

**Aerial Surveys for Ship Strike Mitigation and Other Field Observations of North Atlantic
Right Whales (*Eubalaena glacialis*) off the East Coast of Florida
December 2008-March 2009**

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TABLE OF CONTENTS

INTRODUCTION	3
METHODS	6
<i>AERIAL SURVEYS</i>	6
<i>DATA COLLECTION</i>	7
<i>WHALE/SHIP INTERACTION DOCUMENTATION</i>	9
RESULTS	10
<i>AERIAL SURVEY</i>	10
<i>WHALE/SHIP INTERACTION DOCUMENTATION</i>	10
EVENTS	12
<i>DISENTANGLEMENT RESPONSES</i>	12
<i>STRANDING RESPONSES</i>	15
<i>OTHER</i>	15
DISCUSSION	17
WORKS CITED	19
ACKNOWLEDGEMENTS	21
LIST OF FIGURES	
FIGURE 1: EWS AERIAL SURVEY TRACKLINE MAP	22
FIGURE 2: FWRI SEWS SURVEY TRACKLINE EFFORT MAP	23
FIGURE 3: FWRI SURVEY EFFORT BY BEAUFORT SEA STATE	24
FIGURE 4: FWRI AERIAL SURVEY RIGHT WHALE SIGHTINGS MAP	25
FIGURE 5: FWRI SIGHTINGS, TOTAL WHALES, AND MOM/CALF PAIRS BY WEEK	26
FIGURE 6: FWRI SIGHTINGS AND TOTAL WHALES PER EFFORT BY WEEK	26
FIGURE 7: FWRI AERIAL SURVEY MONTHLY RIGHT WHALE SIGHTINGS MAP	27
FIGURE 8: PERPENDICULAR SIGHTING DISTANCE BY BEAUFORT SEA STATE	28
FIGURE 9: BREAK TRACK SIGHTING DISTANCE BY BEAUFORT SEA STATE	28
FIGURE 10: DEMOGRAPHICS OF CATALOGED AND KNOWN INTERMATCH WHALES	29
FIGURE 11: SEUS WHALE/VESSEL INTERACTIONS MAP	30
FIGURE 12: EXPANDED WHALE ALERT GEOGRAPHIC “BINS” MAP	31
LIST OF TABLES	
TABLE 1: SURVEY WAYPOINTS AND NAUTICAL MILEAGE	32
TABLE 2: FWRI AERIAL SURVEY ACTIVITIES	33
TABLE 3: FWRI AERIAL SURVEY SIGHTINGS	40
TABLE 4: FWRI WHALE/VESSEL INTERACTIONS	51
TABLE 6: FWRI OPPORTUNISTIC LAND-BASED SIGHTINGS	54
TABLE 7: LIST OF ACRONYMS	55
LIST OF APPENDICES	
APPENDIX 1: WHALE ALERT GEOGRAPHIC “BINS” MAP	56

INTRODUCTION

The North Atlantic right whale (*Eubalaena glacialis*) is among the rarest of all large whales with an estimated population of less than 400 individuals (Right Whale Consortium 2007, NMFS, 2009). Hunted to near extinction, the population has shown little or no signs of recovery since receiving international protection from commercial whaling in 1935 and federal protection under the Endangered Species Conservation Act in 1970 and, subsequently, the Marine Mammal Protection Act in 1972 and Endangered Species Act in 1973 (NMFS, 2005). This lack of recovery is principally attributed to deaths from human related activities, mainly ship collisions and fishing gear entanglements (NMFS, 2005). Since the completion of the first Recovery Plan in 1991, efforts to protect right whales in the western North Atlantic have increased substantially to include Regional Recovery Plan Implementation Teams and the Atlantic Large Whale Take Reduction Team (ALWTRT). The National Marine Fisheries Service (NMFS), in collaboration with the Southeastern U.S. Right Whale Recovery Plan Implementation Team (SEIT) and ALWTRT, is continually assessing current right whale regulations and developing new recommendations and management techniques (NMFS, 2005). Despite these efforts, the number of right whales in the western North Atlantic stock is considered to be extremely low (NMFS, 2009). The mean annual mortality and serious injury rate for the right whale was 3.2 from 2001-2005 and among large whale species in the western North Atlantic, right whales had the highest proportion of entanglements and ship strikes relative to the number of reports for a species (Nelson et al., 2007).

Ship strikes are a major contributor to the overall mortality of right whales (Knowlton and Kraus, 2001). From 2003-2007 an average of 2.2 right whales were reportedly killed or seriously injured by ship strike (NMFS, 2009). Only a small number of whales in the Catalog of Identified Right Whales have scars from ship propellers; however, a large number of carcasses have ship propeller wounds (Kraus 1990). According to Kraus (1990), this indicates that a high proportion of collisions between whales and vessels are fatal. Pace and Silber (2005) reported the probability of serious injury or death increases rapidly with increasing vessel speed and most severe and lethal injuries caused by ship strikes occur when vessels are traveling at speeds greater than or equal to 14 knots (Laist et al., 2001, Jensen and Silber, 2003). Right whale mother/calf pairs in the Southeast U.S. (SEUS) are likely particularly susceptible to ship collisions because they spend a large amount of time near the surface and they may be limited by the calf's ability to dive and maneuver through the water (Ward-Geiger et al., 2005). There are four major ports within the SEUS calving area off Georgia and Florida; Brunswick, St. Mary's River, St. Johns River, and Port Canaveral. The of total vessel calls at JAXPORT in the St Johns River has increased 15% from 2004-2008 (Jacksonville Port Authority).

The SEUS is one of six major habitats identified for North Atlantic right whales (NMFS, 2009). The coastal waters of Georgia and northeastern Florida are the only known calving area (Kraus et al., 1993) though recent aerial survey data suggests that calving may occur as far north as Cape Fear, NC (NMFS, 2009). Calving occurs primarily from December through March (Kraus et al., 1986) and the SEUS wintering population consists mostly of mother/calf pairs, juveniles, and a few adult males and non-calving adult females. In 1994, NMFS designated the waters from 31°15N to 30°15N from the shoreline out to 15 nm and the waters from 30°15N to 28°00N from the shoreline out to five nm as critical habitat for the northern right whale. In addition, NMFS published the Right Whale Minimum Approach Regulation (1997), prohibiting all approaches (vessel, aircraft, or other means) within 500 yards of any right whale (NMFS, 2005). A Mandatory Ship Reporting System (MSRS) was federally implemented in the SEUS in

1999. The MSRS is endorsed by the International Maritime Organization (IMO) and requires all commercial vessels 300 gross tons or greater to report into a shore-based station when entering the designated right whale reporting area. In return, the vessels are provided with the latest right whale sighting locations and information on how to avoid collisions with right whales (NMFS, 2005). According to Ward-Geiger et al. (2005), the average reported speed of vessels entering the MSRS WHALESSOUTH area from 1999-2002 was 15.72 knots. In order to reduce the likelihood of vessel collisions with right whales, NMFS, in cooperation with the U.S. Coast Guard (USCG), instituted recommended vessel routes in November 2006 for three major ports in the SEUS: Brunswick, GA; Fernandina, FL; and Jacksonville, FL. The voluntary routes were printed on NOAA charts, described in NOAA's U.S. Coast Pilots, and published in the USCG's Local Notice to Mariners. In October 2008 the final Right Whale Ship Strike Reduction Rule, originally proposed by NMFS in 2006, was passed and became effective on December 9, 2008. The rule established a seasonal speed restriction of 10 knots for all vessels 65 ft in length or greater traveling in designated management areas during times when and areas where right whales occur along the U.S. East Coast including the SEUS MSRS and a portion of the northern right whale critical habitat. Additionally, NMFS may implement temporary "dynamic management areas" to protect right whale aggregations outside the designated seasonal management areas. The Southeast U.S. Seasonal Management Area (SMA) and MSRS are in effect from November 15th through April 15th; the time frame when right whales are typically found in the SEUS. The purpose of the rule is to decrease the number of deaths and serious injury cases resulting from vessel collisions with right whales. The effectiveness of the rule will be evaluated by NMFS prior to its expiration on December 9, 2013 (50 CFR Part 224, October 10, 2008).

During the 1993-1994 calving season, several agencies, including the Florida Fish and Wildlife Conservation Commission (FWC), began an extensive aerial survey network known as the Early Warning System (EWS), to reduce or eliminate ship strikes (NMFS, 2005). The EWS quickly provided valuable right whale sighting information to the U.S. Navy, USCG, U.S. Army Corp of Engineers, harbor pilots, and port authorities. The EWS was improved with the dissemination of information to the general public through USCG Broadcast Notices to Mariners (BNTM) and broadcasts over NOAA Weather Radio. With the incorporation of the Navy's Fleet Area Control and Surveillance Facility Jacksonville (FACSFACJAX) as the sighting collection and dissemination center for all aerial survey aircraft, right whale sighting information was processed and transmitted to mariners in near real-time. Further refinements to the EWS whale alert pager system during the 2007-2008 calving season allowed the aerial survey teams to target vessel operators in specific geographic locations; thus, providing vessel operators with the most applicable whale sighting information for their area of operation (Appendix 1). Presently, aerial surveys remain the best available method to detect right whales and alert mariners about the presence of right whales in the SEUS in order to reduce the risk of ship collisions with whales (NMFS, 2005). FWC's Fish and Wildlife Research Institute (FWRI) has been conducting right whale aerial surveys in the SEUS with varied coverage and effort since the late 1980's. The current three-plane EWS survey format was implemented during the 2002-2003 calving season. The FWRI provides aerial survey coverage of the southern portions of the EWS, SEUS critical habitat, MSRS, and SEUS SMA. Although ship strike mitigation remains the focal objective, the EWS surveys collect photo documentation of right whales; monitor vessel activity; and provide assistance during critical right whale events (such as disentanglements and strandings). The photographic data collected in the SEUS is used to assess demographics and survival estimates of right whales.

This report summarizes FWRI aerial survey data and other field observations for the 2008-2009 calving season. Funding for the FWRI aerial surveys was provided by NMFS.

METHODS

Aerial Surveys

The FWRI conducted daily right whale aerial surveys, weather permitting, during the period December 1, 2008, to March 31, 2009. The FWRI survey consisted of the ten southernmost east/west tracklines (lines #25-34) within the EWS framework (Table 1) and was referred to as the Southern EWS (SEWS). Typically flown from north to south, the tracklines covered the southern portions of the EWS, SEUS critical habitat, MSRS WHALESSOUTH area, and SEUS SMA from Ponte Vedra (30°14.0N) to Crescent Beach (29°47.0N) from approximately 0.5 nm east of the shoreline out to 080°47.0W (Figure 1). The SEWS survey configuration was consistent with previous EWS surveys carried out since the winter of 2003-2004. In conjunction with the SEWS surveys, the FWRI also conducted coastal surveys consisting of south/north transects of varying lengths flown parallel to the coast approximately one nautical mile and three nautical miles offshore respectively. These surveys were flown opportunistically as survey time allowed and in response to reported right whale sightings south of Crescent Beach (29°47.0N).

The survey aircraft were twin engine Cessna 337s operated and maintained by Orion Aviation under provisions of FAA 14 CFR Part 135. In accordance with FAA 14 CFR Part 135 and additional NOAA requirements, the aircraft were equipped with: IFR certification, yoke mounted GPS unit, Emergency Locator Transmitter (ELT), Automatic Flight Following (AFF) transponder, 2-B:C rating fire extinguisher, primary and secondary VHF radios, marine band radio with linkage to intercom system, DC power for observer tablet PC, additional GPS with direct linkage to the tablet PC, and extended over water operations emergency equipment as listed in 14 CFR Part 135.167 including a registered 406 MHz emergency position indicator radio beacon (EPIRB) and an inflatable life raft. Aerial observers were required to wear a Nomex flight suit and an aviation style personal flotation device (PFD) equipped with a safety knife, signaling mirror, high-pitch safety whistle, strobe light, streamer, and a McMurdo Fastfind Plus 406 MHz personal EPIRB with built in GPS receiver. Prior to the start of the season aerial observers were required to attend an aircraft ditching course and complete an online NOAA aircraft safety course. Surveys were flown under visual flight rules (VFR) conditions and a flight plan was filed with the FAA for each day of survey. Aircraft typically departed the airport at 0900 hrs and returned before sunset. In addition, flights were required not to extend beyond 45 minutes reserve fuel. Environmental conditions necessary to conduct a survey included visibility greater than three nautical miles (nm), winds less than seventeen knots, a minimum ceiling of 1200 ft over the survey area and airport, and sea state of Beaufort five or less. A sea state of Beaufort three or less was preferred because the detectability of whales has been shown to decrease in sea states greater than a Beaufort three (Hain et al., 1999).

Survey protocols are outlined in Scott and Gilbert (1982) for the Cetacean and Turtle Assessment Program (CeTAP 1982). The aircraft flew at a target speed of 100 kts and a height of 1000 ft. In order to take into account aircraft fluctuations a speed threshold of 200 kts and an allowable height range of 800 ft-1200 ft were set. Survey personnel included a pilot-in-command (PIC), pilot-second-in-command (SIC), and two observers. One observer sat on each side of the aircraft and visually scanned the survey area out to approximately two nautical miles. Typically the observer seated in the left rear seat recorded data and the observer seated in the right rear seat conducted photo-identification during a sighting.

Data Collection

The survey crew used a Fujitsu ST5000 tablet PC to collect electronic data while in the aircraft. The tablet PC was small enough to comfortably sit in an observer's lap without obscuring his/her field of vision or presenting a safety hazard. Survey data were recorded at 30 second time intervals in Logger 2000, a computer-based data logging program, which automatically retrieved locations, headings, and altitudes from the GPS and stored them in an Access database. The use of the tablet PC and several drop-down options in Logger 2000 allowed for swift data entry and minimized the time spent looking away from the water. However, if the GPS or computer malfunctions, locations, headings, and altitudes were hand recorded at intervals of five minutes on hard copy datasheets and later entered into an Excel spreadsheet.

Environmental data entered into the database consisted of weather, visibility, cloud cover, Beaufort sea state, and the severity of the glare on both sides of the plane. Environmental data were updated throughout the survey when conditions changed. Large whale sighting observations included the initial and final sighting locations, number of whales per sighting, number of calves per sighting, heading, behaviors, observer reliability (measure of certainty of whale identification,) and confidence (measure of certainty of number of whales observed.) Observed vessel information included type of vessel, location, heading, length, and speed. The vessel location was mainly recorded by flying directly over the vessel to obtain a GPS location. If the aircraft was unable to fly directly over a vessel the distance was estimated visually by the observers. Commercial vessels 100 ft or larger, tugs, and military/USCG vessels sighted within 2 nm of the tracklines or any vessel involved in a whale/vessel interaction were recorded. The heading, length, and speed of the vessels were verified by the use of an onboard class B AIS (Automatic Identification System) transponder. All aerial survey AIS data were submitted to FWRI GIS staff for analysis and archived.

Access macros developed by FWRI staff were used to scan the survey data for errors and compliance with the guidelines set by the North Atlantic Right Whale Consortium Database (NARWD) Manager. The data were then exported to Excel format for final submission to the NARWD Manager. A spreadsheet developed to track the sighting distance between the aircraft and whale(s) was maintained by the FWRI survey team and provided to FWRI GIS staff for analysis at the end of the season. In addition to the electronic data collected, hard copy data sheets were compiled. Cover sheet information included the survey crew, flight hours, nautical miles flown, environmental data, and summary of the day's sightings and events. Whale sighting sheets included a drawing of the callosity patterns of whale(s) seen, initial and final sighting times and locations, behaviors, and ancillary photography information (such as images taken.)

The EWS whale alert pager network facilitated the near real time transmission of right whale sighting information via email, text message, and alphanumeric pager system to the U.S. Navy, USCG NAVTEX, harbor pilots, commercial shipping industries, aerial survey teams, NOAA, state agencies, and volunteer networks. The FWRI aerial survey team used satellite phone or marine band VHF radio to relay the date, final sighting time and position, number of whales, number of calves, and heading to the FWRI ground contact. The ground contact was then responsible for sending the whale alert via email to the EWS network and following up with any reporting errors. Whale sighting location details were kept to a minimum when using marine band VHF radio in order to avoid potential harassment of whales by vessel operators in the

surrounding area. The FWRI ground contact was also responsible for: entering FWRI sightings into the MSRS WHALESSOUTH database within an hour of each sighting; maintaining a near real time knowledge of the position and maneuvers of the aircraft during survey; and acting as a liaison between ground crews and the aircraft during entanglement, stranding, or other events.

FWRI prepared and submitted weekly performance reports to NOAA Fisheries. The weekly reports consisted of a survey activities report and a right whale sightings report. The survey activities report included: survey date, survey file name, completed tracklines, aircraft Hobbs time elapsed, total trackline nautical miles flown, total trackline nautical miles flown in sea state ≤ 3 , number of whales seen, and any other pertinent right whale related information. The right whale sightings report included: survey date, time (local), survey name, latitude (in decimal degrees), longitude (in decimal degrees), RIWH letter (from photography datasheets), NARWC ID number (as this information becomes available from the NARWC manager), time sightings were reported the EWS network, whale alert ID number, and comments.

Sighting Distance

The sighting distance is the measurement from the presumed location of the aircraft when the observer first sighted a whale or group of whales to the initial sighting location of the whale or group of whales. For the purposes of this report the sighting distance was calculated in two ways: perpendicular and break track position. The perpendicular sighting distance is the measurement from the right whale sighting location to the closest point on the survey trackline. It is a conservative estimate that assumes the plane was flying exactly on the trackline and the whale was sighted exactly abeam the survey plane. The break track sighting distance is the straight-line measurement from the right whale sighting location to the GPS location of the aircraft recorded by the observers at the time the survey plane broke from trackline to mark the position of the whale sighting. In both methods, only sightings observed while on trackline were used to calculate the average sighting distance.

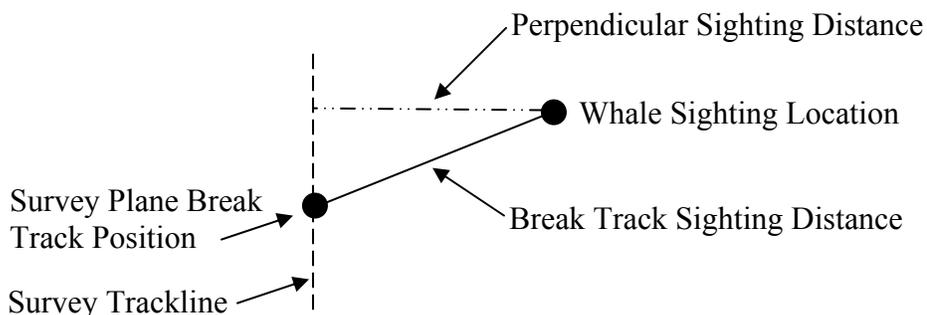


Photo-identification

Individual right whales were identified by the location, shape, and topography of the callosities that occur along the rostrum (Crone and Kraus 1990). In addition, Hamilton and Martin (1999) note that callosities on the upper margins of the lower jaw (known as lip callosities), behind the blowholes, on the chin, along the mandible, and above the eye are key marks to help identify individual whales. White scars from past entanglements, vessel strikes, and other causes rarely fade over time and become unique characteristics (Hamilton and Martin 1999). Crenations along the lower lip (also called lip ridges) can be distinctive and were particularly useful in the identification of calves because the callosity patterns of calves are not fully developed until they are 7-12 months old (Hamilton and Martin 1999).

During the 2008-2009 calving season, FWRI aerial photographs were taken with a Canon EOS 40D Digital SLR camera equipped with a Canon EF 100-400mm f/4.5-5.6L IS USM lens. A Canon EOS 20D Digital SLR camera was utilized as a backup camera. Digital format cameras allowed for expeditious image review in the aircraft and also allowed FWRI to easily share image files with the New England Aquarium (NEAq), NOAA Fisheries, Provincetown Center for Coastal Studies (PCCS) disentanglement team, and other collaborators throughout the calving season.

When right whale sightings occurred the survey plane would break from trackline and fly directly over the whale(s) to obtain an accurate GPS position. The observer on the right side of the aircraft photographed the whale(s) through the opened right rear window. Photographs were taken on the Tv (shutter priority) function with a shutter speed of 1000 (decreased in low light). Whenever feasible, priority was given to obtain a full top view head shot of the whale(s) in order to document a full set of callosities. Once the callosities were fully recorded, photographs of the body and fluke were attempted in order to document any scars and the overall body condition of the whale. A twenty minute time limit was set to photograph small groups of whales in order to ensure adequate time to finish the survey. Larger (less common) groups of whales were allotted more time as long as it did not jeopardize the completion of the survey.

The FWRI aerial survey team reviewed all new FWRI images throughout the season and made preliminary matches to the catalog of identified right whales. Representative images and preliminary identifications for each whale were forwarded to NEAq for preliminary confirmation or assistance with identification if needed. During the 2005-2006 season FWRI created and has since maintained a website that combines images and preliminary whale identifications from all SEUS aerial survey teams. The significant contributions of the aerial survey teams, NEAq, and volunteer sighting networks to the website in recent years have facilitated the ability of survey teams to make more preliminary whale identifications (especially of juvenile whales not yet cataloged). The website has also helped to enhanced communication among survey teams, biopsy crew members, and volunteer sighting networks not only in the SEUS, but throughout right whale habitat.

At the end of the season photographs and sighting data (including whale behaviors, associations, and frame numbers) were submitted to NEAq in accordance with the data and photographic submission guidelines. As the curators of the North Atlantic Right Whale Catalog, NEAq will confirm the final identification of each whale and format the submitted images for inclusion in the North Atlantic Right Whale Identification Database – the central repository for archiving and maintaining images and sighting data on right whales.

Whale/Vessel Interaction Documentation

Prior to the beginning of the 2005-2006 season, FWRI staff in collaboration with all aerial survey teams, NOAA Fisheries, and NOAA law enforcement created a whale/vessel interaction (WVI) form for use by the aerial survey teams. The enhanced form standardized the data collection of all whale/vessel interactions among various teams and facilitated a detailed account of these incidents. Since the 2006-2007 calving seasons this updated form has been used by all aerial survey teams in the SEUS to record observed co-occurrences of right whales and vessels including 500 yard rule violations. All WVI forms were forwarded to NOAA Fisheries and FWRI where they were combined into one database and mapped.

RESULTS

Aerial Survey

The FWRI aerial survey team flew 61 surveys of varying coverage out of an available 121 days between December 1, 2008 and March 31, 2009 (Table 2). Thirty-seven full SEWS surveys (281.6nm each), twelve partial SEWS surveys, six two-plane contingency plan surveys, and six disentanglement support surveys were completed for a total of 326.9 hours and 14,176 nautical miles flown. Four of the six two-plane contingency plan surveys were also partial SEWS surveys. Thus, the FWRI team flew at least a portion of the SEWS survey 44% of the available days (Figure 2) and ninety-eight percent of FWRI surveys were flown during favorable sea state conditions of Beaufort sea state 3 or less (Figure 3). The majority of partial surveys resulted from poor weather conditions; however, five surveys were shortened because of disentanglement support and two-plane contingency surveys. Six opportunistic coastal surveys of varying distances were flown in conjunction with the SEWS survey.

