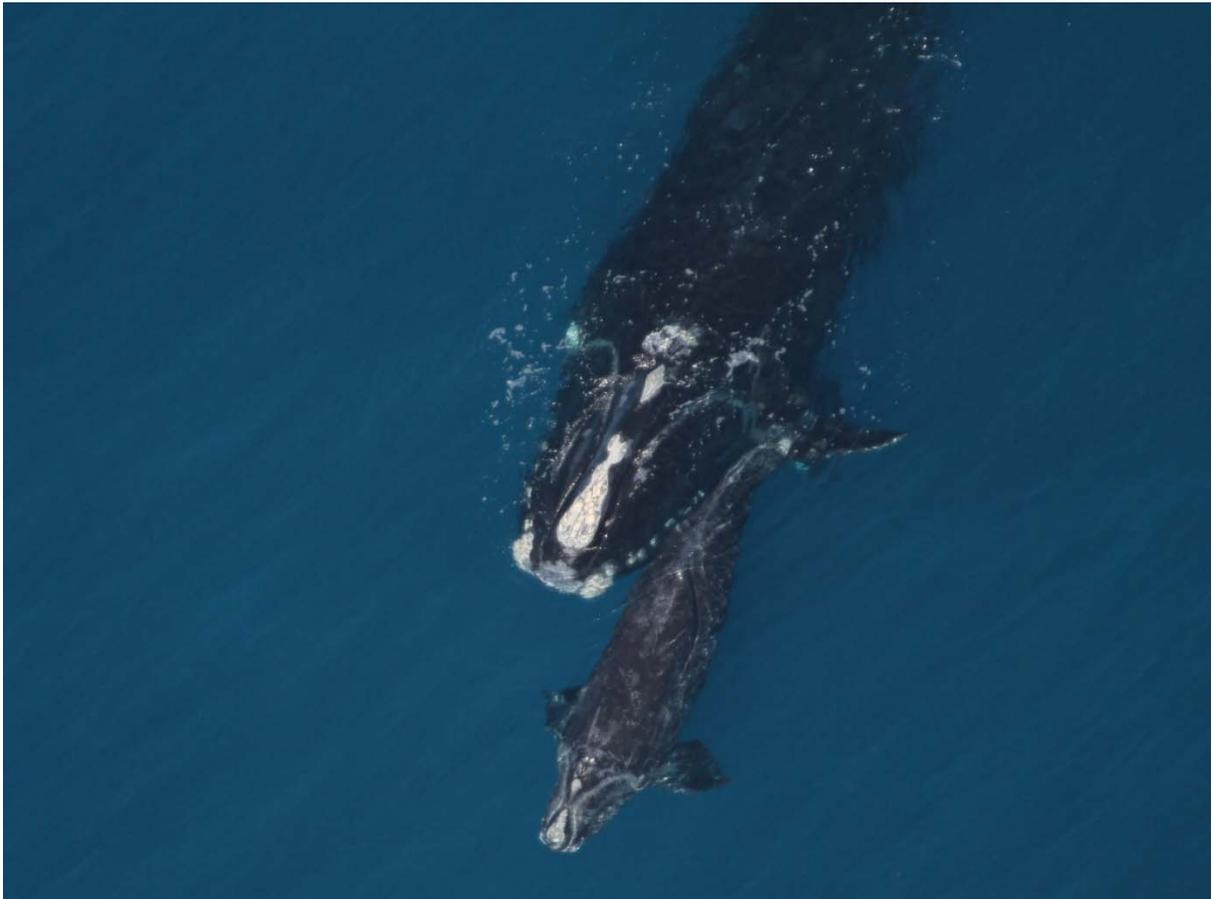


**Aerial Surveys for Ship Strike Mitigation and Other Field Observations of North Atlantic
Right Whales (*Eubalaena glacialis*) off the East Coast of Florida and Georgia
December 2010-March 2011**

Central Early Warning System

Katharine A. Jackson, Jennifer L. Jakush, and Joel G. Ortega-Ortiz

Florida Fish and Wildlife Conservation Commission (FWC)
Fish and Wildlife Research Institute (FWRI)
100 Eighth Avenue S.E.
St Petersburg, Florida 33701



Submitted August 11, 2011

NOAA Fisheries
2382 Sadler Road
Fernandina Beach, FL 32034

FWC/FWRI File Code: F2883-10-A1
Contract No. WC133F-10-CN-0348
Requisition Number NFFN5300-11-03182

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INTRODUCTION

The North Atlantic right whale (*Eubalaena glacialis*) is considered one of the most critically endangered populations of large whales in the world (Kraus et al., 2005). The species was hunted to near extinction and 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 (Kraus et al., 2005, NMFS, 2005). This lack of recovery is principally attributed to deaths from human related activities, mainly vessel collisions and fishing gear entanglements (Waring et al., 2010). Efforts to protect right whales in the western North Atlantic have increased substantially since the completion of the first recovery plan in 1991, but the stock is still considered to be extremely low (Waring et al., 2010). The mean annual mortality and serious injury rate for western North Atlantic right whales was 2.8 from 2004-2008 and among large whale species, right whales had the highest proportion of entanglements and vessel strikes relative to the number of reports for a species (Glass et al., 2010).

The Southeast US (SEUS) is one of six major habitats identified for North Atlantic right whales (Waring et al., 2010). Based on sighting records, the SEUS wintering population consists mainly of mother/calf pairs and juveniles and, to a lesser extent, adult males and non-calving adult females. The majority of calving is believed to occur off Florida and Georgia between December and March. However, right whales have been sighted in the calving area as early as September and as late as July (Taylor et al., 2010) and there are records of calving occurring in the northeastern U.S. (Patrician et al., 2009). There are five major ports within the SEUS calving area off Georgia and Florida: Savannah, Brunswick, Fernandina, Jacksonville, and Canaveral. In 1994 (59 FR 28805), the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA NMFS) designated the waters from 31°15N to 30°15N from the shoreline out to 15 nmi (27.8 km) and the waters from 30°15N to 28°00N from the shoreline out to five nmi (9.3 km) as critical habitat for the northern right whale. In addition, NMFS published the Right Whale Minimum Approach Regulation in 1997 (50 CFR 224.103), 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 (provided by aerial survey teams) and information on how to avoid collisions with right whales (NMFS, 2005).

The probability of serious injury or death to a whale caused by a collision increases rapidly with increasing vessel speed (Pace and Silber, 2005). Laist et al. (2001) reported most severe and lethal injuries caused by known ship strikes occur when vessels are traveling at speeds greater than or equal to 14 knots (25.9km/hr) and none occurred at speeds of 10 knots or less (18.5km/hr). According to Ward-Geiger et al. (2005), the average reported speed of vessels entering the SEUS MSRS area from 1999-2002 was 15.7 knots (29.1 km/h). 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 navigational charts and described in NOAA's U.S. Coast Pilots, USCG's Local Notice to Mariners, and the National Geospatial-Intelligence Agency's (NGA) Notice to

Mariners. On October 10, 2008 the Right Whale Ship Strike Reduction Rule (50 CFR Part 224), originally proposed by NMFS in 2006, was finalized and it became effective on December 9, 2008. The rule established a seasonal speed restriction of 10 knots (18.5 km/hr) for all vessels 65 ft (19.8 km) in length or greater traveling in designated management areas along the U.S. East Coast. Additionally, NMFS may implement temporary Dynamic Management Areas (DMA) to protect right whale aggregations outside the designated Seasonal Management Areas (SMA). The Southeast U.S. 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). Most recently, NMFS announced that a review of North Atlantic right whale critical habitat is underway and proposed designations will be published in the latter half of 2011 (75 FR 61690, October 6, 2010).

During the 1993-1994 calving season several agencies and organizations 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 (whale alerts) to the US Navy (USN), USCG, US Army Corps of Engineers (USACE), harbor pilots, port authorities, and other maritime organizations. The current three-plane EWS survey format was implemented during the 2002-2003 calving season and provides daily monitoring from Sapelo Island, GA (31°32N) to Crescent Beach, FL (29°47N). Under this framework, teams are divided into three survey areas: the northern EWS (NEWS), central EWS (CEWS), and southern EWS (SEWS) (Figure 1). A fourth team surveys South Carolina and northern Georgia (SCGA). 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, whale alerts were processed and transmitted to mariners in near real-time. 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. Further refinements to the EWS network during the 2007-2008 calving season allowed the aerial survey teams to send whale alerts direct to recipients in select geographic regions or "bins"; thus, providing vessel operators with the most applicable whale sighting information for their area of operation (Figure 2).

The CEWS survey area includes the portions of the SEUS critical habitat, SEUS MSRS, and SEUS SMA between 30°50.0N and 30°17.0N, as well as the St Mary's River entrance channel and St Johns River entrance channel. Each of these channels serves a commercial port, a naval base, and a USCG facility. The port of Jacksonville services many types of large merchant vessels. According to the Jacksonville Port Authority (JAXPORT), the port's facilities experienced record number of vessel calls and a 19% increase in container volume, 28% increase in break-bulk cargo, and 24% increase in vehicle traffic during FY 2010¹ (Rubin, 2010). The port is the second largest vehicle-handling port in the US and is one of 13 strategic military cargo ports in the US (Rubin, 2010). Both the St Mary's River and St Johns River entrance channels are dredged routinely to maintain required depths. Dredged material is carried offshore to designated ocean dredged material disposal sites (ODMDS). Hopper dredges make frequent trips to the ODMDS during the day and night. These operations are generally carried out during the winter to lessen impacts on sea turtles, but, consequently, overlap with the right whale calving season.

¹ JAXPORT's Fiscal Year begins on Oct. 1.

Currently, aerial surveys remain one of the best available and cost effective methods to locate right whales and alert mariners in real-time about their presence in the SEUS in order to reduce the risk of ship-whale collisions (NMFS, 2005). During the 2010-2011 calving season, the FWRI provided aerial survey coverage of the CEWS and SEWS survey areas (SEWS survey results are detailed in a separate report). Ship strike mitigation was the focal objective for the FWRI/CEWS surveys. Additionally, the team collected photographs of right whales for photo-identification; monitored whale distribution and vessel activity; reported and documented dead, injured, and entangled whales; and provided support during a river incursion event.

This report summarizes FWRI's CEWS aerial survey data and other field observations for the 2010-2011 calving season. Whale identifications and life history information provided in this report are based on preliminary matches. Funding for the CEWS aerial surveys was provided by the US Army Corps of Engineers, US Coast Guard, and US Navy. Additional support for the CEWS aerial surveys was provided by NMFS, subsequently referred to as NOAA Fisheries in this report.

METHODS

Aerial Surveys

Right whale aerial surveys were conducted daily, weather permitting, during the period December 1, 2010 to March 31, 2011 in the CEWS survey area. The CEWS survey area consisted of the middle twelve east-west tracklines (lines #13-24) within the EWS framework (Figure 1). Tracklines were spaced 3.0 nmi (5.5 km) apart and extended from Cumberland Island, GA (30°50.0N) to Ponte Vedra, FL (30°17.0N) from 0.5 nmi (0.9 km) east of the shoreline to approximately 30 nmi (55.6 km) offshore (080°47.0W). Contingency plan surveys included east/west tracklines #1-30 within the EWS framework and were implemented to ensure aerial coverage of port entrances and inlets when one or more EWS survey teams were unable to survey due to aircraft availability (Table 1). One and two plane contingency plan surveys of varying coverage were flown from Sapelo Island, GA (31°26.0N) to Ponte Vedra, FL (29°59.0N) as needed. The CEWS and contingency plan survey configurations were consistent with previous EWS surveys carried out since the winter of 2002-2003.

The survey aircraft was a twin engine Cessna 337 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 and FWC requirements, the aircraft were equipped with: IFR certification, GPS unit with direct linkage to the tablet PC, Emergency Locator Transmitter (ELT), Automatic Flight Following (AFF) transponder, 2-B:C rating fire extinguishers, primary and secondary VHF radios, marine band radio with linkage to intercom system, DC power for observer tablet PC, back-up GPS with direct linkage to the tablet PC, Automatic Identification System (AIS) receiver, VHF telemetry, satellite phone, and extended over water operations emergency equipment as listed in FAA 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 406 MHz personal EPIRB with built in GPS receiver. Prior to the start of the calving season, pilots and aerial observers were required to successfully complete an aircraft ditching course. Observers were also required to attend NOAA aerial observer orientation, and take 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 of reserve fuel. Environmental conditions necessary to conduct a survey included visibility greater than two nmi (3.7 km), winds less than seventeen knots (31.8 km/hr), and a minimum cloud ceiling of 1200 ft (365.8 m) over the survey area and airport. A sea state of three or less in the Beaufort scale was targeted and preferred because the detectability of whales has been shown to decrease in sea states greater than a Beaufort sea state value of three (Hain et al., 1999). Survey team leaders participated in a sea state calibration flight aboard a NOAA DeHavilland Twin Otter aircraft to ensure standardized sea state determinations among EWS survey teams.

Survey personnel included a pilot-in-command (PIC), pilot-second-in-command (SIC), and two observers. Observers sat in the rear of the aircraft and visually scanned the survey area out to approximately two nmi (3.7 km). Typically, the observer seated in the left rear seat recorded data and the observer seated in the right rear seat conducted photo-documentation

during a sighting. The aircraft flew at a target speed of 100 mph (160 km/h) and 1000 ft (304.8 m) altitude.

Whale Sighting Dissemination and Ground Duties

The EWS network facilitated the near real-time transmission of right whale sighting information (whale alerts) via email, cell phone text message, and pager to the USN, USCG, USACE, NOAA Fisheries, harbor pilots, commercial shipping interests, dredge observers, aerial survey teams, local and state agencies, and volunteer networks. The whale alert message was designed to be brief to accommodate various types of hardware and the email format² was standardized between EWS survey teams to include: distance and bearing to nearest sea buoy, whale alert number (consecutive for each reporting source), date, final sighting time and position, number of whales, number of calves, and heading of whales. EWS network participants were divided into email distribution lists based on geographic “bins” that represent their area of operation or sighting interest (Figure 2). The CEWS aerial survey team used satellite phone or marine band VHF radio to relay sighting information to the FWRI ground contact who was then responsible for sending the whale alert via email to the EWS network participants 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. Duplicate sightings of the same whale(s) were not sent out as whale alerts unless more than an hour had passed from their previous sighting or the whale(s) had traveled more than one nmi (1.85 km) from the original sighting location. In an effort to minimize the number of alerts, multiple whale sightings were occasionally combined into one whale alert notification if the whales were observed in close proximity to each other.

Aerial survey teams attempted to locate and verify “OTHER” sighting reports from non-aerial survey team participants in the EWS network (*e.g.* USN, USCG, and dredge observers) whenever feasible. Sightings verified by aerial survey teams were disseminated by the confirming survey team. The FWRI ground contact was also responsible for entering CEWS sighting information (date, time, and location) into the SEUS MSRS. Duplicate whale sightings that were not distributed to EWS participants via email continued to be updated in MSRS. Sightings remained in the MSRS for 24 hours and could be accessed by vessel captains at any time during that period. Lastly, the FWRI ground contact maintained a near real time knowledge of the position and maneuvers of the aircraft during survey and acted as a liaison between ground crews and the aircraft during entanglement, stranding, or other events (*e.g.* river incursion).

Data Collection and Submission

Aerial Survey Data

The survey crew used a Fujitsu Lifebook T730 tablet PC to collect data electronically 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. The use of the tablet PC and several drop-down options allowed for swift data entry and minimized the time spent looking away from the water. Survey data were recorded at 10 second time intervals in Logger

² Example of Whale Alert format:

Subject: WHALE ALERT 18NM ESE "STJ" (SEWS041)
Body: 24JAN2011, 11:57(L), 3015.3N 08059.6W, 1 ADULT, 1 CALF, HDG N

2000, a computer-based data logging program designed by the International Fund for Animal Welfare (IFAW), which automatically retrieved times, locations, headings, and altitudes from the aircraft GPS and stored them in a Microsoft Access database. If the GPS or computer malfunctioned, GPS locations, headings, and altitudes were hand-recorded at intervals of five minutes on hard copy datasheets and later entered into a Microsoft Excel spreadsheet.

Environmental data collected by the observers and recorded in the survey database included: weather (*e.g.* clear, haze, gray/overcast), visibility, percent 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. Four weather checkpoints per trackline were utilized to ensure environmental conditions were assessed and data were accurate throughout the survey.

Locations, headings, speeds, and static vessel information were recorded using an onboard AMEC CYPHO 101 AIS receiver and Siitech Web VTS Mate software. Vessels³ transmitting from AIS transponders (*e.g.* merchant vessels) were not recorded in the survey database. Observers used the Siitech software AIS viewer installed on the tablet PC to verify transmission of AIS data from vessels in the CEWS survey area. Government/military vessels of all sizes, vessels 65 ft (19.8 m) or larger, and any vessel expected to be transmitting AIS data that were not detected on the AIS viewer were recorded in the survey data. These vessels were entered when sighted within 2 nmi (3.7 km) and perpendicular to the trackline. Vessel information recorded included: type of vessel, time, location, heading, estimated length, estimated speed, estimated distance from aircraft, and name or hull number if discernable. All small vessels (less than 65 ft (19.8 km) in length) within 1.5 nmi (1.8 km) of the trackline were also recorded. The vessel type, time, location, number of vessels, and side of aircraft (*i.e.* left, right, both) were entered in the survey database when the vessel was perpendicular to the trackline. Exact GPS locations of vessels and heading, length, speed, and name or registration number of small vessels were not obtained unless the vessel was involved in a whale/vessel interaction (WVI). The presence of commercial fishing vessels (excluding shrimp vessels) and/or commercial fishing gear (*e.g.* crab buoys) were documented and reported to NOAA Fisheries.

Species recorded were limited to large whales (*e.g.* right whale and humpback whale), leatherback turtle, and large sharks (*e.g.* white shark and basking shark). Leatherback turtles were identifiable out to approximately one nmi (1.85 km) from the trackline depending on sea state and recorded when perpendicular from the trackline. The survey plane generally broke track for large sharks to exclude them as a whale sighting. Large whale sighting observations included the initial and final sighting times and locations, number of whales per sighting, number of calves per sighting, heading of whales, behaviors, observer reliability (measure of certainty of whale identification) and confidence (measure of certainty of number of whales observed). Photographs of right whales and field identifications based on photographs and data available in the North Atlantic Right Whale Catalog (NARWC) were also obtained.

When whale sightings occurred the survey plane would immediately break from the trackline and fly directly over the whale(s) to obtain an accurate GPS position. This location was referred to as the “first pass”. In an effort to maintain consistent survey effort, the pilots were asked to not alert the observers to the presence of approaching whales. However, for vessel

³ For information on vessels required to carry AIS transponders, visit <http://www.navcen.uscg.gov/?pageName=AIS>

strike mitigation purposes, the pilots did inform the observers of whales if they were passed by the survey plane without being sighted. Sighting verifications, such as these, were not included in the sightings per unit effort analyses because the detectability was not consistent with the standard survey protocols. A sighting was defined as any observed whale or group of whales at a given time and location. An individual whale may be part of more than one sighting per day and/or more than one sighting throughout the calving season. The observer on the right side of the aircraft photographed the whale(s) through the opened, right rear window. Photographs were taken with a Canon EOS 7D Digital SLR camera equipped with a Canon EF 100-400mm f/4.5-5.6L IS USM lens. Digital format allowed for expeditious image review in the aircraft and also allowed FWRI to easily share image files with collaborators. Identification of individual whales in the field minimized time spent on scene with a sighting and prevented dissemination of duplicate sighting information. The camera was set on shutter priority mode with a shutter speed of 1/1000 s and minimum ISO of 400 (shutter speed was decreased and ISO increased in low light conditions). Time spent photographing a sighting was directly related to the observer's ability to accurately identify the species of whale and obtain appropriate photo-documentation. When feasible, additional time was allotted to document and assist with whale/vessel interactions (WVI).

A set of Microsoft Access queries and 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 and NOAA Fisheries. In order to take into account aircraft fluctuations a speed threshold of 200 mph (320 km/h) and an allowable altitude range of 800 ft-1200 ft (243.8-365.8 m) were set. Survey effort was defined as the total nautical miles (nmi) or time flown on trackline (east-west or north-south) while the plane was operating within survey parameters and wings-level. Short transits between tracklines and periods of circling or transiting outside survey parameters were not considered to be "on-effort". The daily survey tables were combined into one Microsoft Access database file for final submission to the NARWD Manager. In addition to the electronic survey data collected, hard copy data sheets for each survey day 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, field letters and preliminary whale identifications, behaviors, EWS whale alert number, and ancillary photography information (e.g. image frames).

FWRI staff prepared and submitted weekly performance reports to NOAA Fisheries. The weekly reports included survey activities conducted and right whale sightings recorded during the period. 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 (e.g. presence of fisheries in survey area). The right whale sightings report included: survey date, time (local), survey name, latitude and longitude (in decimal degrees), RIWH letter (from photography datasheets), NARWC ID number, time sightings were reported the EWS network, whale alert ID number, and comments.

Photo-identification

Individual right whales were mainly identified by analyzing the location, shape, and topography of the callosities that occur along the rostrum (Crone and Kraus 1990). Callosities on the upper margins of the lower jaw (referred to as lip callosities), behind the blowholes, on the chin, along the mandible, and above the eye, as well as scars were also used to help identify

individual whales as described by Hamilton and Martin (1999). Although the callosity patterns of calves are not fully developed until 7-12 months of age, distinctive crenations along the lower lip (referred to as lip ridges) can be used in the identification of calves (Hamilton and Martin 1999).

FWRI staff reviewed photographs after each survey and made preliminary matches to the catalog of identified right whales, as well as whales with “intermatch” or season codes (temporary identification codes assigned to uncataloged whales). Photographs were also examined to look for new injuries, scars, and entanglements. Representative images and preliminary identifications were uploaded to an FTP site where personnel from NEA, aerial survey teams, NOAA Fisheries, and GDNR could view or download them. NEA personnel preliminarily verified FWRI’s matches and assisted with the identification of unmatched whales (mainly juveniles). This allowed for up-to-date tracking of the number of mother/calf pairs and individual whales sighted in the SEUS as well as spatial and temporal movements of aggregations of whales during the calving season. Identifications for each sighting were reported to NOAA Fisheries via email and weekly reports.

FWRI staff also reviewed photographs to verify associations and behaviors of whales recorded during flight. Associations and behaviors were defined by NEA in the Data and Photographic Submission to the North Atlantic Right Whale Identification Database protocol⁴: Version 5, December 2010 (photographic submission protocol). According to the photographic submission protocol, right whales are considered associated when they coordinate their movement within a body length or two. Association categories applicable to right whale sightings in the SEUS include: mother/calf pair, surface active group (SAG), pairs or groups not engaged in SAG behavior, and singleton (not associated). In addition to the association categories, there are over 100 potential right whale behaviors defined that were evaluated for each whale sighting. At the end of the season all photographs and sighting data were submitted to NEA in accordance with the photographic submission protocol. These sighting data included: date, time, and location of sighting; individual whale field letter and identification; whale behaviors and associations; photographer and image frame numbers for individual whales; important notes pertaining to the sighting; and organizational codes for region and contributor (FWRI). As the curators of the NARWC, NEA will confirm the final identification of each whale and format the submitted images and data for inclusion in the North Atlantic Right Whale Identification Database – the central repository for archiving and maintaining images and sighting data on right whales.

The NARWC⁵ was used to compile demographic information (mainly sex and age) of individual whales sighted in the SEUS during the 2010-2011 calving season. The sex of cataloged whales was determined through photo-documentation or genetic analysis. Right whales of known age were classified as adults at greater than or equal to nine years, juveniles from one to eight years, and calves at less than one year (born during the 2010-2011 season). One year old whales were also referred to as “yearlings”. Calving females were classified as adults regardless of age and whales of unknown age were classified as adults in their ninth year from initial sighting. NEA personnel assisted with the demographics of intermatch and season code whales when possible and provided information on calving intervals for 2010-2011 mothers.

⁴ Submission protocol available at: <http://www.narwc.org/pdf/photosubmissionguide.pdf>

⁵ The North Atlantic Right Whale Catalog is available online at: <http://rwcatalog.neaq.org/Default.aspx>

Sighting Distance

Sighting or 'radial' distance (Buckland et al. 2001) was estimated by recording the aircraft location when the observer first detected a whale sighting and the initial location of the whale or group of whales recorded by the observer during the first pass. Geodetic distance between both locations was then calculated. Aircraft heading at the time of detection was used to estimate the sighting angle and perpendicular distance (*i.e.* the distance from the whale sighting location to the closest point on the survey trackline). Perpendicular distance was calculated only for sightings observed while on a trackline for which less than five minutes elapsed between initial detection and first pass over the whale.

Whale/Vessel Interaction Documentation

A WVI form was filled out whenever the survey team: a) observed a vessel within 500 yards (457.2 m) of a whale or group of whales, b) determined that the heading of a vessel could result in the vessel and whale(s) being approximately one nmi (1.9 km) or less apart or c) established communication with a vessel to transmit whale sighting location information in an attempt to prevent a collision or mitigate an interaction. Data reported on the WVI form incorporated information from before, during, and after the incident. Information collected included: whale(s) sighting time and location, heading, and behavior; vessel type and description, sighting time and location, heading, and speed; notes on radio communication between observers and vessel captain; vessel actions (*e.g.* changes in heading and/or speed); and the closest distance between whale(s) and vessel. Photographs and/or video were obtained of the vessel and interaction if possible. WVI forms were completed at the end of survey and forwarded to NOAA Fisheries within 24 hours. At the end of the season, the CEWS survey WVI incidents were compiled and combined with NEWS, SEWS, and SCGA interactions into a single database managed by FWRI.

RESULTS

Aerial Survey

CEWS Surveys

The FWRI/CEWS aerial survey team flew 51 out of an available 121 days between December 1, 2010 and March 31, 2011 (Figure 3, Table 2). Sixteen full⁶ CEWS surveys (389.8 nautical miles/722.1 km each), twenty-five partial CEWS surveys, and ten one and two-plane contingency plan surveys were completed for a total of 299.6 hours and 19,243.4 nmi (35,638.8 km) of trackline flown (Figures 4). All one and two-plane contingency plan surveys were also partial CEWS surveys. Effort varied both spatially and temporally, but the FWRI/CEWS team flew at least a portion of the CEWS survey area 42% of the available days and 97% percent of survey effort was completed during favorable sea state conditions of Beaufort sea state 3 or less (Figure 5). The majority of partial CEWS surveys resulted from poor weather conditions and associated time constraints; however, partial surveys also resulted from military operations and airspace conflicts, as well as the river incursion event. When partial CEWS surveys were conducted, effort was focused, as much as possible, on the shipping channels in Jacksonville, FL, Fernandina Beach, FL, and Brunswick GA. Full CEWS surveys were completed 13% of the available days. Surveys were hampered by inclement weather conditions throughout the calving season, most notably during the first half of each month. Zero surveys were conducted during the second week of January.

The first right whale sighting in the CEWS occurred on 15 December 2010 and the last was on 05 March 2011. The FWRI/CEWS aerial survey team had 97 sightings consisting of 228 whales (not unique individuals) and sighted 13 of the 20 females observed with calves in the SEUS (Table 3). Of the 97 sightings, 39 were mother/calf pairs, 19 were single adults or juveniles, 20 were pairs, and 19 were groups of three or more whales (Figure 6). Sixteen (41%) of the 39 pairs and groups involved SAG behavior. SAG behavior was observed during January (69%) and February (31%). The number of right whales observed increased during the latter half of December, peaked during the last week in January, declined sharply the first week of February, and remained at zero after the first week of March. The CEWS team had 39 sightings of 87 whales in December, 40 sightings of 99 whales in January, 17 sightings of 40 whales in February, and 1 sighting of 2 whales in March. Sightings were plotted by month to illustrate the temporal distribution of whales throughout the season (Figure 7). The majority of mother/calf pairs were sighted by the CEWS team in mid to late December 2010, followed by a small peak in mid to late February 2011 (Figure 8). The number of right whale sightings per day ranged from zero to eleven (December 30th) with an average of 1.4 sightings per survey day. As many as 26 right whales (not unique individuals) were sighted on a single day (January 29th); an average 3.3 whales were sighted per survey day. Overall, the lowest sightings per unit nautical mile of effort occurred during February and March 2011 (Figure 9); sightings were also low at the start of December 2010, but increased through the month. The most sightings and whales per unit nautical mile of effort (0.04616 and 0.11132, respectively) occurred between 29 December 2010 and 04 January 2011. Another peak of whales per unit nautical mile of effort (0.07064) occurred between 26 January and 01 February 2011.

