (Access 2000) and reported at the conclusion of the survey to NOAA Fisheries Service within 24 hours of occurrence. In addition, all reported interaction events were compiled and forwarded to FWC at the end of the season for inclusion in the vessel/whale interaction database.

Automatic Identification System (AIS)

AIS is a shipboard system which provides electronic chart data for every significant ship within radio range. Operating in the VHF maritime band, it is capable of transmitting well over 4,500 reports per minute and updates as often as every two seconds. AIS technology is currently being used for identifying and monitoring maritime traffic throughout U.S. waters by various entities interested in commercial shipping activity. AIS equipment sends and receives vessel identification information that is designed for display on an AIS receiver, computer, radar or chart plotter. The standards and regulations of AIS are established by the International Maritime Organization (IMO) as per the 73rd Session of their Maritime Safety Committee. The majority of large, commercial maritime traffic involved in international travel are currently required to carry AIS (Appendix 1).

To obtain AIS information, the survey plane was equipped with an AIS receiver. Data from all commercial vessel traffic transmitting from AIS transponders were recorded in a separate database during all EWS surveys. Data were collected using a Sealinks, Shine Micro RadarPlus SL161R dual channel AIS receiver. Data from the AIS receiver were downloaded directly to the onboard laptop into Shipplotter, software by Centro de Observação Astronómica no Algarve (COAA). The dynamic ship track data collected included Mobile Maritime Service Identities (MMSI), navigational status, rate of turn, speed over ground, position, course over ground, heading (true), every 2 to 10 seconds. In addition, every 6 minutes static ship information such as the IMO number, radio call sign, name, ship dimensions, draft, destination and estimated time of arrival were also recorded. AIS data were collected during survey flights only and covered an area extending from Charleston, SC to Jacksonville, FL. Analyses of the AIS data can provide information on ship densities and ship speeds throughout the critical habitat and of any changes in speed upon entering MSRS or critical habitat boundaries.

EWS RESULTS

Survey Effort

The NEA aerial survey team was on-site for 121 days (01 December 2008 - 31 March 2009) during the 2009 right whale calving season. A total of 71 surveys were conducted and of these, 40 were complete and 31 were partial surveys (Table 1). The NEA team was redirected on six different days to fly contingency surveys. Four of these surveys covered the two-plane contingency survey area and two surveys were flown under the one-plane contingency plan (Table 2). A total of 402.6 hours were spent surveying 23,879 nmi (44,224 km) of tracklines during 71 survey days (Figure 4). Thus, some measure of aerial coverage was provided for 59% of the available days during the 2009 season.

Some surveys were conducted with favorable environmental conditions throughout the duration of the survey, whereas others were flown with favorable environmental conditions during part of the survey (Tables 1 and 2). Favorable conditions consisted of a Beaufort sea state (SS) of three or less and visibility of at least three nmi (5.6 km). Of the total trackline nmi flown during the 2009 EWS season, 85% were flown in favorable conditions. Thus, 41 % of the total nmi available to be flown during the season was flown in favorable conditions. When a partial survey was conducted, effort priority was given to the shipping channels and tracklines immediately to the north and south of channel entrances (St. Johns, St. Mary's or Brunswick Channel depending on survey area).

Sightings and Photographic Identification

The first right whale sighting documented by the NEA aerial survey team in the 2009 season occurred on 03 December 2008, the first survey day of the season. The NEA team had a total of 433 sightings during the 2009 season (Figure 5). The number of sightings per day ranged from zero (n=5) to 22 separate sighting events in a single day (49 different individual whales). Sightings continued throughout the season with the last right whale sighted in the CEWS on 30 March 2009. Average sightings per survey flight varied from two in early December (01-15 December), peaked to 11 in early February (01-15 February), and back down to two in late March (16-31 March). This sighting trend was similar to numbers of whales sighted per unit of survey effort for the season (Figure 9), where a unit is one nmi of survey trackline. The temporal occurrence of non-mom/calf right whales in the survey area peaked in early February, with the highest number of individuals sighted on 10 and 17 February, when 26 individuals were sighted on each of these days (Figure 10). It was also during this period that the number of M/C pairs sighted peaked, with a maximum of 15 M/C pairs sighted on 12 February. The appearance of individuals in the CEWS area which were neither M/C pairs nor pregnant females, was

considerably later than the arrival of 2009 season mothers. The first whale sighted in the CEWS area which was not a M/C pair or pregnant female appeared on 27 December 2008 with the exception of an entangled whale sighted on 08 December 2008. All other individual whales sighted prior to 27 December 2008 as represented in Figure 10, calved during the 2009 season.

All right whale sightings from NEA aerial surveys during the 2009 season were plotted on a chart of the study area in Figure 5 (including the 6 days of contingency surveys) and plotted monthly in Figure 6. All sightings of right whales are detailed in a table in Appendix 2 with the date, time, location, association and behavior type where applicable for each whale. Also included are unconfirmed catalog identification numbers and intermatch codes when known.

The 433 NEA survey sighting events comprised 880 right whales, including calves (not all unique individuals) during the 2009 EWS season. Of the 39 females (as of August 2009) known to have given birth in the 2009 season, 38 of them were documented in the EWS area with their calves. One right whale female (#2223, "Calvin") was never documented in the SEUS during the 2009 season, but was sighted with her calf off of North Carolina (NC) on 30 December 2008 by University of North Carolina, Wilmington (UNCW). One female (#1240, "Baldy") was first opportunistically sighted as a M/C pair off of Virginia by Virginia Aquarium and Marine Science Center (VMSM) on 09 January 2009. She was next seen in the SEUS on 01 February by the WTSC survey team, and subsequently sighted two more times in the 2009 season by the NEA survey team on 11 and 12 February 2009. Of the 38 M/C pairs documented in the SEUS, all were sighted with their calves in the EWS survey area. The NEA aerial survey team documented 36 of the 38 moms known to be in the EWS area (two moms not documented by NEA were #1970 and #3139). Of the 36 moms documented by NEA, one was documented prior to calving but never seen with her 2009 season calf (#3370) and 22 were never sighted prior to calving but documented for the first time with their calves. Thirteen moms were documented by NEA in the CEWS area prior and post 2009 calving event.

Of the 433 NEA survey sighting events, 376 were reported to the EWS pager system directly from the NEA survey team. The 57 sighting events that were not reported were either multiple sightings combined into a single alert because whales were within one nmi (1.85 km) of each other, or reported from 'OTHER' sources, and later confirmed by the NEA team, or were duplicate sightings that had previously been reported in the system but re-sighted during the survey and positively identified as the same individuals. In cases where whales were confirmed as duplicate sightings from earlier in the same survey, an update was not sent out through the pager system if the whale(s) had not travelled more than one nmi (1.85 km) from their original, reported position. However, all duplicate sightings were reported to the survey team's ground contact, and positions were updated in the MSRS. Due to time constraints, nine of the 433 sighting events were not photo-documented, and 17 of the total 880 whales sighted were not photo-documented.

Of the 433 right whale sighting events, 93 of the sightings were of single whales (including pregnant females), 240 of M/C pairs, (two of which were sighted together in a

single sighting event), 26 sightings were groups of whales associated in a SAG and 75 sightings were “others”, i.e. groups of whales not alone, in a SAG or M/C pair.

Sighting Distances

Of the 433 total sightings for the NEA survey team’s 2009 season, there were 299 (69%) right whale sighting events for which sighting distances are calculable, and these are summarized by 1/10 nmi increments in Figure 11. Sighting events that occurred while the survey aircraft was not on trackline were not included in this analysis, such as when additional whale(s) were sighted whilst circling the group of whales for which the aircraft broke from the trackline. The mean sighting distance, without considering SS conditions as a factor, is 1.09 nmi (2.0 km). A summary of sighting distances where SS was considered is shown in Figure 12. The mean sighting distance when considering SS as a factor, is 1.1 nmi (2.0 km) during times of Beaufort 3 or less. The mean sighting distance during times of SS 4 or greater is 1.91 nmi (3.5 km) but the frequency of sightings (Table 3) is reduced considerably (n =285 and 14, respectively). It was often the case that the sightings during times of high SS were of whales that were performing highly energetic behaviors that were visible from greater distances such as breaching or lobtailing. There were 3.5 times more sightings per nmi trackline of effort, when the SS was less than 4. When comparing all sightings (n=430 due to 3 unphotographed sightings with no SS recorded), 410 (95%) were in SS less than 4 and 20 (5%) were in SS 4 or higher. Only 15% of the total survey effort was flown in SS 4 or higher.

Demographics

The matching and confirming process for identification of right whales sighted by all EWS survey teams during the 2009 season is currently being processed. For this reason we are unable to illustrate a complete demographic structure for the area. However, we do know that the area was utilized by a high number of unidentified whales thought to be juveniles (n=44). Many of these whales have been matched to calves or juveniles from previous years and were given a temporary intermatch code. The preliminary count of whales documented during the 2009 season by all survey teams in the EWS area are 38 M/C pairs (one of the 39 total M/C pairs documented during the 2009 season was never documented in the EWS area), 120 cataloged individuals (non M/C pairs) and 44 intermatched whales (probable or known juveniles) for a minimum total of 202 right whales (Figure 13) and 38 calves. Right whale #2223 and her calf have not been represented in summaries of demographic structure of the EWS area (Figure 13) since this M/C pair was never sighted within the EWS survey area.

Figure 13 statistics and the percentages that follow do not include calves. The majority of the whales in the SEUS were adult females (24%), with adult males making up another large proportion (23%), and the next largest gender/age class being juvenile males (16%), the remaining animals were individuals of unknown age and sex, juveniles and yearlings (Figure 13). Not considering age class, the largest proportion of individuals were males (41%), followed by females (34%), with 25% that were of unknown sex. Adults represented the largest proportion of all age classes present (47%), followed by juveniles (33%), whales of unknown age class (15%) and yearlings (5%) (n=202). Without considering calving females, the largest proportion of whales documented in the EWS was made up of juveniles (40%), followed by adults (35%) of which 77% were males and 19% females (4% unknown) (n=164). Of the 49 adult females in the survey area, 38 were documented with calves and 11 were not. Of the 11 adult females that were not documented with calves, 5 have never been documented with a calf, 4 gave birth in 2008 and were not available to calve and two were available to calve in the 2009 season. We anticipate that once the data from all the teams has been matched or intermatched and compared to the catalog, the number of right whales seen during the 2009 season will increase.

Calving Intervals and Rates

Table 4 includes calving intervals, number of calves borne over their known reproductive span, and age (when known) or age class, of each cow documented in a M/C pair during the 2009 calving season. Right whale #2223 and her calf have been included in the total counts for M/C pairs (Table 4) in order to assess calving intervals for all reproductive cows during the 2009 calving season. Data from the 2009 season shows the calving interval ranged from two to six years with a mean of 3.9 years for all cows with multiple calvings. Two of the 31 cows with multiple calvings had a two-year calving interval (EG # 2145, and # 2611), and their 2007 calves are presumed dead. The calving interval, not including these two cows is 4.1 years. Eight right whales calved for the first time in 2009 - five of the eight were of known age – one 6 year old, one 7 year old, and three 8 year olds. Three females bore their eighth known calf this year. The longest known reproductive span for this group of calving females is EG # 1240 (Baldy) who has been reproducing for at least 34 years.

Associations

During the 2009 season all right whale association types were documented by the NEA survey team, except for feeding. Appendix 2 describes all association types observed during each right whale sighting event by the NEA team. Percentage analysis of association types for all sightings in the EWS area during the 2009 season is preliminary

while data continues to be processed for other EWS aerial survey teams (Figure 14). Total numbers for association types documented in the EWS survey area, are as follows: 49 % M/C or Mother / Yearling pairs, 25 % SAGs, 15 % Other, (including pairs, trios, M/C with others if not in a SAG), and 11 % Singletons (n=1,839) (Figure 14). Following the analysis of datasets from all teams, these figures are expected to vary slightly.

Vessel Sightings

The tracks of commercial shipping traffic that carry an AIS transponder were recorded during the EWS 2009 season surveys, and plotted in Figure 15 (See Appendix 1 for the AIS carriage requirements for vessels). This plot contains the track of the vessel as it moved through the habitat and represents the density of traffic within a given area over the course of the season. Figure 16 displays the same data on density but displaying only tanker and cargo ship type, (not including tugs, dredges and pilot boats). Figure 17 represents average vessel speed of all commercial shipping traffic (including tugs, dredges and some pilot boats). Figure 18 displays average speed for tanker and cargo ships. Figures 15 to 19 only represent shipping traffic during periods when the NEA survey aircraft was airborne. Figure 19 displays plots for vessel traffic that is not required to carry AIS and was observed during surveys, recorded abeam of the survey aircraft (plot does not include the track or speed of the vessel).

Vessel/Whale Interactions

During the 2009 season the NEA survey aircraft documented 14 vessel/whale interaction events involving 21 vessels (Table 5). The 21 vessels involved are not all unique, 4 of the 21 are duplicates since they were involved in consecutive interactions with multiple groups of whales. When the survey team visually determined that a vessel was on a course likely to result in the vessel and whale(s) being less than one nmi apart, an attempt to contact the vessel operator was made via Marine VHF Ch. 16, when possible. The 21 vessels involved consisted of eight recreational pleasure crafts, four submarine escorts, two submarines, two survey vessels, two large merchant vessels, one tug alone, one casino vessel and one kayak. The NEA survey team was able to make positive contact in seven of the 14 interaction events documented. Of the seven situations where no communication was achieved between survey team and vessel operator, no hail attempt was made in three cases, either because the vessel was already clear when survey team sighted the interaction, or no form of communication was available such as the case involving the kayaker. All four of the incidents where vessels were hailed resulting in negative contact, involved small recreational vessels. In several interactions where communication was successful, the survey team communicated with a key point of contact, responsible for coordinating other vessels involved. For example, during the

interaction with the submarine and escort vessels, communication was maintained with the escort vessel operator who in turn communicated with the rest of the convoy. Thirteen of the 21 vessels involved were responsible for Close Approach Interactions.

Mortalities and Injuries

Mortalities that either occurred during the 2009 season in the EWS survey area or presumed mortalities that became evident post-season which relate to the individuals documented in the EWS season, are described in the following text. Injuries that occurred during the 2009 season or were first documented during the season are described in the following text, with subsequent descriptions of these individuals post-season when known. Mortalities and injuries are broken down into three sections; entanglements, injury and additional mortality. Table 6 summarizes mortality and injury events during the 2009 season. Not all of the event details, or surrounding descriptions occurred in the CEWS area, or were documented by the NEA team. Event descriptions compile data contributed from various research entities when relevant, and reference is credited in the following text.

Entanglement:

During the 2009 season, EWS survey teams documented five previously unknown right whale entanglement cases. In addition, one previously known entangled whale was sighted in the area (# 3346, 'Kingfisher'). Categorization of 'Fatal' in Table 6 has been determined as negative for cases where entangled whales have been seen gear free and in good health conditions following disentanglement, or 'unknown' when the whale has not been re-sighted whether disentanglement events were successful or not. It cannot be definitively stated that an entanglement is not life threatening when any gear remains on the animal since the severity can worsen considerably over time, and therefore whales that maintain any degree of entanglement are classified as 'unknown'.

On 08 December 2008, an entangled right whale was discovered and documented by the NEA survey team, approximately 16 nmi (29.6 km) northeast of Jacksonville Beach, FL. The line wrapped around the rostrum, through the mouth, with a tight body wrap. There were two trailing lines, with one bitter end stopping just aft of the flukes and the other terminating approximately 350 ft behind the whale. The whale was identified as #3294, an animal of unknown age, first sighted in 2002, and previously sighted gear free in April 2008. Right whale #3294 was sighted again during the 2009 season by the WTGA team on 18 December at which time a Georgia Department of Natural Resources (GDNR) on-water response team were able to attach a telemetry buoy to a tangle of line which appeared to originate from the flippers. The following day it became apparent that the buoy was adrift, and it was recovered by the GDNR response team, with

approximately 402 ft (134 m) of line attached to it. The whale was re-sighted on 01 February 2009 by the NEA team and following documentation from NEA, WTGA aerial teams and FWC, NOAA and PCCS on-water responders, it is thought that this whale is now gear free.

On 26 December 2008 the FWC aerial team sighted an entangled whale with two loops of yellow line wrapped through the mouth, meeting in a knot towards the rear of the body and trailing approximately 300 ft aft of the flukes with one yellow and one white buoy at the end. On the same day, the FWC on-water response team was able to affix a telemetry buoy to the trailing line, and remove buoys and 360 ft of line aft of the attached telemetry buoy. This whale was identified as the 2007 calf of #1701, last seen in the Bay of Fundy 25 September 2008 gear free. Argos and GPS signals were not strong, although the FWC survey plane was able to relocate the whale tracking VHF transmissions on 27 December 2008. A multi-agency team successfully cut the two loops across the back, attached a replacement telemetry buoy closer to the body with an additional float to aid in the shedding of the gear. Based on telemetry data it appeared that the buoy became adrift of the whale in the early hours of 28 December 2008. The adrift buoy was retrieved that same day with approximately 100 ft of line attached to it, and the whale was next seen gear-free by the WTGA team, 07 January 2009 involved in a SAG, and subsequently multiple times throughout the season. It is believed that right whale 2007 calf of #1701 is currently gear free.

A severely entangled whale was discovered 14 January 2009 by the WTGA survey team approximately 15 nmi offshore of GA. The whale, identified as the 2003 Calf of #1711 and subsequently named "Bridle" #3311, had multiple lengths of line anchored in the mouthline and trailing alongside the body. At least one line exited the right mouthline, passing over the upper jaw to a small buoy and tangle of line on the left side of the head close to the eye. The line had cut deeply into the upper jaw and lower lip. The GDNR on-water team was able to mount a response, secure a telemetry buoy to the trailing gear, remove some of the trailing line, and place a small Norwegian buoy in front of the telemetry buoy. This whale was re-sighted 15, 18 and 22 January by the FWC aerial survey team. A disentanglement attempt was made on 22 January, and the Norwegian buoy was removed. The next disentanglement attempt on 23 January found the whale to be highly evasive and it continuously maneuvered away from boat approaches. Further documentation was obtained from re-sights on 01 February by WTGA aerial survey team when another on-water disentanglement attempt was made, then nearly a month later on 04 March by FWC aerial team. The line cutting across the lower lip had incised deeply, there was a bad infestation of orange and white cyamids that had expanded across the head, and skin condition had also generally declined. On 05 March, the WTGA team located the whale, and provided aerial support for a boat-based sedation attempt. Following drug administration the whale was still highly evasive. On 06 March the disentanglement team and on-board veterinarians, successfully administered two doses of sedative which caused a notable change in behavior; specifically a more tolerable response to the boat approaches. A successful cut was made to the line exiting the lower jaw,

foreward of the knot where lines over the rostrum and lower lip converge. This left a short length of line in the mouthline and line trailing from the left flipper, although approximately 400 ft of line came loose and was recovered. The team noted some trailing line at depth but assessed that it may become free over time, however the health of this whale remains a cause for serious concern.

On 31 January 2009 the NEA aerial survey team discovered an entangled right whale with line exiting the left mouthline, crossing over the head towards the right flipper and trailing at least one whale-length beyond the flukes. An on-water GDNR team was able to respond and deploy a telemetry buoy on the trailing line. This whale was identified as #3420, a five-year old female previously seen gear-free in the Bay of Fundy 11 September 2008. Telemetry fixes were sporadic and of low quality, it was suspected that the buoy was fouled or poorly oriented on the whale. On 25 February 2009 the USCG retrieved the telemetry buoy off of Mount Pleasant, NY. It had come adrift with 51 ft of line attached to it. There have been no further sightings of #3420 and the nature of any remaining line is not known.

The WTGA survey team discovered an entangled right whale following the survey flight of 07 February 2009. The whale later identified as a juvenile, 2007 Calf of #2614, had a single wrapping line around the rostrum and two trailing lines stretching approximately 30 and 20 feet behind the flukes. The previously known sighting of this whale was on 05 January 2009 by Marineland and MRC off the coast of FL, showed the whale to be gear free. Following a re-sight of this animal on 09 February, the GDNR on-water response team was able to deploy a telemetry buoy to one of the two trailing lines, and a cut was attempted but the whale became more evasive at successive boat approaches. On 12 February 2009 a series of cuts were made by a multi-agency on-water disentanglement team. A cut was made to the line wrapping the rostrum and very close to the right mouthline, leaving a short length of line exiting the right side of the mouth and a longer length on the left, although the team assessed that this will likely be shed over time. This whale was last sighted by the PCCS aerial survey team in Cape Cod Bay (CCB) on 10 March 2009 actively feeding, although it is unclear as to whether all of the gear had been shed.

Injuries:

During the 2009 season, EWS survey teams documented two right whales that had visible injuries. The injury documented on the 2009 calf of #2145 was observed on multiple sightings and is not considered to be life threatening. The wound of 2009 calf of #2660 was only documented on one sighting, and this serious injury is thought to have led to this calf's death.

A wound on the right flank of the 2009 calf of #2145 was first observed by the GDNR boat-based platform, during a hydrophone recording session on 29 December 2008. Clay George, of GDNR sent images from this cruise to NEA and shark experts for

review. A shark researcher from Massachusetts Division of Marine Fisheries, unofficially provided his opinion that this wound appeared to be the result of a shark bite, most likely a white shark. The calf was first sighted in the SEUS by the FWC aerial survey team on 19 December 2008 with no visibly apparent superficial wounds, although two small marks are evident in the same region where a wound later became apparent. The next sighting of this calf was by the NEA team, on 25 December where a wound is beginning to be evident on the right flank of this calf. In the sighting on 27 December, documented by the NEA aerial survey team, the semi-circle shape of the wound is starting to be visible. It is a possibility that the wound is not evident in aerial images from earlier sightings as it would have been too fresh for cyamids to have infested the exposed area, and marks are less evident from more distant, aerial photographs. Subsequent boat-based and aerial images (09 February 2009 image, Figure 20) show two large bite-shaped marks on the right flank, with orange/pink coloration from cyamid infestation and additional surrounding white scrape lines. This superficial wound is not categorized a serious injury according to the criteria for cuts from entanglement or ship strikes (Knowlton and Kraus, 2001), since the mark is not estimated to be deeper than 8cm (3.1 inches). Interestingly, several sharks were sighted within the EWS, and two sightings allowed for opportunistic photographic documentation, for which species identification was later confirmed as that of white sharks (*Carcharodon carcharias*). No new wounds were evident on the mother of this calf, and the calf was monitored closely during the 2009 season when it was sighted on multiple occasions with no apparent hindrance to its health. The 2009 calf of #2145 has not been categorized as 'Fatal' in Table 6 since the injury was not considered serious, and the calf was seen multiple times in an apparently healthy condition during the EWS 2009 season and subsequently in the Bay of Fundy critical habitat (August 2009).

The calf of #2660 "Gannet" was first sighted with her mother by the NEA team in the CEWS area on 12 February 2009. This was the only sighting of this calf by any aerial survey team during the EWS 2009 season, and following analysis of photo documentation it was noticed that the calf was missing part of its left fluke (Figure 21). The severed edge appears to be a clean cut based on aerial images. No blood was observed in the surrounding water and the calf was swimming normally. The next sighting of right whale #2660 was on 15 February 2009 when she was associated with an unidentified juvenile and her calf was not observed anywhere within the surrounding area. A calf carcass was discovered on 17 February 2009 and towed in by the FWC on-water response team. The identification of this carcass is unknown as of August 2009, until results have been processed from genetic sampling. Considering the time frame of the documented injury, carcass discovery, and estimated time of death from necropsy, it is feasible the carcass is that of 2009 calf of #2660. Identification cannot be verified by matching the fluke injury since the body had been heavily predated upon, apparently while still alive, by sharks (see *Mortalities* below). In the SEUS calving area, when a mother has been documented with a calf and subsequently documented without the calf, if environmental conditions during the sighting are good enough to be confident that the calf would have been seen if present, we assume that the calf has died. Since a carcass was not positively matched to this calf, this

presumed mortality has been accounted for in the mortalities table, represented by the sighting of #2660 alone on 15 February, which is also the reason the calf's injury has been classified as fatal.

In addition, on the final day of the EWS season, 31 March 2009 a report was received from the USCG of a 30 ft recreational vessel travelling approximately 22 kts striking a suspected right whale four nmi (7.4 km) south of Port Royal Sound, SC. The impact did severe damage to the vessel. USCG responded to distress calls and reported seeing a suspected right whale at the surface and a trail of blood in the water. Although aerial surveys dedicated a search to the area, no teams sighted any whales in the vicinity and therefore no photographic documentation exists for this event. The event is currently under investigation by NOAA Fisheries Service Law Enforcement personnel.

Additional Mortalities:

On 17 February 2009 the FWC aerial survey team discovered a dead calf carcass approximately 13 nmi north-northeast of the St. Augustine inlet during a routine SEWS survey. It was towed in by an on-water FWC team, and the necropsy took place the following day on Buck Island, on the south shore of the St Johns River. Bob Bonde of the US Geological Survey (USGS) was leading the necropsy with a multi-agency team (FWC, Jacksonville Zoo, University of Florida and Marineland). The calf was estimated to be a week to 10 days old. The cause of death has not been positively determined, although it appears to have bled to death from premortem shark predation. There is a possibility that this could be the calf of #2660 "Gannet" (see *Injuries* above). Two days had passed between sighting this mom without her calf and discovering the unidentified carcass. In addition, the calf's severed fluke injury may have contributed to the cause of ultimate death. It is not possible to match the identification of this carcass to #2660's calf based on the fluke injury since the condition of the carcass was moderately decomposed and heavily scavenged. Although the main body cavity was intact the fluke was gone and therefore the necropsy team could not confirm the identity as that of #2660's calf. Identification will be determined pending genetic sampling analysis by Trent University, Ontario, Canada. If identification of the carcass is not a genetic match with calf of #2660 then it can be presumed that an additional calf was lost during the 2009 season.

In addition to confirmed calf mortalities with carcass retrievals, the 2009 season mom #2320, "Piper" was documented in CCB, MA by PCCS on 14 and 17 April 2009 without her calf. Piper (#2320) was first sighted with a calf during the 2009 EWS season by WTGA, and on eight subsequent days by various EWS research teams. The environmental conditions were excellent during the 17 April 2009 sighting, and the survey team was confident that they would have seen a calf while on site if it had been present. The 2009 calf of #2320 is presumed dead. Based on the above information, a minimum of two of the 39 mothers documented with their calves during the 2009 season are suspected to have lost their calves.