The first right whale sighting in the SEWS occurred on December 18, 2008 and the last was on March 25, 2009. The FWRI aerial survey team had 169 sightings* consisting of 384 whales (not unique individuals) and sighted 31 of the 39 females observed with calves in the SEWS and Mid-Atlantic (Table 3). Of the 169 sightings, 74 were mother/calf pairs, 39 were single adults or juveniles (including pregnant females), 26 were pairs, and 30 were groups of three or more whales (Figure 4). The number of right whales observed gradually increased throughout December and January, peaked during the first week of February, and declined considerably during the second week in March (Figures 5 and 6). The FWRI team had 15 sightings of 26 whales in December, 36 sightings of 81 whales in January, 90 sightings of 219 whales in February, and 28 sightings of 58 whales in March (Figure 7). The number of right whale sightings per day ranged from one to twelve (February 1st) with as many as 26 whales sighted on a single day (February 6th). The average perpendicular sighting distance[†] was 0.80 nautical miles and the average sighting distance from the survey plane break track position was 1.3 nautical miles (Figures 8 and 9). Preliminary photo analysis indicates FWRI documented 119 individual right whales (excluding calves) of which 13 could be unique to the FWRI survey. Of the 119 individual whales sighted, 105 cataloged or known juvenile intermatch whales have been preliminarily matched to the North Atlantic Right Whale Catalog (Figure 10). The FWRI team also documented 47 leatherback turtles and a right whale calf carcass (see EVENTS - *EgNEFL0904*). No humpback whales were sighted during the 2008-2009 season.

Whale/Vessel Interaction Documentation

During the 2008-2009 season, the FWRI aerial survey team documented 20 whale/vessel interactions involving 12 groups of whales (Table 4). The types of vessels involved consisted of one commercial fishing (shrimp), 14 recreational, one car carrier, one cargo ship, one Jacksonville harbor pilot, and one tug and barge (Figure 11). The groups of whales involved

* A sighting is defined as any observed whale or group of whales at a given time and location. A sighting may consist of one or many whales; however, an individual whale may not be counted more than once during a sighting. An individual whale may be part of more than one sighting per day and/or more than one sighting over a period of many days throughout the calving season.

† See description of sighting distance provided in the *Methods* section.

consisted of five mother/calf pairs (milling, nursing, or swimming), three surface active groups (SAG), two pairs of whales (milling), one yearling whale (logging alone), and a 2 year old entangled whale (traveling alone). Fifteen vessels were observed within 500 yards of the whale(s) and the closest observed distance between the whale(s) and the vessel was three yards. During this particular interaction, no communication was established; however, based on observation it is believed that the recreational vessel operator was concentrating on avoiding a highly visible group of whales at the surface approximately 30 yards from the vessel and was not aware of his proximity to the separate group of subsurface whales three yards away. A behavioral reaction to the presence of the vessel was observed in five interactions and involved spinning, diving, and traveling away from the vessel. In all five interactions where a behavioral reaction was observed the vessel approached within 100 yards or less of the whale(s). Through observation and/or direct communication with the vessel, it was determined that six vessels intentionally approached whales. Observations that lead to this conclusion commonly included an abrupt change in vessel heading towards a whale or group of whales and/or repeated alternations of vessel speed between idle and forward motion that coincided with the surfacings and direction of travel of the whale(s). Five of the six interactions involved recreational vessels and one interaction occurred between a mother/calf pair near the Jacksonville shipping channel and a harbor pilot in the process of guiding two commercial vessels operating under restricted maneuverability into port.

EVENTS

Disentanglement Responses

Catalog #3294

On December 8, 2008 the CEWS aerial survey team sighted an entangled whale of unknown age and gender, Catalog #3294, approximately 11 nautical miles ENE of the St. Johns River entrance. Due to poor sea state conditions a vessel first response was not possible at the time of the initial sighting. The whale was observed trailing approximately 300ft of rope with tight wraps around the rostrum and body as well as a large patch of sloughing skin posterior to the body wrap. On December 18, 2008 the NEWS survey team resighted #3294 approximately 10 nautical miles east of the northern end of Cumberland Island, GA and disentanglement teams from Georgia and Florida responded. A telemetry buoy was successfully deployed by the Georgia DNR crew and a portion of the trailing rope was removed. On December 19, 2009 the FWRI and NEWS aerial survey teams flew a modified 2-plane contingency survey in search of #3294. The telemetry buoy, now adrift, was recovered with approximately 400ft of rope attached, but the whale was not sighted. On February 1, 2009 the CEWS aerial survey team resighted #3294 and a team from FWRI, NOAA Fisheries, and PCCS responded by vessel aboard R/V Orion. The on-water team determined the body and rostrum wraps were no longer present (although fresh scars remained) and the whale was likely gear-free. The FWRI survey team was enroute to relieve the CEWS survey team, but redirected after it was determined the disentanglement team was not in need of aerial support. All photographs and sighting data were submitted to NOAA Fisheries, NEAq, and PCCS.

2007 Calf Of Catalog #1701

On December 26, 2008 the FWRI aerial survey team sighted an entangled two year old right whale of unknown gender, the 2007CalfOf1701, approximately one nautical mile off Crescent Beach, FL. Due to fog and low visibility the FWRI team began survey on the southernmost trackline (29°47N) and did not take off until 1230(L). The whale was sighted heading south at 1241(L) just as the team turned east on their first trackline. The entanglement consisted of two loops of rope through the whale's mouth that joined on the back mid-body creating a bridle and approximately 400ft of trailing rope. The survey team relayed the sighting information to disentanglement first responders and NOAA Fisheries and continued to document the entanglement. Fog and low ceiling conditions to the north prevented the CEWS survey team from responding to relieve the FWRI team. Based on the whale's entanglement configuration and behavior and the plane's proximity to the airport, the survey team felt relocation of the whale was highly probable and departed for the airport with the intention of downloading photographs and refueling in order to later standby with the disentanglement first response team. Within an hour of departing the survey team relocated the entangled whale and vectored in FWRI and NEAq staff aboard R/V Orion. The vessel crew photo-documented the entanglement, attached a telemetry buoy, and cut off a portion of the entangling gear. On December 27, 2008 a disentanglement crew from FWRI, Georgia DNR, NEAq, and NOAA Fisheries departed from St. Augustine, FL. The FWRI aerial survey team located the 2007CalfOf1701 via VHF telemetry and stood by with the disentanglement team until cuts in the entangling rope were successfully made and the vessel crews departed the whale. The following day GPS data indicated the telemetry buoy was adrift off of Jacksonville and this was later visually confirmed by the CEWS aerial survey team. FWRI staff responded in R/V Orion to collect the buoy and any remaining gear attached. In total, approximately 680ft of rope was removed from the whale and it was sighted gear free approximately eight nautical miles off Jekyll Island, GA by the NEWS survey

team on January 4, 2009. The FWRI survey team later sighted the 2007CalfOf1701 within the SEWS area on January 14th and 18th traveling and socializing with other juvenile whales. All photographs and sighting data were submitted to NOAA Fisheries, NEAq, and PCCS.

2007 Calf Of Catalog #2614

The NEWS aerial survey team determined during photo analysis that one of the whales documented during survey on February 7, 2009 was entangled. The whale was sighted approximately 10 nautical miles east of the northern end of Cumberland Island, GA and had a thin black rope wrapped loosely around the rostrum with approximately 30ft of trailing rope. Working in collaboration with NEAq, FWRI staff had previously matched a sighting on January 5, 2009 off Flagler Beach, FL by the Marineland Right Whale Project of this whale to the 2007CalfOf2614, a two year old of unknown gender. This sighting narrowed the window of entanglement to approximately a month or less. On February 9, 2009 the NEWS survey team resighted the 2007CalfOf2614 off Cumberland Island and a disentanglement team from Georgia DNR responded and successfully attached a telemetry buoy. A multi-agency disentanglement team, including FWRI staff, launched from St. Catherine's Island, GA on February 12, 2009. The team was able to successfully cut the rostrum wrap leaving a short length of rope exiting the right side of the mouth. It is believed the whale will likely shed this portion of the rope over time without further intervention. The 2007CalfOf2614 was sighted feeding in Cape Cod Bay by the PCCS aerial survey team on March 10, 2009; however, it is unclear from available photo-documentation if the remaining portion of rope is still present.

Catalog #3420 "Platypus"

On January 31, 2009 the CEWS aerial survey team sighted an entangled five year old female whale, Catalog #3420 "Platypus", approximately 26 nautical miles east of the southern end Cumberland Island, GA. The FWRI survey team had cancelled survey for the day due to high sea state in the SEWS area, but responded to relieve the CEWS team and assist with disentanglement first response. The whale had rope exiting both sides of the mouth that joined together near the right flipper, at least a body length of trailing rope, and heavy peduncle scarring. The FWRI team intersected with the CEWS team approximately 20 nautical miles east of Amelia Island, FL. The whale continued to travel quickly to the south covering approximately 10 nautical miles in less than two hours and was approaching the recommended shipping lanes for the St. Johns River when the plane departed due to diminishing daylight. A first response team from Georgia DNR was able to successfully deploy a telemetry buoy; unfortunately, in the days that followed, the GPS fixes from the buoy were sparse and of low quality and prevented further disentanglement response. On February 1, 2009 the FWRI team flew a standard SEWS survey while listening with telemetry gear for the VHF signal of #3420's tag, but nothing was detected. The FWRI team attempted to fly a coastal survey to Canaveral in search of #3420 on February 2, 2009, but a fast approaching weather front caused the survey team to turn back north near Ponce Inlet. All photographs and sighting data were submitted to NOAA Fisheries, NEAq, and PCCS. On February 12, 2009 good quality GPS fixes from the tag indicated it was adrift approximately 30 miles east of Point Pleasant, NJ. The buoy was subsequently recovered by the USCG with approximately 50ft of rope attached. On August 28, 2009 NEAq sighted #3420 during a vessel survey in the Bay of Fundy. Although not all body areas (e.g. the right flipper) were visible during the sighting, rope was not observed and it is possible the whale is gear-free.

Catalog #3311 "Bridle"

On January 14, 2009, approximately 15 nautical miles east of Brunswick, GA, the NEWS aerial survey team sighted an entangled whale, Catalog #3311 "Bridle". The 6 year old whale of

unknown gender was sighted with at least 4 trailing lines of rope, multiple ropes through the mouth that joined in a tangled mass on the whale's left side near the flipper, and ropes that were cutting into the rostrum and left lip. A first response team from Georgia DNR was able to successfully deploy a telemetry buoy. Telemetry data indicated the whale continued to move south throughout the night and on January 15, 2009 the FWRI aerial survey team located #3311 approximately 14 nautical miles east of Jacksonville Beach, FL. An on-water team from FWRI departed St. Augustine to further document the entanglement and adjust the telemetry buoy position if needed. Poor weather conditions prohibited a disentanglement response over the following days as the whale continued south towards Daytona Beach and then headed offshore before turning northbound. The FWRI aerial survey team relocated #3311 via VHF telemetry approximately 80 nautical miles east of Brunswick, GA on January 18, 2009 in order to verify and document the telemetry buoy attachment and entanglement configuration. On January 22, 2009 the FWRI aerial survey team relocated #3311 via VHF telemetry approximately 11 nautical miles east of Nassau Sound and stood by with the whale prior to and during the disentanglement response. A multi-agency disentanglement team, including FWRI staff, launched from Mayport, but attempts to cut the entangling ropes were unsuccessful due to the complex nature of the entanglement and persistent evasive behavior of the whale. The following day the FWRI aerial survey team again located #3311 via telemetry approximately six nautical miles off Ponte Vedra, FL and stood by for the on-water team enroute from St. Augustine. Disentanglement efforts, including the administration of sedatives, were again unsuccessful due to the whale's evasive behavior. On January 24, 2009 the FWRI aerial survey team flew a standard SEWS survey and detected #3311's VHF tag to the east of the survey area, but the team did not site the whale. Poor weather conditions and the whale's offshore location prevented disentanglement attempts in the coming days. On February 1, 2009 a disentanglement team from GDNR responded to the location of #3311 off southern Sapelo Island, GA. A number of disentanglement attempts were made, but the whale's continued evasive maneuvering prevented the team from making cuts. At this point, it was determined that the best chance for disentanglement of this whale would likely rely on successful sedation; however, sedation of a free-swimming large whale had never been accomplished. Over the next month #3311 traveled south to Palm Coast, FL; north to Block Island, RI; and south again to Florida where on March 4, 2009 the FWRI aerial survey team located the whale approximately 29 nautical miles off Ponte Vedra, FL. Despite poor sea state conditions the survey team was able to document the current entanglement configuration in preparation for planned disentanglement operations the following day. The survey team also documented the noticeable decline in the whale's skin condition and overall health since its last sighting. On March 5, 2009 the FWRI aerial survey team began a search for #3311 off Ponce Inlet while disentanglement crews were enroute to the projected location of the whale, but poor quality VHF signal hampered aerial tracking capabilities. The NEWS aerial survey team, scheduled to relieve the FWRI team, joined the search and later the FWRI team departed to begin two-plane contingency survey with the CEWS survey team. That afternoon the NEWS survey team eventually located #3311 and the on-water team quickly mobilized to make the most of the remaining daylight. The following day (March 6th) the FWRI survey team again flew a two-plane contingency survey while the NEWS survey team assisted with disentanglement efforts. The disentanglement team successfully administered sedatives to #3311 and for the first time was able to make directed approaches to cut the entangling rope on the whale's head without the whale diving to avoid the RHIB. Throughout the day's operations the majority of rope was removed from #3311 and the disentanglement crew determined the small portion of rope that remained would likely work free from the whale's mouth over time. Catalog #3311 has not been sighted since March 6, 2009, but despite its apparent health decline researchers are optimistic about this whale's potential for survival.

Catalog #3346 “Kingfisher”

Since his birth during the 2002-2003 calving season, Catalog #3346 “Kingfisher” has been sighted each winter in the SEUS calving ground. Kingfisher (#3346) was the target of a large scale disentanglement effort during the 2003-2004 calving season and since then has been observed with a portion of the entangling rope wrapped around his right flipper. The FWRI aerial survey team sighted #3346 in the SEWS area on February 10, 2009. Sighting data and photographs were forwarded to NOAA Fisheries, PCCS, and NEAq. No change in the configuration of #3346’s entanglement was apparent from the photographs and his entanglement status continues to be classified by the Atlantic Large Whale Disentanglement Network (ALWDN) as “monitor.”

Stranding Responses

EgNEFL0904

On February 17, 2009 at 1452(L) the FWRI aerial survey team sighted the carcass of a female right whale calf floating approximately 3.4 nautical miles off the Guana Tolomato Matanzas National Estuarine Research Reserve (GTM NERR) near Ponte Vedra, FL (Figure 4). The flukes and portions of the peduncle, lips, rostrum, and flippers were missing and a great white shark, *Carcharodon carcharias*, was observed scavenging the carcass. The survey team relayed the sighting information and continued on survey while FWRI staff responded aboard R/V Orion to the location of the carcass. FWRI staff arrived on scene with the carcass at 1650(L) at the same time the aerial survey team had relocated the carcass after completing survey. The carcass had drifted approximately 1.5 nautical miles north in approximately two hours. The aerial survey team did not standby and the vessel crew photographed and towed the carcass to the Vilano Boat Ramp where it was loaded into a trailer. The following morning FWRI staff transported the carcass to Jacksonville where staff also participated in the necropsy. The carcass discovery coincides temporally with the photo-documented loss of the young calf of Catalog #2660 “Gannet” by the CEWS aerial survey team on February 15, 2009. Genetic results needed to conclusively link these two incidents are still pending at this time.

Other

Biopsy Effort

Biopsy cruises were a collaborative effort between FWRI, GDNR, NEAq, NOAA Fisheries, and Wildlife Trust. The FWRI aerial survey team assisted the biopsy effort by providing real-time location information and preliminary identifications of mother/calf pairs to biopsy teams. Whenever prudent the FWRI team would also provide on-water crews with updated whale locations or assist with relocations. The 2008-2009 biopsy effort was successful; biopsy teams collected samples from 30 calves (the maximum allowable number of takes under NOAA Fisheries’ current permit) and several previously unsampled moms and juvenile whales.

Opportunistic Sightings and Verifications by Land

During the 2008-2009 calving season FWRI staff worked in collaboration with the Marine Resource Council (MRC) and Marineland Right Whale Project in order to verify and document seven public right whale sightings from land (Table 5). These sighting verifications consisted of six mother/calf pairs and a single individual and generally occurred on days when weather conditions prohibited aerial survey efforts. Responding to land-based sightings gave FWRI staff a valuable opportunity to interact with and offer educational information to home

owners and beachgoers from Ponte Vedra, FL to St. Augustine Beach, FL. FWRI staff responded to the St. Augustine Pier where a crowd of 50-100 people had gathered to watch whales in close proximity to the pier (Catalog #2611 “Picasso” and calf on February 22, 2009 and Catalog #1611 and calf on February 27, 2009). Upon arrival, FWRI staff was informed by several bystanders that paddle boarders and surfers had approached the whales several times and on both occasions FWRI staff observed paddle boarders approaching the whales. On February 22nd St. Johns County Marine Rescue responded by jet ski at the request of FWRI staff to stop the persistent close approaches of a paddle boarder to the whales. The actions of the paddle boarder elicited a change in behavior from the whales and they moved farther offshore and out of view of onlookers. On February 27th another paddle boarder was met on the beach by FWRI staff and an FWC law enforcement officer and issued a warning for violation of the Right Whale Minimum Approach Regulation (50 CFR 224.103(c)).

DISCUSSION and RECOMMENDATIONS

An unprecedented five previously unknown entanglement cases were documented in the SEUS by aerial survey teams during the 2008-2009 calving season and disentanglement crews were able to remove all or nearly all of the gear from these five whales. Training, available resources, and proper equipment for both on-water and aerial teams were essential to these successful disentanglement responses. Greater than 70% of the right whale population bears scars from entanglement and a reduction in entanglement-caused mortality and serious injury to right whales is necessary to lessen their probability of extinction (Knowlton et al., 2001; 2005). Gear removed from one of the whales disentangled in the SEUS during the 2008-2009 calving season was preliminarily identified as Canadian lobster gear. Right whales have been documented traveling great distances over relatively short periods of time including multiple trips between the SEUS and the Northeast U.S. in a single winter calving season (NMFS, 2009). Entanglements do not affect researchers and managers on a regional level alone and continued national and international efforts, such as those of the ALWTRT and ALWDN, to share local information and promote productive discussions among stakeholders are essential if reductions in entanglement mortality and serious injury are going to occur.

Over 900 whale alerts were disseminated over the EWS network during the 2008-2009 season. The majority of these sightings came from aerial survey teams, but approximately 17% of the sightings came from sources other than aerial teams and many occurred outside the boundaries of the EWS surveys. Throughout the 2008-2009 season, the newly developed EWS “bins” proved effective at targeting whale alerts to end users in specific geographic locations. Because of this, FWRI is currently working on expanding the EWS bins (Figure 12) to include sightings in North Carolina (such as Catalog #2223 “Calvin” and calf on December 30, 2008) and the Gulf of Mexico (such as Catalog #2503 “Boomerang” and calf on January 16, 2006 and February 27, 2006). Future EWS refinements should concentrate on quicker direct communication with large vessel captains using (for example) AIS as a tool to transmit whale sighting information. Additionally, the assimilation of acoustic detections into whale alerts should be further developed because the detections are a reliable source of general whale location information that is available during times when EWS survey teams are not able to fly.

Although EWS right whale sightings are received by the USCG and subsequently transmitted as a BNTM over VHF radio, both the EWS network and ship strike reduction rule fall short of directly reaching recreational and small boat operators and addressing the threats from these vessels to right whales. From the 2005-2006 season through present, approximately 53% of the observed whale/vessel interactions in the SEUS have been with recreational vessels. During the 2008-2009 season, FWRI observed 14 whale/vessel interactions involving recreational vessels and the CEWS aerial survey team observed an additional eight (Figure 11). In 16 of the 22 total interactions, the closest observed distance between the vessel and the whale(s) was less than 500 yards and in at least six of the interactions the vessel was observed intentionally approaching the whale(s). FWRI intends to focus upcoming outreach efforts on recreational vessel operators as well as kayakers, surfers, and paddle boarders throughout right whale habitat in Florida. Fishing tournaments, local boat shows, and marina and beach events have been preliminarily identified as target venues for education and outreach. Existing signage aimed at recreational boaters and installed at select boat ramps and marinas throughout Florida and Georgia during 2005 should be re-inventoried, assessed for condition, and replaced as needed. FWRI would like to coordinate with NOAA Fisheries on planned education events and collaborate on outreach programs aimed at recreational boaters in Florida.

The FWRI survey team documented a total of 384 right whales (not unique individuals) in 169 sightings during the 2008-2009 season compared to 218 right whales in 86 sightings during the 2007-2008 season. The number of individually unique right whales documented increased by 20% from 99 in 2007-2008 to 119 in 2008-2009. Preliminary analysis indicates 33% or one-third of FWRI's total identified whales this season ($n=105$) were adult females (29% were mothers). FWRI detected an increase this season in the number of adult males documented in the SEWS (23%; Figure 10); however, this percent is consistent with preliminary demographic analyses for the SEUS during the 2007-2008 season (27%; Zani et al., 2008). A considerable number of juvenile whales (43%; Figure 10) were present in the SEWS this season. This is consistent with observations in the SEWS and SEUS for the past several seasons. Based on these observed proportions, it is apparent that the SEUS is being utilized by a sizeable number of juveniles, adult males, and non-calving female whales. Since it is presumed right whales are not feeding while in the SEUS, the calving area likely serves as the location for various social interactions. These social behaviors, though not completely understood by researchers at this time, may serve an important role in the population and should be considered in future management and conservation decisions and initiatives that affect the calving area.

During the 2008-2009 calving season, a record number ($n=39$) of mother/calf pairs were documented by aerial survey teams. The season also brought record numbers of biopsy genetic samples and entanglement cases; the first successful sedation of a free-swimming large whale at sea; a collision between a recreational vessel and a suspected right whale off SC; two live standing events in NC (including the first live standing of a non-calf right whale), and four right whale deaths including a calf in FL, calf in NC, 2 yr old in NC, and an 8yr old female in the Great South Channel. An eventful and challenging calving season, such as this one, demonstrates that teamwork and cooperation among the various agencies and organizations contributing to right whale research and conservation activities in the SEUS are essential. Aerial surveys have proven to be an efficient tool for: documenting right whale distribution and understanding right whale habitat use, demographics, and life history; detecting dead, injured, and entangled whales; and ship strike mitigation on days with favorable weather conditions. Despite being limited by weather and available daylight, the EWS surveys, throughout many seasons, have raised the situational awareness of large vessel operators, harbor pilots, and military/USCG personnel in reference to right whales and the SEUS calving area. The EWS surveys will provide consistent monitoring effort data for the SEUS SMA pre and post ship strike rule implementation will be an important tool in determining the effectiveness of the rule. FWRI, in partnership with NOAA Fisheries, will continue to monitor protective measures, execute recovery activities, and implement educational initiatives for right whales in Florida and the entire SEUS.