⁶ Full survey was defined as 100% coverage of the CEWS survey area

A total of 2,638 vessels were recorded by the CEWS survey team. This total does not represent the total number of vessel observed by the CEWS team, because large merchant and other vessels identified in AIS were not recorded. The 2,638 vessels recorded were comprised of: 1880 recreational, 310 commercial fishing, 62 sport-fishing, 49 motor yacht, 145 sailing, 14 personal watercraft, 137 government, 18 cruise ship/casino boat, 3 research vessel, 1 large merchant, 5 dredge, 1 ferry, and 1 pilot boat. The vast majority (94%; $n=292$) of commercial fishing vessels recorded were shrimp vessels. The cruise ship sightings were almost exclusively two individual casino boats (home-ported in Jacksonville, FL and Brunswick, GA) that were not detected using AIS. Merchant vessels, ferry, pilot boat, dredges, and cruise ships were recorded when the vessel could not be detected using AIS, for reference during WVI incidents, or when supplementary vessel data was needed by the observers. These vessels have been removed from analyses in this report, because these types of vessels were not consistently recorded during survey. Vessels were distributed throughout the survey area (Figures 10 and 11), but there was an apparent increase in sightings around port entrances and inlets (Figures 12 and 13). The number of vessels recorded decreased from December to January, increased from January to February, and more than doubled from February to March. Most remarkable were the observed decrease in both number and percent of total vessels sighted for commercial fishing (shrimp) vessels from December to January; the relatively high percent of government vessels sighted in January; and the observed increase in number, but consistent percent for recreational vessels between February and March (Figure 14). It should also be noted that large clusters (greater than 20) of recreational vessels were sighted near the St Johns River entrance jetties on several occasions.

Whale Alert Dissemination

The FWRI ground contact sent out 78 CEWS whale alerts to EWS network participants. Twenty-one sightings were not distributed because they were either duplicates of previous sightings or were combined with other sightings due to proximity. Duplicate sighting time and GPS locations were updated in the SEUS MSRS.

Sighting Distance

Of the 97 CEWS sightings, 61 (63%) met the standards implemented for sighting distance calculations. The average sighting distance from the survey plane break track position was 0.9 nmi (1.6 km) (Figure 15). Most sightings ($n=47$) occurred between 0.2 nmi (0.4 km) and 1.1 nmi (2.0 km) from the plane, 1 sighting occurred less than 0.2 nmi (0.4 km) from the plane, and 13 sightings were greater than 1.1 nmi (2.0 km) from the plane. One sighting occurred during a Beaufort sea state four or greater (1.0 nmi, 1.8 km); however, sea state four or greater conditions accounted for only 3% of the total survey effort. The average perpendicular distance⁷ was 0.8 nmi (1.5 km) (Figure 16).

Photo Analysis

Preliminary photo analysis indicates the FWRI/CEWS team documented 79 individual right whales (excluding calves) of which 13 could be unique to the FWRI/CEWS survey. The demographic structure of unique individual whales documented was: 17% ($n=13$) mothers, 6% ($n=5$) adult females (not including 2011 mothers), 48% ($n=37$) juveniles, 17% ($n=13$) adult males, 1% ($n=1$) adults of unknown age, and 11% ($n=9$) individuals of unknown age not known to be at least 9 years old (Figure 17). Of the 79 individual whales sighted, 73 cataloged or known intermatch whales have been preliminarily matched to the North Atlantic Right Whale

⁷ See description of sighting distance provided in the *Methods* section.

Catalog; the remaining six whales were matched to SEUS season code⁸ whales or given 2011 SEUS season codes (e.g. S068). Whales assigned season codes are likely juveniles or yearlings and account for the majority (6 out of 9) of unknown age whales documented by the CEWS team. Pregnant females, Catalog #1911, #3270, and #3293, were sighted by the CEWS team prior to giving birth. Observed behaviors for each whale sighted are detailed in Appendix 1.

Whale/Vessel Interaction Documentation

During the 2010-2011 season, the CEWS aerial survey team documented 20 whale/vessel interactions involving 14 groups of whales (Figure 18, Table 4). The types of vessels involved consisted of three large merchants, thirteen recreational, one commercial fish (charter), one research vessel, one casino boat, and one USN frigate. The groups of whales involved consisted of two cow/calf pairs (swimming), eleven groups (swimming, milling, diving, and logging), six SAGs, and one single individual (milling). Twelve vessels were observed within 500 yards (457.2 m) of the whale(s) and the closest observed distance between whale(s) and vessel was 8 yards (7.3 m). A behavioral reaction to the presence of the vessel was observed in one interaction and consisted of a group of whales milling while the vessel was in close proximity (8 yards) and resuming SAG behavior after the vessel departed the area. Analysis of the apparent vessel actions and photo-documentation determined that five vessels were aware of the presence of the whale(s) and/or intentionally approached the whale(s). These conclusions were based on observed abrupt changes in vessel speed and/or heading (including reverse) and prolonged periods of idle speed that coincided with the movements and surfacing intervals of the whales. All 5 of these interactions involved recreational vessels. In an effort to reach large groups of vessels and/or vessels that did not respond to communication attempts, the CEWS team sometimes transmitted a general broadcast on VHF Ch. 16. The broadcast included information about the general location of whales, 500 yard no approach rule, and specific target vessel information if necessary.

Other Marine Species

During the 2010-2011 season, the CEWS aerial survey team recorded 22 humpback whale (*Megaptera novaeangliae*) sightings (Figure 19). Six of these sightings were of a humpback carcass (GA2011012) beached on Cumberland Island, GA and the remaining 16 sightings were of live whales. These sightings occurred from St. Simons Island, GA to St. Augustine, FL between 0.25 nmi (0.5 km) and 11 nmi (20 km) offshore. Photographs of the dorsal fin and body scars were used to link sightings of like individuals. Six individual whales were identified during the CEWS surveys; one humpback whale was not identifiable. Four of the humpback whales sighted by the CEWS team were sighted multiple times in the SEUS. One individual sighted, intermatch SEUS 1104, appeared lethargic during multiple sightings, had large patches of sloughed skin, and peduncle scarring consistent with entanglement wounds. Photographs and sighting data were distributed to NOAA Fisheries, GDNR, aerial survey teams, and Provincetown Center for Coastal Studies (PCCS). Additionally, USN FACSFAC Jacksonville and Fernandina and Jacksonville harbor pilots were phoned and advised of humpback whale sightings in the vicinity of port entrances and inlets in order to mitigate large vessel interactions.

The CEWS aerial survey team documented seven large shark sightings during the 2010-2011 season (Figure 20). These sightings consisted of: four white sharks (*Carcharodon*

⁸ Season codes are assigned to whales without a known catalog number to assist in recognition of individuals and photo identification within a season

carcharias), one basking shark (*Cetorhinus maximus*), one blue shark (*Prionace glauca*), and one whale shark (*Rhincodon typus*). The white sharks were observed on 31 December 2010 approximately 19 nmi (35 km) off Ponte Vedra Beach, FL; 13 March 2011 approximately 8 nmi (15 km) off Crescent Beach, FL; and 18 March 2011 approximately 16 nmi (30 km) off Brunswick, GA and 12 nmi (22 km) off Cumberland Island, GA. The blue shark was sighted on 15 March 2011 approximately 7 nmi (13 km) off Fernandina Beach, FL and the whale shark was sighted on 21 March 2011 approximately 26nmi (48 km) off Jacksonville Beach, FL. Photographs and sighting data were distributed to NOAA Fisheries and shark biologists/researchers with FWRI, GDNR, and the Massachusetts Division of Marine Fisheries.

During the 2010-2011 season, the CEWS aerial survey team sighted 449 leatherback sea turtles (*Dermochelys coriacea*). The majority ($n=384$) of these sightings occurred during March 2011. Leatherback sighting data were distributed to NOAA Fisheries and sea turtle biologists/researchers with FWRI and GDNR.

EVENTS

Disentanglement and Injured Whale Assessment

Catalog #3010 “Binary” and Calf – Entanglement

The SEWS aerial survey team sighted Catalog #3010 “Binary” and calf on 19 January 2011 approximately 12 nmi (22 km) east of Vilano, FL. During routine review of the photographs at the conclusion of survey, the SEWS team discovered that Catalog #3010 was entangled. The entanglement was difficult to see and consisted of a thin, dark (potentially translucent) line originating near the left lip and trailing to at least the peduncle, with no bitter end visible. Prior to this sighting, #3010 and calf had been documented by the CEWS aerial survey team on 30 December 2010 and 31 December 2010. A reassessment of the CEWS photographs from those sightings confirmed #3010 was not entangled at that time. The entanglement and health status of #3010 and calf were monitored during subsequent sightings. On 30 January 2011 the CEWS team sighted #3010 and calf approximately 8 nmi (15 km) east of Little Talbot Island State Park in Jacksonville, FL. The entangling line and several small black floats were visible trailing along the left side of #3010. The point of origin of the line could not be determined, but appeared to be coming from beneath the left flipper. Additionally, the line was observed floating away from #3010’s body and crossing over/laying on top of the calf’s back while it swam next to her (Figure 21). On 22 April 2011, #3010 was sighted in Rhode Island Sound with her calf by the NEFSC and confirmed to be gear-free.

Catalog #3712

On 30 January 2011, the CEWS aerial survey team responded to relieve the SEWS survey team who were on scene with entangled right whale Catalog #3712, a four year old of unknown gender. The whale was located approximately 8 nmi (15 km) east St. Augustine, FL and was observed with two thin greenish lines exiting the left mouth, trailing to mid-back, and terminating in a mass of fine mesh with small black oval floats. The whale was traveling with another juvenile whale and it appeared to be in good body condition. The CEWS team returned to survey after the SEWS team finished refueling. FWRI, GDNR, and NOAA Fisheries responders aboard *RV Orion* were unable to see the gear from the vessel and no disentanglement was attempted. On 10 April 2011, #3712 was sighted in Stellwagen Bank by the NEFSC and appears gear-free, but additional documentation is needed to confirm.

Catalog #3911 (aka 2009CalfOf2611)

On 25 December 2010 the SEWS aerial survey team sighted an entangled two year old female right whale approximately 10 nmi (19 km) east of Ponte Vedra Beach, FL. The juvenile whale was matched to intermatch code 2009CalfOf2611 and later cataloged as #3911. Upon initial sighting, #3911 was traveling with another juvenile whale, but the pair split shortly after the plane arrived on scene. The entanglement was complicated and most notably involved both flippers, several ropes through the mouth, loose loops of rope exiting the mouth and crossing over the back behind the blowholes, and a mass of tangled ropes exiting the lower left mouth. At least three ropes were visible trailing from the area of the left flipper; two joined in a loop behind the fluke and the third trailed approximately five whale-lengths behind the fluke. The whale appeared thin and had patches of sloughed skin behind the blowholes and mid-back. Pink-colored abrasions were evident along the peduncle and fluke insertion and a linear scar was visible across the rostrum. The SEWS team relayed the initial sighting information to the FWRI ground contact and was subsequently relieved by the CEWS team. Both survey planes required refueling and observers were shuffled between ground contact and between survey planes to best respond to the entanglement event. Ultimately, the SEWS team continued on survey to complete

the remaining CEWS and SEWS survey tracklines and the CEWS team remained on scene with the entangled whale and provided support to the disentanglement first response team (survey funding sources for the aircraft were switched at this time). FWRI staff aboard the *RV Orion* successfully deployed a telemetry buoy on the whale before last light.

The CEWS aerial survey team flew contingency plan surveys on 28 December 2010, 29 December 2010, 30 December 2010, 04 January 2011, and 15 January 2011 due to disentanglement support for #3911 by the SEWS and NEWS survey teams on those days. On 15 January 2011 the disentanglement team was able to make several cuts to the ropes exiting both sides of the whale's mouth and removed the majority of the remaining visible gear. However, Catalog #3911 was found floating dead by the SEWS team on 01 February 2011 approximately 11 nmi (20 km) east of Palm Coast, FL.

Stranding Responses

No right whale carcasses were detected by the CWES survey team during the 2010-2011 season. However, a dead right whale (EgNEFL1103) was sighted by the SEWS team on 01 February 2011 and the CEWS team documented the carcass of a humpback whale (GA2011012) beached on the south end of Cumberland Island, GA in March 2011.

Other Events

Vessel Related Injuries

During the 2010-2011 season, the CEWS aerial survey team documented one whale with resolving wounds on the dorso-lateral portion of its lower back and peduncle. The whale was preliminarily identified as Catalog #3966, a 2 year old male. The wound consisted of a series of parallel, equally spaced, linear cuts, which are similar to injuries known to be caused by vessel propellers on Florida manatees (*Trichechus manatus latirostris*) (Wright et al., 1995, Rommel et al., 2007). The wounds were first documented on 16 December 2011 by the CEWS survey team and the CEWS team subsequently obtained additional photographs on 21 December 2010 (Figure 22). Catalog #3966 was last sighted without the wounds by the NEFSC on 16 May 2010 in the Great South Channel.

St Johns River Incursion

On 24 January 2011, the FWRI ground contact overheard a vessel reporting a right whale near the St Johns River channel entrance to the USCG on VHF Ch. 16. The FWRI ground contact relayed the information to the FWRI right whale aerial survey coordinator and the CEWS observers who were en route to the airport to conduct survey. After takeoff, the CEWS team established contact with a Jacksonville Harbor Pilot vessel in the area in order to obtain updated location information on the whale. The CEWS team located the juvenile whale, season code S066, between the jetties at the entrance to the river and remained on scene. The CEWS team relayed the whale's location and behavioral observations to the FWRI ground contact who contacted NOAA Fisheries and FWC Law Enforcement (FWC LE) dispatch to request on-water assistance. For approximately 45 minutes the whale was observed milling around the area inside the jetties. The whale then swam into and remained inside the Mayport Basin for almost an hour. Once inside the basin the whale stopped its milling behavior, began swimming faster, and traveled in straight lines. It encountered several obstacles and its behavior began to become more erratic. Upon exiting the Mayport Basin the whale headed east, collided with the southern jetty, turned north, swam across the channel, encountered shallow shoals near the north jetty, turned back to the west, and headed further up river (Figures 23 and 24). An FWC LE vessel and USCG safety vessel began to escort the whale once it departed the Mayport Basin and additional vessels and support staff arrived on scene. The on-water crew attempted to deter the

whale from heading further up the river by creating whitewater and noise. While on scene, the CEWS team communicated whale location and behavioral observations to the on-water staff from FWRI, FWC LE, NOAA Fisheries, and USCG and maintained consistent radio contact with Mayport Tower and USCG Sector Jacksonville. Mid-day, the SEWS team relieved the CEWS team for approximately 45 minutes while the CEWS team refueled. After the CEWS team returned, the SEWS team continued on survey. For the remainder of the afternoon, the whale swam back and forth between Buck Island and the ferry docks. The longer it remained inside the river the more erratic and unpredictable its behavior became: it was swimming very quickly, only surfaced for one breath at a time, and began to make sudden sharp turns without encountering obstacles. The CEWS team departed the scene due to daylight constraints. The on-water crew remained on scene and the whale eventually turned east, continued down river, and exited the jetties at last light.

Catalog #1245 “Slalom” and Calf

The CEWS aerial survey team sighted Catalog #1245 “Slalom” with a young calf on 13 February 2011 approximately 30 nmi (56 km) off Jacksonville Beach, FL. The calf was small and gray and was observed with flaccid fluke lobes and no visible cyamids on its head or body (Figure 25 and 26). These are characteristics associated with newborn calves (Zani et. al., 2008). The pair was traveling steadily west, primarily at the surface. The calf was also observed swimming above the mother’s back and peduncle area when the mother was subsurface. Apparent nursing was observed twice during the sighting. Catalog #1245 and her calf were the last observed mother/calf pair in the SEUS this calving season. This sighting occurred on 05 March 2011 and was documented by the CEWS team.

DISCUSSION and RECOMMENDATIONS

Only thirteen of the 79 individual whales (16%) documented by FWRI were calving females; thus, the majority (84%) of the whales seen by the CEWS team in the SEUS were present for reasons other than calving. Since it is presumed right whales are not feeding while in the SEUS, the time these whales spend in the calving area likely serves an important social and/or developmental function, especially for juveniles. Of the individual whales documented (excluding 2011 mothers), 70% ($n=46$) were known juvenile whales and uncataloged whales that are likely juveniles. Thirty-nine of the 66 non-mother/calf pair sightings (85%) were associated pairs or groups of whales and 41% of those ($n=16$) involved SAG behavior. SAGs documented by the CEWS team were composed of whales from a variety of ages and sexes and occurred during January and February 2011.

Humpback whale (*Megaptera novaeangliae*) sightings are not rare off Florida and Georgia, but sightings during the winter months have been episodic from year to year. Many of the individuals sighted are small in size and are likely juveniles. During the 2010-2011 season, humpback sightings were relatively prevalent compared to recent seasons. A minimum of 10 individual humpback whales were identified during 32 sightings from South Carolina to Florida (22 by the CEWS team) during the 2010-2011 season. Humpback whale sightings that occurred within approximately five nmi (9.3 km) of inlets and port entrance channels were relayed by the FWRI ground contact to USN FACS FAC JAX and Jacksonville and Fernandina Harbor pilots in order to mitigate large vessel interactions. Since humpback whale sightings tend to occur in nearshore waters in the winter, similar to right whales, it may be worthwhile to incorporate humpback sightings into the EWS Whale Alert system. Many of the humpback sightings occurred during March 2011 when right whale sightings were low. In past seasons the EWS network has disseminated nearly 1000 Whale Alerts for right whales, so the addition of approximately 30 humpback whale sightings should not cause undue burden on the EWS Whale Alert recipients.

During the first part of the 2010-2011 season, survey teams and managers faced an early influx and subsequent apparent shift in right whale distribution similar to the shift south observed during the 2009-2010 season; furthermore, whale sightings were nearly nonexistent in the entire EWS area during March 2011 ($n=2$). According to Keller et. al. (2006) the average Sea Surface Temperature (SST) for right whale sightings in the SEUS is $14.3^{\circ}\text{C} \pm 2.1^{\circ}\text{C}$. A comparison of water temperature measurements from NOAA's National Data Buoy Center⁹ Offshore Fernandina Beach Waverider Buoy (Station 41112) suggests the whale distribution shifted south early in the season due to cooler temperatures in December: the average temperature at Station 41112 in December 2010 was 12.9°C and the average December temperature for years 2006-2009 was 15.1°C (Figure 27). Overall, the average temperature from Station 41112 from December 2010 through March 2011 was similar to the 2009-2010 season average (12.2°C), but lower than the average for the 2006-2007, 2007-2008, and 2008-2009 seasons (15.0°C). Comparatively, the 2010-2011 season Station 41112 temperatures mirrored the 2009-2010 season until the beginning of February when temperatures increased above the 2009-2010 season averages. C-MAN Station in St. Augustine (SAUF1) in St. Augustine, FL showed a similar pattern of cooling in December and warming in February (Figure 28); the average water temperature from this buoy was 13.9°C from December 2010 through March 2011 which was

⁹ Historical buoy data available at: <http://www.ndbc.noaa.gov/>

below the average for the last four seasons (16.4°C), but is exactly the same as the 2009-2010 season. Although water temperature likely had an impact, these data indicate there were other major factors affecting whale distribution and residency in the SEUS during the 2010-2011 season; otherwise, SEUS whale sightings should have been more similar to recent seasons. It is possible that the rapid cooling of water temperatures in December had a lingering effect on whale distribution throughout the season. Other oceanographic characteristics (*e.g.* currents, salinity) associated with the observed influx of clear blue water and unusual marine species documented by aerial survey teams could have led to the observed changes in right whale distribution and residency (Figure 29). Additionally, it is possible that residual effects from the availability of food the preceding spring, summer, and fall months could have caused whales to depart the SEUS earlier than in recent seasons or not migrate to the SEUS at all. The PCCS right whale aerial survey team documented right whales in Cape Cod Bay in January and reported record numbers of whales between January and May 2011 (Right Whale News, 2011).

The 2010-2011 season was the first season that a guideline of sea state of three or less (in the Beaufort scale) was used to determine survey vs. no-surveys days in the CEWS area. In total, 97 percent of CEWS surveys were flown in a sea state three or less compared to 86% during the 2009-2010 season (Taylor et. al., 2010). Additionally, surveys were conducted on 18 more days during the 2009-2010 season (Taylor et. al, 2010). The number of sightings, whales documented, and individual whales identified also decreased, although whale sightings decreased for other survey teams in the SEUS as well. Survey effort was variable, ranging from zero surveys to six surveys per week. Long stretches of unfavorable weather hampered survey efforts, especially in December and January. All no-survey days were a direct result of inclement weather and moderate to high sea state conditions (Beaufort > 3). It is possible that more consistent coverage throughout the calving season may result in more effective ship strike mitigation and better documentation of whale and vessel distribution. It would be useful to have more contingency plan options and overall flexibility built into the SEUS survey design so that all parties involved are better prepared and able to mitigate for extended periods of inclement weather and/or unfavorable environmental conditions. Further analysis into the effects of survey effort on individual whales documented and the effects of sea state on sighting detectability may provide valuable insights on survey design and improve the application of aerial survey resources.

During the 2010-2011 season, 90% ($n=38$) of the observed WVIs in the SEUS occurred off the coast of Florida and 69% ($n=29$) involved recreational vessels (Figures 30). While communication with merchant and USN vessels is, in general, effective during WVIs, communication with recreational vessels is often difficult or unsuccessful and this limits the survey teams' ability to mitigate these circumstances. A variety of educational tools and materials have been developed and implemented in an effort to provide information about right whales to recreational boaters: USCG BNTM and LNTM, NOAA's Coast Pilot, NOAA Weather Radio, NOAA weather buoy websites, awareness signs for ocean-going boat ramps and marinas, brochures, and talks presented to local interest groups, etc. Unfortunately, the recreational boater target audience is extensive and encompasses people from broad personal and professional backgrounds; so, although outreach methods for this group may be effective, the advancement of information throughout the community is slow. The proportion of WVIs involving recreational vessels (69%) was higher during the 2011 season than that observed by aerial survey teams over the last five seasons (59 % on average from 2005-2006 through 2009-2010) and collisions with whales are likely occurring (see *EVENTS: Vessel Related Injuries*). There are approximately 70,000 registered nearshore-capable pleasure-craft vessels 16 ft (4.9 m) in length or greater in Nassau, Duval, St. Johns, Flagler, Volusia, and Brevard Counties in Florida (Florida DMV,

2010). Nearly 9,000 of these vessels are offshore-capable at greater than 26 ft (8.0 m) and 60 vessels are greater than 65ft (19.5 m) and would be subject to the Right Whale Ship Strike Reduction Rule regulations. Additionally, there are approximately 5,500 registered pleasure-craft vessels greater than 16 ft (4.9 m) in Camden, Glynn, and McIntosh counties in southern Georgia (Georgia DNR, 2010). Of these close to 400 are greater than 26 ft (8.0 m) and two are greater than 65 ft (19.5 m). The small vessel data collected during the 2010-2011 season by the FWRI aerial survey teams determined the calving area was frequently utilized by small vessels, mainly recreational vessels, commercial shrimp vessels, as well as government vessels. These data also highlight concentrations of vessels near port entrances and inlets (Figures 12 and 13).

A juvenile right whale was sighted just outside the St Johns River entrance jetties on 24 January 2011, and a Jacksonville Harbor Pilot boat captain was quick to assess the situation. Radio communication between vessels was intercepted by the FWRI ground, but, if it had not, word was already making its way to NOAA Fisheries. After the CEWS survey team arrived on scene and located the whale inside the jetties, the team began to provide minute-by-minute updates of the whale's movements. As the whale moved further into the river and eventually into the Mayport Basin agencies with presence in the area received notification and prearranged action plans were set into motion. By the end of the day, the whale traveled approximately 6 nmi (11.1 km) up the St Johns River and the event involved staff from FWC, NOAA Fisheries, USCG, USN, Jacksonville Harbor Pilot Association, JAXPORT, USACE, Orion Aviation, commercial shipping companies, news media, and likely many more. Right whale awareness was high, the shore of the river was lined with people that had come to see the whale and the operation, and the whale made it safely out of the river. During debriefing sessions, the CEWS team recommended more streamline communication between the vessel crews and the aircraft. Helicopter traffic remained in the vicinity and was sometimes problematic for the survey team. However, communications with Mayport Tower were much improved from the last river incursion event. Allowances were made to ensure the survey aircraft was able to stay on scene and the relief plane swap was executed without incident. The observers are able to provide detailed information about the real-time movements of the whale and could also provide insight about the whale's behavior and the intended operations that would not be apparent to the on-water crew. The advantages of an onsite aerial survey team may not have been used to their full extent due to breakdowns in the chain of communication. Aircraft utilization and overall communication would be areas to improve in the response plan for river incursion events. Additionally, organization of response vessels and management of non-response small vessels in the vicinity of the whale could likely be improved for future events. Including FWC LE in pre-season river incursion event planning with the USCG could be one way to accomplish this goal.

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. These data are important for the upcoming evaluation of the Right Whale Ship Strike Reduction Rule and Critical Habitat designation. Despite being limited by weather and available daylight, the EWS surveys, throughout many seasons, have raised awareness of right whales among vessel operators, harbor pilots, and military personnel in the SEUS and provided consistent, extensive, and comprehensive monitoring data for right whales in the calving area.

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ACKNOWLEDGEMENTS

US Army Corps of Engineers, US Coast Guard, and US Navy provided funding for this survey. These aerial surveys were conducted under Permit #594-1759 issued to the Georgia Department of Natural Resources by the National Oceanic and Atmospheric Administration - National Marine Fisheries Service.

Tim Gowan, FWRI, created the maps included in this report and provided GIS support for this project.