TABLES AND FIGURES

Table 1. NEA Aerial Survey Effort (including contingency surveys)

Number of Available Survey Days	Number of Surveys Flown/Percent	Number of Full Surveys	Number of Partial Surveys	Total Available Transect Miles (nmi)	Total Transect Miles Flown (nmi)/Percent of Total Available	Percent of Transect Miles Flown in Beaufort ≤ 3	Number of Transect Miles Flown in Beaufort ≤ 3 / Percent of Total Available
121	71	40	31	49,142	23,879		20,344
	58.7 %				48.6 %	85.2 %	41.4 %

Table 2. NEA Aerial Contingency Survey Effort

Type of Contingency Survey	Number of Surveys Flown	Number of Full Surveys	Number of Partial Surveys	Total Transect Miles Flown	Number of Transect Miles Flown in Beaufort ≤ 3	Percent Flown in Beaufort ≤ 3 of Total Available
Northern 2-plane	3	2	1	1,003	871	86.8 %
Southern 2-plane	1	1	0	424.3	424.3	100 %
1-plane	2	1	1	813.1	813.1	100 %

Table 3. NEA Aerial Survey Right Whale Sighting Frequency

	Beaufort < 4	Beaufort > 4
Total Transect Miles Flown (nmi)	20,344	3,535
Number of Right Whale Sighting Events with Calculable Sighting Distances	285	14
Sightings per nmi of Effort for Sightings with Calculable Sighting Distances	0.014	0.004
Number of Right Whale Sighting Events	410	20
Sightings per nmi of Effort	0.020	0.006

Table 4. Calving Intervals for 2009 Season Mother / Calf Pairs

2009 Mom/Calf Pairs	Age/Age Class	Number of Calves (including 2009 calf)	Calving Interval
1012	A	7 calves- First w/calf 12/18/08 NEA	4
1142	A	8 calves- First w/calf 02/01/09 NEA	5
1151	A	6 calves- First w/calf 12/15/08 NEA	3
1204	A	7 calves- First w/calf 02/26/09 NEA	4
1233	A	5 calves- First w/calf 03/09/09 NEA	5
1240	A	8 calves- First w/calf 1/09/09 VMSS	4
1246	A	7 calves- First w/calf 01/05/09 WTGA	4
1266	A	7 calves- First w/calf 12/18/08 FWC	5
1281	A	7 calves- First w/calf 01/19/09 WTGA	3
1303	A	6 calves- First w/calf 02/17/09 FWC	4
1310	A	7 calves- First w/calf 01/05/09 WTSC	4
1315	A	5 calves- First w/calf 01/22/09 NEA	4
1334	A	8 calves- First w/calf 1/10/09 NEA	4
1503	24	4 calves- First w/calf 12/18/08 WTSC	3
1515	A	6 calves- First w/calf 12/29/08 WTGA	6
1608	23	2 calves- First w/calf 12/3/08 WTGA	6
1611	23	3 calves- First w/calf 01/14/09 WTGA	3
1612	A	5 calves- First w/calf 12/28/08 NEA	6
1711	22	2 calves- First w/calf 01/02/09 WTGA	6
1817	A	4 calves- First w/calf 01/05/09 NEA	3
1946	20	4 calves- First w/calf 11/25/08 WTSC	3
1970**	A	4 calves- First w/calf 02/25/09 WTSC	4
2123	18	4 calves- First w/calf 12/29/08 WTGA	3
2145	18	4 calves- First w/calf 12/19/08 FWC	2
2223*	17	2 calves- First w/calf 12/29/08 UNCW	4
2320	A	2 calves- First w/calf 12/29/08 WTGA	3
2503	14	2 calves- First w/calf 01/28/09 NEA	3
2520	A	4 calves- First w/calf 02/06/09 WTGA	6
2611	13	2 calves- First w/calf 01/04/09 WTGA	2
2660	13	2 calves- First w/calf 02/12/09 NEA. Lost calf.	3
2791	12	2 calves- First w/calf 02/21/09 FWC	3
3101	8	1 calf- First w/calf 02/01/09 NEA	NA
3108	8	1 calf- First w/calf 12/30/08 FWC	NA
3139**	8	1 calf- First w/calf 02/28/09 WTGA	NA
3290	7	1 calf- First w/calf 02/02/09 FWC	NA
3317	6	1 calf- First w/calf 02/26/09 NEA	NA
3320	A	1 calf- First w/calf 12/04/08 NEA	NA
3370	U	1 calf- First w/calf 02/21/09 WTGA	NA
3440	A	1 calf- First w/calf 01/10/09 WTSC	NA

*Not seen in the SEUS (only seen in NC)

**Never sighted by Central EWS team

Table 5. NEA Aerial Survey Vessel/Whale Interactions

Date	Latitude/ Longitude of whale(s)	Origin or Destination of Vessel (visual / AIS)	Number of Whales and Com- position	Vessel Type and Size (feet)	Communication	Closest Distance (estimate / AIS / flyover data point)	Vessel's Action / Whale(s)'s Reaction
28-Dec-08	30.7126 -81.30949	Inbound St Marys Channel	2 M/C pair	Large Merchant	Yes. Observers spotted the whales at same time as being hailed by harbor pilot onboard large merchant. Harbor Pilot informed that he had a visual on the whales and was reducing speed as navigating in to the channel.	~ 100 meters*	Vessel was to whales' north, and passed east to west. Whales were between buoys #1 and #3 on south side of St Marys channel. No change in whales' behavior, activity or heading.
10-Jan-09	30.6672 -81.3225	Outbound St Marys Channel	2 M/C pair	21 ft Recreational fishing vessel	No. Because vessel name was unknown, survey team hailed 'SE heading recreational vessel at approx position' and response came back from an alternative vessel which was not involved. Vessel in question never responded to hails.	~ 250 yards	After attempted hail, the recreational vessel altered heading to avoid whales but did not reduce speed. No change in movement, behavior or direction heading of whales. Whales remained inactive at surface throughout interaction.
22-Jan-09	30.57965 -81.283	Inbound St Johns Channel probable. ~ 11 nmi N of STJ heading SSW	1 Only calf observed although mom present nearby	~ 40 ft Recreational private yacht	No. No attempt was made to hail the vessel as it was on a course clear to the west and aircraft was onsite as vessel cleared whales.	~ 200 yards	Calf was breaching continuously before, during and following interaction. Vessel operator appeared not to have noticed breaching whale, and did not alter heading or speed.
23-Jan-09	30.59787 -81.07058	~ 20 nmi offshore between Fernandina and Jacksonville beach heading SSW	2 M/C pair	~ 65 ft Recreational private yacht	Yes. Vessel hailed on VHF Ch 16. Response achieved. Observers gave relative position of whales to vessel. Relay of information was delayed due to improper radio communication from vessel operator.	~ 20 feet	No change in movement, behavior or direction heading of whales. Whales remained inactive, spending majority of time at surface. Vessel did not reduce speed after responding to survey team, only reduced speed when abeam of whales at closest position of approximately 20 feet, then made a slight change in direction of about 20 degrees towards whales, then resumed original course with slightly reduced speed.

Date	Latitude/ Longitude of whale(s)	Origin or Destination of Vessel (visual / AIS)	Number of Whales and Com- position	Vessel Type and Size (feet)	Communication	Closest Distance (estimate / AIS / flyover data point)	Vessel's Action / Whale(s)'s Reaction
2-Feb-09	30.69567 -81.32558	Inbound St Johns Channel, Mayport.	3 2 of 3 in a SAG 1 of 3 singleton	~ 30 ft US Army Corps of Engineers survey vessel	Yes. Vessel hailed by survey team on VHF Ch 16, switched to Ch 10. Alerted capt. that was on course for whales. Capt. requested survey plane guide him around whales, was directed 15 degrees to starboard. Remained on site for duration of event. Alerted vessel once clear of whales, and advised to remain on sharp lookout.	~ 1.5 nmi	Vessel was first sighted approx. 5 nmi north of whales, hailed, and altered course when approx. 1.5 nmi north of whales, after being advised by survey plane which heading change to make. No change in behavior of any of the three whales involved.
15-Feb-09	30.63157 -81.18995	Outbound St Marys Channel, Kings Bay	2 M/C pair	Trident Nuclear Submarine ~ 550 ft with two support vessels ~ 240 ft	Yes. Initially operator of HOS Bluewater hailed on VHF Ch 16, switched to Ch 10. Alerted of whale approx 2 nmi off bow (see below). Then additional whales were sighted closer to convoy, attempt was made to hail vessel again with negative response but survey plane was able to hail vessel on aviation frequency 123.15. Survey plane continued communication on VHF Ch 10 throughout following interaction.	~ 200 yards	The easternmost escort of convoy passed closest to M/C pair. Initially convoy was on a SE course approx. 0.5 nmi NW of whales. No apparent change in whales' behavior, activity or heading although observations were limited due to involvement in following interaction (see below).

Date	Latitude/ Longitude of whale(s)	Origin or Destination of Vessel (visual / AIS)	Number of Whales and Com- position	Vessel Type and Size (feet)	Communication	Closest Distance (estimate / AIS / flyover data point)	Vessel's Action / Whale(s)'s Reaction
15-Feb-09	30.6256 -81.1853	Outbound St Marys Channel, Kings Bay	1 Singleton	Trident Nuclear Submarine ~ 550 ft with two support vessels ~ 240 ft	Yes Initially operator of HOS Bluewater hailed on VHF Ch 16, switched to Ch 10 during previous interaction (see above). Survey plane continued communication on VHF Ch 10 throughout interaction.	~ 150 yards	HOS Bluewater conveyed that vessels would be coming to 'all stops' which appeared to happen when at closest position to whale. Whale started to breach when convoy was nearby, and began lobtailing when at closest position, between escort and submarine. Whale was not breaching prior to and following interaction.
15-Feb-09	30.41485 -81.24478	Outbound St Johns Channel	2 Associated	21 ft Recreational vessel	No. Attempted to hail vessel multiple times on VHF Ch 16 with negative response.	~ 1.16 nmi	Initially vessel was 2 nmi to the SSW, on course for whales. Vessel stopped when abeam of whales to the east, appeared to be heading towards whales, with a lookout on the bow, then circled and set anchor. It is possible that those onboard did not see the whale, and were anchoring to fish. Whales did not change behavior but assumed a slow westward heading from no original heading, following the vessel setting anchor to their east.
19-Feb-09	30.22495 -81.31435	Inbound St Johns Channel	1 Singleton	~ 40 ft Army Corps of Engineers Research Vessel	No. Communication was not attempted as the vessel was clear of the whale when initially sighted. Aircraft received a call soon after the incident from the public sighting network, reporting this sighting via the ACOE vessel.	~ 486 yards*	Vessel considerably reduced speed and passed whale at a safe distance. Whale was breaching when initially sighted, and was not breaching at point of closest approach by vessel, or following interaction.

Date	Latitude/ Longitude of whale(s)	Origin or Destination of Vessel (visual / AIS)	Number of Whales and Com- position	Vessel Type and Size (feet)	Communication	Closest Distance (estimate / AIS / flyover data point)	Vessel's Action / Whale(s)'s Reaction
19-Feb-09	30.74895 -81.23534	1 of 2 Outbound St Johns Channel, Jacksonville 2 of 2 Outbound St Marys Channel, Fernandina.	2 M/C pair	1 of 2 Tug alone ~ 110 ft 2 of 2 Freighter, large merchant	1 of 2 Yes. Hailed on VHF Ch 16, Capt. responded immediately and switched to Ch 10. Capt. requested advisement on best change of course to avoid. Following communication with freighter (see below) capt. advised that he had copied coordinates of whales. 2 of 2 Yes. Initial attempts to hail harbor pilot on Ch 11 (pilots working ch.) with negative contact. Vessel capt. hailed on Ch 16, switched to Ch 10. Coordinates of whales relayed, and capt. responded that he would alter course to avoid. Tug and freighter coordinated navigation on Ch 10.	1 of 2 ~ 0.52 nmi* 2 of 2 ~ 2.51 nmi*	Tug was clear of whales to the east and freighter was coordinating with tug to pass sea buoy on its port side. Freighter was clear of whales to the south by over 2 nmi. Initially the mom calf pair were traveling slowly to the south. Following interaction whales had stopped traveling and were resting at the surface facing in a north direction.
27-Feb-09	30.32722 -81.14138	Outbound St Johns Channel	2 M/C pair	~ 21 ft Recreational sport fishing vessel	No. Attempted to hail multiple times on VHF Ch 16 with negative contact.	~ 627 yards	Vessel cleared whales to the south, continuing on a WSW heading, towards another M/C pair (see below). No change in vessel heading or speed. Whales remained resting at surface throughout interaction, no change in activity.

Date	Latitude/ Longitude of whale(s)	Origin or Destination of Vessel (visual / AIS)	Number of Whales and Com- position	Vessel Type and Size (feet)	Communication	Closest Distance (estimate / AIS / flyover data point)	Vessel's Action / Whale(s)'s Reaction
27-Feb-09	30.33002 -81.11123	Outbound St Johns Channel	2 M/C pair	~ 21 ft Recreational sport fishing vessel	No. Attempted to hail multiple times on VHF Ch 16 with negative contact.	~ 1 nmi	After clearing the previous M/C pair, vessel continued towards next M/C pair and passed to the south. It did not appear to the survey team that vessel operator was aware of either group of whales. No change in vessel heading or speed. Whales remained resting at surface, calf rolling, with body contact between pair, throughout interaction, no change in activity.
27-Feb-09	30.3723 -81.34818	1+2 of 3 Outbound St Augustine probable 3 of 3 Outbound St Johns Channel	2 M/C pair	1 of 3 ~ 40 ft Recreational private yacht 2 of 3 ~ 35 ft Recreational vessel 3 of 3 ~ 200 ft Casino cruise ship	Yes. Initially negative response to hails on Ch 16. 2 of 3 eventually responded, switched Ch 10. Vessel informed survey plane that he was coordinating navigations with 2 other vessels planning to converge at the mouth of the channel and continue north. Requested switch Ch 68 in order for all vessels involved to follow guidance. Survey plane guided 1+2 of 3 at risk of collision, clear of the whales by suggesting alter course to stbd. Positive contact was made with 3 of 3 on Ch 16 switched Ch 10. Capt responded that he planned on staying to east of whales.	1 of 3 ~ 750 yards 2 of 3 ~ 700 yards 3 of 3 ~ 1 nmi	1 of 3 altered course to starboard and was clear of whales. Vessel did not appear to reduce speed. 2 of 3 did not appear to have altered course to a great enough degree and was requested to come further to stbd, then was clear of whales to east. Vessel did not appear to reduce speed. 3 of 3 was clear of whales to the north east.

Date	Latitude/ Longitude of whale(s)	Origin or Destination of Vessel (visual / AIS)	Number of Whales and Com- position	Vessel Type and Size (feet)	Communication	Closest Distance (estimate / AIS / flyover data point)	Vessel's Action / Whale(s)'s Reaction
7-Mar-09	30.25763 -81.37748	Jacksonville Beach	2 M/C Pair	~ 10 ft Kayak	No. No direct means of communicating available, although law enforcement were alerted via ground contact.	~ 100 ft	During the time that survey plane was on site, kayaker was to the west of the whales. Initial sighting of kayaker with whales was at 0923 (L). Upon relocation of whales at 1112 (L), there were no vessels in the vicinity of the whales. M/C pair continued to log at surface throughout interaction.

*Data from AIS

Table 6. Entanglement, Injury and Additional Mortality.

Entanglements

Date	Event	Fatal	Right Whale	Sex	Age	Notes
08-Dec-08	Discovery and first documentation of Entanglement	No	#3294	U	A	Attached buoy became adrift and recovered with line. Whale appeared to be gear free on 01 Feb 2009 off FL coast.
26-Dec-08	Discovery and first documentation of Entanglement	No	2007 Calf of #1701	U	2	Successful disentanglement cuts made. Attached buoy became adrift and recovered with line. Whale sighted gear free 07 Jan 2009 and multiple times following this in SEUS
14-Jan-09	Discovery and first documentation of Entanglement	Unk	#3311 'Bridle'	U	6	Multiple disentanglement attempts, successful sedation and cuts made. Whale has not been sighted following responses, nature of gear remaining unknown and health is of serious concern.
31-Jan-09	Discovery and first documentation of Entanglement	Unk	#3420	F	5	Attached buoy became adrift and recovered off NJ with line. Whale has not been sighted following response, nature of gear remaining unknown.
7-Feb-09	Discovery and first documentation of Entanglement	No	2007 Calf of #2614	U	2	Successful disentanglement cuts made. Whale appears to be gear free in Cape Cod Bay 10 March 2009 - sighted actively feeding.
10-Feb-09	First SEUS 2009 season sighting of previous entanglement case	Unk	#3346 Kingfisher	M	6	Known previous entanglement case

Injury

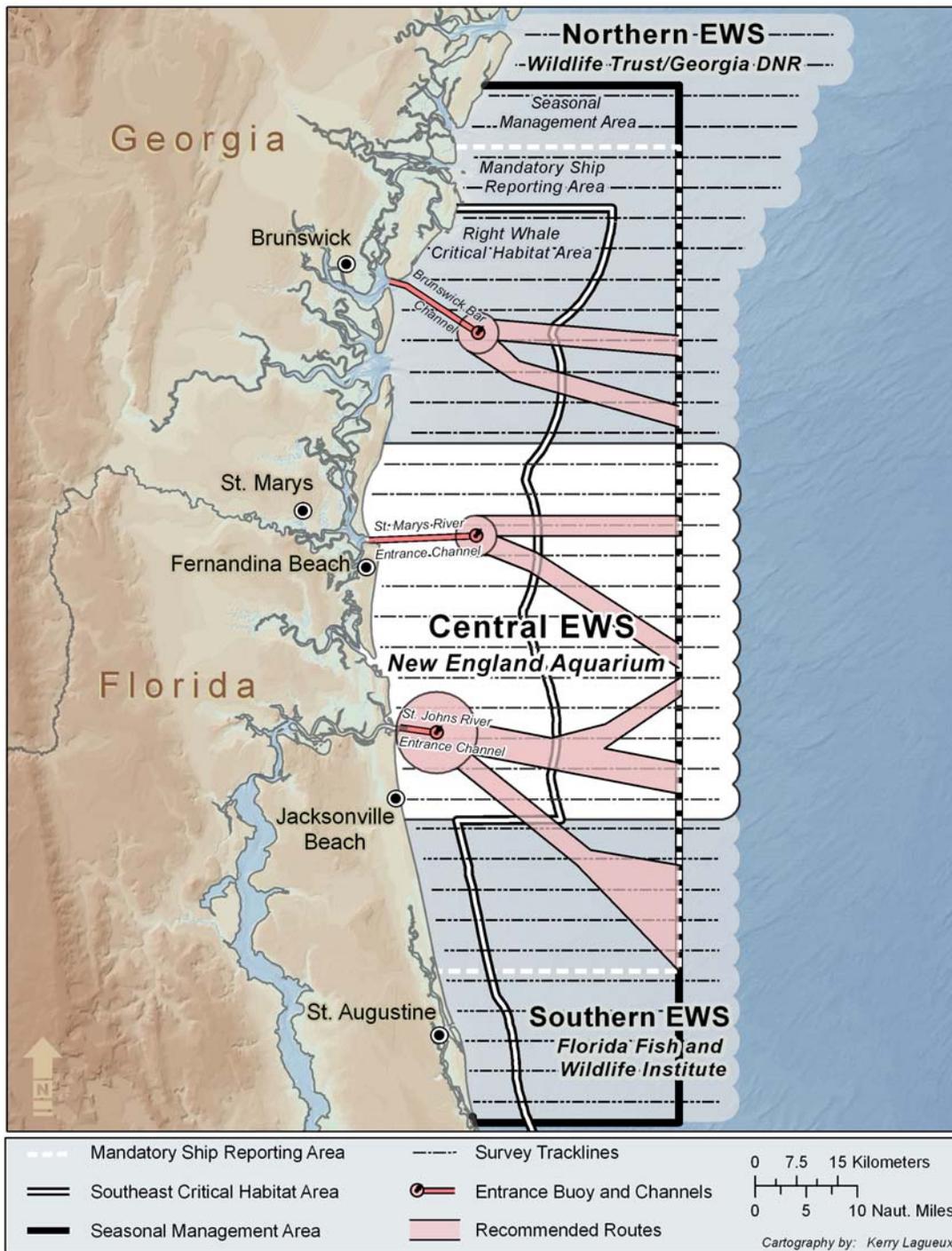
Date	Event	Fatal	Right Whale ID	Sex	Age	Notes
19-Dec-08	First documentation of calf	No	2009 Calf of #2145	M	Calf	Calf documented with suspected shark bite wound on right flank
12-Feb-09*	First and only documentation of calf	Yes	2009 Calf of #2660	U	Calf	Calf documented missing half of left fluke. Probable ship strike. Possible carcass retrieval 17 Feb 2009 although ID not yet matched from genetic sample.
31-Mar-09	Report of suspected vessel strike to USCG off SC	Unk	Unk	U	U	Recreational vessel sent a distress call. USCG responded. Personnel reported seeing a whale after the strike but species identification not confirmed.

Additional Mortalities

Date	Event	Fatal	Right Whale ID	Sex	Age	Notes
15-Feb-09*	First documentation of #2660 without calf	Yes	2009 Calf of #2660	Unk	Calf	Lost calf sometime between 2/12 and 2/15. Could possibly be the carcass towed in on 2/17
17-Feb-09*	Dead Calf off Florida coast	Yes	Unk	F	~ 7-10 d	Cause of death not determined. Necropsy suggests traumas and bleeding to death from premortem shark predation.
14, 17-Apr-09	First and second documentations of #2320 without calf	Yes	2009 Calf of #2320	Unk	~ 3.5 months	#2320 sighted two times without her calf in Cape Cod Bay

* All of these events could represent the same incident of injury leading to mortality. This cannot be confirmed until genetic samples have been processed.

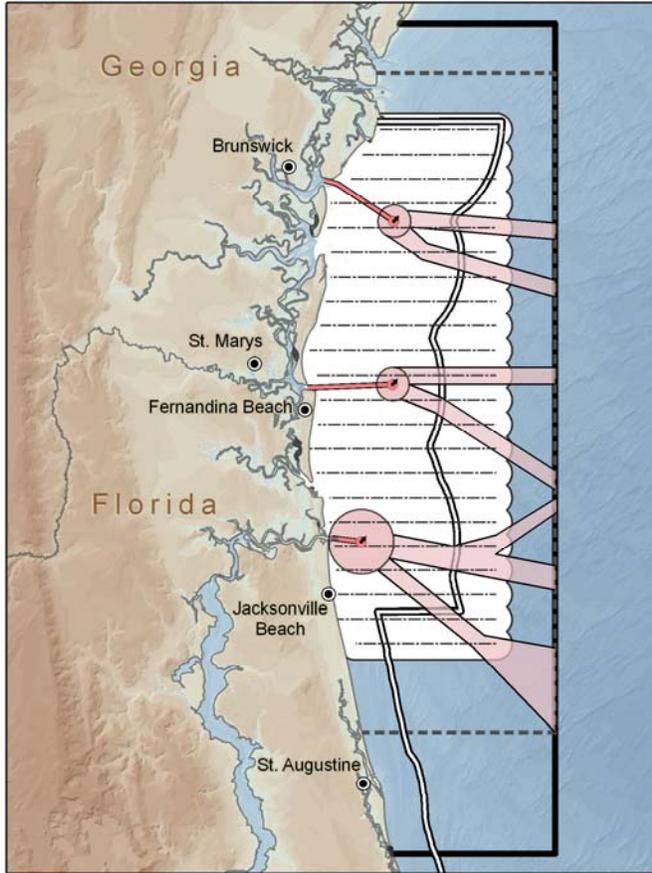
Figure 1. CEWS Survey Area.



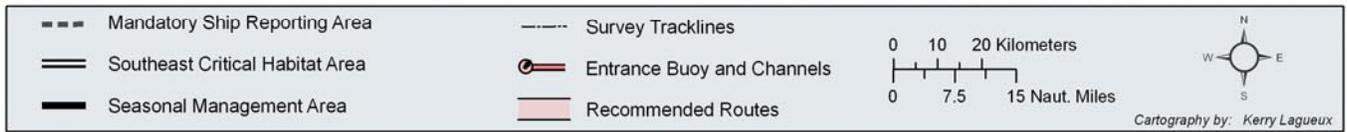
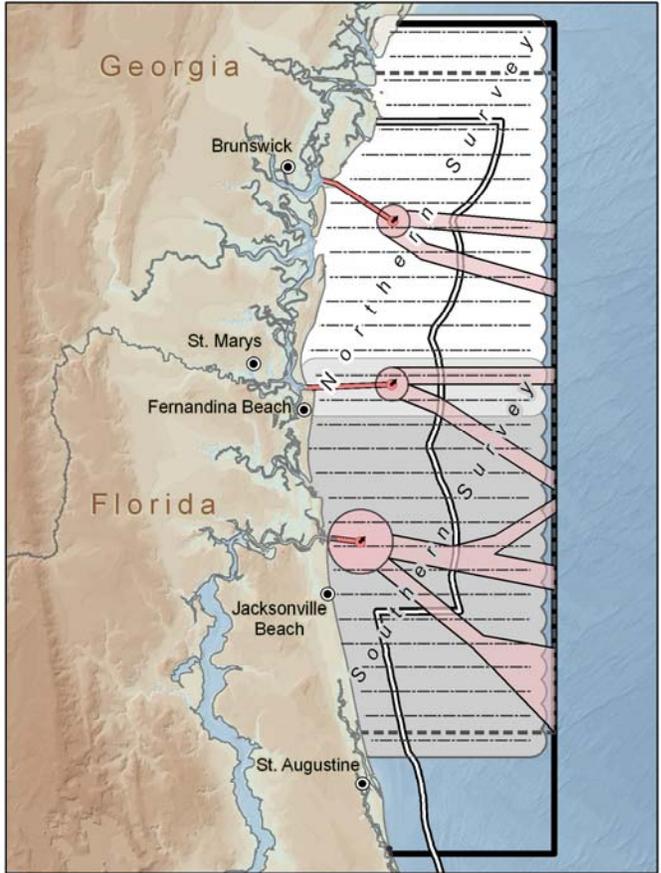
Cartography: Kerry Lagueux / New England Aquarium
 Projected in Universe Transverse Mercator, Zone 17, using North American Datum 1983.