WORKS CITED

- CeTAP. 1982. A characterization of marine mammals and turtles in the mid- and north Atlantic areas of the U.S. outer continental shelf. Final Report of the Cetacean and Turtle Assessment Program to the U.S. Department of the Interior under Contract AA551-CT8-48. U.S. Dep. Int., Wash., D.C. 450pp.
- Crone M.J., and S.D. Kraus. 1990. Right whales (*Eubalaena glacialis*), in the Western North Atlantic: A catalog of identified individuals. New England Aquarium, Boston, MA 02110.
- Hain, J.H.W, S.L. Ellis, R.D. Kenney, and C.K. Slay. 1999. Sightability of right whales in coastal waters of the southeastern United States with implications for the aerial monitoring program. Pp. 191-207, In, Marine Mammal Survey and Assessment Methods, G.W. Garner, S.C. Amstrup J.L. Laake, B.F.J. Manley, L.L. McDonald, and D.G. Robertson (eds). A.A. Balkema: Rotterdam, Netherlands.
- Hamilton, P.K., and S.M. Martin. 1999. A catalog of identified right whales from the western North Atlantic: 1935-1997. New England Aquarium, Boston, MA 02110.
- Jacksonville Port Authority. Marine Statistics [online]. Jacksonville, FL. [cited June 15, 2009]. Available at http://www.jaxport.com/sea/g_stats.cfm.
- Jensen, A.S., and G.K. Silber. 2003. *Large Whale Ship Strike Database*. U.S. Department of Commerce, National Oceanic and Atmospheric Administration Technical Memorandum. NMFS-OPR-25.
- Knowlton, A.R., and S.D. Kraus. 2001. Mortality and serious injury of the northern right whales (*Eubalaena glacialis*) in the western North Atlantic Ocean. *The Journal of Cetacean Research and Management* Special Issue 2:193-208.
- Knowlton, A.R., M.K. Marx, H.M. Pettis, P.K. Hamilton and Kraus, S.D. 2005. Analysis of scarring on North Atlantic right whales (*Eubalaena glacialis*): monitoring rates of entanglement interaction 1980-2002. National Marine Fisheries Service. Contract #43EANF030107. Final Report.
- Kraus, S.D., Prescott, J.H., Knowlton, A.R. and Stone, G.S. 1986. Migration and Calving of Right Whales (*Eubalaena glacialis*) in the Western North Atlantic. *Rep. Int. Whal. Comm.* (Special Issue 10): 139-144.
- Kraus, S.D. 1990. Rates and potential causes of mortality in North Atlantic right whales (*Eubalaena glacialis*). *Mar. Mamm. Sci.* 6(4):278-291.
- Kraus, S.D., Kenney, R.D., Knowlton, A.R. and Ciano, J.N. 1993. Endangered Right Whales of the Southwestern North Atlantic. Final report to the Minerals Management Service, Herndon, VA. 69 pp.
- Laist, D.W., Knowlton A.R., Mead J.G., Collet A.S., Podesta M. 2001. Collisions between ships and whales. *Mar. Mamm. Sci.* 17(1):35-75.

- National Marine Fisheries Service. 2005. Recovery Plan for the North Atlantic Right Whale (*Eubalaena glacialis*). National Marine Fisheries Service, Silver Spring, Maryland.
- National Marine Fisheries Service. 2009. Draft North Atlantic Right Whale (*Eubalaena glacialis*) Western Atlantic Stock. National Marine Fisheries Service, Silver Spring, Maryland.
- Nelson M., Garron M., Merrick R.L., Pace R.M. III, Cole T.V.N. 2007. Mortality and Serious Injury Determinations for Baleen Whale Stocks Along the United States Eastern Seaboard and Adjacent Canadian Maritimes, 2001-2005. US Dep Commer, Northeast Fish Sci Cent Ref Doc 07-05; 18 p.
- New England Aquarium. North Atlantic Right Whale Catalog [online]. Boston, MA. [cited September 2, 2008]. Available at <http://rwcatalog.neaq.org/Terms.aspx>.
- Pace, R.M., and G.K. Silber. 2005. Abstract. Simple analysis of ship and large whale collisions; Does speed kill? Sixteenth Biennial Conference on Biology of Marine Mammals, San Diego, December 2005.
- Right Whale Consortium (2007). North Atlantic Right Whale Consortium 2007 Report Card (New England Aquarium, Boston, MA). Available at: http://www.rightwhaleweb.org/pdf/NARWC_Report_Card2007.pdf
- Scott, G.P. and Gilbert, J.R. 1982. Problems and progress in the US BLM-sponsored CeTAP surveys. Report of the International Whaling Commission 32:587-600.
- Ward-Geiger L.I., Silber G.K., Baumstark R.D., Pulfer T.L. 2005. Characterization of ship traffic in right whale SEUS Critical Habitat. *Coastal Management*. 33:262-278.
- Zani, M.A., Knowlton, A.R., Laguex, K.M., Hamilton, P., Kraus, S.D., Pettis, H.M. 2008. Aerial surveys to reduce ship/whale collisions in the calving ground of the North Atlantic Right Whale (*Eubalaena glacialis*). National Marine Fisheries Service. Contract # WC133F-06-CN-0022. Final Report.

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Florida and Georgia Port Authorities and Harbor Pilot Associations
Georgia Department of Natural Resources
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USGS – Robert Bonde
Volusia County Stranding Network
GTM NERR

FIGURE 1: EWS AERIAL SURVEY TRACKLINE MAP

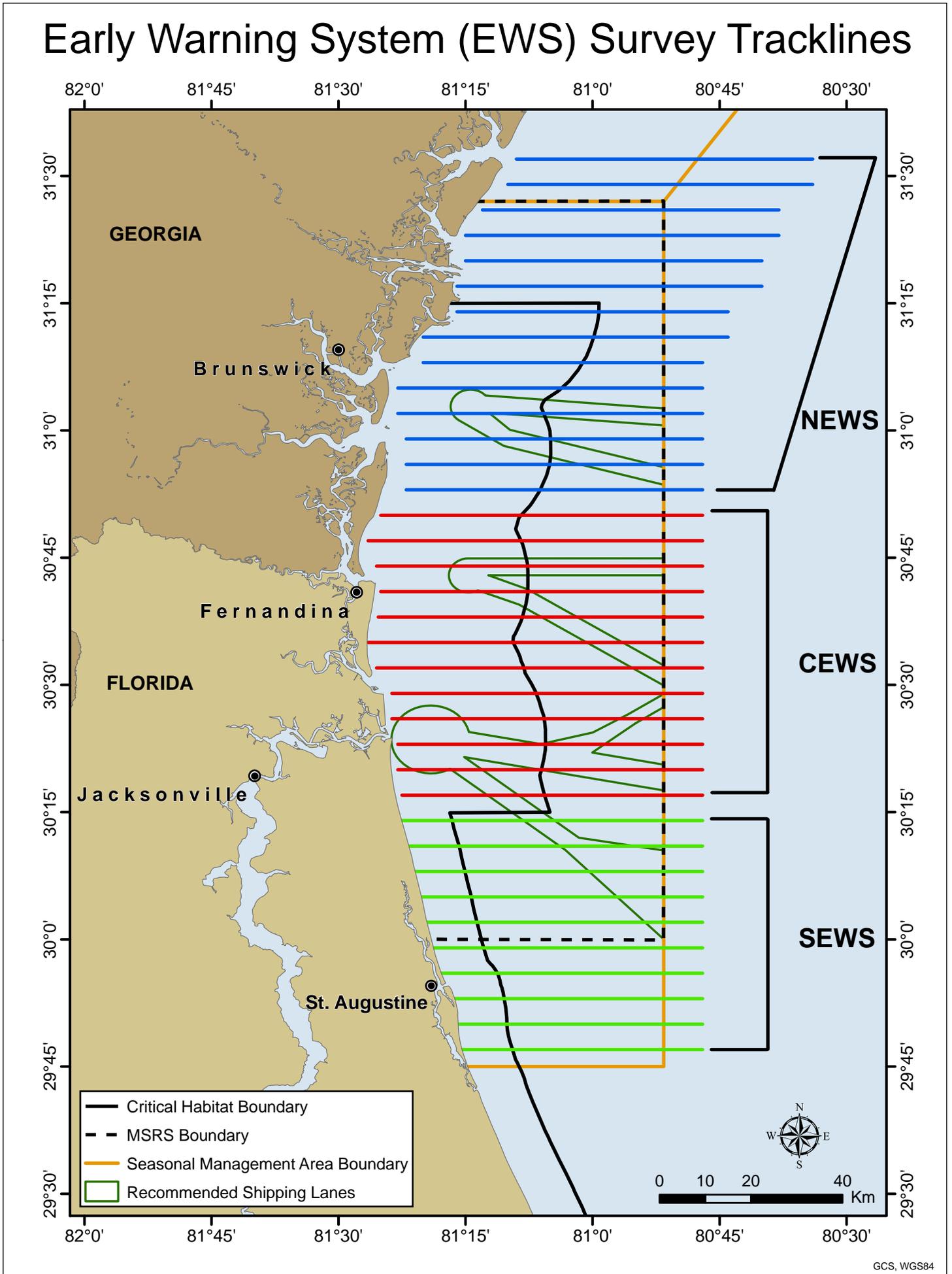


FIGURE 2: FWRI SEWS SURVEY TRACKLINE EFFORT MAP

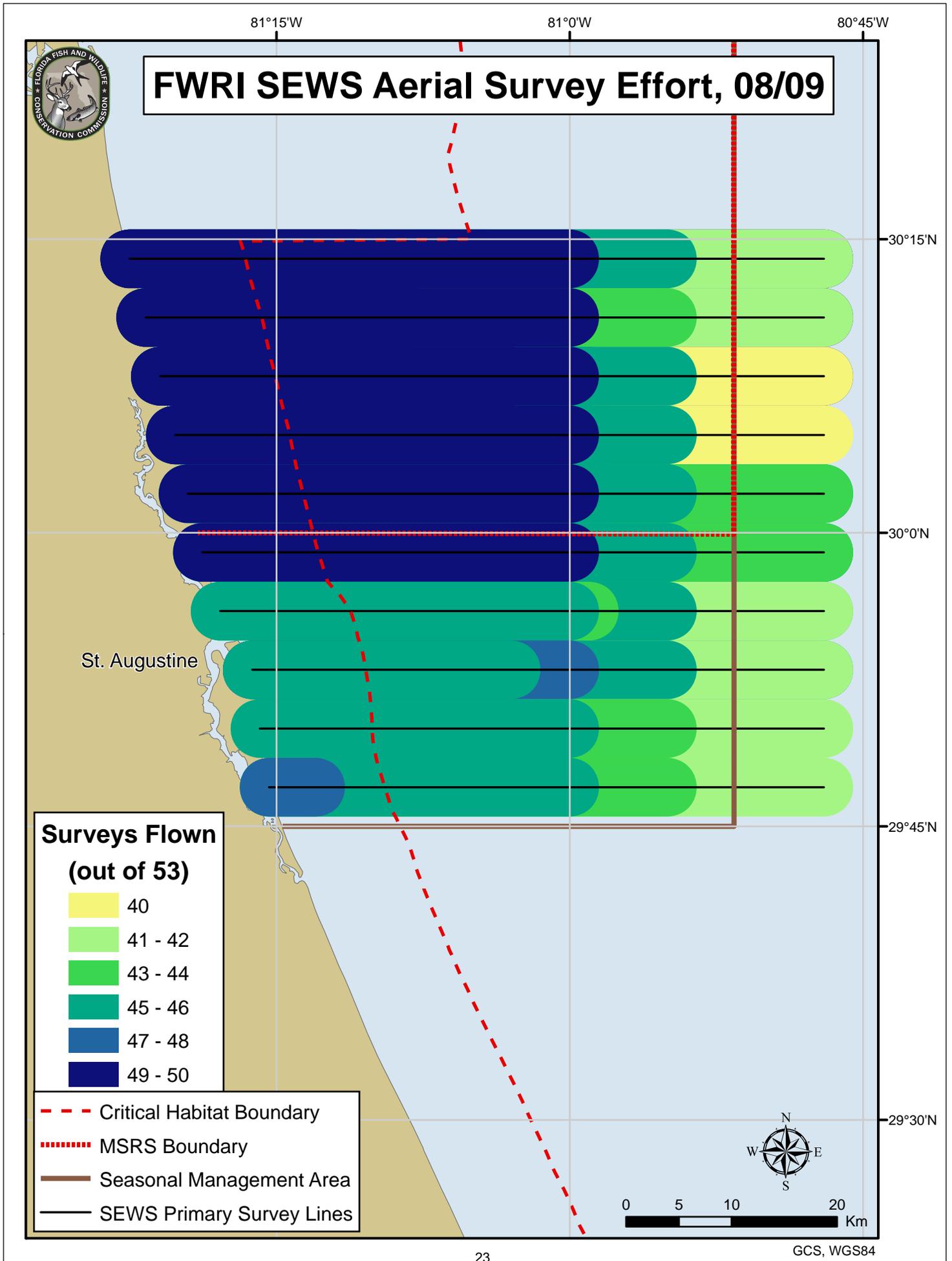


FIGURE 3: FWRI 2008-2009 SURVEY EFFORT BY BEAUFORT SEA STATE

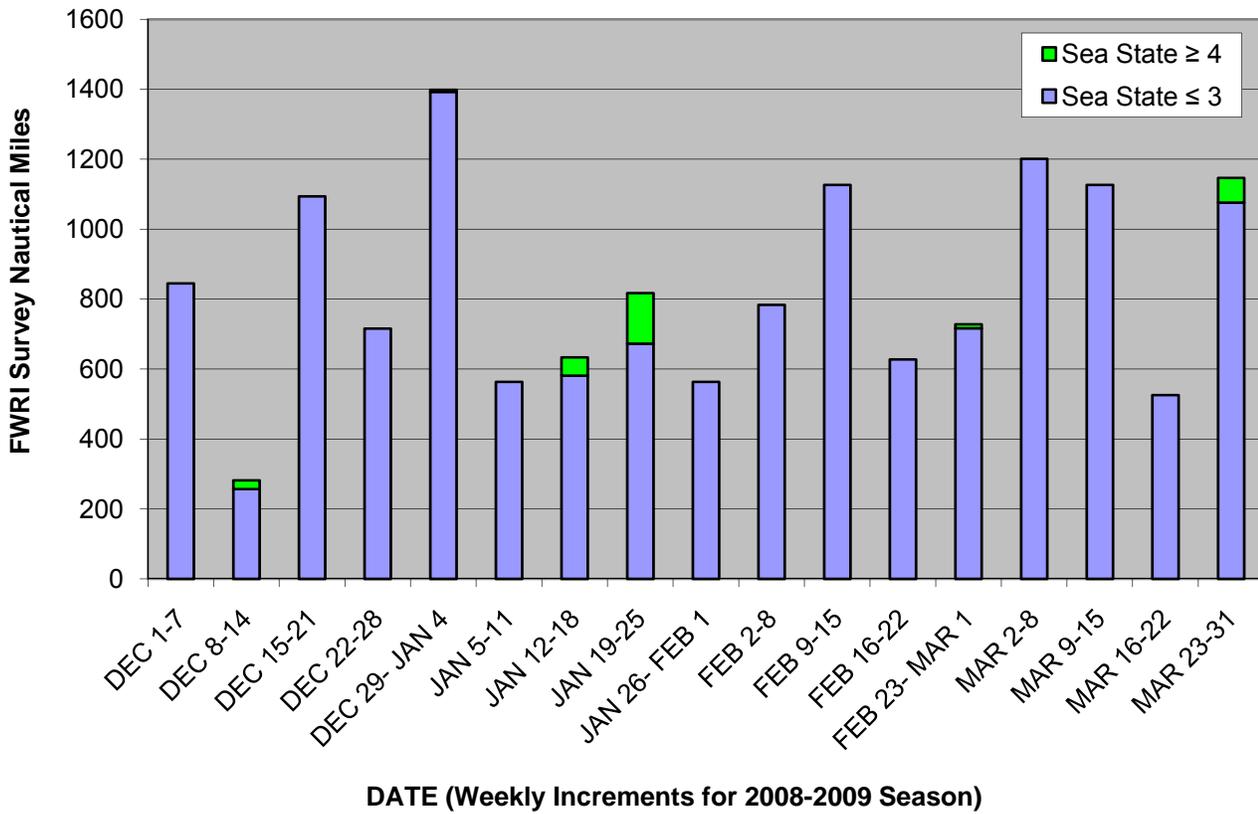


FIGURE 4: FWRI AERIAL SURVEY RIGHT WHALE SIGHTINGS MAP

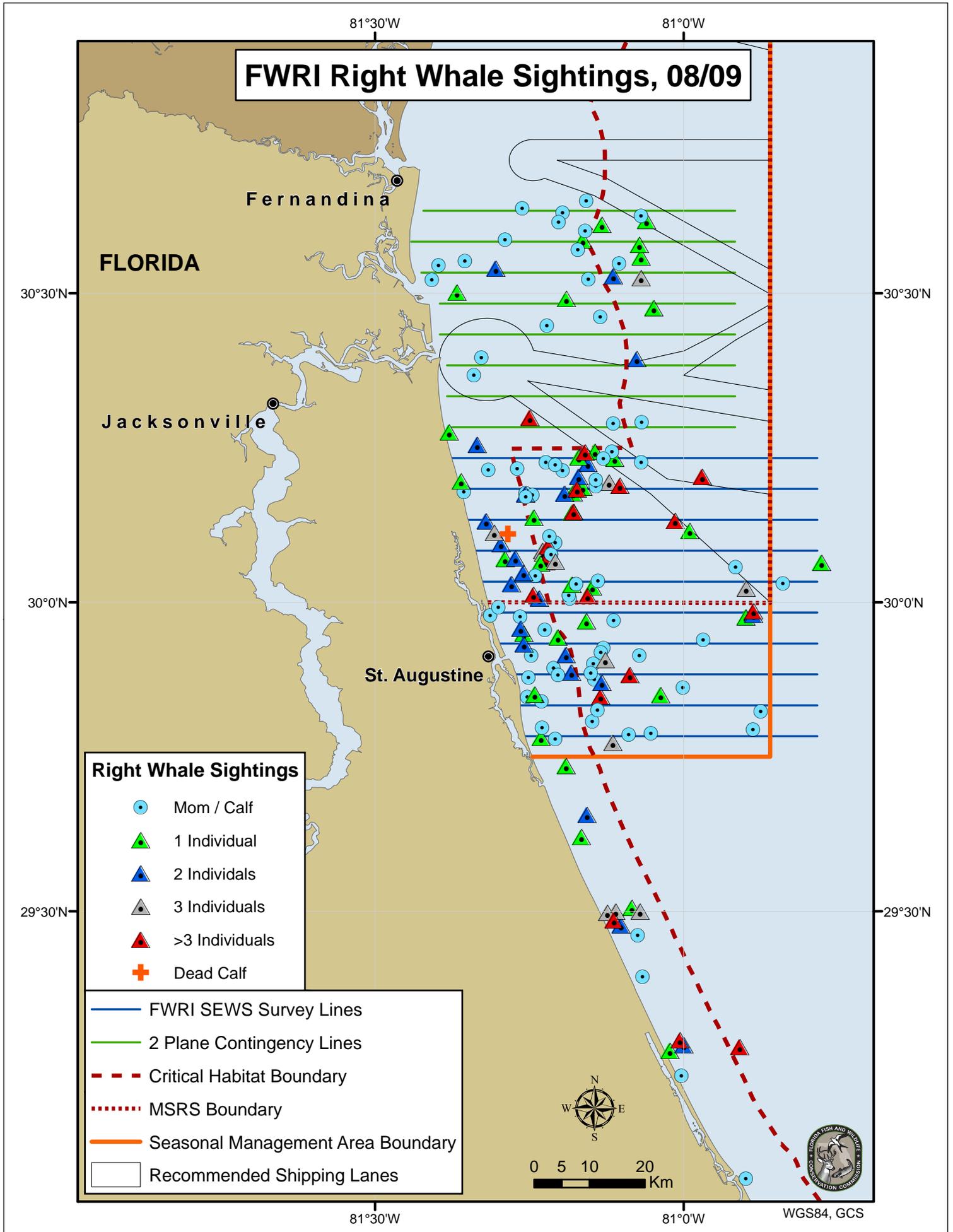


FIGURE 5: FWRI 2008-2009 TOTAL SIGHTINGS, WHALES, AND MOTHER/CALF PAIRS BY WEEK

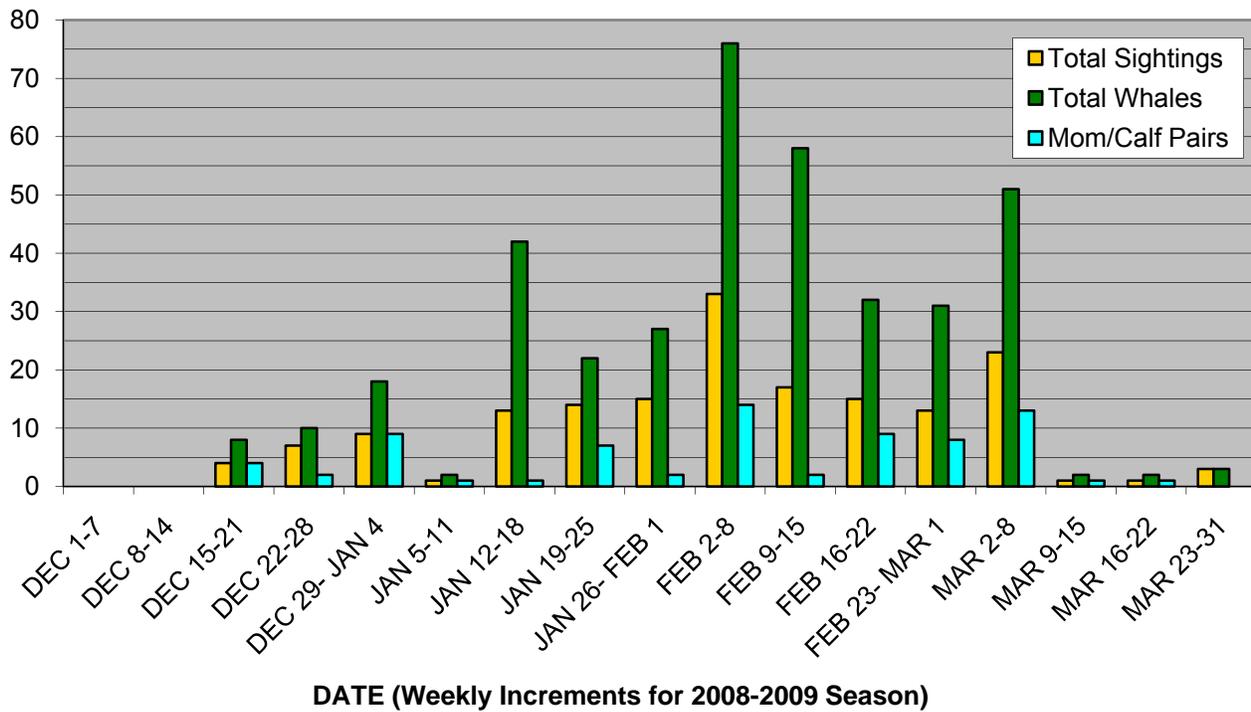
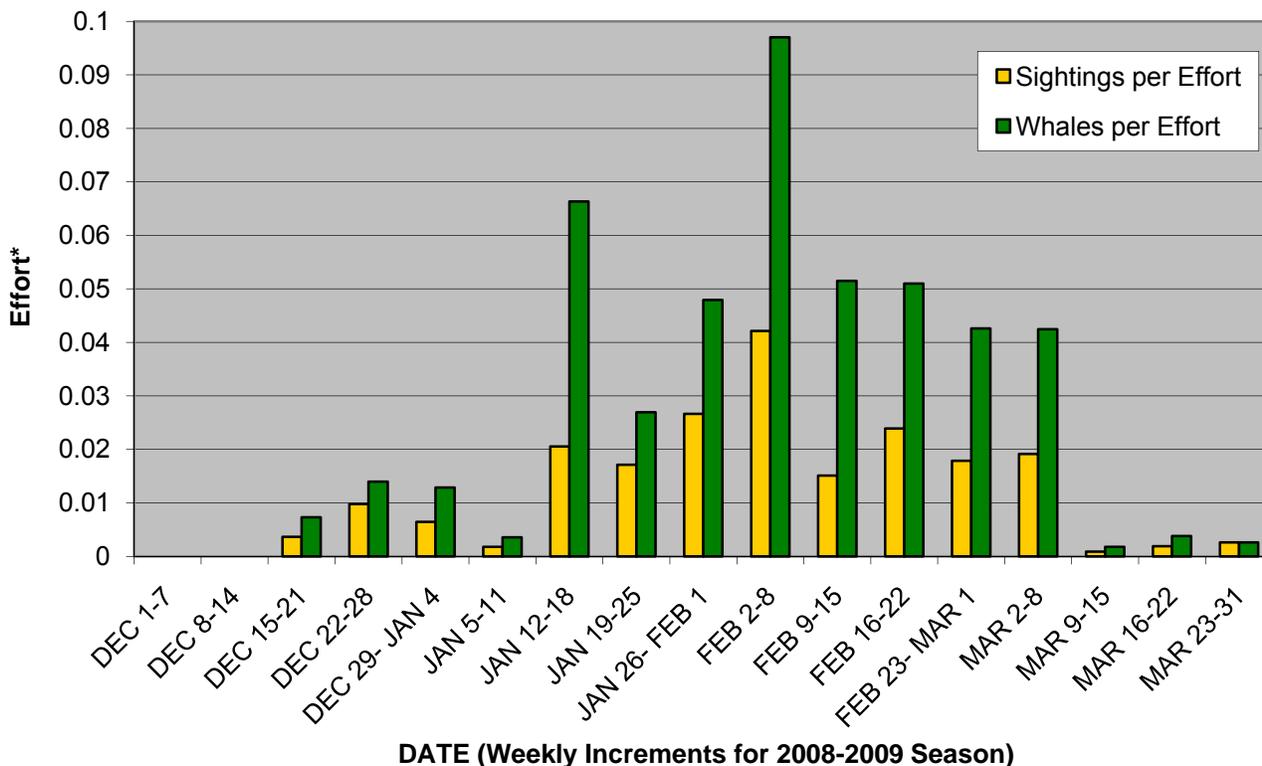


