

EARLY WARNING SYSTEM

Central EWS 2008 FINAL REPORT

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

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INTRODUCTION

There are fewer than 400 North Atlantic right whales (*Eubalaena glacialis*)¹ in the world, despite international protection since 1935 and federal protection since 1970. Failure of the North Atlantic stock to show signs of recovery can be attributed to several factors, including the effects of human activity on mortality rates. Vessel strikes account for the largest number of confirmed deaths. Of the 79 right whale mortalities documented from 1970 through June 2008, at least 28 (35%) were due to collisions with vessels and 9 (11%) were due to entanglements (Knowlton and Kraus, 2001; unpublished data, New England Aquarium). In addition, serious injuries caused by human activity in some cases can lead to the animal's demise (Knowlton and Kraus, 2001). A recent analysis of the 25 year right whale database (1980-2004) indicates a median population growth rate of about 1% (Pace et al., 2007) which is likely due to an increase in calf numbers since 2001. Yet, the authors also note that the population has "almost no capacity to absorb additional mortality, and growth would benefit greatly if mortalities from ship strikes and entanglements were reduced."

The coastal waters of the Southeast U.S. (SEUS) support the only known calving ground for this small population. Some calving may occur as far north as the Carolina's based on a small number of mother/cow and calf pairs (M/C) seen in those waters early or late in the calving season. Calving right whales typically arrive in the area in December to give birth and depart the habitat by late February to mid March to head for the feeding grounds off the Northeast U.S. However, right whales have been documented as early as September and as late as July in this area. Vessel traffic within the SEUS critical habitat is high as three major shipping channels transect the right whale high density area between Brunswick, Georgia (GA) and St. Augustine, Florida (FL).

The three major entrance channels serve three commercial shipping ports and two military bases. The Brunswick channel, at the northern end of the critical habitat extends 8 nautical miles (nmi) (14.6 km) offshore and serves the port of Brunswick, GA. The channel centered in the area at the GA/FL border is the St. Marys entrance channel, which runs 14 nmi (25.9 km) offshore and serves the Kings Bay Naval Submarine Base, as well as the port of Fernandina Beach, FL. The southern-most channel is the St. Johns River entrance channel, which runs 4 nmi (7.28 km) offshore and serves the port of Jacksonville, FL and the Mayport Naval Base. This is by far the busiest channel in the area with all forms of large vessel traffic, including container ships, car carriers, tankers, bulk freighters, tug and tows and cruise ships as well as U.S. Coast Guard (USCG) and U.S. Naval (USN) vessels. Commercial vessel traffic in this federally designated critical habitat has increased substantially over the past 40 years (Knowlton et al., 1997). Port expansions and diversions of military traffic to local bases closed elsewhere augment this trend. Based out of many small inlets and harbors along the coast, commercial fishing,

¹ North Atlantic Right Whale Report Card. North Atlantic Right Whale Consortium. November 2007. http://www.rightwhaleweb.org/pdf/NARWC_Report_Card2007.pdf

charter and recreational vessels increase the traffic utilizing and transiting the area dramatically.

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

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

From 1994 to 2002, the New England Aquarium's (NEAq) EWS surveys covered the majority of the high-density area and provided daily coverage of the three shipping channels within it. Prior to the start of the 2003 calving season, surveys in the SEUS were redesigned to allow for more daily coverage of a larger area. Beginning in 2003, the NEAq's EWS surveys were extended eastward to 30-35 nmi (54.8-63.9 km) from the coast and reduced in latitudinal range. The area includes the St. Marys River Entrance and the St. Johns River Entrance. This redesigned survey area is referred to as the Central EWS survey area. To the north, Georgia Department of Natural Resources (GDNR) conducts similar surveys that represent the Northern EWS surveys. In addition, Florida Conservation Commission/Florida Wildlife Research Institute (FWC) conducts surveys in the southern section of the critical habitat (southern EWS).

At the advent of the 2004 calving season survey aircraft and crew used during the EWS surveys were held to newly imposed federal standards. Survey aircraft were all certified under 14 CFR, Part 135 (airline, aircraft less than 10 seats). In addition, pilots and observers underwent intense pre-season training that included emergency-egress. Pilots also attended FAA Part 135 ground school and passed all associated check rides. A second pilot in command (SIC) was also added to each survey flight to ensure a higher safety margin during survey operations. The addition of a second pilot limited data recording during the surveys that were conducted in a Cessna 337 as the number of science crew was reduced from three to two persons due to weight and balance constraints. For this reason all surveys flown since 2004 have been conducted without a dedicated data recorder.

This report describes the results of the Central EWS right whale aerial survey effort, during the 2007-2008 season (December 1, 2007 – March 31, 2008). The report also shares right whale identification data collected throughout the region by other aerial survey teams.

ACOE, USCG and USN provide the funding for Central EWS surveys with support from the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries).

METHODS

Aerial Surveys

Central EWS surveys were flown daily from December 1, 2007 through March 31, 2008. The surveys were conducted in the area from the southern end of Cumberland Island, GA, approximately 6.5 nmi (12 km) north of the St. Marys River entrance (30° 50.0N), to Jacksonville, FL, approximately 6.5 nmi (12 km) south of the St. Johns River entrance (30° 17.0N), from the shoreline to 30-35 nmi (54.8-63.9 km) offshore. Twelve east/west transects were flown perpendicular to the coast at 3 nmi (5.5 km) intervals with a western limit of 0.5 nmi (0.9 km) off the shoreline. A total of 406 nmi (761 km) of on-transect tracklines were flown during each completed survey. In addition, a small number of contingency surveys were flown. When an aircraft of an adjacent survey (northern EWS or southern EWS) was unable to fly for a period of time (due to maintenance or extended disentanglement efforts) a pre-approved contingency plan would be flown. Contingency plans were developed to ensure aerial survey coverage of port entrances in the absence of one (2-plane contingency) or two (1-plane contingency) of the EWS survey aircrafts. The redirected survey for the central EWS team during the 2-plane contingency plan covered an area extending approximately 26 nmi (47.6 km) north of the Brunswick-Bar channel sea-buoy (31° 26.0N) south to the St. Marys River Entrance channel sea-buoy (30° 41.0N). Fourteen east/west transects were flown perpendicular to the coast 3 nmi (5.5 km) intervals from 0.5 nmi (0.9 km) off the shoreline out to 15- 24 nmi (27.5-43.9 km) from the shore.

Necessary conditions for all flights included a minimum ceiling of 1000 feet (305 meters), visibility greater than 3 nmi (5.5 km) and winds less than 17 knots. Surveys were conducted in a 14 CFR Part 135 certified twin engine Cessna 337 Skymaster. The aircraft was equipped with Global Positioning System (GPS), Automated Identification System (AIS) receiver, Automatic Flight Following (AFF) transponder, full IFR (instrument flight rules) instrumentation, aircraft mounted marine radio, life raft, medical kit, a waterproof handheld VHF marine radio, a registered removable 406MHz EPIRB, aircraft mounted ELT and satellite phone.

The surveys were flown at an altitude of 1000 feet (305m) above sea level and an average air speed of approximately 100 Mph (160 km/hr). The survey team consisted of a pilot-in-command (PIC), pilot-second-in command (SIC), and two observers positioned on each side of the aircraft in the rear seats. Each observer was individually equipped with, but not limited to, a Nomex flight suit, FAA approved survival vest, strobe light, rescue streamer, combo-edge knife and Personal Locator Beacon (PLB) with GPS. The observers scanned the water surface out to at least 2 nmi (3.7 km). In order to maintain standardized sighting effort, the PIC and SIC were instructed not to alert the observers to any sightings, but were allowed to report a sighting after it had been passed by the aircraft if missed by the observers. The distance of each right whale sighting from the flight track was measured using GPS positions of the sighting and the transect line.

All right whale sightings were recorded into a digital voice recorder and entered into a computerized logging program. Logger 2000 was created by International Fund for Animal Welfare (IFAW) and designed for compatibility with the Right Whale Consortium database, curated by the University of Rhode Island (URI). During surveys, Logger 2000 downloaded, at 10-second intervals, time, position (latitude and longitude), altitude, heading and aircraft speed directly from the aircraft's GPS. All downloaded data is stored in a Microsoft Access database. In addition to the automatically downloaded data, the observers could manually enter information on Beaufort, visibility, cloud cover, and weather. Due to the change in configuration of aircraft personnel with the addition of a second pilot and loss of the data recorder position no other marine species sightings were logged during flights except basking sharks and leatherback turtles. These two species were logged because of requests by researchers.

All commercial and military vessels were recorded. Vessels that were visually estimated to be 100 ft (30.5 m) or larger were recorded as they were visually sighted on the transect lines. In addition, detailed location and vessel information data of all commercial vessels required to carry an AIS transponder (Appendix 4) were recorded into a separate computerized database.

When sightings of right whales occurred, the aircraft left the transect line at a right angle to the sighting and flew directly over the whale(s) to obtain an exact GPS location of the whale(s). The aircraft then circled the whale(s), allowing observers to obtain photographic identifications of the individuals sighted. High-resolution digital images were obtained at an altitude of 1000 ft (305 m) using a digital D70 camera with a fixed Nikkor 300mm lens. At the conclusion of photographic work on each sighting, the aircraft returned to the transect line at the point of departure. These methods conformed to research protocols followed by the North Atlantic Right Whale Consortium (NARWC) as approved by NOAA Fisheries.

All photographic and effort data were submitted to NARWC at the conclusion of the survey season.

Notification of Agencies

During the EWS season, all right whale sightings were reported directly, via satellite phone, from the survey aircraft to a ground contact. The ground contact would immediately forward this near real time data to the EWS network through email. The EWS network consists of a marine user group, which includes local, state, federal, non-profit and commercial interests. Some network members are provided with pagers to receive the messages while other members prefer to receive this information via cell phone text messaging, email or other means. As a network member, the USCG transmits a Broadcast Notice to Mariners over VHF marine-band radio channel 16 once they are notified of right whale sightings via the network. Additionally the survey team ground contact is responsible for entering the right whale sighting information into the

Mandatory Ship Reporting System (MSR) via an Internet data entry portal which ensures that ships reporting into the MSR will be aware of the most recent right whale sightings.

Photographic Identification

At each sighting, observers obtained high quality images of right whale callosity patterns, and any scars and other markings that were obvious. The image numbers were recorded by date, time, right whale letter for the day and photographer. Digital metadata time was synchronized to the GPS and the computer-logging program (Logger 2000) times at the start of each survey for accuracy.

Right whale callosity patterns are used as a basis for identification and cataloging of individuals, following methods developed by Payne *et al.* (1983) and Kraus *et al.* (1986). The NEAq curates the North Atlantic Right Whale Catalog (the Catalog), which includes tens of thousands of sightings from numerous research groups and individuals. One or two good quality digital images of each right whale considered to be a new individual for the season were emailed to the NEAq office in Boston for preliminary identification. The identifications were shared with the NEAq team as well as other researchers from Associated Scientists at Woods Hole, Florida Fish and Wildlife Commission, Marineland, Marine Resources Council and Wildlife Trust (all of which also sent images to NEAq for preliminary identifications) and the NOAA Fisheries SEUS right whale coordinator. This allowed for an up-to-date tally of the number of mother/calf pairs during the season. Intermatching of non-mother/calf pairs was also initiated during the season. Photographs of all individuals were downloaded at the end of the day to look for entanglement or other injuries.

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

Distribution

Sightings of all right whales were recorded by time and location within the study area. Integration of the right whale sightings data collected during these surveys with previously collected data will help to further define high-use areas within the southeast region. All right whale sightings for the season were plotted and displayed by group size and association type. Sightings were plotted for the four-month long season and also plotted by month to illustrate temporal distribution. In addition, ship traffic was plotted to visually compare right whale sightings versus ship traffic recorded by the aerial survey effort.

Sighting Distance

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

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

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

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

Sighting events that occurred while the survey aircraft was not on transect were not included in the summary.

Demographics

A preliminary analysis of the sex and age composition of the 2008 wintering population of right whales in the survey area was conducted using data from all aerial surveys in the SEUS and the existing catalog of identified right whales from the western North Atlantic. Right whales with known ages (because they were previously identified in their calving year) were classified as juveniles (1-8 yrs) or adults (≥ 9 yrs). Whales of unknown age were classified as unknown age until their ninth year in which they become classified as an adult. All calving females were classified as adults regardless of age. Sexes were determined by one or all of the following methods: 1) direct observation of the genital area, 2) association with a calf, 3) by the testing of biopsy samples for a genetic marker unique to the Y chromosome (Brown *et al.*, 1994).

Calving Intervals and Rates

Right whale cows in this population have been monitored since 1980, and records of calf production are documented in the North Atlantic Right Whale Catalog (Kraus *et al.*, 2001). Data collected on reproductive females (cows) that were observed with a calf in the monitoring area during the survey period were used to update information on calving intervals, rates of reproduction, time frame and location of calving.

Associations and Behaviors

The survey team remained on site of each sighting until positive species identification was made. During this time photographs were obtained and visible associations and behaviors were recorded with as much detail as possible.

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

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

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

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

A whale or group of whales were also given a direction of travel if it was determined that the whale(s) had traveled a significant distance while the survey team was on site.

Vessel Sightings

All large vessels, greater than 100 ft (30.5 m), sighted during a survey were entered into Logger 2000. Vessels that are no longer recorded due to the loss of a dedicated recorder include commercial fishing vessels and all recreational vessels. The aircraft did not break track during large vessel sightings in order to maximize time available for survey effort. The position (latitude and longitude) of the aircraft was recorded when perpendicular to the vessel. The vessel was recorded with a bearing, estimated distance from the aircraft and the vessel's heading.

Vessels recorded included commercial and military vessels. Small commercial vessels (less than 100 ft) were also recorded, these include tugs, pilot boats and dredge crew and survey vessels. Data collected for each vessel recorded included type of vessel, time, and vessel heading. During a sighting event, if a vessel was determined to have the potential for a "close call" with a whale or group of whales the vessel was contacted directly by the survey aircraft in an attempt to prevent the threat of an interaction. When "close call" events occurred the survey team would record detailed information about the situation. Data collected included type of vessel, vessel's position, whale's position,

whale's reaction (if any), closest distance between whale and vessel, radio communication (if any) between aircraft and vessel, and vessel's actions (course change or speed change). All "close call" events, regardless of vessel type (commercial, military, recreational or commercial fishing) and vessel size, were recorded on a separate data sheet and reported at the conclusion of the survey to NOAA Fisheries. In addition, all "close call" reports were compiled and forwarded to FWC at the end of the season for inclusion in the close call database.

Automatic Identification System (AIS)

The AIS is a shipboard broadcast system that acts like a transponder, operating in the VHF maritime band, that is capable of handling well over 4,500 reports per minute and updates as often as every two seconds. AIS is currently being used for identifying and monitoring maritime traffic throughout U.S. waters by various entities monitoring commercial shipping activity. The AIS system sends and receives vessel identification information that is designed for display on a computer or chart plotter. The standards and regulation of AIS are established by the International Maritime Organization (IMO) and as established at the 73rd Session of their Maritime Safety Committee. The majority of large, commercial maritime traffic involved in international travel are currently required to carry AIS and the remaining commercial vessel traffic (coastal and international) is required as of July of 2007.

All commercial vessel traffic carrying AIS transponders (Appendix 1) were recorded in a separate database during all Central EWS and two-plane contingency surveys. Data was collected using a Sealinks, Shine Micro RadarPlus SL161R dual channel AIS receiver. Data from the AIS receiver was downloaded directly to the onboard laptop into Shipplotter, software by Centro de Observação Astronómica no Algarve (COAA). The data collected included Mobile Maritime Service Identities (MMSI), navigational status, rate of turn, speed over ground, position, course over ground, heading (true), and time every 2 to 10 seconds. In addition, every 6 minutes the IMO number, radio call sign, name, ship dimensions, draft, destination and estimated time of arrival were also recorded. AIS data were collected during survey flights only and covered an area extending from Charleston, SC to Jacksonville, FL. The AIS data provided information on ship densities and ship speeds through the critical habitat and if any changes in speed occur once entering MSR or critical habitat boundaries.

EWS RESULTS

Survey Effort

The central EWS survey team was on-site for 122 days (01 December 2007- 31 March 2008) during the right whale calving season and a total of 74 surveys were conducted. The first survey was conducted on December 2, 2007 and the last survey occurred on March 28, 2008.

Some surveys were conducted with favorable environmental conditions throughout the duration of the survey, where as others were flown with favorable environmental conditions during part of the survey. Favorable conditions were considered to consist of a Beaufort force 3 or less and visibility of at least 2 nautical miles (nmi).

During the 2008 season, 407 hours of survey effort resulted in 43 complete surveys ($\geq 90\%$ of survey area flown) and 31 partial surveys ($< 90\%$ of survey area flown). Thus, some measure of aerial coverage was provided 61% of the season. When a partial central EWS survey was conducted effort priority was given to the shipping channels (St. Marys River Entrance Channel and St. Johns River Entrance Channel) and the immediate surrounding areas. During a partial two-plane contingency survey the effort priority was given to the Brunswick and St Marys River Entrance channels. A summary of all survey effort (including the contingency surveys) is shown in Table 1.

During the 2008 EWS season, the Central EWS team was redirected during three different times in order to fly the two-plane contingency plan. Contingency survey flights occurred 22 January, 25 February and 29 March, 2008. A summary of the effort during the two-plane contingency surveys is described in Table 2. Figure 1 represents the survey area of the Central EWS and the two-plane contingency area flown by the Central EWS team when needed.

In order to evaluate how much effort was given to the EWS surveys during the 2008 season the number of days on site was multiplied by the on-transect miles per survey in order to evaluate how much of the available effort for the season was conducted in favorable sighting conditions (Beaufort ≤ 3 and visibility > 2 nmi). There are 406 on-transect miles (nmi) to be flown per Central EWS survey and 410 on-transect miles (nmi) per two-plane contingency survey. Therefore, 49,544 nmi were available to be flown during the 2008 season (119 days x 406 nmi + 3 days x 410 nmi). During the 2008 season 26,296 nmi of the available 49,544 nmi were flown (53.1%). Of the 26,296 nmi of trackline flown, 22,086 nmi were flown in favorable conditions (84%). Thus, 44.6% of the total miles available to be flown during the season were flown in favorable conditions. Figure 2 represents the survey effort flown by the Central EWS team during the 2008 season.

Table 1. Total Central EWS Survey Effort (including contingency surveys).

Number of Available Survey Days	Number of Surveys Flown/ Percent	Number of Full Surveys	Number of Partial Surveys	Number of Available Transect Miles (nmi)	Number of Transect Miles Flown (nmi)/Percent of Total Available	Percent of Transect Miles Flown in Beaufort ≤ 3	Number of Transect Miles Flown in Beaufort ≤ 3/ Percent of Total Available
122	74	43	31	49,544	26,296		22,086
					53.1%	89.2%	44.6%

Table 2. Two-Plane Contingency Surveys

Number of Surveys Flown	Number of Full Surveys	Number of Partial Surveys	Number of Transect Miles Flown	Number of Transect Miles Flown in Beaufort < 3/ Percent of Total Available
3	2	1	1,080	875
				81%

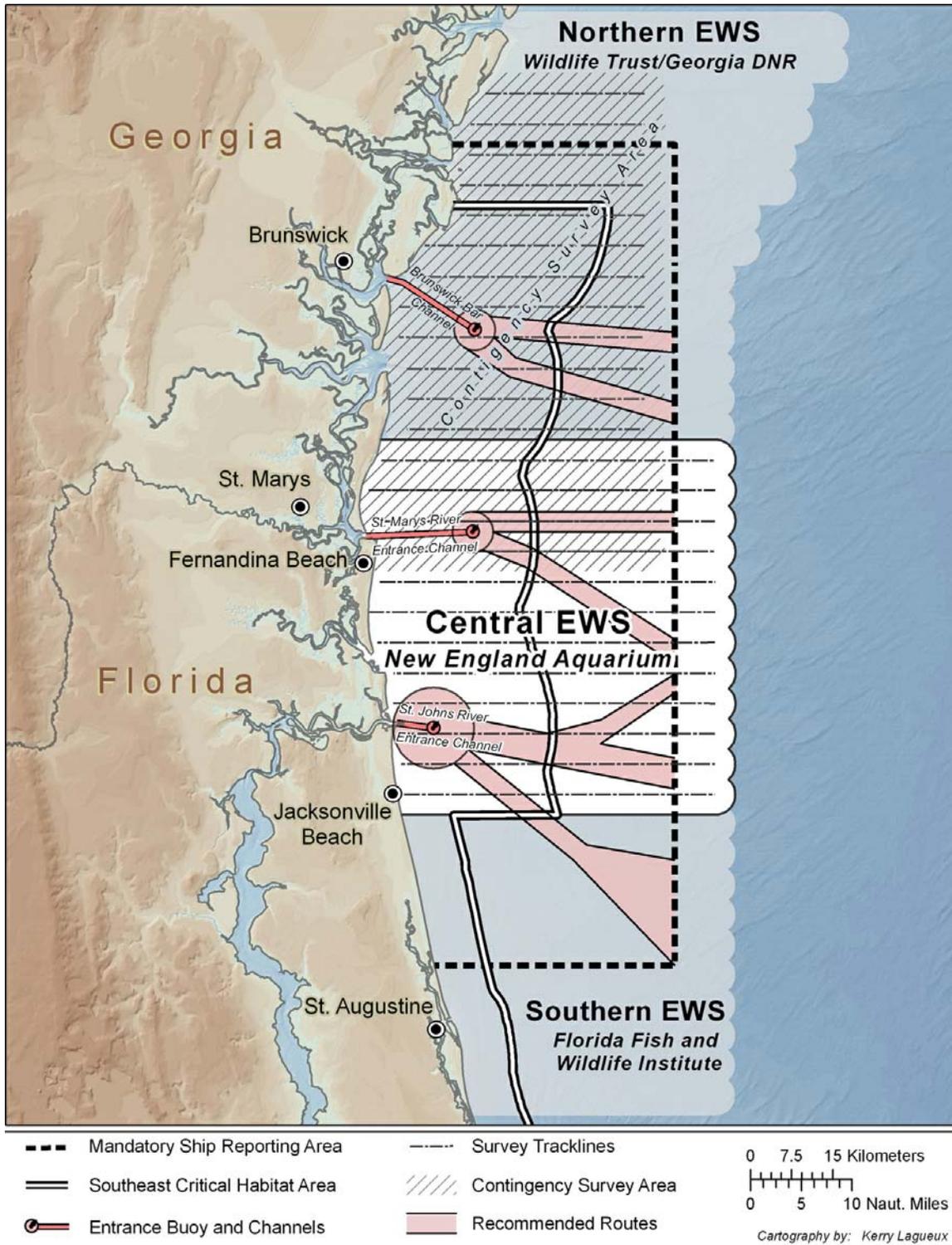


Figure 1. Central EWS Survey Area (including contingency plan flow by NEAq). Projected in Universe Transverse Mercator, Zone 17, using North American Datum 1983.