Figure 2. CEWS Contingency Survey Areas

1 Plane Contingency Plan

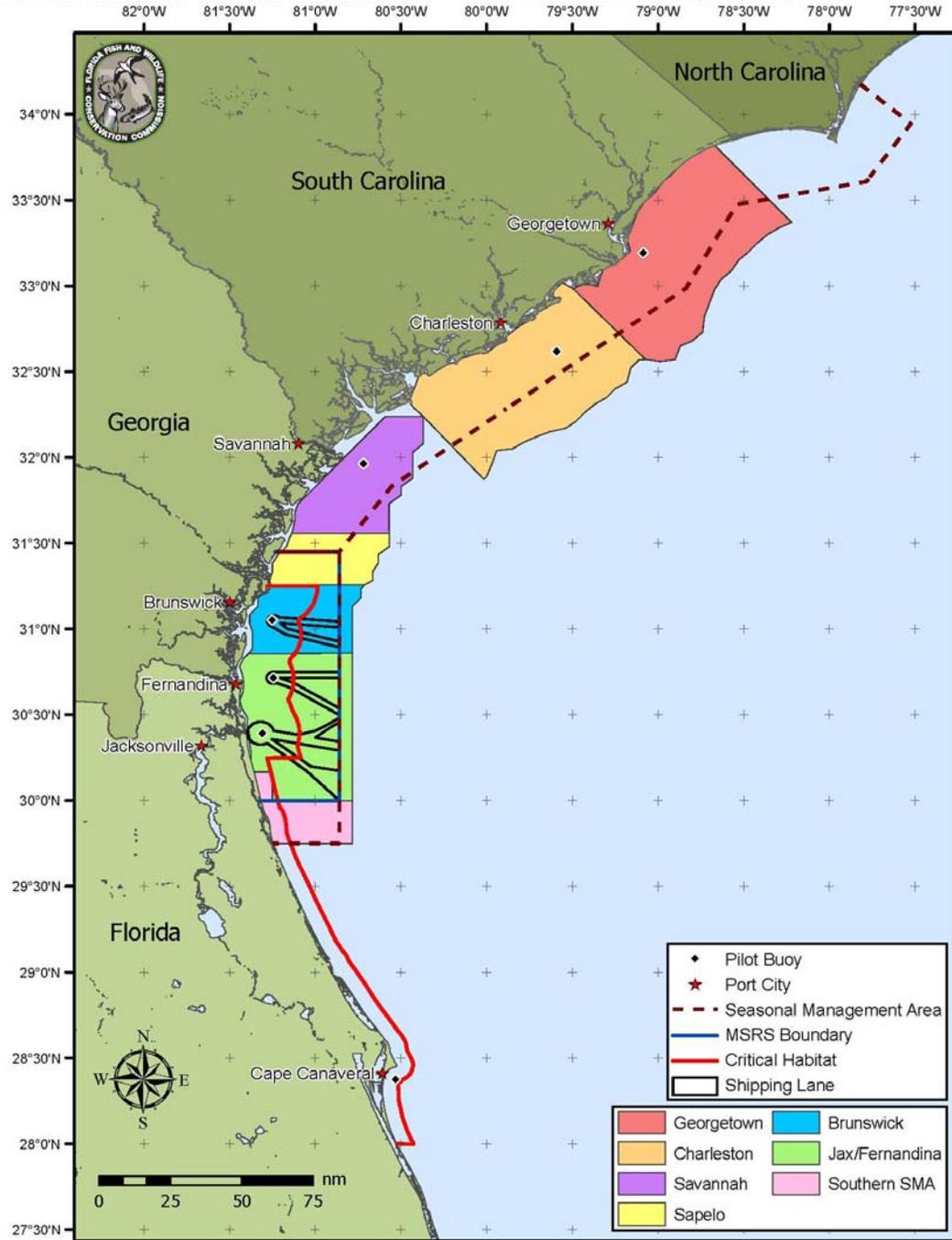


2 Plane Contingency Plan



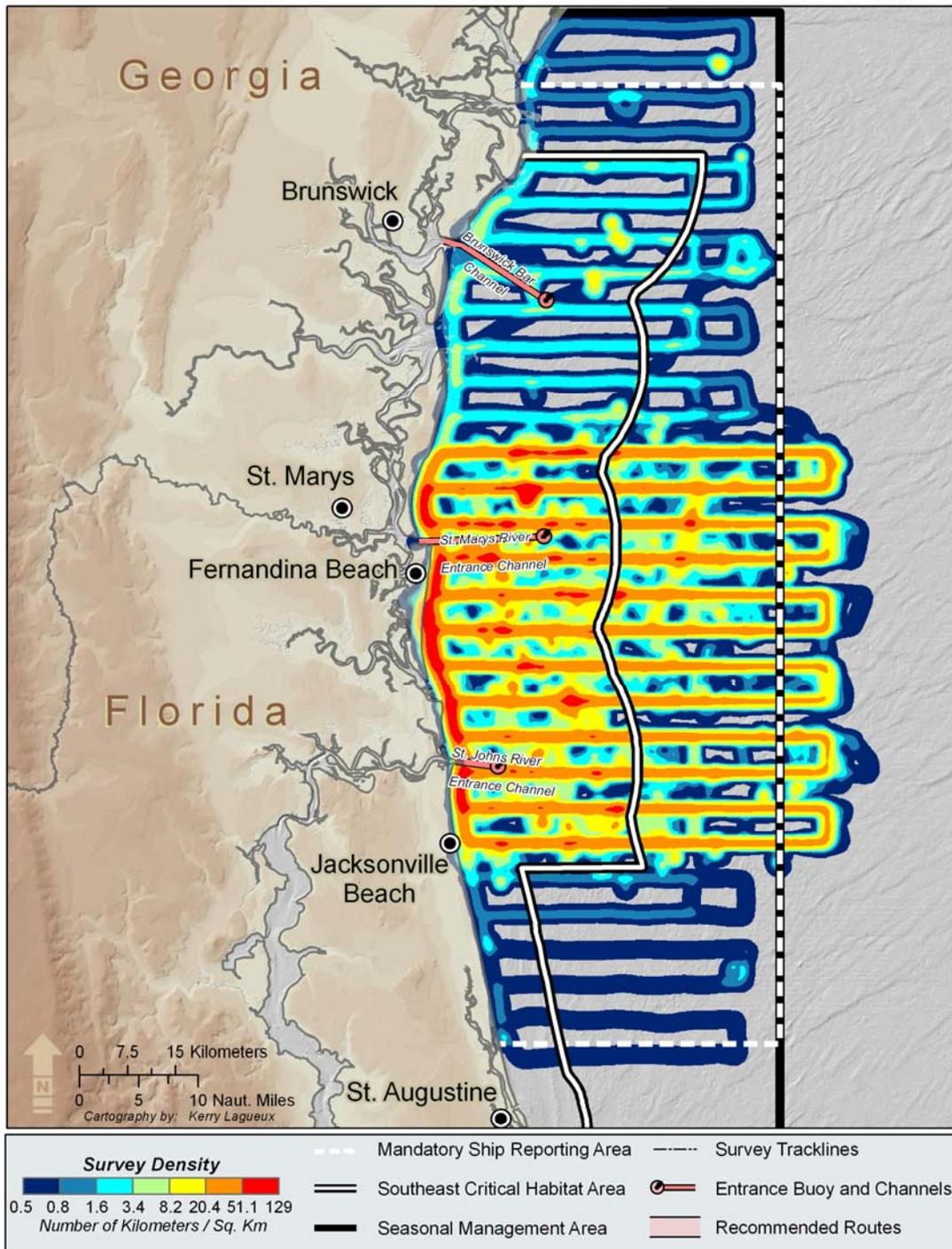
Cartography: Kerry Lagueux / New England Aquarium
 Projected in Universe Transverse Mercator, Zone 17, using North American Datum 1983.

Figure 3. Whale Alert Geographic Bins Map



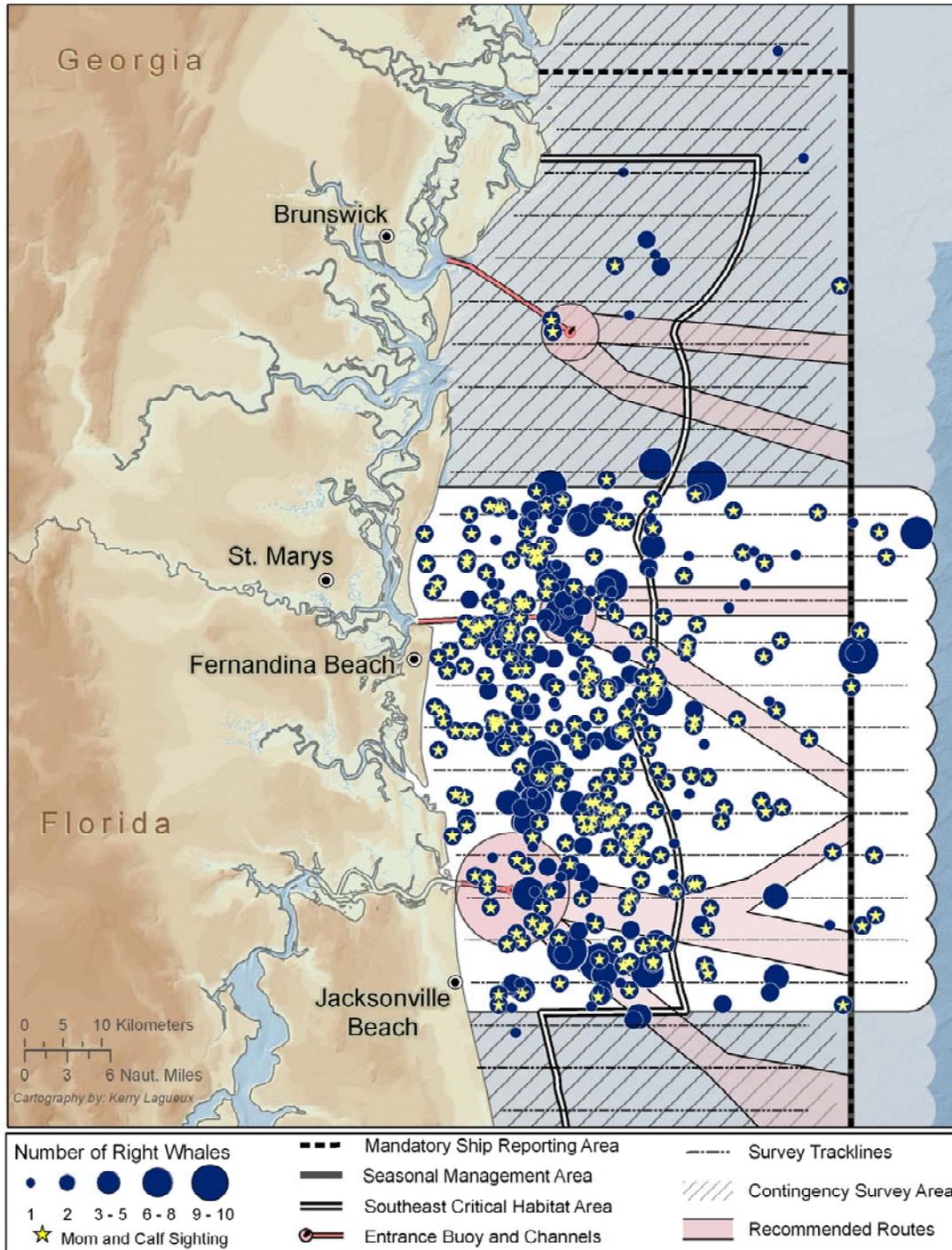
Map provided by Florida Fish and Wildlife Conservation Commission

Figure 4. NEA Aerial Survey Effort



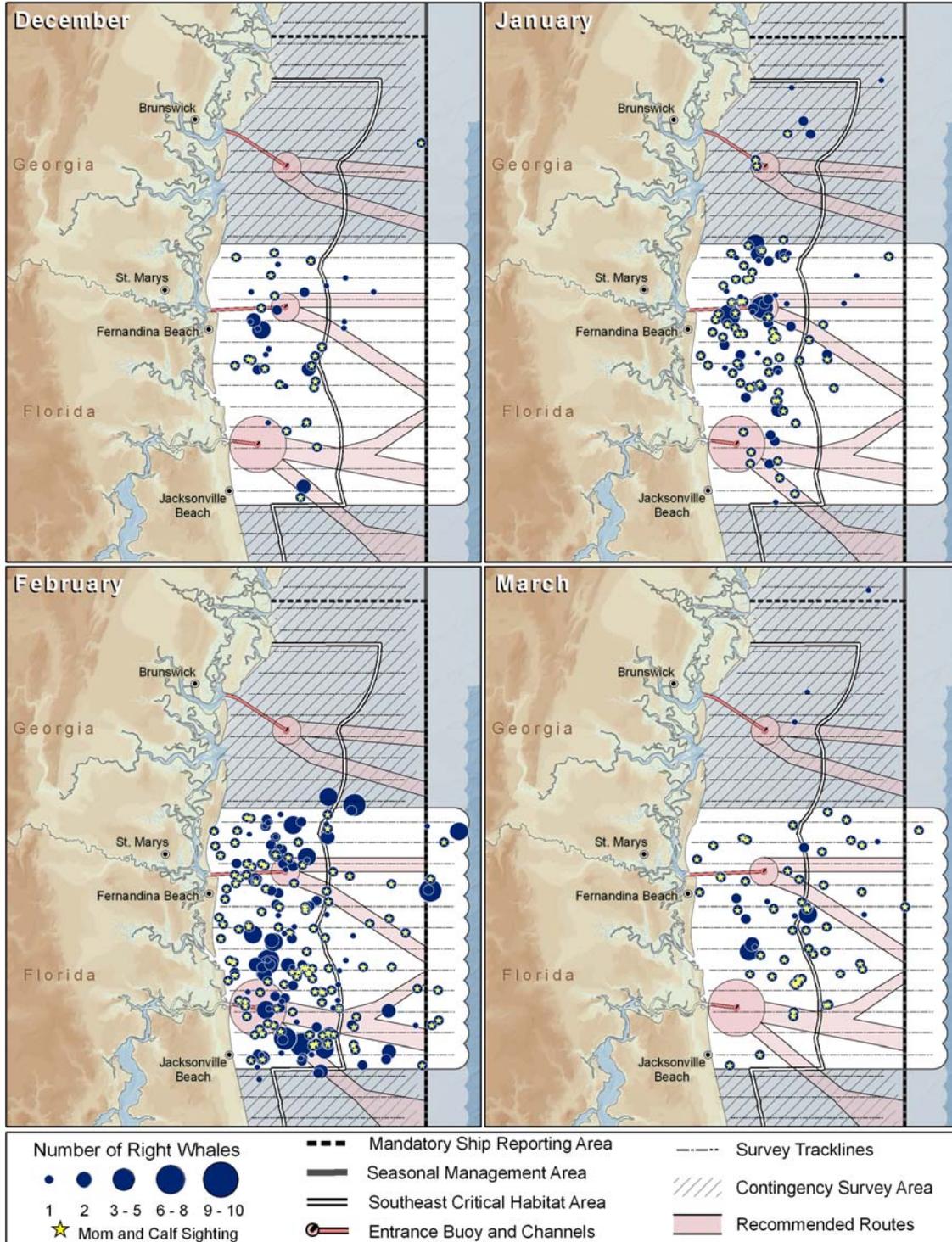
Cartography: Kerry Lagueur / New England Aquarium
 Projected in Universe Transverse Mercator, Zone 17, using North American Datum 1983.

Figure 5. NEA Aerial Survey Right Whale Sighting Events



Cartography: Kerry Lagueux / New England Aquarium
 Projected in Universal Transverse Mercator, Zone 17, using North American Datum 1983.

Figure 6. NEA Aerial Survey Right Whale Sighting Events by Month



Cartography: Kerry Lagueux / New England Aquarium
 Projected in Universal Transverse Mercator, Zone 17, using North American Datum 1983.

Figure 7. NEA Aerial Survey Effort in trackline nmi displayed in 5 day blocks

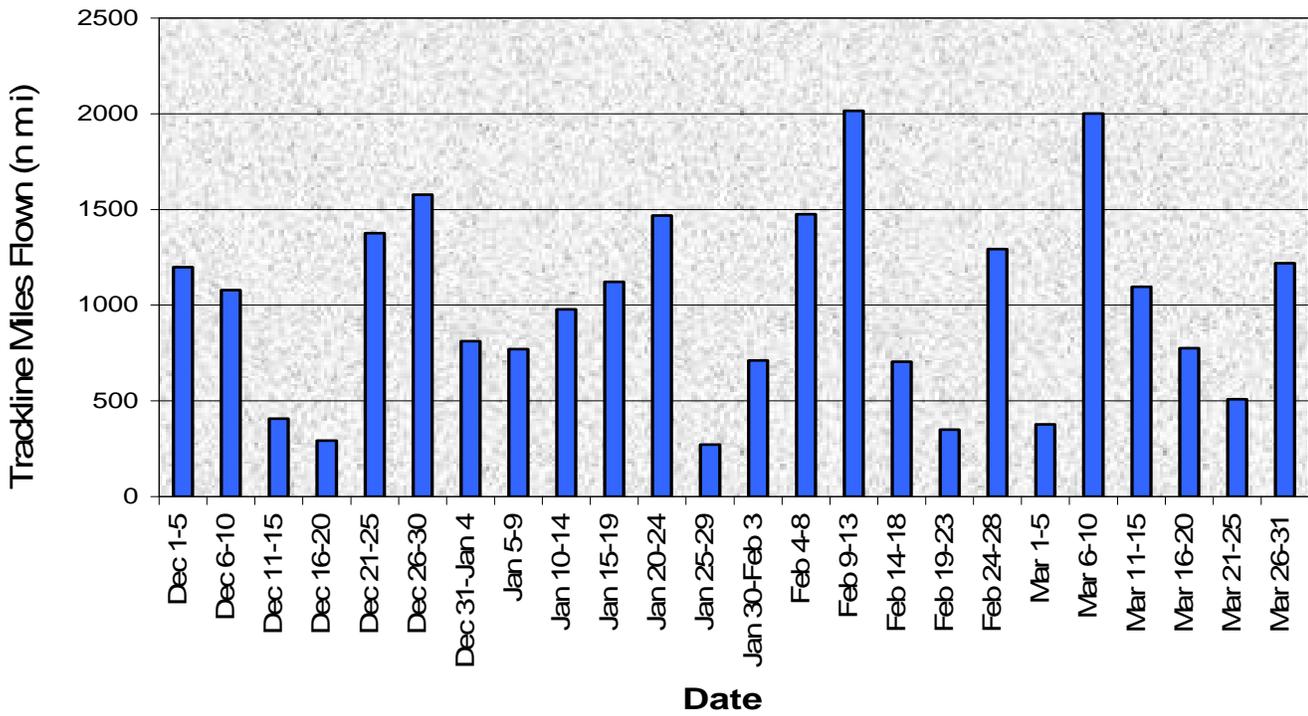


Figure 8. Temporal Occurrence of Right Whales for NEA Aerial Surveys displayed in 5 day blocks. Total numbers include individuals, mothers, and calves.

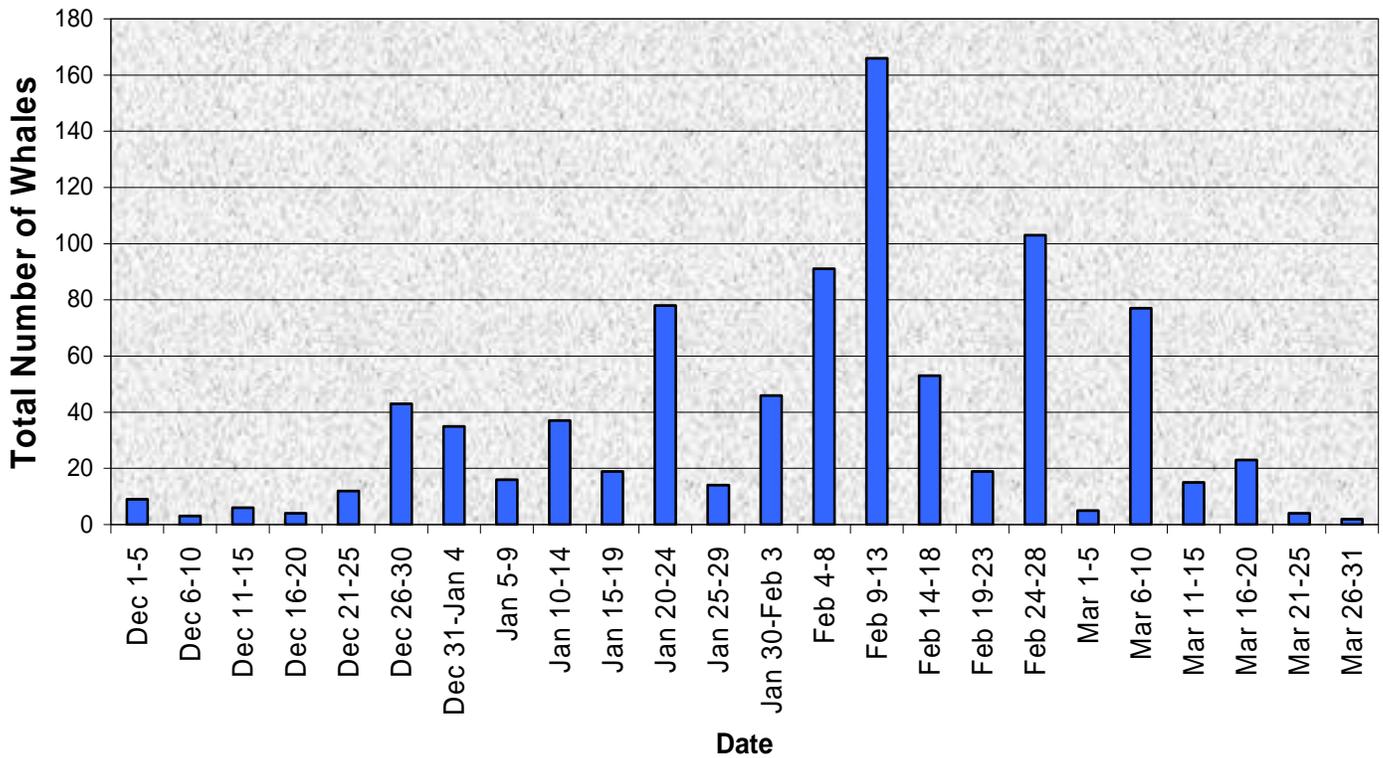


Figure 9. Whales per nmi trackline of NEA Aerial Survey Effort displayed in 5 day blocks

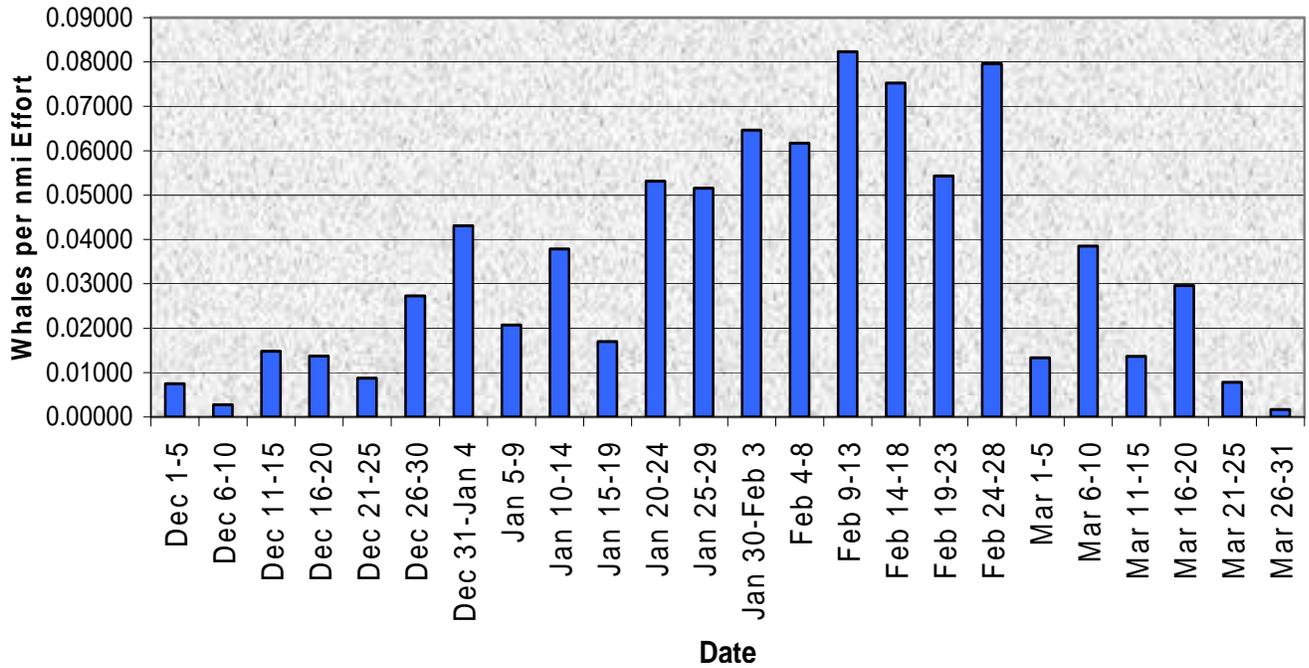


Figure 10. Temporal Occurrence of Right Whales. Mom/calf pairs vs. individuals during NEA surveys displayed in 5 day blocks.

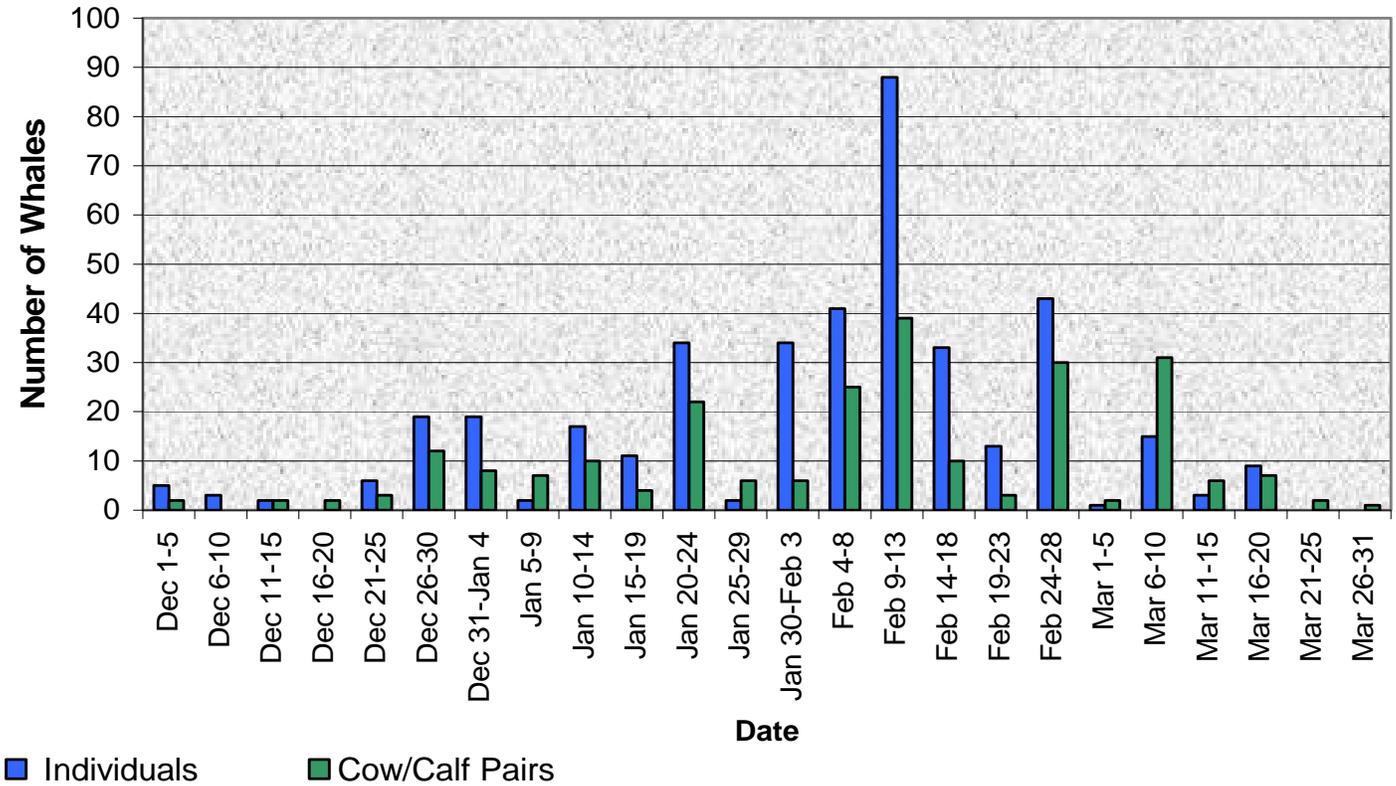


Figure 11. NEA Aerial Survey Sighting Distances (n=299)