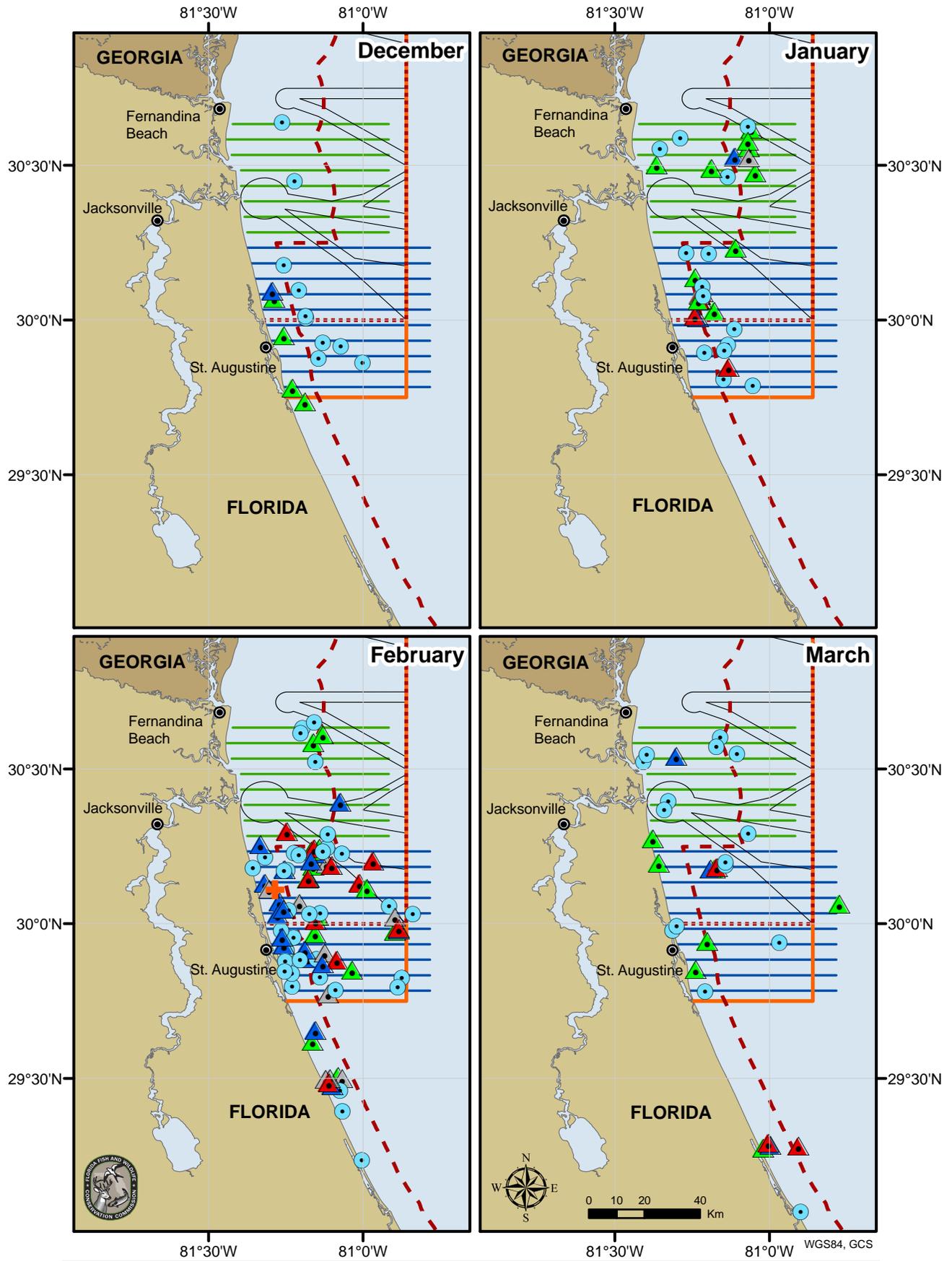
FIGURE 6: FWRI 2008-2009 TOTAL SIGHTINGS AND TOTAL WHALES PER EFFORT BY WEEK



*Effort includes total trackline nautical mileage. No whales were sighted in sea state 4 or greater from trackline.

FIGURE 7: FWRI AERIAL SURVEY MONTHLY RIGHT WHALE SIGHTINGS MAP

FWRI Right Whale Sightings By Month, 08/09



- Mom / Calf
 3 Individuals
 FWRI SEWS Survey Lines
 MSRS Boundary
- 1 Individual
 >3 Individuals
 2 Plane Contingency Lines
 Seasonal Management Area Boundary
- 2 Individuals
 Dead Calf
 Critical Habitat Boundary
 Recommended Shipping Lanes

FIGURE 8: FWRI 2008-2009 PERPENDICULAR SIGHTING DISTANCE BY BEAUFORT SEA STATE

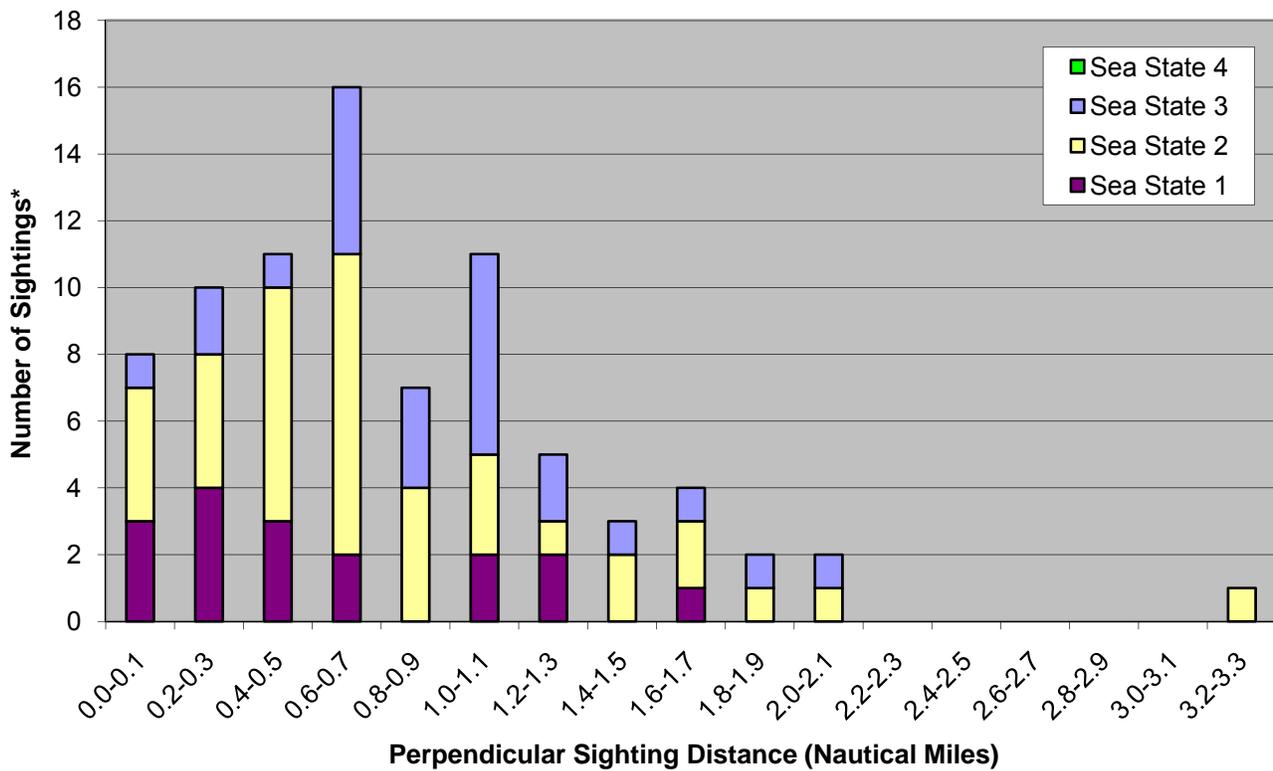


FIGURE 9: FWRI 2008-2009 BREAK TRACK SIGHTING DISTANCE BY BEAUFORT SEA STATE

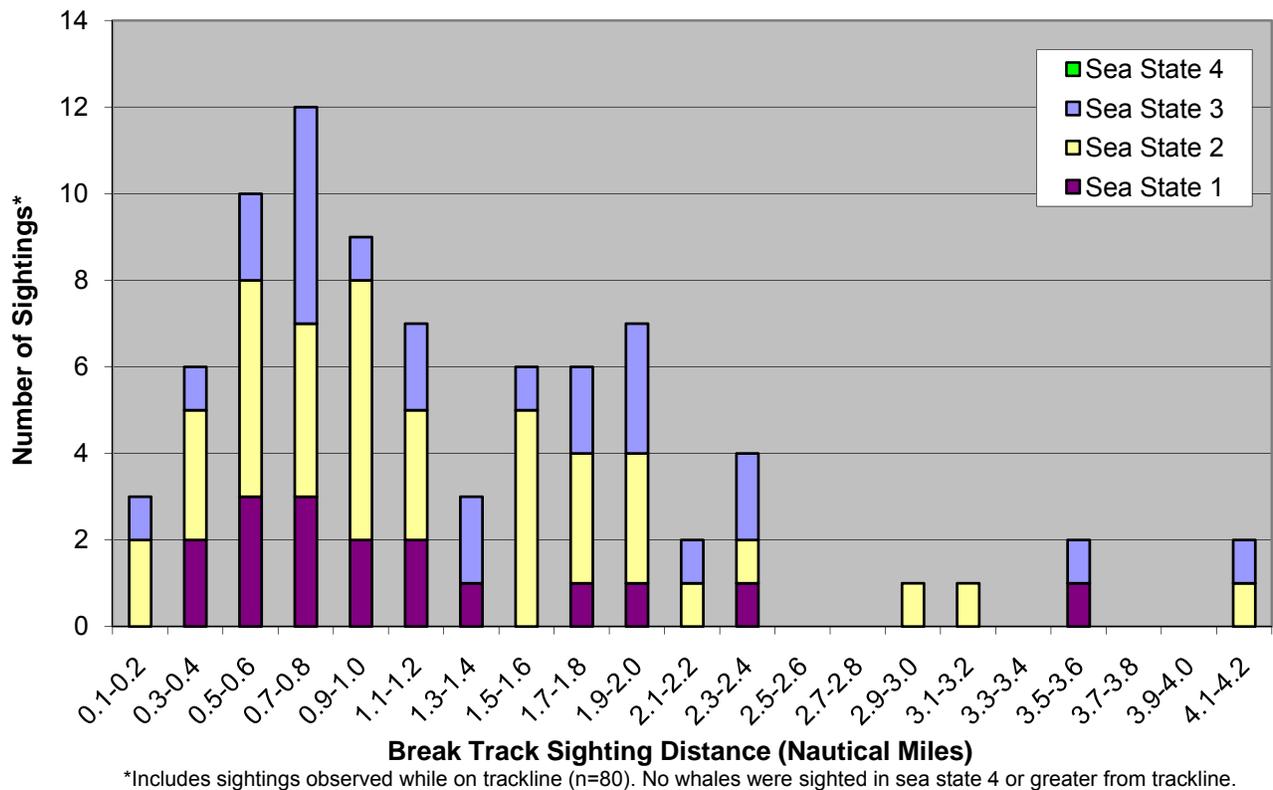


FIGURE 10: FWRI 2008-2009 DEMOGRAPHICS FOR CATALOGED AND KNOWN INTERMATCH WHALES (N=105) IDENTIFICATIONS ARE PRELIMINARY

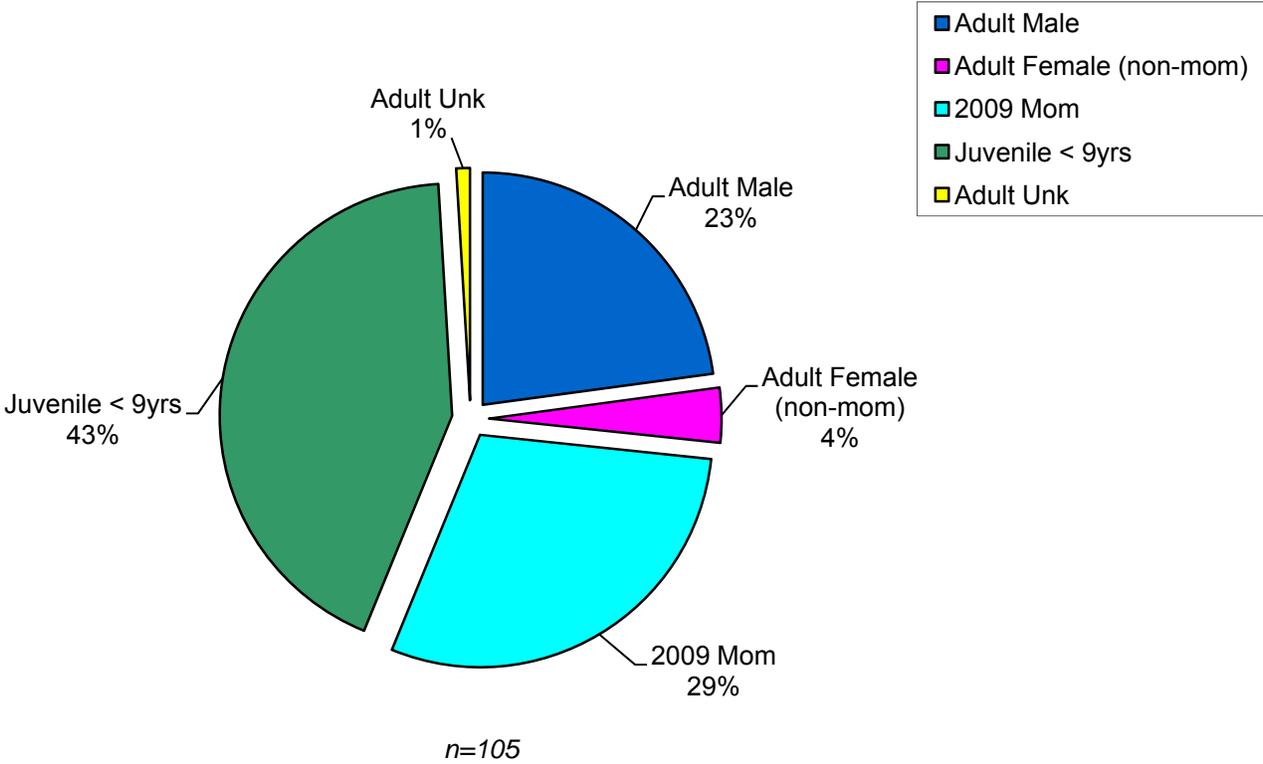


FIGURE 11: SEUS WHALE/VESSEL INTERACTIONS MAP

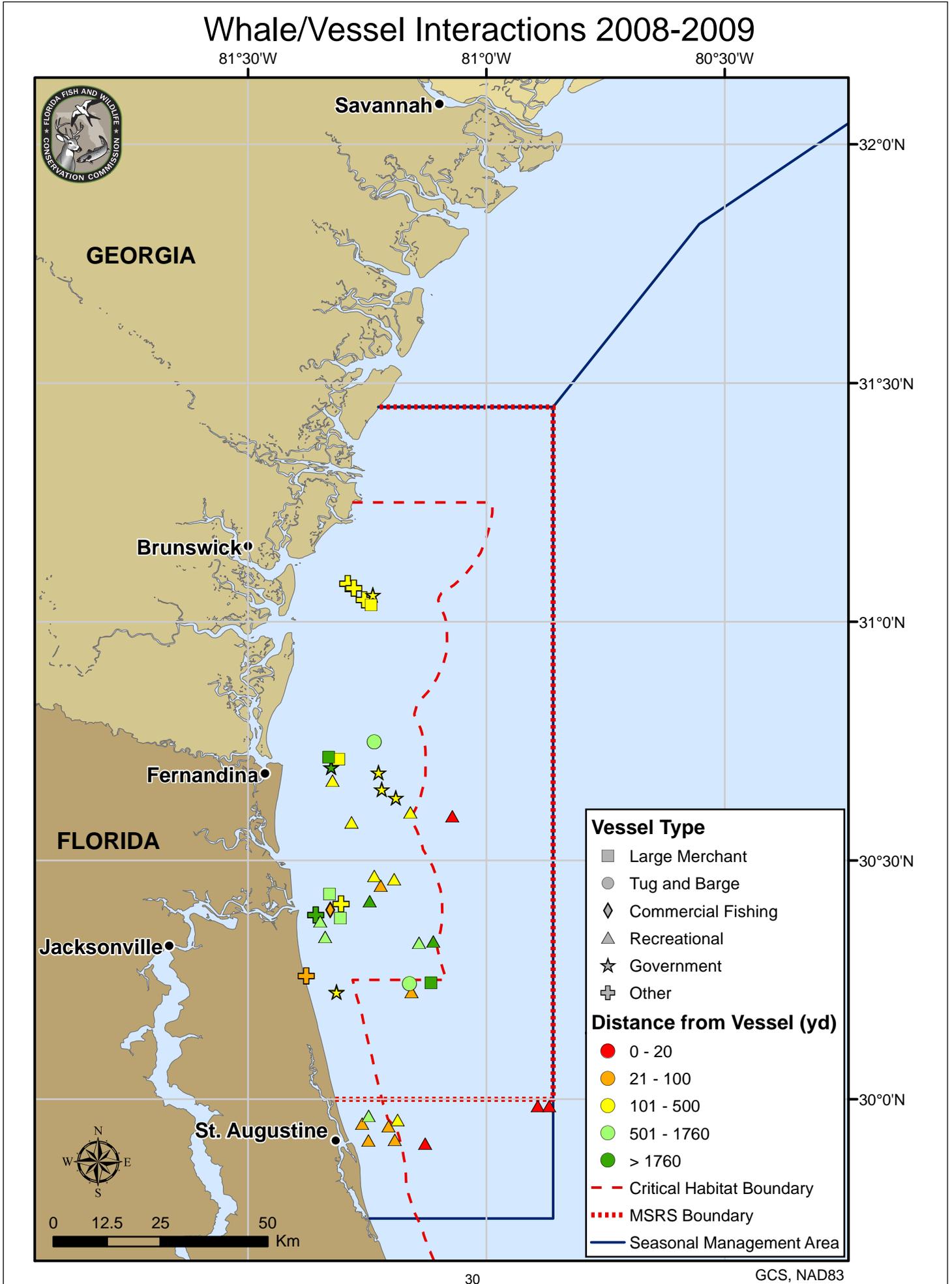


FIGURE 12: EXPANDED WHALE ALERT GEOGRAPHIC "BINS" MAP

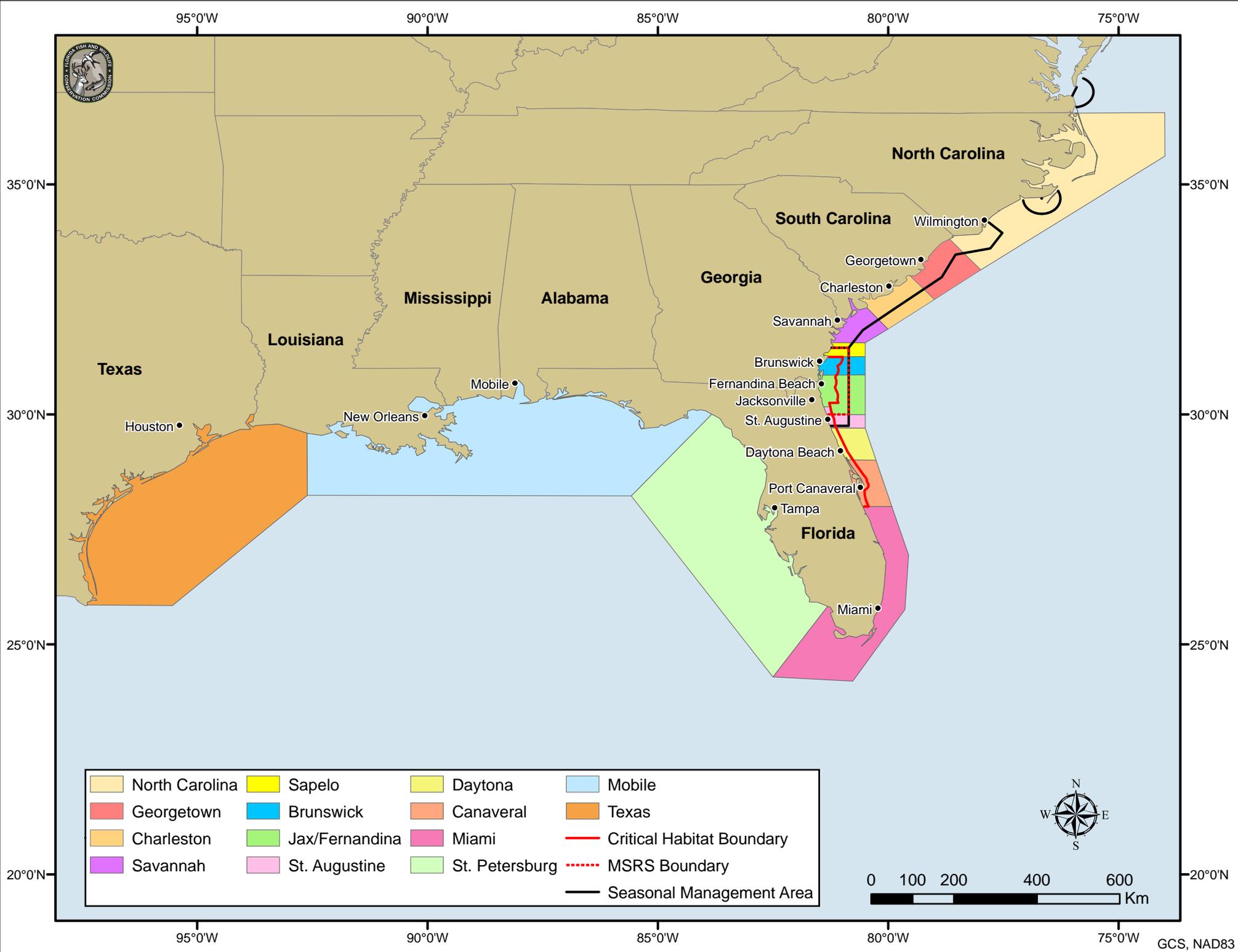


TABLE 1. SURVEY WAYPOINTS AND NAUTICAL MILEAGE

Total Nautical Mileage for FWRI SEWS Survey: 281.6

All EWS Waypoints

EWS Line	Latitude	Longitude (Eastern Point)
1	31°26.0	-080°38.0
2	31°23.0	-080°38.0
3	31°20.0	-080°40.0
4	31°17.0	-080°40.0
5	31°14.0	-080°44.0
6	31°11.0	-080°44.0
7	31°08.0	-080°47.0
8	31°05.0	-080°47.0
9	31°02.0	-080°47.0
10	30°59.0	-080°47.0
11	30°56.0	-080°47.0
12	30°53.0	-080°47.0
13	30°50.0	-080°47.0
14	30°47.0	-080°47.0
15	30°44.0	-080°47.0
16	30°41.0	-080°47.0
17	30°38.0	-080°47.0
18	30°35.0	-080°47.0
19	30°32.0	-080°47.0
20	30°29.0	-080°47.0
21	30°26.0	-080°47.0
22	30°23.0	-080°47.0
23	30°20.0	-080°47.0
24	30°17.0	-080°47.0
25	30°14.0	-080°47.0
26	30°11.0	-080°47.0
27	30°08.0	-080°47.0
28	30°05.0	-080°47.0
29	30°02.0	-080°47.0
30	29°59.0	-080°47.0
31	29°56.0	-080°47.0
32	29°53.0	-080°47.0
33	29°50.0	-080°47.0
34	29°47.0	-080°47.0