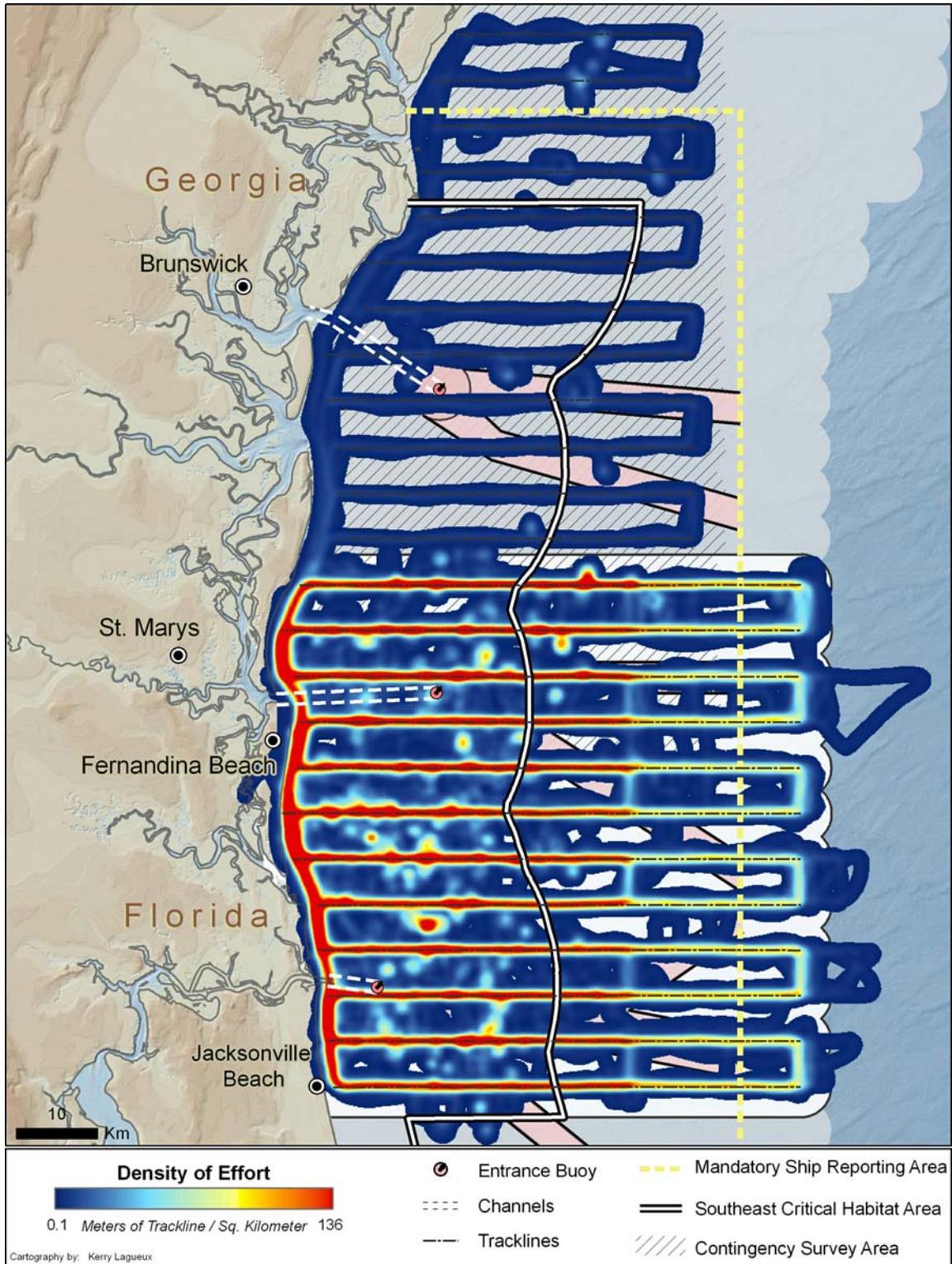


Figure 2. Central EWS Survey Effort (including contingency plan flown by NEAq). Projected in Universe Transverse Mercator, Zone 17, using North American Datum 1983.

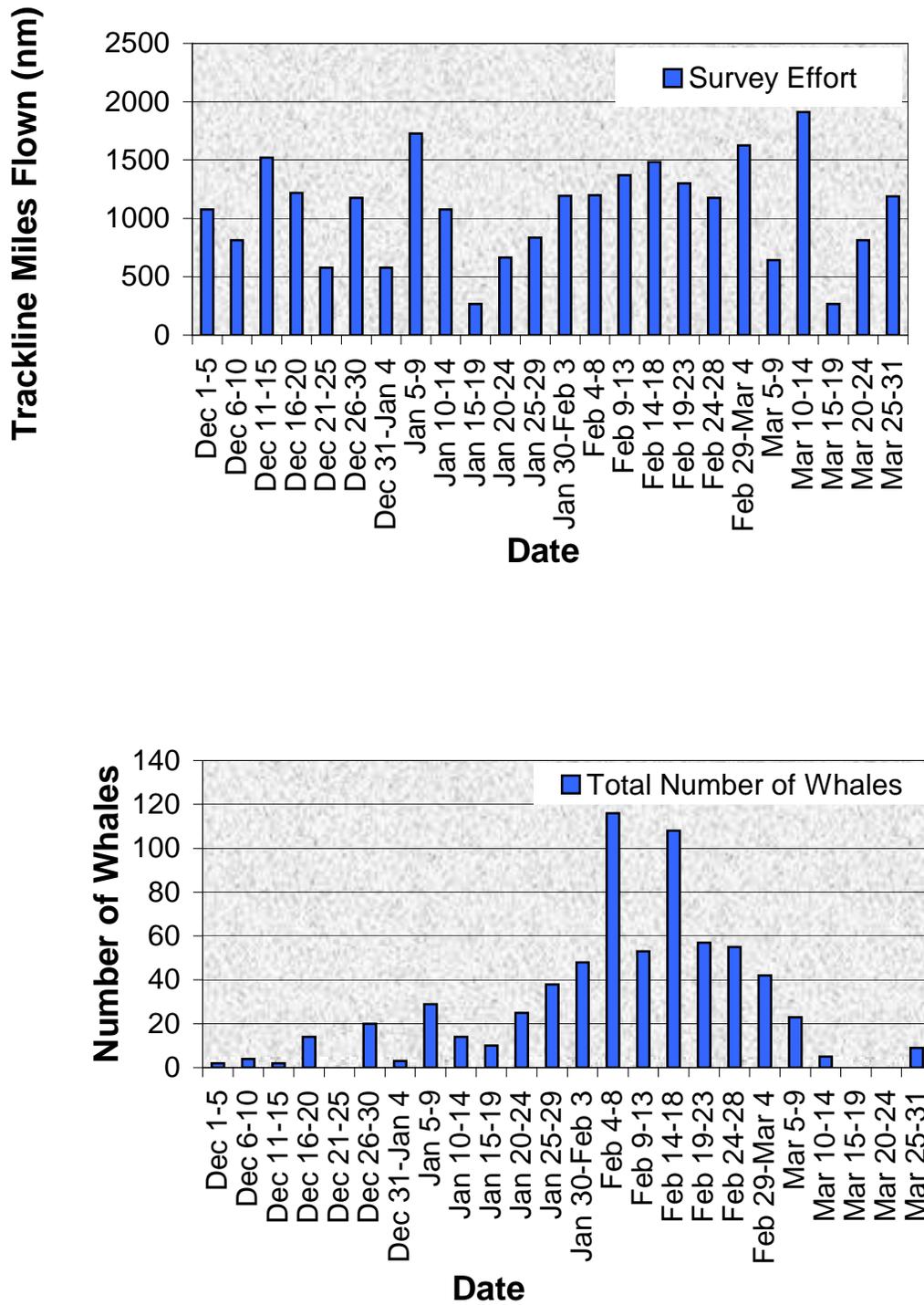


Figure 3. Temporal Occurrence of Right Whales during the Central EWS 2008 Season.

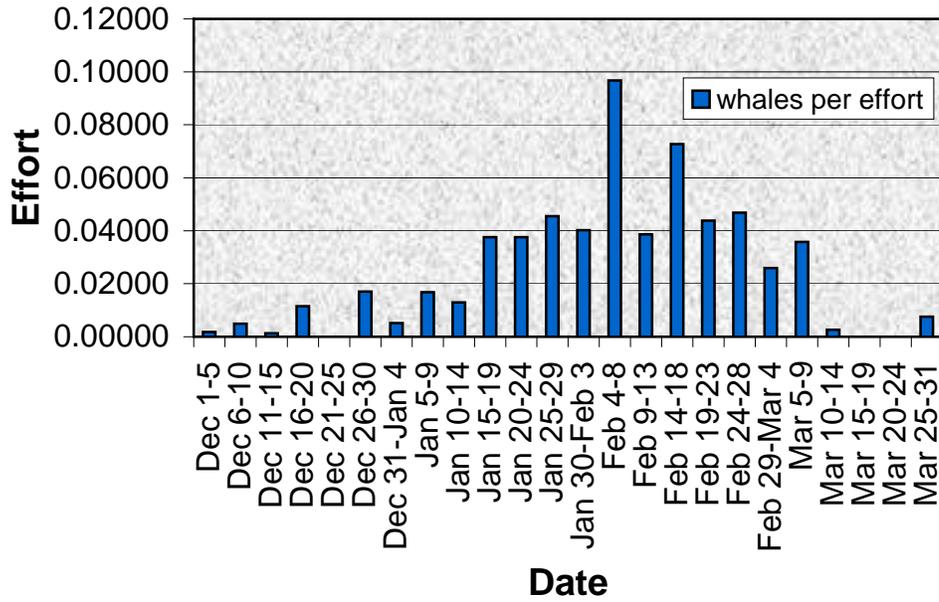


Figure 4. Effort vs. Number of Right Whales.

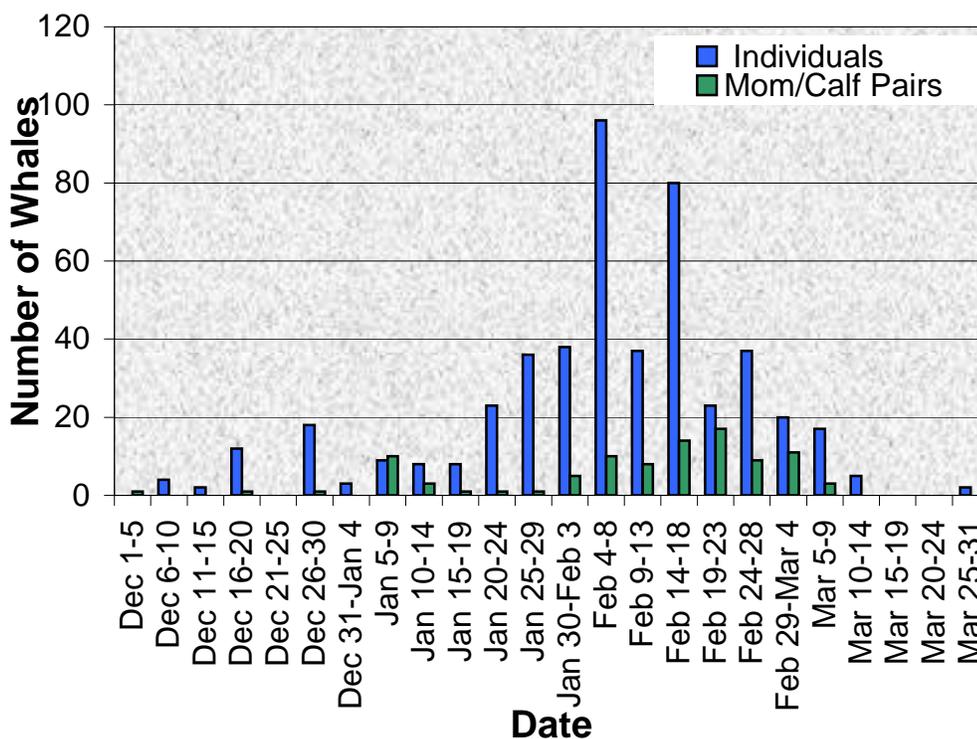


Figure 5. Temporal Occurrence of Right Whales. Mom/Calf Pairs vs. Individuals in the Central EWS during the 2008 Season.

Sightings and Photo-identifications

A sighting event is defined as an event by which the aircraft breaks from the trackline and a whale or group of whales are circled until they are positively identified as right whales. A single sighting event can be of a single whale or a group of whales. The first right whale sighting documented by the Central EWS survey occurred on 05 December 2007. As the coastal, southern progression of right whales continued the number of right whale sighting events increased from 1 to a maximum of 21 sighting events per day with as many as 44 individual whales (Figure 3). Sightings continued throughout the season with the last right whale sighting reported by the Central EWS on 27 March 2008. Figure 4 represents the sightings per unit of survey effort for the season. The temporal occurrence of non-mom/calf right whales in the survey area peaked by early February and slowly subsided toward the end of the month while the temporal occurrence of mom/calf pairs was consistently high during February (Figure 5) and rapidly declined after the first week of March.

All Central EWS right whale sightings from the 2008 season are plotted on a chart of the study area in Figure 6 (including the 3 days of two-plane contingency survey) and plotted monthly in Figure 7. All sightings of right whales are detailed in a table in Appendix 2 with the date, time, location, association and behavior type where applicable of each whale. Also included are the catalog identification numbers when known.

There were 326 sighting events of 693 right whales, including calves (not all unique individuals) in the central EWS survey area (including 3 days of survey effort as the two-plane contingency) during the 2008 season. Of the 21 females (as of early August 2008) known to have given birth in the 2008, 20 of them were documented in the SEUS and 19 of them were documented with their calves. One right whale female was not documented in the SEUS but was documented with a calf elsewhere in 2008 (#1321 was documented in North Carolina in May). Also, one female right whale was documented in the SEUS prior to calving but was later documented with a calf elsewhere (#3115 was first documented with a calf in the Bay of Fundy in July). Of the 20 documented in the SEUS, 18 were documented (with calves) in the EWS. The Central EWS documented 17 of the 20 moms known to be in the EWS area.

All 326 sighting events were reported to the EWS pager system and all sighting events were photo-documented although, only 689 of the 693 right whales were photographed.

Of the 326 right whale sighting events that were photo-documented, 93 of the sightings were of single whales (includes pregnant females), 107 of mom/calf pairs, 44 sightings were groups of whales associated in a SAG and 82 sightings were “others”, i.e. groups of whales not alone, in a SAG or M/C pair.

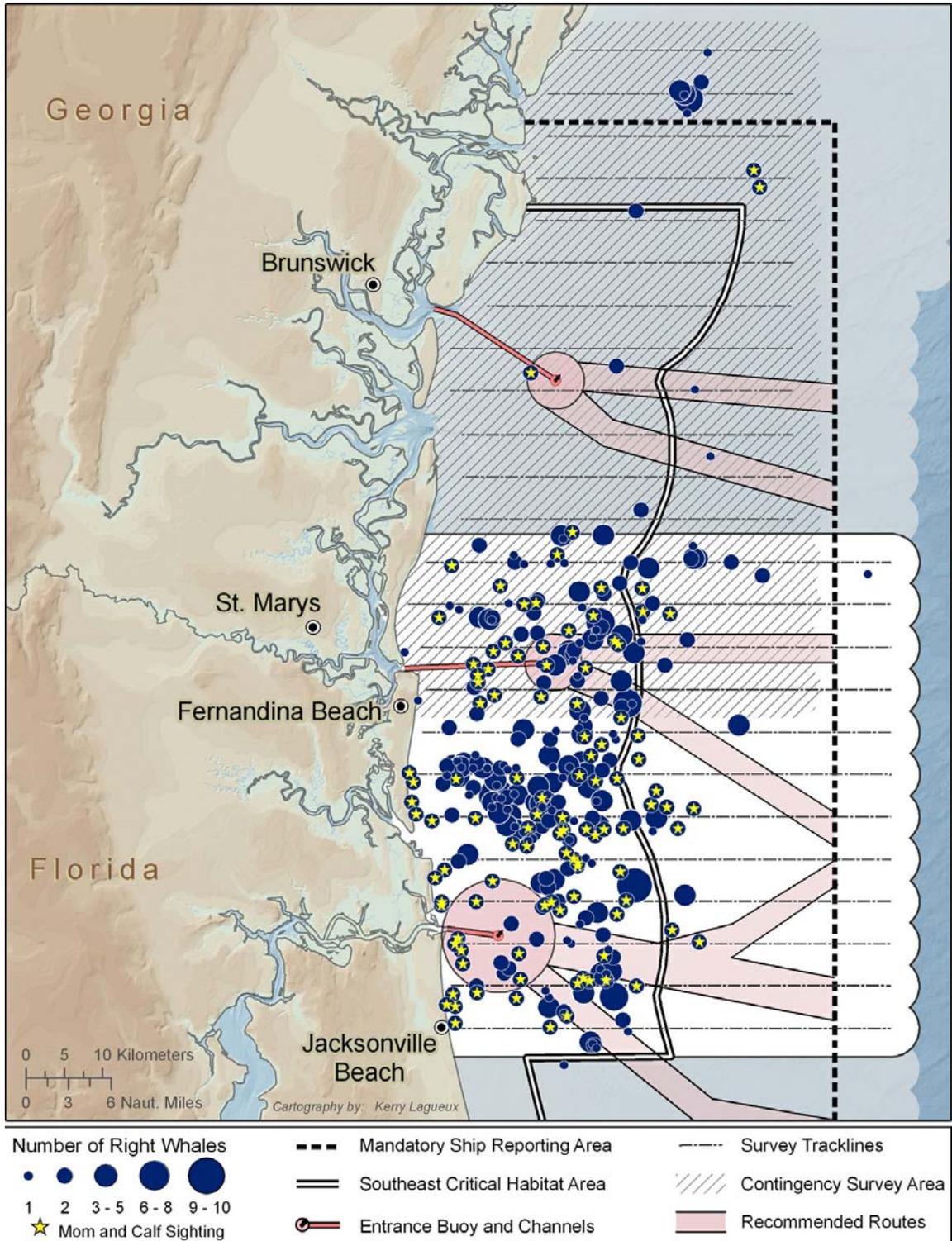


Figure 6. Right Whale Sightings (including contingency plan flow by NEAq). Projected in Universal Transverse Mercator, Zone 17, using North American Datum 1983.