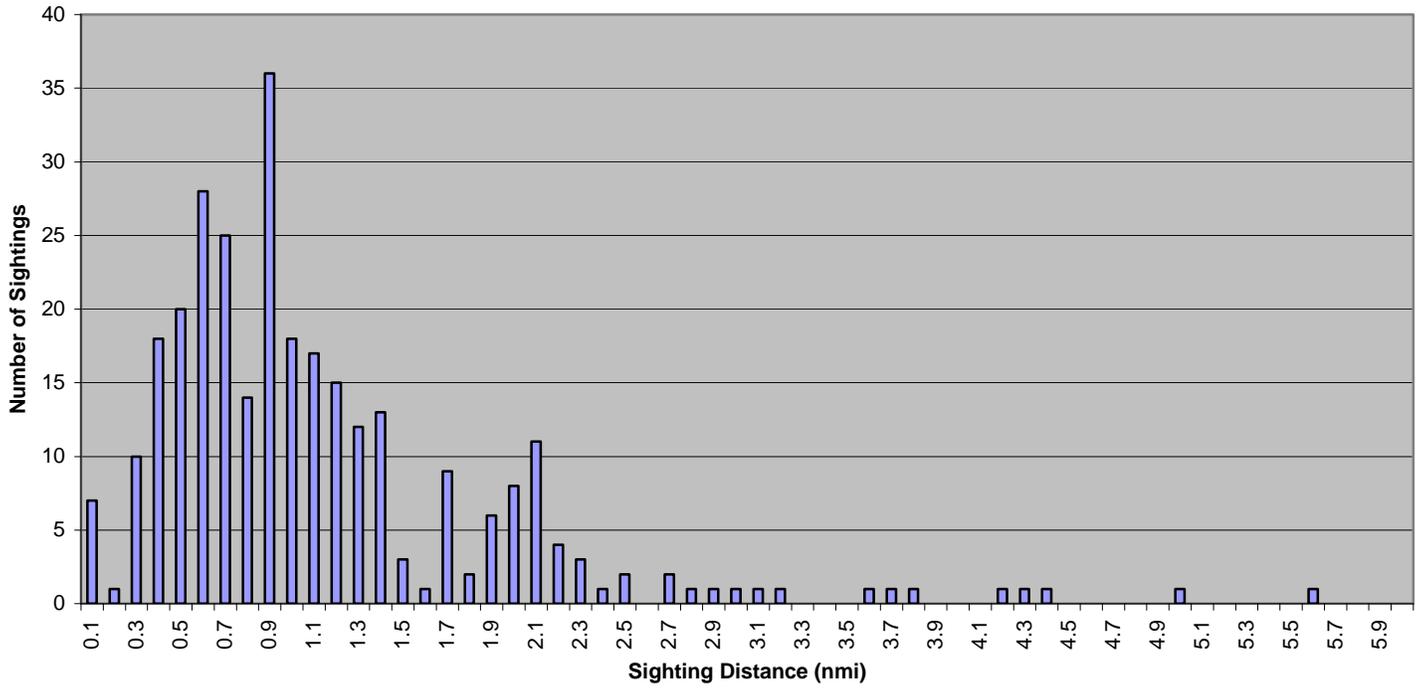


Figure 12. NEA Aerial Survey Sighting Distances with Beaufort Sea State (SS) Considered (n=299)

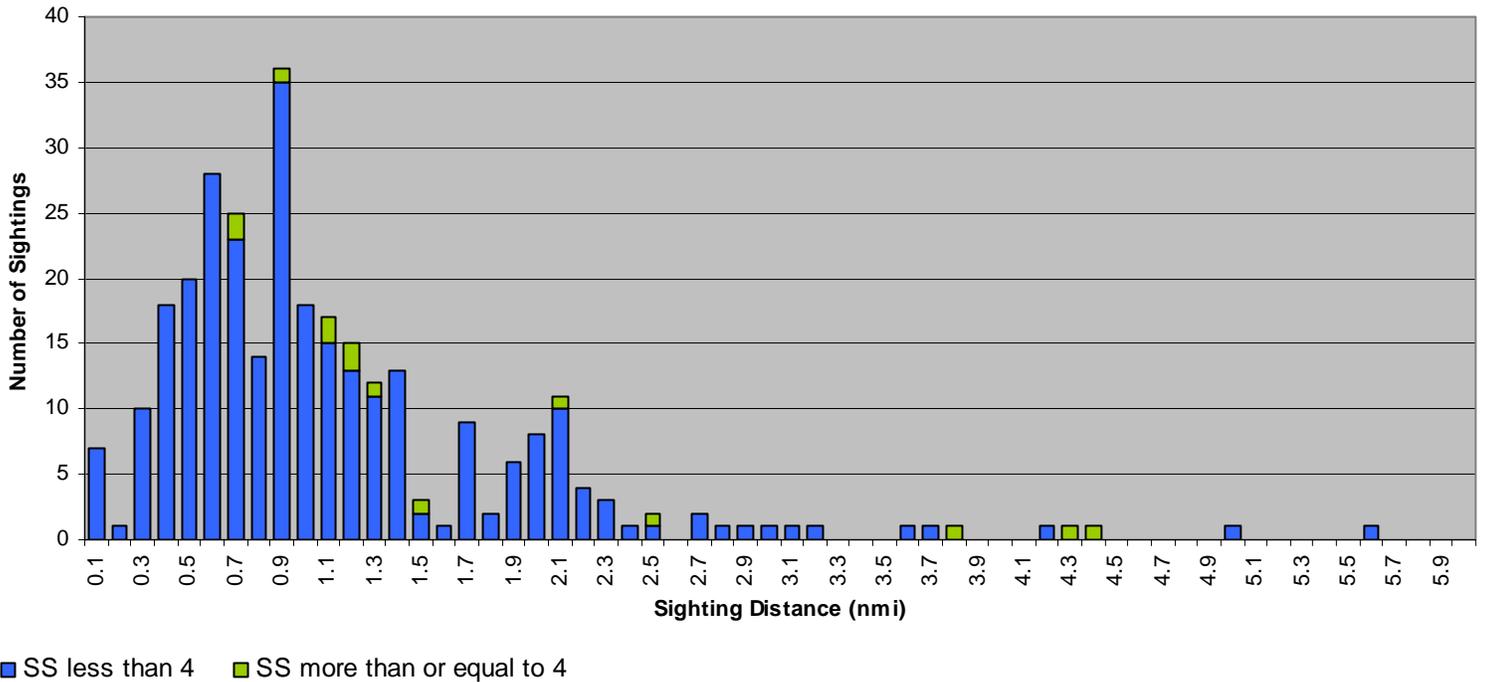
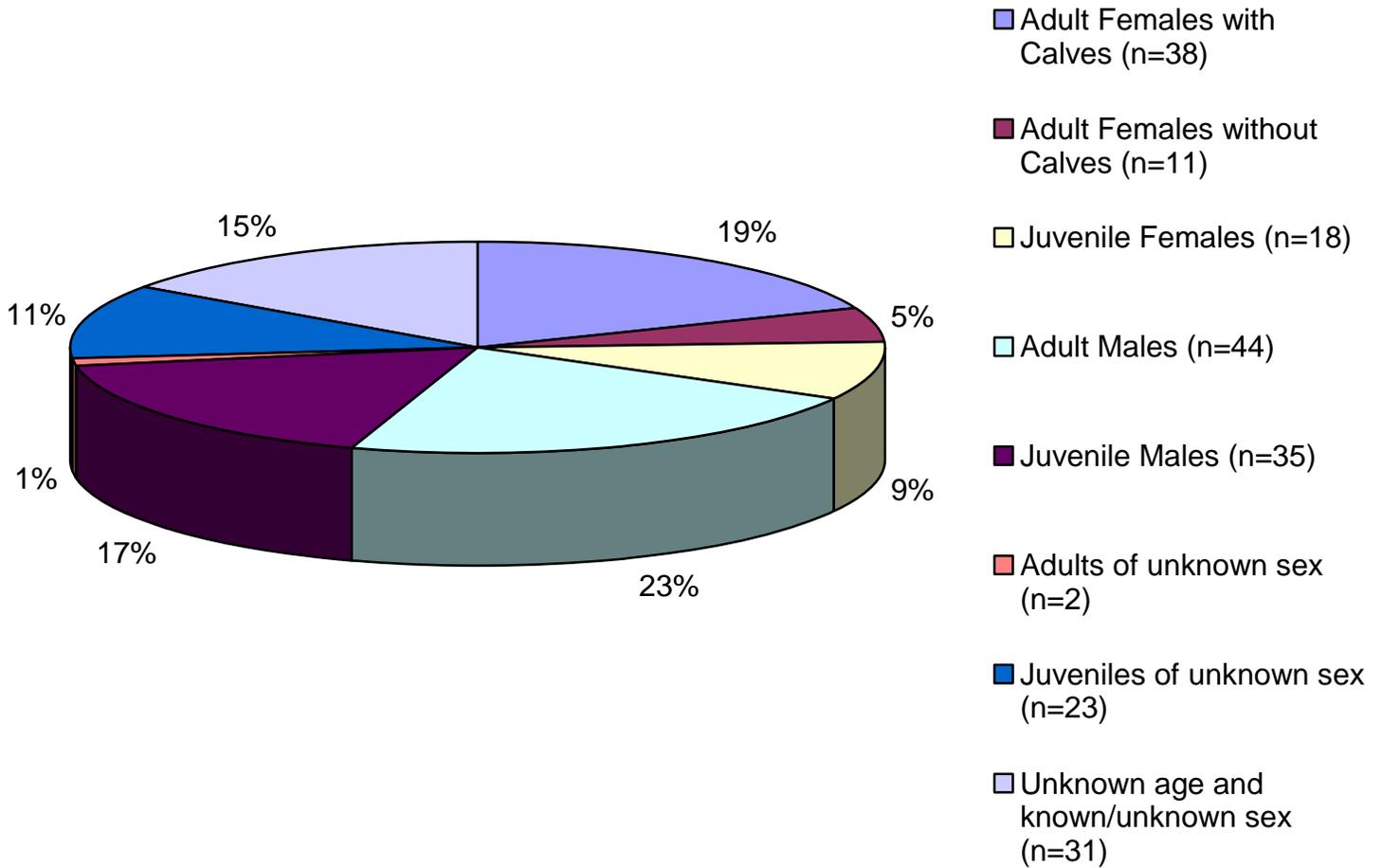
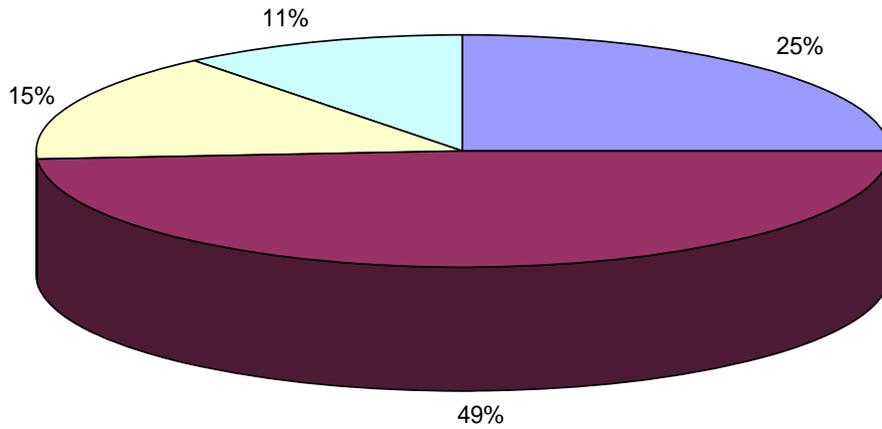


Figure 13. Demographic Structure of the EWS Area for all Non-Calf Right Whales



Gender	Age Class				Grand Total
	Adults	Juveniles	Yearlings	Unknown Age	
Females	49	18	0	2	69
Males	44	33	2	4	83
Unknown Sex	2	15	8	25	50
Grand Total	95	66	10	31	202

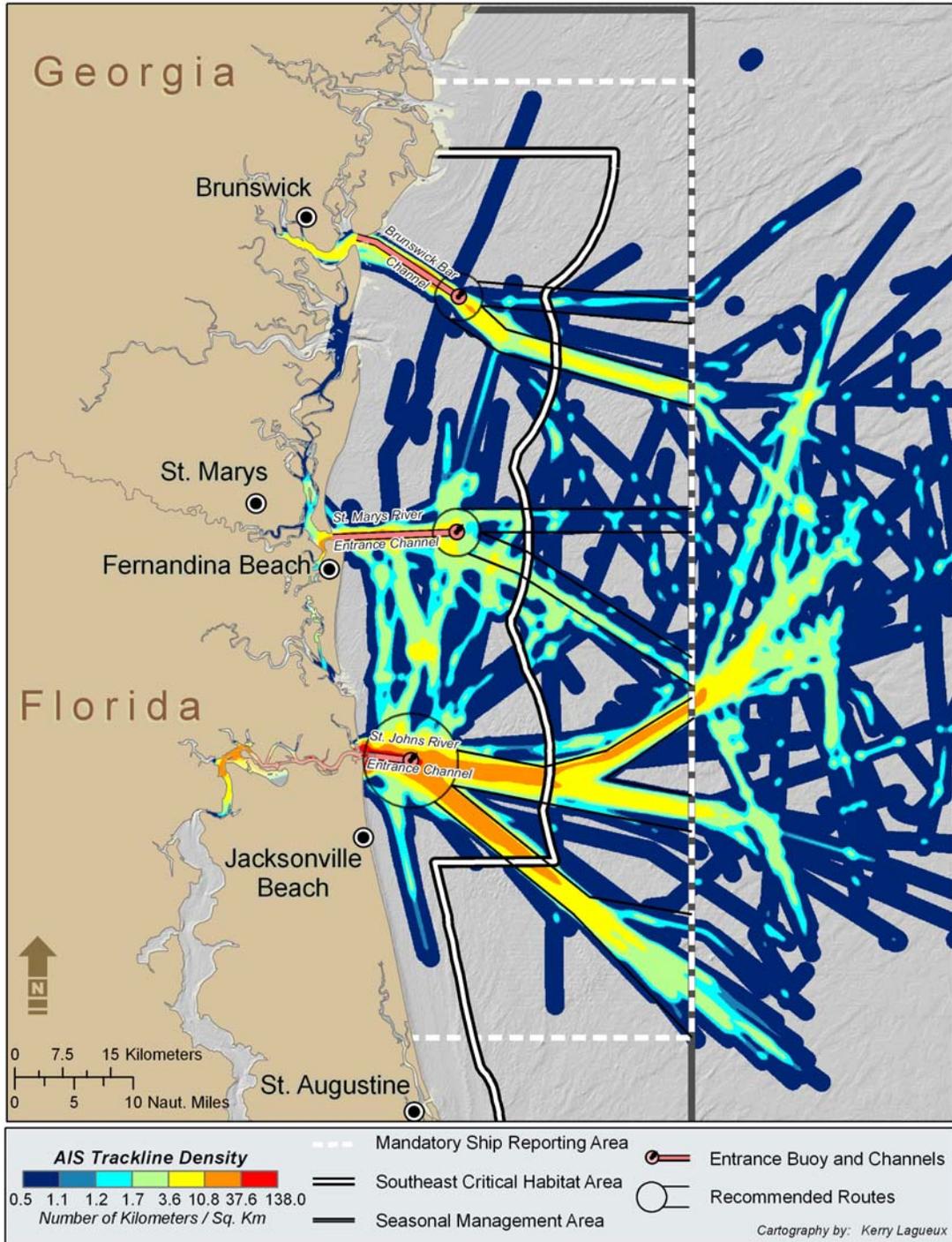
Figure 14. Association Types for all Right Whales Sighted by EWS Aerial Survey Teams



- SAG
- M/C or Mother/Yearling pair
- Other – pairs, trios, includes M/C with others if not in a SAG
- Singleton

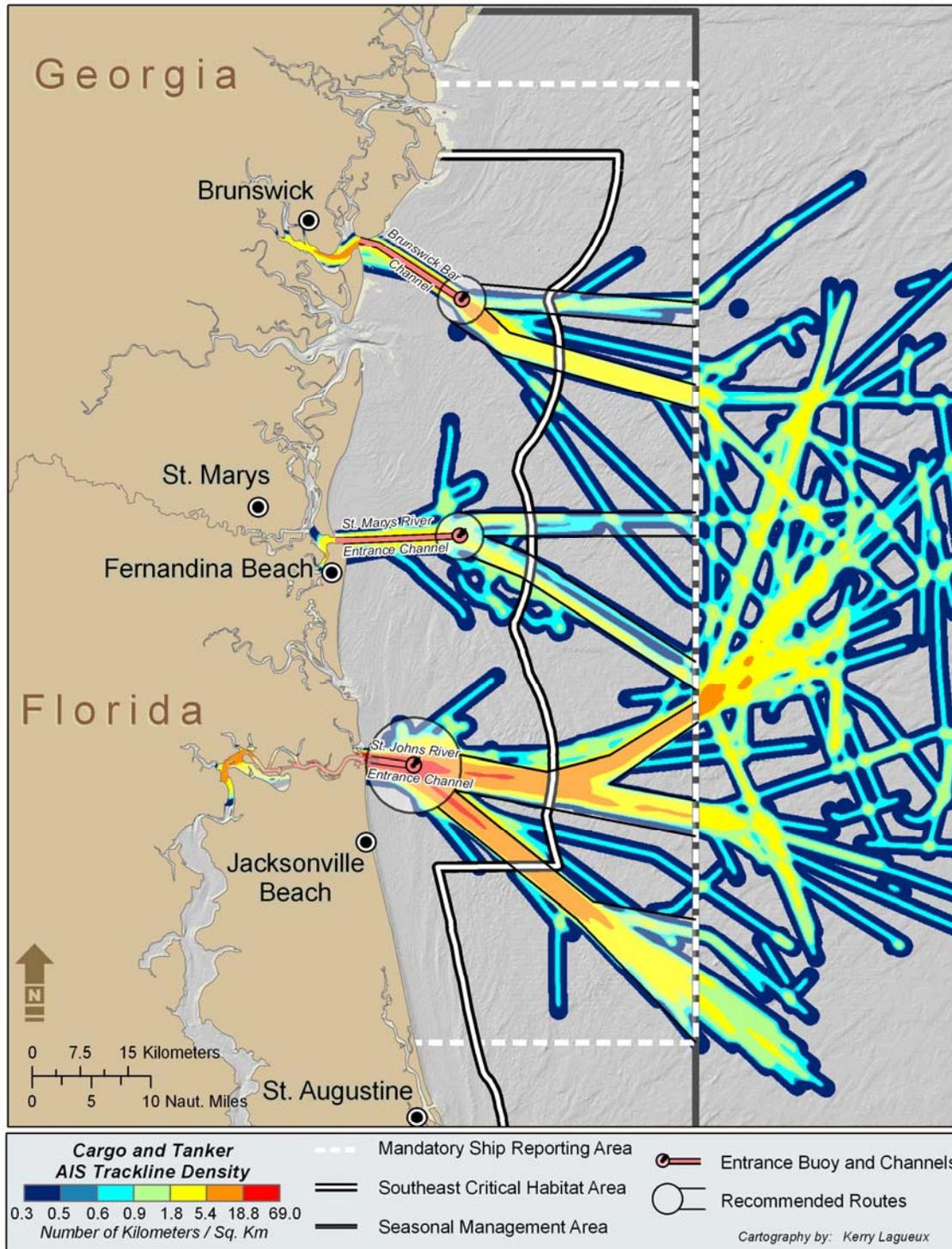
SAG	459
M/C or Mother/Yearling pair	902
Other – pairs, trios, includes M/C with others if not in a SAG	277
Singleton	201

Figure 15. AIS Data for Commercial Shipping Traffic Density (including tugs, dredges and some pilot boats).



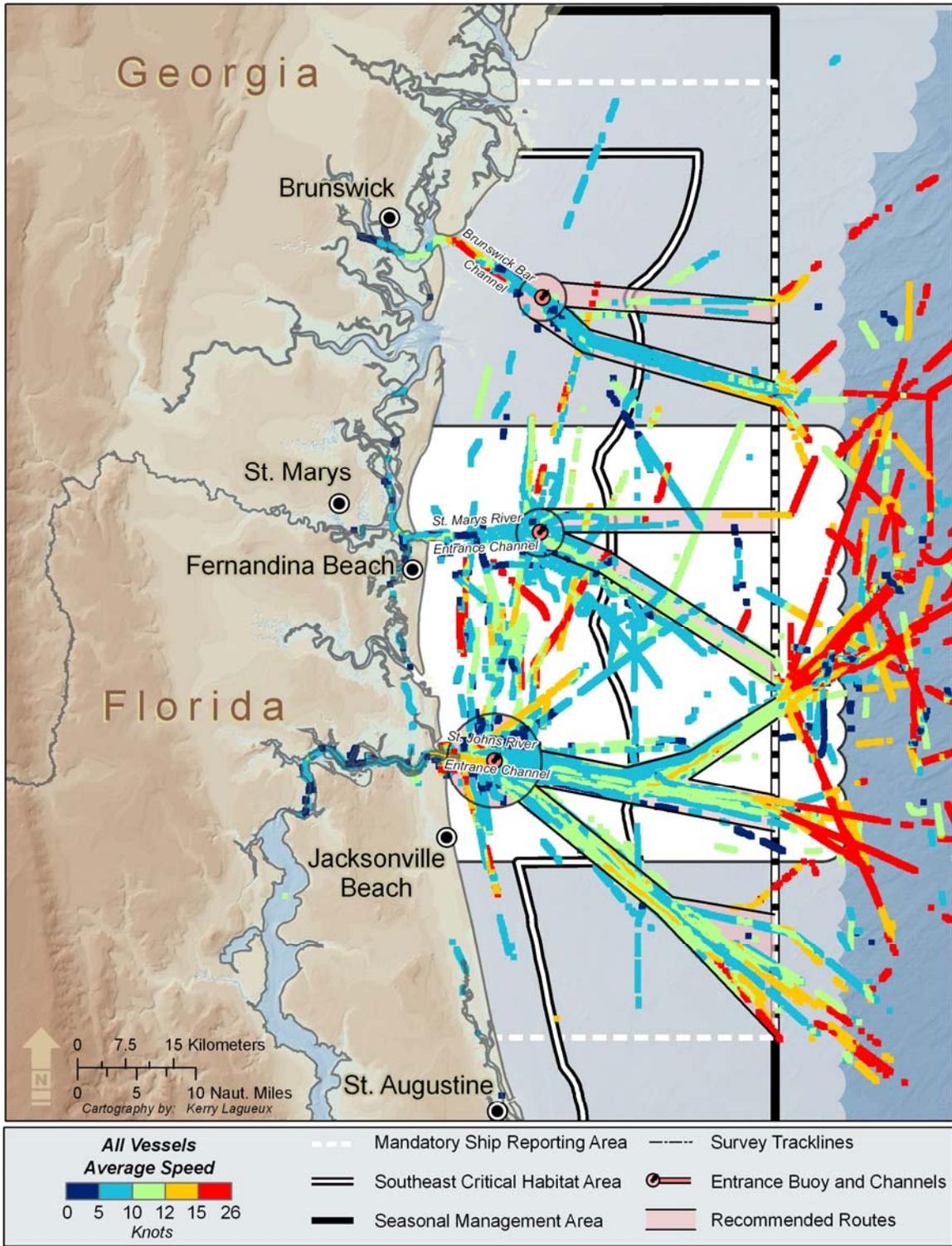
Cartography: Kerry Lagueux / New England Aquarium
 Projected in Universal Transverse Mercator, Zone 17, using North American Datum 1983.

Figure 16. AIS Data for Commercial Tanker and Cargo Traffic Density



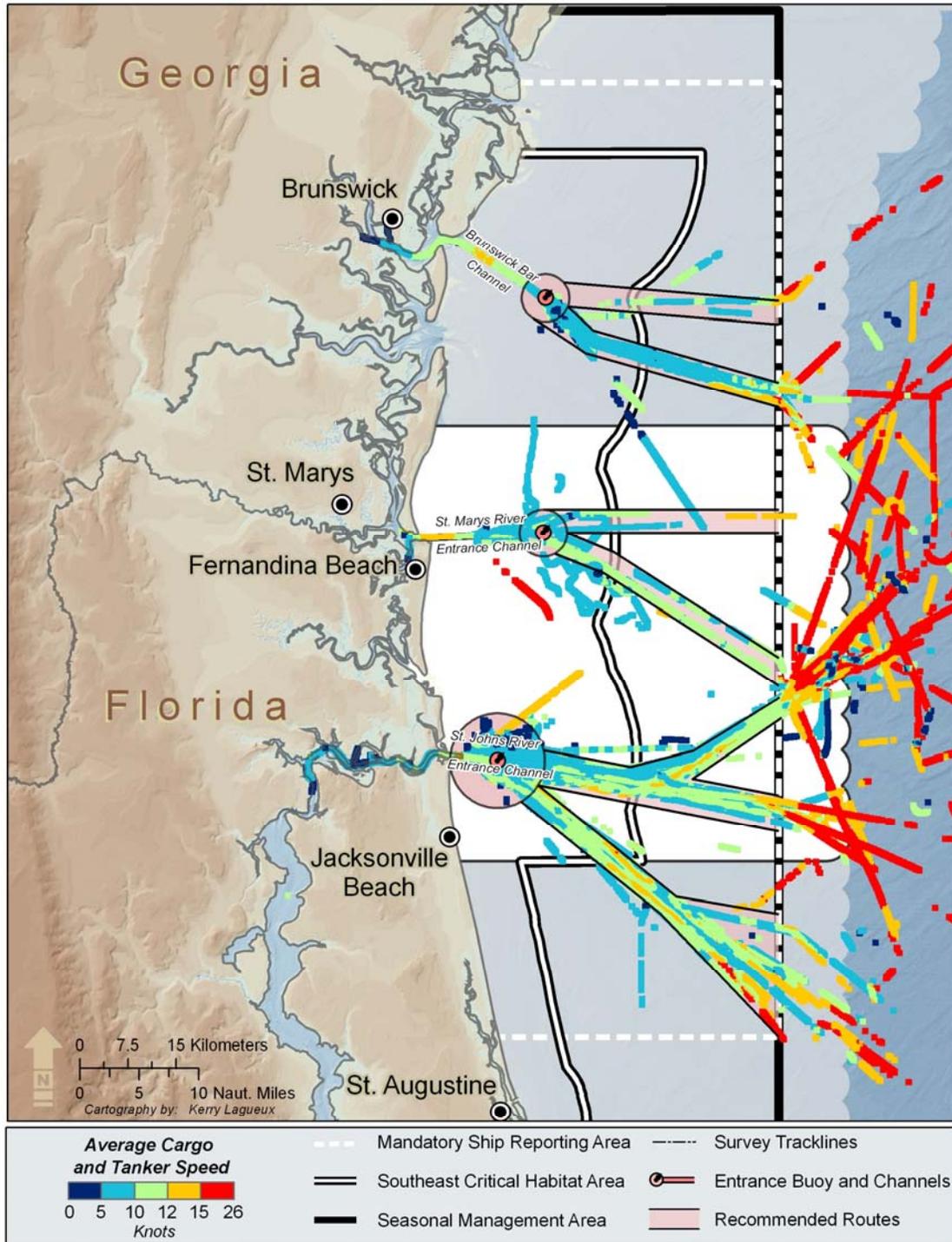
Cartography: Kerry Lagueux / New England Aquarium
 Projected in Universal Transverse Mercator, Zone 17, using North American Datum 1983.