FWRI SEWS Survey Waypoints

EWS Line	Latitude	Longitude (Eastern Point)	Nautical Mileage
25	30°14.0	-080°47.0	30.87
26	30°11.0	-080°47.0	30.60
27	30°08.0	-080°47.0	29.97
28	30°05.0	-080°47.0	29.07
29	30°02.0	-080°47.0	28.80
30	29°59.0	-080°47.0	28.35
31	29°56.0	-080°47.0	27.00
32	29°53.0	-080°47.0	26.10
33	29°50.0	-080°47.0	25.65
34	29°47.0	-080°47.0	25.20

2 Plane Contingency Plan
FWRI typical waypoints

EWS Line	Latitude	Longitude (Eastern Point)
15	30°44.0	-080°55.0
16	30°41.0	-080°55.0
17	30°38.0	-080°55.0
18	30°35.0	-080°55.0
19	30°32.0	-080°55.0
20	30°29.0	-080°55.0
21	30°26.0	-080°55.0
22	30°23.0	-080°55.0
23	30°20.0	-080°55.0
24	30°17.0	-080°55.0
25	30°14.0	-080°55.0
26	30°11.0	-080°55.0
27	30°08.0	-080°55.0
28	30°05.0	-080°55.0
29	30°02.0	-080°55.0
30	29°59.0	-080°55.0

1 Plane Contingency Plan
Waypoints

EWS Line	Latitude	Longitude (Eastern Point)
5	31°14.0	-081°00.0
6	31°11.0	-081°00.0
7	31°08.0	-081°00.0
8	31°05.0	-081°00.0
9	31°02.0	-081°00.0
10	30°59.0	-081°00.0
11	30°56.0	-081°00.0
12	30°53.0	-081°00.0
13	30°50.0	-081°00.0
14	30°47.0	-081°00.0
15	30°44.0	-081°00.0
16	30°41.0	-081°00.0
17	30°38.0	-081°00.0
18	30°35.0	-081°00.0
19	30°32.0	-081°00.0
20	30°29.0	-081°00.0
21	30°26.0	-081°00.0
22	30°23.0	-081°00.0
23	30°20.0	-081°00.0
24	30°17.0	-081°00.0
25	30°14.0	-081°00.0

Table 2: FWRI AERIAL SURVEY ACTIVITIES

Date	Survey File Name	Full SEWS	None	Partial SEWS	2-Plane Cont.	EWS Lines (SEWS 25-34)	Number of Sightings	Number of Whales	M/C Pair	Hobbs	Nautical Miles Flown	Nautical miles flown sea state < 3	WVI	Coastal Survey	Comments
1-Dec-08	fwri20081201		X												No fly- high wind
2-Dec-08	fwri20081202		X												No fly- high wind
3-Dec-08	fwri20081203	X				25-34	0	0	0	4.8	281.61	281.61			All 10 lines flown N to S
4-Dec-08	fwri20081204	X				25-34	0	0	0	4.4	281.61	281.61			All 10 lines flown N to S
5-Dec-08	fwri20081205	X				25-34	0	0	0	3.9	281.61	281.61			All 10 lines flown N to S
6-Dec-08	fwri20081206		X												No fly- high wind
7-Dec-08	fwri20081207		X												No fly- high wind
8-Dec-08	fwri20081208	X				25-34	0	0	0	4.4	281.61	256.94			All 10 lines flown N to S, sea state 4 inshore second half of day
9-Dec-08	fwri20081209		X												No fly- high wind and rain
10-Dec-08	fwri20081210		X												No fly- fog inshore and high winds offshore
11-Dec-08	fwri20081211		X												No fly- high wind and thunderstorms
12-Dec-08	fwri20081212		X												No fly- high wind
13-Dec-08	fwri20081213		X												No fly- high wind
14-Dec-08	fwri20081214		X												No fly- high wind
15-Dec-08	fwri20081215		X												No fly- low visibility. Standby until 1200.
16-Dec-08	fwri20081216			X		22-32	0	0	0	3.2	134.87	134.87			Standby until 1200 due to fog. Lines flown S to N. Cut inshore portion of lines due to fog bank. Covered a portion of the Jax channel (EWS lines 22-24).
17-Dec-08	fwri20081217		X												No fly- fog. Standby until 1100.
18-Dec-08	fwri20081218	X				25-34	2	4	2	5.7	281.61	281.61			All 10 lines flown N to S. Responded to assist CEWS/NEWS survey team with entangled whale, but relief response was called off because vessel assessment was complete for the day.
19-Dec-08	fwri20081219				X	15-24	2	4	2	6.5	307.68	307.68	Yes		2-plane contingency survey. Lines 15-20 flown east to 8047W and 21-24 cut at 8055W. Standby until 1000 due to preparation for disentanglement response. Landed before completing survey due to diminishing daylight.
20-Dec-08	fwri20081220				X	15-30	0	0	0	5.3	369.36	369.36			2-plane contingency survey. Standby until 1100 due to fog. Flew lines 15-24 S to N and flew lines 25-30 N to S. Lines 21-24 cut due to offshore fog.
21-Dec-08	fwri20081221		X												No fly- high wind
22-Dec-08	fwri20081222		X												No fly- high wind
23-Dec-08	fwri20081223		X												No fly- high wind
24-Dec-08	fwri20081224	X				25-34	0	0	0	4.4	281.61	281.61			All 10 lines flown N to S. Standby until 1000 due to high wind.

Table 2: FWRI AERIAL SURVEY ACTIVITIES

Date	Survey File Name	Full SEWS	None	Partial SEWS	2-Plane Cont.	EWS Lines (SEWS 25-34)	Number of Sightings	Number of Whales	M/C Pair	Hobbs	Nautical Miles Flown	Nautical miles flown sea state < 3	WVI	Coastal Survey	Comments
25-Dec-08	fwri20081225			X		25-30	0	0	0	2.5	152.71	152.71			Lines 25-30 flown N to S. Standby until 1130 due to low ceiling and fog. Lines 27-28 cut due to offshore fog. Aborted remaining survey due to low visibility and incoming rain.
26-Dec-08	fwri20081226			X		--	2	2	0	5.1	0	0			Standby until 1230 due to fog. Planned to fly lines S to N due to visibility, but sighted an entangled whale at the westernmost point of the 34 line (2947N). Plane landed and switched out crew to download photos and went back up to assist vessel first response.
27-Dec-08	fwri20081227		X			--	4	6	1	6.1	0	0	Yes		No survey lines flown. Relocated entangled whale from Dec 26 and assisted with disentanglement activities. Rest of sightings for the day were opportunistic and sighted while assisting with disentanglement.
28-Dec-08	fwri20081228	X				25-34	1	2	1	5.7	281.61	281.61			Lines 25-26 flown N to S. Transited south to verify public sighting. Lines 27-34 flown S to N. After completing the 33 line (2950N), verified dead dolphin nearshore (previously reported as a live whale).
29-Dec-08	fwri20081229	X				25-34	0	0	0	6.5	281.61	281.61		Yes	All 10 lines flown N to S. Flew south to Daytona Beach (2913N) to attempt to verify sighting reported by MRC.
30-Dec-08	fwri20081230	X				25-34	4	8	4	6.0	281.61	281.61			All 10 lines flown N to S
31-Dec-08	fwri20081231		X												No fly- high wind
1-Jan-09	fwri20090101		X												No fly- high wind
2-Jan-09	fwri20090102	X				25-34	4	8	4	6.1	281.61	275.7			All 10 lines flown N to S. Standby until 1000 due to high wind.
3-Jan-09	fwri20090103	X				25-34	0	0	0	4.1	271.81	271.81			All 10 lines flown S to N. Cut inshore portion of the 25 line (3014N) due to fog.
4-Jan-09	fwri20090104	X				25-34	1	2	1	5.1	281.61	281.61			All 10 lines flown N to S
5-Jan-09	fwri20090105	X				25-34	1	2	1	4.9	281.61	281.61			All 10 lines flown N to S
6-Jan-09	fwri20090106		X												No fly- fog inshore and high wind offshore
7-Jan-09	fwri20090107		X												No fly- high wind and rain
8-Jan-09	fwri20090108		X												No fly- high wind
9-Jan-09	fwri20090109		X												No fly- high wind
10-Jan-09	fwri20090110	X				25-34	0	0	0	4.1	281.61	281.61			All 10 lines flown N to S
11-Jan-09	fwri20090111		X												No fly- fog inshore, high wind offshore, and afternoon rain

Table 2: FWRI AERIAL SURVEY ACTIVITIES

Date	Survey File Name	Full SEWS	None	Partial SEWS	2-Plane Cont.	EWS Lines (SEWS 25-34)	Number of Sightings	Number of Whales	M/C Pair	Hobbs	Nautical Miles Flown	Nautical miles flown sea state < 3	WVI	Coastal Survey	Comments
12-Jan-09	fwri20090112		X												No fly- high wind
13-Jan-09	fwri20090113		X												No fly- rain
14-Jan-09	fwri20090114	X				25-34	2	14	0	5.7	281.61	281.61			All 10 lines flown N to S. Standby until 1100 due to high wind.
15-Jan-09	fwri20090115	X				25-34	3	4	1	5.3	281.61	281.61			All 10 lines flown N to S. Located entangled whale #3311 with telemetry buoy north of the 25 line (3014N).
16-Jan-09	fwri20090116		X												No fly- high wind
17-Jan-09	fwri20090117		X												No fly- high wind
18-Jan-09	fwri20090118				X	25-28	8	24	0	7.2	70.02	17.64			Flew offshore to track entangled whale #3311 and verify/document the telemetry buoy attachment (3109.92N 7951.10W, sea state 5). Started survey on the eastern end (8047W) of the 25 line (3014N). Cut lines 26-27 at the 8100W due to sea state and time restraints. Landed to refuel and returned to complete photo documentation of a sighting on the 28 line (3005N) before ending survey due to diminishing daylight.
19-Jan-09	fwri20090119			X		25-34	0	0	0	3.0	188.01	43.38			All 10 lines flown N to S. Lines 27-34 cut at 8100W due to high sea state and wind. Standby until 1045 due to wind and high sea state.
20-Jan-09	fwri20090120		X												No fly- high wind
21-Jan-09	fwri20090121				X	17-22	5	8	3	4.9	132.93	132.93			2-plane contingency survey. Lines 17-22 flown S to N. Cut lines at the 8100W due to sea state. Standby until 1230 due to high wind. End survey due to diminishing daylight.

Table 2: FWRI AERIAL SURVEY ACTIVITIES

Date	Survey File Name	Full SEWS	None	Partial SEWS	2-Plane Cont.	EWS Lines (SEWS 25-34)	Number of Sightings	Number of Whales	M/C Pair	Hobbs	Nautical Miles Flown	Nautical miles flown sea state < 3	WVI	Coastal Survey	Comments
22-Jan-09	fwri20090122		X				4	6	1	8.3	0	0			No survey lines flown. Relocated entangled whale #3311 and assisted with disentanglement activities. Other whale sightings for the day were opportunistic while transiting to and from the entangled whale. #3546, a 4 year old whale of unknown gender, was sighted with a calf during transit to #3311. Time spent with the whales was limited and the calf was not photographed before the whales dove. Because it is unlikely #3546 was the mother of the observed calf, this pair was not recorded as a M/C pair.
23-Jan-09	fwri20090123		X				4	6	2	7.5	0	0			No survey lines flown. Relocated entangled whale #3311 and assisted with disentanglement activities. M/C sightings (same pair twice) were opportunistic while circling entangled whale.
24-Jan-09	fwri20090124	X				25-34	0	0	0	7.3	281.61	281.61			All 10 lines flown N to S. Standby until 0930 due to fog. Boxed area at eastern end of the 34 line (2947N) in an attempt to locate entangled whale #3311. After completing survey flew N to attempt to verify land sighting off Ponte Vedra.
25-Jan-09	fwri20090125			X		25-34	1	2	1	5.0	214.8	214.8			All 10 lines flown S to N. Lines 25-28 cut short due to fog. Computer/GPS connection problem, switched to hand data partway through survey.
26-Jan-09	fwri20090126		X												No fly- fog. Standby until 1130.
27-Jan-09	fwri20090127		X												No fly- fog. Standby until 1100.
28-Jan-09	fwri20090128	X				25-34	0	0	0	4.2	281.61	281.61			All 10 lines flown S to N. Switched tablet PCs at inshore end of the 33 line (2950N) due to NMEA server connection problem.
29-Jan-09	fwri20090129		X												No fly- rain
30-Jan-09	fwri20090130		X												No fly- high wind and rain
31-Jan-09	fwri20090131		X				3	5	0	3.3	0	0			Survey cancelled at 1130 due to persistent high sea state in SEWS area. Responded at 14:50 to relieve CEWS plane during disentanglement first response for #3420 "Platypus". No survey lines flown.

Table 2: FWRI AERIAL SURVEY ACTIVITIES

Date	Survey File Name	Full SEWS	None	Partial SEWS	2-Plane Cont.	EWS Lines (SEWS 25-34)	Number of Sightings	Number of Whales	M/C Pair	Hobbs	Nautical Miles Flown	Nautical miles flown sea state < 3	WVI	Coastal Survey	Comments
1-Feb-09	fwri20090201	X				25-34	12	22	2	7.9	281.61	281.61		Yes	All 10 lines flown S to N. Coastal survey flown to Flagler pier to verify land based sighting.
2-Feb-09	fwri20090202		X			--	6	12	5	3.4	0	0		Yes	No survey lines flown. Coastal survey from St. Augustine to S of Ponce Inlet (intended to go to Cape Canaveral) attempted in search of #3420 with malfunctioning telemetry buoy. Turned around and headed back N due to approaching frontal system and rain.
3-Feb-09	fwri20090203		X												No fly- high wind
4-Feb-09	fwri20090204		X												No fly- high wind
5-Feb-09	fwri20090205		X												No fly- high wind
6-Feb-09	fwri20090206			X		27-34	10	26	4	7.5	220.14	220.14	Yes	Yes	Lines 27-34 flown S to N. Flew south to verify numerous public sightings near the Flagler pier. Did not complete survey due to diminishing daylight.
7-Feb-09	fwri20090207	X				25-34	7	18	2	7.2	281.61	281.61	Yes		Lines 29-34 flown N to S and Lines 25-28 flown S to N.
8-Feb-09	fwri20090208	X				25-34	10	20	3	7.8	281.61	281.61	Yes		All 10 lines flown N to S
9-Feb-09	fwri20090209	X				25-34	8	25	1	7.4	281.61	281.61	Yes		Lines 25-30 flown S to N and Lines 31-34 flown N to S.
10-Feb-09	fwri20090210	X				25-34	6	24	0	6.6	281.61	281.61	Yes		All 10 lines flown N to S
11-Feb-09	fwri20090211		X												No fly- high wind offshore
12-Feb-09	fwri20090212	X				25-34	0	0	0	4.0	281.61	281.61			All 10 lines flown N to S. Standby until 1000 due to low ceiling and rain.
13-Feb-09	fwri20090213	X				25-34	3	9	1	6.3	281.61	281.61			All 10 lines flown N to S
14-Feb-09	fwri20090214		X												No fly- rain
15-Feb-09	fwri20090215		X												No fly- rain
16-Feb-09	fwri20090216		X												No fly- high wind
17-Feb-09	fwri20090217			X		25-34	4	13	2	5.4	197.01	197.01	Yes		All 10 lines flown N to S. Standby until 1130 due high wind. Lines 27-28 cut at 8055W and lines 29-34 cut at 8100W due to time restraints. Sighted dead calf floating nearshore off Ponte Vedra.
18-Feb-09	fwri20090218		X												No fly- high wind
19-Feb-09	fwri20090219		X												No fly- rain
20-Feb-09	fwri20090220		X												No fly- high wind
21-Feb-09	fwri20090221				X	17-26	9	16	6	7.7	247.95	247.95			2-plane contingency survey. Lines 17-24 flown S to N, cut at 8055W, and lines 25-26 flown N to S, cut at 8100W.
22-Feb-09	fwri20090222			X		25-34	2	3	1	4.0	182.61	182.61			All 10 lines flown N to S. Lines 25-30 cut at 8100W and lines 31-34 cut at 8055W due to high sea state offshore.

Table 2: FWRI AERIAL SURVEY ACTIVITIES

Date	Survey File Name	Full SEWS	None	Partial SEWS	2-Plane Cont.	EWS Lines (SEWS 25-34)	Number of Sightings	Number of Whales	M/C Pair	Hobbs	Nautical Miles Flown	Nautical miles flown sea state < 3	WVI	Coastal Survey	Comments
23-Feb-09	fwri20090223		X												No fly- high wind
24-Feb-09	fwri20090224		X												No fly- high wind
25-Feb-09	fwri20090225	X				25-34	3	6	2	3.7	164.61	153.52			All 10 lines flown N to S. All lines cut at 8100W due to high sea state offshore and time restraints. Standby until 1045 due to wind and high sea state.
26-Feb-09	fwri20090226	X				25-34	5	10	2	6.1	281.61	281.61			All 10 lines flown N to S
27-Feb-09	fwri20090227	X				25-34	5	15	4	6.8	281.61	281.61			All 10 lines flown N to S
28-Feb-09	fwri20090228		X												No fly- high wind
1-Mar-09	fwri20090301		X												No fly- high wind and rain
2-Mar-09	fwri20090302		X												No fly- high wind
3-Mar-09	fwri20090303		X												No fly- high wind
4-Mar-09	fwri20090304		X				1	1	0	3.6	0	0			Standby until 1145 due to high wind. No survey lines flown, sea state 4. Relocated entangled whale #3311 in order to assess entanglement configuration and behavior in preparation for disentanglement response on Mar 5.
5-Mar-09	fwri20090305				X	17-30	10	24	6	9.1	299.34	299.34	Yes	Yes	2-plane contingency survey. Flew south to Daytona Beach to locate entangled whale #3311. Relieved by NEWS survey team at 10:15 to begin survey. Lines 21-24 cut at 8055W. Lines 17-20 and 25-30 cut at 8100W due to diminishing daylight.
6-Mar-09	fwri20090306				X	17-34	7	14	6	8.0	338.49	338.49	Yes		2-plane contingency survey. Takeoff at 08:00. Lines 17-24 flown S to N and lines 25-34 flown N to S, all lines out to 8055W. Pod of 13 pilot whales sighted approx 25 miles offshore Ponte Vedra.
7-Mar-09	fwri20090307	X				25-34	4	11	1	5.4	281.61	281.61			All 10 lines flown N to S
8-Mar-09	fwri20090308	X				25-34	1	1	0	5.0	281.61	281.61	Yes		All 10 lines flown N to S
9-Mar-09	fwri20090309	X				25-34	1	2	1	5.0	281.61	281.61			All 10 lines flown N to S. Pod of 12 pilot whales sighted nearshore Vilano Beach.
10-Mar-09	fwri20090310	X				25-34	0	0	0	4.0	281.61	281.61			All 10 lines flown N to S
11-Mar-09	fwri20090311	X				25-34	0	0	0	3.9	281.61	281.61			All 10 lines flown S to N. Standby until 0945 due to fog.
12-Mar-09	fwri20090312		X			25-34									No fly- low survey hours. 2-plane contingency survey flown by NEWS/CEWS.
13-Mar-09	fwri20090313		X												No fly- fog. Standby until 1020.
14-Mar-09	fwri20090314		X												No fly- fog. Standby until 1000.
15-Mar-09	fwri20090315	X				25-34	0	0	0	3.9	281.61	281.61			All 10 lines flown N to S. Standby until 1200 due to fog.