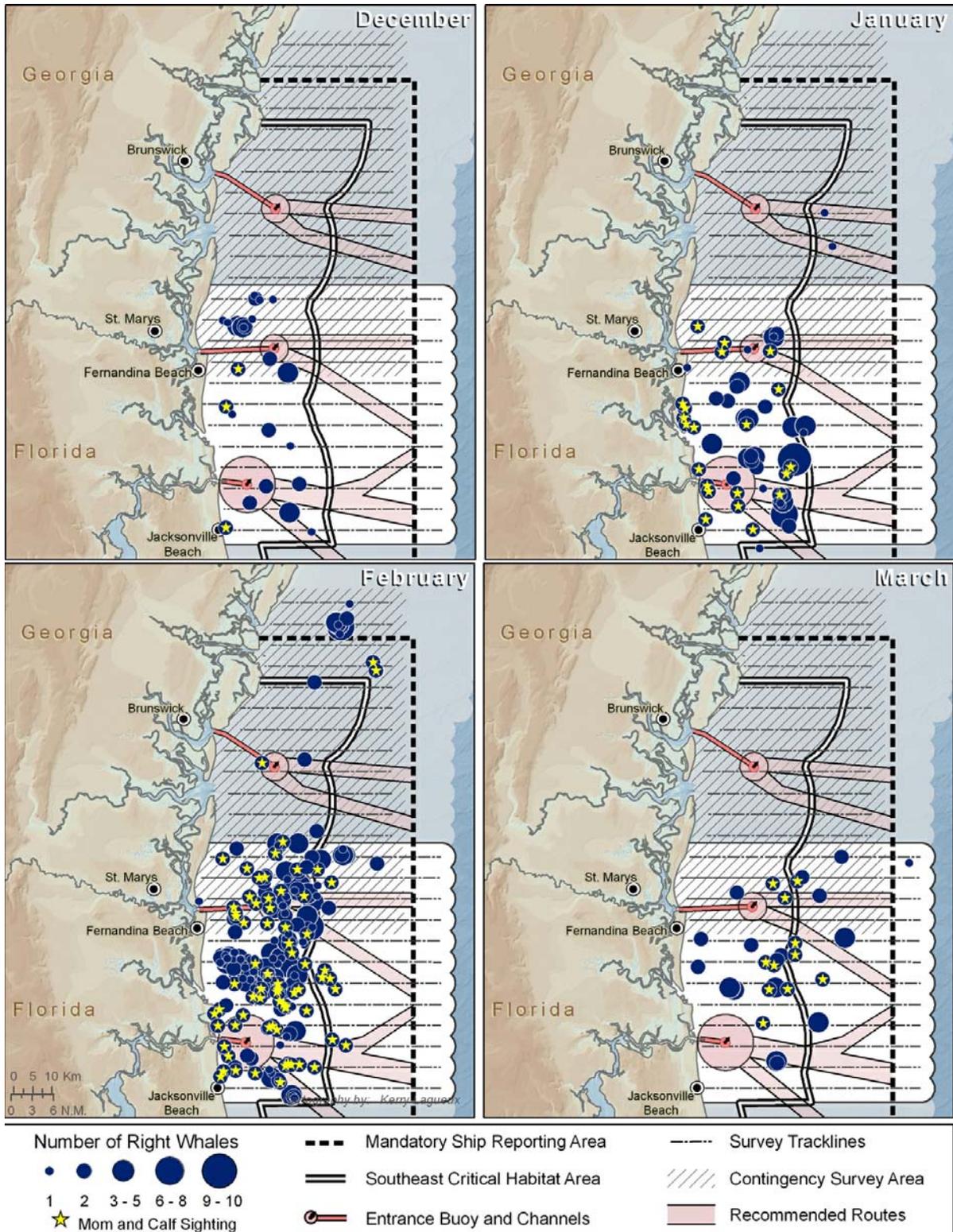
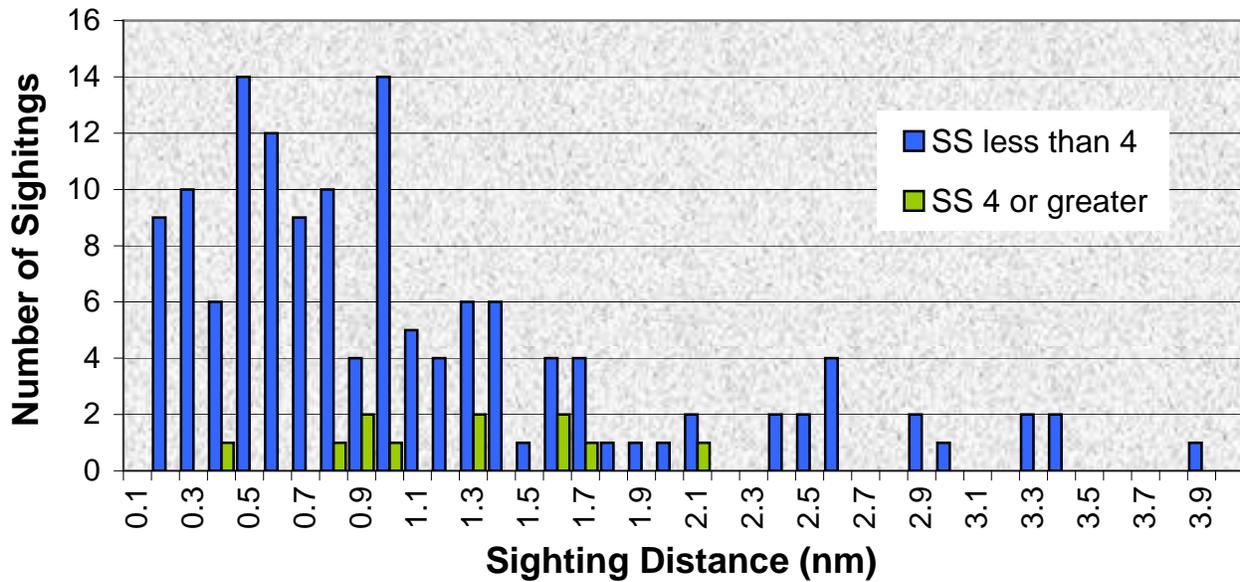


Figure 7. Right Whales Sightings by Month (including contingency plan flown by NEAq). Projected in Universal Transverse Mercator, Zone 17, using North American Datum 1983.

Sighting Distances

Sighting distances for right whale sighting events are summarized by 1/10 nmi increments in Figure 7. Sighting events that occurred while the survey aircraft was not on transect were not included in this analysis. The mean sighting distance, without considering Beaufort sea-state conditions as a factor is 1.1 nmi. A summary of sighting distances where Beaufort sea-state was considered is shown in Figure 8. Analysis of Beaufort sea state and sighting distances shows a mean of 1.1 nmi during times of Beaufort 3 or less. The mean sighting distance during times of Beaufort 4 or greater is 1.2 nmi but the frequency (Table 3) is reduced considerably (n =139 and 11,



respectively).

Figure 7. Central EWS Sighting Distance.

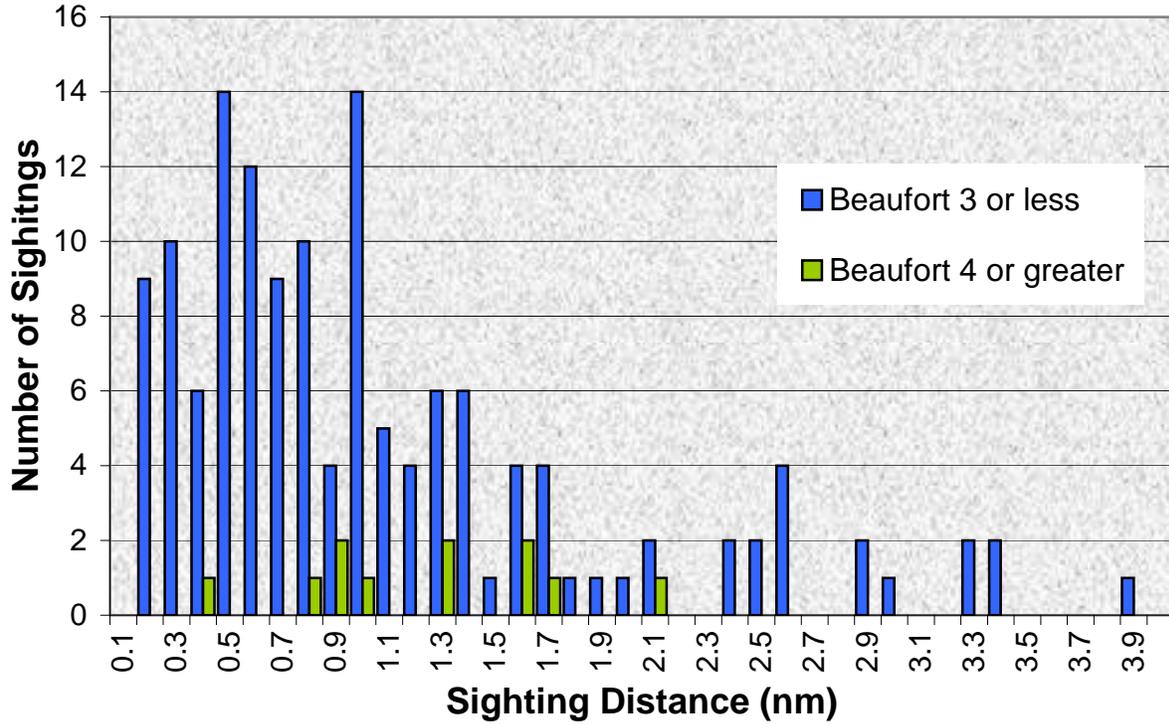


Figure 8. Sighting Distance (Beaufort Sea State Considered).

	Beaufort ≤ 3	Beaufort 4 or Greater
Number of Transect Miles Flown (nmi)	22,086	4,210
Number of Right Whale Sighting Events	139	11

Table 3: Right Whale Sighting Frequency

Demographics

The matching and confirming process for right whale identifications is still currently being conducted for the 2008 season. For this reason we are unable to illustrate a complete demographic structure for the area. However, we do know that the area was highly utilized by a number of unidentified whales thought to be juveniles. Many of these whales have been matched to calves from previous years and are given a temporary intermatch code. The preliminary count of whales documented during the 2008 season by all survey teams in the EWS area are 18 M/C pairs, 90 catalogued individuals (non M/C pairs) and 20 intermatched whales (probable juveniles) for a minimum total of 128 right whales. We anticipate that once the data from all teams has been matched or intermatched and compared to the catalog, this number of right whales seen during the 2008 season may change slightly.

Figure 9 is a graphical depiction demographic structure of the SEUS during the 2008 season of the known 146 matched and/or intermatched right whales.

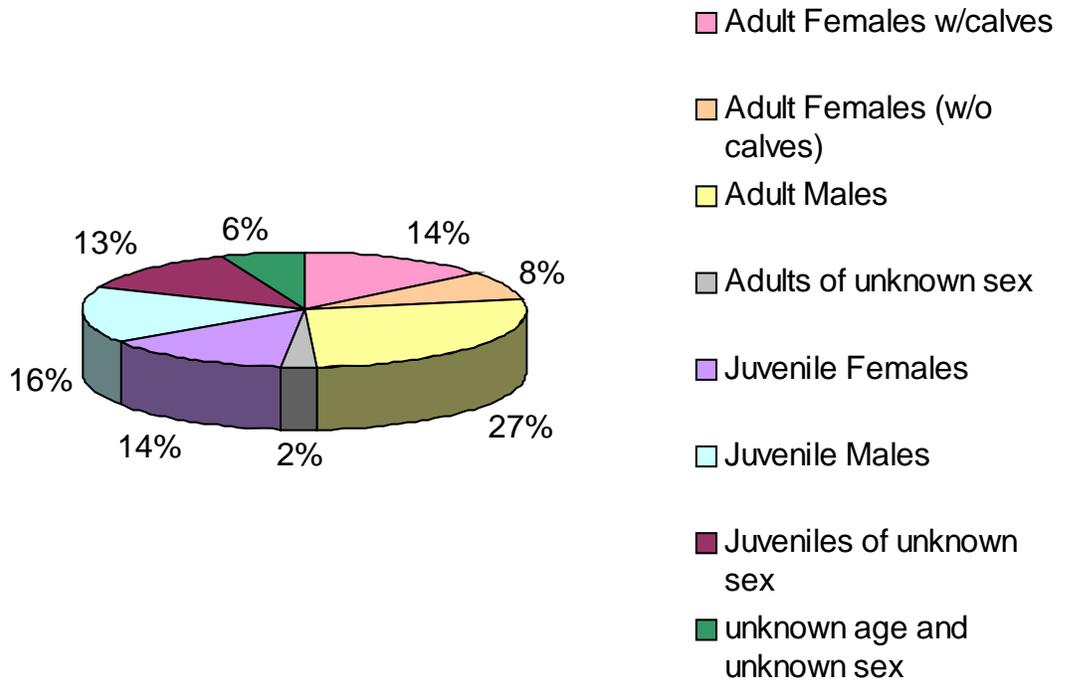


Figure 9: Demographic structure of the 2008 EWS area.

Calving Intervals and Rates

Preliminary data from the 2008 calving season shows the calving interval ranged from 2-4 years with a mean of 3.0 for all cows with multiple calvings. Three of the 11 cows with multiple calvings had a two-year calving interval (#1243, #1301 and #1802)

but all three of them had calves in 2006 that died. The calving interval not including these three cows is 3.3 years. Table 4 includes calving interval, number of calves and age class/age (when known) of each cow from the 2008 season. Seven right whales calved for the first time in 2008. All whales were documented in the Central EWS survey area except #1321, #1632, and #3180. Right whale #1321 was not documented in the SEUS and #1632 and #3115 were documented in the EWS survey area but only prior to calving.

Associations

During the 2008 season all right whale association types were documented except for feeding. Appendix 2 summarizes all association types observed during each right whale sighting event.

Table 4. Calving Interval

1243	26	5	2*
1245	26	4	3
1301	25	4	2*
1308	25	3	3
1321***	Adult	4	4
1408	24	4	3
1622	Adult	4	3
1632	Adult	3	3
1703	21	3	3
1802	20	3	2*
1812	Adult	4	4
2040	18	3	3
2330	Adult	2	4
2753	11	1	N/A
2790	Adult	2	3
3020	Adult	1	N/A
3115**	Adult	1	N/A
3130	7	1	N/A
3180	7	1	N/A
3292	6	1	N/A
3293	Adult	1	N/A

*In 2006 the calves of #1243, #1301 and #1802 died.

** Only seen in the SEUS prior to calving

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

Note: Please note that in late August 2008 and additional (the 22nd) M/C pair were documented in the Bay of Fundy. Right whale #1123 was not seen in the SEUS during the 2008 season.

Vessel Sightings

The tracks of all commercial shipping traffic recorded during the CEWS surveys during the 2008 season that carry an AIS transponder are plotted in Figure 10 (See Appendix 1 for the AIS carriage requirements for vessels). This plot contains the track of the vessel as it moved through the habitat and represents the density of traffic within a given area. Figure 11 displays the same data on density but according to ship type, tanker or cargo (not including tugs, dredges and pilot boats). Figure 12 displays the same shipping traffic as Figure 10 but the plot represents average vessel speed of all commercial shipping traffic (including tugs, dredges and some pilot boats) and Figure 13 displays the same data on average speed but according to ship type, tanker or cargo. Figures 10, 11, 12 and 13 only represent shipping traffic during the timeframe that the survey aircraft is airborne. Figure 14 contains a plot of vessel traffic that is not required to carry AIS and was observed during surveys and recorded abeam of the survey aircraft (plot does not include the track or speed of the vessel).

“Close Call” or Ship/Whale Interactions

During the 2008 season the survey aircraft documented 11 “close call” or vessel/whale interactions events. A “close call” is defined as 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 nmi apart. At the time of this of this determination the survey team attempts to make contact, via Marine VHF Ch. 16, with the vessel in question. During the 2008 season the central EWS survey team was able to make positive contact in five of the nine “close call” situations documented. Table 5 summarizes the nine “close call” events documented.

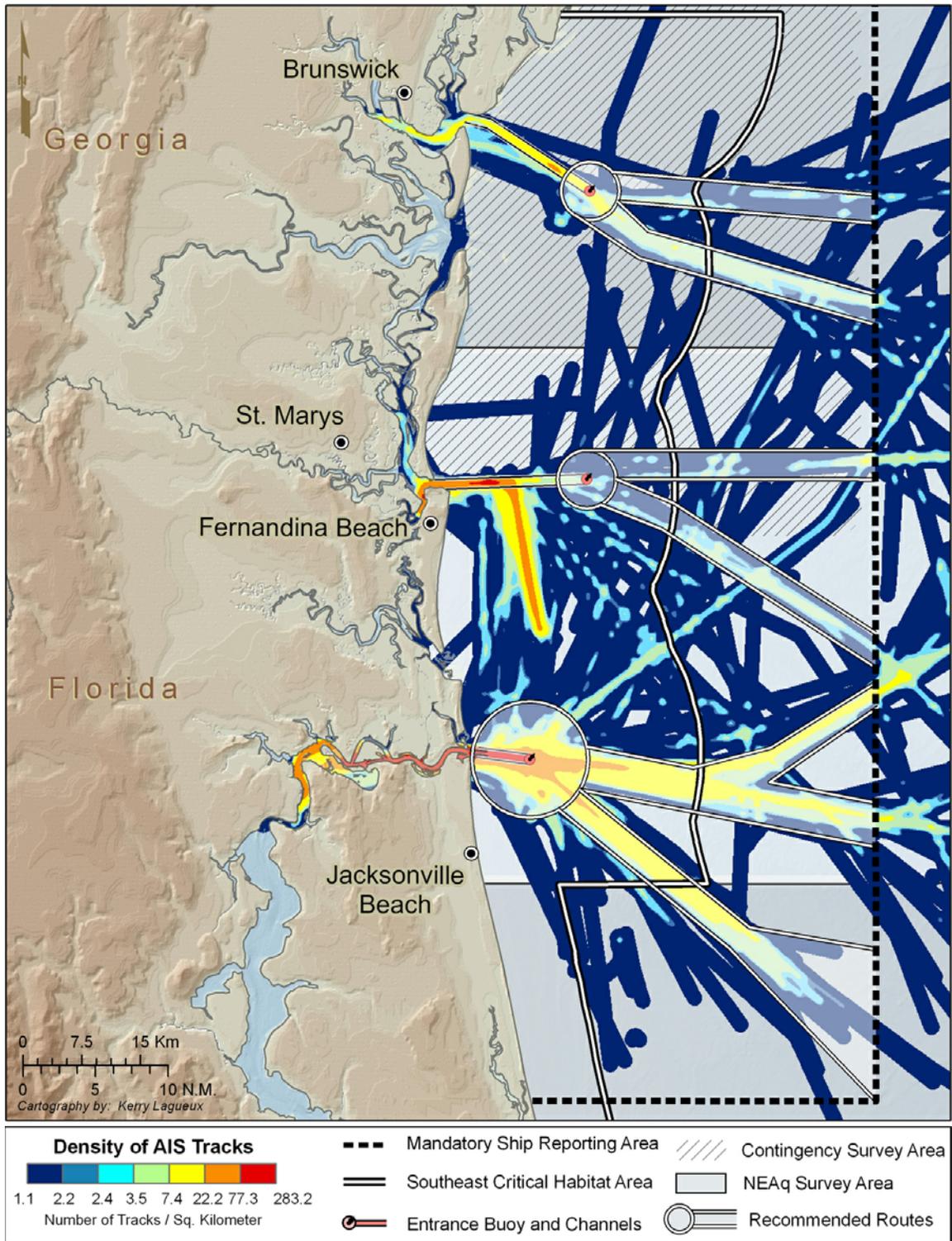


Figure 10. Commercial shipping traffic density recorded during Central EWS flights (including tugs, dredges and some pilot boats). Projected in Universal Transverse Mercator, Zone 17, using North American Datum 1983.