Figure 17. AIS Data for Average Traffic Speed (including tugs, dredges and some pilot boats)



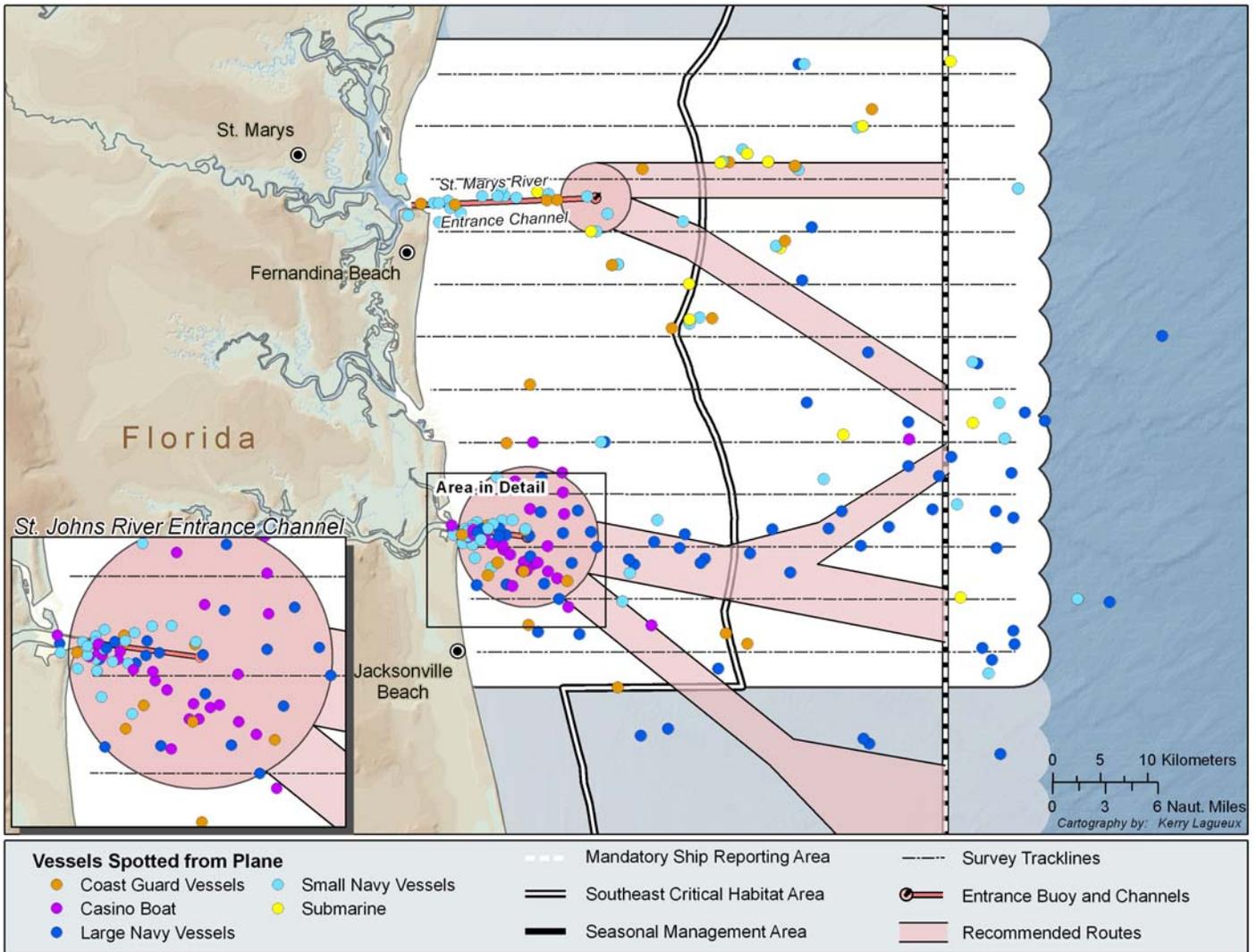
Cartography: Kerry Lagueux / New England Aquarium
 Projected in Universal Transverse Mercator, Zone 17, using North American Datum 1983.

Figure 18. AIS Data for Average Traffic Speed of Commercial Tanker and Cargo Vessels



Cartography: Kerry Lagueux / New England Aquarium
 Projected in Universe Transverse Mercator, Zone 17, using North American Datum 1983

Figure 19. Ship Traffic (not required to carry AIS) Recorded Visually during NEA Aerial Surveys



Cartography: Kerry Lagueux / New England Aquarium
 Projected in Universe Transverse Mercator, Zone 17, using North American Datum 1983.

Figure 20. Right Whale 2009 Calf of #2145 documented on 09 February 2009 by NEA Aerial Survey Team



Photo: Jessica Taylor / New England Aquarium

Figure 21. Right Whale 2009 Calf of #2660 documented on 12 February 2009 by NEA Aerial Survey Team



Photo: Jonathan Cunha / New England Aquarium

DISCUSSION

The coastal waters of Florida and Georgia, and possibly the Carolinas are currently the only known calving ground for the North Atlantic right whale. For 15 years there has been extensive survey effort in the heart of the calving ground (Georgia and Florida) in the form of EWS surveys. Originally, these surveys were designed to reduce the potential for vessel strikes in the calving ground. Over the past 15 years, the program of education, outreach, and regulatory measures implemented to reduce vessel strikes of right whales has grown dramatically. The southeast calving ground, located off some of the busiest ports along the eastern seaboard, is now arguably one of the most comprehensively monitored areas for right whales. On 09 December 2008 the Right Whale Ship Strike Reduction Rule was implemented which mandates, as one of many measures, that relevant vessels greater than or equal to 65 ft (19.8 m) must operate at speeds restricted to 10 knots or less within Seasonal Management Areas. With this critical mandate in place, the chance of having large, compliant vessels involved in a ship strike should be significantly reduced, especially when combined with the aerial survey effort and communication networks that have been refined over the past 15 years. The near daily aerial surveys in Florida and Georgia, and more recently South Carolina for the duration of the calving season meshed with the MSRS, Recommended Routes, and the Ship Strike Reduction Rule have all resulted in a safer habitat for this species. In addition to the main objective of the EWS, these surveys have contributed thousands of photo-documented right whale sightings to the North Atlantic Right Whale Catalog. These data play an integral role in the understanding of habitat use, demographics and reproductive success of this population.

The teamwork and active participation of many agencies and interests is essential to the effectiveness of these surveys in mitigating collisions with right whales. The ability of the survey teams to alert their ground contact from as far as 35 nmi (64.8 km) from shore is the crucial catalyst to this network. Each survey teams' ground contact receives the right whale sighting information from the survey aircraft and initiates many notifications via pagers. USCG Office of Aids to Navigation in Miami transmits right whale sighting information via NAVTEX. The USCG also transmits Notices to Mariners over VHF marine-band radio while the survey teams' ground contact updates the MSRS. Simultaneously, the Harbor Pilot Associations at the ports of Jacksonville, Fernandina, Brunswick and Savannah monitor pagers, cell phones, or email for information transmitted by the survey teams or FACSJAX and relay this information to ships being piloted to/from their respective ports. This transmission of near-real time data, which propels a chain reaction of alerts and notifications along the coastline of the SEUS, is what distinguishes these aerial surveys as a potentially meaningful conservation tool. However, this tool as a primary measure for collision mitigation has limitations on many fronts. First, reduced visibility and weather that is too severe for survey aircrafts to be launched, results in numerous days with no survey effort. In turn, near real-time sightings cannot be provided to vessels during days of inclement weather. Second, in order for this effort to be effective, vessel operators must take measures to reduce the risk of a strike from occurring whenever transiting through the calving ground whether

sightings are available or not. Third, the information provided to vessels that are outbound from a port in the critical habitat is limited to NAVTEX messages (which provide information every four hours) as opposed to the near real-time data provided by the MSRS for incoming vessels. Fourth, the EWS system has not been proven as an effective measure in preventing vessel strikes from smaller, recreational vessels that typically operate at fast speeds and are not bound by the mandatory ship strike reduction rule. Finally, sightings reported are related to the survey teams' ability to sight groups of whales which is dependent on a variety of factors including whales' dive and respiration patterns.

During the 2009 season, there was a suspected vessel strike injury documented in the SEUS, severing a portion of the left side of a calf's fluke. Unfortunately, this could not be confirmed as the calf subsequently disappeared, and a calf carcass found days later had been predated on by sharks to such a degree that the fluke area was gone and thus not able to be assessed. In addition to the above suspected strike, there was a report received of a small recreational vessel striking a whale on the final day of the season off the coast of SC.

A total of 14 vessel/whale interactions were witnessed and mitigated by the NEA aerial survey team. 21 vessels were involved in these events, of which 13 were involved in 'Close Approach' interactions coming within 500 yards of a right whale(s). Various vessel types were involved, although the limiting factor to efficient mitigation during interactions was the success in establishing communication with vessel operators. It is consistently difficult or impossible to hail the attention of small recreational vessel captains, particularly when travelling at high speeds. Every attempted hail directed at a vessel other than a small recreational vessel, successfully resulted in positive contact in order to coordinate interaction mitigation. Commercial vessel operators and harbor pilots were cooperative to coordination attempts from the survey team.

The process of assessing the effectiveness of the Right Whale Ship Strike Reduction Rule for mitigating risk from large merchant vessels is complicated and will require the area to be monitored for several years. Measuring vessel compliance with these new regulations will be essential for this process as only high levels of compliance will allow for a useful assessment of the potential benefit to right whales. AIS is a valuable tool for monitoring compliance, and efforts by NEA as well as state and Federal agencies are underway to evaluate vessel compliance.

The use of passive acoustic monitoring as a tool for gathering information on temporal whale abundance in the vicinity of busy shipping channels made considerable advancements during the 2009 season. However, technology has not yet advanced enough in order to localize exact positions of whales on a real-time scale. The Ship Strike Reduction Rule in conjunction with present education and outreach, and survey efforts, provide the best chance for mitigating risks to the North Atlantic right whale population.

A review of the mortality and injury data maintained by NEA shows a total of 83 mortalities and 106 serious injuries documented between 1970 and the present (Knowlton and Kraus 2001; NMFS Stock Assessment Report, 2008; New England Aquarium unpublished data). Serious injuries include cuts from entanglements or ship strikes

deeper than 8 cm, as well as all whales carrying any kind of gear. It is likely that the severed left fluke documented on the calf of #2660 led to mortality, and possible that this coincides with the calf carcass discovered off the coast of FL. Since identification has not been confirmed through genetic analysis, these have been counted as two separate events; one serious injury and one mortality. Twenty-eight of the 83 (34%) known mortalities documented since 1970 were the result of ship strikes and 10 (12%) were caused by entanglements. The remainder were either of unknown causes or neonates. Thirty of the 83 (36%) mortalities have occurred in the SEUS from SC to Texas including 6 ship strikes, 1 entanglement, 4 of unknown cause, and 19 calves.

Tracking the geographic area of where an injury from vessel strike or entanglement interaction occurred is hard to discern as animals that survive can swim long distances with their injury. Right whale carcasses are not always retrieved following fatal interactions, and this cryptic mortality makes it hard to provide a comprehensive assessment of threats to this species. Of the 106 serious injuries (66 entanglements, 39 vessel strikes, and 1 unknown), 11 entanglements and 9 vessel strikes were initially documented in the SEUS, and at least two of the entanglements and 8 of the vessel strikes were known to have occurred in the SEUS region.

Using contributed data from all survey groups and opportunistic sightings; identification of all right whales photographed in the SEUS 2009 season is currently being conducted. These data continue to provide an understanding of how the critical habitat and adjacent areas in the SEUS are being utilized by the population throughout the winter. As of August 2009, 39 M/C pairs were documented during the 2009 right whale calving season, and 38 M/C pairs are known to have been in the EWS survey area. The NEA aerial survey team documented 36 (92%) of the 39 known M/C pairs. Of the 39 M/C pairs observed, two (5%) had previously calved in 2007 (in both cases, the 2007 calves are presumed dead), eleven (28%) had previously calved in 2006, ten (26%) had previously calved in 2005, three (8%) had previously calved in 2004, five (13%) had previously calved in 2003 and eight (20%) had never calved before. Of the 31 females with multiple calvings, 58% had a calving interval higher than three years (between four and six years), considerably higher than last year when only 11% had calving intervals of more than three years. The mean calving interval for this population between 1993-1998 was over 5 years (Kraus et al., 2001) and had increased from a 3.67 year average between 1980-1992 (Knowlton et al., 1994). The mean calving interval using contributed data for all known M/C pairs in all regions in 2009 is 3.9 years. This is a higher interval period when compared with the 2008 calving season (3.0 yr) although total numbers of M/C pairs were considerably higher this year than in any year previously documented. The 2009 mean calving interval of 3.9 years is shorter than the average documented in the late 1990's. Of the 39 mothers documented in the 2009 season, 17 are of known age ranging from 6 to 24 years of age. Of the eight females in the EWS survey area that calved for the first time one was age six, one was age seven, three were age eight, and three were of unknown ages, making the average age of first time moms 7.4 yrs. This is lower than the mean age for first calving of 11.4 years documented through 2005 (Kraus and Rolland, 2007) and represents a hopeful sign that perhaps the reproductive health of the population is improving.

An opportunistic sighting off of NC, was the only sighting of the one calving female (#2223, "Calvin"), which was never documented within the SEUS survey area. Right whale #2223 is 17 years of age, has had two known calves in her reproductive history, with four years between these calving events. During the 2005 season, #2223 and her calf, were also first observed off the coast of NC. Documentation was by USCG on 30 December, 2004 and the whale was subsequently sighted multiple times further south within the EWS area throughout the 2005 season, whereas this year the only sighting of this whale was off of coastal NC. One M/C pair (#1240) was first sighted opportunistically off of VA, and subsequently many times in the EWS area. Right whale #1240 is of unknown age, although she gave birth to her first known calf in 1974 and therefore is presumed to be at least 45 yrs of age. In the 2009 season she had her eighth known calf, and was present in the calving grounds with her daughter (#1503) and granddaughter (#2503) that were also 2009 season moms.

Though all the individuals observed in the SEUS have not been identified, preliminary analysis indicates that the largest proportion of individuals that were not M/C pairs were juveniles (40%), many of which were involved in surface active groups. Since the SEUS is not known to be a feeding ground, the presence and the behavior of these non-M/C pairs suggests the habitat may serve another function, at least in some years. The high number of calves born in the past eight winters and the documented increase in juvenile, non-calving female and adult male presence in the SEUS warrants further exploration to define this additional function of the calving ground.

In conclusion, the SEUS critical habitat has one of the highest densities of commercial shipping traffic transiting through, along the eastern seaboard, and can now be considered one of the most well monitored habitats for North Atlantic right whales. The combination of near-daily aerial surveys, an extensive communications network, and comprehensive regulatory measures will likely serve to reduce risk of vessel collisions with right whales. Although it is too early to determine whether these combined measures have in fact been successful, careful assessment of the recently implemented Right Whale Ship Strike Reduction Rule is a high priority, as this regulation is set to expire 5 years after its implementation unless evidence is clear that it is proving beneficial. The joint efforts by the survey teams, NOAA Fisheries, USN, USCG and USACE to monitor and implement protective measures in this only known calving ground must continue in order to protect this most vulnerable segment of the population, and allow for it to grow and thrive.

ABBREVIATIONS

AFF	Automatic Flight Following
AIS	Automated Identification System
CCB	Cape Cod Bay
CEWS	Central EWS survey area covered by the New England Aquarium.
CFR	Code of Federal Regulations
COAA	Centro de Observação Astronómica no Algarve
DIGITS	Data Image Gathering and Information Tracking System
ELT	Emergency Locator Transmitter
EPIRB	Emergency Position Indicating Radio Beacon
EWS	Early Warning System
FAA	Federal Aviation Administration
FACSFAC JAX	Fleet Area Control and Surveillance Facility, Jacksonville
FL	Florida
FWC	Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute
GA	Georgia
GDNR	Georgia Department of Natural Resources
GIS	Geographic Information System
GPS	Global Positioning System
ID	Identification
IFAW	International Fund for Animal Welfare
IFR	Instrument Flight Rules
IMO	International Maritime Organization
M/C	Mom (or Cow) calf pair association
MA	Massachusetts
Marineland	Marineland Right Whale Project
MMSI	Mobile Maritime Service Identities
MRC	Marine Resources Council
MSR / MSRS	Mandatory Ship Reporting System
NARWC	North Atlantic Right Whale Consortium
NAVTEX	The primary means for transmitting coastal urgent marine safety information to ships worldwide. NAVTEX is broadcast from Coast Guard facilities around the United States including Miami, FL. The Coast Guard began operating NAVTEX from Boston in 1983
NC	North Carolina
NEA	New England Aquarium
NEFSC	NOAA's National Marine Fisheries Service, Northeast Fisheries

	Science Center
NEUS	Northeast United States
NEWS	Northern Early Warning System survey area covered by the Wildlife Trust, Georgia survey team.
NOAA Fisheries Service	National Oceanic and Atmospheric Administration's National Marine Fisheries Service
PCCS	Provincetown Center for Coastal Studies
PIC	Pilot in Command
PLB	Personal Locator Beacon
SAG	Surface Active Group
SEUS	Southeast United States
SEWS	Southern Early Warning System survey area covered by Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute survey team
SIC	Second in Command
SC	South Carolina
SS	Beaufort sea-state
UNCW	University of North Carolina, Wilmington
URI	University of Rhode Island
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USGS	US Geological Survey
USN	United States Navy
VHF	Very-high-frequency
VMSM	Virginia Aquarium & Marine Science Center
WTGA	Wildlife Trust, Georgia
WTSC	Wildlife Trust, South Carolina aerial survey team.

UNITS OF MEASURE

d	Days
ft	Feet
hr	Hour
km	Kilometers
kts	Knots
m	Metres
MHz	Megahertz
Mph	Miles per hour
nmi	Nautical miles

DEFINITION OF TERMS

#	Example, '#2320' refers to right whale catalog number 2320 in accordance with the North Atlantic Right Whale Catalog. Occasionally denoted as EG#2320 referring to <i>Eubalaena glacialis</i>
Adult	9 years of age or older
Associated	Whales that are within several body lengths of each other and coordinating their movements at the surface
CEWS	Central Early Warning System: Refers to the survey area covered by the New England Aquarium team. The regular survey area is from 30°50N to 30°17N, although summary data provided in this report for the CEWS area includes a selection of days when contingency surveys were flown.
Close Approach Event	A vessel/whale interaction when the observed vessel comes within 500 yards at the closest distance to the whale(s).
Effort	Any time that the aircraft is above water and observers have a visibility of one nmi or greater.
EWS area	The survey area covered by northern, central and southern Early Warning System aerial survey teams. This does not include the WTSC survey area.
Individuals	Whales which are not 2009 season moms or calves. These include singletons, members of; pairs, associations, and surface active groups.
Intentional Close Approach	An interaction event when the survey team believes that the vessel operator is aware of the presence of the whales and intentionally approaches within 500 yards.
Intermatch Code	A code given to a whale by NEA that has been matched for more than one sighting but the catalog # is unknown
Juvenile	1 – 8 years of age
Logger 2000	Computerized logging program created by IFAW and designed for compatibility with the Right Whale Consortium database
Neonate	A calf less than four weeks old
OTHER	Alternative sources of sighting information reported through the EWS system. These were reliable sources such as Navy, US Coast Guard or the volunteer sighting network.
Presumed Dead	For a calf in the SEUS: When mother has been seen in the SEUS post calving without her calf during good sighting conditions at least once.
Season Code	A code given to a whale by different organizations (other than NEA) to assist in the recognition of individuals in the field, based on matching within the season's sightings, when the catalog # is unknown

SEUS	Southeast United States. When referred to in the context of this report, the SEUS area includes survey areas of WTSC, NEWS, CEWS, and SEWS.
Sighting Event	An event by which the aircraft breaks from the trackline and a whale or group of whales are circled until they are positively identified as right whales.
Survey Effort	Trackline nmi flown not including cross legs, transit miles or any deviation from tracklines.
Unavoidable Close Approach	A Close Approach Event when the survey team determines that the vessel's operator cannot alter course due to navigational safety and/or restricted maneuverability.
Unit of Survey Effort	One unit is equivalent to one nmi flown when the survey team is on effort i.e. any time that the aircraft is above water and observers have a visibility of one nmi or greater.
Vessel/Whale Interaction Event	A situation when the survey team visually determines that a vessel is on a course that will result in the vessel and whale(s) being less than one nautical mile apart and communication between survey team and vessel are attempted in order to prevent collision or mitigate an interaction.
Whale	Refers to north Atlantic right whale except for when indicated otherwise
Whales per nmi Effort	Individual whales per nautical mile of survey trackline

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With extreme gratitude we thank the EWS pilots Holly Friedman, Ken Pearson, Ron Salmon and Mike Vigus for their dedication and many long hours in the air. Also, Roy Hanan and Brad Payne of Eagle Cap Aviation for use of the aircraft and their willingness to accommodate our ongoing effort.

Great appreciation goes to the USACE, USCG, U.S. Navy, and NOAA Fisheries Service for providing funding to enable the EWS 2009 aerial surveys.

APPENDIX 1

IMO Carriage Requirement

The 73rd Session of the International Maritime Organization's (IMO) Maritime Safety Committee decided the following ships would be required to carry AIS equipment: All ships of 300 gross tonnage and upwards-engaged on international voyages and cargo ships of 500 gross tonnage and upwards not engaged on international voyages and passenger ships irrespective of size shall be fitted with AIS, as follows:

- Ships constructed on or after 1 July 2002;
- Ships engaged on international voyages constructed before 1 July 2002;
- In the case of passenger ships, not later than 1 July 2003;
- In the case of tankers, not later than the first "safety equipment survey" after 1 July 2003;
- In the case of ships, other than passenger ships and tankers, of 50,000 gross tonnage and upwards, not later than 1 July 2004;
- In the case of ships, other than passenger ships and tankers, of 10,000 gross tonnage and upwards but less than 50,000 gross tonnage, not later than 1 July 2005;
- In the case of ships, other than passenger ships and tankers, of 3,000 gross tonnage and upwards but less than 10,000 gross tonnage, not later than 1 July 2006;
- In the case of ships, other than passenger ships and tankers, of 300 gross tonnage and upwards but less than 3,000 gross tonnage, not later than 1 July 2007; and
- In the case of ships not engaged on international voyages constructed before July 2002.

Source: <http://www.navcen.uscg.gov/marcomms/ais.htm>

The United States Coast Guard also requires AIS on certain vessels not subject to SOLAS.

- Commercial self-propelled vessel 65 feet or greater in VTS areas or on international voyage (not including fishing and passenger vessels) operating on U.S. navigable waters
- Towing vessels 26 feet or greater and 600 horsepower or passenger vessels (150+ passengers) in a VTS area.

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2008	12	3	1100	A	30.75155	81.33615	GA	SEUS	
		2008	12	3	1140	B	30.66618	81.0841	FL	SEUS	MOPN
		2008	12	3	1215	C	30.68112	81.08324	FL	SEUS	
		2008	12	3	1709	D	31.1013	80.87437	GA	SEUS	BOD CNT, W/CALF
		2008	12	3	1709	E	31.1013	80.87437	GA	SEUS	BOD CNT, CALF W/MOM
		2008	12	4	0944	A	30.78485	81.07982	GA	SEUS	
3320		2008	12	4	1016	B	30.79043	81.2837	GA	SEUS	W/CALF
	2009CalfOf3320	2008	12	4	1016	C	30.79043	81.2837	GA	SEUS	CALF W/MOM
		2008	12	5	1007	A	30.76563	81.13158	GA	SEUS	
		2008	12	6	1011	A	30.75145	81.00294	GA	SEUS	
		2008	12	6	1236	B	30.53083	81.24278	FL	SEUS	
3294		2008	12	8	1248	A	30.43855	81.19189	FL	SEUS	FRST ENTGL, RACE
1151		2008	12	15	1026	A	30.8443	81.27383	GA	SEUS	W/CALF
	2009CalfOf1151	2008	12	15	1026	B	30.8443	81.27383	GA	SEUS	CALF W/MOM
		2008	12	15	1205	C	30.70848	81.2667	GA	SEUS	BODO
2320		2008	12	15	1205	D	30.70848	81.2667	GA	SEUS	BODO
3320		2008	12	15	1629	E	30.5275	81.16641	FL	SEUS	NURS, W/CALF
	2009CalfOf3320	2008	12	15	1629	F	30.5275	81.16641	FL	SEUS	CALF W/MOM, NURS

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
1012		2008	12	18	1105	A	30.5917	81.33462	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1012	2008	12	18	1105	B	30.5917	81.33462	FL	SEUS	BLK BEL, BLK CHN, BOD CNT, CALF W/MOM, ROLL
1012		2008	12	18	1211	C	30.54293	81.16235	FL	SEUS	NURS, W/CALF
	2009CalfOf1012	2008	12	18	1211	D	30.54293	81.16235	FL	SEUS	CALF W/MOM, NURS
2320		2008	12	21	1140	A	30.56962	81.31902	FL	SEUS	
		2008	12	21	1140	B	30.56962	81.31902	FL	SEUS	
		2008	12	24	1008	A	30.75057	81.19189	GA	SEUS	
2320		2008	12	24	1008	B	30.75057	81.19189	GA	SEUS	
1151		2008	12	24	1143	C	30.57233	81.30013	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1151	2008	12	24	1143	D	30.57233	81.30013	FL	SEUS	BOD CNT, CALF W/MOM
1012		2008	12	24	1239	E	30.42407	81.24041	FL	SEUS	BOD CNT, BODO, BRCH, LBTL, W/CALF
	2009CalfOf1012	2008	12	24	1239	F	30.42407	81.24041	FL	SEUS	BOD CNT, CALF W/MOM
2145		2008	12	25	1323	A	30.59439	81.34478	FL	SEUS	BOD CNT, BODO, W/CALF
	2009CalfOf2145	2008	12	25	1323	B	30.59439	81.34478	FL	SEUS	BOD CNT, BODO, CALF W/MOM, WH BEL, WH CHN
2320		2008	12	25	1405	C	30.61765	81.2887	FL	SEUS	
		2008	12	25	1417	D	30.60487	81.29668	FL	SEUS	BODO
1266		2008	12	27	1124	A	30.26725	81.20243	FL	SEUS	W/CALF
	2009CalfOf1266	2008	12	27	1124	B	30.26725	81.20243	FL	SEUS	CALF W/MOM

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2008	12	27	1133	C	30.2931	81.19389	FL	SEUS	SAG
		2008	12	27	1133	D	30.2931	81.19389	FL	SEUS	SAG
		2008	12	27	1133	E	30.2931	81.19389	FL	SEUS	SAG
1608		2008	12	27	1231	F	30.38522	81.1576	FL	SEUS	W/CALF
	2009CalfOf1608	2008	12	27	1231	G	30.38522	81.1576	FL	SEUS	CALF W/MOM
1012		2008	12	27	1335	H	30.53428	81.25912	FL	SEUS	W/CALF
	2009CalfOf1012	2008	12	27	1335	I	30.53428	81.25912	FL	SEUS	CALF W/MOM
2145		2008	12	27	1539	J	30.7417	81.27322	GA	SEUS	W/CALF
	2009CalfOf2145	2008	12	27	1539	K	30.7417	81.27322	GA	SEUS	CALF W/MOM
		2008	12	27	1635	L	30.81742	81.2635	GA	SEUS	
		2008	12	28	1037	A	30.44383	81.29087	FL	SEUS	
3320		2008	12	28	1205	B	30.65277	81.18602	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf3320	2008	12	28	1205	C	30.44383	81.18602	FL	SEUS	BOD CNT, CALF W/MOM, ROLL
		2008	12	28	1213	D	30.66482	81.3187	FL	SEUS	BLK BEL, BLK CHN, BRCH, FEM, LBTL
		2008	12	28	1218	#1	30.66302	81.30905	FL	SEUS	BODO, SAG
		2008	12	28	1218	E	30.66302	81.30905	FL	SEUS	BODO, SAG
	2007CalfOf2430	2008	12	28	1218	F	30.66302	81.30905	FL	SEUS	BODO, SAG
		2008	12	28	1218	G	30.66302	81.30905	FL	SEUS	BODO, SAG

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
3681	2006CalfOf1281	2008	12	28	1218	H	30.66302	81.30905	FL	SEUS	BODO, SAG
		2008	12	28	1218	I	30.66302	81.30905	FL	SEUS	BODO, SAG
2145		2008	12	28	1410	J	30.7126	81.30949	GA	SEUS	W/CALF
	2009CalfOf2145	2008	12	28	1410	K	30.7126	81.30949	GA	SEUS	CALF W/MOM
3320		2008	12	28	1438	L	30.60192	81.16323	FL	SEUS	W/CALF
	2009CalfOf3320	2008	12	28	1438	M	30.60162	81.16323	FL	SEUS	CALF W/MOM
1612		2008	12	28	1546	N	30.8255	81.17446	GA	SEUS	W/CALF
	2009CalfOf1612	2008	12	28	1546	O	30.8255	81.17446	GA	SEUS	CALF W/MOM
2145		2008	12	29	0926	A	30.83408	81.37724	GA	SEUS	BOD CNT, BODO, W/CALF
	2009CalfOf2145	2008	12	29	0926	B	30.83408	81.37724	GA	SEUS	BOD CNT, BODO, CALF W/MOM
		2008	12	29	1055	#1	30.68497	81.32975	FL	SEUS	SAG
		2008	12	29	1055	C	30.68497	81.32975	FL	SEUS	SAG
		2008	12	29	1055	D	30.68497	81.32975	FL	SEUS	SAG
1612		2008	12	29	1114	E	30.62263	81.1439	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1612	2008	12	29	1114	F	30.62263	81.1439	FL	SEUS	BOD CNT, CALF W/MOM
		2008	12	30	1048	A	30.68154	81.3389	FL	SEUS	
3320		2008	12	30	1204	B	30.57927	81.17235	FL	SEUS	W/CALF
	2009CalfOf3320	2008	12	30	1204	C	30.57927	81.17235	FL	SEUS	CALF W/MOM