Table 2: FWRI AERIAL SURVEY ACTIVITIES

Date	Survey File Name	Full SEWS	None	Partial SEWS	2-Plane Cont.	EWS Lines (SEWS 25-34)	Number of Sightings	Number of Whales	M/C Pair	Hobbs	Nautical Miles Flown	Nautical miles flown sea state < 3	WVI	Coastal Survey	Comments
16-Mar-09	fwri20090316			X		25-34	0	0	0	3.6	243.81	243.81			All 10 lines flown N to S. Standby until 1215 due to fog. Lines 25-26 cut at 8100W and lines 27-28 cut at 8055W due to offshore fog.
17-Mar-09	fwri20090317		X												No fly- high wind and low ceiling
18-Mar-09	fwri20090318		X												No fly- high wind
19-Mar-09	fwri20090319	X				25-34	1	2	1	4.3	281.61	281.61			All 10 lines flown N to S. Standby until 1000 due to high wind.
20-Mar-09	fwri20090320		X												No fly- fog and high wind
21-Mar-09	fwri20090321		X												No fly- high wind
22-Mar-09	fwri20090322		X												No fly- high wind
23-Mar-09	fwri20090323		X												No fly- high wind and rain
24-Mar-09	fwri20090324			X		21-34	2	2	0	6.6	373.61	302.99			All 10 lines flown N to S. Lines 25-26 cut at the 8100W due to high sea state. Landed after line 28 to evaluate inclement weather/increase in sea state. After isolated storm passed through area flew N to cover Jax channel lines 21-24 N to S and then transited S to fly lines 29-34.
25-Mar-09	fwri20090325			X		25-34	1	1	0	4.3	209.61	209.61		Yes	All 10 lines flown N to S. Lines 25-34 cut at 8055W due to forecasted increase in winds offshore. After completing SEWS survey, flew coastal survey to the Flagler Pier.
26-Mar-09	fwri20090326		X												No fly- high wind
27-Mar-09	fwri20090327		X												No fly- high wind
28-Mar-09	fwri20090328		X												No fly- high wind
29-Mar-09	fwri20090329		X												No fly high wind
30-Mar-09	fwri20090330	X				25-34	0	0	0	4.0	281.61	281.61			Flew all 10 lines N to S. Standby until 1200 due to wind.
31-Mar-09	fwri20090331	X				25-34	0	0	0	3.9	281.61	281.61			All 10 lines flown N to S

TABLE 3: FWRI AERIAL SURVEY SIGHTINGS - IDENTIFICATIONS ARE PRELIMINARY

Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	Last Sighting Time (L)	Time (L) Paged	SEWS Number	Comments
12/18/2008	1232	29.91408	-81.07189	A	1266	F	A	W/CALF, LOG, BOD CNT	1249	1311	SEWS001	
12/18/2008	1232	29.91408	-81.07189	B	2009CalfOf1266		C	CALF W/MOM, BOD CNT	1249	1311	SEWS001	
12/18/2008	1320	29.87555	-81.14458	C	1608	F	23	W/CALF, NURS	1337	1352	SEWS002	
12/18/2008	1320	29.87555	-81.14458	D	2009CalfOf1608		C	CALF W/MOM, NURS	1337	1352	SEWS002	
12/19/2008	1131	30.63749	-81.26150	A	2145	F	18	W/CALF, LOG, NURS	1145	1156	SEWS003	
12/19/2008	1131	30.63749	-81.26150	B	2009CalfOf2145		C	CALF W/MOM, NURS	1145	1156	SEWS003	
12/19/2008	1317	30.44770	-81.22155	C	3320	F	A	W/CALF, AGG VSL	1348	1401	SEWS004	
12/19/2008	1317	30.44770	-81.22155	D	2009CalfOf3320		C	CALF W/MOM, AGG VSL	1348	1401	SEWS004	
12/26/2008	1241	29.78098	-81.23258	A	2007CalfOf1701		U 2	FRST ENTGL, FL, MUD, SFC TR, SUB TR	1404	1258	SEWS005	Entangled whale first sighted
12/26/2008	1501	29.73548	-81.19195	B	2007CalfOf1701		U 2	ENTGL, FL, W/TELBUOY, SFC TR, SUB TR	1720			Entangled whale relocation during first response effort, not repaged
12/27/2008	1051	29.94928	-81.26058	A	2007CalfOf1701		U 2	ENTGL, FL, W/TELBUOY, SFC TR, SUB TR, BODO	1318	1104	SEWS006	Entangled whale relocation with telemetry equipment
12/27/2008	1426	30.07010	-81.29099	B	2007CalfOf1701		U 2	ENTGL, FL, W/TELBUOY, SFC TR, SUB TR	1629			Entangled whale disentanglement response support, not repaged
12/27/2008	1555	30.09402	-81.29737	C	3651	M	3	BODO, SAG, BEL/BEL	1616	1630	SEWS007	
12/27/2008	1555	30.09402	-81.29737	D	BK03BOF07		U	BODO, SAG, BEL/BEL	1616	1630	SEWS007	
12/27/2008	1636	30.09650	-81.20811	E	1266	F	A	W/CALF, BOD CNT	1651	1712	SEWS008	
12/27/2008	1636	30.09650	-81.20811	F	2009CalfOf1266		C	CALF W/MOM	1651	1712	SEWS008	
12/28/2008	1045	29.92569	-81.13010	A	1266	F	A	W/CALF	1054	1107	SEWS009	
12/28/2008	1045	29.92569	-81.13010	B	2009CalfOf1266		C	CALF W/MOM	1054	1107	SEWS009	
12/30/2008	1021	30.17624	-81.25623	A	1608	F	23	W/CALF	1049	1100	SEWS010	
12/30/2008	1021	30.17624	-81.25623	B	2009CalfOf1608		C	CALF W/MOM, WH BEL	1049	1100	SEWS010	
12/30/2008	1209	30.00605	-81.18478	C	1151	F	A	W/CALF, BOD CNT	1247	1315	SEWS012	Sighting near SEWS011, called in together
12/30/2008	1209	30.00605	-81.18478	D	2009CalfOf1151		C	CALF W/MOM, BOD CNT	1247	1315	SEWS012	
12/30/2008	1215	30.01140	-81.18607	E	3108	F	8	W/CALF, BOD CNT, BEL UP, BLK BEL	1229	1312	SEWS011	Sighting near SEWS012, called in together
12/30/2008	1215	30.01140	-81.18607	F	2009CalfOf3108		C	CALF W/MOM, BOD CNT, BEL UP, BLK BEL	1229	1312	SEWS011	
12/30/2008	1412	29.86210	-81.00162	G	1266	F	A	W/CALF	1426	1433	SEWS013	
12/30/2008	1412	29.86210	-81.00162	H	2009CalfOf1266		C	CALF W/MOM	1426	1433	SEWS013	
1/2/2009	1054	30.21606	-81.26953	A	1151	F	A	W/CALF	1102	1110	SEWS014	
1/2/2009	1054	30.21606	-81.26953	B	2009CalfOf1151		C	CALF W/MOM	1102	1110	SEWS014	
1/2/2009	1114	30.21350	-81.19609	C	1612	F	A	W/CALF, NURS	1139	1146	SEWS015	
1/2/2009	1114	30.21350	-81.19609	D	2009CalfOf1612		C	CALF W/MOM, NURS	1139	1146	SEWS015	
1/2/2009	1336	29.97048	-81.11338	E	1266	F	A	W/CALF	1356	1402	SEWS016	
1/2/2009	1336	29.97048	-81.11338	F	2009CalfOf1266		C	CALF W/MOM	1356	1402	SEWS016	
1/2/2009	1412	29.91825	-81.13404	G	3108	F	8	W/CALF	1437	1446	SEWS017	
1/2/2009	1412	29.91825	-81.13404	H	2009CalfOf3108		C	CALF W/MOM	1437	1446	SEWS017	
1/4/2009	1330	29.90058	-81.14648	A	1266	F	A	W/CALF, BOD CNT, NURS	1342	1352	SEWS018	

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Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	Last Sighting Time (L)	Time (L) Paged	SEWS Number	Comments
1/4/2009	1330	29.90058	-81.14648	B	2009CalfOf1266		C	CALF W/MOM, NURS, BOD CNT	1342	1352	SEWS018	
1/5/2009	1405	29.80742	-81.14806	A	1266	F	A	W/CALF, NURS, BOD CNT, ROLL	1422	1435	SEWS019	
1/5/2009	1405	29.80742	-81.14806	B	2009CalfOf1266		C	CALF W/MOM, NURS, BOD CNT, ROLL	1422	1435	SEWS019	
1/14/2009	1436	29.87157	-81.13970	A	no photo			SAG	1446	1510	SEWS020	
1/14/2009	1436	29.87157	-81.13970	B	no photo			SAG	1446	1510	SEWS020	
1/14/2009	1436	29.87157	-81.13970	C	no photo			SAG	1446	1510	SEWS020	
1/14/2009	1436	29.87157	-81.13970	D	no photo			SAG	1446	1510	SEWS020	
1/14/2009	1436	29.87157	-81.13970	E	no photo			SAG	1446	1510	SEWS020	
1/14/2009	1436	29.87157	-81.13970	F	no photo			SAG	1446	1510	SEWS020	
1/14/2009	1436	29.87157	-81.13970	G	no photo			SAG	1446	1510	SEWS020	
1/14/2009	1524	29.84739	-81.13610	H	2008CalfOf2753	U	1	SAG, WH CHN	1609		SEWS020	Whales H-N are resight of whales A-G paged at 1510, not repaged
1/14/2009	1524	29.84739	-81.13610	I	3405	F	5	SAG	1609		SEWS020	
1/14/2009	1524	29.84739	-81.13610	J	2007CalfOf1701	U	2	SAG	1609		SEWS020	Previously entangled 2008-2009 season
1/14/2009	1524	29.84739	-81.13610	K	3430	F	5	SAG, FLIP	1609		SEWS020	
1/14/2009	1524	29.84739	-81.13610	L	2007CalfOf2430	U	2	SAG	1609		SEWS020	
1/14/2009	1524	29.84739	-81.13610	M	S013		U	SAG	1609		SEWS020	
1/14/2009	1524	29.84739	-81.13610	N	3343	M	6	SAG, FLIP	1609		SEWS020	
1/15/2009	1018	30.23270	-81.11349	A	3311	U	6	ENTGL, SUB TR, W/TELBUOY, NOT FL	1054	1115	SEWS021	Entangled
1/15/2009	1632	30.15826	-81.15434	B	3311	U	6	ENTGL, SUB TR, W/TELBUOY, NOT FL				Resight of entangled Whale A, not repaged
1/15/2009	1327	29.89348	-81.21068	C	2145	F	18	W/CALF, NURS, BOD CNT	1338	1348	SEWS022	
1/15/2009	1327	29.89348	-81.21068	D	2009CalfOf2145		C	CALF W/MOM, NURS, BOD CNT, ROLL, WH BEL	1338	1348	SEWS022	
1/18/2009	0942	30.01216	-81.24497	A	no photo			SAG	942	1000	SEWS023	Did not photograph whales A-G because disentanglement support
1/18/2009	0942	30.01216	-81.24497	B	no photo			SAG	942	1000	SEWS023	
1/18/2009	0942	30.01216	-81.24497	C	no photo			SAG	942	1000	SEWS023	
1/18/2009	0942	30.01216	-81.24497	D	no photo			SAG	942	1000	SEWS023	
1/18/2009	0944	30.00662	-81.23534	E	no photo			SAG	944	1006	SEWS024	
1/18/2009	0944	30.00662	-81.23534	F	no photo			SAG	944	1006	SEWS024	
1/18/2009	0949	30.02881	-81.18250	G	no photo			BRCH, WH BEL	948	1008	SEWS025	
1/18/2009	1210	31.17102	-79.84006	H	3311	U	6	ENTGL, NOT FL, W/TELBUOY, SUB TR	1204	1219	SEWS026	Entangled whale relocation to verify telemetry buoy attachment
1/18/2009	1426	30.06549	-81.22504	I	CT03RB06		U	SAG, BEL/BEL, WH BEL	1447	1513	SEWS027	
1/18/2009	1426	30.06549	-81.22504	J	3560	U	4	SAG, BEL/BEL	1447	1513	SEWS027	

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1/18/2009	1426	30.06549	-81.22504	K	S007		U	SAG	1447	1513	SEWS027		
1/18/2009	1426	30.06549	-81.22504	L	S015		U	SAG	1447	1513	SEWS027		
1/18/2009	1426	30.06549	-81.22504	1	CT05SEUS08		U	SAG	1447	1513	SEWS027		
1/18/2009	1426	30.06549	-81.22504	2	3620	M	3	SAG	1447	1513	SEWS027		
1/18/2009	1438	30.08317	-81.23032	M	2007CalfOf1701		U	2	BRCH, LBTL, BODO, MOPN, W/UNPH EGS			Previously entangled 2008-2009 season, whales M-O not paged	
1/18/2009	1438	30.08317	-81.23032	N	no photo				BODO				
1/18/2009	1438	30.08317	-81.23032	O	no photo				BODO				
1/18/2009	1544	30.07917	-81.22896	P	2007CalfOf3360		U	2	SAG	1614	1649	SEWS028	
1/18/2009	1544	30.07917	-81.22896	Q	3560		U	4	SAG	1614	1649	SEWS028	
1/18/2009	1544	30.07917	-81.22896	R	CT03RB06		U		SAG	1614	1649	SEWS028	
1/18/2009	1614	30.09048	-81.22062	S	2008CalfOf2753		U	1	SAG	1629	1652	SEWS029	
1/18/2009	1614	30.09048	-81.22062	T	CT05SEUS08		U		SAG	1629	1652	SEWS029	
1/18/2009	1614	30.09048	-81.22062	U	S007		U		SAG	1629	1652	SEWS029	
1/18/2009	1614	30.09048	-81.22062	3	S015		U		SAG	1629	1652	SEWS029	
1/21/2009	1343	30.46150	-81.13518	A	1266	F	A		W/CALF	1401	1410	SEWS030	
1/21/2009	1343	30.46150	-81.13518	B	2009CalfOf1266		C		CALF W/MOM	1401	1410	SEWS030	
1/21/2009	1511	30.61710	-81.06212	C	2008CalfOf2330		U	1	POST, MOPN, HD LFT	1543	1553	SEWS031	
1/21/2009	1535	30.62482	-81.06905	D	3440	F	A		W/CALF	1543	1553	SEWS031	
1/21/2009	1535	30.62482	-81.06905	E	2009CalfOf3440		C		CALF W/MOM, ROLL	1543	1553	SEWS031	
1/21/2009	1606	30.55233	-81.35448	F	2145	F	18		W/CALF	1610	1618	SEWS032	
1/21/2009	1606	30.55233	-81.35448	G	2009CalfOf2145		C		CALF W/MOM, WH CHN	1610	1618	SEWS032	
1/21/2009	1615	30.50162	-81.36892	H	3311		U	6	ENTGL, NOT FL, W/TELBUOY, FL, SUB TR	1715	1722	SEWS033	Entangled whale relocation for documentation
1/22/2009	0925	30.49101	-81.19167	A	3311		U	6	ENTGL, NOT FL, W/TELBUOY, FL, SUB TR	925	933	SEWS034	Entangled whale relocation/standby for disentanglement efforts
1/22/2009	1305	30.58666	-81.28915	B	1012	F	A		W/CALF	1304	1322	SEWS035	
1/22/2009	1305	30.58666	-81.28915	C	2009CalfOf1012		C		CALF W/MOM	1304	1322	SEWS035	
1/22/2009	1403	30.52824	-81.11539	D	3546		U	4	W/CALF UNPH	1403	1410	SEWS036	
1/22/2009	1403	30.52824	-81.11539	E	no photo		C			1403	1410	SEWS036	
1/22/2009	1410	30.47618	-81.05017	F	3311		U	6	ENTGL, NOT FL, W/TELBUOY, BODO, SUB TR				Entangled whale last pass for day, not paged
1/23/2009	1028	30.13696	-81.24429	A	3311		U	6	ENTGL, NOT FL, W/TELBUOY, SUB TR	1141	1155	SEWS038	Entangled whale relocation/standby for disentanglement efforts
1/23/2009	1119	30.10692	-81.21744	B	1612	F	A		W/CALF	1119	1152	SEWS037	Whale B-C called in with entangled whale
1/23/2009	1119	30.10692	-81.21744	C	2009CalfOf1612		C		CALF W/MOM	1119	1152	SEWS037	
1/23/2009	1439	30.06339	-81.23348	D	3311		U	6	ENTGL, NOT FL, W/TELBUOY, BODO, SUB TR				Entangled whale last pass for day, not paged

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1/23/2009	1419	30.07758	-81.21468	E	1612	F	A	W/CALF, BOD CNT				Resight of whales B-C, no movement, not repaged
1/23/2009	1419	30.07758	-81.21468	F	2009CalfOf1612		C	CALF W/MOM, ROLL, FLIP, BOD CNT				
1/25/2009	0918	29.78819	-81.05334	A	1266	F	A	W/CALF, BOD CNT, BODO	935	950	SEWS039	
1/25/2009	0918	29.78819	-81.05334	B	2009CalfOf1266		C	CALF W/MOM, BOD CNT, BODO, FLIP, ROLL, HD LFT	935	950	SEWS039	
1/31/2009	1520	30.55823	-81.07073	A	no photo				1520	1716	SEWS040	Relayed position at later time with other sightings because of disentanglement response
1/31/2009	1541	30.57846	-81.07364	B	3420	F	5	ENTGL, W/TELBUOY, BODO, FL, NOT FL, SUB TR	1734	1752	SEWS042	Entangled whale relief/standby for first response team
1/31/2009	1622	30.52501	-81.07091	C	no photo			SAG	1622	1718	SEWS041	Relayed position of whales C-E at later time with other sightings because of disentanglement response
1/31/2009	1622	30.52501	-81.07091	D	no photo			SAG	1622	1718	SEWS041	
1/31/2009	1622	30.52501	-81.07091	E	no photo			SAG	1622	1718	SEWS041	
2/1/2009	0912	29.79727	-81.22946	A	3440	F	A	W/CALF, BOD CNT	922	904	MLD009	Paged whales A-B as an MLD, sighted later but not repaged by SEWS
2/1/2009	0912	29.79727	-81.22946	B	2009CalfOf3440		C	CALF W/MOM, BOD CNT, ROLL	922	904	MLD009	
2/1/2009	0939	29.62038	-81.16738	C	2008CalfOf3130	U	1		955	1003	SEWS043	
2/1/2009	1012	29.50582	-81.08562	D	2008CalfOf2753	U	1	SUB TR, APPR	1046	1110	SEWS044	
2/1/2009	1017	29.50006	-81.07224	E	3560		4	SAG	1049	1110	SEWS044	
2/1/2009	1017	29.50006	-81.07224	F	3603	F	3	SAG, FLIP	1049	1110	SEWS044	
2/1/2009	1017	29.50006	-81.07224	G	3411	F	5		1051	1111	SEWS045	
2/1/2009	1114	29.77301	-81.11646	H	2410	M	A	SAG, BEL/BEL, WH CHN, WH BEL	1129	1139	SEWS046	
2/1/2009	1114	29.77301	-81.11646	I	1146	M	A	SAG, BEL/BEL	1129	1139	SEWS046	
2/1/2009	1114	29.77301	-81.11646	J	1607	M	23	SAG, BEL/BEL	1129	1139	SEWS046	
2/1/2009	1413	30.05638	-80.91588	K	1817	F	A	W/CALF, LOG	1419	1425	SEWS047	
2/1/2009	1413	30.05638	-80.91588	L	2009CalfOf1817		C	CALF W/MOM, LOG	1419	1425	SEWS047	
2/1/2009	1443	30.14657	-81.17965	M	CT03RB06		U	LOG	1532	1543	SEWS048	
2/1/2009	1443	30.14657	-81.17965	N	2006CalfOf1248	M	3	SAG	1532	1543	SEWS048	
2/1/2009	1443	30.14657	-81.17965	O	S015		U	SAG	1532	1543	SEWS048	
2/1/2009	1443	30.14657	-81.17965	P	3460		5	SAG	1532	1543	SEWS048	
2/1/2009	1446	30.14489	-81.18249	Q	3520	F	4		1525	1544	SEWS049	
2/1/2009	1443	30.14657	-81.17965	R	2007CalfOf2645	U	2	SAG, APPR	1514	1546	SEWS050	
2/1/2009	1511	30.18580	-81.16475	S	2008CalfOf3115	U	1	BRCH	1533	1548	SEWS051	

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2/1/2009	1555	30.19384	-81.12231	T	2018	M	19	SAG, UW EXH	1605	1624	SEWS052	
2/1/2009	1555	30.19384	-81.12231	U	1307	M	A	SAG, BEL/BEL	1605	1624	SEWS052	
2/1/2009	1555	30.19384	-81.12231	V	2406	M	15	SAG	1605	1624	SEWS052	
2/2/2009	0922	29.65615	-81.15813	A	no photo							Flying coastal listening for tag of entangled whale #3420, passed whales A-B to MLD aircam
2/2/2009	0922	29.65615	-81.15813	B	no photo							
2/2/2009	0947	29.46091	-81.07443	C	1151	F	A	W/CALF	958	1002	SEWS053	
2/2/2009	0947	29.46091	-81.07443	D	2009CalfOf1151		C	CALF W/MOM	958	1002	SEWS053	
2/2/2009	1002	29.39426	-81.06664	E	3108	F	8	W/CALF, NURS, BODO	1022	1032	SEWS054	
2/2/2009	1002	29.39426	-81.06664	F	2009CalfOf3108		C	CALF W/MOM, NURS, BODO	1022	1032	SEWS054	
2/2/2009	1033	29.23431	-81.00361	G	1711	F	22	W/CALF, BOD CNT, ROLL	1103	1112	SEWS055	
2/2/2009	1033	29.23431	-81.00361	H	2009CalfOf1711		C	CALF W/MOM, BOD CNT, ROLL	1103	1112	SEWS055	
2/2/2009	1156	29.95539	-81.22472	I	3290	F	7	W/CALF	1200	1224	SEWS056	
2/2/2009	1156	29.95539	-81.22472	J	2009CalfOf3290		C	CALF W/MOM, WH CHN	1200	1224	SEWS056	
2/2/2009	1202	29.97674	-81.26496	K	1817	F	A	W/CALF, BOD CNT	1208	1228	SEWS057	
2/2/2009	1202	29.97674	-81.26496	L	2009CalfOf1817		C	CALF W/MOM, BOD CNT	1208	1228	SEWS057	
2/6/2009	0926	29.91388	-81.24712	A	2145	F	18	W/CALF, NURS, AGG VSL	957	1004	SEWS058	
2/6/2009	0926	29.91388	-81.24712	B	2009CalfOf2145		C	CALF W/MOM, NURS, AGG VSL	957	1004	SEWS058	
2/6/2009	1018	29.49976	-81.11181	C	2427	M	15	SAG				Already paged whales C-N including whales 1-2 as MLD sighting MLD016
2/6/2009	1018	29.49976	-81.11181	D	3541	M	4	SAG				
2/6/2009	1018	29.49976	-81.11181	E	S013	U		SAG				
2/6/2009	1031	29.49733	-81.12529	F	2008CalfOf2330	U	1	SAG				
2/6/2009	1031	29.49733	-81.12529	G	3760	U	2	SAG				
2/6/2009	1031	29.49733	-81.12529	H	3620	M	3	SAG				
2/6/2009	1049	29.48605	-81.11437	I	2006CalfOf1248	M	3	SAG, BODO				
2/6/2009	1049	29.48605	-81.11437	J	3520	F	4	SAG, BODO				
2/6/2009	1049	29.48605	-81.11437	K	BK03BOF07	U		SAG, BODO				
2/6/2009	1049	29.48605	-81.11437	L	3208?	M	7	SAG, BODO				
2/6/2009	1049	29.48605	-81.11437	1	3460	U	5	SAG, BODO				
2/6/2009	1049	29.48605	-81.11437	2	S013	U		SAG, BODO				
2/6/2009	1057	29.47781	-81.10312	M	3513	F	4	BOD CNT				
2/6/2009	1057	29.47781	-81.10312	N	3405	F	5	BOD CNT				
2/6/2009	1152	29.82345	-80.87526	O	1334	F	A	W/CALF, BOD CNT	1215	1226	SEWS059	
2/6/2009	1152	29.82345	-80.87526	P	2009CalfOf1334		C	CALF W/MOM, WH CHN, WH BEL, ROLL, BOD CNT, BEL UP	1215	1226	SEWS059	
2/6/2009	1234	29.88701	-81.18331	Q	2008CalfOf1245	U	1	BODO	1252	1308	SEWS060	

