

# Protected Species Monitoring in the Onslow Bay, Jacksonville, and Cape Hatteras Sites

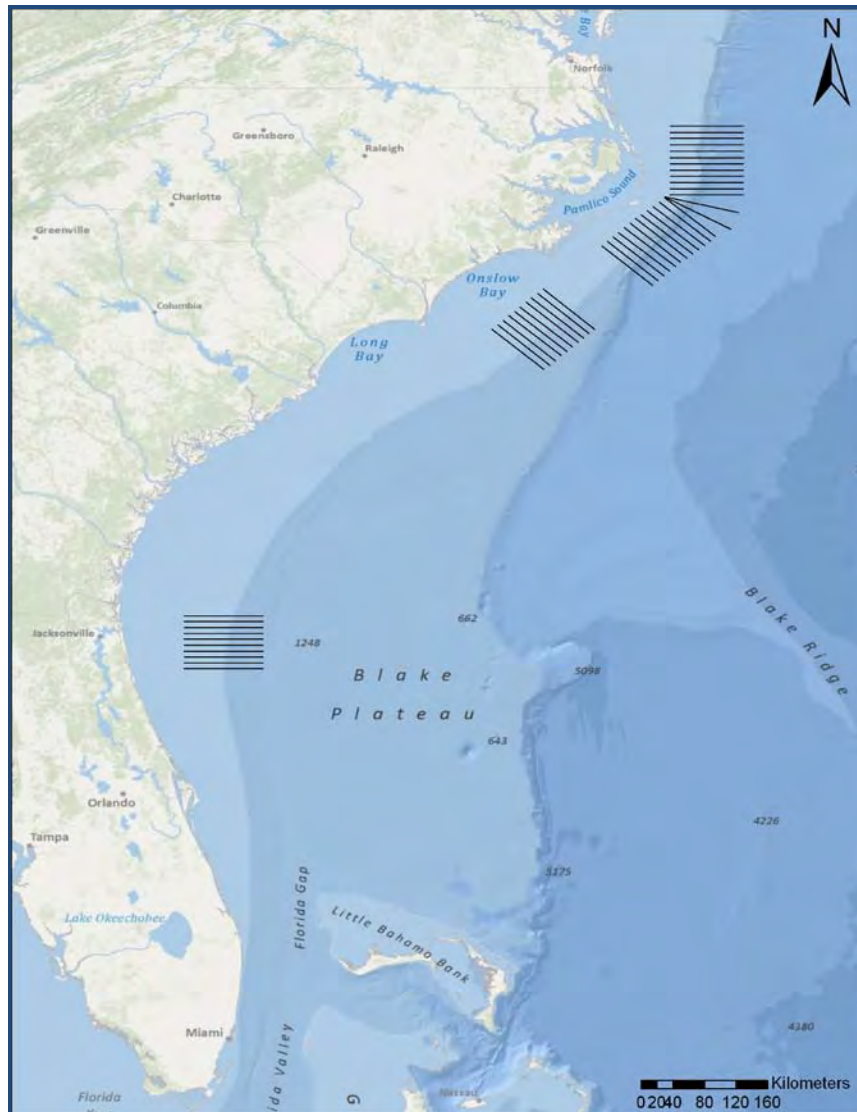
Onslow Bay, NC

Jacksonville, FL

Cape Hatteras, NC

Final Report (July 2010 – December 2011)

March 20, 2012



## **Executive Summary**

This is the fourth progress report of a monitoring program for protected marine species in waters offshore Onslow Bay and Cape Hatteras, North Carolina and Jacksonville, Florida. The results of aerial surveys, vessel-based line transect and photo-ID surveys and passive acoustic monitoring are reported for the period from July 2010 through December 2011. Density estimates for marine mammals and sea turtles were generated from data collected during aerial and vessel-based line transect surveys. In Onslow Bay, continued monitoring has yielded a comprehensive picture of the density, distribution and abundance of marine mammals and sea turtles and of the distribution and relative abundance of seabirds. Three years of monitoring in Jacksonville has similarly provided information on the density and distribution of marine mammals and sea turtles in this area. In Cape Hatteras, focused monthly monitoring surveys began in May 2011, and have provided preliminary information on the distribution and diversity of the marine mammals and sea turtles in this highly productive area.