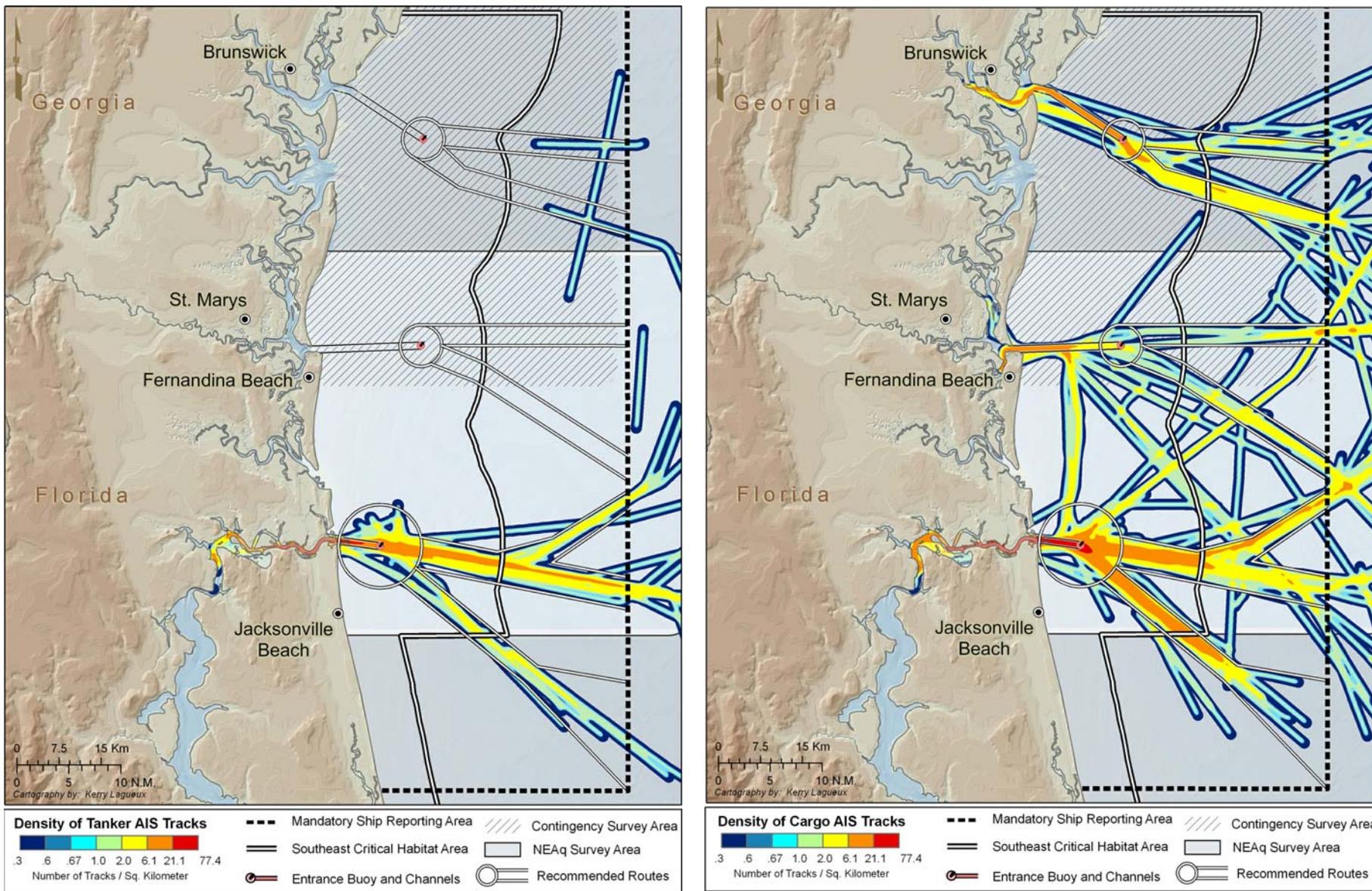


Figure 11. Commercial Shipping Traffic in the Central EWS 2008. Density Tanker vs. Cargo. Projected in Universal Transverse Mercator, Zone 17, using North American Datum 1983.

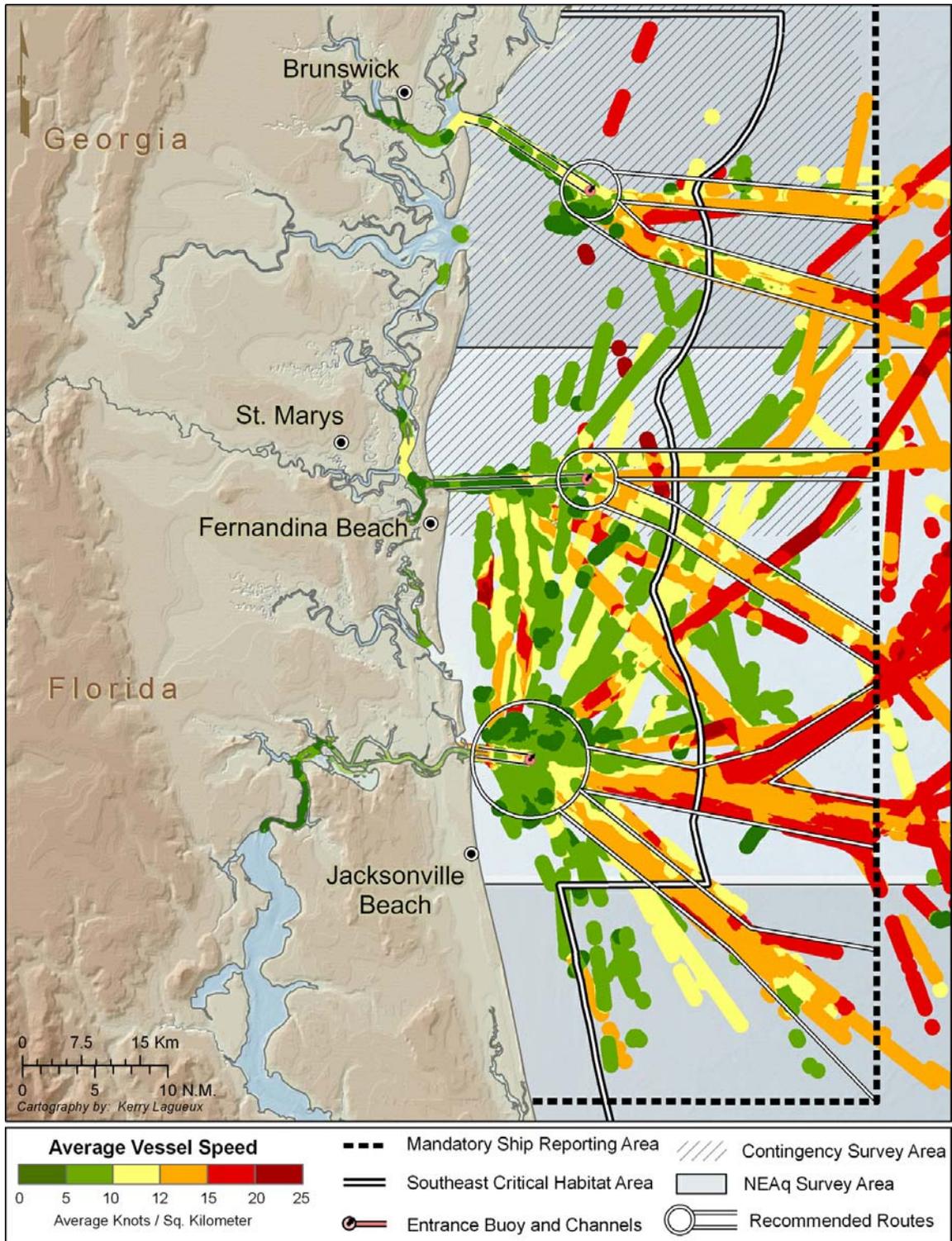


Figure 12. Average Commercial Shipping Traffic Speed (including tugs, dredges and some pilot boats) Central EWS 2008. Projected in Universal Transverse Mercator, Zone 17, using North American Datum 1983.

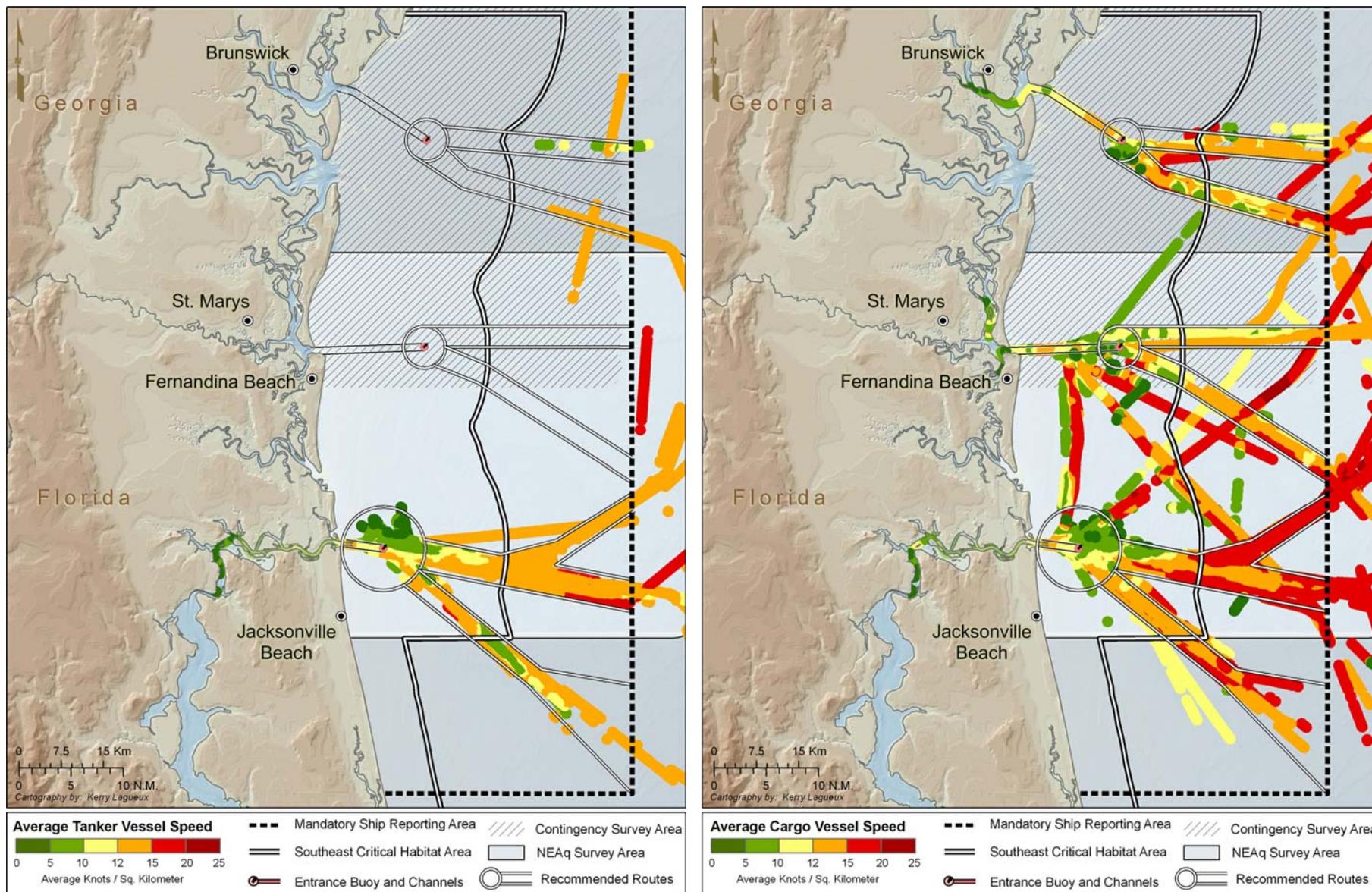


Figure 13. Average Commercial Shipping Traffic Speed in the Central EWS 2008. Tanker vs. Cargo. Projected in Universe Transverse Mercator, Zone 17, using North American Datum 1983.

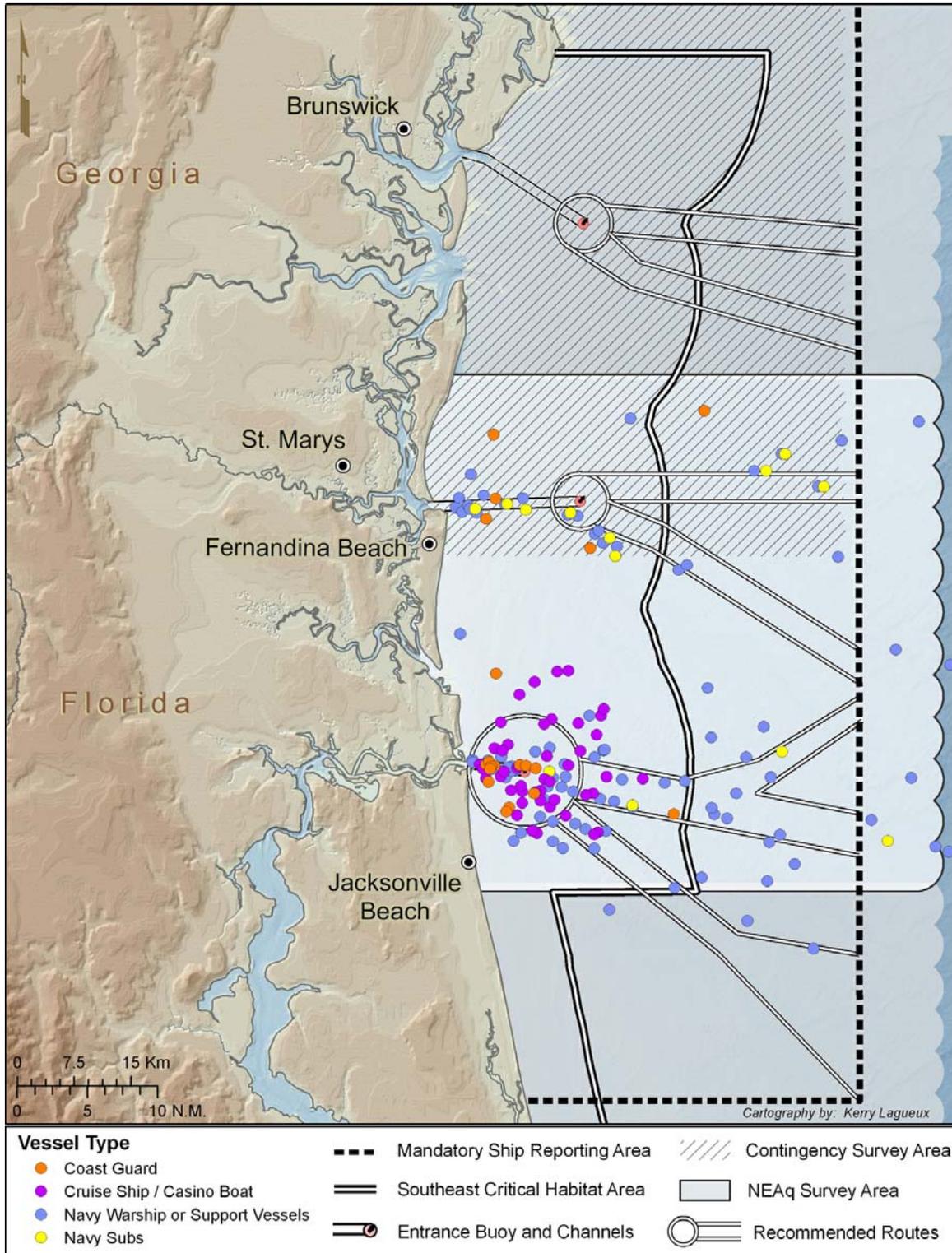


Figure 14. Ship traffic (not required to carry AIS) recorded visually by the Central EWS survey team. Projected in Universe Transverse Mercator, Zone 17, using North American Datum 1983.

Table 5. "Close Call" Vessel/Whale Events in the Central EWS 2008.

Date	Latitude/ Longitude (of the whale)	Origin or Destination of Vessel	Number of Whales	Vessel Type and size (ft)	Communication	Closest Distance (estimated)	Vessels Action/ Whales Reaction
14-Dec-07	30.39365 -81.17597	Inbound the St. Johns River Entrance	2	21-24ft. Recreational Boat	N/A	~ 100 meters	Vessel was inbound for the St John at a slow speed. It appeared the vessel sighted the whales and altered course to get closer. The vessel moved in a parallel direction and motored along side whales. The vessel left soon after because of whale behavior made staying with it difficult. /Whales avoided vessel.
14-Dec-07	30.39365 -81.17597	Inbound for Naval Station Mayport	2	Navy Warship 99	Yes, Marine VHF Ch. 16 and switched to working channel 10.	~ 0.25 nm	The warship was moving slowly at the time of the sighting. Warship altered its course to avoid whales position once contacted by survey team./ No apparent behavior change for the whales.
19-Dec-07	30.76783 -81.34451	Homeport: Fernandina Beach, FL	4	Commercial Fishing (Shrimp boat)	N/A	~ 1-2 meters	The vessel was not engaged in fishing at the time and nets were not in the water. Vessel continued on course with not alteration or speed change./Two whales had no reaction, one whale reacted but only when the vessel was less than a few meters away and the fourth whales reaction is unknown.
28-Dec-08	30.32505 -81.2023	Inbound St. Johns River Entrance	3	Recreational Vessel	Communication attempted on Marine VHF Ch. 16 but vessel did not respond.	~ 200 meters	One whale was lobtailing when the vessel approached./The whale stopped lobtailing once the vessel approached within 200 meters.
10-Jan-08	30.59075 -81.31651	Working St. Marys River Entrance	2	Hopper Dredge	Dredge was hailed on Marine VHF and position of whales was reported. The dredge acknowledged the whale position.	250 meters*	There was no visual change in the whales behavior./ The dredge reduced speed from 10 knots to 5 knots* but did not alter course.
07-Feb-08	30.34253 -81.20372	Inbound St. Johns River Entrance	1	Tanker	Yes, Marine VHF Ch. 16	0.9 nm*	The tanker altered its course/The whale had been breaching and then stopped but began flipper slapping as the tanker approached. .
09-Feb-08	30.38693 -81.2248	Outbound St. Johns River Entrance	1	Recreational Vessel	The vessel was hailed three times but no contact was achieved.	~ 200 meters	The vessel appeared to notice the whale once it got close and slowed down and stopped to watch before the whale dove./The whale dove

Table 5. "Close Call" Vessel/Whale Events in the Central EWS 2008.

14-Feb-08	30.3335 -81.1308	N/A	2 (M/C pair)	Recreational Vessel	The vessel was hailed four times but no contact was achieved.	~ 100 meters	The vessel passed the whales at approx 100 meters and never slowed or altered course/ Whales had no apparent change in behavior. Whales were nursing before and after the vessel passed.
16-Feb-08	30.65 -81.43	Homeport: Fernandina Beach, FL	2 (M/C pair)	Recreational Vessel	The vessel was hailed three times but no contact was achieved.	~ 10-20 meters	Vessel reached the whales location and began to circle the whales position for approximately 20 minutes./ Calf was rolling at the surface before the vessel approached. After the vessel arrived the mom would head lift and sink. The whales direction kept changing but the vessel would follow. This case was forwarded to NOAA Law Enforcement.
24-Feb-08	30.8148 -80.95437	Inbound for the St. Marys River Entrance	2	Cargo Ship	The vessel was hailed on Marine VHF ch. 16. And acknowledged whales reported position.	~ 0.5nm - 1.0 nm	The vessel altered course/no apparent behavior change for the whales.
01-Mar-08	30.62895 -81.12833	N/A	2 (M/C pair)	Tug and Barge	The vessel was hailed on Marine VHF ch. 16. And acknowledged whales reported position.	1.25 nm*	The tug and barge altered its course after radio communication with the survey plane./ No apparent behavior change for the whales.

*Data from AIS

Mortalities and Injuries

Mortalities and injuries that either occurred during the 2008 season or were first documented during the 2008 are summarized below. Mortalities and injuries are broken down into three sections; entanglements, injury and mortality. Table 6 summarizes mortality and injury events during the 2008 season.

Entanglement:

During the 2008 season, EWS survey teams documented two right whales as being entangled. One whale was previously documented as entangled and one was a new entanglement.

On January 29, 2008, a right whale was documented by the Central EWS survey team entangled. The animal had rope through the mouth and trailing along both sides of the animal with extensive scarring (but no gear) around the peduncle. The entangled whale was later identified as #3333, a 5-year old male. The survey team alerted first responder teams before being relieved by the Southern EWS survey team. Unfortunately, the whale was not relocated by the first responders therefore no disentanglement effort was attempted. The whale was later sighted off the coast of Georgia on February 3, 2008 by the Northern EWS team but this time the whale was sighted too far offshore to mount an on-water response.

On February 2, 2008, right whale #3346 was sighted by the Central EWS survey team. Right whale #3346 was first documented entangled off the coast of St. Augustine, FL, in 2004. The animal had multiple body and flipper wraps. It was partially disentangled and has been documented each winter in the SEUS since that time with rope still remaining on his flipper. The whale was sighted on numerous occasions by each of the three EWS survey teams and each team provided photographic documentation of the whale and its current entanglement. No disentanglement attempt was made on this animal as it is listed as a case to monitor (document and photograph) by the Atlantic Large Whale Disentanglement Network, Provincetown Center for Coastal Studies.

Injury:

On January 29, 2008, the Central EWS survey team document a whale that appeared to have had extensive scarring and wounds on it head, back, peduncle, fluke and chin (figure 15). The whale was later identified as #3530, a male of unknown age. The New England Aquarium confirmed that #3530 had last been sighted by a NMFS survey off the coast of New England on December 19, 2007. The type of wounds and scarring documented indicate this whale had been badly entangled but became free of the entangling gear. Right whale #3530 was documented on numerous occasions during the 2008 season by both by the Central EWS survey team and by on water first response teams.