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2/6/2009	1234	29.88701	-81.18331	R	3314	F	6	BODO	1252	1308	SEWS060		
2/6/2009	1256	29.88561	-81.15050	S	2320	F	A	W/CALF, BOD CNT	1318	1329	SEWS061		
2/6/2009	1256	29.88561	-81.15050	T	2009CalfOf2320		C	CALF W/MOM, BOD CNT	1318	1329	SEWS061		
2/6/2009	1505	30.03055	-80.83951	U	3440	F	A	W/CALF, BOD CNT	1516	1532	SEWS062		
2/6/2009	1505	30.03055	-80.83951	V	2009CalfOf3440		C	CALF W/MOM, BOD CNT, ROLL, BLK BEL, BLK CHN	1516	1532	SEWS062		
2/6/2009	1540	30.07122	-81.27387	W	1968	F	20	BOD CNT, BEL UP, BLK BEL, BLK CHN	1550	1559	SEWS063		
2/6/2009	1540	30.07122	-81.27387	X	2413	F	15	BOD CNT	1550	1559	SEWS063		
2/7/2009	0915	30.02971	-81.28047	A	1968	F	20		931	937	SEWS064		
2/7/2009	0915	30.02971	-81.28047	B	2413	F	15		931	937	SEWS064		
2/7/2009	1007	29.96929	-81.15906	C	3411	F	5	LOG	1019	1036	SEWS065		
2/7/2009	1050	29.90686	-81.12847	D	3545	M	4	SAG, AGG VSL	1110	1130	SEWS066		
2/7/2009	1050	29.90686	-81.12847	E	3546	U	4	SAG, AGG VSL, BLK CHN, BLK BEL, BEL UP	1110	1130	SEWS066		
2/7/2009	1050	29.90686	-81.12847	F	BK13SEUS08		U	SAG, AGG VSL	1110	1130	SEWS066		
2/7/2009	1119	29.88250	-81.08859	G	2042	F	19	SAG, WH BEL, WH CHN	1133	1139	SEWS067		
2/7/2009	1119	29.88250	-81.08859	H	2709	M	12	SAG	1133	1139	SEWS067		
2/7/2009	1119	29.88250	-81.08859	I	3442	M	5	SAG, WH CHN, BEL/BEL	1133	1139	SEWS067		
2/7/2009	1119	29.88250	-81.08859	J	3560	U	4	SAG, BEL/BEL	1133	1139	SEWS067		
2/7/2009	1201	29.88082	-81.08115	K	no photo			SAG				Whales K-N are resighted of whales G-J, not repaged	
2/7/2009	1201	29.88082	-81.08115	L	no photo			SAG					
2/7/2009	1201	29.88082	-81.08115	M	no photo			SAG					
2/7/2009	1201	29.88082	-81.08115	N	no photo			SAG					
2/7/2009	1209	29.83960	-81.23037	O	2320	F	A	W/CALF, NURS, BOD CNT				Whales O-P already paged as MLD018, not repaged	
2/7/2009	1209	29.83960	-81.23037	P	2009CalfOf2320		C	CALF W/MOM, NURS, BOD CNT					
2/7/2009	1440	30.17840	-81.35619	Q	2503	F	14	W/CALF, BODO	1459	1503	SEWS068		
2/7/2009	1440	30.17840	-81.35619	R	2009CalfOf2503		C	CALF W/MOM, BODO	1459	1503	SEWS068		
2/8/2009	0912	29.93241	-81.26027	A	1968	F	20	BOD CNT, BODO	923	932	SEWS069		
2/8/2009	0912	29.93241	-81.26027	B	2413	F	15	BOD CNT, BODO	923	932	SEWS069		
2/8/2009	0954	30.24377	-81.14509	C	3370	F	A		1010	1053	SEWS070		
2/8/2009	1012	30.23566	-81.16678	D	3411	F	5		1029	1057	SEWS071		
2/8/2009	1012	30.23566	-81.16678	E	3546	U	4		1029	1057	SEWS071		
2/8/2009	1021	30.22485	-81.15689	F	S023		U		1044	1100	SEWS072		
2/8/2009	1021	30.22485	-81.15689	G	2008CalfOf3115		U	1		1044	1100	SEWS072	
2/8/2009	1115	30.17354	-81.24480	H	2145	F	18	W/CALF, BOD CNT, ROLL	1132	1147	SEWS073		
2/8/2009	1115	30.17354	-81.24480	I	2009CalfOf2145		C	CALF W/MOM, BOD CNT, ROLL, WH CHN, WH BEL	1132	1147	SEWS073		
2/8/2009	1235	30.02459	-81.14957	J	3442	M	5	WH CHN, APPR	1247	1311	SEWS074		
2/8/2009	1249	30.01025	-81.15695	K	2709	M	12	SAG	1302	1319	SEWS075		
2/8/2009	1249	30.01025	-81.15695	L	3545	M	4	SAG, BEL/BEL	1302	1319	SEWS075		

TABLE 3: FWRI AERIAL SURVEY SIGHTINGS - IDENTIFICATIONS ARE PRELIMINARY

Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	Last Sighting Time (L)	Time (L) Paged	SEWS Number	Comments
2/8/2009	1249	30.01025	-81.15695	M	2042	F	19	SAG, WH CHN, WH BEL, BEL/BEL	1302	1319	SEWS075	
2/8/2009	1249	30.01025	-81.15695	N	BK13SEUS08		U	SAG	1302	1319	SEWS075	
2/8/2009	1445	29.91494	-81.19209	O	1968	F	20	AGG VSL, AVD, BOD CNT	1458	1525	SEWS076	
2/8/2009	1445	29.91494	-81.19209	P	2413	F	15	AGG VSL, AVD, BOD CNT	1458	1525	SEWS076	
2/8/2009	1612	29.79434	-80.88770	Q	1515	F	A	W/CALF, BOD CNT, ROLL	1618	1635	SEWS077	
2/8/2009	1612	29.79434	-80.88770	R	2009CalfOf1515		C	CALF W/MOM, BOD CNT, ROLL, WH CHN	1618	1635	SEWS077	
2/8/2009	1629	29.78588	-81.08928	S	2320	F	A	W/CALF	1647	1654	SEWS078	
2/8/2009	1629	29.78588	-81.08928	T	2009CalfOf2320		C	CALF W/MOM, CH BRCH	1647	1654	SEWS078	
2/9/2009	0926	29.95804	-81.26539	A	1968	F	20		1118	1134	SEWS081	
2/9/2009	0926	29.95804	-81.26539	B	2413	F	15		1118	1134	SEWS081	
2/9/2009	1008	29.96490	-81.25925	C	1968	F	20		959	1014	SEWS079	
2/9/2009	1008	29.96490	-81.25925	D	2413	F	15		959	1014	SEWS079	
2/9/2009	1020	29.97596	-80.90071	E	2006CalfOf1248	M	3		1025	1133	SEWS080	
2/9/2009	1026	29.98018	-80.88838	F	3460	U	5	BEL/BEL	1118	1134	SEWS081	
2/9/2009	1026	29.98018	-80.88838	G	2006CalfOf2660	M	3	BEL/BEL, WH BEL, WH CHN	1118	1134	SEWS081	
2/9/2009	1037	29.98553	-80.88838	H	3550	U	4	SAG, AGG VSL, AVD	1118	1134	SEWS081	
2/9/2009	1037	29.98553	-80.88838	I	2006CalfOf2660	M	3	SAG, AGG VSL, AVD	1118	1134	SEWS081	
2/9/2009	1037	29.98553	-80.88838	J	2007CalfOf3360	U	2	SAG, AGG VSL, AVD	1118	1134	SEWS081	
2/9/2009	1037	29.98553	-80.88838	K	3208	M	7	SAG, AGG VSL, AVD	1118	1134	SEWS081	
2/9/2009	1037	29.98553	-80.88838	L	3460	U	5	SAG, AGG VSL, AVD	1118	1134	SEWS081	
2/9/2009	1037	29.98553	-80.88838	M	3681	U	3	SAG, AGG VSL, AVD	1118	1134	SEWS081	
2/9/2009	1037	29.98553	-80.88838	N	3520	F	4	SAG, AGG VSL, AVD	1118	1134	SEWS081	
2/9/2009	1037	29.98553	-80.88838	O	3513	F	4	SAG, AGG VSL, AVD	1118	1134	SEWS081	
2/9/2009	1037	29.98553	-80.88838	1	3620	M	3	SAG, AGG VSL, AVD	1118	1134	SEWS081	
2/9/2009	1037	29.98553	-80.88838	2	2427	M	15	SAG, AGG VSL, AVD	1118	1134	SEWS081	
2/9/2009	1137	30.02265	-80.90064	P	BK03BOF07		U	SAG, BEL/BEL, BEL UP, BLK BEL, WH CHN(SEE NOTE)	1156	1205	SEWS082	
2/9/2009	1137	30.02265	-80.90064	Q	3405	F	5	SAG, BEL UP, BLK BEL, BLK CHN	1156	1205	SEWS082	
2/9/2009	1137	30.02265	-80.90064	R	3541	M	4	SAG, BEL/BEL, WH BEL	1156	1205	SEWS080	
2/9/2009	1219	30.06621	-81.20972	S	2709	M	12	SAG	1237	1241	SEWS083	
2/9/2009	1219	30.06621	-81.20972	T	2042	F	19	SAG, WH BEL	1237	1241	SEWS083	
2/9/2009	1219	30.06621	-81.20972	U	3545	M	4	SAG	1237	1241	SEWS083	
2/9/2009	1547	29.82575	-81.13953	V	3290	F	7	W/CALF	1552	1559	SEWS084	
2/9/2009	1547	29.82575	-81.13953	W	2009CalfOf3290		C	CALF W/MOM, WH CHN	1552	1559	SEWS084	
2/10/2009	0920	30.13113	-81.32154	A	2709	M	12		940	947	SEWS085	
2/10/2009	0920	30.13113	-81.32154	B	2042	F	19	WH CHN	940	947	SEWS085	
2/10/2009	0951	30.23495	-81.17151	C	2008CalfOf2330	U	1	LOG	956	1037	SEWS086	
2/10/2009	1000	30.24262	-81.16123	D	3620	M	3	SAG	1027	1037	SEWS087	
2/10/2009	1000	30.24262	-81.16123	E	2007CalfOf3360	U	2	SAG	1027	1037	SEWS087	

TABLE 3: FWRI AERIAL SURVEY SIGHTINGS - IDENTIFICATIONS ARE PRELIMINARY

Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	Last Sighting Time (L)	Time (L) Paged	SEWS Number	Comments
2/10/2009	1000	30.24262	-81.16123	F	2006CalfOf1248	M	3	SAG	1027	1037	SEWS087	
2/10/2009	1000	30.24262	-81.16123	G	3681	U	3	SAG	1027	1037	SEWS087	
2/10/2009	1000	30.24262	-81.16123	H	3460	U	5	SAG	1027	1037	SEWS087	
2/10/2009	1000	30.24262	-81.16123	I	S029	U		SAG	1027	1037	SEWS087	
2/10/2009	1000	30.24262	-81.16123	J	BK03BOF07	U		SAG	1027	1037	SEWS087	
2/10/2009	1000	30.24262	-81.16123	K	2007CalfOf2645	U	2	SAG	1027	1037	SEWS087	
2/10/2009	1000	30.24262	-81.16123	L	3513	F	4	SAG	1027	1037	SEWS087	
2/10/2009	1000	30.24262	-81.16123	M	2006CalfOf2660	M	3	SAG	1027	1037	SEWS087	
2/10/2009	1000	30.24262	-81.16123	N	3208	M	7	SAG	1027	1037	SEWS087	
2/10/2009	1127	30.11273	-81.30836	O	2709	M	12	SAG, BODO, HD LFT	1134	1143	SEWS088	
2/10/2009	1127	30.11273	-81.30836	P	2042	F	19	SAG, BODO	1134	1143	SEWS088	
2/10/2009	1127	30.11273	-81.30836	Q	3545	M	4	SAG, BODO	1134	1143	SEWS088	
2/10/2009	1151	30.18852	-81.10486	R	2743	M	12		1213	1222	SEWS089	
2/10/2009	1151	30.18852	-81.10486	S	1706	F	22		1213	1222	SEWS089	
2/10/2009	1151	30.18852	-81.10486	T	3279	M	7		1213	1222	SEWS089	
2/10/2009	1151	30.18852	-81.10486	U	3346	M	6	ENTGL	1213	1222	SEWS089	
2/10/2009	1151	30.18852	-81.10486	V	3691	U	3		1213	1222	SEWS089	
2/10/2009	1451	29.86983	-81.13414	W	1968	F	20	BOD CNT	1506	1516	SEWS090	
2/10/2009	1451	29.86983	-81.13414	X	2413	F	15	BOD CNT	1506	1516	SEWS090	
2/13/2009	1009	30.13159	-81.01537	A	1901	M	20	SUB TR	1053	1100	SEWS091	
2/13/2009	1009	30.13159	-81.01537	B	2370	U	A	SUB TR	1053	1100	SEWS091	
2/13/2009	1009	30.13159	-81.01537	C	2540	M	A	SUB TR	1053	1100	SEWS091	
2/13/2009	1009	30.13159	-81.01537	D	1603	M	23	SUB TR	1053	1100	SEWS091	
2/13/2009	1009	30.13159	-81.01537	E	1307	M	A	SUB TR, BLK BEL, LBTL	1053	1100	SEWS091	
2/13/2009	1009	30.13159	-81.01537	F	1427	M	25	SUB TR	1053	1100	SEWS091	
2/13/2009	1216	30.21417	-81.31641	G	1246	F	A	W/CALF, NURS, BOD CNT, BODO	1239	1247	SEWS092	
2/13/2009	1216	30.21417	-81.31641	H	2009CalfOf1246	C		CALF W/MOM, NURS, BODO, BOD CNT	1239	1247	SEWS092	
2/13/2009	1418	29.84994	-81.03891	I	3314	F	6		1447	1454	SEWS093	
2/17/2009	1217	30.24416	-81.11636	A	1303	F	A	W/CALF, BOD CNT	1237	1306	SEWS094	
2/17/2009	1217	30.24416	-81.11636	B	2009CalfOf1303	C		CALF W/MOM, BOD CNT	1237	1306	SEWS094	
2/17/2009	1239	30.23291	-81.13012	C	1142	F	A	W/CALF, WH CHN	1249	1307	SEWS095	
2/17/2009	1239	30.23291	-81.13012	D	2009CalfOf1142	C		CALF W/MOM, WH CHN	1249	1307	SEWS095	
2/17/2009	1327	30.20347	-80.97131	E	BK01BOF07	U		SUB TR, SFC TR	1357	1403	SEWS096	
2/17/2009	1327	30.20347	-80.97131	F	3301	M	6	SUB TR, SFC TR	1357	1403	SEWS096	
2/17/2009	1327	30.20347	-80.97131	G	3330	M	6	SUB TR, SFC TR	1357	1403	SEWS096	
2/17/2009	1327	30.20347	-80.97131	H	3442	M	5	SUB TR, SFC TR	1357	1403	SEWS096	
2/17/2009	1327	30.20347	-80.97131	I	3120	M	8	SUB TR, SFC TR	1357	1403	SEWS096	
2/17/2009	1327	30.20347	-80.97131	J	3312	M	6	SUB TR, SFC TR	1357	1403	SEWS096	
2/17/2009	1327	30.20347	-80.97131	K	3401	M	5	SUB TR, SFC TR	1357	1403	SEWS096	
2/17/2009	1327	30.20347	-80.97131	L	BK13SEUS08	U		SUB TR, SFC TR	1357	1403	SEWS096	
2/17/2009	1452	30.11020	-81.28465	M	dead calf	C		FLTG DEAD, BEL UP, WH BEL, WH CHN				Not paged

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Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	Last Sighting Time (L)	Time (L) Paged	SEWS Number	Comments
2/21/2009	0946	30.28924	-81.11401	A	2791	F	12	W/CALF, BOD CNT	1009	1019	SEWS097	
2/21/2009	0946	30.28924	-81.11401	B	2009CalfOf2791		C	CALF W/MOM, BOD CNT	1009	1019	SEWS097	
2/21/2009	1048	30.39339	-81.07767	C	1968	F	20	BOD CNT	1110	1118	SEWS098	
2/21/2009	1048	30.39339	-81.07767	D	2413	F	15	BOD CNT	1110	1118	SEWS098	
2/21/2009	1207	30.52230	-81.15433	E	1315	F	A	W/CALF, BOD CNT	1228	1240	SEWS099	
2/21/2009	1207	30.52230	-81.15433	F	2009CalfOf1315		C	CALF W/MOM, BOD CNT	1228	1240	SEWS099	
2/21/2009	1253	30.58551	-81.16497	G	2008CalfOf1802	U	1		1304	1341	SEWS100	
2/21/2009	1308	30.63051	-81.19602	H	2123	F	18	W/CALF, BOD CNT	1315	1343	SEWS101	
2/21/2009	1308	30.63051	-81.19602	I	2009CalfOf2123		C	CALF W/MOM, BOD CNT, FLIP, ROLL, WH CHN, WH BEL	1315	1343	SEWS101	
2/21/2009	1316	30.61456	-81.20248	J	2320	F	A	W/CALF, BOD CNT	1331	1344	SEWS102	
2/21/2009	1316	30.61456	-81.20248	K	2009CalfOf2320		C	CALF W/MOM, BOD CNT	1331	1344	SEWS102	
2/21/2009	1354	30.61057	-81.13407	L	no photo				1555	1607	SEWS103	
2/21/2009	1509	30.64933	-81.15798	M	1503	F	24	W/CALF	1535	1606	SEWS104	
2/21/2009	1509	30.64933	-81.15798	N	2009CalfOf1503		C	CALF W/MOM, HD LFT	1535	1606	SEWS104	
2/21/2009	1620	30.22698	-81.22340	O	3108	F	8	W/CALF	1636	1652	SEWS105	
2/21/2009	1620	30.22698	-81.22340	P	2009CalfOf3108		C	CALF W/MOM	1636	1652	SEWS105	
2/22/2009	1012	30.11553	-80.99185	A	S024	U			1031	1044	SEWS106	
2/22/2009	1144	29.87850	-81.25142	B	2611	F	13	W/CALF, NURS	1201	1207	SEWS107	
2/22/2009	1144	29.87850	-81.25142	C	2009CalfOf2611		C	CALF W/MOM, NURS, FLIP	1201	1207	SEWS107	
2/25/2009	1232	30.22190	-81.20809	A	1303	F	A	W/CALF	1245	1253	SEWS108	
2/25/2009	1232	30.22190	-81.20809	B	2009CalfOf1303		C	CALF W/MOM	1245	1253	SEWS108	
2/25/2009	1251	30.20353	-81.17175	C	1968	F	20	BOD CNT	1300	1307	SEWS109	
2/25/2009	1251	30.20353	-81.17175	D	2413	F	15	BOD CNT	1300	1307	SEWS109	
2/25/2009	1355	30.04280	-81.24025	E	3290	F	7	W/CALF	1408	1416	SEWS110	
2/25/2009	1355	30.04280	-81.24025	F	2009CalfOf3290		C	CALF W/MOM	1408	1416	SEWS110	
2/26/2009	0959	30.17474	-81.25778	A	2008CalfOf1802	U	1	SAG, BEL/BEL	1026	1042	SEWS111	
2/26/2009	0959	30.17474	-81.25778	B	1804	M	21	SAG, BEL/BEL, WH CHN	1026	1042	SEWS111	
2/26/2009	1010	30.17059	-81.25562	C	3290	F	7	W/CALF	1028	1043	SEWS112	
2/26/2009	1010	30.17059	-81.25562	D	2009CalfOf3290		C	CALF W/MOM, WH CHN	1028	1043	SEWS112	
2/26/2009	1040	30.25525	-81.33605	E	1968	F	20	BODO, HD LFT	1059	1105	SEWS113	
2/26/2009	1040	30.25525	-81.33605	F	2413	F	15	BODO	1059	1105	SEWS113	
2/26/2009	1142	30.04770	-81.26086	G	1233	F	A	BODO	1203	1210	SEWS114	
2/26/2009	1142	30.04770	-81.26086	H	2142	M	18	BODO	1203	1210	SEWS114	
2/26/2009	1213	30.03418	-81.13900	I	1611	F	23	W/CALF, BOD CNT, NURS	1229	1235	SEWS115	
2/26/2009	1213	30.03418	-81.13900	J	2009CalfOf1611		C	CALF W/MOM, BOD CNT, NURS	1229	1235	SEWS115	
2/27/2009	0937	30.22655	-81.06870	A	2520	F	A	W/CALF, BOD CNT, BEL UP, BLK BEL, ROLL, BLK CHN	1015	1024	SEWS116	
2/27/2009	0937	30.22655	-81.06870	B	2009CalfOf2520		C	CALF W/MOM, BOD CNT, ROLL	1015	1024	SEWS116	

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Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	Last Sighting Time (L)	Time (L) Paged	SEWS Number	Comments
2/27/2009	1049	30.29850	-81.25058	C	no photo			SAG				Whales C-I previously paged as CEWS301, not repaged
2/27/2009	1049	30.29850	-81.25058	D	no photo			SAG				
2/27/2009	1049	30.29850	-81.25058	E	no photo			SAG				
2/27/2009	1049	30.29850	-81.25058	F	no photo			SAG				
2/27/2009	1049	30.29850	-81.25058	G	no photo			SAG				
2/27/2009	1049	30.29850	-81.25058	H	no photo			SAG				
2/27/2009	1049	30.29850	-81.25058	I	no photo			SAG				
2/27/2009	1150	30.02961	-81.17400	J	2145	F	18	W/CALF, NURS	1214	1236	SEWS117	
2/27/2009	1150	30.02961	-81.17400	K	2009CalfOf2145			CALF W/MOM, NURS	1214	1236	SEWS117	
2/27/2009	1432	29.88214	-81.20345	L	3370	F	A	W/CALF	1500	1509	SEWS118	
2/27/2009	1432	29.88214	-81.20345	M	2009CalfOf3370			CALF W/MOM	1500	1509	SEWS118	
2/27/2009	1508	29.84631	-81.25338	N	1611	F	23	W/CALF, BODO, NURS	1516	1536	SEWS119	
2/27/2009	1508	29.84631	-81.25338	O	2009CalfOf1611			CALF W/MOM, BODO, NURS	1516	1536	SEWS119	
3/4/2009	1313	30.06400	-80.77828	A	3311	U	6	ENTGL, W/TELBUOY, FL, NOT FL, SUB TR	1456	1509	SEWS120	Entangled
3/5/2009	0830	29.28105	-80.91078	A	no photo				830	836	SEWS121	Whales A-E sighted enroute to entangled whale
3/5/2009	0830	29.28105	-80.91078	B	no photo				830	836	SEWS121	
3/5/2009	0830	29.28105	-80.91078	C	no photo				830	836	SEWS121	
3/5/2009	0830	29.28105	-80.91078	D	no photo				830	836	SEWS121	
3/5/2009	0830	29.28105	-80.91078	E	no photo				830	836	SEWS121	
3/5/2009	1006	29.06798	-80.89935	F	3370	F	A	W/CALF, BOD CNT	1013	1115	SEWS122	During disentanglement response, delay in reporting
3/5/2009	1006	29.06798	-80.89935	G	2009CalfOf3370			CALF W/MOM, BOD CNT	1013	1115	SEWS122	
3/5/2009	1023	29.28414	-81.00137	H	1249	M	27	BODO	1038	1116	SEWS123	
3/5/2009	1023	29.28414	-81.00137	I	1043	M	A	BODO	1038	1116	SEWS123	
3/5/2009	1027	29.29140	-81.00758	J	2142	M	18	BODO	1055	1118	SEWS124	
3/5/2009	1027	29.29140	-81.00758	K	2770	M	A	BODO	1055	1118	SEWS124	
3/5/2009	1027	29.29140	-81.00758	L	S033		U	BODO	1055	1118	SEWS124	
3/5/2009	1027	29.29140	-81.00758	M	S034		U	BODO	1055	1118	SEWS124	
3/5/2009	1054	29.27484	-81.02417	N	2008CalfOf1243	U	1	BODO	1101	1121	SEWS125	
3/5/2009	1118	29.77930	-81.20786	O	2791	F	12	W/CALF, BODO, BOD CNT	1122	1133	SEWS126	
3/5/2009	1118	29.77930	-81.20786	P	2009CalfOf2791			CALF W/MOM, BODO, BOD CNT	1122	1133	SEWS126	
3/5/2009	1149	30.39616	-81.32748	Q	1817	F	A	W/CALF, AGG VSL, AVD	1206	1215	SEWS127	
3/5/2009	1149	30.39616	-81.32748	R	2009CalfOf1817			CALF W/MOM, AGG VSL, AVD	1206	1215	SEWS127	
3/5/2009	1335	30.36697	-81.34014	S	1817	F	A	W/CALF				Resight, not repaged
3/5/2009	1335	30.36697	-81.34014	T	2009CalfOf1817			CALF W/MOM				
3/5/2009	1432	30.54835	-81.10459	U	1281	F	A	W/CALF	1440	1453	SEWS128	
3/5/2009	1432	30.54835	-81.10459	V	2009CalfOf1281			CALF W/MOM	1440	1453	SEWS128	