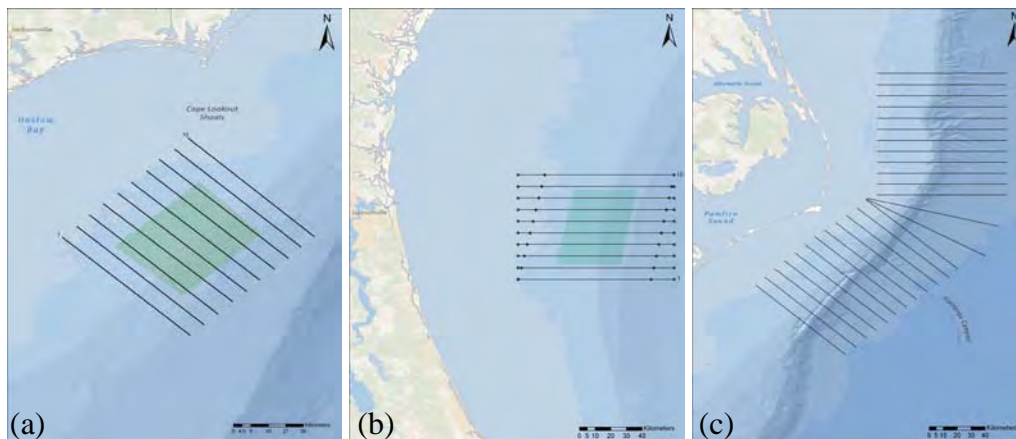
## Study Areas

The study area in Onslow Bay encompasses the region that had previously been proposed by the Navy as an Undersea Warfare Training Range (USWTR). The survey area is 25 nm (46 km) long and 20 nm (37 km) wide (approximately 1700 km<sup>2</sup>) and extends 20 nm in each direction past the proposed boundaries of the original USWTR. Ten transect lines 40 nm (74 km) in length and spaced approximately 5 nm (9.3 km) apart cross the survey area, oriented parallel to the short axis of the proposed USWTR boundaries and perpendicular to the shelf break and flow of the Gulf Stream (Figure 1-a). This design yields a total of 400 nm (~740 km) of track line that has been surveyed by both aerial and shipboard platforms.

The study area off Jacksonville, Florida encompasses the proposed Jacksonville (JAX) USWTR site and, like that in Onslow Bay, is 25 nm (46 km) long and 20 nm (37 km) wide (approximately 1700 km<sup>2</sup>). The survey area straddles the continental shelf and Blake Plateau and includes neritic, shelf waters and pelagic, offshore waters (Figure 1-b). The ten survey tracklines in JAX are longer (86 km) than those in Onslow Bay to allow

complementary survey coverage in the USWTR area with that of the Early Warning (EWS) aerial surveys for North Atlantic right whales (*Eubalaena glacialis*).

The site off Cape Hatteras, North Carolina is subsumed within the Navy's Atlantic Fleet Active Sonar Training (AFAST) Monitoring Program. The survey area encompasses approximately 16,000 km<sup>2</sup> and includes continental shelf waters and deeper waters beyond the shelf break (Figure 1-c). Twenty six tracklines ranging from 40-44 nm (73.5 - 81.5 km) long, and orientated perpendicular to the coastline, transect the survey area. The survey area includes a large portion of the Cape Hatteras Special Research Area (CHSRA), designated by NOAA Fisheries to address interactions between short-finned pilot whales (*Globicephala macrorhynchus*) and the pelagic longline fisheries. The survey area excludes coastal waters to minimize survey effort in areas where the spatial distribution and relative abundance of coastal bottlenose dolphins is reasonably well understood (Torres *et al.* 2003; Torres *et al.* 2005).



*Figure 1.* Maps depicting the survey areas and tracklines used for vessel and aerial surveys: (a) Onslow Bay, NC; (b) Jacksonville, FL; and (c) Cape Hatteras, NC.

#### Vessel-Based Surveys for Cetaceans and Sea Turtles – Onslow Bay

Researchers from Duke University conducted line-transect and photo-id/biopsy shipboard surveys for marine mammals and sea turtles in the Onslow Bay survey site. Five tracklines (333.4 km) and 420.6 km of photo-id/biopsy effort were surveyed, totaling approximately 52 hours of survey effort. Most line-transect (65%) and photo-id/biopsy

(91%) effort occurred in Beaufort Sea States (BSS) 1 and BSS 2-3, respectively. Sixteen cetacean sightings (14 on effort, two off effort) of two species were observed during vessel surveys: bottlenose dolphins (seven sightings) and Atlantic spotted dolphins (nine sightings). As in previous years, bottlenose dolphins were observed in both shallow and deep waters across the continental shelf break, whereas spotted dolphins were observed only in shallow waters over the continental shelf. Three sightings of loggerhead sea turtles were recorded during vessel surveys (two on effort, one off effort). Over 1480 digital images were taken for species identification and individual recognition. Analysis of these photographic images resulted in re-sightings of seven bottlenose dolphins and two spotted dolphins during the four years of surveys in Onslow Bay. Approximately 6% of bottlenose dolphins (7 of 112) and 3% (2 of 68) of spotted dolphins identified in Onslow Bay have now been resighted, despite limited sampling effort. Several of these re-sightings span periods of a year or more, suggesting some degree of residency in the study area.