Photo: Kara Mahoney/New England Aquarium

Figure 15: Right Whale #3530 was first documented with extensive wounds on January 29, 2008 by the Central EWS team.

Other Mortalities:

On December 5, 2007 the Central EWS team documented right whale #1301 with a calf. Right whale #1301 is a 25-year old female and has had four calves (including the December 5, 2007 calf). On December 18, 2007, #1301 was again documented by the Central EWS team but was without her calf. Subsequently she was documented a number of times in the SEUS in 2008 and in Cape Cod Bay in the spring of 2008 without her calf. Sometime between December 5 and December 18, 2007 #1301 lost her calf and a carcass was never found and causes for this loss are unknown.

On January 25, 2008 a male right whale calf carcass washed up on Ormond Beach, FL. The calf died of natural causes and the identification of it's mother is unknown.

On February 8, 2008 right whale #3180 was documented with a calf by the Northern EWS team. Right whale #3180 is a seven-year old female and this was her first calf. She was documented again on February 14, 2008 without her calf.

On February 15, 2008 a male right whale calf was found on Huguenot State Park, Jacksonville, FL. The calf died of natural causes and it is unclear if this could be the carcass of #3180's calf.

Table 6. Entanglement, Injury and Mortality.

Entanglements

Date	Event	Fatal	Right Whale	Sex	Age	Notes
29-Jan-08	First documentation of Entanglement	N/A	#3333	M	5	Appears to be gear free in May 2008 sightings in Great South Channel, MA
02-Feb-08	First SEUS 2008 sightings of #3346 "Kingfisher"	N/A	#3346	M	5	Known Entanglement

Injury

Date	Event	Fatal	Right Whale	Sex	Age	Notes
29-Jan-08	First Documentation of Injury	N/A	#3530	M	U	Whale last seen April in Cape Cod Bay, MA

Other Mortality

Date	Event	Fatal	Right Whale	Sex	Age	Notes
18-Dec-07	Loss of Calf	Yes	2008 Calf of #1301	Unknown	Calf	Lost calf sometime between 12/5 and 12/18
25-Jan-08	Dead Calf	Yes	Unknown	M	Calf	Carcass on Ormond Beach, FL
14-Feb-08	Loss of Calf	Yes	2008 Calf of #3180	Unknown	Calf	Lost calf sometime between 2/8 and 2/14
15-Feb-08	Dead Calf	Yes	Unknown*	M	Calf	Carcass on Huguenot Beach, Jacksonville, FL

* It is possible that the calf found on Huguenot Beach is the 2008 calf of 3180

Discussion

The coastal waters of the Florida and Georgia and possibly the Carolinas are currently the only known calving ground for the North Atlantic right whale. For nearly 15 years there has been extensive survey effort in the heart of the calving ground (Georgia and Florida) in the form of Early Warning System (EWS) surveys. Originally, the EWS surveys were designed to reduce the potential for ship strikes in the calving ground. However, over the past 14 years, in addition to the main objective of the EWS, these surveys have contributed thousands of photo-documented right whale sightings. These data play an integral role in the understanding of habitat use, demographics and reproductive levels.

Using contributed data from all survey groups; identification of all right whales photographed in the southeast in 2008 is currently being conducted. These data provide a better understanding of how the critical habitat and adjacent areas in the SEUS are being utilized by the population throughout the winter. At least 18 of the known 20 M/C pairs are known to have been in the EWS survey area. Of the 18 M/C pairs observed, three (17%) had previously calved in 2006 (although in all three cases, their 2006 calves died within months after their birth), seven (39%) had previously calved in 2005, two (11%) had previously calved in 2004 and six (33%) had never calved before. Of the 12 females with multiple calvings, only two (11%) had a calving interval higher than 3 years (4 years). The Central EWS teams documented 17 (85%) of the 20 known M/C pairs. The mean calving interval using preliminary, contributed data for all known M/C pairs in all regions in 2008 is 3.0 years, which indicates an improvement when compared to the average documented in the late 1990's. The mean calving interval for this population between 1993-1998 was over 5 years (Kraus et al., 2001) and had increased from a 3.67 year average between 1980-1992 (Knowlton et al., 1994).

Of the 18 mothers documented in the EWS survey area, 12 are of known age ranging from 6 to 26 years of age with a mean of 18.0 years. Of the six females in the EWS survey area that calved for the first time one (17%) was age 11, two (33%) were age 7, one (17%) was age 6 and 2 (33%) were of unknown age. Of the two calving females never documented (with their calf) within the EWS survey area neither are of known age.

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

The teamwork and active participation of many agencies and interests is essential to the effectiveness of these surveys in mitigating collisions with right whales. The ability of the survey teams to alert their ground contact from as far as 30-35 nmi from

shore is the crucial catalyst to this network. Each survey teams' ground contact acknowledges the right whale sighting information from the survey aircraft and initiates many notifications via pagers. U.S. Coast Guard (USCG) Office of Aids to Navigation in Miami transmits right whale sighting information via NAVTEX. The USCG also transmits Notices to Mariners over VHF marine-band radio while the survey teams' ground contact updates the Mandatory Ship Reporting (MSR) System. Simultaneously, the Harbor Pilot Associations at the ports of Jacksonville, Fernandina, Brunswick and Savannah monitor pagers, cell phones, or email for information transmitted by the survey teams or FACSFACJAX and relay this information to ships being piloted to/from their respective ports. This transmission of near-real time data, which propels a chain reaction of alerts and notifications along the coastline of the southeastern U.S., is what distinguishes these aerial surveys as a potentially meaningful conservation tool. Yet, this tool for collision mitigation has limitations on many fronts. First, reduced visibility and weather too severe for survey aircraft to be launched result in numerous days with no survey effort. In turn, near real-time sightings cannot be provided to vessels every day. Second, in order for this effort to be effective, vessel operators must take measures to reduce the risk of a strike from occurring whenever transiting through the calving ground whether sightings are available or not. Third, the information provided to vessels that are outbound from a port in the critical habitat is limited to NAVTEX messages (which provide information every 4 hours) as opposed to the near real-time data provided by the MSR System for incoming vessels. Fourth, the EWS system has not been proven as an effective measure in preventing vessel strikes from smaller, recreational vessels that typically operate at fast speeds.

A review of the mortality and injury data maintained by the New England Aquarium show a total of 79 mortalities and 100 serious injuries documented between 1970 and the present (Knowlton and Kraus 2001; NEAq unpublished data). 28 of the 79 (35%) mortalities were the result of ship strikes and 9 (11%) were caused by entanglement. The remainder were either of unknown cause or neonates. Twenty-nine of the 79 (37%) mortalities have occurred in the southeast region from South Carolina to Texas including 6 ship strikes, 1 entanglement, 4 unknown cause, and 18 calves.

Tracking the geographic area of where an injury interaction from vessel strike or entanglement occurred is harder to discern as the animals are still alive and can swim long distances with their injury. Of the 100 injuries (61 entanglement, 38 vessel strike and 1 unknown), 6 entanglement and 8 vessel strikes were initially documented in the Southeast U.S. At least one of the entanglements and 7 of the vessel strikes were known to have occurred in the Southeast region.

During the 2008 season, no vessel strikes were documented in the SEUS. Until several years pass without any documented strikes and vessel speeds throughout the critical habitat are reduced, all the present efforts need to be continued in order to provide the best chance for mitigating risk.

In conclusion the implementation of a system that is not based on the ability of a survey team to visually locate, on a daily basis, the location of all right whales is needed in the calving ground to protect right whales from vessel collisions. Aerial surveys should be recognized as a tool for collecting data on the distribution and occurrence of right whales but not as a system that can consistently prevent commercial or recreational vessel strikes over an extended period of time. The communication of right whale sightings from the EWS surveys to the shipping community has likely reduced the potential for ship strikes through continuing education and increased awareness of mariners as well as proactive measures taken by some organizations and federal agencies to reduce their risk of striking a whale. Yet, it is not an infallible plan to eliminate vessel strikes to right whales in the southeast U.S. The joint efforts by the survey teams, NMFS, Navy, USCG and ACOE to monitor and implement protective measures in this only known calving ground must continue in order to protect this most vulnerable segment of the population and allow this population to grow and thrive.

REFERENCES CITED

Brown, M. W., S. D. Kraus, D. E. Gaskin, and B. N. White. 1994. Sexual composition and analysis of reproductive females in the North Atlantic right whale (*Eubalaena glacialis*), population. *Mar. Mamm. Sci.* 10: 253-265.

Hamilton, P. K. 2002. Associations among North Atlantic Right Whales. M. S. Thesis. University of Massachusetts, Boston.

Knowlton, A.R., S.D. Kraus, and R.D. Kenney. 1994. Reproduction in North Atlantic right whales (*Eubalaena glacialis*). *Canadian Journal of Zoology*. Vol. 72:1297-1305.

Knowlton, A.R., 1997. The Regulation of Shipping to Protect North Atlantic Right Whales: Need and Feasibility. For Master of Marine Affairs degree, University of Rhode Island. 188 pp.

Knowlton, A. R., S. D. Kraus. 2001. Mortality and serious injury of northern right whales (*Eubalaena glacialis*) in the western North Atlantic Ocean. *Journal of Cetacean Research and Management (special issue 2)*: 193-208.

Kraus, S. D., K. E. Moore, C. E. Price, M. J. Crone, W. A. Watkins, H. E. Winn and J. H. Prescott. 1986. "The Use of Photographs to Identify Individual North Atlantic Right Whales (*Eubalaena glacialis*)," pp. 145-151, *Right Whales: Past and Present Status*, Special Issue No.10. Reports of the International Whaling Commission, Cambridge, England.

Kraus, S. D., P. K. Hamilton, R. D. Kenney, A. R. Knowlton and C. K. Slay. 2001. Reproductive Parameters of the North Atlantic right whale. *Journal of Cetacean Research and Management (special issue) 2*: 231-236.

Laist, D. W., A. R. Knowlton, J. G. Mead, A. S. Collet, and M. Podesta. 2001. Collisions between ships and whales. *Mar. Mamm. Sci.* 17(1): 35-75.

Pace III, R. M., S. D. Kraus, P. K. Hamilton, A. R. Knowlton. Life on the Edge : Examining North Atlantic Right Whale Population Viability Using Updated Reproduction Data and Survival Estimates. Oral Presentation 17th Biennial Conference on the Biology of Marine Mammals. Cape Town, South Africa. November 29-December 3, 2007.

Payne, R., O. Brazier, E. M. Dorsey, J. S. Perkins, V. J. Rowntree, and A. Titus. 1983. "External features in southern right whales (*Eubalaena australis*) and their use in identifying individuals," pp. 371-445 in R. Payne, ed., *Communication and Behavior of Whales*. Westview Press. Boulder, CO.

Vanderlaan, A. S. M. and C. T. Taggart. 2006. Vessel Collisions with Whales: The Probability of Lethal Injury Based on Vessel Speed. *Mar. Mamm. Sci.* 23 (1): 144-156.

Ward-Geiger, L. I., G. K. Silber, R. D. Baumstark and T. L. Pulfer. 2005. Characterization of Ship Traffic in Right Whale Critical Habitat. *Coastal Management*. 33: 263-278.

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FACSFAC JAX, Naval Air Station Jacksonville went to great lengths to keep the system running efficiently with whale sightings from dredges and military vessels. The U.S. Coast Guard group Mayport and station Brunswick displayed a great willingness to help with the effort, as did the U.S. Army Corps of Engineers, South Atlantic Division and the U.S. Navy. On more than one occasion during the 2008 season the cooperation of the St. Johns Bar pilots and the Cumberland Sound pilots and the Brunswick Bar pilots was invaluable. The assistance of Barb Zoodsma of NOAA Fisheries was greatly appreciated through out the course of the season as well Clay George of Georgia Department of Natural Resources and Tom Pitchford of Florida Conservation Commission (FWRI). The coordination among the various aerial survey teams is of extreme importance and we thank the dedication and support from Tricia Naessig, of Wildlife Trust, and Katie Jackson, of FWRI and their hardworking observers.

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Appendix 1: IMO Carriage Requirement

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

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

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

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

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

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
1301		2007	12	5	1120	A	30.57763	81.37653	NEA/A	FL	NURS, W/CALF
	2008 Calf of 1301	2007	12	5	1120	B	30.57763	81.37653	NEA/A	FL	CALF W/MOM, NURS
2790		2007	12	9	1025	A	30.84163	81.29742	NEA/A	GA	
3314		2007	12	9	1030	B	30.83322	81.29622	NEA/A	GA	BODO
3293		2007	12	9	1030	C	30.83322	81.29622	NEA/A	GA	BODO
1243		2007	12	9	1038	D	30.83108	81.28343	NEA/A	GA	
2614		2007	12	14	1508	A	30.39365	81.17597	NEA/A	FL	NURS, W/YRLG
	2007 Calf of 2614	2007	12	14	1508	B	30.39365	81.17597	NEA/A	FL	NURS, YRLG W/MOM
		2007	12	18	1324	#1	30.6585	81.20724	NEA/A	FL	
3314		2007	12	18	1324	A	30.6585	81.20724	NEA/A	FL	
3513		2007	12	18	1324	B	30.6585	81.20724	NEA/A	FL	
3240		2007	12	19	1013	A	30.78497	81.3043	NEA/A	GA	
3314		2007	12	19	1015	C	30.76558	81.33089	NEA/A	GA	BOD CNT
3513		2007	12	19	1015	D	30.76558	81.33089	NEA/A	GA	BOD CNT
		2007	12	19	1015	E	30.76558	81.33089	NEA/A	GA	BOD CNT
3520		2007	12	19	1027	B	30.76525	81.32755	NEA/A	GA	
3314		2007	12	19	1127	F	30.76783	81.34451	NEA/A	GA	AGG VSL
		2007	12	19	1127	G	30.76783	81.34451	NEA/A	GA	AGG VSL, BLK BEL, ROLL

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
3520		2007	12	19	1127	H	30.76783	81.34451	NEA/A	GA	AGG VSL
3513		2007	12	19	1127	I	30.76783	81.34451	NEA/A	GA	AGG VSL
2753		2007	12	20	0934	A	30.28934	81.37762	NEA/A	FL	BOD CNT, BODO, W/CALF
	2008 Calf of 2753	2007	12	20	0934	B	30.28934	81.37762	NEA/A	FL	BOD CNT, BODO, CALF W/MOM, WH CHN
2790		2007	12	27	1041	A	30.32505	81.2023	NEA/A	FL	LBTL
1241		2007	12	27	1041	B	30.32505	81.2023	NEA/A	FL	WH CHN
1703		2007	12	27	1041	C	30.32505	81.2023	NEA/A	FL	
		2007	12	27	1127	D	30.4845	81.19946	NEA/A	FL	
2790		2007	12	27	1622	E	30.27976	81.14172	NEA/A	FL	
3513		2007	12	28	1133	A	30.38864	81.26646	NEA/A	FL	BODO
3405		2007	12	28	1133	B	30.38864	81.26646	NEA/A	FL	BODO
3292		2007	12	28	1246	C	30.83145	81.24738	NEA/A	GA	BODO, RACE
		2007	12	28	1335	D	30.78217	81.38474	NEA/A	GA	BODO
1301		2007	12	28	1343	E	30.77712	81.3718	NEA/A	GA	
3513		2007	12	29	1314	A	30.76798	81.32632	NEA/A	GA	LOG
3405		2007	12	29	1314	B	30.76798	81.32632	NEA/A	GA	LOG

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
1301		2007	12	29	1359	C	30.5593	81.3586	NEA/A	FL	LOG
	2007 Calf of 3360	2007	12	29	1406	D	30.52225	81.25924	NEA/A	FL	ROLL, YRLG W/MOM
3360		2007	12	29	1406	E	30.52225	81.25924	NEA/A	FL	W/YRLG
	2006 Calf of 1946	2007	12	29	1500	F	30.34867	81.3111	NEA/A	FL	
3520		2007	12	29	1500	G	30.34867	81.3111	NEA/A	FL	
3292		2007	12	30	1214	A	30.66714	81.34372	NEA/A	FL	W/CALF
	2008 Calf of 3292	2007	12	30	1214	B	30.66714	81.34372	NEA/A	FL	
3520		2007	12	30	1244	C	30.69162	81.25671	NEA/A	FL	
	2006 Calf of 1946	2007	12	30	1244	D	30.69162	81.25671	NEA/A	FL	
3430		2008	1	1	1057	A	30.63618	81.2845	NEA/A	FL	SAG
		2008	1	1	1057	B	30.63618	81.2845	NEA/A	FL	SAG
3421		2008	1	1	1057	C	30.63618	81.2845	NEA/A	FL	SAG
1622		2008	1	6	1129	A	30.42867	81.39648	NEA/A	FL	BOD CNT, BODO, W/CALF
	2008 Calf of 1622	2008	1	6	1129	B	30.42867	81.39648	NEA/A	FL	BOD CNT, BODO, CALF W/MOM
2042		2008	1	6	1224	C	30.4069	81.30128	NEA/A	FL	BODO
3103		2008	1	6	1224	D	30.4069	81.30128	NEA/A	FL	BODO
1622		2008	1	7	1044	A	30.5505	81.43739	NEA/A	FL	BOD CNT, W/CALF

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
	2008 Calf of 1622	2008	1	7	1044	B	30.5505	81.43739	NEA/A	FL	BOD CNT, CALF W/MOM
	2007 Calf of 2645	2008	1	7	1052	C	30.67063	81.42788	NEA/A	FL	BODO, FLIP
3292		2008	1	7	1256	D	30.28463	81.24814	NEA/A	FL	W/CALF
	2008 Calf of 3292	2008	1	7	1256	E	30.28463	81.24814	NEA/A	FL	CALF W/MOM
1622		2008	1	7	1402	F	30.57427	81.43513	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 1622	2008	1	7	1402	G	30.57427	81.43513	NEA/A	FL	BOD CNT, CALF W/MOM
3142		2008	1	7	1545	H	30.62488	81.29194	NEA/A	FL	BODO, WH CHN
3240		2008	1	7	1545	I	30.62488	81.29194	NEA/A	FL	BODO
1622		2008	1	8	1056	A	30.53625	81.43117	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 1622	2008	1	8	1056	B	30.53625	81.43117	NEA/A	FL	BOD CNT, CALF W/MOM, ROLL
1622		2008	1	8	1249	C	30.5285	81.40962	NEA/A	FL	NURS, W/CALF
	2008 Calf of 1622	2008	1	8	1249	D	30.5285	81.40962	NEA/A	FL	CALF W/MOM, NURS
3293		2008	1	8	1511	E	30.2397	81.22865	NEA/A	FL	BODO
1802		2008	1	8	1604	F	30.37175	81.29099	NEA/A	FL	W/CALF
	2008 Calf of 1802	2008	1	8	1604	G	30.37175	81.29009	NEA/A	FL	CALF W/MOM, POST
1622		2008	1	9	0944	A	30.70743	81.33286	NEA/A	FL	BOD CNT, BODO, NURS, W/CALF
	2008 Calf of 1622	2008	1	9	0944	B	30.70743	81.33286	NEA/A	FL	BOD CNT, BODO, CALF W/MOM, NURS

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
3293		2008	1	9	1114	C	30.71298	81.26185	NEA/A	GA	
1622		2008	1	9	1153	D	30.72848	81.32583	NEA/A	GA	CHN BRCH, W/CALF
	2008 Calf of 1622	2008	1	9	1153	E	30.72848	81.32583	NEA/A	GA	CALF W/MOM
2753		2008	1	9	1215	F	30.38934	81.37402	NEA/A	FL	W/CALF
	2008 Calf of 2753	2008	1	9	1215	G	30.38934	81.37402	NEA/A	FL	CALF W/MOM
2753		2008	1	9	1449	H	30.37533	81.36985	NEA/A	FL	W/CALF
	2008 Calf of 2753	2008	1	9	1449	I	30.37533	81.36985	NEA/A	FL	CALF W/MOM
1622		2008	1	10	1052	A	30.70895	81.20027	NEA/A	GA	BOD CNT, BODO, W/CALF
	2008 Calf of 1622	2008	1	10	1052	B	30.70895	81.40047	NEA/A	GA	BOD CNT, BODO, CALF W/MOM
2753		2008	1	10	1117	C	30.3091	81.37777	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 2753	2008	1	10	1117	D	30.3091	81.37777	NEA/A	FL	BOD CNT, CALF W/MOM
3142		2008	1	10	1259	E	30.59075	81.31651	NEA/A	FL	BODO
3240		2008	1	10	1259	F	30.59075	81.31651	NEA/A	FL	BODO
1622		2008	1	11	0910	A	30.58503	81.44055	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 1622	2008	1	11	0910	B	30.58503	81.44055	NEA/A	FL	BOD CNT, CALF W/MOM
2790		2008	1	11	1608	C	30.29322	81.14905	NEA/A	FL	
1703		2008	1	11	1608	D	30.29322	81.14905	NEA/A	FL	