Thank you to the following for their support and collaboration:

All EWS Network Participants
EcoHealth Alliance (formerly Wildlife Trust)
Georgia Department of Natural Resources
New England Aquarium
NOAA Fisheries
USCG Sector Jacksonville
US Navy FACSAC Jacksonville

Special Thanks to:

FWRI Survey Team Members – Marjorie Foster, Amy Willoughby, Nicole Brandt, Angie Stiles, Kate Pagan, Amy Willard, and Kristin Norris (additional members Jen Jakush and Katie Jackson authored this report)
NOAA Fisheries – Barb Zoodsma, Jamison Smith, David Morin, Blair Mase, Liz Tuohy-Sheen
NOAA Corp – LTJG Greg Schweitzer
Orion Aviation – Ed Coffman, Christina Colpitts, Collin Mendenhall, Ryan MacGregor, and Larry Marino (Orion Aircraft used during 2010-2011 season: N1353L and N337CH)
EcoHealth Alliance Survey Team Leaders, Tricia Naessig and Dianna Schulte, and project coordinator, Cyndi Taylor and the rest of their survey team members
GDNR – Clay George, Kate Sparks, and Mark Dodd
NEA – Philip Hamilton and Monica Zani
MRC – Julie Albert
FWC Law Enforcement
NOAA Law Enforcement
UNCW – Bill McLellan, Ann Pabst, and the USWTR JAX aerial survey team members
FWRI – Leslie Ward, Tom Pitchford, Mark Mueller, Tim Gowan, Andrea Mosier, and Katalin Jacob

Cover photograph: Catalog #3270 “Pico” and calf taken by Marjorie Foster, FWRI, on 24February2011

FIGURES

FIGURE 1: MAP OF EARLY WARNING SYSTEM (EWS) SURVEY TRACKLINES

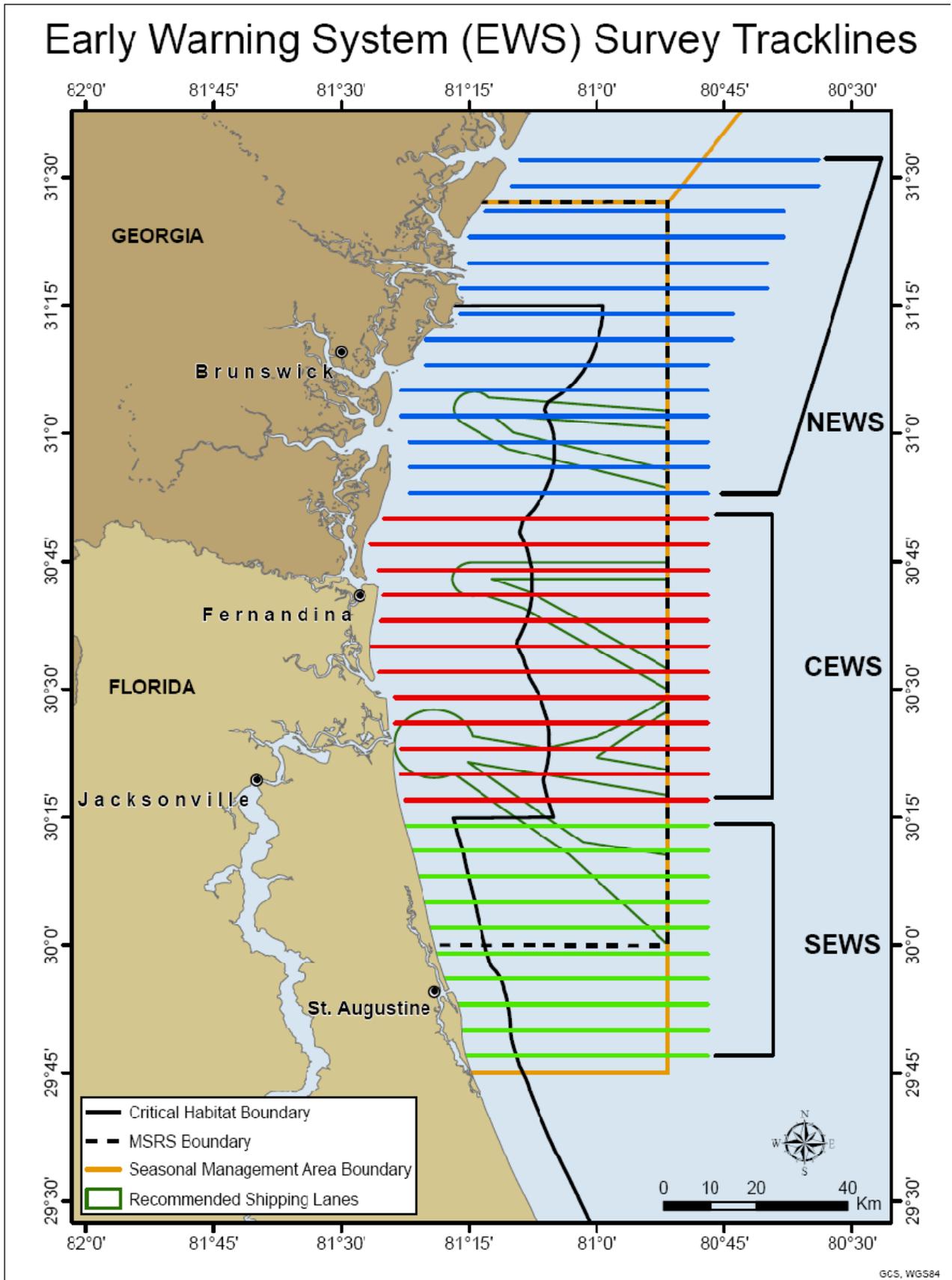


FIGURE 2: MAP OF WHALE ALERT GEOGRAPHIC “BINS”

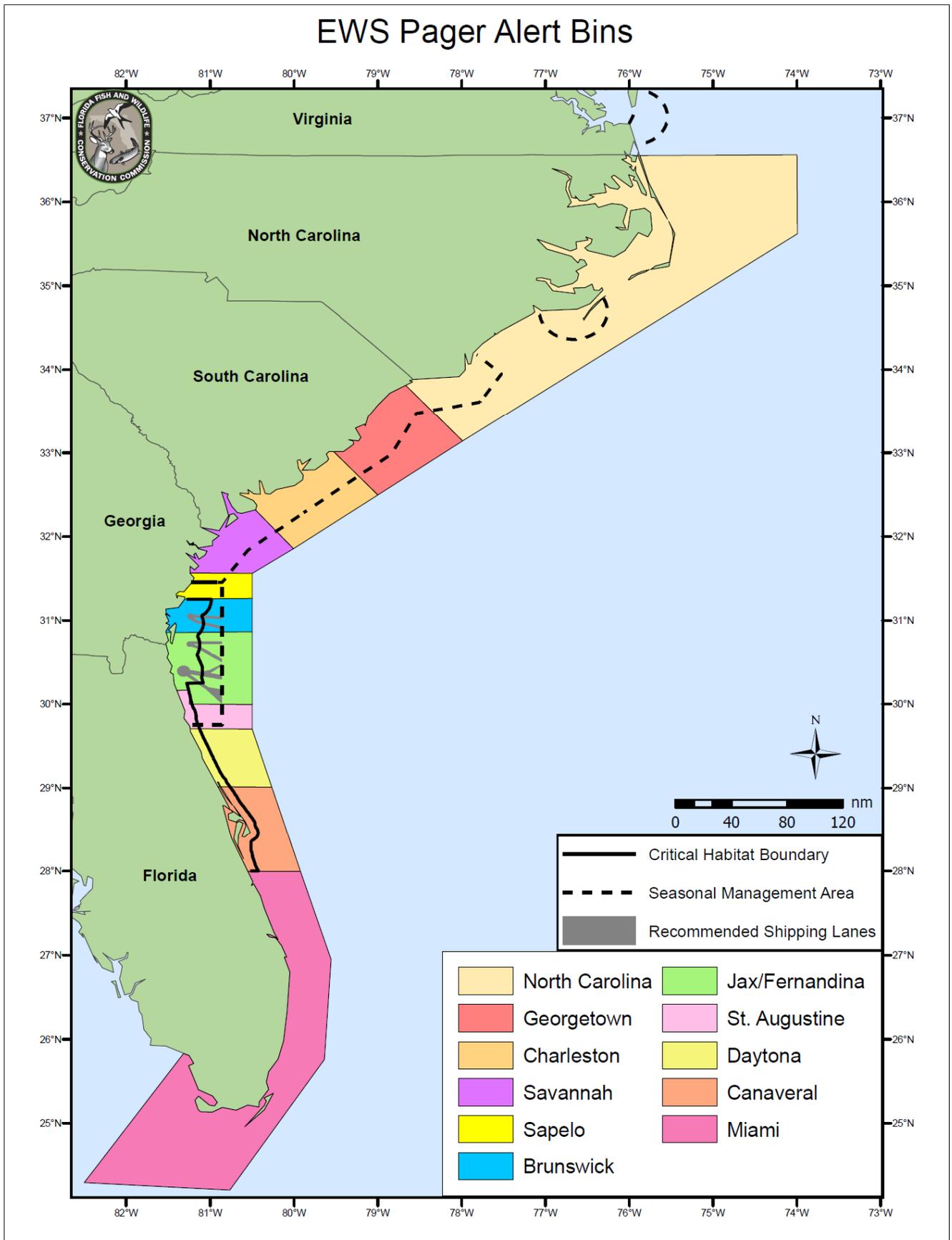


FIGURE 3: MAP OF CEWS TOTAL SURVEY DENSITY DECEMBER 2010 – MARCH 2011

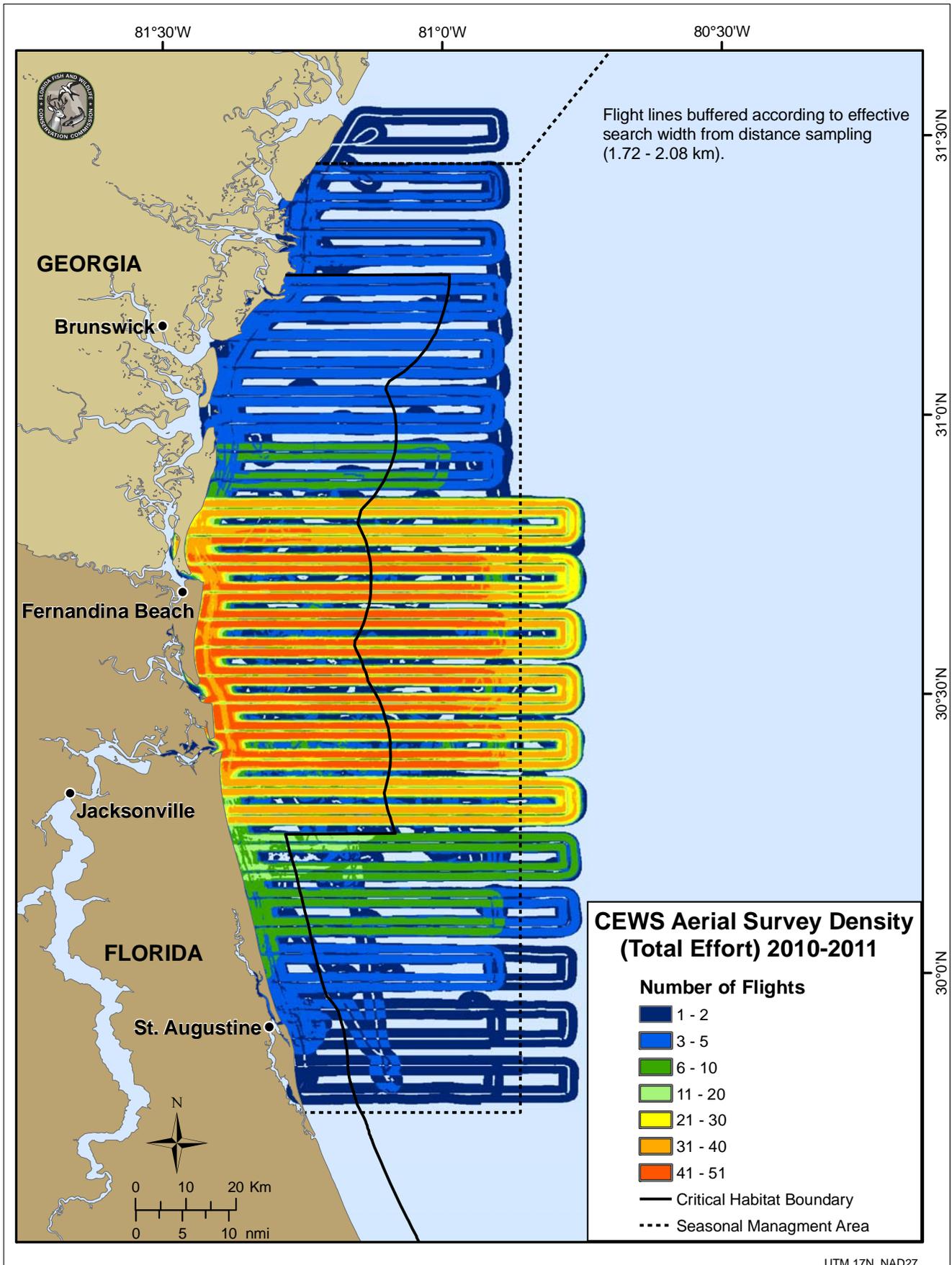


FIGURE 4: MAP OF CEWS ON-TRACK SURVEY DENSITY DEC 2010 – MAR 2011

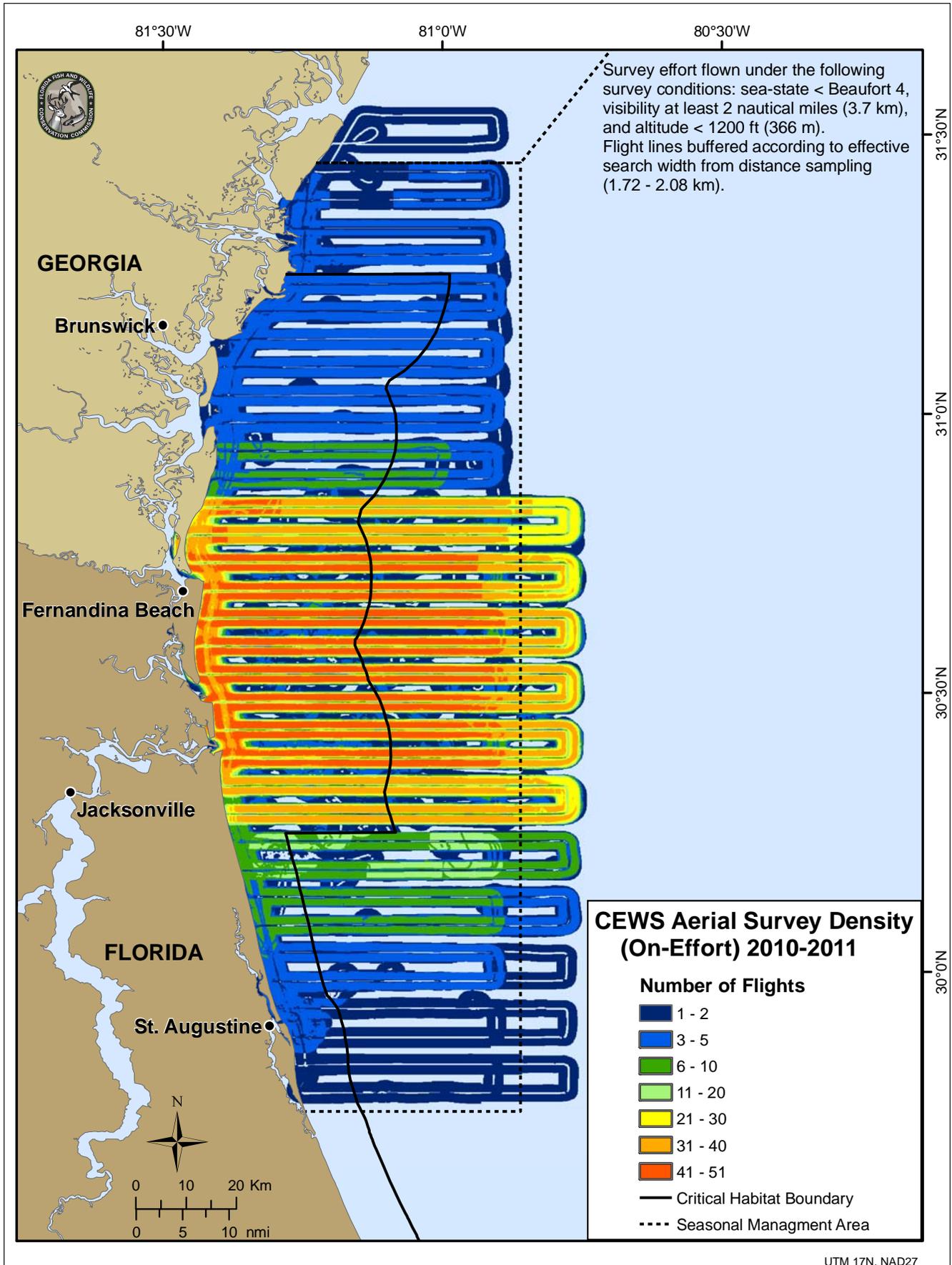


FIGURE 5: GRAPH OF CEWS AERIAL SURVEY EFFORT

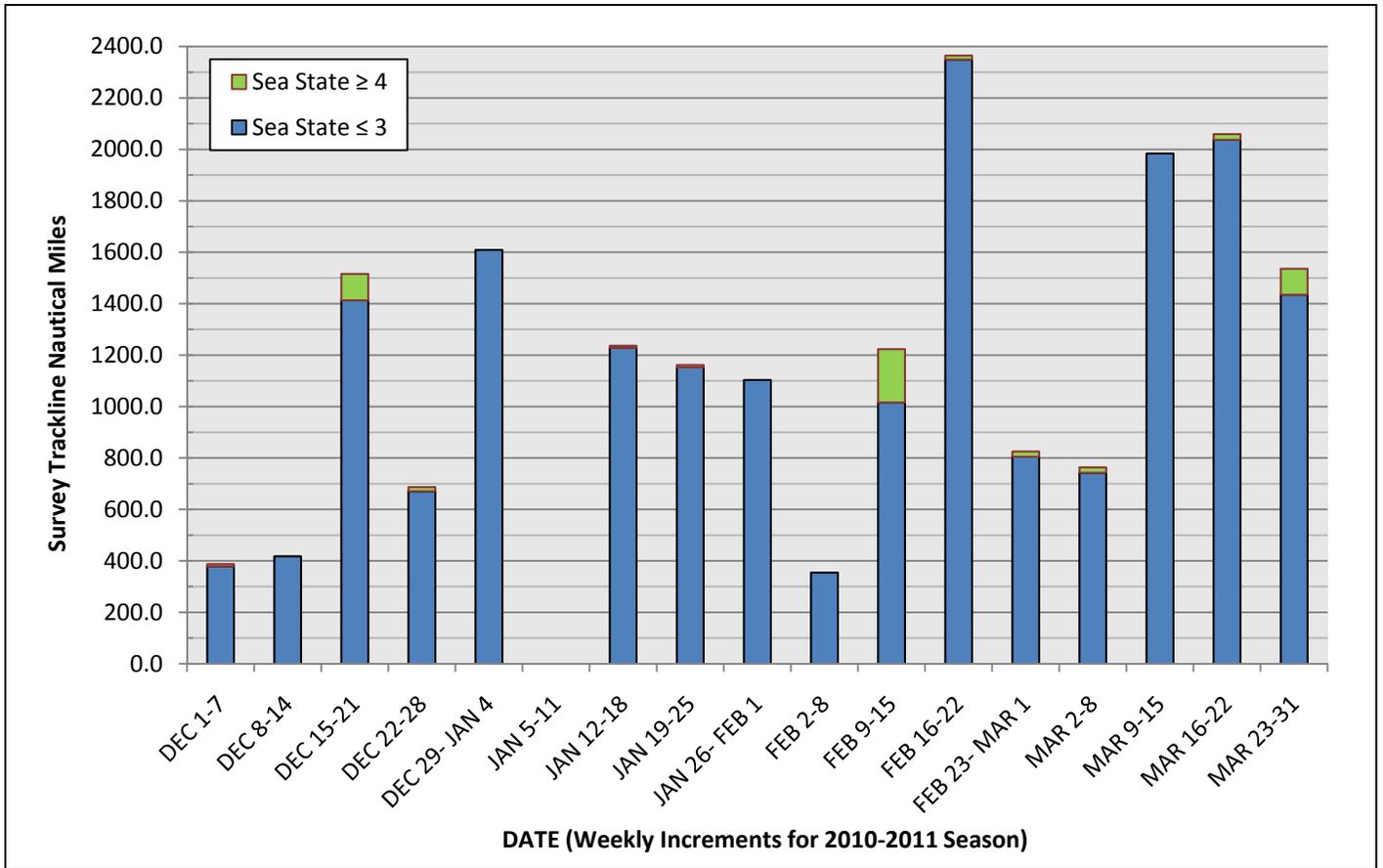


Figure 5: Total nautical miles of survey flown per week during the 2010-2011 season broken down by Beaufort sea state less than and greater than or equal to 4

FIGURE 6: MAP OF 2010-2011 CEWS RIGHT WHALE SIGHTINGS

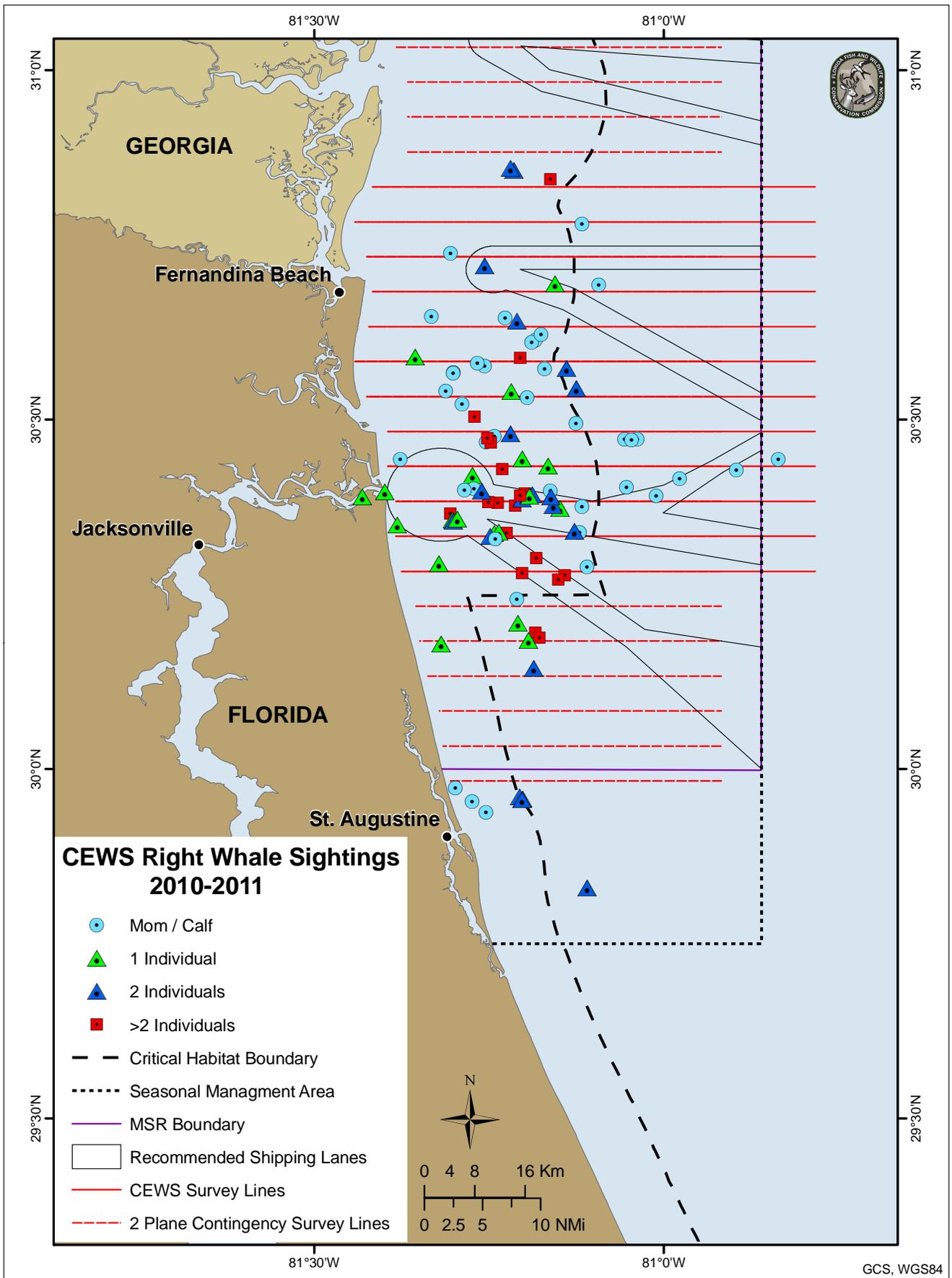


FIGURE 7: MAP OF 2010-2011 CEWS RIGHT WHALE SIGHTINGS PER MONTH

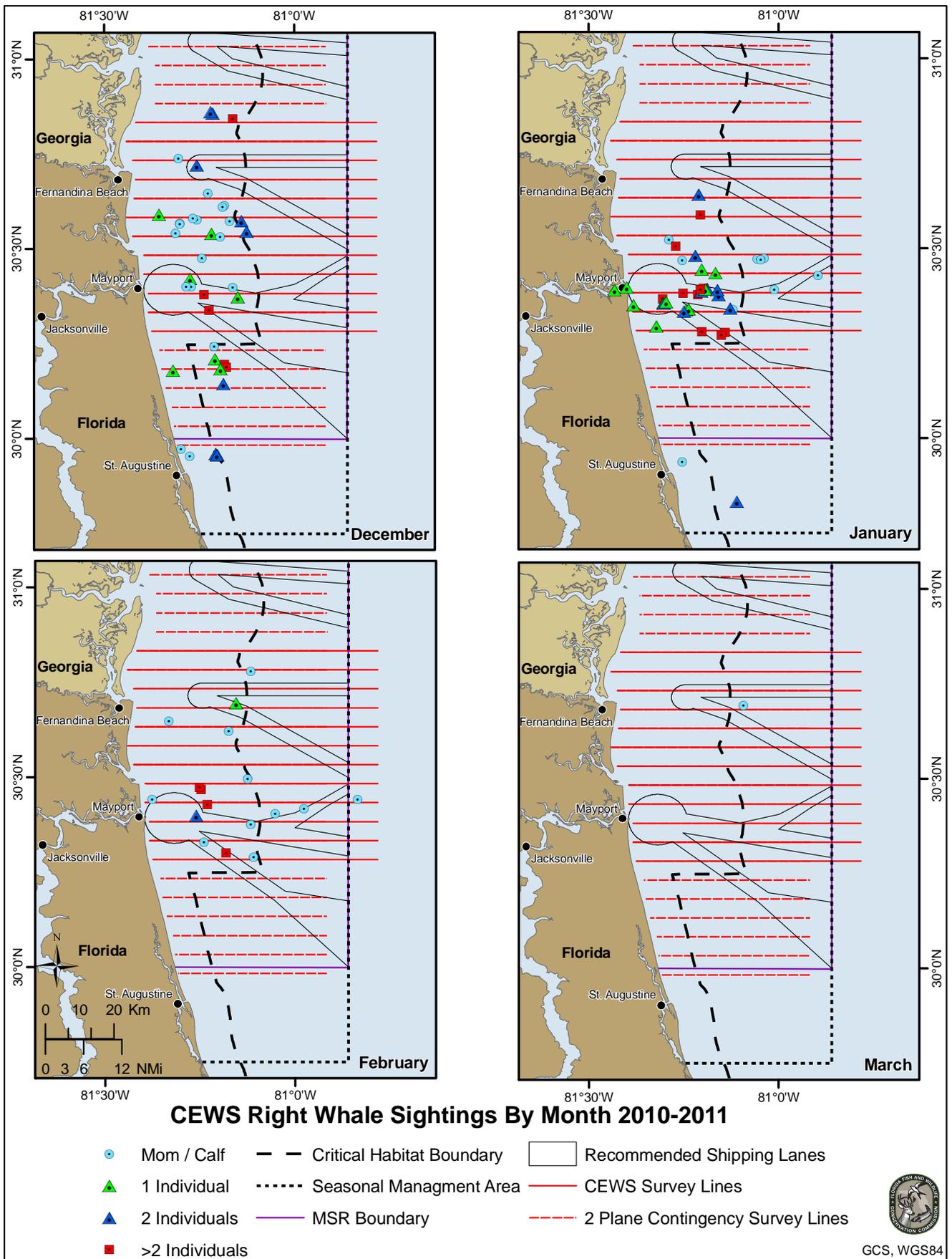


FIGURE 8: GRAPH OF TOTAL CEWS SIGHTINGS, WHALES, AND COW/CALF PAIRS

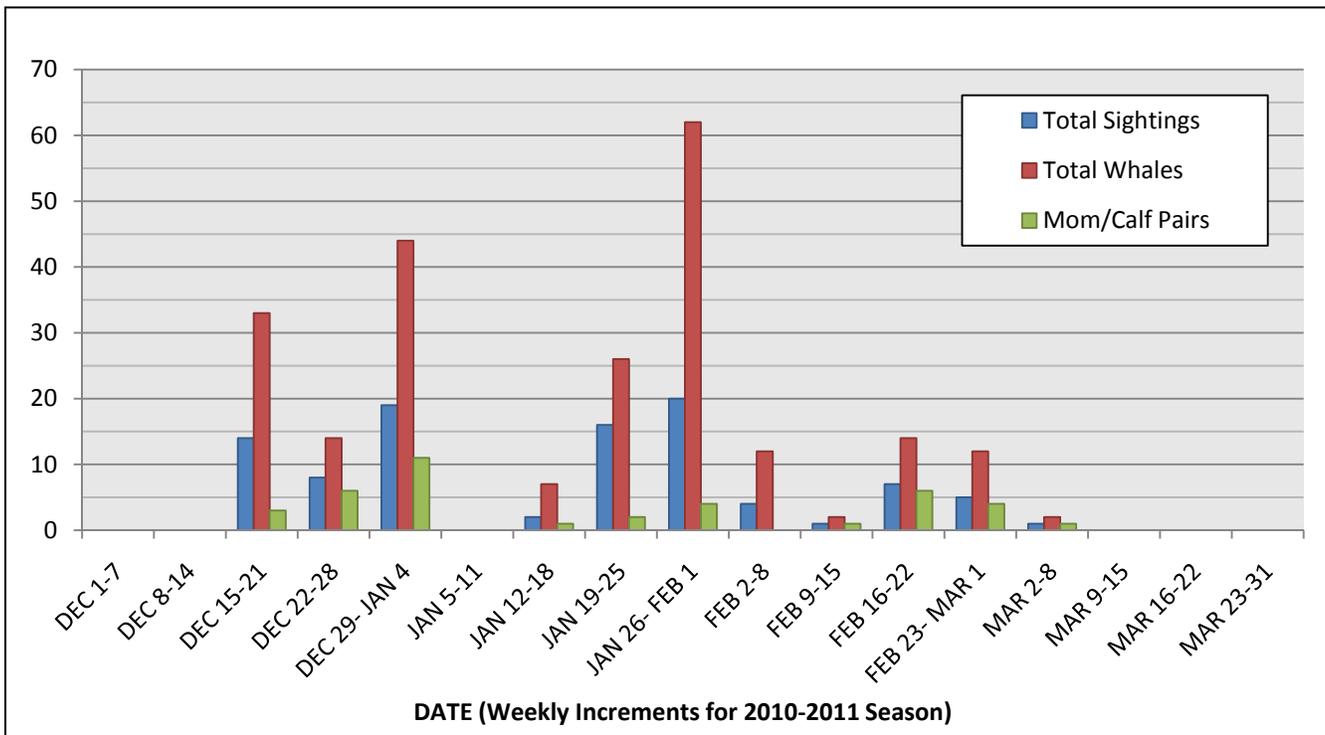


Figure 8: Total number of sightings, whales, and cow/calf pairs sighted per week by FWRI during the 2010-2011 season