#### Passive Acoustic Monitoring – Onslow Bay

Researchers from Duke University conducted vessel-based and fixed passive acoustic monitoring in the Onslow Bay survey site. During two vessel-based surveys, a four-element hydrophone array was towed behind the vessel, resulting in 7.93 hours of passive acoustic monitoring. Two groups of cetaceans detected with the hydrophone array were positively identified by visual observers (one group of bottlenose dolphins and one group of Atlantic spotted dolphins). These hydrophone recordings will help identify species in vocalizations recorded on bottom-mounted acoustic recording devices (High Frequency Acoustic Recording Packages; HARPs). Two HARP deployments occurred in Year Four. Two instruments were deployed and recovered southeast of the center of the survey area, close to the 200 m shelf break. The current deployment is located at a new, deeper site, and is expected to be retrieved in the spring of 2012. In all deployments, the instruments were programmed to record at a sample rate of 200 kHz for five-minute periods, separated by an inactive interval of five minutes. Analysis of the HARP recordings for odontocete vocalizations revealed that Risso's dolphins and sperm whales showed nocturnal increases in click occurrence, *Kogia* spp. showed no significant diel variation in click occurrence, and unidentified delphinids showed either an increase in click events at

dawn or at night, depending on the time of year and location. Analysis for mysticete vocalizations revealed that fin, minke, and, possibly, sei whales were recorded throughout the winter months, when they are expected to be on breeding grounds.

#### Aerial Survey for Cetaceans and Sea Turtles – Onslow Bay

Researchers from the University of North Carolina Wilmington (UNCW) conducted aerial surveys in Onslow Bay. Surveys were flown monthly between June 2010 and April 2011. The goal was to survey the entire survey area (10 tracklines) at least once per month. This goal was accomplished for seven of ten months. For both February and April a single survey day was flown after which weather conditions prevented a complete set of ten tracklines from being flown. In December 2010, unfavorable weather prevented any tracklines from being surveyed. A total of 41 cetacean sightings, of 1127 individuals were observed while on effort in the study area. Five cetacean species were observed in the survey site while on effort, including bottlenose dolphins (*Tursiops truncatus*; 21 sightings of 679 individuals), Atlantic spotted dolphins (*Stenella frontalis*; ten sightings of 411 individuals), Risso's dolphins (*Grampus griseus*; two sightings of 12 individuals), humpback whales (*Megaptera novaeangliae*; one sighting of two individuals) and minke whales (*Balaenoptera acutorostrata*; one sighting of three individuals). In five sightings (20 individual animals) it was not possible to determine the specific identity with certainty. Three of these sightings were "unidentified delphinids" and the other two were not small delphinids and were reported as "unidentified cetaceans." A total of 234 sea turtles were observed during the study period. Of these, 181 were identified as loggerhead sea turtles (*Caretta caretta*) and the remaining 53 were recorded as "unidentified sea turtles". Encounter rates dropped dramatically as Beaufort Sea State (BSS) increased. For example, as BSS increased from 1 to 3, cetacean sighting rates decreased from 12.77 to 3.31 per 1000 km surveyed, and sea turtle sighting rates decreased from 70.23 to 19.49 per 1000 km surveyed. In addition to cetaceans and sea turtles, other pelagic marine vertebrates, including sharks, manta rays, and ocean sunfish, were observed. Most vessels encountered in the survey area were recreational fishing vessels, which were predominantly observed shoreward of the 200 m isobath.

During the current reporting period a limited amount of additional effort was conducted in offshore waters outside the survey site in Onslow Bay to examine the distribution of cetacean species in deeper water habitats. Analysis of passive acoustic monitoring records within the Onslow Bay site (see below) suggests that pelagic cetaceans, such as sperm whales (*Physeter macrocephalus*), are likely present near the outer boundaries of the area. Four 74 km tracklines were placed at 18.5 km increments in a NE – SW orientation. The outer trackline extended beyond the 2000 m shelf break (Figure 1-b, Figure 1 in Appendix H). Three lines were flown between July 2010 and April 2011. Five cetacean sightings were collected during this effort, which included one sighting of bottlenose dolphins (*Tursiops truncatus*) and four sightings of beaked whales (*Mesoplodon* spp.). All beaked whale sightings occurred between the 1000 and 2000 m isobaths.

#### Vessel-Based Surveys for Cetaceans and Sea Turtles – Jacksonville

Researchers from Duke University and UNCW conducted vessel-based surveys in the Jacksonville, Florida survey area. Thirteen tracklines were surveyed in approximately 52 hours of survey effort. The majority of survey effort (82%) occurred in BSS 2-3. A total of 28 groups of cetaceans were sighted during vessel surveys (26 on effort, 2 off effort) and two species were observed: bottlenose dolphins (10 sightings) and Atlantic spotted dolphins (17 sightings). In addition, one sighting of unidentified delphinids was made. Bottlenose dolphins were observed in deeper and slightly cooler waters than Atlantic spotted dolphins. Forty sea turtle sightings were recorded during vessel surveys (37 on effort, 3 off effort) and two species were observed: loggerhead sea turtles (25 sightings) and leatherback sea turtles (7 sightings). Eight turtle sightings were not identified to species. Approximately 4930 digital images were taken for the purposes of species identification and individual recognition. Analysis of these photographs resulted in re-sightings of two Atlantic spotted dolphins in the Jacksonville survey area.