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
	2007CalfOf2430	2008	12	30	1208	D	30.57163	81.17948	FL	SEUS	SAG
		2008	12	30	1208	E	30.57163	81.17948	FL	SEUS	SAG, WH CHN
		2008	12	30	1208	F	30.57163	81.17948	FL	SEUS	SAG
2145		2008	12	30	1221	G	30.57952	81.38065	FL	SEUS	W/CALF
	2009CalfOf2145	2008	12	30	1221	H	30.57952	81.38065	FL	SEUS	CALF W/MOM, WH BEL, WH CHN
	2009CalfOf1012	2009	1	2	0918	#1	30.84237	81.33328	GA	SEUS	BODO, CALF W/MOM
1012		2009	1	2	0918	A	30.84237	81.33328	GA	SEUS	BODO, W/CALF
		2009	1	2	1038	B	30.67733	81.23196	FL	SEUS	
		2009	1	2	1038	C	30.67733	81.23196	FL	SEUS	MOPN
		2009	1	2	1047	#2	30.69533	81.33925	FL	SEUS	BODO
		2009	1	2	1047	#3	30.69533	81.33925	FL	SEUS	BODO, SAG
		2009	1	2	1047	D	30.69533	81.33925	FL	SEUS	BODO
	BK03BoF07	2009	1	2	1047	E	30.69533	81.33925	FL	SEUS	BODO
		2009	1	2	1047	F	30.69533	81.33925	FL	SEUS	BODO
3681	2006Calfof1281	2009	1	2	1047	G	30.69533	81.33925	FL	SEUS	BODO
	2007CalfOf2645	2009	1	2	1047	H	30.69533	81.33925	FL	SEUS	BODO, SAG
	2006calfof2791	2009	1	2	1047	I	30.69533	81.33925	FL	SEUS	BODO, SAG
		2009	1	2	1047	J	30.69533	81.33925	FL	SEUS	BODO

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
1012		2009	1	2	1109	K	30.63878	81.21923	FL	SEUS	W/CALF
	2009CalfOf1012	2009	1	2	1109	L	30.63878	81.21923	FL	SEUS	CALF W/MOM
2145		2009	1	2	1205	M	30.59795	81.20157	FL	SEUS	W/CALF
	2009CalfOf2145	2009	1	2	1205	N	30.59795	81.20157	FL	SEUS	CALF W/MOM, WH CHN
		2009	1	2	1219	O	30.5788	81.31002	FL	SEUS	BODO
	CT05SEUS08	2009	1	2	1219	P	30.5788	81.31002	FL	SEUS	BODO
	2008CalfOf2753	2009	1	2	1232	Q	30.58042	81.30571	FL	SEUS	BODO, YRLG
		2009	1	2	1542	R	30.25588	81.21172	FL	SEUS	
3180		2009	1	4	1008	A	30.37284	81.27872	FL	SEUS	W/CALF
	2009CalfOf3108	2009	1	4	1008	B	30.37284	81.27872	FL	SEUS	CALF W/MOM
2145		2009	1	4	1232	C	30.65603	81.38337	FL	SEUS	W/CALF
	2009CalfOf2145	2009	1	4	1232	D	30.65603	81.38337	FL	SEUS	CALF W/MOM
2320		2009	1	4	1337	E	30.7011	81.32114	FL	SEUS	W/CALF
	2009CalfOf2320	2009	1	4	1337	F	30.7011	81.32114	FL	SEUS	CALF W/MOM
1012		2009	1	4	1344	G	30.65806	81.21937	FL	SEUS	W/CALF
	2009CalfOf1012	2009	1	4	1344	H	30.65806	81.21937	FL	SEUS	CALF W/MOM
3320		2009	1	4	1508	I	30.86152	81.28602	GA	SEUS	W/CALF
	2009CalfOf3320	2009	1	4	1508	J	30.86152	81.28602	GA	SEUS	CALF W/MOM

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	1	4	1510	K	30.86683	81.26753	GA	SEUS	
		2009	1	4	1510	L	30.86683	81.26753	GA	SEUS	
		2009	1	5	0930	A	30.80558	81.27053	GA	SEUS	
		2009	1	5	0930	B	30.80558	81.27053	GA	SEUS	
1612		2009	1	5	0947	C	30.83598	80.9044	GA	SEUS	BOD CNT, W/CALF
	2009Calfof1612	2009	1	5	0947	D	30.83598	80.9044	GA	SEUS	BOD CNT, CALF W/MOM
2145		2009	1	5	1028	E	30.72757	81.3082	GA	SEUS	W/CALF
	2009CalfOf2145	2009	1	5	1028	F	30.72757	81.3082	GA	SEUS	CALF W/MOM, WH CHN
1817		2009	1	5	1355	G	30.64451	81.20913	FL	SEUS	W/CALF
	2009Calfof1817	2009	1	5	1355	H	30.64451	81.20913	FL	SEUS	CALF W/MOM
2320		2009	1	8	0914	A	30.78061	81.32047	GA	SEUS	BOD CNT, W/CALF
	2009Calfof2320	2009	1	8	0914	B	30.78061	81.32047	GA	SEUS	BOD CNT, CALF W/MOM
1817		2009	1	9	1415	A	30.51624	81.20367	FL	SEUS	BOD CNT, W/CALF
	2009Calfof1817	2009	1	9	1415	B	30.51624	81.20367	FL	SEUS	BOD CNT, CALF W/MOM
		2009	1	9	1450	C	30.53032	81.26967	FL	SEUS	SAG
		2009	1	9	1450	D	30.53032	81.26967	FL	SEUS	SAG
2320		2009	1	9	1454	E	30.52602	81.2785	FL	SEUS	W/CALF
	2009Calfof2320	2009	1	9	1454	F	30.52602	81.2785	FL	SEUS	CALF W/MOM

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
2145		2009	1	9	1536	G	30.60193	81.41553	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf2145	2009	1	9	1536	H	30.60193	81.41553	FL	SEUS	BOD CNT, CALF W/MOM
		2009	1	10	1006	A	30.72541	81.33009	GA	SEUS	
1012		2009	1	10	1009	B	30.72658	81.33155	GA	SEUS	BOD CNT, W/CALF
	2009CalfOf1012	2009	1	10	1009	C	30.72658	81.33155	GA	SEUS	BOD CNT, CALF W/MOM, LBTL
3320		2009	1	10	1019	D	30.67488	81.34365	FL	SEUS	W/CALF
	2009CalfOf3320	2009	1	10	1019	E	30.67488	81.34365	FL	SEUS	CALF W/MOM
		2009	1	10	1029	F	30.74389	81.21252	GA	SEUS	MOPN
3320		2009	1	10	1117	G	30.6672	81.3225	FL	SEUS	NURS, W/CALF
	2009CalfOf3320	2009	1	10	1117	H	30.6672	81.3225	FL	SEUS	CALF W/MOM, NURS
		2009	1	10	1125	I	30.7529	81.34577	GA	SEUS	
1334		2009	1	10	1210	J	30.59031	81.14661	FL	SEUS	W/CALF
	2009CalfOf1334	2009	1	10	1210	K	30.59031	81.14661	FL	SEUS	CALF W/MOM
		2009	1	10	1343	L	30.50312	81.29395	FL	SEUS	
		2009	1	10	1343	M	30.50312	81.29395	FL	SEUS	
2145		2009	1	10	1347	N	30.5273	81.28288	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf2145	2009	1	10	1347	O	30.5273	81.28288	FL	SEUS	BOD CNT, CALF W/MOM, ROLL, WH BEL, WH CHN
		2009	1	10	1543	P	30.345	81.22895	FL	SEUS	BOD CNT, BRCH

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	1	10	1543	Q	30.345	81.22895	FL	SEUS	BOD CNT
1012		2009	1	11	1102	A	30.49585	81.21301	FL	SEUS	W/CALF
	2009CalfOf1012	2009	1	11	1102	B	30.49585	81.21301	FL	SEUS	CALF W/MOM
2145		2009	1	11	1130	C	30.5346	81.2552	FL	SEUS	W/CALF
	2009CalfOf2145	2009	1	11	1130	D	30.5346	81.2552	FL	SEUS	CALF W/MOM
1946		2009	1	11	1139	E	30.56127	81.3284	FL	SEUS	W/CALF
	2009Calfof1946	2009	1	11	1139	F	30.56127	81.3284	FL	SEUS	CALF W/MOM
		2009	1	11	1156	G	30.57331	81.34978	FL	SEUS	
		2009	1	11	1228	H	30.66925	81.1709	FL	SEUS	LBTL
		2009	1	11	1228	I	30.66925	81.1709	FL	SEUS	
2320		2009	1	14	1317	A	30.34595	81.28093	FL	SEUS	BOD CNT, W/CALF
	2009Calfof2320	2009	1	14	1317	B	30.34595	81.28093	FL	SEUS	BOD CNT, CALF W/MOM
		2009	1	14	1353	C	30.47357	81.20444	FL	SEUS	SAG
	BK03BoF07	2009	1	14	1353	D	30.47357	81.20444	FL	SEUS	SAG
	2007CalfOf2645	2009	1	14	1353	E	30.47357	81.20444	FL	SEUS	SAG
1817		2009	1	14	1405	F	30.47193	81.19052	FL	SEUS	W/CALF
	2009Calfof1817	2009	1	14	1405	G	30.47193	81.19052	FL	SEUS	CALF W/MOM
		2009	1	14	1554	H	30.83902	81.20135	GA	SEUS	SAG

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	1	14	1554	I	30.83902	81.20135	GA	SEUS	SAG
		2009	1	14	1603	J	30.84307	81.1884	GA	SEUS	W/YRLG
	2008CalfOf3115	2009	1	14	1603	K	30.84307	81.1884	GA	SEUS	YRLG W/MOM
		2009	1	15	1428	A	30.60447	81.30814	FL	SEUS	
		2009	1	15	1428	B	30.60447	81.30814	FL	SEUS	
2320		2009	1	18	1030	A	30.58773	81.23397	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf2320	2009	1	18	1030	B	30.58773	81.23397	FL	SEUS	BOD CNT, CALF W/MOM
1817		2009	1	18	1038	C	30.56314	81.22917	FL	SEUS	BOD CNT, HDLFT, W/CALF
	2009CalfOf1817	2009	1	18	1038	D	30.56314	81.22997	FL	SEUS	BOD CNT, CALF W/MOM
2123		2009	1	18	1059	E	30.64723	81.2135	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf2123	2009	1	18	1059	F	30.64723	81.2135	FL	SEUS	BOD CNT, CALF W/MOM, WH CHN
		2009	1	19	1100	A	30.39905	81.21495	FL	SEUS	BOD CNT
		2009	1	19	1100	B	30.39905	81.21495	FL	SEUS	BOD CNT, ROLL, WH BEL, WH CHN
		2009	1	19	1156	C	30.41367	81.22615	FL	SEUS	
		2009	1	19	1156	D	30.41367	81.22615	FL	SEUS	
		2009	1	19	1259	E	30.52913	81.24993	FL	SEUS	BOD CNT
		2009	1	19	1259	F	30.52913	81.24993	FL	SEUS	BOD CNT
		2009	1	19	1625	G	30.84343	81.17647	GA	SEUS	

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	1	19	1635	H	30.85203	81.25022	GA	SEUS	
		2009	1	19	1644	I	30.85022	81.25022	GA	SEUS	BLK BEL, BLK CHN, FLIP, LBTL, W/CALF UNPH
N/A		2009	1	19	1659	N/A	30.83323	81.31853	GA	SEUS	1 UNPHOTOGRAPHED RIGHT WHALES
		2009	1	21	1344	A	31.25053	80.92414	GA	SEUS	
1281		2009	1	21	1411	B	31.12483	81.17953	GA	SEUS	W/CALF
	2009CalfOf1281	2009	1	21	1411	C	31.12483	81.17953	GA	SEUS	CALF W/MOM
		2009	1	21	1427	D	31.15532	81.13676	GA	SEUS	
		2009	1	21	1427	E	31.15532	81.13676	GA	SEUS	
		2009	1	21	1433	F	31.12398	81.11726	GA	SEUS	
	2007CalfOf3360	2009	1	21	1433	G	31.12398	81.11726	GA	SEUS	
2611		2009	1	21	1545	H	30.87485	81.191	GA	SEUS	W/CALF
	2009CalfOf2611	2009	1	21	1545	I	30.87485	81.191	GA	SEUS	CALF W/MOM
1012		2009	1	21	1619	J	30.79805	81.27527	GA	SEUS	BOD CNT, W/CALF
	2009CalfOf1012	2009	1	21	1619	K	30.79805	81.27527	GA	SEUS	BLK BEL, BOD CNT, CALF W/MOM
2123		2009	1	21	1622	L	30.7801	81.29	GA	SEUS	W/CALF, WH CHN
	2009CalfOf2123	2009	1	21	1622	M	30.7801	81.29	GA	SEUS	CALF W/MOM
1246		2009	1	21	1627	N	30.78212	81.28243	GA	SEUS	BODO, W/CALF
	2009CalfOf1246	2009	1	21	1627	O	30.78212	81.28243	GA	SEUS	BODO, CALF W/MOM

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
3660	2006CalfOf2660	2009	1	21	1640	P	30.72267	81.24211	GA	SEUS	BEL/BEL, SAG, WH BEL, WH CHN
		2009	1	21	1640	Q	30.72267	81.24211	GA	SEUS	BEL/BEL, BLK BEL, SAG
	SE07BK08	2009	1	21	1646	R	30.73365	81.2324	GA	SEUS	WH CHN
		2009	1	21	1646	S	30.73365	81.2324	GA	SEUS	WH CHN
		2009	1	21	1715	T	30.68885	81.24085	FL	SEUS	
1711		2009	1	22	1013	A	31.06168	81.2661	GA	SEUS	W/CALF
	2009CalfOf1711	2009	1	22	1013	B	31.06168	81.2661	GA	SEUS	CALF W/MOM
		2009	1	22	1030	C	31.23356	81.16808	GA	SEUS	
1711		2009	1	22	1118	D	31.04772	81.26379	GA	SEUS	W/CALF
	2009CalfOf1711	2009	1	22	1118	E	31.04772	81.26379	GA	SEUS	CALF W/MOM, WH CHN
		2009	1	22	1228	F	30.84143	81.26072	GA	SEUS	BOD CNT, BODO
		2009	1	22	1228	G	30.84143	81.26072	GA	SEUS	BOD CNT, BODO
	2007CalfOf3360	2009	1	22	1228	H	30.84143	81.26072	GA	SEUS	BOD CNT, BODO
		2009	1	22	1233	I	30.82465	81.23061	GA	SEUS	SAG
		2009	1	22	1233	J	30.82465	81.23061	GA	SEUS	SAG
2611		2009	1	22	1248	K	30.83163	81.1875	GA	SEUS	W/CALF, WH CHN
	2009CalfOf2611	2009	1	22	1248	L	30.83163	81.1875	GA	SEUS	CALF W/MOM
1315		2009	1	22	1316	M	30.72913	81.29939	GA	SEUS	NURS, W/CALF

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
	2009CalfOf1315	2009	1	22	1316	N	30.72913	81.29939	GA	SEUS	CALF W/MOM
		2009	1	22	1324	O	30.70168	81.31333	FL	SEUS	WH CHN
2123		2009	1	22	1331	P	30.69207	81.23075	FL	SEUS	W/CALF, WH CHN
	2009CalfOf2123	2009	1	22	1331	Q	30.69207	81.23075	FL	SEUS	CALF W/MOM
3320		2009	1	22	1337	R	30.67415	81.08306	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf3320	2009	1	22	1337	S	30.67415	81.08306	FL	SEUS	BOD CNT, CALF W/MOM
	2009CalfOf1012	2009	1	22	1528	T	30.57965	81.283	FL	SEUS	BRCH, CALF OF UNPH MOM, CALF W/MOM
2145		2009	1	22	1546	U	30.58005	81.39612	FL	SEUS	W/CALF
	2009CalfOf2145	2009	1	22	1546	V	30.58005	81.39612	FL	SEUS	CALF W/MOM, LBTL, WH BEL
1817		2009	1	22	1617	W	30.35254	81.20617	FL	SEUS	W/CALF
	2009CalfOf1817	2009	1	22	1617	X	30.35254	81.20617	FL	SEUS	CALF W/MOM
3108		2009	1	22	1625	Y	30.42068	81.29967	FL	SEUS	W/CALF
	2009CalfOf3108	2009	1	22	1625	Z	30.42068	81.29967	FL	SEUS	CALF W/MOM
1012		2009	1	23	1123	A	30.81403	81.29853	GA	SEUS	W/CALF
	2009CalfOf1012	2009	1	23	1123	B	30.81403	81.29853	GA	SEUS	CALF W/MOM
		2009	1	23	1147	C	30.76557	81.35423	GA	SEUS	BODO, W/CALF
		2009	1	23	1147	D	30.76557	81.35423	GA	SEUS	BODO, CALF W/MOM
		2009	1	23	1215	G	30.70332	81.2744	FL	SEUS	

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	1	23	1236	E	30.71222	81.27398	GA	SEUS	BLK BEL, BLK CHN, BODO
	2007CalfOf1701	2009	1	23	1236	F	30.71222	81.27398	GA	SEUS	BLK CHN, BODO
3440		2009	1	23	1355	H	30.59317	81.0715	FL	SEUS	W/CALF
	2009CalfOf3440	2009	1	23	1355	I	30.59317	81.0715	FL	SEUS	CALF W/MOM
3660	2006CalfOf2660	2009	1	23	1411	J	30.5684	81.2067	FL	SEUS	BEL/BEL, BOD CNT, WH BEL, WH CHN
	2008CalfOf2753	2009	1	23	1411	K	30.5684	81.2067	FL	SEUS	BEL/BEL, BOD CNT, WH BEL, WH CHN
	2006CalfOf1248	2009	1	23	1420	L	30.56388	81.2055	FL	SEUS	
	2008calfOf2330	2009	1	23	1427	M	30.60892	81.25992	FL	SEUS	BLK BEL, BLK CHN, BRCH
2320		2009	1	23	1439	N	30.53753	81.30784	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf2320	2009	1	23	1439	O	30.53753	81.30784	FL	SEUS	BOD CNT, CALF W/MOM
1503		2009	1	23	1450	P	30.52568	81.05386	FL	SEUS	NURS, W/CALF
	2009CalfOf1503	2009	1	23	1450	Q	30.52568	81.05386	FL	SEUS	CALF W/MOM, NURS
1608		2009	1	23	1556	R	30.27514	81.15993	FL	SEUS	NURS, W/CALF
	2009CalfOf1608	2009	1	23	1556	S	30.27514	81.15993	FL	SEUS	CALF W/MOM, NURS
		2009	1	24	1009	A	30.71435	81.24979	GA	SEUS	SAG
		2009	1	24	1009	B	30.71435	81.24979	GA	SEUS	SAG, WH CHN
3660		2009	1	24	1009	C	30.71435	81.24979	GA	SEUS	SAG, WH BEL, WH CHN
		2009	1	24	1009	D	30.71435	81.24979	GA	SEUS	SAG

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
	2007CalfOf3360	2009	1	24	1009	E	30.71435	81.24979	GA	SEUS	SAG
		2009	1	24	1009	F	30.71435	81.24979	GA	SEUS	SAG
		2009	1	24	1009	G	30.71435	81.24979	GA	SEUS	SAG, WH BEL, WH CHN
		2009	1	24	1104	H	30.62695	81.35155	FL	SEUS	BODO
		2009	1	24	1104	I	30.62695	81.35155	FL	SEUS	BODO
2320		2009	1	24	1113	J	30.63865	81.12109	FL	SEUS	W/CALF
	2009CalfOf2320	2009	1	24	1113	K	30.63865	81.12109	FL	SEUS	CALF W/MOM
1012		2009	1	24	1309	L	30.49642	81.20582	FL	SEUS	W/CALF
	2009CalfOf1012	2009	1	24	1309	M	30.49642	81.20582	FL	SEUS	CALF W/MOM
		2009	1	28	1109	A	30.74	81.3068	GA	SEUS	BODO
		2009	1	28	1123	B	30.72368	81.18085	GA	SEUS	BODO
2503		2009	1	28	1218	C	30.6855	81.37519	FL	SEUS	W/CALF
	2009CalfOf2503	2009	1	28	1218	D	30.6855	81.37519	FL	SEUS	CALF W/MOM
3320		2009	1	28	1241	E	30.64447	81.35567	FL	SEUS	BODO, W/CALF
	2009CalfOf3320	2009	1	28	1241	F	30.64447	81.35567	FL	SEUS	BODO, CALF W/MOM
2320		2009	1	28	1255	G	30.6525	81.31633	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf2320	2009	1	28	1255	H	30.6525	81.3003	FL	SEUS	BOD CNT, CALF W/MOM
1315		2009	1	28	1332	I	30.58417	81.31633	FL	SEUS	BODO, W/CALF

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
	2009CalfOf1315	2009	1	28	1332	J	30.58417	81.31633	FL	SEUS	BODO, CALF W/MOM
1611		2009	1	28	1533	K	30.3115	81.2007	FL	SEUS	BODO, W/CALF
	2009CalfOf1611	2009	1	28	1533	L	30.3115	81.2007	FL	SEUS	BODO, CALF W/MOM
2145		2009	1	28	1614	M	30.44092	81.15776	FL	SEUS	W/CALF
	2009CalfOf2145	2009	1	28	1614	N	30.44092	81.15776	FL	SEUS	CALF W/MOM, WH BEL, WH CHN
		2009	1	31	1211	A	30.82642	81.25806	GA	SEUS	WH BEL, WH CHN
		2009	1	31	1225	B	30.79022	80.99107	GA	SEUS	FRST ENTGL
	2008CalfOf3115	2009	1	31	1341	C	30.72425	81.02516	GA	SEUS	
N/A		2009	1	31	1524	N/A	30.60534	81.07252	FL	SEUS	2 UNPHOTOGRAPHED RIGHT WHALES
1946		2009	1	31	1538	D	30.6522	81.31387	FL	SEUS	NURS, W/CALF
	2009CalfOf1946	2009	1	31	1538	E	30.6522	81.31387	FL	SEUS	CALF W/MOM, NURS
1315		2009	1	31	1544	F	30.69935	81.3681	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1315	2009	1	31	1544	G	30.69935	81.3681	FL	SEUS	BOD CNT, CALF W/MOM
1151		2009	2	1	0928	A	30.27164	81.30479	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1151	2009	2	1	0928	B	30.27164	81.30479	FL	SEUS	BOD CNT, CALF W/MOM
		2009	2	1	0935	#1	30.30662	81.20073	FL	SEUS	SAG
		2009	2	1	0935	#2	30.30662	81.20073	FL	SEUS	SAG
3111		2009	2	1	0935	C	30.36206	81.20073	FL	SEUS	SAG

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	2	1	0935	D	30.30662	81.20073	FL	SEUS	SAG
		2009	2	1	0935	E	30.30662	81.20073	FL	SEUS	SAG
		2009	2	1	0935	F	30.30662	81.20073	FL	SEUS	SAG
		2009	2	1	0935	G	30.30662	81.20073	FL	SEUS	SAG
		2009	2	1	0935	H	30.30662	81.20073	FL	SEUS	SAG
		2009	2	1	1031	I	30.35975	81.2122	FL	SEUS	
3101		2009	2	1	1103	J	30.44802	81.24663	FL	SEUS	NURS, W/CALF
	2009Calfof3101	2009	2	1	1103	K	30.44802	81.24663	FL	SEUS	CALF W/MOM, NURS
2320		2009	2	1	1131	L	30.50165	81.38406	FL	SEUS	BODO, W/CALF
	2009Calfof2320	2009	2	1	1131	M	30.50165	81.38406	FL	SEUS	BODO, CALF W/MOM
		2009	2	1	1218	N	30.77407	81.26431	GA	SEUS	LN GONE
		2009	2	1	1255	O	30.80382	81.34092	GA	SEUS	BODO
N/A		2009	2	1	1338	N/A	30.74819	81.26179	GA	SEUS	1 UNPHOTOGRAPHED RIGHT WHALE
	2007Calfof1701	2009	2	1	1635	P	30.72012	81.24229	GA	SEUS	BLK CHN, FLIP
N/A		2009	2	1	1717	N/A	30.76743	81.25269	GA	SEUS	2 UNPHOTOGRAPHED RIGHT WHALES
1315		2009	2	2	0920	A	30.84155	81.33857	GA	SEUS	MOPN, W/CALF
	2009CalfOf1315	2009	2	2	0920	B	30.84155	81.33857	GA	SEUS	CALF W/MOM
	2007CalfOf1425	2009	2	2	1031	C	30.69567	81.32558	FL	SEUS	SAG

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	2	2	1031	D	30.69567	81.32558	FL	SEUS	SAG
		2009	2	2	1031	E	30.69784	81.3198	FL	SEUS	
		2009	2	2	1210	F	30.28312	81.308	FL	SEUS	
		2009	2	2	1211	G	30.2758	81.30468	FL	SEUS	SAG
		2009	2	2	1211	H	30.2758	81.30468	FL	SEUS	SAG
		2009	2	2	1211	I	30.2758	81.30468	FL	SEUS	SAG, WH BEL, WH CHN
	2007CalfOf3360	2009	2	2	1220	J	30.27967	81.3213	FL	SEUS	BODO, SAG
		2009	2	2	1220	K	30.27967	81.3213	FL	SEUS	BODO, SAG
		2009	2	2	1225	L	30.2841	81.31834	FL	SEUS	BEL/BEL
	CT03RB06	2009	2	2	1225	M	30.2841	81.31834	FL	SEUS	BEL/BEL, UW EXH, WH BEL, WH CHN
	2008calfof2330	2009	2	2	1238	N	30.25392	81.31931	FL	SEUS	BLK BEL, BLK CHN, BRCH
	2008CalfOf1245	2009	2	5	1351	A	30.74018	81.3426	GA	SEUS	
		2009	2	5	1448	#1	30.55383	81.28047	FL	SEUS	BOD CNT
	CT05SEUS08	2009	2	5	1448	B	30.55383	81.28047	FL	SEUS	BOD CNT
		2009	2	5	1448	C	30.55383	81.28047	FL	SEUS	BOD CNT
3101		2009	2	5	1453	D	30.58837	81.34299	FL	SEUS	BOD CNT, W/CALF
	2009Calfof3101	2009	2	5	1453	E	30.58837	81.34299	FL	SEUS	BOD CNT, CALF W/MOM
1151		2009	2	5	1455	F	30.57967	81.37029	FL	SEUS	W/CALF

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
	2009CalfOf1151	2009	2	5	1455	G	30.57967	81.37029	FL	SEUS	CALF W/MOM
1281		2009	2	5	1502	H	30.59138	81.41269	FL	SEUS	BOD CNT, BODO, W/CALF
	2009CalfOf1281	2009	2	5	1502	I	30.59138	81.41269	FL	SEUS	BLK BEL, BLK CHN, BOD CNT, BODO, CALF W/MOM, MALE
		2009	2	5	1510	J	30.55015	81.27557	FL	SEUS	MOPN, SAG
		2009	2	5	1510	K	30.55015	81.27557	FL	SEUS	SAG
		2009	2	5	1510	L	30.55015	81.27557	FL	SEUS	BLK CHN, SAG
	CT05SEUS08	2009	2	5	1510	M	30.55015	81.27557	FL	SEUS	SAG
1503		2009	2	5	1547	N	30.43077	81.14635	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1503	2009	2	5	1547	O	30.43077	81.14635	FL	SEUS	BOD CNT, CALF W/MOM
1315		2009	2	5	1641	P	30.50561	81.39543	FL	SEUS	BODO, W/CALF
	2009CalfOf1315	2009	2	5	1641	Q	30.50561	81.39543	FL	SEUS	BODO, CALF W/MOM
1281		2009	2	6	0920	A	30.65022	81.40728	FL	SEUS	W/CALF
	2009CalfOf1281	2009	2	6	0920	B	30.65022	81.40728	FL	SEUS	CALF W/MOM
2611		2009	2	6	1002	C	30.78492	81.20832	GA	SEUS	LOG, W/CALF
	2009CalfOf2611	2009	2	6	1002	D	30.78492	81.20832	GA	SEUS	CALF W/MOM, LOG
		2009	2	6	1007	E	30.77843	81.28282	GA	SEUS	
	2007CalfOf1701	2009	2	6	1007	F	30.77843	81.28282	GA	SEUS	
1151		2009	2	6	1056	G	30.67443	81.29605	FL	SEUS	W/CALF