FIGURE 9: GRAPH OF TOTAL CEWS SIGHTINGS AND WHALES PER EFFORT

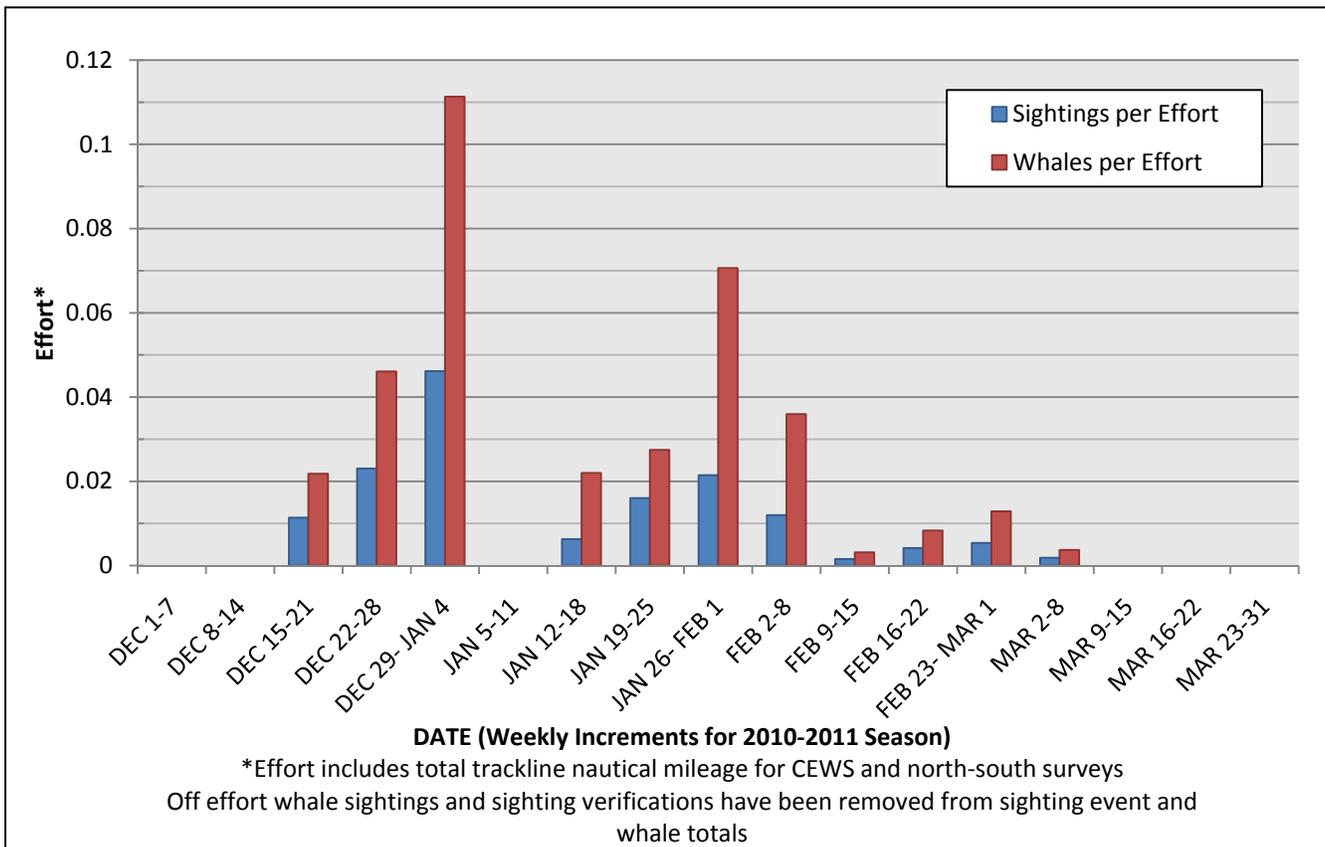


Figure 9: Total number of FWRI sightings and whales per survey nautical mileage effort

FIGURE 10: MAP OF TOTAL CEWS VESSELS SIGHTED

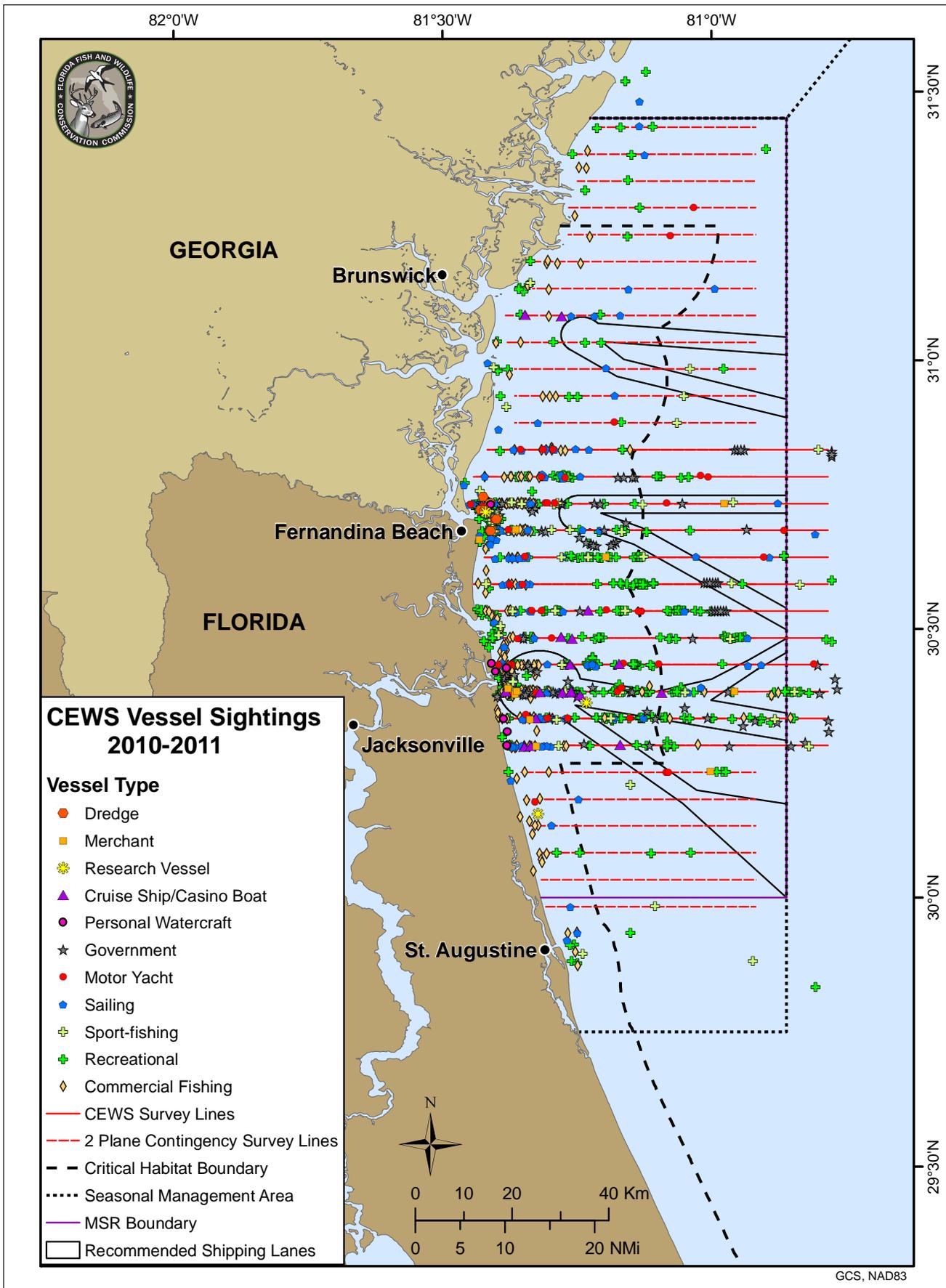


FIGURE 11: MAP OF CEWS VESSELS SIGHTED IN THE CEWS AREA
 MAP ZOOMED AND CROPPED TO SHOW DISTRIBUTION OF SIGHTINGS IN CEWS

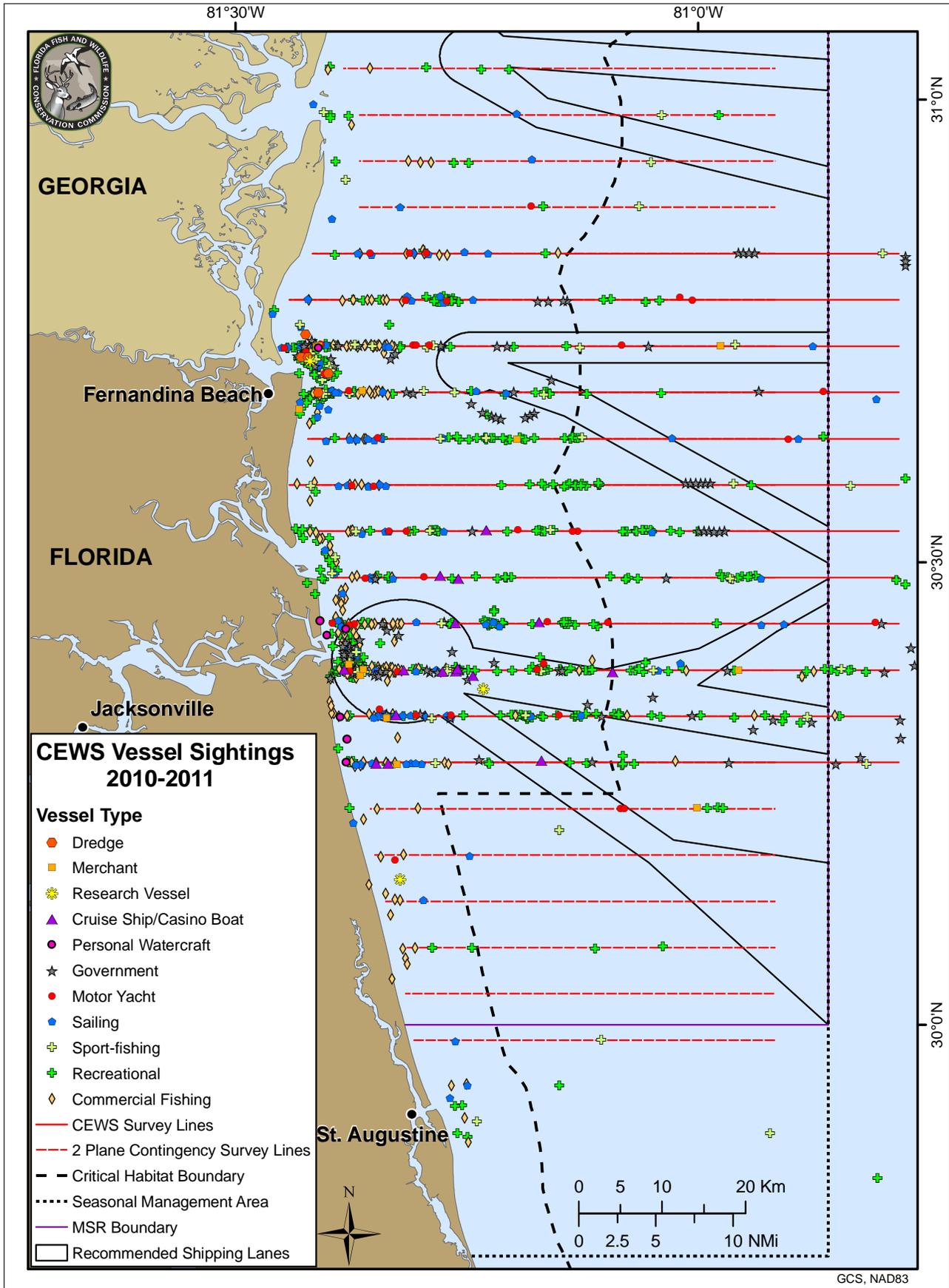


FIGURE 12: MAP OF CEWS VESSELS SIGHTED IN THE CEWS AREA
 MAP ZOOMED AND CROPPED TO SHOW DISTRIBUTION OF SIGHTINGS NEAR THE ST. MARY'S RIVER INLET

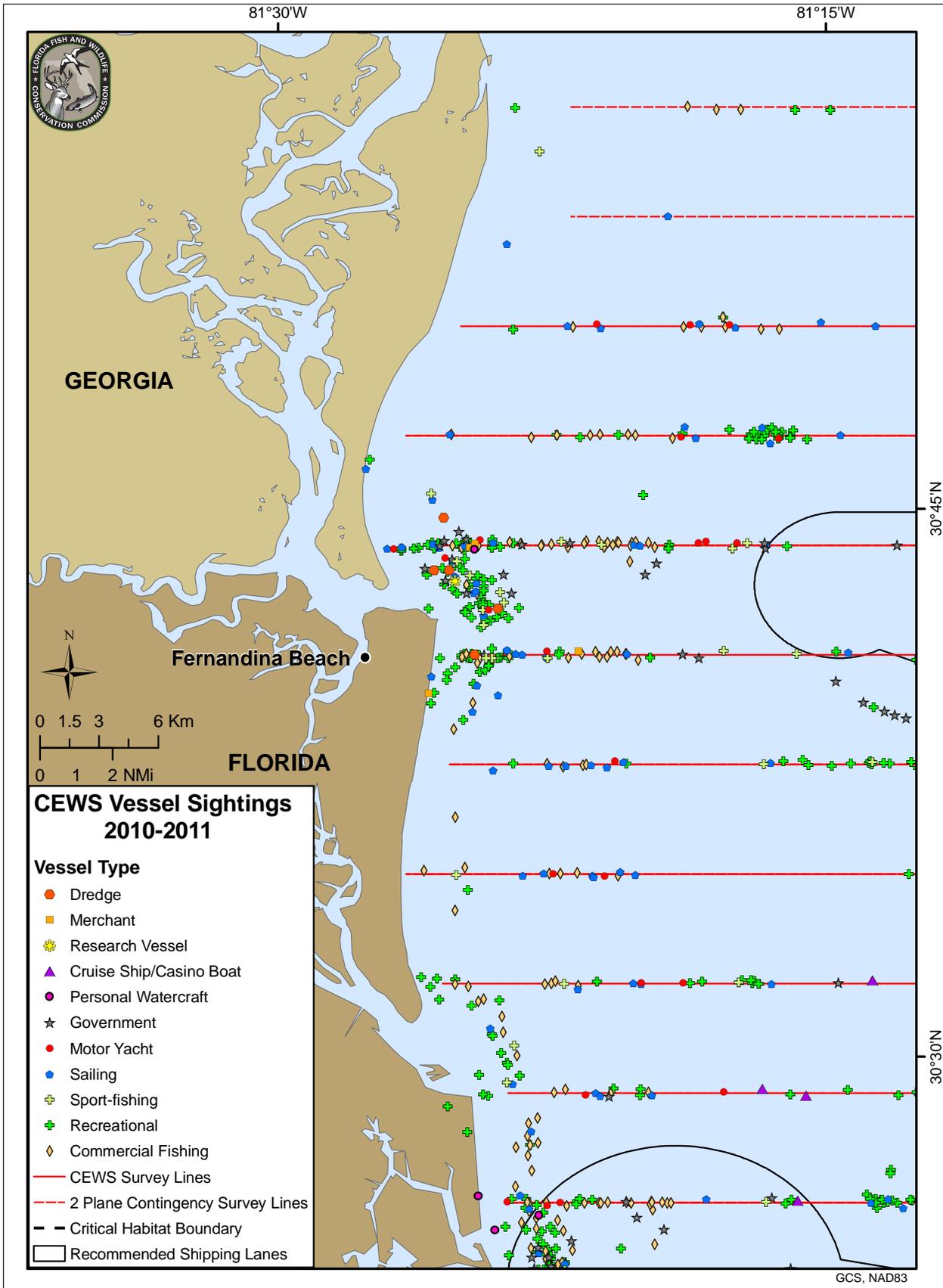


FIGURE 13: MAP OF CEWS VESSELS SIGHTED IN THE CEWS AREA
 MAP ZOOMED AND CROPPED TO SHOW DISTRIBUTION OF SIGHTINGS NEAR THE ST JOHNS RIVER ENTRANCE

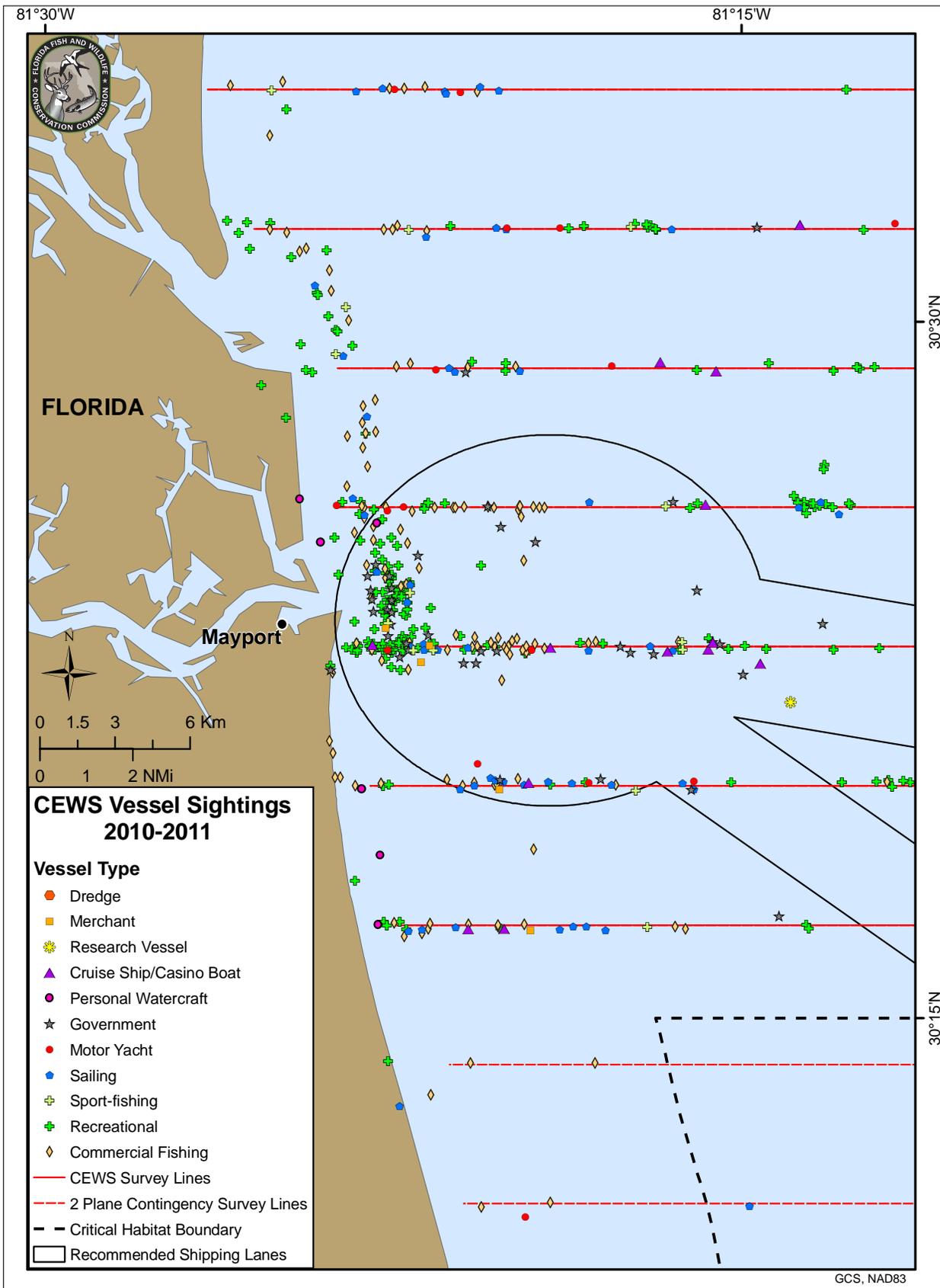


FIGURE 14: GRAPH OF PROPORTION OF CEWS SMALL AND GOVERNMENT VESSELS SIGHTED PER MONTH

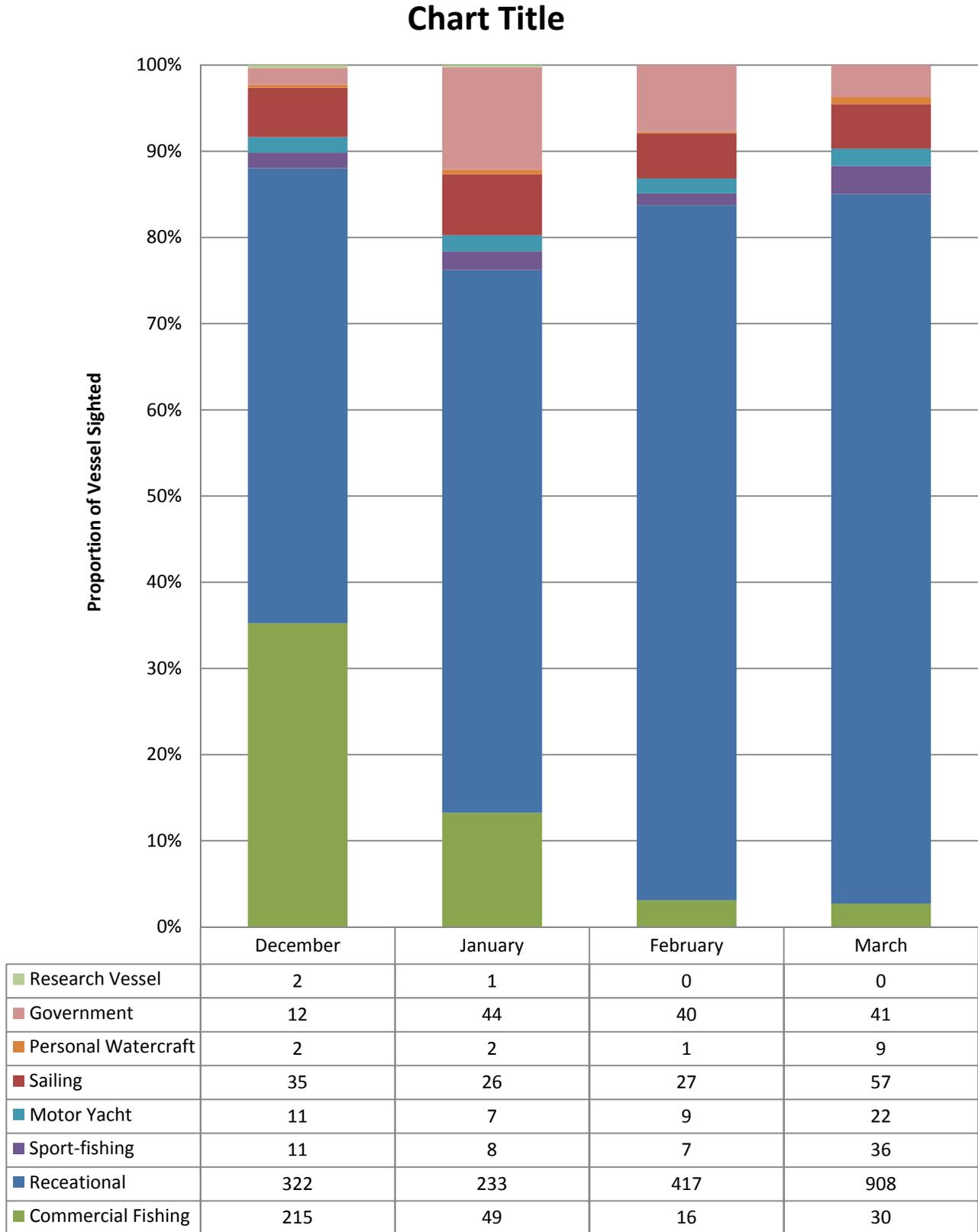


Figure 14: Total number of CEWS small and government vessel sightings per month are detailed in the table below the graph; graph shows the proportion of total vessels sighted per month

FIGURE 15: GRAPH OF CEWS SIGHTING DISTANCE

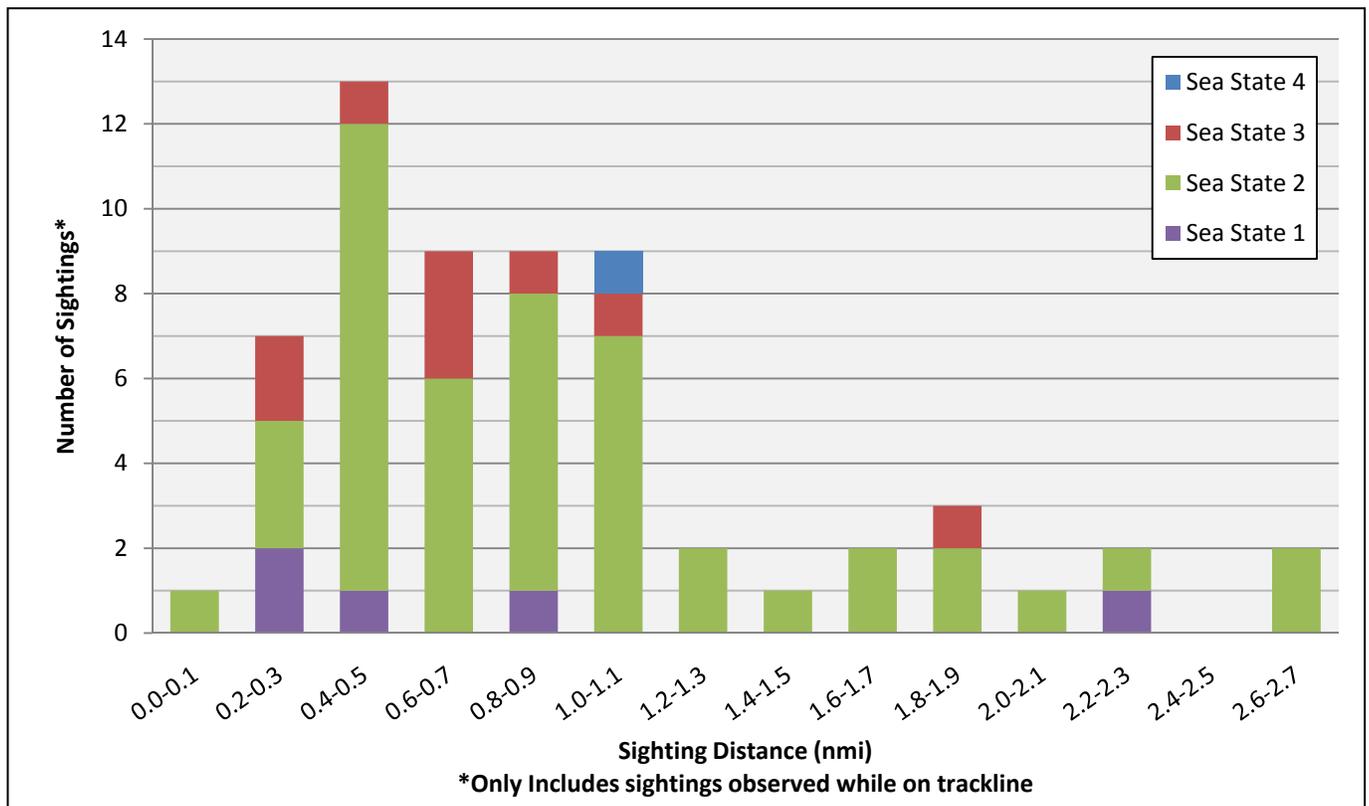


Figure 15: Sighting distance by Beaufort sea state for sightings observed from survey trackline

FIGURE 16: GRAPH OF CEWS PERPENDICULAR DISTANCE

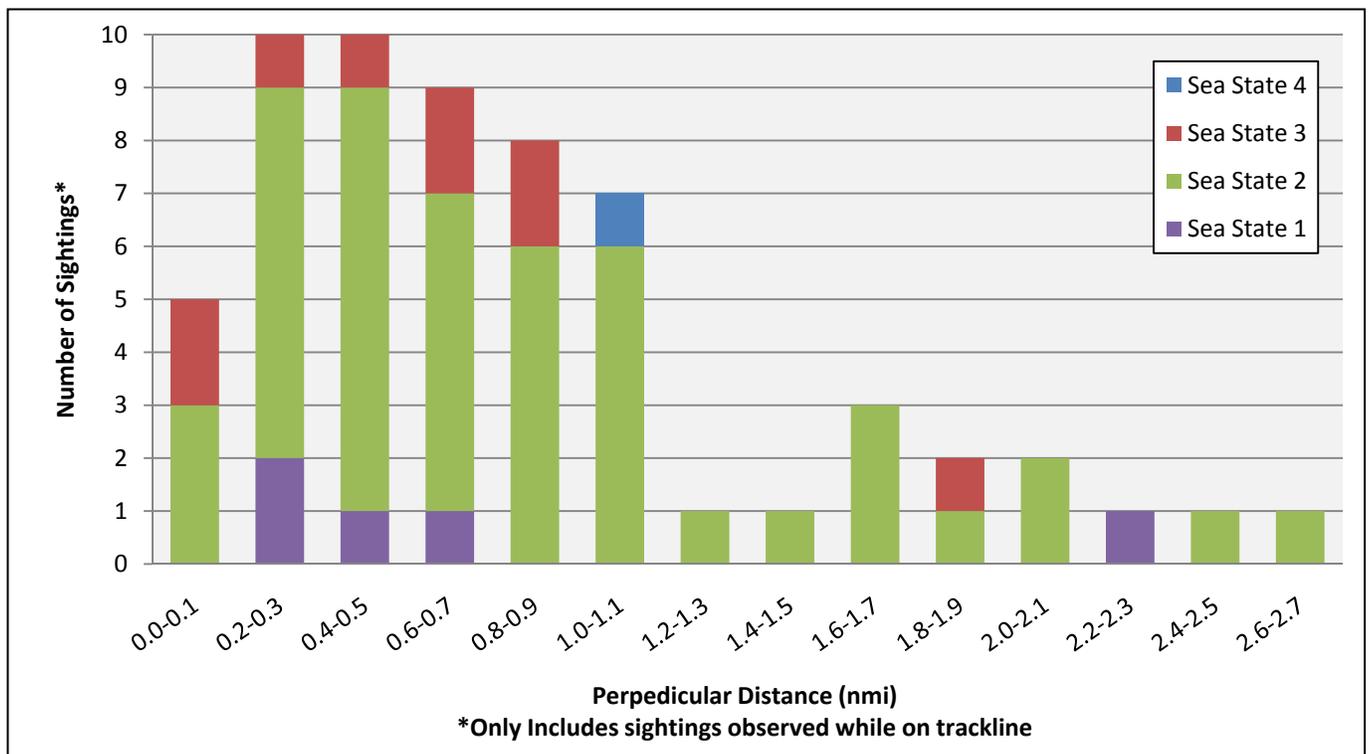


Figure 16: Sighting distance by Beaufort sea state for sightings observed from survey trackline. See METHODS section for description of sighting distance.