TABLE 3: FWRI AERIAL SURVEY SIGHTINGS - IDENTIFICATIONS ARE PRELIMINARY

Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	Last Sighting Time (L)	Time (L) Paged	SEWS Number	Comments
3/5/2009	1457	30.52182	-81.40786	W	1310	F	A	W/CALF, BOD CNT, BODO	1510	1519	SEWS129	
3/5/2009	1457	30.52182	-81.40786	X	2009CalfOf1310		C	CALF W/MOM, BOD CNT, BODO, HD LFT, WH CHN	1510	1519	SEWS129	
3/6/2009	0839	29.97872	-81.31339	A	1315	F	A	W/CALF	850	913	SEWS130	
3/6/2009	0839	29.97872	-81.31339	B	2009CalfOf1315		C	CALF W/MOM	850	913	SEWS130	
3/6/2009	0852	29.99192	-81.30028	C	1611	F	23	W/CALF, BOD CNT	904	915	SEWS131	
3/6/2009	0852	29.99192	-81.30028	D	2009CalfOf1611		C	CALF W/MOM, BOD CNT	904	915	SEWS131	
3/6/2009	0925	30.29137	-81.06824	E	1817	F	A	W/CALF	932	940	SEWS132	
3/6/2009	0925	30.29137	-81.06824	F	2009CalfOf1817		C	CALF W/MOM	932	940	SEWS132	
3/6/2009	1103	30.54038	-81.30592	G	2007CalfOf1705		U	2	1110	1120	SEWS133	
3/6/2009	1103	30.54038	-81.30592	H	2008CalfOf1408		U	1	1110	1120	SEWS133	
3/6/2009	1116	30.54523	-81.39710	I	1515	F	A	W/CALF	1125	1131	SEWS134	
3/6/2009	1116	30.54523	-81.39710	J	2009CalfOf1515		C	CALF W/MOM	1125	1131	SEWS134	
3/6/2009	1141	30.60036	-81.15938	K	2611	F	13	W/CALF, NURS	1151	1200	SEWS135	
3/6/2009	1141	30.60036	-81.15938	L	2009CalfOf2611		C	CALF W/MOM, NURS	1151	1200	SEWS135	
3/6/2009	1155	30.56999	-81.17140	M	1310	F	A	W/CALF	1208	1233	SEWS136	
3/6/2009	1155	30.56999	-81.17140	N	2009CalfOf1310		C	CALF W/MOM	1208	1233	SEWS136	
3/7/2009	0946	30.18269	-81.17397	A	1403	M	25	SAG	1025	1049	SEWS137	
3/7/2009	0946	30.18269	-81.17397	B	1270	M	A	SAG, BRCH	1025	1049	SEWS137	
3/7/2009	0946	30.18269	-81.17397	C	1170	M	28	SAG, BEL/BEL, WH CHN, WH BEL	1025	1049	SEWS137	
3/7/2009	0946	30.18269	-81.17397	D	BK01BOF07		U	SAG, BEL/BEL	1025	1049	SEWS137	
3/7/2009	0946	30.18269	-81.17397	E	1603	M	23	SAG	1025	1049	SEWS137	
3/7/2009	0946	30.18269	-81.17397	G	2440	M	15	SAG	1025	1049	SEWS137	
3/7/2009	0955	30.17717	-81.18056	F	2440	M	15	APPR	1025	1049	SEWS137	
3/7/2009	1031	30.17603	-81.19434	H	1616	M	A	BODO	1039	1050	SEWS138	
3/7/2009	1031	30.17603	-81.19434	I	1121	M	A	BODO	1039	1050	SEWS138	
3/7/2009	1309	29.93863	-80.96819	J	1246	F	A	W/CALF	1327	1332	SEWS139	
3/7/2009	1309	29.93863	-80.96819	K	2009CalfOf1246		C	CALF W/MOM	1327	1332	SEWS139	
3/8/2009	1253	29.94372	-81.20525	A	2008CalfOf1243		U	1	1318	1333	SEWS140	
3/9/2009	1015	30.18805	-81.14216	A	1611	F	23	W/CALF, BOD CNT, LOG	1025	1031	SEWS141	
3/9/2009	1015	30.18805	-81.14216	B	2009CalfOf1611		C	CALF W/MOM, BOD CNT	1025	1031	SEWS141	
3/19/2009	1034	30.19814	-81.14214	A	3317	F	6	W/CALF, HD LFT	1050	1056	SEWS142	
3/19/2009	1034	30.19814	-81.14214	B	2009CalfOf3317		C	CALF W/MOM	1050	1056	SEWS142	
3/24/2009	0955	30.27552	-81.38148	A	S031		U	SUB TR	1009	1014	SEWS143	
3/24/2009	1437	30.19578	-81.36216	B	S031		U	BODO	1442	1448	SEWS144	
3/25/2009	1122	29.85134	-81.24261	A	S031		U	FLIP, LBTL, WH CHN	1138	1142	SEWS145	

*Behavior Codes: AGG VSL = Aggressive Vessel,AVD = Avoidance,BOD CNT = Body Contact,BODO = Associated with Bottlenose Dolphins,BEL/BEL = Belly to Belly Contact,BEL UP = Belly Up,BLK BEL = Black Belly,BRCH = Breach,BUBLS = Bubbles Observed,CHN BRCH = Chin Breach,ENTGL = Entangled,FRST ENTGL = First Observed Entangled,FL = Fluke Up Dive (Entangled),FLIP = Flipper Slapping,HD LFT = Head Lift,LBTL = Lobtail,LOG = Logging,MOPN = Mouth Open,MUD = Mud On Whale,NOT FL = Dive No Fluke Up (Entangled),NURS = Nursing,POST = Posturing,RAND SUB TR = Random Subsurface Travel,ROLL = Rolling (not in SAG),SAG = Surface Active Group,SFC TR = Surface Travel,SPY = Spying,SUB TR = Subsurface Travel,UW EXH = Underwater Exhale,W/UNPH EGS or CALF = With Unphotographed Whales or Calf,W/TELEBUOY = Telemetry Buoy Attached (Entangled),WH BEL = White Belly,WH CHN = White Chin,YRLG = Yearling

TABLE 4: FWRI WHALE/VESSEL INTERACTIONS

Date	Unique ID	Survey Area	Whale EGNO (preliminary)	Initial Whale LAT	Initial Whale LONG	Vessel #	Close Approach	Vessel Type	Estimated Initial Vessel Speed (kts)	Closest Distance (yds)	Initial Whale Behavior	Reaction to Vessel	Coms Achieved	Communication Notes	Vessel Actions
12/19/2008	405	CEWS	3320 and Calf	30.4477	-81.22155	1	No	Recreational	Approx 15	67	Milling	Yes	No	Vessel was hailed twice on Ch. 16 referencing its description and location with no response.	As vessel approached within 100 yards it altered course apparently to avoid the whales and then continued heading south on its original heading.
12/19/2008	405	CEWS	3320 and Calf	30.4477	-81.22155	2	Yes	Recreational	Approx 2	167	Milling	No	N/A	No direct communication attempted, observers sent a general broadcast about the 500 yard rule on Ch. 16	One of many small fishing vessels in the area. Vessel began to move slowly towards whales, then after broadcast turned around and headed away from whales.
12/19/2008	405	CEWS	3320 and Calf	30.4477	-81.22155	3-8	No	Recreational	0	167	Milling	No	N/A	No direct communication attempted, observers sent a general broadcast about the 500 yard rule on Ch. 16	Six vessels at anchor in the vicinity of Obstm fish haven "MR". Vessels remained at anchor during observation.
12/27/2008	71	SEWS	2007CalfOf1701 (Entangled)	29.94928	-81.26058	1	No	Recreational	Approx 10	50	Swimming/ Traveling	No	Yes	Vessel captain responded to hail on Ch. 16 and then switched to working channel. Captain asked if he should alter course to avoid the whales, but the observers advised he could maintain his correct heading if it was safe to do so. Coms with captain were prompt and courteous.	Whale and vessel were traveling in opposite directions and by the time communication was established the whale surfaced abeam the vessel. The captain maintained course, heading south away from the whales.
12/27/2008	71	SEWS	2007CalfOf1701 (Entangled)	29.94928	-81.26058	2	No	Recreational	Approx 15	880	Swimming/ Traveling	No	Yes	Vessel captain responded to hail on Ch. 16 and then switched to working channel. The observers advised the captain of whales in the area and that his current heading would maintain a safe distance from the whales. Coms with captain were prompt and courteous.	Vessel maintained southerly heading until clear of the whale's location.
2/6/2009	28	SEWS	2145 and Calf	29.91388	-81.24712	1	Yes	Recreational	10-15	100	Nursing	No	No	Vessel was hailed several times on Ch. 16 referencing its description and location with no response. The observers followed these hails with a general broadcast of the 500 yard rule. Two border patrol vessels in the area approached the rec vessel after hearing the plane's broadcast and relayed information from the observers to the captain. They asked the observers if it would be safe for the vessel to depart to NE and the observers confirmed.	Vessel initially slowed to approach the whales. After facilitation of communication between captain and observers the vessel departed on its original heading, northeast.
2/7/2009	216	SEWS	3545, 3546, BK13SEUS08	29.90686	-81.12847	1	Yes	Recreational	Approx 1	100	SAG	No	Yes	Vessel was hailed on Ch. 16 referencing its description and location, captain responded. Observers advised the captain of the whales and the 500 yard rule. Captain responded they were going to "take some pictures and then move away". Observers acknowledged the captain and then restated the 500 yard rule. After several minutes the observers hailed the vessel again on Ch. 16, captain responded that they were leaving. Observers thanked the captain for his cooperation.	Vessel was originally stationary and then observed slowly motoring towards the whales. Vessel maneuvered closer to the whales and remained within 500 yards after initial communication. Vessel eventually departed to the east away from the whales.
2/8/2009	595	SEWS	1968 and 2413	29.91494	-81.19209	1	Yes	Recreational	Approx 5	15	Avoidance	Yes	No	Vessel was hailed three times on Ch. 16 referencing its description and location with no response. The observers broadcast the 500 yard rule on Ch. 16 twice during the interaction.	The vessel maneuvered towards the whales' heads and then made several fast close approaches to the whales from behind as the whales attempted to move away. After approx 10 minutes the vessel departed.

TABLE 4: FWRI WHALE/VESSEL INTERACTIONS

Date	Unique ID	Survey Area	Whale EGNO (preliminary)	Initial Whale LAT	Initial Whale LONG	Vessel #	Close Approach	Vessel Type	Estimated Initial Vessel Speed (kts)	Closest Distance (yds)	Initial Whale Behavior	Reaction to Vessel	Coms Achieved	Communication Notes	Vessel Actions
2/8/2009	155	SEWS	2008CalfOf3115, S023	30.22485	-81.15689	1	No	Recreational	Approx 15	100	Diving	Unk	N/A	Once assessed as a possible threat to the whales, the vessel was already almost clear of the whale's position, so no communication was attempted.	The whales surfaced approx 100 yards abeam the vessel and it slowed and turned slightly away from the whales. Once past the whale's location the vessel accelerated and continued on its original SSE heading.
2/9/2009	173	SEWS	3550, 3208, 3460, 3681, 3520, 3513, 3620, 2427, 2006CalfOf2660, 2007CalfOf3360	29.98553	-80.89228	1	No	Recreational	20-25	3	SAG	Yes	No	Vessel was hailed twice on Ch. 16 referencing its description and location with no response. The observers made a general broadcast about the 500 yard rule on Ch. 16.	The vessel appeared to obtain a visual on one of the subgroups of whales and slowed. After the observer's broadcast on Ch. 16 about the 500 yard rule the vessel turned and headed NE away from the whales.
2/9/2009	173	SEWS	3550, 3208, 3460, 3681, 3520, 3513, 3620, 2427, 2006CalfOf2660, 2007CalfOf3360	29.98553	-80.89228	2	No	Recreational	30-35	20	SAG	No	Yes	Vessel was hailed on Ch. 16 referencing its description and location. After the third coms attempt the vessel stopped, responded, and switched to a working channel. The captain sounded concerned over the presence of so many whales and requested assistance to safely maneuver away from the whales. The observers provided the information on the whales' locations.	The vessel was originally observed traveling approx 30 knots, but came to a stop once in the vicinity of the whales. The vessel was nearly surrounded by whales and the captain slowly and cautiously maneuvered out of the area with assistance from the observers.
2/10/2009	192	SEWS	3620, 3681, 3460, 3513, 3208, 2007Calf Of 3360, 2006CalfOf1248, S029, BK03BOF07, 2007CalfOf2645, 2006CalfOf2660	30.24262	-81.16123	1	No	Tug and Barge	6	1760	SAG	No	Yes	Vessel captain responded to observer's third hail on Ch. 16 referencing its description and location (name was too small to read) and then switched to working channel. Observers advised the captain of whales off his bow and he advised he would alter course. Coms with captain were prompt and courteous.	After communication was established the captain altered course to the west in order to pass to the west of the whales and then continued heading north.
2/17/2009	66	SEWS	1303 and Calf	30.24416	-81.11636	1	No	Large Merchant, Car Carrier	10	8800	Milling	No	Yes	Vessel captain responded promptly when hailed by name and switched to working channel. Observers advised captain of whales on his present course. The captain advised he would lookout for whales and steer clear of the location provided by the observers.	Vessel was observed turning north to avoid the position of the whales and then back to its original heading of NW as it continued inbound for Jacksonville.
3/5/2009	461	SEWS	1817 and Calf	30.39616	-81.32748	1	No	Commercial Fish, Shrimp	Approx 2	100	Swimming/Traveling	Yes	No	Vessel was hailed four times on Ch. 16 referencing its description and location with no response.	Vessel was initially observed circling in close proximity to the whales. At one point the vessel turned and headed towards the whales and then turned south. The vessel continued to circle and then increased speed. The whales dove for a longer than previously observed period of time and the vessel departed the vicinity.
3/5/2009	461	SEWS	1817 and Calf	30.39616	-81.32748	2	Yes	Jax Pilot	7.3	300	Swimming/Traveling	No	Yes	Vessel was hailed twice by name on Ch. 16 with no response. After a short time the captain hailed the survey plane and the observers informed him of the whales and their location. The captain acknowledged and said he would keep an eye out. While inbound the observers attempted to hail the vessel again to provide an updated position for the whales, but after two attempts there was no response.	Vessel was first observed while outbound from the St. Johns River enroute to a car carrier. On the vessel's return trip (inbound for the St. Johns River) the whales were <500 yards off the vessel's port bow.

TABLE 4: FWRI WHALE/VESSEL INTERACTIONS

Date	Unique ID	Survey Area	Whale EGNO (preliminary)	Initial Whale LAT	Initial Whale LONG	Vessel #	Close Approach	Vessel Type	Estimated Initial Vessel Speed (kts)	Closest Distance (yds)	Initial Whale Behavior	Reaction to Vessel	Coms Achieved	Communication Notes	Vessel Actions
3/5/2009	461	SEWS	1817 and Calf	30.39616	-81.32748	3	No	Large Merchant, Car Carrier	6.1	528	Swimming/Traveling	No	N/A	Pilot onboard the ship hailed the survey plane on Ch. 16 and switched to working channel. Captain asked for the position of whales relative to the car carrier. The plane stated the whales were at the surface and they would fly over them for a visual reference. The captain advised he had eyes on the whales. Coms were courteous and efficient.	Vessel was inbound for the St. Johns River with pilot onboard.
3/5/2009	461	SEWS	1817 and Calf	30.39616	-81.32748	4	No	Large Merchant, Cargo	3.9	528	Swimming/Traveling	No	No	No communication was attempted.	The vessel had a pilot onboard and was following the car carrier (above) into port.
3/6/2009	396	SEWS	2611 and Calf	30.60036	-81.15938	1	Yes	Recreational	Approx 15	167	Milling	No	N/A	No communication was attempted, upon arrival of the plane the vessel was moving away from the whales.	Vessel appeared to slow and alter course around the whales to the SE (actually bringing the vessel closer to the whales). Once past the whales the vessel resumed its original WNW heading.
3/8/2009	381	SEWS	2008CalfOf1243	29.94372	-81.20525	1	No	Recreational	Approx 5	100	Logging	Yes	Yes	Vessel was hailed twice on Ch. 16 referencing its description and location with no response. The observers then broadcast the 500 yard rule on Ch. 16. The captain responded that he had copied the broadcast and the observers thanked him for his response.	The vessel made a 180 degree turn and headed away from the whale after hearing the broadcast on Ch. 16.
3/8/2009	381	SEWS	2008CalfOf1243	29.94372	-81.20525	2	No	Recreational	Approx 5	200	Swimming/Traveling	No	Yes	Vessel was hailed twice on Ch. 16 referencing its description and location with no response. The observers then broadcast the 500 yard rule on Ch. 16. The captain responded that he had copied the broadcast and asked for the heading of whale so they could alter course. The observers thanked him for his response.	The vessel altered course from NE to east in order to avoid the whale (now traveling north).

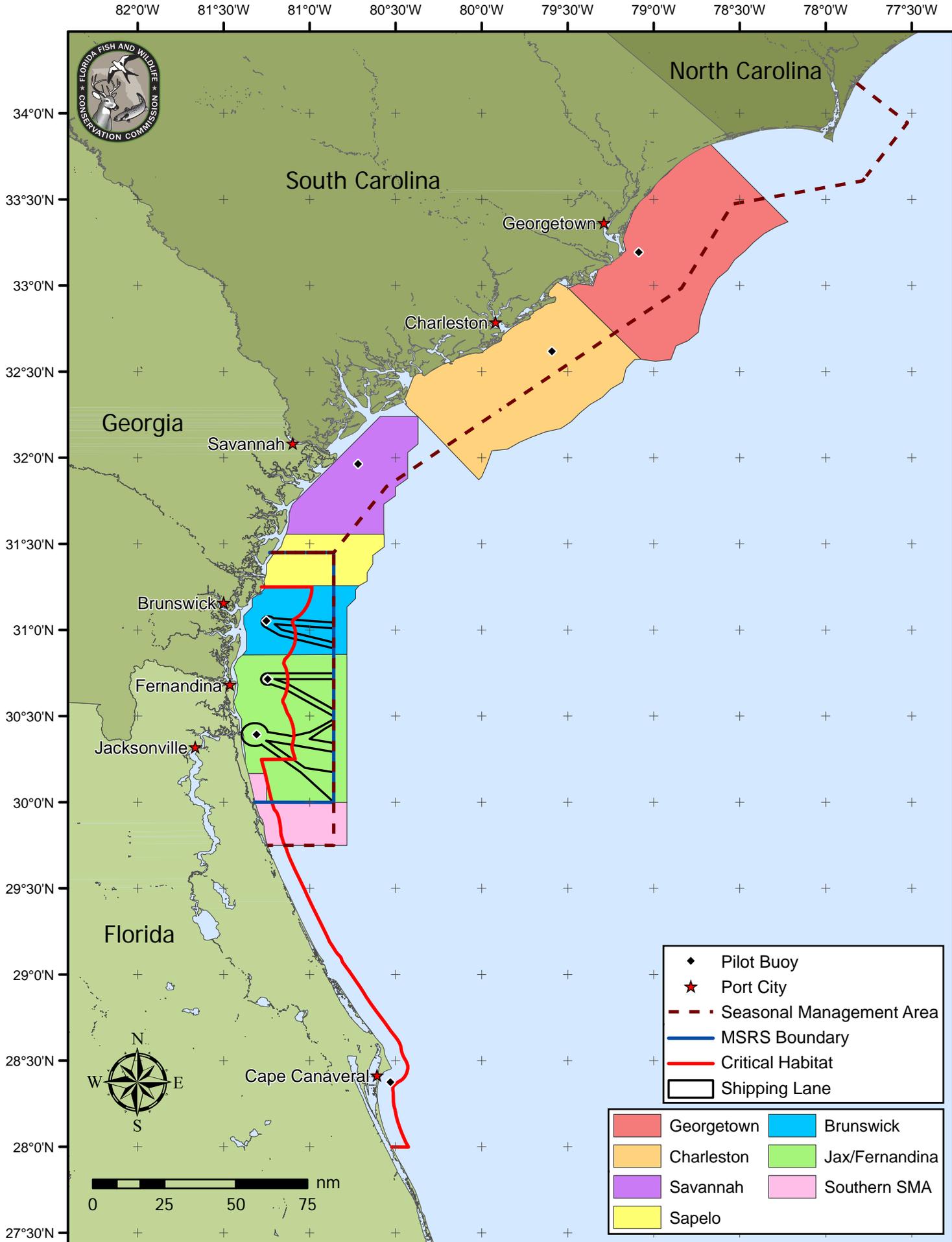
TABLE 5: FWRI LAND VERIFICATION SIGHTINGS - IDENTIFICATIONS ARE PRELIMINARY

Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors	Last Sighting Time (L)	Whale Alert ID No.	Comments
1/11/2009	1554	30.085	-81.328	A				ROLL, FLIP, BODO	1645	MRC001	Raining, photos taken but unable to ID due to distance and rain.
1/15/2009	1530	29.975	-81.302	A	1503	F	24	W/CALF, BOD CNT, BODO, CH LFT	1705	MRC002	
1/15/2009	1530	29.975	-81.302	B	2009CalfOf1503		C	CALF W/MOM, BOD CNT, BODO, HD LFT, ROLL	1705	MRC002	
1/29/2009	755	30.060	-81.325	A		F		W/CALF, FLIP, BRCH, BOD CNT, ROLL, BEL UP	945	MRC004	Dark, rainy, photos taken but unable to ID due to distance and conditions.
1/29/2009	755	30.060	-81.325	B	Calf		C	CALF W/MOM, LBTL, BRCH, BOD CNT, WH BEL	945	MRC004	
2/13/2009	1619	30.15598	-81.35413	A	1246	F	A	W/CALF, BOD CNT, BODO, ROLL	1751	SEWS092	Sighted and paged by SEWS plane before MRC report
2/13/2009	1619	30.15598	-81.35413	B	2009CalfOf1246		C	CALF W/MOM, BOD CNT, ROLL, BODO	1751	SEWS092	
2/22/2009	1144	29.87850	-81.25142	B	2611	F	13	W/CALF, NURS	1201	SEWS107	Sighting information from survey plane used for reporting, whales B-C for survey team
2/22/2009	1144	29.87850	-81.25142	C	2009CalfOf2611		C	CALF W/MOM, NURS, FLIP	1201	SEWS107	
2/27/2009	1508	29.84631	-81.25338	N	1611	F	23	W/CALF, BODO, NURS	1516	SEWS119	Sighting information from survey plane used for reporting, whales N-O for survey team
2/27/2009	1508	29.84631	-81.25338	O	2009CalfOf1611		C	CALF W/MOM, BODO, NURS	1516	SEWS119	
3/13/2009	800	29.94567	-81.30027	A	1611	F	23	W/CALF, HD LFT, BOD CNT	940	MRC023	
3/13/2009	800	29.94567	-81.30027	B	2009CalfOf1611		C	CALF W/MOM, HD LFT, ROLL, BOD CNT	940	MRC023	

TABLE 6: ACRONYMS

AFF	Automatic Flight Following
ALWDN	Atlantic Large Whale Disentanglement Network
ALWTRT	Atlantic Large Whale Take Reduction Team
AIS	Automatic Identification System
BMN	USCG Broadcast Notices to Mariners
CEWS	Central Early Warning System
EPIRB	Emergency Position Indicator Radio Beacon
EWS	Early Warning System
FACSFACJAX	Navy's Fleet Area Control and Surveillance Facility Jacksonville
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	Fish and Wildlife Research Institute (part of FWC)
IFR	Instrument Flight Rules
GDNR	Georgia Department of Natural Resources
GIS	Geographic Information Systems
GPS	Global Positioning System
GTM NERR	Guana Tolomato Matanzas National Estuarine Research Reserve
MSRS	Mandatory Ship Reporting System
NARWC	North Atlantic Right Whale Catalog
NARWD	North Atlantic Right Whale Consortium Database
NEAq	New England Aquarium
NEWS	Northern Early Warning System
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
PCCS	Provincetown Center for Coastal Studies
PIC	Pilot in Command
RIWH	Right Whale
R/V	Research Vessel
SAG	Surface Active Group
SEIT	Southeastern U.S. Right Whale Recovery Plan Implementation Team
SEUS	Southeast U.S.
SEWS	Southern Early Warning System
SIC	Second (pilot) In Command
SLR	Single Lens Reflex
SMA	Seasonal Management Area
VFR	Visual Flight Rules
VHF	Very High Frequency
USCG	U.S. Coast Guard
WVI	Whale/Vessel Interaction

APPENDIX 1: WHALE ALERT GEOGRAPHIC "BINS" MAP



Created November 2008
GCS, WGS84