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
		2008	1	14	1125	A	30.48855	81.3605	NEA/A	FL	SAG
	2006 Calf of 1946	2008	1	14	1125	B	30.48855	81.3605	NEA/A	FL	SAG
3550		2008	1	14	1125	C	30.48855	81.3605	NEA/A	FL	SAG
	BK03BOF07	2008	1	14	1125	D	30.48855	81.3605	NEA/A	FL	SAG
3545		2008	1	15	1059	A	30.54955	81.26733	NEA/A	FL	SAG
3405		2008	1	15	1059	B	30.54955	81.26733	NEA/A	FL	SAG
		2008	1	15	1059	C	30.54955	81.26733	NEA/A	FL	SAG
3550		2008	1	15	1059	D	30.54955	81.26733	NEA/A	FL	SAG
3314		2008	1	15	1105	E	30.54838	81.26103	NEA/A	FL	
		2008	1	15	1105	F	30.54838	81.26103	NEA/A	FL	
		2008	1	15	1105	G	30.54838	81.26103	NEA/A	FL	
		2008	1	15	1105	H	30.54838	81.26103	NEA/A	FL	
1243		2008	1	15	1244	I	30.76803	81.39986	NEA/A	GA	BEL UP, W/CALF
	2008 Calf of 1243	2008	1	15	1244	J	30.76803	81.39986	NEA/A	GA	CALF W/MOM
3180		2008	1	22	1035	A	31.03657	81.0503	NEA/A	GA	
1703		2008	1	22	1048	B	30.958	81.02905	NEA/A	GA	BRCH, MOPN
3293		2008	1	24	1133	A	30.5357	81.2661	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 3293	2008	1	24	1133	B	30.5357	81.2661	NEA/A	FL	BOD CNT, CALF W/MOM

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
	BK01CCB08	2008	1	24	1205	C	30.52893	81.13815	NEA/A	FL	SAG
3423		2008	1	24	1205	D	30.52893	81.13815	NEA/A	FL	SAG
		2008	1	24	1205	E	30.52893	81.13815	NEA/A	FL	
	BK03BOF07	2008	1	24	1205	F	30.52893	81.13815	NEA/A	FL	
3103		2008	1	24	1325	G	30.5775	81.21413	NEA/A	FL	LOG
2042		2008	1	24	1325	H	30.5775	81.21413	NEA/A	FL	LOG
		2008	1	24	1332	I	30.51597	81.108	NEA/A	FL	LBTL
	BK03BOF07	2008	1	24	1338	J	30.53143	81.10347	NEA/A	FL	
3423		2008	1	24	1338	K	30.53143	81.10347	NEA/A	FL	SAG
		2008	1	24	1338	L	30.53143	81.10347	NEA/A	FL	SAG
	BK01CCB08	2008	1	24	1338	M	30.53143	81.10347	NEA/A	FL	SAG
2920		2008	1	24	1430	#1	30.45192	81.13289	NEA/A	FL	SAG
3579		2008	1	24	1430	N	30.45192	81.13289	NEA/A	FL	APPR
3540		2008	1	24	1430	O	30.45192	81.13289	NEA/A	FL	
3460		2008	1	24	1430	P	30.45192	81.13289	NEA/A	FL	SAG
3541		2008	1	24	1430	Q	30.45192	81.13289	NEA/A	FL	
		2008	1	24	1430	R	30.45192	81.13289	NEA/A	FL	SAG
3623		2008	1	24	1430	S	30.45192	81.13289	NEA/A	FL	SAG, WH CHN

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
		2008	1	24	1430	U	30.45192	81.13289	NEA/A	FL	
		2008	1	24	1430	V	30.45192	81.13289	NEA/A	FL	SAG
3294		2008	1	24	1509	W	30.38323	81.21932	NEA/A	FL	
		2008	1	28	1006	A	30.74337	81.19024	NEA/A	GA	BODO
		2008	1	28	1018	B	30.74185	81.19014	NEA/A	GA	BODO, SAG
3623		2008	1	28	1018	C	30.74185	81.19014	NEA/A	GA	BODO, SAG
3540		2008	1	28	1018	D	30.74185	81.19014	NEA/A	GA	BODO, SAG
	SE07BK08	2008	1	28	1018	E	30.74185	81.19014	NEA/A	GA	BODO, SAG
		2008	1	28	1033	F	30.75022	81.18185	NEA/A	GA	
3460		2008	1	28	1033	G	30.75022	81.18185	NEA/A	GA	
		2008	1	28	1222	#1	30.32056	81.16093	NEA/A	FL	
3541		2008	1	28	1222	#2	30.32056	81.16093	NEA/A	FL	
		2008	1	28	1222	H	30.32302	81.1621	NEA/A	FL	
3230		2008	1	28	1222	I	30.32056	81.16093	NEA/A	FL	SAG
		2008	1	28	1222	J	30.32056	81.16093	NEA/A	FL	SAG
		2008	1	28	1222	K	30.32056	81.16093	NEA/A	FL	SAG
1603		2008	1	28	1222	L	30.32056	81.16093	NEA/A	FL	SAG
		2008	1	28	1249	M	30.36767	81.16222	NEA/A	FL	W/UNPH EG

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
2330		2008	1	28	1257	P	30.36877	81.17495	NEA/A	FL	W/CALF
	2008 Calf of 2330	2008	1	28	1257	Q	30.36877	81.17495	NEA/A	FL	CALF W/MOM
		2008	1	28	1301	R	30.37652	81.16855	NEA/A	FL	
3423		2008	1	29	1006	A	30.35064	81.16495	NEA/A	FL	SAG
2920		2008	1	29	1006	B	30.35064	81.16495	NEA/A	FL	SAG, UW EXH
		2008	1	29	1006	C	30.35064	81.16495	NEA/A	FL	SAG
	2006 CALF of 1611	2008	1	29	1022	D	30.34332	81.16786	NEA/A	FL	
3530		2008	1	29	1028	E	30.35365	81.17933	NEA/A	FL	WH CHN
	2006 CALF of 1611	2008	1	29	1047	F	30.34781	81.17135	NEA/A	FL	
		2008	1	29	1137	G	30.43352	81.23779	NEA/A	FL	LBTL
		2008	1	29	1137	H	30.43352	81.23779	NEA/A	FL	
3603		2008	1	29	1147	I	30.44935	81.25155	NEA/A	FL	BEL UP, BEL/BEL, BLK BEL, BLK CHN, BOD CNT
3541		2008	1	29	1147	J	30.44935	81.25155	NEA/A	FL	BEL/BEL, BOD CNT, WH BEL, WH CHN
		2008	1	29	1153	K	30.4605	81.25372	NEA/A	FL	LOG
		2008	1	29	1153	L	30.4605	81.25372	NEA/A	FL	LOG
3314		2008	1	29	1227	#1	30.45855	81.243	NEA/A	FL	

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
3333		2008	1	29	1227	M	30.45855	81.243	NEA/A	FL	FRST ENTGL
3405		2008	1	29	1227	N	30.45855	81.243	NEA/A	FL	
3405		2008	1	29	1309	#2	30.45493	81.26028	NEA/A	FL	SAG
		2008	1	29	1309	O	30.45493	81.26028	NEA/A	FL	SAG
3541		2008	1	29	1309	P	30.45493	81.26028	NEA/A	FL	SAG, WH BEL, WH CHN
		2008	1	29	1309	Q	30.45493	81.26028	NEA/A	FL	BEL/BEL, SAG
3603		2008	1	29	1309	R	30.45493	81.26028	NEA/A	FL	BEL UP, BLK BEL, BLK CHN, SAG
3142		2008	1	29	1659	S	30.59682	81.34824	NEA/A	FL	WH CHN
3240		2008	1	29	1659	T	30.59682	81.34824	NEA/A	FL	
1802		2008	1	31	1001	A	30.41802	81.157	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 1802	2008	1	31	1001	B	30.41802	81.157	NEA/A	FL	BOD CNT, BRCH, CALF W/MOM, ROLL
3293		2008	1	31	1017	C	30.43415	81.14481	NEA/A	FL	BOD CNT, NURS, W/CALF
	2008 Calf of 3293	2008	1	31	1017	D	30.43415	81.14481	NEA/A	FL	BOD CNT, CALF W/MOM, NURS
3130		2008	1	31	1222	E	30.34113	81.28863	NEA/A	FL	BOD CNT, BODO, W/CALF
	2008 Calf of 3130	2008	1	31	1222	F	30.34113	81.28863	NEA/A	FL	BOD CNT, BODO, CALF W/MOM
2330		2008	1	31	1459	G	30.6184	81.17823	NEA/A	FL	BOD CNT, W/CALF

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
	2008 Calf of 2330	2008	1	31	1459	H	30.6184	81.17823	NEA/A	FL	BOD CNT, CALF W/MOM, ROLL
2753		2008	2	2	1000	A	30.35967	81.36743	NEA/A	FL	NURS, W/CALF
	2008 Calf of 2753	2008	2	2	1000	B	30.35967	81.36743	NEA/A	FL	
3530		2008	2	2	1358	C	30.83675	81.04781	NEA/A	GA	
		2008	2	2	1358	D	30.83675	81.04781	NEA/A	GA	
3623		2008	2	2	1358	E	30.83675	81.04781	NEA/A	GA	
	2006 CALF of 1611	2008	2	2	1359	F	30.83737	81.05267	NEA/A	GA	SAG
		2008	2	2	1359	G	30.83737	81.05267	NEA/A	GA	SAG
2920		2008	2	2	1359	H	30.83737	81.05267	NEA/A	GA	SAG
3346		2008	2	2	1434	I	30.83765	81.05614	NEA/A	GA	ENTGL
	BK01CCB08	2008	2	2	1434	J	30.83765	81.05614	NEA/A	GA	
3460		2008	2	2	1437	K	30.85232	81.0528	NEA/A	GA	
1308		2008	2	3	0916	A	30.50143	81.2998	NEA/A	FL	W/CALF
	2008 Calf of 1308	2008	2	3	0916	B	30.50143	81.2998	NEA/A	FL	CALF W/MOM
		2008	2	3	1027	C	30.74018	81.1235	NEA/A	GA	
3230		2008	2	3	1032	D	30.71203	81.092	NEA/A	GA	BEL/BEL, BOD CNT, LBTL
		2008	2	3	1032	E	30.71203	81.092	NEA/A	GA	BEL/BEL, BOD CNT
		2008	2	3	1115	#1	30.66672	81.1426	NEA/A	FL	BODO, SAG

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
	BK03BOF07	2008	2	3	1115	F	30.66672	81.1426	NEA/A	FL	BODO, SAG
3310		2008	2	3	1115	G	30.66672	81.1426	NEA/A	FL	BODO, SAG
		2008	2	3	1115	H	30.66672	81.1426	NEA/A	FL	BODO, SAG
		2008	2	3	1115	I	30.66672	81.1426	NEA/A	FL	BODO, SAG
3346		2008	2	3	1115	J	30.66672	81.1426	NEA/A	FL	BODO, ENTGL, SAG
3541		2008	2	3	1115	K	30.66672	81.1426	NEA/A	FL	BODO, SAG
		2008	2	3	1127	L	30.66263	81.1509	NEA/A	FL	BOD CNT, BODO
		2008	2	3	1127	M	30.66263	81.1509	NEA/A	FL	BOD CNT, BODO
	BK01CCB08	2008	2	3	1147	N	30.66644	81.1359	NEA/A	FL	
		2008	2	3	1207	O	30.62468	81.1582	NEA/A	FL	
2920		2008	2	3	1233	P	30.59185	81.2212	NEA/A	FL	LBTL
	2006 CALF of 1611	2008	2	3	1257	Q	30.57903	81.2308	NEA/A	FL	
	2006 Calf of 1946	2008	2	3	1259	R	30.59299	81.2231	NEA/A	FL	BODO, SAG
		2008	2	3	1259	S	30.59299	81.2231	NEA/A	FL	BODO, SAG
	2006 CALF of 1611	2008	2	3	1259	T	30.59299	81.2231	NEA/A	FL	BODO, SAG
3530		2008	2	3	1303	U	30.59803	81.2055	NEA/A	FL	SAG
		2008	2	3	1303	V	30.59803	81.2055	NEA/A	FL	SAG
	CT01SEUS05	2008	2	3	1303	W	30.59803	81.2055	NEA/A	FL	SAG

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
2920		2008	2	3	1303	X	30.59803	81.2055	NEA/A	FL	SAG
1308		2008	2	3	1432	Y	30.53175	81.3504	NEA/A	FL	W/CALF
	2008 Calf of 1308	2008	2	3	1432	Z	30.53175	81.3504	NEA/A	FL	CALF W/MOM
3123		2008	2	3	1448	AA	30.52179	81.2956	NEA/A	FL	
3142		2008	2	3	1506	BB	30.55637	81.3076	NEA/A	FL	
3240		2008	2	3	1506	CC	30.55637	81.3076	NEA/A	FL	
1802		2008	2	3	1527	DD	30.48348	81.2165	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 1802	2008	2	3	1527	EE	30.48348	81.2165	NEA/A	FL	BOD CNT, CALF W/MOM
3130		2008	2	3	1543	FF	30.42267	81.2349	NEA/A	FL	W/CALF
	2008 Calf of 3130	2008	2	3	1543	GG	30.42267	81.2349	NEA/A	FL	CALF W/MOM
3103		2008	2	5	1346	A	30.3542	81.30439	NEA/A	FL	WH CHN
2042		2008	2	5	1346	B	30.3542	81.30439	NEA/A	FL	
	BK57	2008	2	5	1443	C	30.47827	81.19095	NEA/A	FL	
1243		2008	2	5	1450	D	30.47498	81.21125	NEA/A	FL	W/CALF
	2008 Calf of 1243	2008	2	5	1450	E	30.47498	81.21125	NEA/A	FL	CALF W/MOM
	CT01SEUS05	2008	2	5	1523	F	30.55572	81.321	NEA/A	FL	
3460		2008	2	5	1534	#1	30.55774	81.32115	NEA/A	FL	SAG
	BK01CCB08	2008	2	5	1534	G	30.55774	81.32115	NEA/A	FL	SAG

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
2920		2008	2	5	1534	H	30.55774	81.32115	NEA/A	FL	SAG
		2008	2	5	1534	I	30.55774	81.32115	NEA/A	FL	SAG
2427		2008	2	5	1534	J	30.55774	81.3215	NEA/A	FL	SAG
		2008	2	5	1534	K	30.55774	81.32115	NEA/A	FL	SAG
	BK03BOF07	2008	2	5	1534	L	30.55774	81.32115	NEA/A	FL	APPR, SAG
		2008	2	5	1534	M	30.55774	81.32115	NEA/A	FL	SAG
		2008	2	5	1534	N	30.55774	81.32115	NEA/A	FL	SAG
		2008	2	5	1539	O	30.55472	81.31473	NEA/A	FL	
	2007 Calf of 2614	2008	2	5	1546	P	30.53753	81.31859	NEA/A	FL	SAG
	2006 Calf of 2503	2008	2	5	1546	Q	30.53753	81.31859	NEA/A	FL	SAG
		2008	2	5	1546	R	30.53753	81.31859	NEA/A	FL	SAG
3330		2008	2	5	1547	S	30.54248	81.30528	NEA/A	FL	
		2008	2	5	1622	T	30.63103	81.16223	NEA/A	FL	
		2008	2	5	1647	U	30.69383	81.21128	NEA/A	FL	W/UNPH EG
		2008	2	5	1653	V	30.69328	81.15125	NEA/A	FL	APPR, SAG, W/UNPH EG
3294		2008	2	5	1653	W	30.69328	81.15125	NEA/A	FL	SAG, W/UNPH EG
		2008	2	5	1653	X	30.69328	81.15125	NEA/A	FL	SAG, W/UNPH EG
	BK01BOF07	2008	2	5	1701	AA	30.72634	81.13422	NEA/A	GA	SAG, W/UNPH EG

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
		2008	2	5	1701	BB	30.72634	81.13422	NEA/A	GA	SAG, W/UNPH EG
3503		2008	2	5	1701	Z	30.72634	81.13422	NEA/A	GA	SAG, W/UNPH EG
		2008	2	5	1720	DD	30.79665	81.17492	NEA/A	GA	SAG
		2008	2	5	1720	EE	30.79665	81.17492	NEA/A	GA	SAG
3040		2008	2	6	1144	A	30.57307	81.24606	NEA/A	FL	SAG
3540		2008	2	6	1144	B	30.57307	81.24606	NEA/A	FL	SAG
2427		2008	2	6	1144	C	30.57307	81.24606	NEA/A	FL	SAG
2541		2008	2	6	1144	D	30.57307	81.24606	NEA/A	FL	SAG
		2008	2	6	1144	E	30.57307	81.24606	NEA/A	FL	SAG
3579		2008	2	6	1201	F	30.5941	81.31095	NEA/A	FL	
		2008	2	6	1203	G	30.58882	81.3055	NEA/A	FL	BODO, BRCH
3330		2008	2	6	1214	H	30.59085	81.2941	NEA/A	FL	BODO
	2007 Calf of 2642	2008	2	6	1235	I	30.599	81.37447	NEA/A	FL	
	2007 Calf of 2614	2008	2	6	1238	J	30.5906	81.35322	NEA/A	FL	
3411		2008	2	7	0924	A	30.58045	81.37289	NEA/A	FL	BODO, SAG
		2008	2	7	0924	B	30.58045	81.37289	NEA/A	FL	BODO, SAG
	CT01SEUS05	2008	2	7	0924	C	30.58045	81.37289	NEA/A	FL	BODO, SAG
		2008	2	7	0924	D	30.58045	81.37289	NEA/A	FL	BODO, SAG

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
		2008	2	7	0924	E	30.58045	81.37289	NEA/A	FL	BODO, SAG
		2008	2	7	0930	F	30.58192	81.38865	NEA/A	FL	BODO
3040		2008	2	7	0933	G	30.59332	81.38918	NEA/A	FL	BODO, SAG
3503		2008	2	7	0933	H	30.59332	81.38918	NEA/A	FL	BODO, SAG
	2006 Calf of 1946	2008	2	7	0938	#1	30.59387	81.3807	NEA/A	FL	SAG
3530		2008	2	7	0938	I	30.59387	81.3807	NEA/A	FL	SAG
3579		2008	2	7	0938	J	30.59387	81.3807	NEA/A	FL	SAG
3540		2008	2	7	0938	K	30.59387	81.3807	NEA/A	FL	SAG
		2008	2	7	0947	L	30.57045	81.32065	NEA/A	FL	MOPN
		2008	2	7	1003	#2	30.55893	81.2929	NEA/A	FL	SAG
	BK01BOF07	2008	2	7	1003	M	30.55893	81.2929	NEA/A	FL	
2427		2008	2	7	1003	N	30.55893	81.2929	NEA/A	FL	SAG
	BK01CCB08	2008	2	7	1003	O	30.55893	81.2929	NEA/A	FL	SAG
		2008	2	7	1003	P	30.55893	81.2929	NEA/A	FL	SAG
3310		2008	2	7	1008	Q	30.56897	81.26468	NEA/A	FL	MOPN, SAG, W/UNPH EG
		2008	2	7	1008	S	30.56897	81.26468	NEA/A	FL	SAG, W/UNPH EG
3142		2008	2	7	1107	T	30.68585	81.35178	NEA/A	FL	
3240		2008	2	7	1107	U	30.68585	81.35178	NEA/A	FL	

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
		2008	2	7	1124	V	30.69971	81.21073	NEA/A	FL	
3293		2008	2	7	1220	W	30.80267	81.12244	NEA/A	GA	W/CALF
	2008 Calf of 3293	2008	2	7	1220	X	30.80267	81.12244	NEA/A	GA	CALF W/MOM
	2006 Calf of 2123	2008	2	7	1229	Y	30.76545	81.12218	NEA/A	GA	BRCH
	2008 Calf of 1622	2008	2	7	1406	AA	30.47053	81.39236	NEA/A	FL	CALF W/MOM
1622		2008	2	7	1406	Z	30.47053	81.39236	NEA/A	FL	W/CALF
3292		2008	2	7	1423	BB	30.34253	81.20372	NEA/A	FL	W/CALF
	2008 Calf of 3292	2008	2	7	1423	CC	30.34253	81.20372	NEA/A	FL	CALF W/MOM
2040		2008	2	7	1546	DD	30.46858	81.15286	NEA/A	FL	W/CALF
	2008 Calf of 2040	2008	2	7	1546	EE	30.46858	81.15286	NEA/A	FL	CALF W/MOM
1243		2008	2	7	1602	FF	30.43313	81.34901	NEA/A	FL	W/CALF
	2008 Calf of 1243	2008	2	7	1602	GG	30.43313	81.34901	NEA/A	FL	CALF W/MOM
1622		2008	2	8	0923	A	30.46125	81.40517	NEA/A	FL	BODO, NURS, W/CALF
	2008 Calf of 1622	2008	2	8	0923	B	30.46125	81.40517	NEA/A	FL	BODO, CALF W/MOM, NURS
1802		2008	2	8	1012	C	30.33673	81.2113	NEA/A	FL	W/CALF
	2008 Calf of 1802	2008	2	8	1012	D	30.33673	81.2113	NEA/A	FL	CALF W/MOM
3157		2008	2	8	1056	E	30.42661	81.25905	NEA/A	FL	
		2008	2	8	1056	F	30.42661	81.25905	NEA/A	FL	