#### Passive Acoustic Monitoring – Jacksonville

Researchers from Duke University and UNCW conducted vessel-based and fixed passive acoustic monitoring in the Jacksonville, Florida survey area. During three surveys, a four-element hydrophone array was towed behind the vessel, resulting in 1.52 hours of passive

acoustic monitoring. Two groups of cetaceans were detected with the hydrophone array and identified by visual observers (one group of bottlenose dolphins and one group of Atlantic spotted dolphins). Recordings from the hydrophone array will help identify species vocalizations recorded on bottom-mounted HARPs. Between 1 July 2010 and 31 December 2011, three HARP recoveries and two re-deployments occurred at two sites in the JAX survey area. Analysis of the HARP data for odontocetes was completed for deployments JAX01A, JAX03A, and JAX04B. Delphinid clicks were detected in 19.6%, 30.9%, and 5.2% hours of recording during JAX01A, JAX03A, and JAX04B, respectively. Delphinid whistles were detected in 2.0%, 4.9%, and 1.4% hours of recording during JAX01A, JAX03A, and JAX04B, respectively. For all deployments analyzed to date both odontocete whistle and click events were detected more frequently during the day at the shallow site and more frequently at night at the deeper site. This may reflect differences in call usage or detectability and may reflect site-specific, season-specific, or species-specific differences.

#### Aerial Surveys for Cetaceans and Sea Turtles - Jacksonville

Researchers from Duke University and UNCW conducted aerial surveys off Jacksonville, Florida. Surveys were flown monthly between July 2010 and December 2011. The goal was to survey the entire site (10 tracklines) twice per calendar month. During the months of March, November and December of 2011 no surveys were conducted due to unfavorable weather conditions. At least one complete set of tracklines was flown for the remaining nine months of this reporting period. Thus, a total of 248 tracklines (20998 km) were surveyed during the reporting period. A total of 241 sightings of 3198 cetaceans were recorded while on effort in the study area. Seven species of cetaceans were observed including bottlenose dolphins (111 sightings of 928 individuals), Atlantic spotted dolphins (88 sightings of 1671 individuals), rough-toothed dolphins (three sightings of 114 individuals), Risso's dolphins (16 sightings of 282 individuals), short-finned pilot whales (eight sightings of 173 individuals), minke whales (three sightings of five individuals), and a humpback whale (one sighting of a single individual). In ten sightings (23 individual dolphins) the species identity could not be established with certainty (*i.e.* "unidentified delphinids"). On one occasion a single animal, clearly not a delphinid, was observed but not identified to species; this sighting was reported as an

“unidentified cetacean”. There was also an off effort sighting of a single North Atlantic right whale (*Eubalaena glacialis*) approximately 20 km off the coast made while in transit to the survey area. The number of cetacean sightings varied by month; the highest number of encounters occurred in December 2010 and August 2011. A total of 1,149 sea turtles were recorded during the study period. Of these, 906 were identified as loggerheads, 45 as leatherbacks, two as Kemp’s Ridley (*Lepidochelys kempii*), and 196 as “unidentified sea turtles”. Sea turtles were observed during each month surveyed, with highest numbers recorded in July 2010 and February 2011. Sighting rates dropped dramatically as the Beaufort Sea State increased. As BSS increased from 0 to 3, cetacean sighting rates decreased from 16.53 to 6.86 per 1000 km, and sea turtle sighting rates decreased from 113.31 to 13.57 per 1000 km. In addition to cetaceans and sea turtles, other pelagic marine vertebrates (*e.g.* multiple species of sharks, manta rays, and ocean sunfish) were observed. Commercial, Navy and recreational vessels were also encountered in the survey area.

#### Vessel-Based Surveys for Cetaceans and Sea Turtles – Cape Hatteras

In May-June 2011, researchers at Duke University conducted vessel-based surveys in conjunction with a pilot whale behavioral response study off Cape Hatteras. During 13 field days, 82 sightings of seven species were recorded, including: short-finned pilot whales, bottlenose dolphins, common dolphins, Atlantic spotted dolphins, Risso’s dolphins, Cuvier’s beaked whales, and sperm whales. Twenty-four biopsy samples were obtained from bottlenose dolphins (14), Atlantic spotted dolphins (6) and short-finned pilot whales (4), plus an additional skin sample from a pilot whale from the suction cup of a Digital Acoustic Tag (DTAG). Controlled exposure playbacks were conducted with six short-finned pilot whales equipped with DTAGs and five additional four-hour focal follows were conducted with pilot whales with DTAGs. The deployment of these 11 DTAGs yielded an enormous quantity of data on the diving and foraging behavior of pilot whales, which will be useful in future modeling work aimed at estimating the availability of these animals to vessel and aerial survey platforms.