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
	2009CalfOf1151	2009	2	6	1056	H	30.67443	81.29605	FL	SEUS	CALF W/MOM
1315		2009	2	6	1102	I	30.68628	81.37887	FL	SEUS	W/CALF
	2009CalfOf1315	2009	2	6	1102	J	30.68628	81.37887	FL	SEUS	CALF W/MOM
		2009	2	6	1157	K	30.48908	81.30645	FL	SEUS	BEL/BEL, BLK BEL, BLK CHN, BOD CNT, BODO, UW EXH
		2009	2	6	1157	L	30.48908	81.30645	FL	SEUS	BEL/BEL, BOD CNT, BODO, UW EXH
		2009	2	6	1241	M	30.4725	81.30325	FL	SEUS	
		2009	2	6	1241	N	30.4725	81.30325	FL	SEUS	BOD CNT
		2009	2	6	1241	O	30.4725	81.30325	FL	SEUS	BOD CNT
		2009	2	6	1250	P	30.49583	81.32368	FL	SEUS	
		2009	2	6	1250	Q	30.49583	81.32368	FL	SEUS	
		2009	2	6	1250	R	30.49583	81.32368	FL	SEUS	
1315		2009	2	7	0915	A	30.84372	81.34897	GA	SEUS	W/CALF
	2009CalfOf1315	2009	2	7	0915	B	30.84372	81.34897	GA	SEUS	CALF W/MOM
		2009	2	7	0921	C	30.85205	81.2563	GA	SEUS	
		2009	2	7	0939	D	30.82372	80.85722	GA	SEUS	MOPN
		2009	2	7	0945	E	30.81174	80.7706	GA	SEUS	SAG, WH CHN
3570		2009	2	7	0945	F	30.81174	80.7706	GA	SEUS	SAG
		2009	2	7	0945	G	30.81174	80.7706	GA	SEUS	SAG

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	2	7	0945	H	30.81174	80.7706	GA	SEUS	SAG, WH BEL, WH CHN
		2009	2	7	0945	I	30.81174	80.7706	GA	SEUS	SAG
2123		2009	2	7	1026	J	30.72868	81.29973	GA	SEUS	BOD CNT, W/CALF, WH CHN
	2009CalfOf2123	2009	2	7	1026	K	30.72868	81.29973	GA	SEUS	BOD CNT, CALF W/MOM
		2009	2	7	1030	L	30.72665	81.22311	GA	SEUS	BOD CNT, BODO
		2009	2	7	1030	M	30.72665	81.22311	GA	SEUS	BOD CNT, BODO
		2009	2	7	1040	N	30.73543	81.18715	GA	SEUS	
		2009	2	7	1114	O	30.63707	81.26902	FL	SEUS	BEL/BEL, SAG
		2009	2	7	1114	P	30.63707	81.26902	FL	SEUS	BEL/BEL, SAG
		2009	2	7	1116	Q	30.6646	81.26248	FL	SEUS	SAG
		2009	2	7	1116	R	30.6646	81.26248	FL	SEUS	SAG
		2009	2	7	1159	S	30.56417	81.05883	FL	SEUS	
2611		2009	2	7	1209	T	30.55908	81.13558	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf2611	2009	2	7	1209	U	30.55908	81.13558	FL	SEUS	BOD CNT, CALF W/MOM
3320		2009	2	7	1209	V	30.55908	81.13558	FL	SEUS	NURS, W/CALF
	2009CalfOf3320	2009	2	7	1209	W	30.55908	81.13558	FL	SEUS	CALF W/MOM, NURS
1012		2009	2	7	1218	X	30.57071	81.23133	FL	SEUS	BODO, W/CALF
	2009CalfOf1012	2009	2	7	1218	Y	30.57071	81.23133	FL	SEUS	BODO, CALF W/MOM

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	2	7	1335	Z	30.50578	81.07854	FL	SEUS	
1817		2009	2	7	1405	AA	30.48807	81.18787	FL	SEUS	BLK BEL, BLK CHN, BOD CNT, NURS, W/CALF
	2009CalfOf1817	2009	2	7	1405	BB	30.48807	81.18787	FL	SEUS	BOD CNT, CALF W/MOM, NURS
3101		2009	2	7	1408	CC	30.47688	81.20869	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf3101	2009	2	7	1408	DD	30.47688	81.20869	FL	SEUS	BOD CNT, CALF W/MOM
		2009	2	7	1426	EE	30.43084	81.34535	FL	SEUS	
1315		2009	2	8	0920	A	30.75315	81.41997	GA	SEUS	W/CALF
	2009CalfOf1315	2009	2	8	0920	B	30.75315	81.41997	GA	SEUS	CALF W/MOM
1946		2009	2	8	1005	C	30.75453	81.27084	GA	SEUS	BOD CNT, W/CALF
	2009CalfOf1946	2009	2	8	1005	D	30.75453	81.27084	GA	SEUS	BOD CNT, CALF W/MOM
		2009	2	8	1009	E	30.77483	81.2587	GA	SEUS	
		2009	2	8	1137	F	30.24385	81.14744	FL	SEUS	
		2009	2	8	1137	G	30.24385	81.14744	FL	SEUS	
		2009	2	8	1137	H	30.24385	81.14744	FL	SEUS	
	2008CalfOf3115	2009	2	8	1141	I	30.23972	81.15456	FL	SEUS	
		2009	2	8	1141	J	30.23972	81.15456	FL	SEUS	
3440		2009	2	8	1216	K	30.32865	81.1771	FL	SEUS	NURS, W/CALF
	2009CalfOf3440	2009	2	8	1216	L	30.32865	81.1771	FL	SEUS	CALF W/MOM, NURS

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
2503		2009	2	8	1358	M	30.40488	81.14439	FL	SEUS	NURS, W/CALF
	2009CalfOf2503	2009	2	8	1358	N	30.40488	81.14439	FL	SEUS	CALF W/MOM, NURS
1817		2009	2	8	1429	O	30.48623	81.17002	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1817	2009	2	8	1429	P	30.48623	81.17002	FL	SEUS	BLK BEL, BLK CHN, BOD CNT, CALF W/MOM, ROLL
1315		2009	2	8	1501	Q	30.7261	81.3345	GA	SEUS	W/CALF
	2009CalfOf1315	2009	2	8	1501	R	30.7261	81.3345	GA	SEUS	CALF W/MOM
1012		2009	2	8	1546	S	30.48736	81.12508	FL	SEUS	W/CALF
	2009CalfOf1012	2009	2	8	1546	T	30.48736	81.12508	FL	SEUS	CALF W/MOM
3101		2009	2	8	1553	U	30.47667	81.17876	FL	SEUS	W/CALF
	2009CalfOf3101	2009	2	8	1553	V	30.47667	81.17876	FL	SEUS	CALF W/MOM
1817		2009	2	8	1614	W	30.52672	81.18581	FL	SEUS	W/CALF
	2009CalfOf1817	2009	2	8	1614	X	30.52672	81.18581	FL	SEUS	CALF W/MOM
1503		2009	2	9	1011	A	30.71433	81.1142	GA	SEUS	W/CALF
	2009CalfOf1503	2009	2	9	1011	B	30.71433	81.1142	GA	SEUS	CALF W/MOM
		2009	2	9	1029	#1	30.66928	80.84928	FL	SEUS	SAG
		2009	2	9	1029	#2	30.66928	80.84928	FL	SEUS	SAG
		2009	2	9	1029	#3	30.66928	80.84928	FL	SEUS	SAG
		2009	2	9	1029	C	30.66928	80.84928	FL	SEUS	SAG

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	2	9	1029	D	30.66928	80.84928	FL	SEUS	SAG
		2009	2	9	1029	E	30.66928	80.84928	FL	SEUS	SAG
		2009	2	9	1029	F	30.66928	80.84928	FL	SEUS	SAG
		2009	2	9	1029	G	30.66928	80.84928	FL	SEUS	SAG, UW EXH
		2009	2	9	1029	H	30.66928	80.84928	FL	SEUS	SAG, WH BEL, WH CHN
		2009	2	9	1029	I	30.66928	80.84928	FL	SEUS	SAG
		2009	2	9	1044	J	30.67143	80.85448	FL	SEUS	BEL/BEL, BOD CNT
		2009	2	9	1044	K	30.67143	80.85448	FL	SEUS	BEL/BEL, BLK BEL, BLK CHN, BOD CNT
		2009	2	9	1104	L	30.64665	81.15884	FL	SEUS	BLK BEL, BLK CHN, BOD CNT
		2009	2	9	1104	M	30.64665	81.15884	FL	SEUS	BLK CHN, BOD CNT
		2009	2	9	1129	N	30.55778	81.41898	FL	SEUS	BOD CNT, W/CALF
		2009	2	9	1129	O	30.55778	81.41898	FL	SEUS	BOD CNT, CALF W/MOM
		2009	2	9	1213	P	30.58162	81.16683	FL	SEUS	W/CALF
		2009	2	9	1213	Q	30.58162	81.16683	FL	SEUS	BLK CHN, CALF W/MOM
		2009	2	9	1221	R	30.58496	81.34262	FL	SEUS	BODO, NURS, W/CALF
		2009	2	9	1221	S	30.58496	81.34262	FL	SEUS	BODO, CALF W/MOM, NURS
		2009	2	9	1445	T	30.44745	81.09897	FL	SEUS	
		2009	2	9	1500	U	30.35102	80.84457	FL	SEUS	BOD CNT, W/CALF

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	2	9	1500	V	30.35102	80.84457	FL	SEUS	BOD CNT, CALF W/MOM
		2009	2	9	1535	W	30.3314	81.12368	FL	SEUS	BLK CHN, SAG
		2009	2	9	1535	X	30.3314	81.12368	FL	SEUS	BLK BEL, BLK CHN, FCL, FEM, SAG
		2009	2	9	1535	Y	30.3314	81.12368	FL	SEUS	SAG, WH BEL, WH CHN
		2009	2	9	1620	AA	30.27024	81.33752	FL	SEUS	BODO, CALF W/MOM
		2009	2	9	1620	Z	30.27024	81.33752	FL	SEUS	BODO, W/CALF
1315		2009	2	10	0923	A	30.69128	81.32332	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1315	2009	2	10	0923	B	30.69128	81.32332	FL	SEUS	BOD CNT, CALF W/MOM
2503		2009	2	10	0934	C	30.81148	81.43778	GA	SEUS	BOD CNT, W/CALF
	2009Calfof2503	2009	2	10	0934	D	30.81148	81.43778	GA	SEUS	BOD CNT, CALF W/MOM
2753		2009	2	10	0949	E	30.8287	81.13097	GA	SEUS	MOPN
	2008CalfOf2753	2009	2	10	1004	F	30.89282	81.12576	GA	SEUS	MOPN, WH CHN
		2009	2	10	1004	G	30.89282	81.12576	GA	SEUS	SAG
		2009	2	10	1004	H	30.89282	81.12576	GA	SEUS	SAG
		2009	2	10	1004	I	30.89282	81.12576	GA	SEUS	SAG
	CT03RB06	2009	2	10	1004	J	30.89282	81.12576	GA	SEUS	SAG, WH BEL, WH CHN
	2007calfof1620	2009	2	10	1004	K	30.89282	81.12576	GA	SEUS	SAG
		2009	2	10	1018	L	30.85977	81.06368	GA	SEUS	

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	2	10	1018	M	30.85977	81.06368	GA	SEUS	
		2009	2	10	1023	#1	30.8731	81.05528	GA	SEUS	
		2009	2	10	1023	#2	30.8731	81.05528	GA	SEUS	
		2009	2	10	1023	N	30.8731	81.05528	GA	SEUS	APPR, SAG
		2009	2	10	1023	O	30.8731	81.05528	GA	SEUS	APPR, SAG
	BK01BOF07	2009	2	10	1023	P	30.8731	81.05528	GA	SEUS	BLK BEL, MALE, SAG
		2009	2	10	1023	Q	30.8731	81.05528	GA	SEUS	SAG, WH CHN
		2009	2	10	1023	R	30.8731	81.05528	GA	SEUS	FCL, FEM, SAG
1012		2009	2	10	1041	S	30.78418	80.81156	GA	SEUS	W/CALF
	2009CalfOf1012	2009	2	10	1041	T	30.78418	80.81156	GA	SEUS	CALF W/MOM
1281		2009	2	10	1109	U	30.77592	81.4352	GA	SEUS	W/CALF
	2009CalfOf1281	2009	2	10	1109	V	30.77592	81.4352	GA	SEUS	CALF W/MOM
		2009	2	10	1150	W	30.6696	81.2821	FL	SEUS	BODO, SAG
		2009	2	10	1150	X	30.6696	81.2821	FL	SEUS	BODO, SAG
2520		2009	2	10	1210	Y	30.62483	81.1883	FL	SEUS	BLK BEL, BLK CHN, BOD CNT, W/CALF
	2009CalfOf2520	2009	2	10	1210	Z	30.62483	81.1883	FL	SEUS	BOD CNT, CALF W/MOM
		2009	2	10	1443	AA	30.55705	81.22559	FL	SEUS	BEL/BEL, BLK BEL, BODO
		2009	2	10	1443	BB	30.55705	81.22559	FL	SEUS	BEL/BEL, BODO, WH BEL, WH CHN

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
1946		2009	2	10	1535	CC	30.42843	81.14059	FL	SEUS	W/CALF
	2009CalfOf1946	2009	2	10	1535	DD	30.42843	81.14059	FL	SEUS	CALF W/MOM
2611		2009	2	10	1604	EE	30.38285	81.22376	FL	SEUS	W/CALF
	2009CalfOf2611	2009	2	10	1604	FF	30.38285	81.22376	FL	SEUS	CALF W/MOM
1334		2009	2	10	1639	GG	30.36329	80.82608	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1334	2009	2	10	1639	HH	30.36329	80.82608	FL	SEUS	BOD CNT, CALF W/MOM, WH BEL, WH CHN
3660	2006CalfOf2660	2009	2	10	1704	II	30.28347	81.17195	FL	SEUS	BODO
		2009	2	10	1709	JJ	30.27005	81.19545	FL	SEUS	SAG, W/UNPH EG
N/A		2009	2	10	1709	N/A	30.27487	81.20253	FL	SEUS	1 UNPHOTOGRAPHED RIGHT WHALE
N/A		2009	2	10	1711	N/A	30.27478	81.19652	FL	SEUS	2 UNPHOTOGRAPHED RIGHT WHALES
1315		2009	2	11	0913	A	30.70027	81.36853	FL	SEUS	BODO, W/CALF
	2009CalfOf1315	2009	2	11	0913	B	30.70027	81.36853	FL	SEUS	BODO, CALF W/MOM
		2009	2	11	1021	C	30.3882	81.29665	FL	SEUS	SAG
		2009	2	11	1021	D	30.3882	81.29665	FL	SEUS	SAG
		2009	2	11	1021	E	30.3882	81.29665	FL	SEUS	SAG
3681	2006CalfOf1281	2009	2	11	1021	F	30.3882	81.29665	FL	SEUS	SAG
		2009	2	11	1021	G	30.3882	81.29665	FL	SEUS	SAG
		2009	2	11	1021	H	30.3882	81.29665	FL	SEUS	SAG, WH CHN

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	2	11	1024	I	30.39083	81.28822	FL	SEUS	
		2009	2	11	1047	J	30.39242	81.11308	FL	SEUS	
		2009	2	11	1109	K	30.41073	81.10072	FL	SEUS	
		2009	2	11	1148	#1	30.49598	81.2883	FL	SEUS	SAG
		2009	2	11	1148	L	30.49598	81.2883	FL	SEUS	SAG
3346		2009	2	11	1148	M	30.49598	81.2883	FL	SEUS	SAG
	BK03BoF07	2009	2	11	1148	N	30.49598	81.2883	FL	SEUS	SAG
		2009	2	11	1148	O	30.49598	81.2883	FL	SEUS	SAG
		2009	2	11	1148	P	30.49598	81.2883	FL	SEUS	SAG
		2009	2	11	1208	Q	30.47173	81.29936	FL	SEUS	BODO, SAG
		2009	2	11	1208	R	30.47173	81.29936	FL	SEUS	BODO, SAG
		2009	2	11	1208	S	30.47173	81.29936	FL	SEUS	BODO, SAG
1246		2009	2	11	1222	T	30.48963	81.03139	FL	SEUS	W/CALF
	2009CalfOf1246	2009	2	11	1222	U	30.48963	81.03139	FL	SEUS	BLK BEL, CALF W/MOM, FEM, LBTL, ROLL
1240		2009	2	11	1422	V	30.5709	80.91635	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1240	2009	2	11	1422	W	30.5709	80.91635	FL	SEUS	BOD CNT, CALF W/MOM
1151		2009	2	11	1500	X	30.68725	81.22021	FL	SEUS	W/CALF
	2009CalfOf1151	2009	2	11	1500	Y	30.68725	81.22021	FL	SEUS	CALF W/MOM

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
	2008CalfOf1408	2009	2	11	1654	Z	30.56995	81.24618	FL	SEUS	BRCH, MOPN
		2009	2	12	0925	A	30.82675	81.22293	GA	SEUS	SAG
		2009	2	12	0925	B	30.82675	81.22293	GA	SEUS	SAG
		2009	2	12	0925	C	30.82675	81.22293	GA	SEUS	SAG
		2009	2	12	0925	D	30.82675	81.22293	GA	SEUS	SAG
		2009	2	12	0925	E	30.82675	81.22293	GA	SEUS	SAG
		2009	2	12	0936	F	30.83338	81.2004	GA	SEUS	
		2009	2	12	0936	G	30.83338	81.2004	GA	SEUS	WH CHN
		2009	2	12	1034	H	30.72338	81.38171	GA	SEUS	BEL UP, BLK BEL, BOD CNT, W/CALF
		2009	2	12	1034	I	30.70698	81.38171	FL	SEUS	BOD CNT, CALF W/MOM
		2009	2	12	1047	J	30.70698	81.34962	FL	SEUS	BOD CNT, W/CALF
		2009	2	12	1047	K	30.70698	81.34962	FL	SEUS	BOD CNT, CALF W/MOM
		2009	2	12	1055	L	30.75065	81.18505	GA	SEUS	SAG
		2009	2	12	1055	M	30.75065	81.18505	GA	SEUS	SAG
		2009	2	12	1055	N	30.75065	81.18505	GA	SEUS	SAG
		2009	2	12	1055	O	30.75065	81.18505	GA	SEUS	SAG
		2009	2	12	1055	P	30.75065	81.18505	GA	SEUS	SAG
		2009	2	12	1055	Q	30.75065	81.18505	GA	SEUS	SAG

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	2	12	1102	R	30.74249	81.184	GA	SEUS	
		2009	2	12	1155	S	30.60452	80.96077	FL	SEUS	W/CALF
		2009	2	12	1155	T	30.60452	80.96077	FL	SEUS	CALF W/MOM
		2009	2	12	1222	U	30.5933	81.01435	FL	SEUS	W/CALF
		2009	2	12	1222	V	30.5933	81.01435	FL	SEUS	CALF W/MOM
		2009	2	12	1404	W	30.48998	81.95344	GMEX	SEUS	W/CALF
		2009	2	12	1404	X	30.48998	80.95344	FL	SEUS	CALF W/MOM
		2009	2	12	1419	Y	30.47718	81.2248	FL	SEUS	W/CALF
		2009	2	12	1419	Z	30.47718	81.2248	FL	SEUS	CALF W/MOM
		2009	2	12	1444	AA	30.434	81.11821	FL	SEUS	W/CALF
		2009	2	12	1444	BB	30.434	81.11821	FL	SEUS	CALF W/MOM
		2009	2	12	1514	CC	30.34763	81.05628	FL	SEUS	BOD CNT, W/CALF
		2009	2	12	1514	DD	30.34763	81.05628	FL	SEUS	BOD CNT, CALF W/MOM
		2009	2	12	1520	EE	30.37098	81.05042	FL	SEUS	W/CALF
		2009	2	12	1520	FF	30.37098	81.05042	FL	SEUS	CALF W/MOM
		2009	2	12	1524	GG	30.39083	81.09682	FL	SEUS	
		2009	2	12	1528	HH	30.38049	81.15141	FL	SEUS	BOD CNT, W/CALF
		2009	2	12	1528	II	30.39083	81.09682	FL	SEUS	BOD CNT, CALF W/MOM, WH BEL

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	2	12	1550	JJ	30.33154	81.30556	FL	SEUS	W/CALF
		2009	2	12	1550	KK	30.33154	81.30556	FL	SEUS	CALF W/MOM
		2009	2	12	1557	LL	30.34643	81.15877	FL	SEUS	
		2009	2	12	1557	MM	30.34643	81.15877	FL	SEUS	
		2009	2	12	1602	NN	30.3522	81.0633	FL	SEUS	
		2009	2	12	1602	OO	30.3522	81.0633	FL	SEUS	
		2009	2	12	1619	PP	30.2577	80.87044	FL	SEUS	W/CALF
		2009	2	12	1619	QQ	30.2577	80.87044	FL	SEUS	CALF W/MOM
		2009	2	12	1634	RR	30.30505	81.05791	FL	SEUS	W/CALF
		2009	2	12	1634	SS	30.30505	81.05791	FL	SEUS	CALF W/MOM
		2009	2	12	1635	TT	30.30487	81.08337	FL	SEUS	W/CALF
		2009	2	12	1635	UU	30.30487	81.16845	FL	SEUS	CALF W/MOM
		2009	2	12	1643	VV	30.30392	81.16845	FL	SEUS	W/CALF
		2009	2	12	1643	WW	30.30392	81.16845	FL	SEUS	CALF W/MOM
		2009	2	13	1019	A	30.35152	80.88855	FL	SEUS	
1151		2009	2	13	1052	B	30.42868	81.31245	FL	SEUS	W/CALF
	2009CalfOf1151	2009	2	13	1052	C	30.42868	81.31245	FL	SEUS	CALF W/MOM
2320		2009	2	13	1113	D	30.48913	81.1961	FL	SEUS	BOD CNT, W/CALF

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
	2009CalfOf2320	2009	2	13	1113	E	30.48913	81.1961	FL	SEUS	BOD CNT, CALF W/MOM
3108		2009	2	13	1124	F	30.47473	81.18125	FL	SEUS	NURS, W/CALF
	2009CalfOf3108	2009	2	13	1124	G	30.47473	81.18125	FL	SEUS	CALF W/MOM, NURS
		2009	2	13	1323	H	30.58577	81.21848	FL	SEUS	
		2009	2	13	1407	I	30.613	81.26241	FL	SEUS	
3320		2009	2	13	1535	J	30.81799	81.12818	GA	SEUS	BOD CNT, W/CALF
	2009CalfOf3320	2009	2	13	1535	K	30.81799	81.12818	GA	SEUS	BOD CNT, CALF W/MOM
3440		2009	2	13	1550	L	30.85118	81.12832	GA	SEUS	BOD CNT, W/CALF
	2009CalfOf3440	2009	2	13	1550	M	30.85118	81.12832	GA	SEUS	BOD CNT, CALF W/MOM
	2009CalfOf1281	2009	2	13	1603	O	30.81188	81.37428	GA	SEUS	CALF W/MOM, LOG
1281		2009	2	13	1603	N	30.81188	81.37428	GA	SEUS	LOG, W/CALF
2611		2009	2	14	1208	A	30.33652	81.25581	FL	SEUS	W/CALF
	2009CalfOf2611	2009	2	14	1208	B	30.3365	81.25581	FL	SEUS	CALF W/MOM
1608		2009	2	14	1315	C	30.64396	81.12576	FL	SEUS	W/CALF
	2009CalfOf1608	2009	2	14	1315	D	30.64396	81.12576	FL	SEUS	CALF W/MOM
		2009	2	14	1319	E	30.63383	81.17831	FL	SEUS	
		2009	2	14	1319	F	30.63383	81.17831	FL	SEUS	
2123		2009	2	14	1327	G	30.63157	81.25981	FL	SEUS	BOD CNT, W/CALF

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
	2009CalfOf2123	2009	2	14	1327	H	30.63157	81.25981	FL	SEUS	BOD CNT, CALF W/MOM
3101		2009	2	14	1356	I	30.73345	81.30805	GA	SEUS	W/CALF
	2009CalfOf3101	2009	2	14	1356	J	30.73345	81.30805	GA	SEUS	CALF W/MOM
1281		2009	2	14	1420	K	30.7823	81.38018	GA	SEUS	W/CALF
	2009CalfOf1281	2009	2	14	1420	L	30.7823	81.38018	GA	SEUS	CALF W/MOM
		2009	2	15	1023	A	30.6256	81.1853	FL	SEUS	BRCH, LBTL, VIDEO
1315		2009	2	15	1030	B	30.63157	81.18995	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1315	2009	2	15	1030	C	30.63157	81.18995	FL	SEUS	BOD CNT, CALF W/MOM
		2009	2	15	1106	D	30.63157	81.18995	FL	SEUS	
		2009	2	15	1106	E	30.61448	81.12987	FL	SEUS	
		2009	2	15	1129	F	30.41485	81.24478	FL	SEUS	
		2009	2	15	1129	G	30.41485	81.24478	FL	SEUS	
N/A		2009	2	17	836	N/A	30.48841	81.19458	FL	SEUS	1 UNPHOTOGRAPHED RIGHT WHALES
		2009	2	17	0930	A	30.25858	81.03383	FL	SEUS	BEL/BEL
		2009	2	17	0930	B	30.25858	81.03383	FL	SEUS	BEL/BEL, BLK CHN
		2009	2	17	0948	C	30.28975	80.96098	FL	SEUS	
		2009	2	17	0948	D	30.28975	80.96098	FL	SEUS	
		2009	2	17	0948	E	30.28975	80.96098	FL	SEUS	

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	2	17	1000	F	30.27212	80.96945	FL	SEUS	BEL/BEL, SAG, WH CHN
		2009	2	17	1000	G	30.27212	80.96945	FL	SEUS	BEL/BEL, SAG, WH BEL, WH CHN
		2009	2	17	1048	H	30.3854	80.96208	FL	SEUS	
		2009	2	17	1048	I	30.3854	80.96208	FL	SEUS	
		2009	2	17	1048	J	30.3854	80.96208	FL	SEUS	
		2009	2	17	1116	K	30.43397	80.82844	FL	SEUS	BOD CNT, W/CALF
		2009	2	17	1116	L	30.43397	80.82844	FL	SEUS	BOD CNT, CALF W/MOM
		2009	2	17	1142	M	30.49418	81.19791	FL	SEUS	SAG
		2009	2	17	1142	N	30.49418	81.19791	FL	SEUS	SAG
		2009	2	17	1154	O	30.43032	81.16219	FL	SEUS	W/CALF
		2009	2	17	1154	P	30.43032	81.16219	FL	SEUS	CALF W/MOM, LBTL
		2009	2	17	1207	Q	30.41993	81.27113	FL	SEUS	
		2009	2	17	1207	R	30.41993	81.27113	FL	SEUS	
		2009	2	17	1212	S	30.45514	81.29147	FL	SEUS	NURS, W/CALF
		2009	2	17	1212	T	30.45514	81.29147	FL	SEUS	CALF W/MOM, NURS
		2009	2	17	1224	U	30.49538	81.23628	FL	SEUS	
		2009	2	17	1224	V	30.49538	81.23628	FL	SEUS	
		2009	2	17	1224	W	30.49538	81.23628	FL	SEUS	