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
	CT01SEUS05	2008	2	8	1124	G	30.51437	81.27732	NEA/A	FL	
3503		2008	2	8	1126	H	30.5148	81.27455	NEA/A	FL	
2427		2008	2	8	1126	I	30.5148	81.27455	NEA/A	FL	
	2007 Calf of 2614	2008	2	8	1126	J	30.5148	81.27455	NEA/A	FL	BEL/BEL
3340		2008	2	8	1126	K	30.5148	81.27455	NEA/A	FL	BEL/BEL, WH BEL, WH CHN
	SE07BK08	2008	2	8	1131	L	30.5167	81.28162	NEA/A	FL	
		2008	2	8	1133	M	30.51543	81.28455	NEA/A	FL	
	BK01BOF07	2008	2	8	1137	N	30.50728	81.27145	NEA/A	FL	
	CT01SEUS05	2008	2	8	1142	O	30.50479	81.27804	NEA/A	FL	
3330		2008	2	8	1151	P	30.536	81.30237	NEA/A	FL	RACE, SAG
		2008	2	8	1151	Q	30.536	81.30237	NEA/A	FL	RACE, SAG
		2008	2	8	1151	R	30.536	81.30237	NEA/A	FL	RACE, SAG
		2008	2	8	1151	S	30.536	81.30237	NEA/A	FL	RACE, SAG, WH BEL, WH CHN
		2008	2	8	1203	T	30.54178	81.30628	NEA/A	FL	
2040		2008	2	8	1233	U	30.51958	81.07432	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 2040	2008	2	8	1233	V	30.51958	81.07432	NEA/A	FL	BOD CNT, CALF W/MOM
		2008	2	8	1258	W	30.56023	81.29674	NEA/A	FL	BRCH, LBTL, WH BEL, WH CHN
3540		2008	2	8	1315	X	30.568	81.35313	NEA/A	FL	BOD CNT, BODO

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
		2008	2	8	1315	Y	30.568	81.35313	NEA/A	FL	BOD CNT, BODO
		2008	2	8	1319	AA	30.5501	81.32668	NEA/A	FL	SAG, WH CHN
3310		2008	2	8	1319	BB	30.5501	81.32668	NEA/A	FL	SAG
3346		2008	2	8	1319	CC	30.5501	81.32668	NEA/A	FL	SAG
		2008	2	8	1319	Z	30.5501	81.32668	NEA/A	FL	SAG
	2007 Calf of 2642	2008	2	8	1326	FF	30.54462	81.3271	NEA/A	FL	
		2008	2	8	1441	GG	30.592	81.37064	NEA/A	FL	BOD CNT
		2008	2	8	1441	HH	30.592	81.37064	NEA/A	FL	BOD CNT
		2008	2	8	1441	II	30.592	81.37064	NEA/A	FL	BOD CNT, WH BEL, WH CHN
3460		2008	2	8	1442	JJ	30.5915	81.36935	NEA/A	FL	
3423		2008	2	8	1445	KK	30.59635	81.36568	NEA/A	FL	BOD CNT
	2006 calf of 1950	2008	2	8	1445	LL	30.59635	81.36568	NEA/A	FL	BEL/BEL, WH BEL
2920		2008	2	8	1445	MM	30.59635	81.36568	NEA/A	FL	
3401		2008	2	8	1445	NN	30.59635	81.36568	NEA/A	FL	
1308		2008	2	8	1605	OO	30.75243	81.22292	NEA/A	GA	W/CALF
	2008 Calf of 1308	2008	2	8	1605	PP	30.75243	81.22292	NEA/A	GA	CALF W/MOM
3293		2008	2	8	1615	QQ	30.72265	81.29222	NEA/A	GA	BOD CNT, W/CALF
	2008 Calf of 3293	2008	2	8	1615	RR	30.72265	81.29222	NEA/A	GA	BOD CNT, CALF W/MOM

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
3142		2008	2	9	0940	A	30.36105	81.3154	NEA/A	FL	
3246		2008	2	9	0940	B	30.36105	81.3154	NEA/A	FL	
3010		2008	2	9	0952	C	30.38693	81.22478	NEA/A	FL	
2427		2008	2	9	1001	#1	30.41975	81.18346	NEA/A	FL	SAG, WH BEL
2027		2008	2	9	1001	D	30.41975	81.18346	NEA/A	FL	MALE, SAG
3411		2008	2	9	1001	E	30.41975	81.18346	NEA/A	FL	BEL UP, BLK BEL, BLK CHN, FCL, FEM, SAG
3579		2008	2	9	1008	F	30.41382	81.19981	NEA/A	FL	BOD CNT
3503		2008	2	9	1008	G	30.41382	81.19981	NEA/A	FL	BOD CNT
		2008	2	9	1014	H	30.40647	81.20727	NEA/A	FL	
1243		2008	2	9	1053	I	30.45716	81.32703	NEA/A	FL	BOD CNT, BODO, W/CALF
	2008 Calf of 1243	2008	2	9	1053	J	30.45716	81.32703	NEA/A	FL	BOD CNT, BODO, CALF W/MOM
2790		2008	2	9	1130	K	30.54727	81.11083	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 2790	2008	2	9	1130	L	30.54727	81.11083	NEA/A	FL	BOD CNT, CALF W/MOM
3229		2008	2	9	1139	#2	30.53744	81.24886	NEA/A	FL	WH CHN
3530		2008	2	9	1139	M	30.53744	81.24886	NEA/A	FL	BEL/BEL
		2008	2	9	1139	N	30.53744	81.24886	NEA/A	FL	BEL/BEL
3190		2008	2	9	1139	O	30.53744	81.24886	NEA/A	FL	

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
3541		2008	2	9	1139	P	30.53744	81.24886	NEA/A	FL	WH BEL, WH CHN
3310		2008	2	9	1139	Q	30.53744	81.24886	NEA/A	FL	
2920		2008	2	9	1149	R	30.54113	81.24555	NEA/A	FL	
		2008	2	9	1151	S	30.55083	81.23727	NEA/A	FL	
3466		2008	2	9	1151	T	30.55083	81.23727	NEA/A	FL	
		2008	2	9	1155	U	30.55383	81.25555	NEA/A	FL	
		2008	2	9	1157	#3	30.55065	81.25374	NEA/A	FL	BOD CNT
		2008	2	9	1157	#4	30.55065	81.25374	NEA/A	FL	BOD CNT
3279		2008	2	9	1157	V	30.55065	81.25374	NEA/A	FL	MALE, SAG, WH BEL, WH CHN
3540		2008	2	9	1157	W	30.55065	81.25374	NEA/A	FL	FCL, SAG
		2008	2	9	1157	X	30.55065	81.25374	NEA/A	FL	MALE, SAG
3401		2008	2	9	1159	Y	30.5598	81.25167	NEA/A	FL	MOPN, WH BEL
3229		2008	2	9	1204	AA	30.52893	81.25011	NEA/A	FL	
3310		2008	2	9	1204	Z	30.52893	81.25011	NEA/A	FL	
3460		2008	2	9	1209	BB	30.57642	81.32284	NEA/A	FL	
	2006 calf of 1950	2008	2	9	1209	CC	30.57642	81.32284	NEA/A	FL	BEL UP, BLK BEL, BLK CHN, FCL, FEM, SAG
3423		2008	2	9	1209	DD	30.57642	81.32284	NEA/A	FL	SAG

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
		2008	2	9	1331	EE	30.59101	81.33985	NEA/A	FL	SAG
	2006 Calf of 2503	2008	2	9	1331	FF	30.59101	81.33985	NEA/A	FL	SAG, WH BEL, WH CHN
		2008	2	9	1331	GG	30.59101	81.33985	NEA/A	FL	SAG
		2008	2	9	1332	HH	30.59112	81.33357	NEA/A	FL	
	2006 Calf of 1946	2008	2	9	1333	II	30.60605	81.34997	NEA/A	FL	
3346		2008	2	9	1358	JJ	30.59043	81.33363	NEA/A	FL	ENTGL
3293		2008	2	9	1500	KK	30.67488	81.26062	NEA/A	FL	W/CALF
	2008 Calf of 1243	2008	2	9	1500	LL	30.67488	81.26062	NEA/A	FL	CALF W/MOM
1308		2008	2	9	1544	MM	30.80533	81.31644	NEA/A	GA	BOD CNT, W/CALF
	2008 Calf of 1243	2008	2	9	1544	NN	30.80533	81.31644	NEA/A	GA	BOD CNT, CALF W/MOM
1243		2008	2	11	1208	A	30.31892	81.29402	NEA/A	FL	BOD CNT, LBTL, NURS, W/CALF
	2008 Calf of 1243	2008	2	11	1208	B	30.31892	81.29402	NEA/A	FL	BOD CNT, BRCH, CALF W/MOM, NURS
1802		2008	2	12	1003	A	30.33983	81.1722	NEA/A	FL	W/CALF, WH CHN
	2008 Calf of 1802	2008	2	12	1003	B	30.33983	81.1722	NEA/A	FL	CALF W/MOM
3240		2008	2	12	1015	C	30.33353	81.34843	NEA/A	FL	BODO
3142		2008	2	12	1015	D	30.33353	81.34843	NEA/A	FL	BODO
3293		2008	2	12	1024	E	30.32553	81.34795	NEA/A	FL	BODO, W/CALF

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
	2008 Calf of 3293	2008	2	12	1024	F	30.32553	81.34795	NEA/A	FL	BODO, CALF W/MOM
3130		2008	2	12	1332	G	30.67675	81.32442	NEA/A	FL	W/CALF
	2008 Calf of 3130	2008	2	12	1332	H	30.67675	81.32442	NEA/A	FL	CALF W/MOM
2330		2008	2	12	1424	I	30.73829	81.3091	NEA/A	GA	W/CALF
	2008 Calf of 2330	2008	2	12	1424	J	30.73829	81.3091	NEA/A	GA	CALF W/MOM
		2008	2	14	1223	#1	30.6051	81.24953	NEA/A	FL	SAG
3330		2008	2	14	1223	A	30.6051	81.24953	NEA/A	FL	SAG
3442		2008	2	14	1223	B	30.6051	81.24953	NEA/A	FL	SAG, WH BEL, WH CHN
		2008	2	14	1223	C	30.6051	81.24953	NEA/A	FL	SAG
1243		2008	2	14	1243	D	30.57828	81.15694	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 1243	2008	2	14	1243	E	30.57828	81.15694	NEA/A	FL	BOD CNT, CALF W/MOM
3157		2008	2	14	1307	F	30.65493	81.34827	NEA/A	FL	LOG
3294		2008	2	14	1307	G	30.65493	81.34827	NEA/A	FL	LOG
3142		2008	2	14	1321	H	30.67287	81.17867	NEA/A	FL	LOG
3240		2008	2	14	1321	I	30.67287	81.17867	NEA/A	FL	LOG
3466		2008	2	14	1336	J	30.747	81.1499	NEA/A	GA	
		2008	2	14	1336	K	30.747	81.1499	NEA/A	GA	
3579		2008	2	14	1336	L	30.747	81.1499	NEA/A	GA	

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
1802		2008	2	14	1345	M	30.74067	81.16032	NEA/A	GA	BOD CNT, W/CALF
	2008 Calf of 1802	2008	2	14	1345	N	30.74067	81.16032	NEA/A	GA	BOD CNT, CALF W/MOM
3292		2008	2	14	1424	O	30.84192	81.23855	NEA/A	GA	BOD CNT, W/CALF
	2008 Calf of 3292	2008	2	14	1424	P	30.84192	81.23855	NEA/A	GA	BOD CNT, CALF W/MOM
3293		2008	2	14	1606	Q	30.33335	81.13078	NEA/A	FL	NURS, W/CALF
	2008 Calf of 3293	2008	2	14	1606	R	30.33335	81.13078	NEA/A	FL	CALF W/MOM, NURS
2790		2008	2	14	1620	S	30.33955	81.19504	NEA/A	FL	W/CALF
	2008 Calf of 2790	2008	2	14	1620	T	30.33955	81.19504	NEA/A	FL	CALF W/MOM
	2006 Calf of 2503	2008	2	14	1624	U	30.31997	81.24943	NEA/A	FL	BODO, LOG, WH CHN
3530		2008	2	14	1632	V	30.32788	81.25449	NEA/A	FL	
3442		2008	2	14	1733	W	30.58499	81.19878	NEA/A	FL	SAG, WH CHN
		2008	2	14	1733	X	30.58499	81.19878	NEA/A	FL	SAG
		2008	2	14	1733	Y	30.58499	81.19878	NEA/A	FL	BLK BEL, BLK CHN, SAG
		2008	2	14	1733	Z	30.58499	81.19878	NEA/A	FL	BLK BEL, SAG
2330		2008	2	15	0901	A	30.29797	81.22545	NEA/A	FL	NURS, W/CALF
	2008 Calf of 2330	2008	2	15	0901	B	30.29797	81.22545	NEA/A	FL	CALF W/MOM, NURS
2790		2008	2	15	0946	C	30.43233	81.24651	NEA/A	FL	BOD CNT, W/CALF

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
	2008 Calf of 2790	2008	2	15	0946	D	30.43233	81.24651	NEA/A	FL	BLK BEL, BLK CHN, BOD CNT, CALF W/MOM
	2006 Calf of 2503	2008	2	15	1103	E	30.53208	81.19044	NEA/A	FL	BEL/BEL
		2008	2	15	1103	F	30.53208	81.19044	NEA/A	FL	BEL/BEL
3293		2008	2	15	1116	G	30.53228	81.23186	NEA/A	FL	NURS, W/CALF
	2008 Calf of 3293	2008	2	15	1116	H	30.53228	81.23186	NEA/A	FL	CALF W/MOM, NURS
1243		2008	2	15	1129	I	30.55523	81.25993	NEA/A	FL	NURS, W/CALF
	2008 Calf of 1243	2008	2	15	1129	J	30.55523	81.25993	NEA/A	FL	CALF W/MOM, NURS
3346		2008	2	15	1218	K	30.6309	81.20461	NEA/A	FL	BOD CNT, ENTGL
	2006 CALF of 1611	2008	2	15	1218	L	30.6309	81.20461	NEA/A	FL	BOD CNT
3541		2008	2	15	1218	M	30.6309	81.20461	NEA/A	FL	
		2008	2	15	1223	N	30.63815	81.20897	NEA/A	FL	BRCH
3442		2008	2	15	1224	O	30.6406	81.20077	NEA/A	FL	SAG
	BK03BOF07	2008	2	15	1224	P	30.6406	81.20077	NEA/A	FL	BLK BEL, BLK CHN, SAG
3503		2008	2	15	1227	Q	30.65012	81.20127	NEA/A	FL	
3123		2008	2	15	1446	R	30.74967	81.26537	NEA/A	GA	BODO
3010		2008	2	15	1446	S	30.74967	81.26537	NEA/A	GA	BODO
3330		2008	2	16	0958	A	30.79853	81.20837	NEA/A	GA	

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
	2006 CALF of 1611	2008	2	16	0958	B	30.79853	81.20837	NEA/A	GA	
	BK03BOF07	2008	2	16	0958	C	30.79853	81.20837	NEA/A	GA	
3040		2008	2	16	1010	D	30.78022	81.20433	NEA/A	GA	
		2008	2	16	1042	E	30.73855	81.20808	NEA/A	GA	LOG
3346		2008	2	16	1044	F	30.7258	81.21738	NEA/A	GA	ENTGL
3503		2008	2	16	1044	G	30.7258	81.21738	NEA/A	GA	
		2008	2	16	1048	H	30.73037	81.21526	NEA/A	GA	SAG
3442		2008	2	16	1048	I	30.73037	81.21526	NEA/A	GA	SAG, WH CHN
3346		2008	2	16	1050	#1	30.72892	81.22221	NEA/A	GA	APPR
	2006 Calf of 2503	2008	2	16	1050	J	30.72892	81.22221	NEA/A	GA	BEL/BEL, SAG, WH CHN
		2008	2	16	1050	K	30.72892	81.22221	NEA/A	GA	BEL/BEL, SAG, WH BEL, WH CHN
		2008	2	16	1057	L	30.71726	81.21696	NEA/A	GA	BODO, WH CHN
3292		2008	2	16	1138	M	30.69213	81.34658	NEA/A	FL	BODO, W/CALF
	2008 Calf of 3292	2008	2	16	1138	N	30.69213	81.34658	NEA/A	FL	BODO, CALF W/MOM
3293		2008	2	16	1157	O	30.62789	81.2014	NEA/A	FL	NURS, W/CALF
	2008 Calf of 3293	2008	2	16	1157	P	30.62789	81.2014	NEA/A	FL	CALF W/MOM, NURS
		2008	2	16	1340	Q	30.56748	81.19553	NEA/A	FL	BEL/BEL

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
		2008	2	16	1340	R	30.56748	81.19553	NEA/A	FL	
		2008	2	16	1340	S	30.56748	81.19553	NEA/A	FL	
		2008	2	16	1349	T	30.55153	81.18459	NEA/A	FL	
		2008	2	16	1355	U	30.55222	81.1775	NEA/A	FL	
	BK01BOF07	2008	2	16	1355	V	30.55222	81.1775	NEA/A	FL	
2427		2008	2	16	1355	W	30.55222	81.1775	NEA/A	FL	
		2008	2	16	1406	X	30.52817	81.21567	NEA/A	FL	
	2007 Calf of 2614	2008	2	16	1410	AA	30.51977	81.23042	NEA/A	FL	
1243		2008	2	16	1410	Y	30.51773	81.23032	NEA/A	FL	W/CALF
	2008 Calf of 1243	2008	2	16	1410	Z	30.51773	81.23032	NEA/A	FL	CALF W/MOM
1308		2008	2	16	1548	BB	30.32355	81.38084	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 1308	2008	2	16	1548	CC	30.32355	81.38084	NEA/A	FL	BOD CNT, CALF W/MOM
		2008	2	17	0920	A	30.83225	81.22847	NEA/A	GA	
3346		2008	2	17	0929	B	30.86072	81.22993	NEA/A	GA	ENTGL
	2007 Calf of 2614	2008	2	17	0932	C	30.86435	81.23289	NEA/A	GA	BODO
3503		2008	2	17	0932	D	30.86498	81.23289	NEA/A	GA	BEL/BEL, BOD CNT, BODO
		2008	2	17	0932	E	30.86435	81.23289	NEA/A	GA	BODO, MOPN
	2006 CALF of 1611	2008	2	17	0932	F	30.86453	81.23289	NEA/A	GA	BOD CNT, BODO

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
	2006 calf of 1950	2008	2	17	0950	G	30.86498	81.1757	NEA/A	GA	BODO, MOPN, SAG
		2008	2	17	0950	H	30.86498	81.1757	NEA/A	GA	BODO, SAG
3040		2008	2	17	0950	I	30.86498	81.1757	NEA/A	GA	BODO, SAG
		2008	2	17	1022	#1	30.7621	81.17918	NEA/A	GA	BODO, SAG
		2008	2	17	1022	#2	30.7621	81.17918	NEA/A	GA	BODO, SAG
		2008	2	17	1022	J	30.7621	81.17918	NEA/A	GA	BODO, SAG
3330		2008	2	17	1022	K	30.7621	81.17918	NEA/A	GA	BODO, SAG
1934		2008	2	17	1022	L	30.7621	81.17918	NEA/A	GA	BODO, FCL, SAG
		2008	2	17	1022	M	30.7621	81.17918	NEA/A	GA	BODO, SAG
		2008	2	17	1022	N	30.7621	81.17918	NEA/A	GA	BODO, SAG
		2008	2	17	1041	O	30.75748	81.17861	NEA/A	GA	LBTL
3150		2008	2	17	1041	P	30.75432	81.17725	NEA/A	GA	
2608		2008	2	17	1056	Q	30.75293	81.18548	NEA/A	GA	
3530		2008	2	17	1106	R	30.7245	81.22331	NEA/A	GA	BOD CNT
3442		2008	2	17	1106	S	30.7245	81.22331	NEA/A	GA	BOD CNT
2608		2008	2	17	1106	T	30.7245	81.22331	NEA/A	GA	BOD CNT
3420		2008	2	17	1114	U	30.71197	81.24155	NEA/A	GA	SAG, W/UNPH EG
		2008	2	17	1114	V	30.71197	81.24155	NEA/A	GA	SAG, W/UNPH EG