## Aerial Surveys for Cetaceans and Sea Turtles – Cape Hatteras

Researchers from the University of North Carolina Wilmington (UNCW) conducted aerial surveys off Cape Hatteras. Surveys were flown monthly between May 2011 and December 2011. The goal of each survey month was to conduct two days of effort, covering a subset of the 26 tracklines that cover the area. This goal was achieved for five of eight months. During the three remaining months (August, September and December 2011) unfavorable weather conditions precluded any survey effort. A total of 64 tracklines (5027 km) were covered in this area. Survey conditions were dominated by Beaufort Sea State (BSS) 3, but some effort occurred in both BSS 4 and 5. The rate of cetacean sightings dropped from 29.42 to 5.69 per 1000 km as BSS increased from 2 to a 5. A total of 66 sightings of 1270 cetaceans were encountered while on effort. Thirteen species of cetaceans were documented, including short-finned pilot whales; 17 sightings of 327 individuals), bottlenose dolphins (13 sightings of 272 individuals), sperm whales (10 sightings of 18 individuals), Atlantic spotted dolphins (three sightings of 84 individuals), mesoplodont beaked whales (three sightings of four individuals), Cuvier's beaked whales (*Ziphius cavirostris*; two sightings of five individuals), spinner dolphins (*Stenella longirostris*; one sighting of 70 individuals), Clymene dolphins (*Stenella clymene*; one sighting of 70 individuals), rough-toothed dolphins (*Steno bredanensis*; one sighting for four individuals), Fraser's dolphins (*Lagenodelphis hosei*; one sighting of 75 individuals), common dolphins (*Delphinus delphis*; one sighting of 300 individuals), dwarf or pygmy sperm whales (*Kogia* spp; one sighting of one individual) and fin whales (*Balaenoptera physalus*; one sighting of one individual). In seven sightings (37 individuals) the species identity could not be established with certainty. Four of these sightings were of animals of considerable size and were recorded as "unidentified cetaceans". The remaining three sightings were recorded as "unidentified delphinids". A total of 39 sea turtle sightings were recorded during this survey period, including 29 loggerhead (*Caretta caretta*) and three leatherback (*Dermochelys coriacea*) sea turtles. The remaining seven sightings could not be identified to the species level and were recorded as "unidentified sea turtles". In addition to cetaceans and sea turtles, other pelagic marine vertebrates (e.g. a small number of shark species, manta rays and ocean sunfish) were observed. Commercial, Coast Guard and recreational vessels were also encountered in the survey area.

## Density Estimation

Analysis of data from aerial and shipboard surveys of Onslow Bay site from June 2007 to April 2011 was conducted by researchers from the University of St. Andrews. This analysis generated spatial representations of the density of bottlenose dolphins, spotted dolphins, pilot and beaked whales (combined) and loggerhead turtles. In addition to estimating abundance, the statistical models also provided insight into some environmental correlates of animal distributions. To generate an estimated density map for each taxon of interest the data were analyzed by first estimating the probability of detection associated with each sighting and then estimating abundance per segment of realized trackline within the truncation distance. Estimated density maps were obtained from a two stage modeling process of these segments: firstly, probability of presence was modeled [as a logistic generalized additive model (GAM)] and secondly, estimated density within a segment, given that animals were present, was modeled. Predictions were obtained from these two models for the region of interest and the product of these two prediction surfaces gave an estimated relative density map of the region. Abundance was obtained by numerically integrating under this density surface. The resulting abundances were relative (rather than absolute) because they do not take into account imperfect detection on the trackline and the amount of time animals are submerged (and therefore unavailable for detection). Estimates of variance for the predicted abundances were obtained from bootstrapping. Detection functions were estimated from the multi-platform, multi-year Onslow Bay surveys described above, together with additional data from the UNCW right whale surveys, the 1998/1999 UNCW aerial surveys of Wallop Island and additional sightings data from vessel surveys from Cape Hatteras in 2009. Detection functions were fitted separately to the aerial sightings and the shipboard sightings but were not fitted to all of the detected species owing to a paucity of data. Instead detection functions were fitted to the species groups, *dolphins* and *whales*. Due to the shape of the perpendicular distance distributions for turtles and the lack of sightings of whales from the shipboard surveys, detection was assumed to be certain and constant (*i.e.* a strip transect) in these cases. For the two-stage modeling process of segments, the variables considered for inclusion as explanatory variables in the models were longitude, latitude, depth, year, day of year and survey platform (*e.g.* vessel or plane). If survey platform was selected in the model, then predicted values were obtained for a vessel as

the availability of animals at the surface should be higher for vessel-based surveys than aerial surveys. Estimates of species abundance were obtained for the core USWTR region and an outer region. Depending on the spatial models chosen, estimates were obtained either as an average for the entire time period or for each month (September 1998 to July 1999 and June 2007 to April 2011).