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	2	17	1232	X	30.48997	81.22359	FL	SEUS	LBTL
		2009	2	17	1241	Y	30.47668	81.18743	FL	SEUS	
		2009	2	17	1247	Z	30.48155	81.0962	FL	SEUS	
		2009	2	17	1310	AA	30.5682	81.33175	FL	SEUS	BODO, SAG
		2009	2	17	1310	BB	30.5682	81.33175	FL	SEUS	BODO, SAG
		2009	2	17	1310	CC	30.5682	81.33175	FL	SEUS	BODO, SAG
		2009	2	17	1310	DD	30.5682	81.33175	FL	SEUS	BODO, SAG
		2009	2	17	1530	EE	30.69702	80.84743	FL	SEUS	W/CALF
		2009	2	17	1530	FF	30.69702	80.84743	FL	SEUS	CALF W/MOM
		2009	2	17	1557	GG	30.74092	81.23117	GA	SEUS	
	2008calfof2330	2009	2	19	1158	A	30.79682	81.27068	GA	SEUS	BLK BEL, BOD CNT
		2009	2	19	1158	B	30.79682	81.27068	GA	SEUS	BOD CNT
		2009	2	19	1202	C	30.79685	81.26925	GA	SEUS	MOPN
1315		2009	2	19	1225	D	30.70483	81.06832	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1315	2009	2	19	1225	E	30.70483	81.06832	FL	SEUS	BOD CNT, CALF W/MOM
1142		2009	2	19	1236	F	30.74895	81.23534	GA	SEUS	BODO, W/CALF
	2009Calfof1142	2009	2	19	1236	G	30.74895	81.23534	GA	SEUS	BODO, CALF W/MOM
		2009	2	19	1355	H	30.22495	81.31435	FL	SEUS	BODO

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
2145		2009	2	19	1418	I	30.3319	81.12753	FL	SEUS	BLK CHN, BOD CNT, W/CALF
	2009CalfOf2145	2009	2	19	1418	J	30.3319	81.12753	FL	SEUS	BOD CNT, CALF W/MOM, WH BEL
		2009	2	19	1431	K	30.31733	81.2505	FL	SEUS	BOD CNT
		2009	2	19	1431	L	30.31733	81.2505	FL	SEUS	BOD CNT
	2008CalfOf1245	2009	2	22	1112	A	30.82316	81.29801	GA	SEUS	SAG
		2009	2	22	1112	B	30.82316	81.29801	GA	SEUS	SAG
	BK01BOF07	2009	2	22	1119	C	30.82421	81.29888	GA	SEUS	
		2009	2	22	1128	D	30.8396	81.2945	GA	SEUS	BOD CNT
		2009	2	22	1128	E	30.8396	81.2945	GA	SEUS	BOD CNT
		2009	2	22	1132	F	30.8338	81.28523	GA	SEUS	
	BK01BOF07	2009	2	22	1149	G	30.8317	81.29035	GA	SEUS	
		2009	2	25	0935	A	30.26858	81.19865	FL	SEUS	
		2009	2	25	0935	B	30.26853	81.19865	FL	SEUS	
2791		2009	2	25	1012	C	30.35128	81.27522	FL	SEUS	W/CALF
	2009Calfof2791	2009	2	25	1012	D	30.35128	81.27522	FL	SEUS	CALF W/MOM
1817		2009	2	25	1151	E	30.58408	81.26199	FL	SEUS	BOD CNT, W/CALF
	2009Calfof1817	2009	2	25	1151	F	30.58408	81.26199	FL	SEUS	BOD CNT, CALF W/MOM
3108		2009	2	25	1234	G	30.62133	81.30848	FL	SEUS	W/CALF

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
	2009CalfOf3108	2009	2	25	1234	H	30.62133	81.30848	FL	SEUS	CALF W/MOM
		2009	2	25	1355	I	30.69207	81.32529	FL	SEUS	
	2008CalfOf1245	2009	2	25	1405	J	30.7	81.32303	FL	SEUS	
1142		2009	2	25	1422	K	30.6868	80.95506	FL	SEUS	BOD CNT, W/CALF
	2009Calfof1142	2009	2	25	1422	L	30.68608	80.95506	FL	SEUS	BOD CNT, CALF W/MOM, WH CHN
1281		2009	2	25	1451	M	30.73309	81.34862	GA	SEUS	BODO, W/CALF
	2009CalfOf1281	2009	2	25	1451	N	30.73309	81.34862	GA	SEUS	BODO, CALF W/MOM
		2009	2	25	1509	O	30.79658	81.12812	GA	SEUS	SAG
	2008CalfOf1408	2009	2	25	1509	P	30.79658	81.12812	GA	SEUS	SAG
		2009	2	25	1509	Q	30.79658	81.12812	GA	SEUS	SAG
2503		2009	2	26	0924	A	30.60803	81.4239	FL	SEUS	W/CALF
	2009Calfof2503	2009	2	26	0924	B	30.60803	81.4239	FL	SEUS	CALF W/MOM
1817		2009	2	26	0947	C	30.39055	81.2659	FL	SEUS	BOD CNT, W/CALF
	2009Calfof1817	2009	2	26	0947	D	30.39055	81.2659	FL	SEUS	BOD CNT, CALF W/MOM
3101		2009	2	26	0953	E	30.34213	81.31293	FL	SEUS	BOD CNT, BODO, NURS, W/CALF
	2009Calfof3101	2009	2	26	0953	F	30.34213	81.31293	FL	SEUS	BLK CHN, BOD CNT, BODO, CALF W/MOM, NURS
3317		2009	2	26	0956	G	30.35572	81.2916	FL	SEUS	BODO, W/CALF
	2009Calfof3317	2009	2	26	0956	H	30.35572	81.2916	FL	SEUS	BODO, CALF W/MOM

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
1315		2009	2	26	1128	I	30.4378	80.88455	FL	SEUS	W/CALF
	2009CalfOf1315	2009	2	26	1128	J	30.4378	80.88455	FL	SEUS	CALF W/MOM
2791		2009	2	26	1143	K	30.445	81.22292	FL	SEUS	
	2009CalfOf2791	2009	2	26	1143	L	30.445	81.22292	FL	SEUS	
1204		2009	2	26	1152	M	30.4771	81.38182	FL	SEUS	
	2009CalfOf1204	2009	2	26	1152	N	30.4771	81.38182	FL	SEUS	
1246		2009	2	26	1154	O	30.46903	81.38049	FL	SEUS	BOD CNT, BODO, W/CALF
	2009CalfOf1246	2009	2	26	1154	P	30.46903	81.38049	FL	SEUS	BOD CNT, BODO, CALF W/MOM
		2009	2	26	1218	#1	30.5054	81.29002	FL	SEUS	SAG
		2009	2	26	1218	#2	30.5054	81.29002	FL	SEUS	POST, SAG
		2009	2	26	1218	#3	30.5054	81.29002	FL	SEUS	SAG
		2009	2	26	1218	Q	30.5054	81.29002	FL	SEUS	SAG
		2009	2	26	1218	R	30.5054	81.29002	FL	SEUS	SAG
		2009	2	26	1218	S	30.5054	81.29002	FL	SEUS	SAG
	CT05SEUS08	2009	2	26	1218	T	30.5054	81.29002	FL	SEUS	SAG
	2007CalfOf1701	2009	2	26	1218	U	30.5054	81.29002	FL	SEUS	SAG
		2009	2	26	1218	V	30.5054	81.29002	FL	SEUS	SAG
		2009	2	26	1218	W	30.5054	81.29002	FL	SEUS	SAG

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	2	26	1229	X	30.50685	81.29121	FL	SEUS	
		2009	2	26	1242	Y	30.49655	81.28638	FL	SEUS	
		2009	2	26	1242	Z	30.49655	81.28638	FL	SEUS	
1142		2009	2	26	1258	AA	30.4613	81.16953	FL	SEUS	W/CALF
	2009Calfof1142	2009	2	26	1258	BB	30.4613	81.16953	FL	SEUS	CALF W/MOM, WH CHN
2123		2009	2	26	1608	CC	30.7304	81.19682	GA	SEUS	BOD CNT, NURS, W/CALF, WH BEL, WH CHN
	2009Calfof2123	2009	2	26	1608	DD	30.7304	81.19682	GA	SEUS	BOD CNT, CALF W/MOM, NURS, WH CHN
	2008CalfOf1408	2009	2	26	1617	EE	30.73423	81.37679	GA	SEUS	BEL/BEL, BLK CHN, FLIP, SAG
		2009	2	26	1617	FF	30.73423	81.37679	GA	SEUS	BEL/BEL, BLK CHN, SAG
1142		2009	2	27	0921	A	30.40972	81.36934	FL	SEUS	BODO, W/CALF, WH CHN
	2009Calfof1142	2009	2	27	0921	B	30.40972	81.36934	FL	SEUS	BODO, CALF W/MOM, WH CHN
		2009	2	27	0939	C	30.28765	81.25383	FL	SEUS	
		2009	2	27	0943	D	30.3208	81.2443	FL	SEUS	SAG
		2009	2	27	0943	E	30.3208	81.2443	FL	SEUS	SAG
		2009	2	27	0943	F	30.3208	81.2443	FL	SEUS	SAG
		2009	2	27	0943	G	30.3208	81.2443	FL	SEUS	SAG
		2009	2	27	0943	H	30.3208	81.2443	FL	SEUS	SAG
		2009	2	27	0943	I	30.3208	81.2443	FL	SEUS	SAG

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	2	27	0943	J	30.3208	81.2443	FL	SEUS	SAG
		2009	2	27	0943	K	30.3208	81.2443	FL	SEUS	SAG
		2009	2	27	0950	L	30.40798	81.25314	FL	SEUS	LBTL
		2009	2	27	0955	M	30.39267	81.25845	FL	SEUS	BOD CNT
		2009	2	27	0955	N	30.39267	81.25845	FL	SEUS	BLK CHN, BOD CNT, UW EXH
1817		2009	2	27	1032	O	30.2945	81.05348	FL	SEUS	W/CALF
	2009Calfof1817	2009	2	27	1032	P	30.2945	81.05348	FL	SEUS	CALF W/MOM
3101		2009	2	27	1106	Q	30.32722	81.14138	FL	SEUS	W/CALF
	2009Calfof3101	2009	2	27	1106	R	30.32722	81.14138	FL	SEUS	CALF W/MOM
1303		2009	2	27	1118	S	30.33002	81.11123	FL	SEUS	BOD CNT, W/CALF
	2009Calfof1303	2009	2	27	1118	T	30.33002	81.11123	FL	SEUS	BOD CNT, CALF W/MOM, WH BEL, WH CHN
2108		2009	2	27	1131	U	30.30825	81.15948	FL	SEUS	NURS, W/CALF
	2009CalfOf3108	2009	2	27	1131	V	30.30825	81.15948	FL	SEUS	CALF W/MOM, NURS
2320		2009	2	27	1157	W	30.3723	81.34818	FL	SEUS	W/CALF
	2009Calfof2320	2009	2	27	1157	X	30.3723	81.34818	FL	SEUS	CALF W/MOM
1142		2009	2	27	1222	Y	30.40685	81.35297	FL	SEUS	W/CALF
	2009Calfof1142	2009	2	27	1222	Z	30.40685	81.35297	FL	SEUS	CALF W/MOM
1142		2009	2	27	1306	AA	30.39647	81.35225	FL	SEUS	W/CALF

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
	2009CalfOf1142	2009	2	27	1306	BB	30.39647	81.35225	FL	SEUS	CALF W/MOM, WH CHN
2503		2009	2	27	1415	CC	30.67398	81.40343	FL	SEUS	W/CALF
	2009CalfOf2503	2009	2	27	1415	DD	30.67398	81.40343	FL	SEUS	CALF W/MOM
		2009	2	27	1445	EE	30.7605	81.26475	GA	SEUS	SAG
		2009	2	27	1445	FF	30.7605	81.26475	GA	SEUS	SAG
		2009	2	27	1445	GG	30.7605	81.26475	GA	SEUS	SAG
		2009	2	27	1445	HH	30.7605	81.26475	GA	SEUS	SAG
		2009	2	27	1445	II	30.7605	81.26475	GA	SEUS	SAG
1281		2009	2	27	1636	KK	30.4669	81.21227	FL	SEUS	W/CALF
	2009CalfOf1281	2009	2	27	1636	LL	30.4669	81.21227	FL	SEUS	CALF W/MOM
		2009	2	28	0928	A	30.2962	81.13609	FL	SEUS	BLK BEL, MALE, SAG
		2009	2	28	0928	B	30.2962	81.13609	FL	SEUS	BLK BEL, BLK CHN, FCL, SAG
		2009	2	28	0928	C	30.2962	81.13609	FL	SEUS	SAG, WH BEL
		2009	2	28	0928	D	30.2962	81.13609	FL	SEUS	SAG
1246		2009	2	28	0933	F	30.30704	81.1282	FL	SEUS	W/CALF
	2009CalfOf1246	2009	2	28	0933	G	30.30704	81.1282	FL	SEUS	CALF W/MOM
2145		2009	2	28	0950	H	30.30857	81.12759	FL	SEUS	NURS, W/YRLG
	2009CalfOf2145	2009	2	28	0950	I	30.30857	81.12759	FL	SEUS	CALF W/MOM, NURS

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
3290		2009	2	28	1020	J	30.32915	81.32624	FL	SEUS	W/CALF, WH CHN
	2009CalfOf3290	2009	2	28	1020	K	30.32915	81.32624	FL	SEUS	CALF W/MOM, WH CHN
1310		2009	2	28	1054	L	30.4566	81.39973	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1310	2009	2	28	1054	M	30.4566	81.39973	FL	SEUS	BOD CNT, CALF W/MOM
2503		2009	2	28	1113	N	30.66887	81.13117	FL	SEUS	LBTL, W/CALF
	2009Calfof2503	2009	2	28	1113	O	30.66887	81.13117	FL	SEUS	CALF W/MOM
2145		2009	3	5	1000	A	30.77638	81.38126	GA	SEUS	BOD CNT, W/CALF
	2009CalfOf2145	2009	3	5	1000	B	30.77638	81.38126	GA	SEUS	BOD CNT, CALF W/MOM, MALE, WH BEL, WH CHN
		2009	3	5	1201	C	31.13772	81.1249	GA	SEUS	
2145		2009	3	5	1504	D	30.74433	81.4269	GA	SEUS	W/CALF
	2009CalfOf2145	2009	3	5	1504	E	30.74433	81.4269	GA	SEUS	CALF W/MOM
2145		2009	3	6	0930	A	30.69198	81.29407	FL	SEUS	W/CALF
	2009CalfOf2145	2009	3	6	0930	B	30.69198	81.29407	FL	SEUS	CALF W/MOM, WH CHN
2123		2009	3	6	1013	C	30.79416	81.30168	GA	SEUS	NURS, W/CALF, WH CHN
	2009Calfof2123	2009	3	6	1013	D	30.79416	81.30168	GA	SEUS	CALF W/MOM, NURS, WH CHN
1612		2009	3	6	1033	E	30.789	81.00684	GA	SEUS	W/CALF
	2009Calfof1612	2009	3	6	1033	F	30.789	81.00684	GA	SEUS	CALF W/MOM
1281		2009	3	6	1107	G	30.8574	81.07024	GA	SEUS	W/CALF

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
	2009CalfOf1281	2009	3	6	1107	H	30.8574	81.07024	GA	SEUS	CALF W/MOM
		2009	3	6	1217	I	31.06673	81.1599	GA	SEUS	SUB TR
		2009	3	6	1511	J	31.37502	80.95872	GA	SEUS	
1315		2009	3	7	0923	A	30.25763	81.33748	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1315	2009	3	7	0923	B	30.25763	81.33748	FL	SEUS	BOD CNT, CALF W/MOM
3101		2009	3	7	0932	C	30.28318	81.25477	FL	SEUS	NURS, W/CALF
	2009CalfOf3101	2009	3	7	0932	D	30.28318	81.25477	FL	SEUS	CALF W/MOM, NURS
1204		2009	3	7	1041	E	30.44905	81.16153	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1204	2009	3	7	1041	F	30.44905	81.16153	FL	SEUS	BOD CNT, CALF W/MOM
2791		2009	3	7	1041	G	30.4462	81.15773	FL	SEUS	W/CALF
	2009CalfOf2791	2009	3	7	1041	H	30.4462	81.15773	FL	SEUS	CALF W/MOM
1515		2009	3	7	1131	I	30.47372	81.03615	FL	SEUS	BOD CNT, W/CALF
	2009calfOf1515	2009	3	7	1131	J	30.47372	81.03615	FL	SEUS	BOD CNT, CALF W/MOM
1303		2009	3	7	1154	K	30.52675	81.0765	FL	SEUS	NURS, W/CALF
	2009CalfOf1303	2009	3	7	1154	L	30.52675	81.0765	FL	SEUS	CALF W/MOM, NURS
		2009	3	7	1214	M	30.60365	81.29298	FL	SEUS	BOD CNT
		2009	3	7	1214	N	30.60365	81.29298	FL	SEUS	BOD CNT
2791		2009	3	7	1242	O	30.46015	81.14973	FL	SEUS	NURS, W/CALF

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
	2009Calfof2791	2009	3	7	1242	P	30.46015	81.14973	FL	SEUS	CALF W/MOM, NURS
1204		2009	3	7	1246	Q	30.46118	81.1407	FL	SEUS	BOD CNT, W/CALF
	2009Calfof1204	2009	3	7	1246	R	30.46118	81.1407	FL	SEUS	BOD CNT, CALF W/MOM
2611		2009	3	7	1253	S	30.57722	81.1293	FL	SEUS	W/CALF
	2009CalfOf2611	2009	3	7	1253	T	30.57722	81.1293	FL	SEUS	CALF W/MOM
		2009	3	7	1312	U	30.63228	80.85928	FL	SEUS	W/CALF UNPH
		2009	3	7	1312	V	30.63228	80.85928	FL	SEUS	
		2009	3	7	1446	W	30.65142	81.31948	FL	SEUS	BOD CNT
		2009	3	7	1446	X	30.65142	81.31948	FL	SEUS	BOD CNT
2145		2009	3	7	1457	Y	30.68277	81.08145	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf2145	2009	3	7	1457	Z	30.68277	81.08145	FL	SEUS	BOD CNT, CALF W/MOM, WH CHN
1204		2009	3	8	0957	A	30.83813	81.0189	GA	SEUS	BOD CNT, W/CALF
	2009Calfof1204	2009	3	8	0957	B	30.83813	81.0189	GA	SEUS	BOD CNT, CALF W/MOM
		2009	3	8	1022	C	30.78625	80.93415	GA	SEUS	
2145		2009	3	8	1111	D	30.78625	80.93415	GA	SEUS	BOD CNT, W/CALF
	2009CalfOf2145	2009	3	8	1111	E	30.7165	81.1796	GA	SEUS	BOD CNT, CALF W/MOM, ROLL, WH BEL, WH CHN
2611		2009	3	8	1156	F	30.62755	81.21781	FL	SEUS	W/CALF
	2009CalfOf2611	2009	3	8	1156	G	30.62755	81.21781	FL	SEUS	CALF W/MOM

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
		2009	3	8	1204	H	30.61595	81.12418	FL	SEUS	SAG
		2009	3	8	1204	I	30.61959	81.12755	FL	SEUS	SAG
	BK01BOF07	2009	3	8	1204	J	30.61595	81.12755	FL	SEUS	SAG
		2009	3	8	1204	K	30.61595	81.12755	FL	SEUS	SAG
		2009	3	8	1219	L	30.63587	81.12418	FL	SEUS	
		2009	3	8	1238	M	30.61489	80.97034	FL	SEUS	
2791		2009	3	8	1301	N	30.58527	81.07333	FL	SEUS	NURS, W/CALF
	2009CalfOf2791	2009	3	8	1301	O	30.58527	81.07333	FL	SEUS	CALF W/MOM, NURS
1315		2009	3	8	1626	P	30.5203	81.10986	FL	SEUS	W/CALF
	2009CalfOf1315	2009	3	8	1626	Q	30.5203	81.10986	FL	SEUS	BLK CHN, CALF W/MOM, CHN BRCH
1233		2009	3	9	1147	A	30.57675	81.16531	FL	SEUS	NURS, W/CALF
	2009CalfOf1233	2009	3	9	1147	B	30.57675	81.16531	FL	SEUS	CALF W/MOM, NURS
2791		2009	3	9	1206	C	30.69688	81.1484	FL	SEUS	W/CALF
	2009CalfOf2791	2009	3	9	1206	D	30.69688	81.1484	FL	SEUS	CALF W/MOM
3317		2009	3	9	1209	E	30.62932	81.12617	FL	SEUS	W/CALF
	2009CalfOf3317	2009	3	9	1209	F	30.62932	81.12617	FL	SEUS	CALF W/MOM
1315		2009	3	9	1405	G	30.48452	81.97548	GMEX	SEUS	BOD CNT, W/CALF
	2009CalfOf1315	2009	3	9	1405	H	30.48452	81.97548	GMEX	SEUS	BOD CNT, CALF W/MOM

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
1303		2009	3	9	1502	I	30.38292	81.1623	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1303	2009	3	9	1502	J	30.38292	81.1623	FL	SEUS	BOD CNT, CALF W/MOM, WH CHN
		2009	3	10	1011	A	30.39938	81.07445	FL	SEUS	NURS, W/CALF
		2009	3	10	1011	B	30.39938	81.07445	FL	SEUS	CALF W/MOM, WH CHN
		2009	3	10	1038	C	30.40005	81.0682	FL	SEUS	W/CALF
		2009	3	10	1038	D	30.40005	81.0682	FL	SEUS	CALF W/MOM
		2009	3	10	1109	E	30.49765	80.9814	FL	SEUS	BLK BEL, BLK CHN, BOD CNT, W/CALF
		2009	3	10	1109	F	30.49765	80.9814	FL	SEUS	BOD CNT, CALF W/MOM
		2009	3	10	1202	G	30.62702	81.12743	FL	SEUS	NURS, W/CALF
		2009	3	10	1202	H	30.62702	81.12743	FL	SEUS	CALF W/MOM, NURS
		2009	3	10	1420	I	30.66737	80.97805	FL	SEUS	BOD CNT, W/CALF
		2009	3	10	1420	J	30.66737	80.97805	FL	SEUS	BOD CNT, CALF W/MOM
		2009	3	10	1458	K	30.76197	81.08621	GA	SEUS	W/CALF
		2009	3	10	1458	L	30.76197	81.08621	GA	SEUS	CALF W/MOM, WH CHN
		2009	3	11	1720	A	30.77167	81.13427	GA	SEUS	
		2009	3	11	1720	B	30.77167	81.13427	GA	SEUS	
3290		2009	3	11	1728	C	30.77743	80.97702	GA	SEUS	W/CALF, WH CHN
	2009CalfOf3290	2009	3	11	1728	D	30.77743	80.97702	GA	SEUS	CALF W/MOM, WH CHN

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
2791		2009	3	11	1752	E	30.82575	81.16452	GA	SEUS	BOD CNT, W/CALF
	2009CalfOf2791	2009	3	11	1752	F	30.82575	81.16452	GA	SEUS	BOD CNT, CALF W/MOM
1315		2009	3	12	0931	A	30.6664	81.41897	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1315	2009	3	12	0931	B	30.6664	81.41897	FL	SEUS	BOD CNT, CALF W/MOM
		2009	3	12	1016	C	30.64445	81.2347	FL	SEUS	BLK BEL, BLK CHN, BRCH, FLIP, LBTL, MOPN, POST
1303		2009	3	12	1109	D	30.53414	81.12199	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1303	2009	3	12	1109	E	30.53414	81.12199	FL	SEUS	BOD CNT, CALF W/MOM, WH BEL, WH CHN
2791		2009	3	15	1449	A	30.46642	81.22179	FL	SEUS	NURS, W/CALF
	2009CalfOf2791	2009	3	15	1449	B	30.46642	81.22179	FL	SEUS	CALF W/MOM, NURS
1233		2009	3	15	1544	C	30.62503	81.3157	FL	SEUS	W/CALF
	2009CalfOf1233	2009	3	15	1544	D	30.62503	81.3157	FL	SEUS	CALF W/MOM
3317		2009	3	16	1243	A	30.78985	81.2907	GA	SEUS	NURS, W/CALF
	2009CalfOf3317	2009	3	16	1243	B	30.78985	81.2907	GA	SEUS	CALF W/MOM, NURS
2791		2009	3	16	1430	C	30.4728	81.28157	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf2791	2009	3	16	1430	D	30.4728	81.28157	FL	SEUS	BOD CNT, CALF W/MOM
1315		2009	3	19	1054	A	30.70367	81.36301	FL	SEUS	W/CALF
	2009CalfOf1315	2009	3	19	1054	B	30.70367	81.36301	FL	SEUS	CALF W/MOM
1315		2009	3	19	1145	C	30.70123	81.36104	FL	SEUS	BOD CNT, W/CALF

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
	2009CalfOf1315	2009	3	19	1145	D	30.70123	81.36104	FL	SEUS	BOD CNT, CALF W/MOM
		2009	3	19	1215	E	30.61223	81.15897	FL	SEUS	
		2009	3	19	1259	F	30.54438	81.27534	FL	SEUS	SAG
		2009	3	19	1259	G	30.54438	81.27534	FL	SEUS	SAG
		2009	3	19	1259	H	30.54438	81.27534	FL	SEUS	BEL/BEL, SAG
		2009	3	19	1313	I	30.5378	81.26808	FL	SEUS	
		2009	3	19	1440	J	30.52792	81.28527	FL	SEUS	SAG
		2009	3	19	1440	K	30.52792	81.28527	FL	SEUS	SAG
		2009	3	19	1440	L	30.52792	81.28527	FL	SEUS	SAG
		2009	3	19	1440	M	30.52792	81.28527	FL	SEUS	SAG
2791		2009	3	19	1445	N	30.51767	81.25307	FL	SEUS	BOD CNT, W/CALF
	2009Calfof2791	2009	3	19	1445	O	30.51767	81.25307	FL	SEUS	BOD CNT, CALF W/MOM
1233		2009	3	19	1516	P	30.5066	81.18885	FL	SEUS	BOD CNT, W/CALF
	2009CalfOf1233	2009	3	19	1516	Q	30.5066	81.18885	FL	SEUS	BOD CNT, CALF W/MOM
3317		2009	3	20	1752	A	30.37232	81.16325	FL	SEUS	BOD CNT, W/CALF
	2009Calfof3317	2009	3	20	1752	B	30.37232	81.16325	FL	SEUS	BOD CNT, CALF W/MOM
1233		2009	3	23	1659	A	30.4509	81.15024	FL	SEUS	W/CALF
	2009CalfOf1233	2009	3	23	1659	B	30.4509	81.15024	FL	SEUS	CALF W/MOM

APPENDIX 2

Right Whale Catalog Number	Intermatch Code	Year	Month	Day	Time (L)	Letter	Latitude	Longitude	Area	Region	Behaviors
1233		2009	3	24	1410	A	30.64245	81.14098	FL	SEUS	W/CALF
	2009CalfOf1233	2009	3	24	1410	B	30.64245	81.14098	FL	SEUS	CALF W/MOM
1303		2009	3	30	1245	A	30.81348	80.82149	GA	SEUS	W/CALF
	2009Calfof1303	2009	3	30	1245	B	30.81348	80.82149	GA	SEUS	CALF W/MOM