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
3010		2008	2	17	1131	X	30.7737	81.27037	NEA/A	GA	
2753		2008	2	17	1131	Y	30.7737	81.27037	NEA/A	GA	
	2008 Calf of 2753	2008	2	17	1319	AA	30.31138	81.38947	NEA/A	FL	BOD CNT, CALF W/MOM
		2008	2	17	1319	Z	30.31138	81.38947	NEA/A	FL	BOD CNT, W/CALF
2330		2008	2	17	1422	BB	30.39928	81.08233	NEA/A	FL	W/CALF
	2008 Calf of 2330	2008	2	17	1422	CC	30.39928	81.08233	NEA/A	FL	CALF W/MOM
3142		2008	2	17	1457	DD	30.4808	81.3737	NEA/A	FL	BOD CNT, BODO
3240		2008	2	17	1457	EE	30.4808	81.3737	NEA/A	FL	BOD CNT, BODO
		2008	2	17	1539	FF	30.5353	81.38198	NEA/A	FL	
3103		2008	2	17	1539	GG	30.5353	81.38198	NEA/A	FL	
1245		2008	2	19	1310	A	30.7339	81.25798	NEA/A	GA	BODO, W/CALF
	2008 Calf of 1245	2008	2	19	1310	B	30.7339	81.25798	NEA/A	GA	BODO, CALF W/MOM
2330		2008	2	19	1336	C	30.66633	81.21139	NEA/A	FL	BOD CNT, NURS, W/CALF
	2008 Calf of 2330	2008	2	19	1336	D	30.66633	81.21139	NEA/A	FL	BOD CNT, CALF W/MOM, NURS
1703		2008	2	19	1436	E	30.57903	81.29338	NEA/A	FL	BODO, W/CALF
	2008 Calf of 1703	2008	2	19	1436	F	30.57903	81.29338	NEA/A	FL	BODO, CALF W/MOM
3420		2008	2	19	1537	G	30.30798	81.24973	NEA/A	FL	BODO, SAG, WH CHN
		2008	2	19	1537	H	30.30798	81.24973	NEA/A	FL	BODO, SAG

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
3150		2008	2	19	1537	I	30.30798	81.24973	NEA/A	FL	BODO, SAG, WH BEL, WH CHN
	BK01BOF07	2008	2	19	1537	J	30.30798	81.24973	NEA/A	FL	APPR, BODO
1706		2008	2	19	1617	K	30.30315	81.2296	NEA/A	FL	WH BEL, WH CHN
3245		2008	2	19	1617	L	30.30315	81.2296	NEA/A	FL	
3530		2008	2	19	1622	M	30.30123	81.22915	NEA/A	FL	
3292		2008	2	19	1633	N	30.38315	81.37821	NEA/A	FL	BOD CNT, BODO, W/CALF
	2008 Calf of 3292	2008	2	19	1633	O	30.38315	81.37821	NEA/A	FL	BOD CNT, BODO, CALF W/MOM
1308		2008	2	19	1651	P	30.38519	81.04499	NEA/A	FL	NURS, W/CALF
	2008 Calf of 1308	2008	2	19	1651	Q	30.38519	81.04499	NEA/A	FL	CALF W/MOM, NURS
2470		2008	2	20	0932	A	30.26702	81.19348	NEA/A	FL	
3245		2008	2	20	0932	B	30.26702	81.19348	NEA/A	FL	
3530		2008	2	20	0932	C	30.26702	81.19348	NEA/A	FL	
1706		2008	2	20	0933	D	30.25933	81.1871	NEA/A	FL	
3442		2008	2	20	0938	E	30.26513	81.19033	NEA/A	FL	WH CHN
2470		2008	2	20	0939	F	30.25975	81.18477	NEA/A	FL	
	BK01BOF07	2008	2	20	0943	G	30.2633	81.18845	NEA/A	FL	
		2008	2	20	0943	H	30.2633	81.18845	NEA/A	FL	

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
1308		2008	2	20	1222	I	30.60543	81.19296	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 1308	2008	2	20	1222	J	30.60543	81.19296	NEA/A	FL	BOD CNT, CALF W/MOM
1245		2008	2	20	1234	K	30.5637	81.10361	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 1245	2008	2	20	1234	L	30.56372	81.10361	NEA/A	FL	BOD CNT, CALF W/MOM
2790		2008	2	20	1308	M	30.71198	81.25337	NEA/A	GA	BOD CNT, W/CALF
	2008 Calf of 2790	2008	2	20	1308	N	30.71198	81.25337	NEA/A	GA	BOD CNT, CALF W/MOM
3142		2008	2	20	1410	O	30.78865	81.26501	NEA/A	GA	LOG, WH CHN
3240		2008	2	20	1410	P	30.78865	81.26501	NEA/A	GA	LOG
1802		2008	2	20	1444	Q	30.83265	81.13818	NEA/A	GA	BOD CNT, W/YRLG
	2008 Calf of 1802	2008	2	20	1444	R	30.83265	81.13818	NEA/A	GA	BOD CNT, CALF W/MOM
1243		2008	2	21	0946	A	30.71334	81.35285	NEA/A	GA	W/CALF
	2008 Calf of 1243	2008	2	21	0946	B	30.71334	81.35285	NEA/A	GA	CALF W/MOM
3292		2008	2	21	0956	C	30.82882	81.38268	NEA/A	GA	BODO, W/CALF
	2008 Calf of 3292	2008	2	21	0956	D	30.82882	81.38268	NEA/A	GA	BODO, CALF W/MOM
3142		2008	2	21	1001	E	30.85318	81.34467	NEA/A	GA	
3240		2008	2	21	1001	F	30.85318	81.34467	NEA/A	GA	
1703		2008	2	21	1009	G	30.86883	81.21819	NEA/A	GA	W/CALF
	2008 Calf of 1703	2008	2	21	1009	H	30.86883	81.21819	NEA/A	GA	CALF W/MOM

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
2753		2008	2	21	1023	I	30.80305	81.17886	NEA/A	GA	W/CALF
	2008 Calf of 2753	2008	2	21	1023	J	30.80305	81.17886	NEA/A	GA	CALF W/MOM
1802		2008	2	21	1057	K	30.78522	81.26762	NEA/A	GA	W/CALF
	2008 Calf of 1802	2008	2	21	1057	L	30.78522	81.26762	NEA/A	GA	CALF W/MOM, FLIP, LBTL, ROLL
1243		2008	2	21	1141	M	30.7005	81.34714	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 1243	2008	2	21	1141	N	30.7005	81.34714	NEA/A	FL	BOD CNT, CALF W/MOM
1802		2008	2	23	1134	A	30.5448	81.08919	NEA/A	FL	NURS, W/CALF
	2008 Calf of 1802	2008	2	23	1134	B	30.5448	81.08919	NEA/A	FL	CALF W/MOM, NURS
		2008	2	23	1209	C	30.47167	81.2238	NEA/A	FL	
3442		2008	2	23	1209	D	30.47167	81.2238	NEA/A	FL	
3245		2008	2	23	1222	E	30.50598	81.22185	NEA/A	FL	
		2008	2	23	1222	F	30.50598	81.22185	NEA/A	FL	
1622		2008	2	23	1230	G	30.51081	81.18694	NEA/A	FL	W/CALF
	2008 Calf of 1622	2008	2	23	1230	H	30.51081	81.18694	NEA/A	FL	CALF W/MOM
1960		2008	2	24	0936	A	30.81725	80.95879	NEA/A	GA	
2410		2008	2	24	0936	B	30.81725	80.95879	NEA/A	GA	WH CHN
		2008	2	24	1024	#1	30.82635	81.114	NEA/A	GA	

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
1706		2008	2	24	1024	C	30.82635	81.114	NEA/A	GA	WH CHN
	BK01BOF07	2008	2	24	1024	D	30.82635	81.114	NEA/A	GA	
		2008	2	24	1024	E	30.82635	81.114	NEA/A	GA	
3150		2008	2	24	1024	F	30.82635	81.114	NEA/A	GA	WH CHN
1245		2008	2	24	1040	G	30.78355	81.2837	NEA/A	GA	W/CALF
	2008 Calf of 1245	2008	2	24	1040	H	30.78355	81.2837	NEA/A	GA	CALF W/MOM
		2008	2	24	1052	I	30.72772	81.44658	NEA/A	GA	BODO, ROLL
3130		2008	2	24	1136	J	30.65025	81.15172	NEA/A	FL	NURS, W/CALF
	2008 Calf of 3130	2008	2	24	1136	K	30.65025	81.15172	NEA/A	FL	CALF W/MOM, NURS
		2008	2	24	1201	L	30.6349	81.2397	NEA/A	FL	
		2008	2	24	1244	M	30.59198	81.24419	NEA/A	FL	
1802		2008	2	24	1517	N	30.42888	81.25581	NEA/A	FL	BOD CNT, W/CALF, WH CHN
	2008 Calf of 1802	2008	2	24	1517	O	30.42888	81.25581	NEA/A	FL	BOD CNT, CALF W/MOM
1622		2008	2	24	1531	P	30.43258	81.39612	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 1622	2008	2	24	1531	Q	30.43258	81.39612	NEA/A	FL	BOD CNT, CALF W/MOM
3245		2008	2	24	1610	R	30.54637	81.26116	NEA/A	FL	
1429		2008	2	24	1618	S	30.54448	81.25875	NEA/A	FL	

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
		2008	2	25	1009	A	31.4313	81.03335	NEA/A	GA	
	CT02BOF2004	2008	2	25	1019	B	31.39645	81.04245	NEA/A	GA	
		2008	2	25	1019	C	31.39645	81.04245	NEA/A	GA	
		2008	2	25	1026	D	31.38228	81.06487	NEA/A	GA	
		2008	2	25	1026	E	31.38228	81.06487	NEA/A	GA	WH CHN
3503		2008	2	25	1026	F	31.38228	81.06487	NEA/A	GA	
		2008	2	25	1026	G	31.38228	81.06487	NEA/A	GA	
3150		2008	2	25	1028	H	31.38147	81.06516	NEA/A	GA	WH CHN
		2008	2	25	1030	#1	31.37683	81.05915	NEA/A	GA	
1320		2008	2	25	1030	I	31.37683	81.05915	NEA/A	GA	
1712		2008	2	25	1030	J	31.37683	81.05915	NEA/A	GA	
	2006 Calf of 2503	2008	2	25	1030	K	31.37683	81.05915	NEA/A	GA	
		2008	2	25	1030	L	31.37683	81.05915	NEA/A	GA	
	2007 Calf of 2614	2008	2	25	1030	M	31.37683	81.05915	NEA/A	GA	
3346		2008	2	25	1034	N	31.3867	81.07118	NEA/A	GA	BOD CNT
		2008	2	25	1034	O	31.3867	81.07118	NEA/A	GA	BOD CNT
1706		2008	2	25	1034	P	31.3867	81.07118	NEA/A	GA	
		2008	2	25	1034	Q	31.3867	81.07118	NEA/A	GA	

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
3442		2008	2	25	1042	R	31.36019	81.06095	NEA/A	GA	WH CHN
2040		2008	2	25	1117	S	31.2933	80.97065	NEA/A	GA	BOD CNT, W/CALF
	2008 Calf of 2040	2008	2	25	1117	T	31.2933	80.97065	NEA/A	GA	BLK BEL, BLK CHN, BOD CNT, CALF W/MOM, ROLL
1408		2008	2	25	1127	U	31.27363	80.96218	NEA/A	GA	BOD CNT, W/CALF, WH BEL, WH CHN
	2008 Calf of 1408	2008	2	25	1127	V	31.27363	80.96218	NEA/A	GA	BOD CNT, CALF W/MOM
2042		2008	2	25	1156	W	31.2459	81.13109	NEA/A	GA	
3103		2008	2	25	1156	X	31.2459	81.13109	NEA/A	GA	
		2008	2	25	1247	Y	31.06372	81.15773	NEA/A	GA	
3294		2008	2	25	1247	Z	31.06372	81.15773	NEA/A	GA	
1308		2008	2	25	1307	AA	31.05588	81.27468	NEA/A	GA	W/CALF
	2008 Calf of 1308	2008	2	25	1307	BB	31.05588	81.27468	NEA/A	GA	CALF W/MOM
2753		2008	2	25	1524	CC	30.77227	81.08482	NEA/A	GA	W/CALF
	2008 Calf of 2753	2008	2	25	1524	DD	30.77227	81.08482	NEA/A	GA	BRCH, CALF W/MOM
3260		2008	2	25	1600	EE	30.89465	81.12452	NEA/A	GA	
	BK57	2008	2	25	1600	FF	30.89465	81.12452	NEA/A	GA	BLK BEL, BLK CHN, MOPN, ROLL
2790		2008	2	28	1329	A	30.4903	81.22607	NEA/A	FL	W/CALF

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
	2008 Calf of 2790	2008	2	28	1329	B	30.4903	81.22607	NEA/A	FL	CALF W/MOM
1812		2008	2	28	1344	C	30.47858	81.2106	NEA/A	FL	W/CALF
	2008 Calf of 1812	2008	2	28	1344	D	30.47858	81.2106	NEA/A	FL	CALF W/MOM
		2008	2	29	0929	A	30.80833	81.15333	NEA/A	GA	
3294		2008	2	29	0929	B	30.80833	81.15333	NEA/A	GA	
1245		2008	2	29	1149	C	30.49833	81.28	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 1245	2008	2	29	1149	D	30.49833	81.28	NEA/A	FL	BOD CNT, CALF W/MOM
3142		2008	2	29	1155	E	30.51333	81.235	NEA/A	FL	
3240		2008	2	29	1155	F	30.51333	81.235	NEA/A	FL	
2790		2008	2	29	1203	G	30.51833	81.175	NEA/A	FL	NURS, W/CALF
	2008 Calf of 2790	2008	2	29	1203	H	30.51833	81.175	NEA/A	FL	CALF W/MOM, NURS
1245		2008	2	29	1409	I	30.52	81.27833	NEA/A	FL	W/CALF UNPH
1812		2008	3	1	1135	A	30.58252	81.20841	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 1812	2008	3	1	1135	B	30.58252	81.20841	NEA/A	FL	BOD CNT, CALF W/MOM
1245		2008	3	1	1139	C	30.57565	81.18632	NEA/A	FL	W/CALF
	2008 Calf of 1245	2008	3	1	1139	D	30.57565	81.18632	NEA/A	FL	CALF W/MOM
3020		2008	3	1	1154	E	30.62895	81.12833	NEA/A	FL	W/CALF
	2008 Calf of 3020	2008	3	1	1154	F	30.62895	81.12833	NEA/A	FL	CALF W/MOM

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
1802		2008	3	1	1519	G	30.77045	81.18956	NEA/A	GA	BOD CNT, W/CALF
	2008 Calf of 1802	2008	3	1	1519	H	30.77045	81.19555	NEA/A	GA	BOD CNT, CALF W/MOM
3503		2008	3	1	1536	I	30.81942	80.81477	NEA/A	GA	BRCH, LBTL, UW EXH
	2007 Calf of 2601	2008	3	2	1001	A	30.74855	81.28783	NEA/A	GA	BOD CNT
1321		2008	3	2	1001	B	30.74855	81.28783	NEA/A	GA	BOD CNT
2470		2008	3	2	1132	C	30.52267	81.18198	NEA/A	FL	
3343		2008	3	2	1132	D	30.52267	81.18198	NEA/A	FL	BOD CNT
3157		2008	3	2	1132	E	30.52267	81.18198	NEA/A	FL	
2135		2008	3	2	1132	F	30.52267	81.18198	NEA/A	FL	BOD CNT
1017		2008	3	2	1132	G	30.52267	81.18198	NEA/A	FL	
1703		2008	3	2	1140	H	30.51827	81.19949	NEA/A	FL	MOPN, W/CALF
	2008 Calf of 1703	2008	3	2	1140	I	30.51827	81.19949	NEA/A	FL	CALF W/MOM
1812		2008	3	2	1152	J	30.54272	81.05254	NEA/A	FL	BOD CNT, W/CALF
	2008 Calf of 1812	2008	3	2	1152	K	30.54272	81.05254	NEA/A	FL	BOD CNT, CALF W/MOM
		2008	3	3	1128	A	30.51752	81.29593	NEA/A	FL	BODO, SAG
2010		2008	3	3	1128	B	30.51752	81.29593	NEA/A	FL	BODO, SAG
		2008	3	3	1128	C	30.51752	81.29593	NEA/A	FL	BODO, SAG
		2008	3	3	1128	D	30.51752	81.29593	NEA/A	FL	BODO, SAG

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
1017		2008	3	3	1137	E	30.5225	81.30741	NEA/A	FL	
		2008	3	3	1137	F	30.5225	81.30741	NEA/A	FL	
		2008	3	3	1137	G	30.5225	81.30741	NEA/A	FL	
2135		2008	3	3	1137	H	30.5225	81.30741	NEA/A	FL	
1802		2008	3	3	1152	I	30.51932	81.14878	NEA/A	FL	W/CALF
	2008 Calf of 1802	2008	3	3	1152	J	30.51932	81.14878	NEA/A	FL	CALF W/MOM
2790		2008	3	3	1405	K	30.43887	81.21582	NEA/A	FL	LBTL, W/CALF
	2008 Calf of 2790	2008	3	3	1405	L	30.43887	81.21582	NEA/A	FL	LBTL, W/CALF
3020		2008	3	5	1311	A	30.77518	81.1219	NEA/A	GA	W/CALF
	2008 Calf of 3020	2008	3	5	1311	B	30.77518	81.1219	NEA/A	GA	CALF W/MOM
2042		2008	3	5	1325	C	30.78492	81.10881	NEA/A	GA	W/UNPH EG
1308		2008	3	5	1354	D	30.73628	81.15572	NEA/A	GA	NURS, W/CALF
	2008 Calf of 1308	2008	3	5	1354	E	30.73628	81.15572	NEA/A	GA	CALF W/MOM, NURS
2541		2008	3	5	1405	F	30.74177	81.06088	NEA/A	GA	WH CHN
2750		2008	3	5	1405	G	30.74177	81.06088	NEA/A	GA	
3142		2008	3	5	1510	H	30.60025	81.1669	NEA/A	FL	LOG, WH CHN
3240		2008	3	5	1510	I	30.60025	81.1669	NEA/A	FL	LOG
1278		2008	3	5	1644	J	30.44025	81.06422	NEA/A	FL	SAG

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
1423		2008	3	5	1644	K	30.44025	81.06422	NEA/A	FL	SAG
2795		2008	3	5	1644	L	30.44025	81.06422	NEA/A	FL	SAG
1427		2008	3	6	1044	A	30.64124	80.99117	NEA/A	FL	BOD CNT
1428		2008	3	6	1044	B	30.64124	80.99117	NEA/A	FL	BOD CNT
2750		2008	3	6	1044	C	30.64124	80.99117	NEA/A	FL	
2541		2008	3	6	1044	D	30.64124	80.99117	NEA/A	FL	WH CHN
3294		2008	3	6	1122	E	30.62427	81.24841	NEA/A	FL	BOD CNT
3157		2008	3	6	1122	F	30.62427	81.24841	NEA/A	FL	BOD CNT
1812		2008	3	6	1224	G	30.60111	81.12772	NEA/A	FL	W/CALF
	2008 Calf of 1812	2008	3	6	1224	H	30.60111	81.12772	NEA/A	FL	CALF W/MOM
3240		2008	3	6	1228	I	30.58787	81.17738	NEA/A	FL	LOG
3142		2008	3	6	1228	J	30.58787	81.17738	NEA/A	FL	LOG, WH CHN
3123		2008	3	10	1105	A	30.63858	81.386	NEA/A	FL	
3010		2008	3	10	1105	B	30.63858	81.386	NEA/A	FL	
3123		2008	3	10	1541	C	30.57225	81.39467	NEA/A	FL	
3010		2008	3	10	1541	D	30.57225	81.39467	NEA/A	FL	
		2008	3	26	1336	A	30.34332	81.17812	NEA/A	FL	
1150		2008	3	26	1336	B	30.34332	81.17812	NEA/A	FL	

EGNO	INTER-MATCH	YEAR	MONTH	DAY	TIME (L)	LETTER	LATITUDE	LONGITUDE	OBSERVER	AREA	BEHAVIORS
		2008	3	26	1344	C	30.34818	81.1788	NEA/A	FL	SAG
		2008	3	26	1344	D	30.34818	81.1788	NEA/A	FL	SAG
1616		2008	3	26	1344	E	30.34818	81.1788	NEA/A	FL	SAG
1019		2008	3	26	1344	F	30.34818	81.1788	NEA/A	FL	SAG
		2008	3	26	1344	G	30.34818	81.1788	NEA/A	FL	SAG
2142		2008	3	27	1451	A	30.83341	81.00113	NEA/A	GA	
		2008	3	27	1451	B	30.83341	81.00113	NEA/A	GA	