FIGURE 17: CHART OF DEMOGRAPHICS OF ALL INDIVIDUAL WHALES SIGHTED BY CEWS DURING THE 2010-2011 SEASON (N=92)

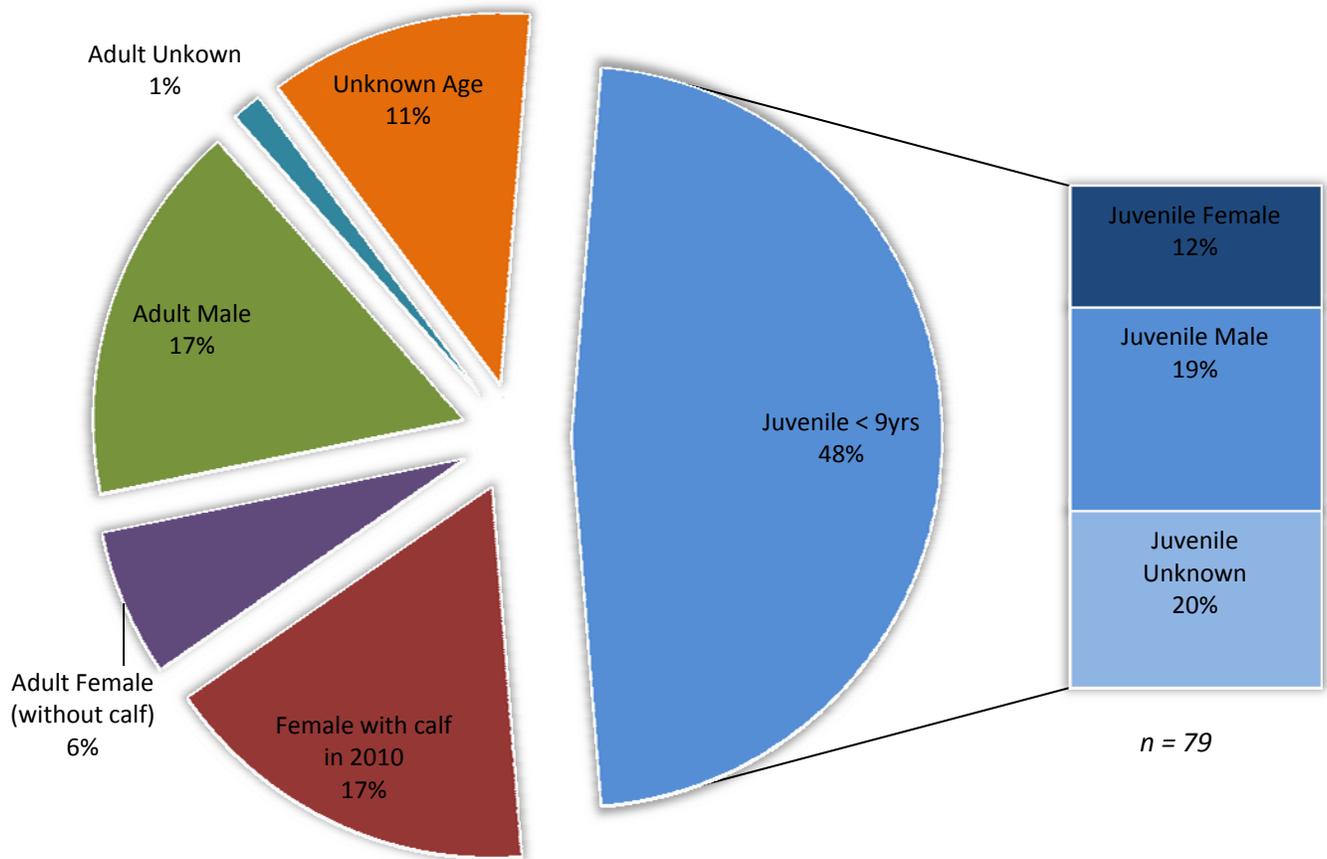


FIGURE 18: MAP OF FWRI 2010-2011 WHALE/VESSEL INTERACTIONS

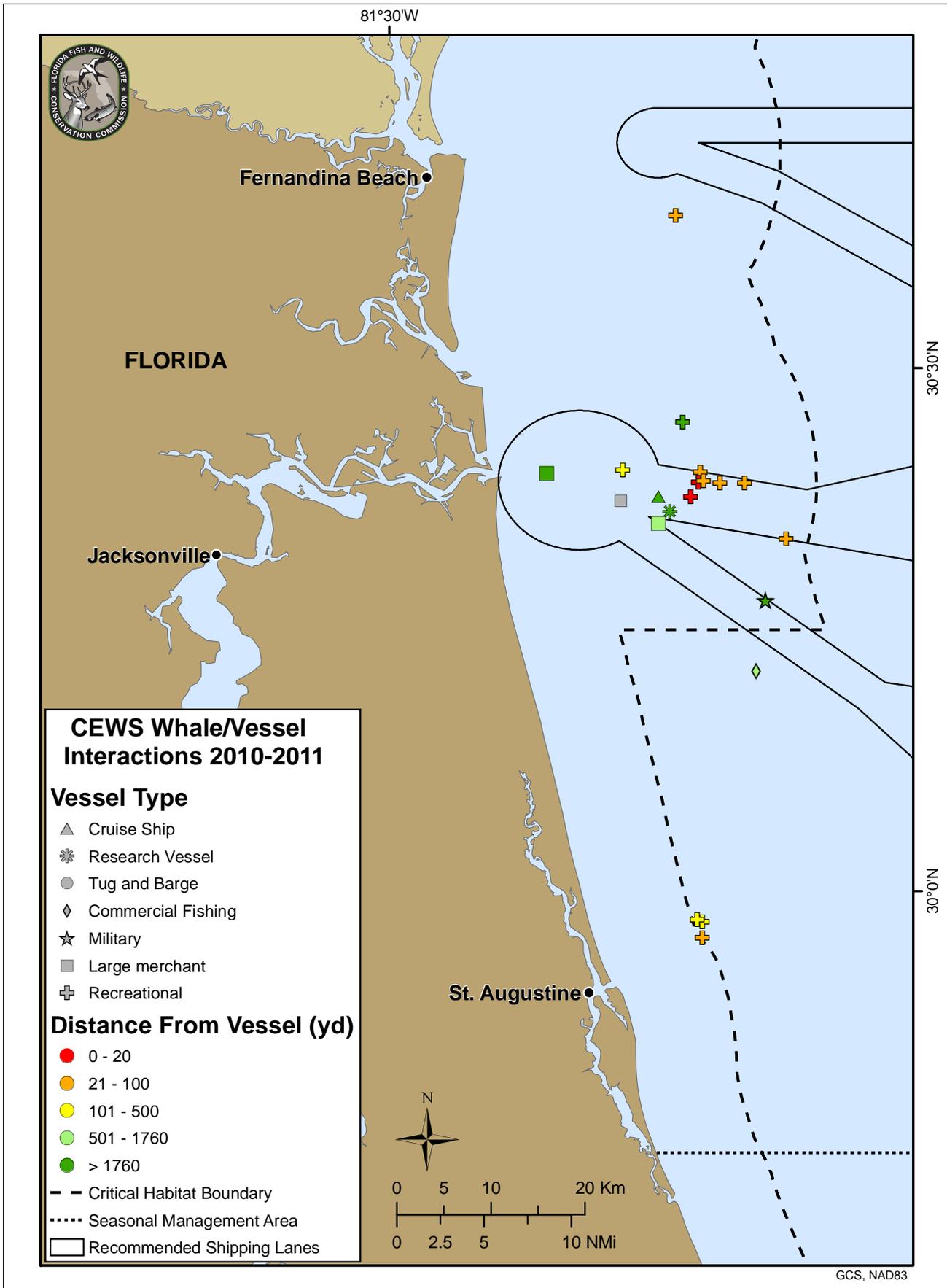


FIGURE 19: MAP OF 2010-2011 CEWS HUMPBACK WHALE SIGHTINGS

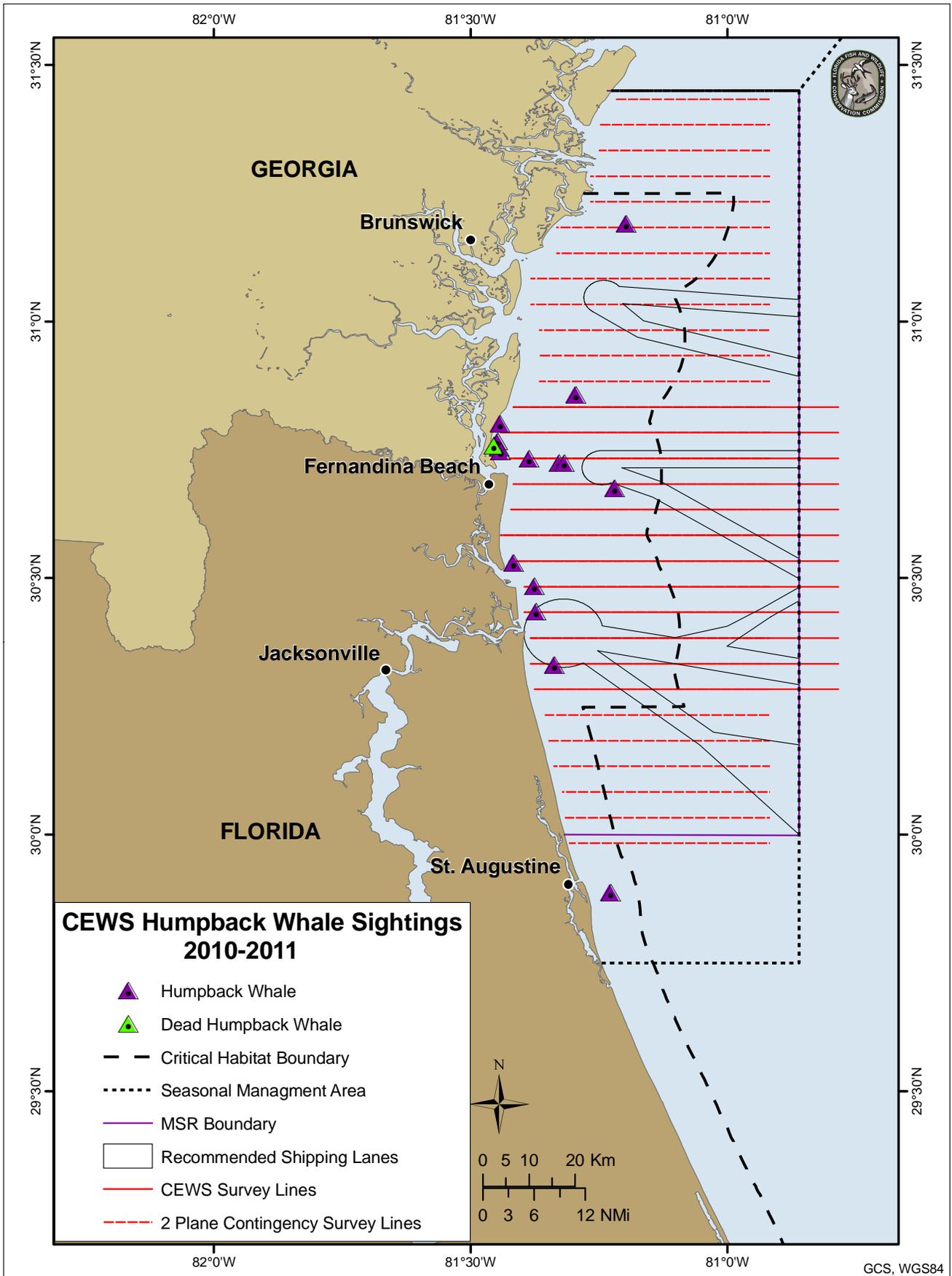


FIGURE 20: MAP OF 2010-2011 SEUS LARGE SHARK SIGHTINGS

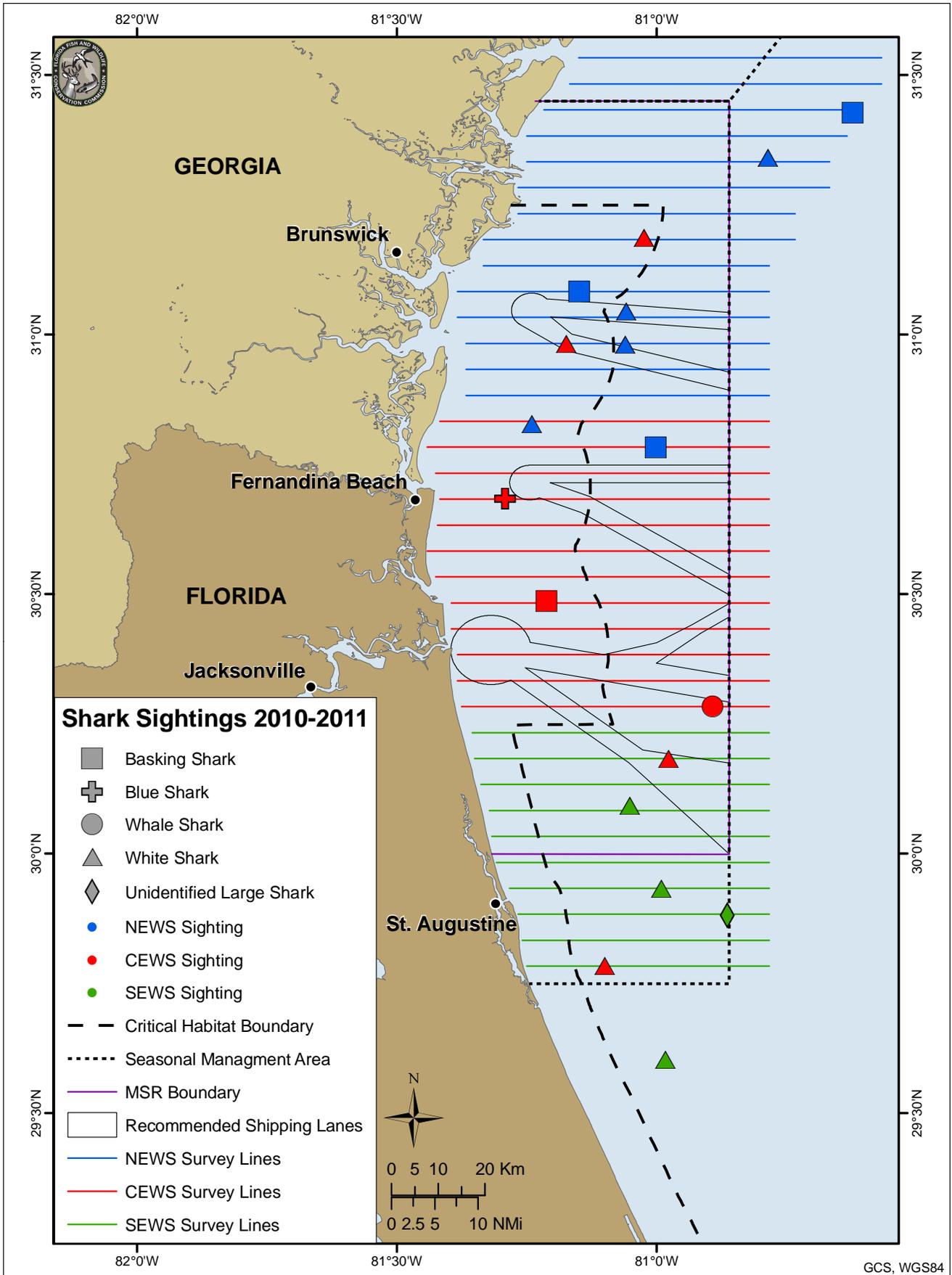


FIGURE 21: PHOTOGRAPH OF CATALOG #3010 “BINARY” ON 30 JANUARY 2011

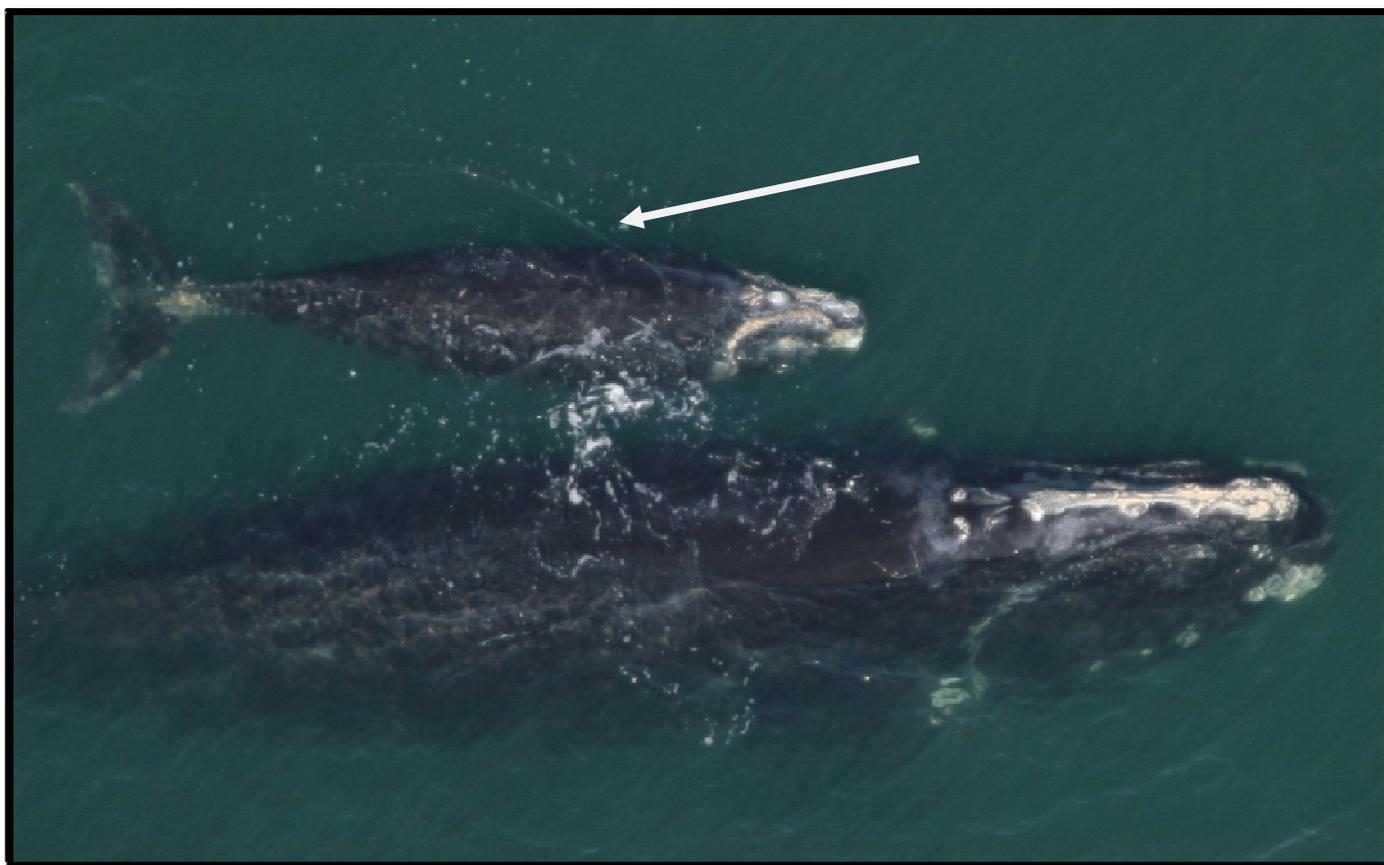


Figure 21: Note single line entanglement crossing over the calf's (top) back, see *EVENTS* section for details.
Photographer: Kate Pagan, FWRI

FIGURE 22: PHOTOGRAPH OF CATALOG #3966 ON 21 DECEMBER 2010



Figure 22: Note wound series on lower left back of Catalog #3966 (right), see *EVENTS* section for details.
Photographer: Marjorie Foster, FWRI



Figure 23: Juvenile whale collides with the southern jetty at the St Johns River entrance (top)

Figure 24: Whale passes by the ferry dock on its way up river (bottom), see *EVENTS* section for details

Photographer: Angie Stiles, FWRI

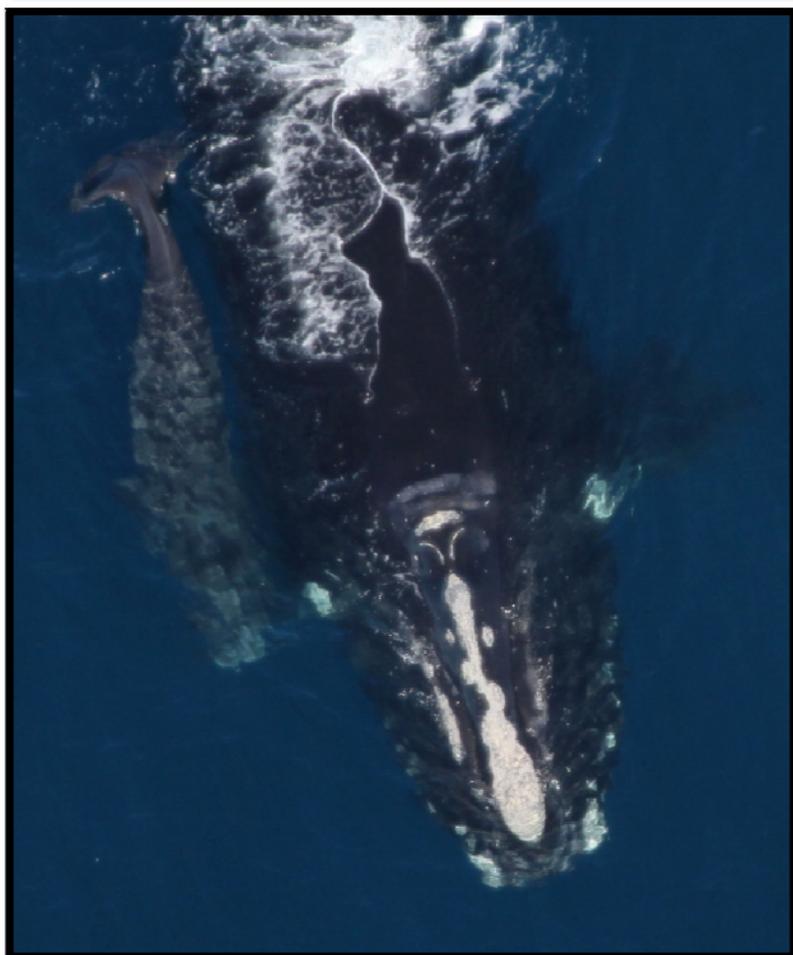


Figure 25: Note the calf on the peduncle of Catalog #1245 (top)

Figure 26: Note the flaccid fluke of the calf (bottom photo, calf on left), see EVENTS section for details.

Photographer: Marjorie Foster, FWRI

FIGURE 27: GRAPH OF WATER TEMPERATURES RECORDED AT STATION 41112

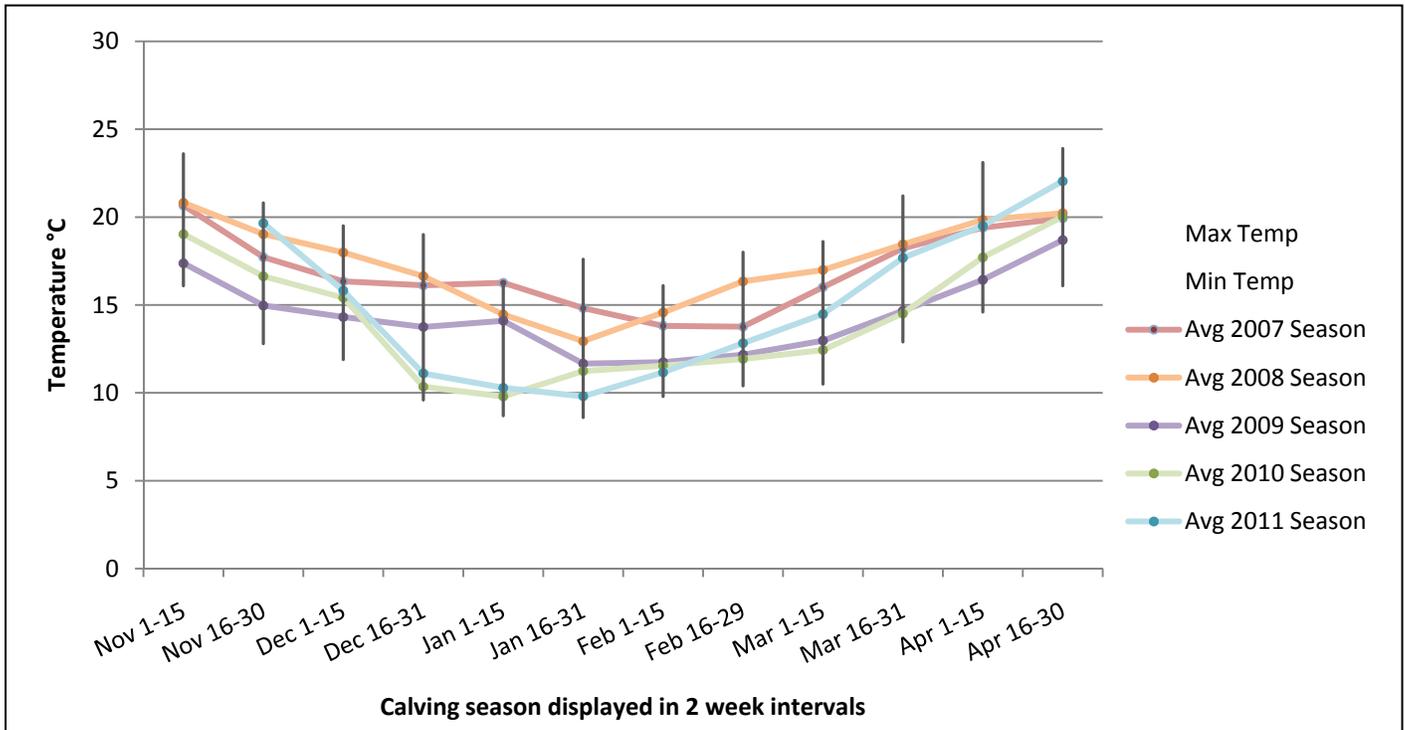


Figure 27: Water temperature recordings from NOAA’s National Data Buoy Center Waverider buoy (Station 41112) offshore of Fernandina Beach, FL