Estimated numbers of bottlenose dolphins varied between 203 (95% CI: 70 - 500, July 2007) and 1384 (275 – 3,800, April 2011) for the core USWTR region and from 543 (160 – 1170, July 2007) to 3,605 (760 – 9010, April 2011) for the outer region. Spotted dolphins were not detected in 1998/1999 but from 2007 numbers varied from 15 (0 – 52, June 2007) to 1229 (100 – 4860, January 2011) in the core region and from 31 (0 - 110, June 2007) to 2455 (215 – 8690, January 2011) in the outer region. Estimated loggerhead turtle numbers varied from 14 (8 - 30 July 2007) to 895 (530 – 1320; March 2011) in the core USWTR region and from 27 (15 - 55; July 2007) to 1615 (980 – 2330; March 2011) in the outside region. Pilot and beaked whale abundance was estimated as an average for the entire time period and was estimated to be 4 (1 – 7) in the inner region and 8 (3 – 13) in the outer region. Small sample sizes result in very little power to detect trend in abundance but there was no evidence of a decline in any species and potential evidence for an increase in both the numbers of dolphins and sea turtles.

Analysis of data from aerial and shipboard surveys of the Jacksonville study area for the period June 2009 to June 2011 was also performed by researchers from the University of St. Andrews. There were sufficient numbers of detections of loggerhead turtles, all turtles combined, and all dolphins combined to estimate monthly abundance using density surface modeling techniques. Conventional distance sampling (CDS) methods were used to estimate monthly abundances for bottlenose dolphins and spotted dolphins using the aerial survey data. Estimates were obtained for the inner core (USWTR) region and the outer region. Density surface modeling (DSM) allows animal density to vary both temporally and spatially across the survey region. To generate an estimated density map for each species/taxa of interest the count method of Hedley *et al.* (2004) was used. Firstly, the probability of detection associated with each sighting was estimated from a detection function model and this was then used to estimate abundance in small sections,

or segments, of the trackline. These estimated abundances formed the response variable in a generalized additive model (GAM) with survey platform (*i.e.* aerial or vessel), location, habitat and temporal variables as potential explanatory variables. After model selection, the chosen model was used to estimate density for the region of interest and abundance was obtained by numerically integrating under the predicted density surface. If survey platform was included in the model, then predicted values were obtained assuming a vessel to minimize problems associated with availability bias and detection on the track line, as was done for the analysis described above for Onslow Bay. Resulting estimates of abundance were relative (rather than absolute) because they do not take into account imperfect detection on the transect line nor availability at the surface. Detection functions were fitted separately to the aerial and shipboard sightings and to different species or species group. Due to the shape of the perpendicular distance distributions for sea turtles detected during the aerial survey, detection was assumed to be constant and certain within a narrow strip. All the density surface models used to estimate abundance included terms for survey platform, month, location and depth. Average monthly abundance estimates using CDS estimates from the aerial survey data, and DSM estimates obtained from both the aerial and shipboard data, were generated. These estimates indicated seasonal patterns in abundance with dolphins being more abundant in spring and autumn than in summer or winter. The highest estimate of dolphins was 23,758 animals ( $CV=0.27$ ) in April and the lowest estimate was 4,144 animals ( $CV=0.35$ ) in June. Sea turtles were more abundant in May (2856;  $CV=0.23$ ) and least abundant in November (636 animals;  $CV=0.36$ ). These seasonal patterns may be linked to sea surface temperature, which is highest between June and August and lowest in February. The spatial patterns observed in the density surface maps indicate that both dolphins and turtles were more abundant in shallower waters.

**PROTECTED SPECIES MONITORING IN THE CHERRY POINT OPAREA  
ONSLow BAY, NORTH CAROLINA  
JULY 2010 THROUGH DECEMBER 2011**



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## **Onslow Bay Vessel Surveys**

### **Methodology**

#### Study Area

The study area within the Cherry Point (CHPT) OPAREA consists of a box approximately 37% larger than the original proposed USWTR; the USWTR area itself is 25 nm (46 km) long and 20 nm (37 km) wide (approximately from NW to SE; Figure 1). Tracklines were oriented parallel to the short axis of the USWTR boundaries and perpendicular to the prevailing bathymetric and oceanographic features influencing the study area. The transect lines are spaced approximately five nm (9.3 km) apart. This design yields a total of 400 nm (741 km) of trackline available for surveys; all ten transect lines were surveyed by both aerial and shipboard platforms.