FIGURE 28: GRAPH OF WATER TEMPERATURES RECORDED AT STATION SAUF1

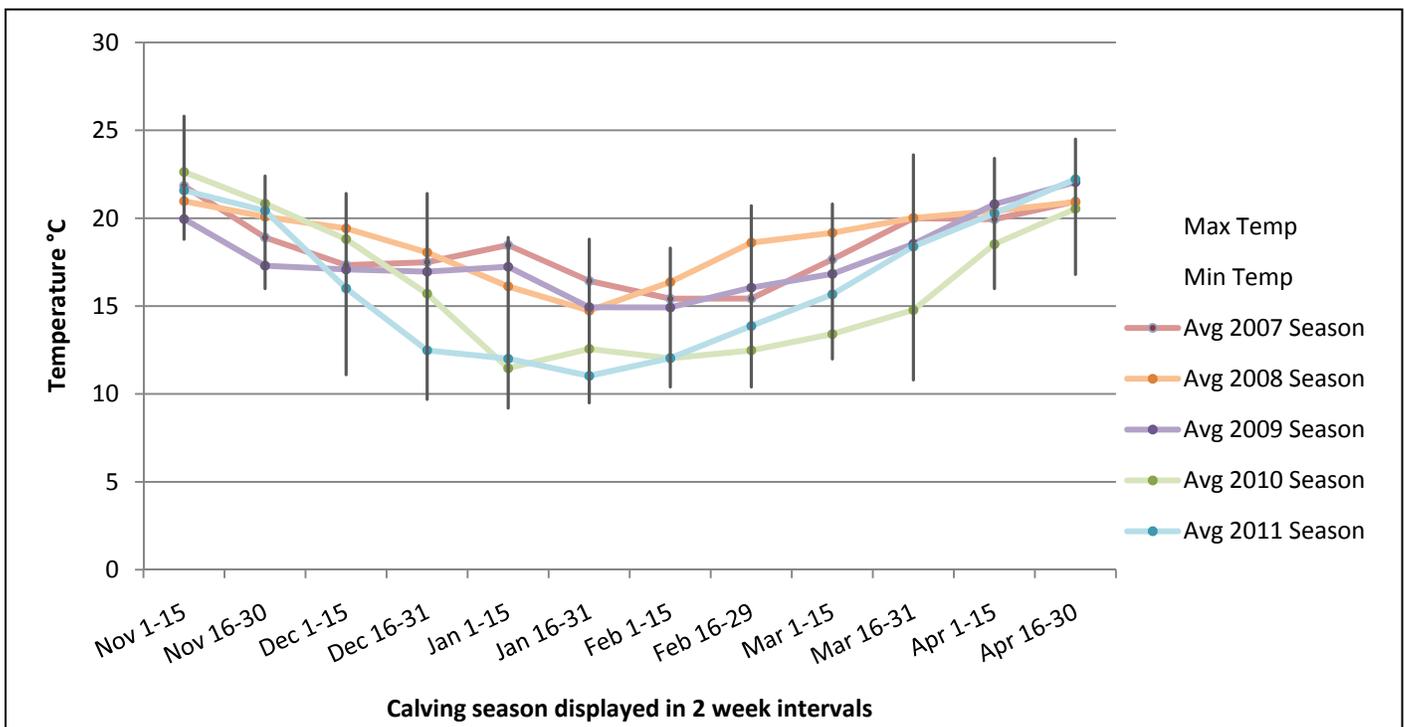


Figure 28: Water temperature recordings from NOAA’s National Data Buoy Center C-MAN Station in St. Augustine (Station SAUF1)

FIGURE 29: PHOTOGRAPH OF WHALE SHARK ON 21 MARCH 2011

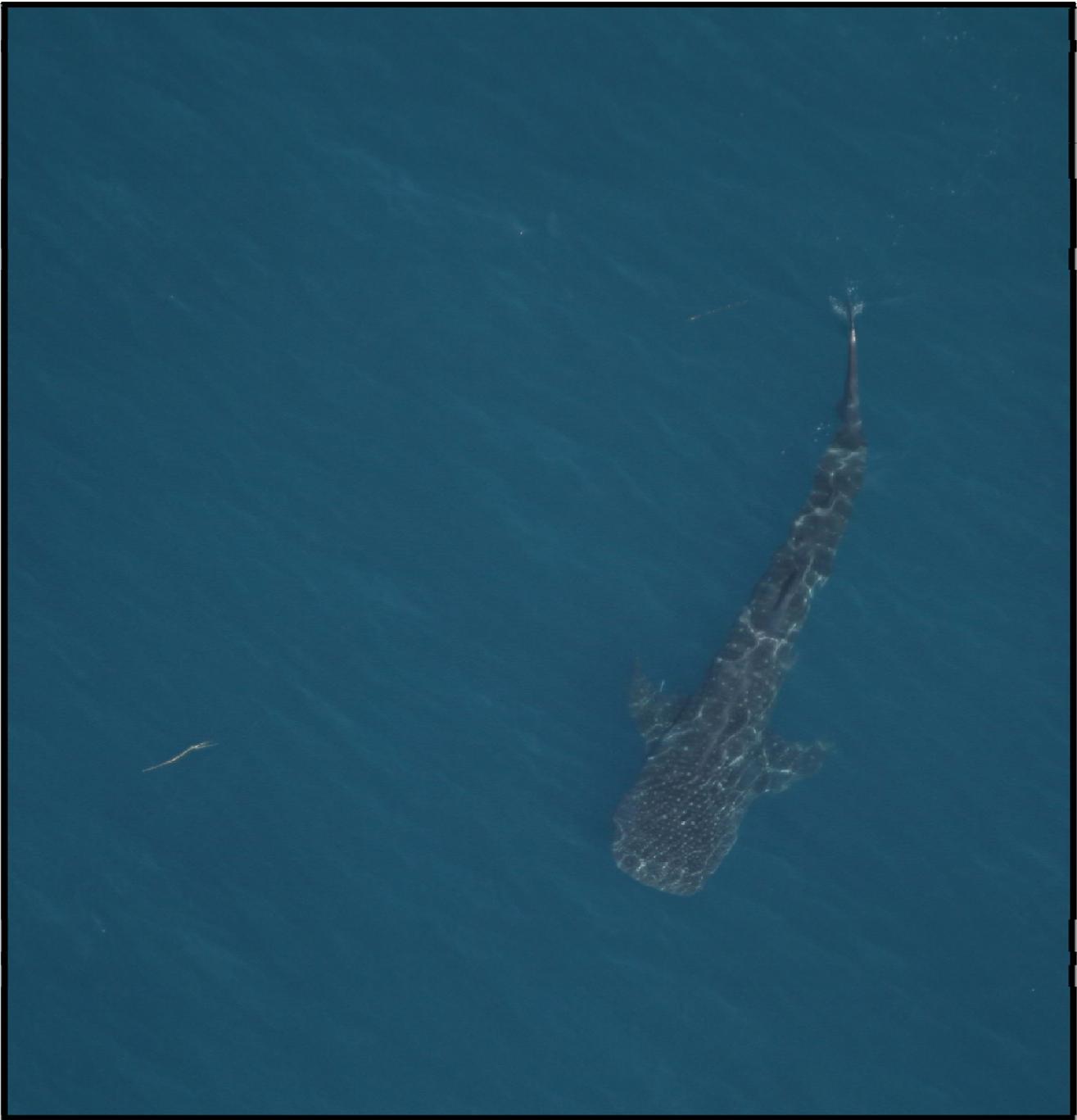
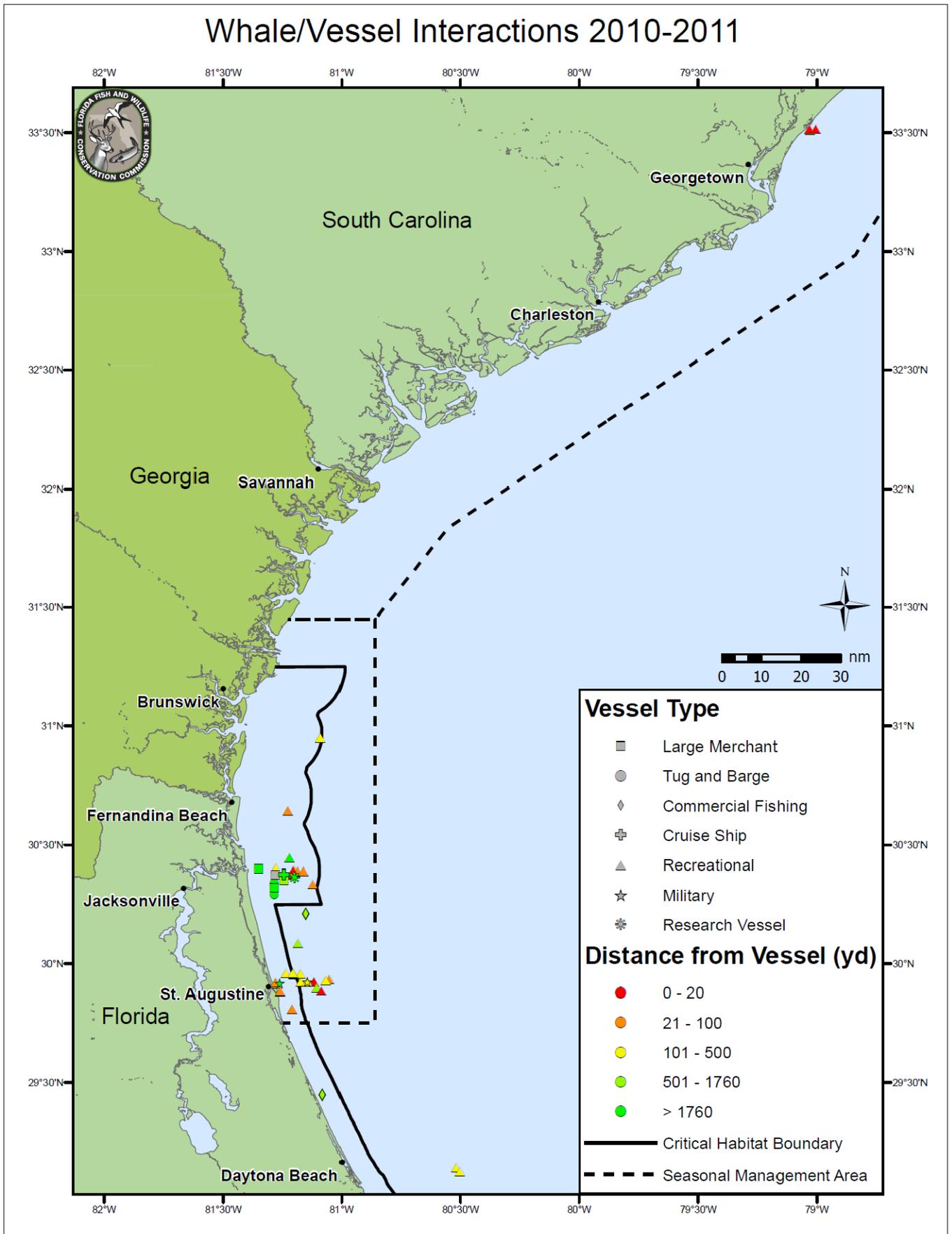


Figure 29: Note the clear, blue water this whale shark (*Rhincodon typus*) was sighted in offshore of Jacksonville, FL; see EVENTS section for more details on the whale shark sighting.
Photographer: Angie Stiles, FWRI

FIGURE 30: MAP OF SEUS 2010-2011 WHALE/VESSEL INTERACTIONS



TABLES

TABLE 1: EWS SURVEY TRACKLINE WAYPOINTS

Survey Area	EWS Trackline Number	Trackline Latitude	Eastern End Point Longitude	Standard Nautical Mileage	2-Plane Tracklines	Trackline Latitude	2-Plane Eastern Longitude	2-Plane Nautical Mileage	1-Plane Tracklines	Trackline Latitude	1-Plane Eastern Longitude	1-Plane Nautical Mileage
NEWS	a	31° 32.0	80° 34.0	29.9								
NEWS	b	31° 29.0	80° 34.0	30.8								
NEWS	1	31° 26.0	80° 38.0	30.0	1	31° 26.0	80° 55.0	15.4				
NEWS	2	31° 23.0	80° 38.0	31.7	2	31° 23.0	80° 55.0	17.1				
NEWS	3	31° 20.0	80° 40.0	30.0	3	31° 20.0	80° 55.0	17.1				
NEWS	4	31° 17.0	80° 40.0	30.8	4	31° 17.0	80° 55.0	18.0				
NEWS	5	31° 14.0	80° 44.0	27.5	5	31° 14.0	80° 55.0	18.0	5	31° 14.0	81° 00.0	13.7
NEWS	6	31° 11.0	80° 44.0	30.9	6	31° 11.0	80° 55.0	21.4	6	31° 11.0	81° 00.0	17.1
NEWS	7	31° 08.0	80° 47.0	28.3	7	31° 08.0	80° 55.0	21.4	7	31° 08.0	81° 00.0	17.1
NEWS	8	31° 05.0	80° 47.0	30.9	8	31° 05.0	80° 55.0	24.0	8	31° 05.0	81° 00.0	19.7
NEWS	9	31° 02.0	80° 47.0	30.9	9	31° 02.0	80° 55.0	24.0	9	31° 02.0	81° 00.0	19.7
NEWS	10	30° 59.0	80° 47.0	30.1	10	30° 59.0	80° 55.0	23.2	10	30° 59.0	81° 00.0	18.9
NEWS	11	30° 56.0	80° 47.0	30.1	11	30° 56.0	80° 55.0	23.2	11	30° 56.0	81° 00.0	18.9
NEWS	12	30° 53.0	80° 47.0	30.2	12	30° 53.0	80° 55.0	23.2	12	30° 53.0	81° 00.0	18.9
CEWS	13	30° 50.0	80° 47.0	32.8	13	30° 50.0	80° 55.0	25.8	13	30° 50.0	81° 00.0	21.5
CEWS	14	30° 47.0	80° 47.0	34.1	14	30° 47.0	80° 55.0	27.1	14	30° 47.0	81° 00.0	22.8
CEWS	15	30° 44.0	80° 47.0	33.2	15	30° 44.0	80° 55.0	26.3	15	30° 44.0	81° 00.0	22.0
CEWS	16	30° 41.0	80° 47.0	32.8	16	30° 41.0	80° 55.0	25.9	16	30° 41.0	81° 00.0	21.6
CEWS	17	30° 38.0	80° 47.0	33.1	17	30° 38.0	80° 55.0	26.1	17	30° 38.0	81° 00.0	21.8
CEWS	18	30° 35.0	80° 47.0	34.1	18	30° 35.0	80° 55.0	27.2	18	30° 35.0	81° 00.0	22.9
CEWS	19	30° 32.0	80° 47.0	33.3	19	30° 32.0	80° 55.0	26.3	19	30° 32.0	81° 00.0	22.0
CEWS	20	30° 29.0	80° 47.0	31.7	20	30° 29.0	80° 55.0	24.8	20	30° 29.0	81° 00.0	20.5
CEWS	21	30° 26.0	80° 47.0	31.7	21	30° 26.0	80° 55.0	24.8	21	30° 26.0	81° 00.0	20.5
CEWS	22	30° 23.0	80° 47.0	31.1	22	30° 23.0	80° 55.0	24.2	22	30° 23.0	81° 00.0	19.9
CEWS	23	30° 20.0	80° 47.0	31.2	23	30° 20.0	80° 55.0	24.2	23	30° 20.0	81° 00.0	19.9
CEWS	24	30° 17.0	80° 47.0	30.8	24	30° 17.0	80° 55.0	23.8	24	30° 17.0	81° 00.0	19.5
SEWS	25	30° 14.0	80° 47.0	29.7	25	30° 14.0	80° 55.0	22.8	25	30° 14.0	81° 00.0	18.5
SEWS	26	30° 11.0	80° 47.0	29.5	26	30° 11.0	80° 55.0	22.5	26	30° 11.0	81° 00.0	18.2
SEWS	27	30° 08.0	80° 47.0	28.9	27	30° 08.0	80° 55.0	21.9				
SEWS	28	30° 05.0	80° 47.0	28.1	28	30° 05.0	80° 55.0	21.1				
SEWS	29	30° 02.0	80° 47.0	27.8	29	30° 02.0	80° 55.0	20.8				
SEWS	30	29° 59.0	80° 47.0	27.4	30	29° 59.0	80° 55.0	20.4				
SEWS	31	29° 56.0	80° 47.0	26.1								
SEWS	32	29° 53.0	80° 47.0	25.2								
SEWS	33	29° 50.0	80° 47.0	24.8								
SEWS	34	29° 47.0	80° 47.0	24.4								

Nautical mileage calculated using Geodetic Datums

Total SEWS Nautical Mileage: 271.8

TABLE 2: FWRI/CEWS 2010-2011 AERIAL SURVEY ACTIVITIES

Date	Full	None	Partial	1/2 Plane Cont.	EWS Lines (13-24)	Number of RIWH Sightings	Number of RIWH Whales	M/C Pair	HUWH Whales	Hobbs	Nautical Miles Flown	Nautical miles flown sea state < 3	WVI	Comments
1-Dec-10		X												No fly - high winds/sea state
2-Dec-10		X												No fly - high winds/sea state
3-Dec-10		X												No fly - high winds/sea state
4-Dec-10			X		13-24	0	0	0		5.5	387.8	378.8		All 12 lines flown S to N. Lines 21-22 offshore (approx 1nmi) due to warship. Standby due to high winds/sea state.
5-Dec-10		X												No fly - high winds/sea state
6-Dec-10		X												No fly - high winds/sea state
7-Dec-10		X												No fly - high winds/sea state
8-Dec-10				X	4-17, 21-22	0	0	0		5.6	418.10	418.10		Two-plane contingency survey; Lines 4-17 flown N to S east to 8055W; Lines 21-22 flown N to S east to 8100W. Transit to northern line 'On Track' (50.0nm). Did not fly lines 1-3 due to high sea state. Airspace south of 3100N was closed due to planned missile launch; after launch airspace reopened and we were able to survey a portion of the restricted area in the afternoon. Standby due to high winds/sea state.
9-Dec-10		X												No fly - high winds/sea state
10-Dec-10		X												No fly - high winds/sea state
11-Dec-10		X												No fly - high winds/sea state
12-Dec-10		X												No fly - high winds/sea state
13-Dec-10		X												No fly - high winds/sea state
14-Dec-10		X												No fly - high winds/sea state
15-Dec-10			X		13-22	1	4	0		5.4	327.90	297.40		Lines 13-22 flown N to S. Standby due to high winds offshore. Cut lines 23-24 due to daylight constraints.
16-Dec-10			X		13-24	2	10	0		5.1	174.40	102.10	Yes	All 12 lines flown. Lines 21-24 flown S to N, then lines 13-16 flown N to S due to approaching weather system. After completing line 16 responded to report of whales near Jacksonville channel. After working whales, flew lines 17-20 flown S to N. All lines cut on or before 8100W due to high sea state.
17-Dec-10		X												No fly - high winds/sea state
18-Dec-10			X		15-24	3	4	1		5.8	323.00	323.00		Flew lines 15-24 S to N. Lines 13-14 cut due to fog. Data recorded by hand. Takeoff delayed due to computer issues.
19-Dec-10		X												No fly- high wind/sea state
20-Dec-10			X		13-22	2	4	2		4.9	310.40	301.30		Lines 13-22 flown N to S. Lines 19-22 cut at 8100W due to time constraints. Lines 23-24 not flown. Transit to northern line 'On Track' (27.5nm). Standby due to high winds/sea state.
21-Dec-10	X				13-24	6	11	0		7.2	389.80	389.80		All 12 lines flown N to S
22-Dec-10		X												No fly - high winds/sea state

TABLE 2: FWRI/CEWS 2010-2011 AERIAL SURVEY ACTIVITIES

Date	Full	None	Partial	1/2 Plane Cont.	EWS Lines (13-24)	Number of RIWH Sightings	Number of RIWH Whales	M/C Pair	HUWH Whales	Hobbs	Nautical Miles Flown	Nautical miles flown sea state < 3	WVI	Comments
23-Dec-10		X												No fly - high winds/sea state
24-Dec-10		X												No fly - high winds/sea state
25-Dec-10			X		17-24	7	12	5		8.2	381.50	365.10	Yes	Lines 17-24 flown S to N. Cut lines 17-18 at approx 8052W due to high sea state offshore. After completing line 17, transited south (off effort) to location of entangled whale in SEWS area to relieve them for refueling, arrived at approx 1330(L). Remained on scene for approx 70 minutes with entangled whale until SEWS plane (AVS/ALW) returned. Landed to refuel and switch observers (KAJ for JLJ) at St. Augustine Airport (aircraft funding sources switched). KMP/JLJ relieved AVS/ALW on entangled whale and AVS/ALW departed to complete CEWS survey lines 13-16 S to N (transit off effort). Transit to St. Augustine after completing line 13 was off effort to stay clear of disentanglement activities.
26-Dec-10		X												No fly - high winds/sea state
27-Dec-10		X												No fly - high winds/sea state
28-Dec-10				X	11-22	1	2	1		5.1	305.70	305.70		2-plane contingency survey due to SEWS disentanglement efforts. Flew EWS lines 17-18 flown N to S. Started out on line 19 but broke away to transit south to St. Augustine airport to troubleshoot aircraft telemetry equipment. CEWS/SEWS pilots and observers switched aircraft and CEWS team returned to survey in N1353L. Transit to and from St. Augustine airport off watch, above speed. Lines 19-22 flown S to N. After completing line 19, transited to line 16 and flew lines 11-16 S to N. Lines 11-12 cut at the 8100W due to daylight constraints. Transit south to Craig Airport off watch, above survey speed. Standby due to high sea state.
29-Dec-10				X	15-26	4	15	0		5.7	332.80	332.80	Yes	2-plane contingency survey. Lines 15-24 flown N to S east to 8055W and lines 25-26 flown S to N east to 8047W.
30-Dec-10				X	17-30	11	21	7		7.2	346.0	346.0	Yes	2-plane contingency survey. Lines 17-30 flown N to S. Verified report from USWTR survey team near line 18. Line 30 cut inshore after last sighting due to daylight restraints.
31-Dec-10	X				13-28	2	4	2		7.9	506.0	506.0		Lines 13-28 flown N to S. Modified 2-plane contingency due to SEWS disentanglement efforts. Flew south to verify sighting by St. Augustine inlet, but was unable to locate.
1-Jan-11		X												No fly - high winds/sea state
2-Jan-11		X												No fly - rain and high winds/sea state

TABLE 2: FWRI/CEWS 2010-2011 AERIAL SURVEY ACTIVITIES

Date	Full	None	Partial	1/2 Plane Cont.	EWS Lines (13-24)	Number of RIWH Sightings	Number of RIWH Whales	M/C Pair	HUWH Whales	Hobbs	Nautical Miles Flown	Nautical miles flown sea state < 3	WVI	Comments
3-Jan-11		X												No fly - high winds/sea state
4-Jan-11				X	15-30	2	4	2		6.7	424.6	424.6		2-plane contingency survey. Lines 15-30 flown N to S. Lines 15-20 east to 8047W and lines 21-30 east to 8055W. Transited south to verify a sighting report from FWC LE near St. Augustine channel.
5-Jan-11		X												No fly - rain and low ceiling
6-Jan-11		X												No fly - high winds/sea state
7-Jan-11		X												No fly - high winds/sea state
8-Jan-11		X												No fly - high winds/sea state
9-Jan-11		X												No fly - high winds/sea state
10-Jan-11		X												No fly - high winds/sea state
11-Jan-11		X												No fly - high winds/sea state
12-Jan-11		X												No fly - high winds/sea state
13-Jan-11		X												No fly - high winds/sea state
14-Jan-11			X		13-24	0	0	0		5.6	379.8	379.8		All 12 lines flown N to S. Lines 15-18 cut at 8049W due to naval exercises offshore and closed airspace. Standby due to high sea state.
15-Jan-11				X	5-23	2	7	1		8.0	467.1	459.2	Yes	1-Plane contingency survey. Flew EWS lines 5-23. Lines 5-18 flown S to N and lines 19-23 flown N to S. Channel lines (7-12, 15-18 and 19-22) flown out to 8055W. Line 23 cut at 8107W due to daylight constraints. Portion of line 22 reflowed due to earlier WVIs. SEWS plane completed line 24, so all channel lines were covered.
16-Jan-11	X				13-24	0	0	0		5.6	389.8	389.8		All 12 lines flown S to N
17-Jan-11		X												No fly - rain
18-Jan-11		X												No fly - fog and low ceilings
19-Jan-11			X		13-24	3	6	0		6.0	376.4	367.3	Yes	All 12 lines flown N to S. Lines 13-16 cut at approx 8058W due to fog. Standby due to fog.
20-Jan-11	X				13-24	2	3	1		6.0	389.8	389.8		All 12 lines flown S to N. Standby due to fog. Fishery with small yellow buoys observed 10NM offshore Jacksonville.
21-Jan-11		X												No fly - fog and high wind/sea state
22-Jan-11		X												No fly - high winds/sea state
23-Jan-11			X		13-24	9	15	1		7.3	395.7	395.7		Lines 13-24 flown N to S. Cut lines 23-24 at the 8100W due to daylight constraints. Standby due to high winds/high sea state.
24-Jan-11			X		None	2	2	0		8.6	0.0	0.0		Located whale in St Johns channel at the start of day. Remained on scene with the whale inside the river all day. No survey lines flown.
25-Jan-11		X												No fly - high winds/sea state
26-Jan-11		X												No fly - high winds/sea state
27-Jan-11		X												No fly - high winds/sea state
28-Jan-11		X												No fly - high winds/sea state

TABLE 2: FWRI/CEWS 2010-2011 AERIAL SURVEY ACTIVITIES

Date	Full	None	Partial	1/2 Plane Cont.	EWS Lines (13-24)	Number of RIWH Sightings	Number of RIWH Whales	M/C Pair	HUWH Whales	Hobbs	Nautical Miles Flown	Nautical miles flown sea state < 3	WVI	Comments
29-Jan-11	X				13-24	9	26	3		7.5	419.0	419.0	Yes	All 12 lines flown N to S, 5 WVIs outside of St John's River.
30-Jan-11			X		15-24	8	22	1		8.4	295.2	295.2	Yes	Lines 15-24 flown S to N. Broke from line 20 to standby with entangled whale #3712 while SEWS team refueled (CEWS refueled at Craig en route). Lines 17-20 cut at 8055W due to time constraints. Off watch (above survey speed) during transit to refuel at Craig, to entangled whale, and back to line 20.
31-Jan-11	X				13-24	3	14	0		6.1	389.8	389.8		Lines 19-24 flown S to N and lines 13-18 flown N to S. Standby due to fog.
1-Feb-11		X												No fly - fog
2-Feb-11		X												No fly - high winds/sea state
3-Feb-11		X												No fly - high winds/sea state
4-Feb-11		X												No fly - high winds/ low ceilings
5-Feb-11		X												No fly - high winds/ low ceilings
6-Feb-11			X		13-22	4	12	0		5.9	354.8	354.8		Lines 13-22 flown N to S. Standby due to low ceilings. Transit north on track (26.9nm)
7-Feb-11		X												No fly - high sea state/rain
8-Feb-11		X												No fly - high winds/sea state
9-Feb-11			X		17-28	0	0	0		3.1	373.1	203.8		Lines 17-24 flown S to N. Lines 25-28 flown N to S. Lines 13-16 not flown due to front with low patchy fog and high sea state moving south into the area. Reduced visibility on lines 17-19 due to haze and patchy fog, and on W end of line 28 and transit N to Craig due to patchy fog. Standby due to high sea state.
10-Feb-11		X												No fly - high winds/sea state, rain
11-Feb-11		X												No fly - high winds/sea state
12-Feb-11		X												No fly - high winds/sea state
13-Feb-11	X				13-26	1	2	1		7.0	473.7	473.7		Lines 13-26 flown N to S. Broke from line 26 to transit north (off watch, above survey speed) to relieve NEWS team and assist with entangled whale response. Vessel operations completed during transit, so returned to finish line 26.
14-Feb-11			X		13-24	0	0	0	1	5.0	376.6	338.4		Lines 13-24 flown N to S. Lines 15-16 cut at 8100W and lines 17-18 cut at approx 8057W due to high sea state. Transit north on track (26.4nm).
15-Feb-11		X												No fly - high winds/sea state
16-Feb-11			X		13-22	3	6	2		5.5	355.1	355.1		Lines 13-22 flown N to S. Transit north on track (27.2nm). Documented mass of tangled floating rope. SEWS completed lines 23-24 due to daylight constraints. Visibility reduced throughout survey to overcast, light rain, and drizzle weather. Standby due to high sea state.