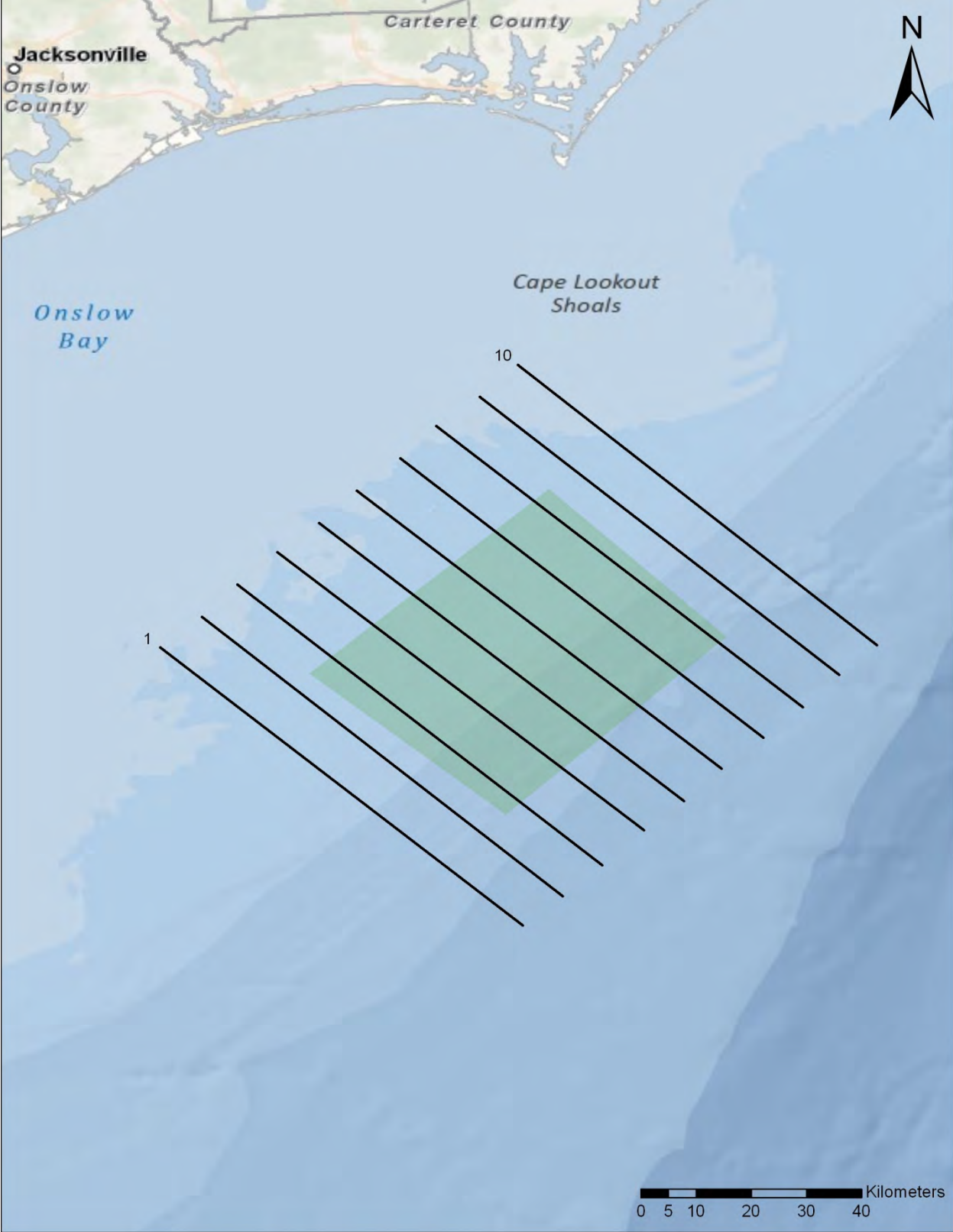


Figure 1. Map of the Onslow Bay survey area and proposed USWTR site (shaded box).

## Vessel Survey Data Collection

### Visual Surveys

Vessel-based survey platforms provide a greater probability of sighting deep-diving species than aerial surveys (Barlow and Gisiner 2006). Shipboard observers are also more likely to be able to confirm species identity, particularly for animals that are difficult to distinguish from the air.

Additionally, vessel-based platforms allow for biopsy sampling and photographic identification.