TABLE 2: FWRI/CEWS 2010-2011 AERIAL SURVEY ACTIVITIES

Date	Full	None	Partial	1/2 Plane Cont.	EWS Lines (13-24)	Number of RIWH Sightings	Number of RIWH Whales	M/C Pair	HUWH Whales	Hobbs	Nautical Miles Flown	Nautical miles flown sea state < 3	WVI	Comments
17-Feb-11			X		19-26	2	4	2		3.9	270.9	270.9		Lines 19-24 flown S to N, lines 25-26 flown S to N. Lines 13-18 cut due to fog and time restraints.
18-Feb-11	X				13-28	0	0	0		6.5	506.0	506.0		Lines 13-24 flown S to N and lines 25-28 flown N to S. After completing survey, boxed area of reported sighting off Jax. Standby due to fog.
19-Feb-11	X				13-24	0	0	0		5.3	415.7	415.7		All 12 lines flown N to S. Transit north on track (25.9nm). Visibility reduced, 1-4nmi throughout survey. Transited around warship N or line 23 for approx 2.6nmi.
20-Feb-11		X												No fly - high winds/sea state
21-Feb-11			X		13-24	2	4	2		5.3	403.5	388.0		Lines 13-24 flown S to N. Transit south, 'On Track' (25.9nm). Cut lines 21-22 at 8054W due to high sea state.
22-Feb-11			X		13-24	0	0	0		5.4	413.7	413.7		Lines 13-24 flown S to N. Cut offshore portion of line 23 due to naval activity. Standby due to high winds/low ceiling.
23-Feb-11		X												No fly - high winds/sea state and low ceiling
24-Feb-11	X				13-24	3	8	2		6.2	389.8	389.8		Lines 19-24 flown S to N and lines 13-18 flown N to S. Refueled and transited north after line 19 in anticipation of airspace closure due to shuttle launch. Lines 17-18 flown N to S flown after airspace re-opened (on ground for approx 1 hour). Mass of tangled floating rope sighted again. Standby due to haze and fog.
25-Feb-11		X												No fly - high winds/sea state
26-Feb-11			X		15-20	0	0	0		1.3	75.3	75.3		Lines 15-20 flown N to S. Lines 13-14, 21-24, and offshore portions of lines 15-20 cut due to fog. Standby due to fog.
27-Feb-11		X												No Fly - fog
28-Feb-11			X		13-24	2	4	2		5.8	360.4	339.8		Lines 13-24 flown N to S. Cut lines 21-22 at approx 8053W and lines 23-24 at approx 8103W due to high sea state. Cut lines 22 and 23 inshore at approx 8117W due to high sea state. Transit north on track (29.0nm)
1-Mar-11		X												No fly - high winds/sea state
2-Mar-11		X												No fly - high winds/sea state
3-Mar-11		X												No fly - high winds/sea state
4-Mar-11		X												No fly - high winds/sea state, rain
5-Mar-11			X		13-24	1	2	1	1	5.4	373.9	364.4		Lines 13-24 flown N to S. Lines 15-16 cut at 8056W due to high sea state. HUWH sighting of dead whale (GA2011012Mn). Mass of floating rope sighted. Standby due to high sea state.
6-Mar-11		X												No fly - high winds/sea state
7-Mar-11		X												No fly - high winds/sea state
8-Mar-11	X				13-24	0	0	0	1	5.5	389.8	378.3		Lines 13-24 flown S to N. HUWH sighting of dead whale (GA2011012Mn).

TABLE 2: FWRI/CEWS 2010-2011 AERIAL SURVEY ACTIVITIES

Date	Full	None	Partial	1/2 Plane Cont.	EWS Lines (13-24)	Number of RIWH Sightings	Number of RIWH Whales	M/C Pair	HUWH Whales	Hobbs	Nautical Miles Flown	Nautical miles flown sea state < 3	WVI	Comments
9-Mar-11		X												No fly - high winds/sea state
10-Mar-11		X												No fly - rain, high winds/sea state
11-Mar-11		X												No fly - high winds/sea state
12-Mar-11	X				13-34	0	0	0		5.2	718.0	718.0		Lines 13-34 flown N to S
13-Mar-11				X	17-34	0	0	0	1	6.7	435.7	435.7		Two-plane contingency. Lines 17-34 flown N to S east to 8055W. Standby due to high winds/sea state
14-Mar-11	X				13-34	0	0	0	1	5.7	415.7	415.7		All 12 lines flown N to S. Resighting of dead HUWH on Cumberland Island (GA2011012Mn)
15-Mar-11	X				13-24	0	0	0	3	5.7	414.7	414.7		Lines 13-24 flown N to S. Resighting of dead HUWH on Cumberland Island (GA2011012Mn)
16-Mar-11				X	1-16	0	0	0		5.5	412.3	397.7		Two-plane contingency. Lines 1-16 flown S to N. Transit south on track (61.1nm). String of crab-like orange buoys off St. Simons Island.
17-Mar-11		X												No fly- high winds/sea state
18-Mar-11				X	A-B, 1-16	0	0	0	1	6.3	445.6	445.6		Two-plane contingency. Lines A-B and 1-16 flown N to S east to 8055W.
19-Mar-11				X	1-16	0	0	0		5.7	414.3	414.3		Two-plane contingency. Lines 1-16 flown S to N.
20-Mar-11		X												No fly- high winds/sea state
21-Mar-11	X				13-24	0	0	0		5.1	414.4	414.4		Lines 13-24 flown N to S. Whale shark sighted off Jacksonville Beach. Standby due to high winds/sea state.
22-Mar-11			X		13-24	0	0	0	3	5.6	373.4	365.2		Lines 13-24 flown N to S. Lines 22-23 cut inshore at approximately 8116W due to high sea state. Standby due to high winds.
23-Mar-11			X		13-24	0	0	0	1	4.4	365.6	336.1		Lines 13-24 flown S to N. Lines 15-20 cut offshore at or east of the 8100W due to high sea state. Resighting dead HUWH (GA2011012Mn) on Cumberland Island.
24-Mar-11		X												No fly - high winds/sea state
25-Mar-11			X		13-24	0	0	0	3	6.1	410.2	410.2		Lines 13-24 flown N to S. After line 20 and prior to landing to refuel transited north to verify sighting off Cumberland. Cut lines 22-23 inshore due to Mayport airspace restriction. Standby due to high winds/ sea state.
26-Mar-11	X				13-24	0	0	0	3	6.0	415.8	415.8		Lines 13-24 flown N to S. Resighting of dead HUWH on Cumberland Island (GA2011012Mn). Transit to northern line 'On Track' (26.0nm).
27-Mar-11			X		13-24	0	0	0	3	5.1	344.8	273.1		Lines 19-24 flown S to N and lines 13-18 flown N to S due to high sea state south. Lines 19-22 cut at 8100W due to high sea state.
28-Mar-11		X												No fly - high winds/sea state
29-Mar-11		X												No fly - Rain, thunderstorms, low ceilings, high winds/sea state
30-Mar-11		X												No fly - Rain, thunderstorms, low ceilings, high winds/sea state

TABLE 2: FWRI/CEWS 2010-2011 AERIAL SURVEY ACTIVITIES

Date	Full	None	Partial	1/2 Plane Cont.	EWS Lines (13-24)	Number of RIWH Sightings	Number of RIWH Whales	M/C Pair	HUWH Whales	Hobbs	Nautical Miles Flown	Nautical miles flown sea state < 3	WVI	Comments
31-Mar-11		X												No fly - Rain, thunderstorms, low ceilings, high winds/sea state

TABLE 3: FWRI/CEWS 2010-2011 AERIAL SURVEY SIGHTINGS

Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	CEWS Number	Comments
12/15/2010	1239	30.84400	-81.16216	A	3560	U	6	BOD CNT, HD LFT	CEWS001	
12/15/2010	1239	30.84400	-81.16216	B	3794	F	>4	BOD CNT	CEWS001	
12/15/2010	1239	30.84400	-81.16216	C	3812	U	3	BOD CNT	CEWS001	
12/15/2010	1239	30.84400	-81.16216	D	3951	U	2	BOD CNT, ROLL, FLIP	CEWS001	
12/16/2010	1011	30.38117	-81.23717	A	3951	U	2		CEWS002	
12/16/2010	1011	30.38117	-81.23717	B	3794	F	>4		CEWS002	
12/16/2010	1011	30.38117	-81.23717	C	3812	U	3		CEWS002	
12/16/2010	1011	30.38117	-81.23717	D	3560	U	6		CEWS002	
12/16/2010	1255	30.33834	-81.22433	E	3951	U	2		CEWS003	Paged as 4 whales
12/16/2010	1255	30.33834	-81.22433	F	3794	F	>4		CEWS003	
12/16/2010	1255	30.33834	-81.22433	G	3560	U	6		CEWS003	
12/16/2010	1255	30.33834	-81.22433	H	3812	U	3		CEWS003	
12/16/2010	1255	30.33834	-81.22433	1	3966	M	2		CEWS003	
12/16/2010	1255	30.33834	-81.22433	2	3802	U	3	FLIP	CEWS003	
12/18/2010	1103	30.42100	-81.27370	A	3293	F	>9	BRCH, CHN BRCH, MOPN, BODO	CEWS004	
12/18/2010	1216	30.54100	-81.21780	B	1968	F	22	LBTL	CEWS005	
12/18/2010	1449	30.73880	-81.30480	C	2029	F	21	W/CALF	CEWS006	
12/18/2010	1449	30.73880	-81.30480	D	2011CalfOf2029	U	1	CALF W/COW	CEWS006	
12/20/2010	1520	30.53267	-81.19534	A	2420	F	>17	W/CALF	CEWS007	
12/20/2010	1520	30.53267	-81.19534	B	2011CalfOf2420	U	1	CALF W/COW	CEWS007	
12/20/2010	1624	30.47667	-81.24216	C	2029	F	21	W/CALF	CEWS008	
12/20/2010	1624	30.47667	-81.24216	D	2011CalfOf2029	U	1	CALF W/COW	CEWS008	
12/21/2010	0937	30.85733	-81.21450	A	3802	U	3	BODO	CEWS009	
12/21/2010	0937	30.85733	-81.21450	B	3966	M	2	BODO	CEWS009	
12/21/2010	0941	30.85983	-81.21950	C	3915	U	2	BODO	CEWS010	
12/21/2010	0941	30.85983	-81.21950	D	3794	F	>4	BODO	CEWS010	
12/21/2010	1042	30.72133	-81.25600	E	3405	F	7	BODO	CEWS011	
12/21/2010	1042	30.72133	-81.25600	F	S054	U	U	BODO	CEWS011	
12/21/2010	1216	30.57417	-81.13933	G	1911	F	22	POST, BOD CNT	CEWS012	
12/21/2010	1216	30.57417	-81.13933	H	3270	F	>9	POST, BOD CNT, WH CHN	CEWS012	

TABLE 3: FWRI/CEWS 2010-2011 AERIAL SURVEY SIGHTINGS

Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	CEWS Number	Comments
12/21/2010	1333	30.54567	-81.12500	I	1911	F	22	BOD CNT	CEWS013	
12/21/2010	1333	30.54567	-81.12500	J	3270	F	>9	BOD CNT, ROLL, BEL UP, WH CHN, WH BEL, FEM	CEWS013	
12/21/2010	1511	30.37366	-81.14867	K	3293	F	>9	LIN TR	CEWS014	
12/25/2010	1027	30.39850	-81.16167	A	2420	F	>17	W/CALF, NURS, BOD CNT, HD LFT	CEWS015	
12/25/2010	1027	30.39850	-81.16167	B	2011CalfOf2420	U	1	CALF W/COW, NURS, BOD CNT	CEWS015	
12/25/2010	1155	30.56850	-81.30067	C	2029	F	21	W/CALF, BOD CNT	CEWS016	
12/25/2010	1155	30.56850	-81.30067	D	2011CalfOf2029	U	1	CALF W/COW, BOD CNT, ROLL	CEWS016	
12/25/2010	1205	30.54133	-81.31184	E	2746	F	14	W/CALF, BOD CNT, WH CHN	CEWS017	
12/25/2010	1205	30.54133	-81.31184	F	2011CalfOf2746	U	1	CALF W/COW, BOD CNT, WH CHN	CEWS017	
12/25/2010	1222	30.56667	-81.30100	G	2029	F	21	W/CALF	CEWS016	Resight, not paged again
12/25/2010	1222	30.56667	-81.30100	H	2011CalfOf2029	U	1	CALF W/COW	CEWS016	
12/25/2010	1253	30.64633	-81.22701	I	1243	F	29	W/CALF, LIN TR	CEWS018	
12/25/2010	1253	30.64633	-81.22701	J	2011CalfOf1243	U	1	CALF W/COW, LIN TR	CEWS018	
12/25/2010	1327	30.20933	-81.20850	K	3911	F	2	ENTGL, FL, SICK	SEWS006	Paged earlier by SEWS
12/25/2010	1543	30.17983	-81.31883	L	3911	F	2	ENTGL, W/TELBUOY, FL, SICK	SEWS006	
12/28/2010	1211	30.57350	-81.17033	A	2420	F	>17	W/CALF, NURS, BOD CNT	CEWS019	
12/28/2010	1211	30.57350	-81.17033	B	2011CalfOf2420	U	1	CALF W/COW, NURS, BOD CNT	CEWS019	
12/29/2010	1300	30.19550	-81.18350	A	3790	U	>4	BODO	CEWS020	
12/29/2010	1300	30.19550	-81.18350	B	3812	U	3	BODO	CEWS020	
12/29/2010	1300	30.19550	-81.18350	C	3794	F	>4	BODO, ROLL, BOD CNT	CEWS020	
12/29/2010	1300	30.19550	-81.18350	D	3802	U	3	BODO, FLIP, BOD CNT, ROLL	CEWS020	

TABLE 3: FWRI/CEWS 2010-2011 AERIAL SURVEY SIGHTINGS

Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	CEWS Number	Comments
12/29/2010	1300	30.19550	-81.18350	E	BK03SEUS09	F	U	BODO, BOD CNT, ROLL, HD LFT	CEWS020	
12/29/2010	1300	30.19550	-81.18350	F	3560	U	6	BODO	CEWS020	
12/29/2010	1403	30.14517	-81.18616	G	S054	U	U	BOD CNT, ROLL, BEL UP, BLK CHN, BLK BEL, MALE, HD LFT	CEWS021	
12/29/2010	1403	30.14517	-81.18616	H	3405	F	7	BOD CNT	CEWS021	
12/29/2010	1416	30.18900	-81.17783	I	3560	U	6		CEWS020	Resight, not paged again
12/29/2010	1416	30.18900	-81.17783	J	3812	U	3		CEWS020	
12/29/2010	1416	30.18900	-81.17783	K	BK03SEUS09	F	U		CEWS020	
12/29/2010	1416	30.18900	-81.17783	L	3790	U	>4		CEWS020	
12/29/2010	1416	30.18900	-81.17783	M	3794	F	>4		CEWS020	
12/29/2010	1416	30.18900	-81.17783	N	UNID	U	U		CEWS020	
12/29/2010	1430	30.18484	-81.19350	O	2009CalfOf3317	U	2	LOG	CEWS022	
12/30/2010	0942	30.61450	-81.18383	A	2420	F	>17	W/CALF	CEWS023	
12/30/2010	0942	30.61450	-81.18383	B	2011CalfOf2420	U	1	CALF W/COW	CEWS023	
12/30/2010	1013	30.61133	-81.18884	C	2420	F	>17	W/CALF	CEWS023	Resight, not paged again
12/30/2010	1013	30.61133	-81.18884	D	2011CalfOf2420	U	1	CALF W/COW	CEWS023	
12/30/2010	1020	30.57750	-81.25617	E	1243	F	29	W/CALF	CEWS024	
12/30/2010	1020	30.57750	-81.25617	F	2011CalfOf1243	U	1	CALF W/COW	CEWS024	
12/30/2010	1126	30.40117	-81.27116	G	2029	F	21	W/CALF, BODO	CEWS025	
12/30/2010	1126	30.40117	-81.27116	H	2011CalfOf2029	U	1	CALF W/COW, BODO	CEWS025	
12/30/2010	1227	30.40000	-81.28467	I	2029	F	21	W/CALF, BODO	CEWS025	Resight, not paged again
12/30/2010	1227	30.40000	-81.28467	J	2011CalfOf2029	U	1	CALF W/COW, BODO	CEWS025	
12/30/2010	1242	30.59033	-81.35600	K	1968	F	22	LOG, BODO, HD LFT	CEWS026	
12/30/2010	1538	29.96017	-81.20617	L	BK03SEUS09	F	U	BODO, AGG VSL	CEWS027	
12/30/2010	1538	29.96017	-81.20617	M	UNID	U	U	BODO, AGG VSL	CEWS027	
12/30/2010	1542	29.95767	-81.20167	N	3802	U	3	AGG VSL	CEWS027	
12/30/2010	1542	29.95767	-81.20167	O	3981	M	2	AGG VSL	CEWS027	
12/30/2010	1547	29.95716	-81.20284	P	3812	U	3	AGG VSL	CEWS027	

TABLE 3: FWRI/CEWS 2010-2011 AERIAL SURVEY SIGHTINGS

Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	CEWS Number	Comments
12/30/2010	1547	29.95716	-81.20284	Q	3560	U	6	AGG VSL	CEWS027	
12/30/2010	1614	29.95417	-81.27451	R	3010	F	>11	W/CALF, BODO	CEWS028	
12/30/2010	1614	29.95417	-81.27451	S	2011CalfOf3010	U	1	CALF W/COW, BODO	CEWS028	
12/30/2010	1620	29.97317	-81.29817	T	1604	F	>25	W/CALF, BODO, BOD CNT	CEWS029	
12/30/2010	1620	29.97317	-81.29817	U	2011CalfOf1604	U	1	CALF W/COW, BODO, BOD CNT, ROLL	CEWS029	
12/31/2010	1131	30.58134	-81.26684	A	1243	F	29	W/CALF, LIN TR	CEWS030	
12/31/2010	1131	30.58134	-81.26684	B	2011CalfOf1243	U	1	CALF W/COW, FLIP	CEWS030	
12/31/2010	1453	30.24384	-81.21017	C	3010	F	>11	W/CALF, BODO, BOD CNT	CEWS031	
12/31/2010	1453	30.24384	-81.21017	D	2011CalfOf3010	U	1	CALF W/COW, BODO, BOD CNT	CEWS031	
1/4/2011	1055	30.52300	-81.28817	A	1243	F	29	W/CALF	CEWS032	
1/4/2011	1055	30.52300	-81.28817	B	2011CalfOf1243	U	1	CALF W/COW	CEWS032	
1/4/2011	1528	29.93800	-81.25450	C	3430	F	7	W/CALF, BOD CNT	CEWS033	
1/4/2011	1528	29.93800	-81.25450	D	2011CalfOf3430	U	1	CALF W/COW, BOD CNT	CEWS033	
1/15/2011	1511	30.38217	-81.25100	A	3730	F	4	SAG	CEWS034	
1/15/2011	1511	30.38217	-81.25100	B	S048	U	U	SAG, BEL/BEL, HD LFT	CEWS034	
1/15/2011	1511	30.38217	-81.25100	C	3503	F	6	SAG, BEL UP, BLK CHN, BLK BEL, FEM	CEWS034	
1/15/2011	1511	30.38217	-81.25100	D	3812	U	3	SAG	CEWS034	
1/15/2011	1511	30.38217	-81.25100	E	3770	U	4	SAG, HD LFT	CEWS034	
1/15/2011	1643	30.33900	-81.12050	F	2029	F	21	W/CALF, NURS, HD LFT	CEWS035	
1/15/2011	1643	30.33900	-81.12050	G	2011CalfOf2029	U	1	CALF W/COW, NURS	CEWS035	
1/19/2011	1246	30.64167	-81.21000	A	3617	M	5	BOD CNT, BODO, HD LFT, ROLL, BLK CHN	CEWS036	
1/19/2011	1246	30.64167	-81.21000	B	3512	U	U	BOD CNT, BODO	CEWS036	
1/19/2011	1343	30.58867	-81.20517	C	3230	F	9	BOD CNT, ROLL, BLK CHN	CEWS037	
1/19/2011	1343	30.58867	-81.20517	D	3540	F	6	BOD CNT	CEWS037	

TABLE 3: FWRI/CEWS 2010-2011 AERIAL SURVEY SIGHTINGS

Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	CEWS Number	Comments
1/19/2011	1343	30.58867	-81.20517	E	3190	U	>10		CEWS037	
1/19/2011	1516	30.44450	-81.20234	F	S062	U	U	FLIP, LBTL, BRCH, MOPN, BLK CHN, BLK BEL, ROLL, BEL UP, MALE	CEWS038	
1/20/2011	1151	30.43484	-81.16533	A	3308	M	8		CEWS039	
1/20/2011	1235	30.47217	-81.05617	B	2040	F	21	W/CALF, NURS, BOD CNT	CEWS040	
1/20/2011	1235	30.47217	-81.05617	C	2011CalfOf2040	U	1	CALF W/COW, NURS, BOD CNT	CEWS040	
1/23/2011	1016	30.34983	-81.38150	A	S066	U	U	BODO, LIN TR	CEWS041	
1/23/2011	1459	30.42867	-80.89633	B	2746	F	14	W/CALF, NURS, WH CHN	CEWS042	
1/23/2011	1459	30.42867	-80.89633	C	2011CalfOf2746	U	1	CALF W/COW, NURS, WH CHN, WH BEL	CEWS042	
1/23/2011	1539	30.33767	-81.24250	D	S065	U	U	LBTL, BRCH	CEWS043	
1/23/2011	1539	30.33767	-81.24250	E	2009CalfOf3317	U	2		CEWS043	
1/23/2011	1608	30.36617	-81.30533	F	S048	U	U	SAG, HD LFT	CEWS045	
1/23/2011	1608	30.36617	-81.30533	G	3823	U	3	SAG, FLIP, BEL/BEL	CEWS045	
1/23/2011	1608	30.36617	-81.30533	H	2427	M	17	SAG	CEWS045	
1/23/2011	1608	30.36617	-81.30533	I	3546	U	6	SAG	CEWS045	
1/23/2011	1613	30.35717	-81.30250	I	3950	U	2		CEWS044	
1/23/2011	1617	30.35517	-81.30150	J	3904	U	2	APPR, SAG	CEWS044	
1/23/2011	1617	30.35517	-81.30150	K	BK03SEUS09	F	U	HD LFT, APPR, SAG	CEWS044	
1/23/2011	1646	30.35867	-81.29567	L	3620	M	5		CEWS044	
1/23/2011	1704	30.33333	-81.24850	M	S065	U	U	WH CHN	-	Joined with CEWS045
1/23/2011	1704	30.33333	-81.24850	N	2009CalfOf3317	U	2		-	
1/24/2011	0933	30.39783	-81.39900	A	S066	U	U	RAND SUB TRV, AGG VSL, AVD, TL SLSH	-	Paged as OTHER prior to arrival, not repaged
1/24/2011	1223	30.39017	-81.43150	B	S066	U	U	RAND SUB TRV, AGG VSL, AVD, TL SLSH, VIDEO	-	

TABLE 3: FWRI/CEWS 2010-2011 AERIAL SURVEY SIGHTINGS

Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	CEWS Number	Comments
1/29/2011	1222	30.47300	-81.03783	A	2029	F	21	W/CALF, LOG	CEWS046	
1/29/2011	1222	30.47300	-81.03783	B	2011CalfOf2029	U	1	CALF W/COW, LOG	CEWS046	
1/29/2011	1403	30.47117	-81.04601	C	2029	F	21	W/CALF	-	Resight, not paged again
1/29/2011	1403	30.47117	-81.04601	D	2011CalfOf2029	U	1	CALF W/COW	-	
1/29/2011	1422	30.39117	-81.01100	E	2420	F	>17	W/CALF, LOG	CEWS047	
1/29/2011	1422	30.39117	-81.01100	F	2011CalfOf2420	U	1	CALF W/COW, LOG	CEWS047	
1/29/2011	1443	30.39334	-81.18800	G	3670	F	5		CEWS049	Paged first pass info (CEWS048 not paged)
1/29/2011	1443	30.39334	-81.18800	H	3730	F	4		CEWS049	
1/29/2011	1447	30.37750	-81.21250	I	3513	F	6	SAG, AGG VSL	CEWS050	
1/29/2011	1447	30.37750	-81.21250	J	2042	F	21	SAG, AGG VSL	CEWS050	
1/29/2011	1447	30.37750	-81.21250	K	1427	M	27	SAG, AGG VSL, HD LFT	CEWS050	
1/29/2011	1500	30.39500	-81.19833	L	3503	F	6	SAG, BEL UP, BLK CHN, BLK BEL, FEM	CEWS051	
1/29/2011	1500	30.39500	-81.19833	M	3110	M	10	SAG, HD LFT	CEWS051	
1/29/2011	1500	30.39500	-81.19833	N	3111	M	10	SAG	CEWS051	
1/29/2011	1500	30.39500	-81.19833	O	3730	F	4	SAG, HD LFT, BEL UP, BLK CHN, BLK BEL	CEWS051	
1/29/2011	1500	30.39500	-81.19833	P	3312	M	8	SAG, POST	CEWS051	
1/29/2011	1500	30.39500	-81.19833	Q	S048	U	U	SAG	CEWS051	
1/29/2011	1500	30.39500	-81.19833	1	2135	M	20		CEWS051	
1/29/2011	1525	30.38733	-81.20300	R	3750	M	4	BEL/BEL	CEWS051	
1/29/2011	1525	30.38733	-81.20300	S	3701	U	4	BEL/BEL	CEWS051	
1/29/2011	1532	30.39067	-81.19234	T	3323	M	8	APPR	CEWS051	
1/29/2011	1559	30.39117	-81.20517	U	3110	M	10	SAG, AGG VSL, W/UNPH EGS	CEWS051	Resight of CEWS051, not repaged
1/29/2011	1559	30.39117	-81.20517	V	3312	M	8	SAG, AGG VSL, W/UNPH EGS	CEWS051	
1/29/2011	1559	30.39117	-81.20517	W	3730	F	4	SAG, AGG VSL, W/UNPH EGS	CEWS051	

TABLE 3: FWRI/CEWS 2010-2011 AERIAL SURVEY SIGHTINGS

Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	CEWS Number	Comments
1/29/2011	1559	30.39117	-81.20517	X	3323	M	8	SAG, AGG VSL, W/UNPH EGS	CEWS051	
1/29/2011	1559	30.39117	-81.20517	Y	3111	M	10	SAG, AGG VSL, W/UNPH EGS	CEWS051	
1/30/2011	1015	30.37750	-81.15767	A	3503	F	6		CEWS052	
1/30/2011	1015	30.37750	-81.15767	B	3512	U	U		CEWS052	
1/30/2011	1020	30.39017	-81.16116	C	2740	M	14	SAG	CEWS053	Paged first pass info
1/30/2011	1020	30.39017	-81.16116	D	2608	M	15	SAG	CEWS053	
1/30/2011	1615	30.50483	-81.27067	E	1803	M	23	LOG	CEWS054	
1/30/2011	1615	30.50483	-81.27067	F	3545	M	6	SAG	CEWS054	
1/30/2011	1615	30.50483	-81.27067	G	1719	F	>24	SAG, BLK CHN	CEWS054	
1/30/2011	1615	30.50483	-81.27067	H	2770	M	>14	SAG	CEWS054	
1/30/2011	1615	30.50483	-81.27067	I	2406	M	17	SAG	CEWS054	
1/30/2011	1150	30.46783	-81.25383	J	3010	F	>11	W/CALF, ENTGL, NURS, BOD CNT, LOG	CEWS055	
1/30/2011	1150	30.46783	-81.25383	K	2011CalfOf3010	U	1	CALF W/COW, NURS, BOD CNT, HD LFT, ROLL	CEWS055	
1/30/2011	1228	30.48050	-81.21900	L	3670	F	5		CEWS056	
1/30/2011	1228	30.48050	-81.21900	M	3730	F	4		CEWS056	
1/30/2011	1325	29.83117	-81.10966	N	3712	U	4	ENTGL, LIN TR	CEWS057	
1/30/2011	1325	29.83117	-81.10966	O	3513	F	6	LIN TR	CEWS057	
1/30/2011	1426	30.28050	-81.20250	P	3110	M	10	SAG	CEWS058	
1/30/2011	1426	30.28050	-81.20250	Q	3312	M	8	SAG	CEWS058	
1/30/2011	1426	30.28050	-81.20250	R	2042	F	21	SAG	CEWS058	
1/30/2011	1426	30.28050	-81.20250	S	3111	M	10	SAG	CEWS058	
1/30/2011	1426	30.28050	-81.20250	T	2330	F	>18	SAG, BEL/BEL	CEWS058	
1/30/2011	1512	30.34133	-81.12783	U	3503	F	6		CEWS059	
1/30/2011	1512	30.34133	-81.12783	V	3512	U	U		CEWS059	

TABLE 3: FWRI/CEWS 2010-2011 AERIAL SURVEY SIGHTINGS

Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	CEWS Number	Comments
1/31/2011	0948	30.29500	-81.32166	A	2009CalfOf1303	U	2	WH CHN	CEWS060	SEWS053 and CEWS060 switched in original page
1/31/2011	1021	30.27783	-81.14117	B	3545	M	6	SAG	CEWS061	
1/31/2011	1021	30.27783	-81.14117	C	3312	M	8	SAG	CEWS061	
1/31/2011	1021	30.27783	-81.14117	D	1803	M	23	SAG	CEWS061	
1/31/2011	1021	30.27783	-81.14117	E	2330	F	>18	SAG, UW EXH	CEWS061	
1/31/2011	1021	30.27783	-81.14117	F	3111	M	10	SAG	CEWS061	
1/31/2011	1021	30.27783	-81.14117	G	1719	F	>24	SAG	CEWS061	
1/31/2011	1021	30.27783	-81.14117	1	2406	M	17	SAG	CEWS061	
1/31/2011	1021	30.27783	-81.14117	2	2740	M	14	SAG	CEWS061	
1/31/2011	1021	30.27783	-81.14117	3	3110	M	10	SAG	CEWS061	
1/31/2011	1021	30.27783	-81.14117	4	3503	F	6	SAG	CEWS061	
1/31/2011	1022	30.27117	-81.15050	H	3323	M	8	SAG, HD LFT, BEL/BEL	CEWS062	
1/31/2011	1022	30.27117	-81.15050	I	3512	U	U	SAG, HD LFT, BEL/BEL, BEL UP, BLK CHN, BLK BEL, FEM	CEWS062	
1/31/2011	1022	30.27117	-81.15050	J	2770	M	>14	SAG, HD LFT, BEL/BEL	CEWS062	
2/6/2011	1224	30.69533	-81.15533	A	2010CalfOf1701	U	1	MOPN	CEWS063	
2/6/2011	1450	30.46750	-81.24767	B	3714	M	4	SAG	CEWS064	
2/6/2011	1450	30.46750	-81.24767	C	2740	M	14	SAG	CEWS064	
2/6/2011	1450	30.46750	-81.24767	D	3333	M	8	SAG	CEWS064	
2/6/2011	1450	30.46750	-81.24767	E	3843	M	3	SAG, BEL UP, BLK BEL, BLK CHN, MALE	CEWS064	
2/6/2011	1511	30.47400	-81.25233	F	3466	M	7	SAG	CEWS064	
2/6/2011	1511	30.47400	-81.25233	G	3651	M	5	SAG, WH CHN	CEWS064	
2/6/2011	1511	30.47400	-81.25233	H	3333	M	8	APPR, SAG	CEWS064	
2/6/2011	1511	30.47400	-81.25233	I	2740	M	14	APPR, SAG	CEWS064	
2/6/2011	1537	30.43000	-81.23083	J	3650	F	5	SAG	CEWS065	
2/6/2011	1537	30.43000	-81.23083	K	2810	M	13	SAG, BEL UP, BLK CHN, BLK BEL, MALE, PENIS, HD LFT	CEWS065	

TABLE 3: FWRI/CEWS 2010-2011 AERIAL SURVEY SIGHTINGS

Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	CEWS Number	Comments
2/6/2011	1537	30.43000	-81.23083	L	1901	M	22	SAG	CEWS065	
2/13/2011	1345	30.44333	-80.83549	A	1245	F	29	W/CALF, NURS, BOD CNT, BODO	CEWS066	
2/13/2011	1345	30.44333	-80.83549	B	2011CalfOf1245	U	1	CALF W/COW, NURS, BODO, BOD CNT	CEWS066	
2/16/2011	1149	30.44333	-81.37683	A	2420	F	>17	W/CALF, NURS	CEWS067	
2/16/2011	1149	30.44333	-81.37683	B	2011CalfOf2420	U	1	CALF W/COW, NURS	CEWS067	
2/16/2011	1212	30.39850	-81.26000	C	3545	M	6	SAG, HD LFT	CEWS068	
2/16/2011	1212	30.39850	-81.26000	D	3546	U	6	SAG, HD LFT	CEWS068	
2/16/2011	1417	30.64850	-81.33250	E	1604	F	>25	W/CALF, NURS	CEWS069	
2/16/2011	1417	30.64850	-81.33250	F	2011CalfOf1604	U	1	CALF W/COW, NURS	CEWS069	
2/17/2011	1410	30.28983	-81.10950	A	3270	F	>9	W/CALF, HD LFT, BOD CNT, WH CHN, DFCN?	CEWS070	
2/17/2011	1410	30.28983	-81.10950	B	2011CalfOf3270	U	1	CALF W/COW, BOD CNT	CEWS070	
2/17/2011	1509	30.37634	-81.11684	C	3293	F	>9	W/CALF, NURS, BOD CNT	CEWS071	
2/17/2011	1509	30.37634	-81.11684	D	2011CalfOf3293	U	1	CALF W/COW, NURS, BOD CNT	CEWS071	
2/21/2011	1022	30.41683	-80.97701	A	2040	F	21	W/CALF, BOD CNT	CEWS072	
2/21/2011	1022	30.41683	-80.97701	B	2011CalfOf2040	U	1	CALF W/COW, BOD CNT, FLIP, LBTL, BLK CHN, BLK BEL, BEL UP	CEWS072	
2/21/2011	1210	30.62234	-81.17550	C	2029	F	21	W/CALF, NURS	CEWS073	
2/21/2011	1210	30.62234	-81.17550	D	2011CalfOf2029	U	1	CALF W/COW, NURS	CEWS073	
2/24/2011	1102	30.30217	-81.18217	A	1719	F	>24	SAG, BODO, BLK BEL, BLK CHN, BEL UP	CEWS074	
2/24/2011	1102	30.30217	-81.18217	B	2743	M	14	SAG, BODO, PENIS, MALE	CEWS074	
2/24/2011	1102	30.30217	-81.18217	C	S067	U	U	SAG, BODO, HD LFT	CEWS074	
2/24/2011	1102	30.30217	-81.18217	D	3545	M	6	SAG, BODO	CEWS074	
2/24/2011	1251	30.49567	-81.12566	E	3270	F	>9	W/CALF, BOD CNT	CEWS075	
2/24/2011	1251	30.49567	-81.12566	F	2011CalfOf3270	U	1	CALF W/COW, BOD CNT	CEWS075	

TABLE 3: FWRI/CEWS 2010-2011 AERIAL SURVEY SIGHTINGS

Date	Time (L)	Latitude (Dec Degrees)	Longitude (Dec Degrees)	RIWH Letter	NARWC ID No Or Intermatch Code	Sex	Age	Behaviors*	CEWS Number	Comments
2/24/2011	1457	30.78000	-81.11684	G	1245	F	29	W/CALF, BOD CNT	CEWS076	
2/24/2011	1457	30.78000	-81.11684	H	2011CalfOf1245	U	1	CALF W/COW, BOD CNT	CEWS076	
2/28/2011	1325	30.40433	-81.05300	A	1911	F	22	W/CALF, NURS, BOD CNT, BLK BL, BLK CHN, BEL UP, ROLL	CEWS077	
2/28/2011	1325	30.40433	-81.05300	B	2011CalfOf1911	U	1	CALF W/COW, NURS, BOD CNT, BLK BEL, ROLL, BLK CHN	CEWS077	
2/28/2011	1409	30.32917	-81.24067	C	2413	F	17	W/CALF, BRCH, BOD CNT, BLK CHN, BLK BEL, MOPN, HD LFT	CEWS078	
2/28/2011	1409	30.32917	-81.24067	D	2011CalfOf2413	U	1	CALF W/COW, BRCH, BOD CNT, ROLL	CEWS078	
3/5/2011	1109	30.69350	-81.09267	A	1245	F	29	W/CALF, BOD CNT, HD LFT	CEWS079	
3/5/2011	1109	30.69350	-81.09267	B	2011CalfOf1245	U	1	CALF W/COW, BOD CNT, ROLL, BEL UP, BLK BEL	CEWS079	

TABLE 4: FWRI/CEWS 2010-2011 WHALE/VESSEL INTERACTIONS

Date	WVI ID	Survey Area	Whale ID	Initial Whale LAT	Initial Whale LONG	Vessel #	Vessel Type	Est. Initial Vessel Speed (kts)	Closest Distance (yds)	Initial Whale Behavior	Reaction to Vessel	Comms Achieved	Additional Event Details and Communication Notes
12/16/2010	314	CEWS	Catalog #3794, #3560, #3812, #3951	30.38117	-81.23717	1	Large Merchant/Tanker	10.4	5280	Swimming /Traveling	No	No	Vessel was approximately 4 nmi west of whales' position at initial sighting. Observers hailed vessel by name three times on VHF Ch. 16 and twice on Ch. 10 with no response. During the third communication attempt on Ch. 16 observers notified vessel that whales were located approx 3nmi off his port bow. Observers noted the vessel turned to the SSE (to use the southern Jacksonville shipping lane) and was angling away from the whales' location. No further communication was attempted.
12/16/2010	1259	CEWS	Catalog #3794, #3560, #3812, #3951, #3966, #3802	30.33834	-81.22433	1	Large Merchant/Car Carrier	7.2	Unk	Diving	No	No	Vessel reported 3 whales to the USCG on VHF Ch. 16/22A. Plane responded to reported location and observers hailed the vessel by name three times on VHF Ch. 16 in an attempt to verify the coordinates, but did not receive a response. When observers spotted whales inside the Jacksonville shipping lane, the reporting vessel had already passed the whales' location. Since no interaction between vessel and whales was observed, change of course and speed and closest distance are unknown.
12/16/2010	1259	CEWS	Catalog #3794, #3560, #3812, #3951, #3966, #3802	30.33834	-81.22433	2	Large Merchant/Tanker	10	1760	Diving	No	No	Vessel reported 2 right whales to the USCG on VHF Ch. 16/22A. When plane arrived on scene, vessel had already passed the whales' location. No communication was attempted.

TABLE 4: FWRI/CEWS 2010-2011 WHALE/VESSEL INTERACTIONS

Date	WVI ID	Survey Area	Whale ID	Initial Whale LAT	Initial Whale LONG	Vessel #	Vessel Type	Est. Initial Vessel Speed (kts)	Closest Distance (yds)	Initial Whale Behavior	Reaction to Vessel	Comms Achieved	Additional Event Details and Communication Notes
12/25/2010	1272	CEWS	Catalog #1243 "Magic" and calf	30.64633	-81.22701	1	Recreational/ 23ft center console	0	100	Swimming /Traveling	No	No	Recreational vessel at anchor was logged in data while flying on transect line. Immediately following, two whales were spotted 300 yards west of the vessel. The whales passed approx 100 yards south of the vessel and continued heading away from it. The vessel remained anchored. No communication was attempted.
12/29/2010	1726	CEWS	Catalog #3790, #3812, #3794, #3560, BK03SEUS09 and 1 UNID	30.18900	-81.17783	1	Commercial Fish/57ft charter sport fishing vessel	25	1320	Logging	No	No	Vessel was sighted heading in the general direction of the whales' location at a high rate of speed. Observers hailed vessel three times by description and location on VHF Ch 16 with no response. During the third hail, observers alerted vessel that there were whales approx 2 miles off their bow. There was no change in the vessel's heading or speed.
12/30/2010	771	CEWS	Catalog #2029 "Viola" and calf	30.40117	-81.27116	1	Recreational/ 21ft cutty cabin	0	350	Swimming /Traveling	No	No	Whales were initially sighted 1/2 mile NE of anchored vessel. Observers determined the whales were heading west towards the vessel. Hailed vessel three times on VHF Ch.16 by description and location with no response. Plane stayed on scene until whales were clear of the vessel. Vessel remained anchored.

TABLE 4: FWRI/CEWS 2010-2011 WHALE/VESSEL INTERACTIONS

Date	WVI ID	Survey Area	Whale ID	Initial Whale LAT	Initial Whale LONG	Vessel #	Vessel Type	Est. Initial Vessel Speed (kts)	Closest Distance (yds)	Initial Whale Behavior	Reaction to Vessel	Comms Achieved	Additional Event Details and Communication Notes
12/30/2010	2125	SEWS	Catalog #3802, #3560, #3812, #3981, BK03SEUS09 and 1 UNID	29.96017	-81.20617	1	Recreational/ 18 ft center console	5	83	Logging	No	Yes	Recreational vessel sighted slowly motoring around in close proximity to three whales. Observers hailed vessel on VHF Ch. 16 by description, location, and association with whales, along with general broadcast of the 500 Yard Rule. When the plane arrived on scene, the vessel had already turned and departed the area.
12/30/2010	2125	SEWS	Catalog #3802, #3560, #3812, #3981, BK03SEUS0 and 1 UNID	29.96017	-81.20617	2	Recreational/ 25ft center console	30	440	Logging	No	No	Recreational vessel sighted heading in the general direction of whales at a high rate of speed. Observers immediately attempted to hail vessel on VHF Ch. 16 by location, heading, and description, followed by a general broadcast that there were whales approximately 2 mile off their starboard bow and to reduce speed if possible and keep a sharp look out. Vessel did not respond to hail or change heading/speed.
12/30/2010	2125	SEWS	Catalog #3802, #3560, #3812, #3981, BK03SEUS09 and 1 UNID	29.96017	-81.20617	3	Recreational 28ft center console	35	440	Logging	No	No	Observers sighted a second recreational vessel heading in the general direction of the whales at a high rate of speed. Observers attempted to hail vessel on VHF Ch. 16 by location, heading, and description, followed by a general broadcast that there were whales approximately 2 mile off their port bow and to reduce speed if possible and keep a sharp look out. Vessel did not respond to hail or change heading/speed.

TABLE 4: FWRI/CEWS 2010-2011 WHALE/VESSEL INTERACTIONS

Date	WVI ID	Survey Area	Whale ID	Initial Whale LAT	Initial Whale LONG	Vessel #	Vessel Type	Est. Initial Vessel Speed (kts)	Closest Distance (yds)	Initial Whale Behavior	Reaction to Vessel	Comms Achieved	Additional Event Details and Communication Notes
1 /15/2011	2038	CEWS	Catalog #3730, #3503, #3812, #3770 and S048	30.38217	-81.25100	1	Cruise Ship/Casino Boat	5	3520	SAG	No	Yes	Observers sighted a casino boat heading in the general direction of the group of whales. Hailed the casino boat on VHF Ch 16 by vessel type, general location and heading. The captain responded to the first hail. Observers advised the captain of the whales' location relative to his vessel and the captain acknowledged that he had a visual on the whales based on the observers description. Communication switched to Ch. 10 to provide additional information, including the ship speed rule, and advised captain to keep a sharp lookout during his transit for additional whales that could be in the area.
1 /15/2011	2038	CEWS	Catalog #3730, #3503, #3812, #3770 and S048	30.38217	-81.25100	2	Research Vessel/ 70 ft	10	2640	SAG	No	Yes	Observers sighted vessel heading in general direction of the group of whales. Hailed vessel on VHF Ch 16 by description and location. The captain responded to first hail and identified vessel as a research vessel. Communication switched to Ch. 10 and the captain stated that they were doing survey work in the area. Observers advised captain of the whales' location relative to their vessel.

TABLE 4: FWRI/CEWS 2010-2011 WHALE/VESSEL INTERACTIONS

Date	WVI ID	Survey Area	Whale ID	Initial Whale LAT	Initial Whale LONG	Vessel #	Vessel Type	Est. Initial Vessel Speed (kts)	Closest Distance (yds)	Initial Whale Behavior	Reaction to Vessel	Comms Achieved	Additional Event Details and Communication Notes
1 /19/2011	1594	CEWS	2009 Calf of 1611	30.44450	-81.20234	1	Recreational/ 15ft flats boat	15+	2640	Rolling	No	No	While on scene with the whale, observers sighted vessel heading in the general direction at a high rate of speed, then stopped and remained stationary approx. 1.5 miles from the whale. Hailed vessel twice by description and location on VHF Ch. 16. with no response. Observers read general broadcast about the 500 yard rule. Several minutes later the vessel turned and headed away from the whale.
1 /29/2011	1762	CEWS	Catalog #3513, #1427, #2042	30.37750	-81.21250	1	Recreational/ 19ft center console	20	8	Milling	Yes	Yes	Vessel was seen from a distance traveling toward the whales at a high rate of speed. When the plane arrived on scene the vessel was idle next to the whales. Observers hailed vessel by description and location on VHF Ch.16. The captain responded and communication switched to Ch. 10. Observers advised the captain of the whales' in the immediate vicinity and the 500 yard rule. The vessel departed to the west at a slow speed.
1 /29/2011	1837	CEWS	Catalog #3503, #3110, #3111, #3730, #3312, #2135, and S048	30.39500	-81.19833	1	Recreational/ 25ft center console	15	100	SAG	No	No	While on scene, observers sighted vessel heading directly towards the whales. Vessel was hailed several times on VHF Ch. 16 by description and location with no response. Vessel slowed and passed the whales at approx 100yds. Once past the whales' location the vessel increased speed and continued on its same heading.

TABLE 4: FWRI/CEWS 2010-2011 WHALE/VESSEL INTERACTIONS

Date	WVI ID	Survey Area	Whale ID	Initial Whale LAT	Initial Whale LONG	Vessel #	Vessel Type	Est. Initial Vessel Speed (kts)	Closest Distance (yds)	Initial Whale Behavior	Reaction to Vessel	Comms Achieved	Additional Event Details and Communication Notes
1 /29/2011	1837	CEWS	Catalog #3503, #3110, #3111, #3730, #3312, #2135, and S048	30.39500	-81.19833	2	Recreational / 21ft center console	10	100	SAG	No	No	Observers sighted vessel heading in the general direction of the whales. Hailed vessel by description and location on VHF Ch.16 with no response. Vessel decreased speed, but maintained heading and passed the whales at approx. 100 yds.
1 /29/2011	1837	CEWS	Catalog #3503, #3110, #3111, #3730, #3312, #2135, and S048	30.39500	-81.19833	3	Recreational / 26ft center console	20	8	SAG	No	No	Vessel was initially sighted heading toward the whales at a high rate of speed. The vessel stopped about 400 yds east of the southernmost whales, slowly approached to about one whale length and stayed with the whales for 5 minutes. The vessel then motored in reverse towards the northern group of whales approximately 20 yards away. Observers hailed vessel multiple times on VHF Ch. 16. with no response. Also attempted to hail on VHF Ch. 6 and Ch.8.

TABLE 4: FWRI/CEWS 2010-2011 WHALE/VESSEL INTERACTIONS

Date	WVI ID	Survey Area	Whale ID	Initial Whale LAT	Initial Whale LONG	Vessel #	Vessel Type	Est. Initial Vessel Speed (kts)	Closest Distance (yds)	Initial Whale Behavior	Reaction to Vessel	Comms Achieved	Additional Event Details and Communication Notes
1 /29/2011	1989	CEWS	Catalog #3701, #3750	30.38733	-81.20300	1	Recreational / 23ft center console	20	100	Milling	No	Yes	Observers initially sighted vessel heading in the general direction of the whales at a high rate of speed. Observers hailed vessel on VHF Ch. 16 by description and location. Captain responded and communication switched to Ch. 10. Captain recognized that they were near right whales and requested general whale location information from observers so he could alter course. The observers advised the captain of the whales' locations relative to his vessel and confirmed his plan to motor south for approximately two miles before turning west again.
1 /30/2011	446	CEWS	Catalog #2740, #2608	30.39017	-81.16116	1	Recreational/ 40 ft motor yacht	0	100	Milling	No	No	The vessel was anchored with approximately 7 other recreation vessels nearby. Observers did a general broadcast on VHF Ch.16 advising vessel in the area of the whales and the 500 yard rule. Observers identified themselves as Whale Survey Aircraft and stated they would be standing by on VHF Ch. 16 for further questions. No vessels responded. Persons on board the vessel were actively fishing and they remained at anchor. The whales slowly moved away from the vessel.

TABLE 4: FWRI/CEWS 2010-2011 WHALE/VESSEL INTERACTIONS

Date	WVI ID	Survey Area	Whale ID	Initial Whale LAT	Initial Whale LONG	Vessel #	Vessel Type	Est. Initial Vessel Speed (kts)	Closest Distance (yds)	Initial Whale Behavior	Reaction to Vessel	Comms Achieved	Additional Event Details and Communication Notes
1 /30/2011	1938	CEWS	Catalog #3503, #3512	30.34133	-81.12783	1	Recreational / 22ft center console	20	50	Swimming /Traveling	No	No	Vessel was initially sighted heading towards the whales at a high rate of speed. Observers hailed vessel on VHF Ch.16. by description and location with no response. The vessel passed the whales before a second communication attempt could be made. The whales surfaced after the vessel passed just to the south of the vessel's wake.
1 /31/2011	258	CEWS	Catalog #3545, #3312, #1803, #2330, #3111, #1719, #2406, #2740, #3110, #3503, #3323, #3512, #2770	30.27783	-81.14117	1	Government/ USN frigate	10	N/A	SAG	No	Yes	After the plane departed the whales, observers sighted a military vessel headed in the general direction of several groups of whales. Vessel was hailed three time by warship number on VHF Ch. 16. The captain responded and communication was switched to Ch. 69. Observers advised the captain of several groups of whales ahead of them on their current course. The captain acknowledged and took the coordinates of the sightings. Observers did not remain on scene with whales or observe vessel in close proximity to whales, so there is no information available regarding whether the warship was seen altering course or speed.

APPENDICES

APPENDIX 1: BEHAVIOR CODES

Behavior Code	Behavior Name	Behavior Code	Behavior Name
AGG VSL	Aggressive Approach	W/CALF UNPH	Cow with Unphotographed Calf
APPR	Approacher to SAG	W/SATTG	Satellite Tagged
BEL UP	Belly Up	W/TELBUOY	Telemetry Buoy
BEL/BEL	Belly to Belly	W/UNPH EG	With Unphotographed Whale
BLK BEL	Black Belly	W/YRLG	Cow of Cow/Yearling Pair
BLK CHN	Black Chin	WH BEL	White Belly
BOD CNT	Body Contact	WH CHN	White Chin
BODO	Bottlenose Dolphins	YRLG	Yearling
BRCH	Breaching	YRLG W/COW	Yearling of Cow/Calf Pair
CALF	Calf Alone		
CALF W/ UNPH	Calf With Unphotographed Whale(S)		
CALF W/COW	Calf of a Cow/Calf Pair		
CHN BRCH	Chin Breach		
CUR	Curious Approach		
DEAD ON BEACH	Dead on Beach		
DFCN	Defecation		
DSENTGL	Disentangled		
DSENTGL ATT	Disentanglement Attempt		
ENTGL	Entangled		
FCL	Focal Animal		
FEM	Female		
FL	Fluking		
FLIP	Flippering/ Flipper Slapping		
FLTG DEAD	Floating Dead		
FRST DEAD	First Sighting of a Dead Whale		
FRST ENTGL	First Entangled		
FRST SATTG	First Satellite Tagged		
HDLFT	Head Lift		
HDPSH	Head Push		
INTRO	Intromission		
LBTL	Lobtailing		
LIN TR	Linear Travel		
LIVE STRAND	Live stranded		
LN GONE	Line Gone		
LOG	Logging		
MALE	Male		
MOPN	Mouth Open		
MUD	Mud		
NOT FL	Not Fluking		
NURS	Probable Nursing		
PENIS	Penis observed		
POST	Posturing		
PRT DSENTGL	Disentangled Partially		
RACE	Racing Dive		
RAND SUB TRV	Random Subsurface Movement		
RETRVD	Carcass Retrieved		
ROLL	Rolling		
SAG	Surface Active Group		
SATTG GONE	Satellite tag Gone		
SICK	Sick Whale		
SPY	Spyhopping		
TL BRCH	Tail Breach		
TL SLSH	Tail Slash		
UW EXH	Underwater Exhalation		
W/CALF	Cow of a Cow/Calf Pair		

APPENDIX 2: ACRONYMS

AFF	Automatic Flight Following
AIS	Automatic Identification System
ALWDN	Atlantic Large Whale Disentanglement Network
BNTM	Broadcast Notices to Mariners (USCG)
CEWS	Central Early Warning System
CFR	Code of Federal Regulations
DMA	Dynamic Management Area
ELT	Emergency Locator Transmitter
EPIRB	Emergency Position Indicator Radio Beacon
EWS	Early Warning System
FAA	Federal Aviation Administration
FACSFACJAX	Fleet Area Control and Surveillance Facility Jacksonville (U.S. Navy)
FL	Florida
FTP	File transfer protocol
FWC	Florida Fish and Wildlife Conservation Commission
FWC-LE	Florida Fish and Wildlife Conservation Commission Law Enforcement
FWRI	Fish and Wildlife Research Institute (part of FWC)
GA	Georgia
GDNR	Georgia Department of Natural Resources
GIS	Geographic Information Systems
GPS	Global Positioning System
GTM NERR	Guana Tolomato Matanzas National Estuarine Research Reserve
ID	Identification
IFAW	International Fund for Animal Welfare
IFR	Instrument Flight Rules
IMO	International Maritime Organization
EF, IS USM	Electro-Focus , Image stabilizer, Ultrasonic motor (camera lens)
JAX	Jacksonville, FL
Jaxport	Port of Jacksonville, FL
LNTM	Local Notice to Mariners (USCG)
MRC	Marine Resources Council
MSRS	Mandatory Ship Reporting System
NARWC	North Atlantic Right Whale Catalog
NARWD	North Atlantic Right Whale Consortium Database
NC	North Carolina
NEA	New England Aquarium
NEFSC	NOAA's National Marine Fisheries Service, Northeast Fisheries Science Center
NEWS	Northern Early Warning System
NGA	National Geospatial-Intelligence Agency
NMFS	National Marine Fisheries Service (aka NOAA Fisheries)
NOAA	National Oceanic and Atmospheric Administration
ODMDS	Ocean Dredged Material Disposal Sites
PC	Personal computer
PCCS	Provincetown Center for Coastal Studies
PFD	Personal flotation device
PIC	Pilot in Command
R/V	Research Vessel
RIWH	Right Whale
SAG	Surface Active Group
SC	South Carolina
SCGA	South Carolina Northern Georgia
SEUS	Southeast United States
SEWS	Southern Early Warning System
SIC	Second In Command (pilot)
SLR	Single Lens Reflex
SMA	Seasonal Management Area
SST	Sea surface temperature
UNCW	University of North Carolina Wilmington
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USN	United States Navy
USWTR	Undersea Warfare Training Range
VFR	Visual Flight Rules
VHF	Very High Frequency
WVI	Whale/Vessel Interaction

APPENDIX 3: UNITS OF MEASURE

ft	feet
hr	hour
km	kilometers
km/hr	kilometer/hour
knots, kn, kts	knots
m	meter
Mhz	mega hertz
min	minute
mph	miles per hour
nmi	Nautical miles
s	second
yd	yard

APPENDIX 4: DEFINITION OF TERMS

Adult	Any calving female, or individual 9 years of age or older
Calf	Less than one year of age
Callosity	Raised patches of roughened tissue located on the top of the head, chin, jaw, lips, above the eyes and behind the blowholes. The callosity pattern is black in color, but appears white due to the presence of cyamids.
Confidence	Measure of certainty of number of whales observed
Critical Habitat	Specific areas within the geographical area occupied by the species that contain physical or biological features essential to conservation and those features may require special management considerations or protection. Also, specific areas outside the geographical area occupied by the species, if the agency determines that the area itself is essential for conservation.
Cyamids	Small white crustaceans of the order Amphipoda that live exclusively on cetaceans. Cyamids, also known as "whale lice" colonize the callosities of right.
Dedicated Survey	Refers to a survey when no EWS tracklines were flown.
Effort	The total nautical miles (nmi) or time flown on trackline (east-west or north-south) while the plane was operating within survey parameters and wings-level. Short transits between tracklines and periods of circling or transiting outside survey parameters were not considered to be "on-effort".
Geodetic Distance	The shortest path along the ellipsoid of the earth at sea level between one point and another
Intermatch Code	A code assigned by NEA to a whale that has been matched for more than one sighting but the Catalog number is unknown
Juvenile	1-8 years of age (except calving females within this range)
OTHER Sighting	Sighting report from non-aerial survey team participant in the EWS network (e.g. USN, USCG, dredge observers)
Reliability	Measure of certainty of whale species identification
Season Code	A code given to a whale within a season, to assist in the recognition of individuals in the field, when the Catalog number is unknown.
Sighting	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. An individual whale may be part of more than one sighting per day and/or more than one sighting throughout the calving season.
Verification	A sighting reported to the survey team from another party (e.g public sighting, volunteer sighting network, military) that requires searching of a specific area in order to locate and confirm.
Vessel- Commercial Fishing	Vessel involved in fishing for commercial purposes, can be various sizes. Category includes shrimp vessels and crab vessels.
Vessel- Cruise Ship	Passenger ship used for pleasure voyages, includes casino boats
Vessel- Government	Vessel involved in government operations. Category includes Navy, Coast Guard, Homeland Security and law enforcement.
Vessel- Large Merchant	Ship that transports cargo. Category includes car carrier, container ship, tanker, freighter, tug and barge.
Vessel- Motor Yacht	Vessel with enclosed living area for passengers, often used for socializing or transiting. Many have dinghies or other small vessels onboard. Can be classified as large (>100ft) or small (<100ft)
Vessel- Personal Watercraft	Any vessel designed to typically carry one or two people. Includes: jet ski, wave runner, kayak, canoe.
Vessel- Recreational	Vessel without substantial closed spaces, typically center console, often with outboard engines. Includes parasail operators.
Vessel- Research	Vessel designed and equipped to carry out research at sea, can be various sizes
Vessel- Sailing	Vessel powered by the wind. Can be classified as large (>50ft) or small(<50ft). Includes windsurfers.
Vessel- Sport-fishing	Larger recreational vessel with multiple towers, outriggers and inboard engines
WVI	A situation when the survey team visually determines that a vessel is on a course that will result in the vessel and whale(s) being less than one nautical mile apart and communication between survey team and vessel are attempted in order to prevent collision or mitigate an interaction.
Yearling	One year old whale