To ensure maximum detection rates, we employed a traditional visual survey approach,

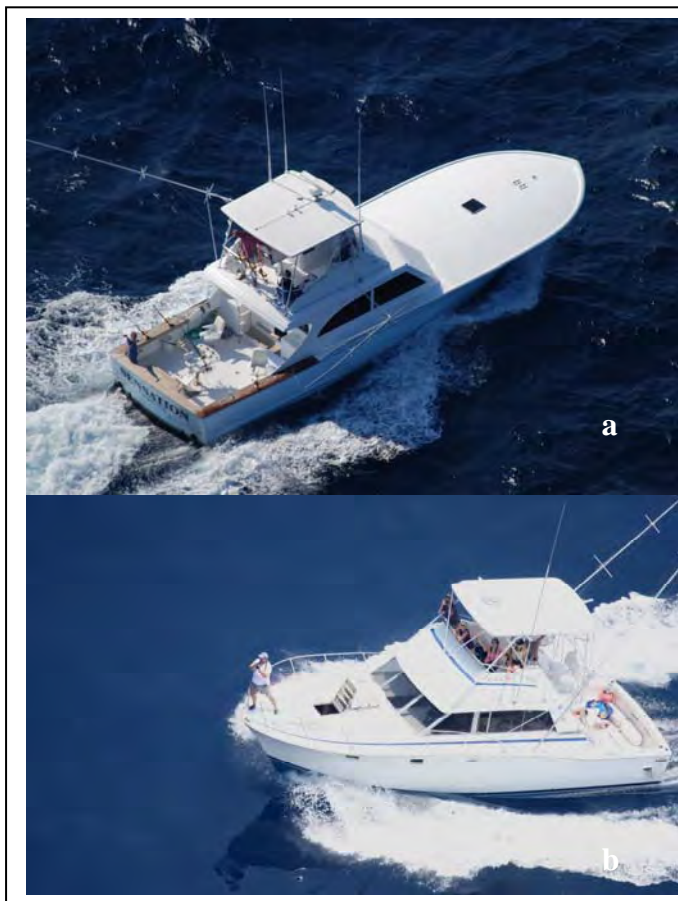


Figure 2. Vessel survey platforms, the F/V *Sensation* (a) and the R/V *Cetus* (b).

supplemented by passive acoustic monitoring using a towed hydrophone array. We conducted these surveys at a speed of approximately 10 knots.

### *Line Transect Surveys*

Visual, line-transect surveys for cetaceans and other marine megafauna were conducted from two survey platforms: the F/V *Sensation* (Fig. 2a), a 16 m offshore fishing vessel and the R/V *Cetus* (Fig. 2b), a modified 12 m offshore fishing vessel.



Observations were made from the flying bridge (5.0 m and 4.2 m above waterline for the *Sensation* and *Cetus*, respectively) by naked eye and 7x50 binoculars. Two observers (one port and one starboard) scanned constantly from straight ahead to 90° abeam either side of the trackline. A center observer monitored the trackline, coordinated with the vessel skipper and acted as data recorder. Observations were conducted following standard distance sampling/line transect methods for cetaceans, similar to those described by Barlow and Gisiner (2006). The location, species and behavior of each cetacean group were recorded. If turtles were encountered, the location and species were recorded. Each observer estimated cetacean group size independently and individual estimates were averaged at the end of the survey to generate an overall estimate of group size. Environmental conditions (weather, sea state, depth and sea surface temperature) were recorded every 30 minutes, at each sighting and whenever sighting conditions changed. Sighting and environmental data were entered into an at-sea data collection system (*VisSurvey*, developed by Dr. Lance Garrison, NOAA/SEFSC) linked with the onboard GPS.

In addition, use of the Onslow Bay survey area by individual cetaceans was monitored using photo-identification techniques. This approach is feasible for sperm, beaked and humpback whales, bottlenose, spotted and Risso's dolphins, pilot whales and other species of odontocetes. Thus, whenever possible, photographs were obtained of cetaceans for individual photo-identification; we also use these photographs to confirm species identification at each sighting and to compare identification features with those used by the aerial survey team. Photographs were taken with Canon or Nikon digital SLRs (equipped with 100-300 mm zoom lenses) in 24-bit color at a resolution of 3072 X 2048 pixels and saved in jpg format.

### *Photo-ID and Biopsy Surveys*

Shipboard line-transect survey methods transitioned to biopsy and photo-identification sampling at the end of April 2011. We are focusing on residency and population structure with our shipboard surveys because we are: (1) obtaining adequate data with which to estimate density from aerial line transect sampling; (2) interested in addressing questions of residency as photo-identification data from Onslow suggest considerable residency in that area despite minimal sampling; and (3) not observing a large number of deep-diving marine mammal species on either platform using line transect survey method in Onslow Bay that are likely to be missed during aerial surveys.

Photo-ID and biopsy surveys for cetaceans and other marine megafauna were conducted from 01 May 2011 to 31 December 2011 aboard the F/V *Sensation* (Fig. 2a). Survey methods were consistent with line-transect survey protocol, but effort was not confined to the established tracklines. Most survey effort was expended along the 200 m depth contour and occasionally around eddies and fronts generated by the Gulf Stream. The *VisSurvey* software program was not required for opportunistic visual sampling. Instead, sighting and environmental data were recorded using a combination of datasheets, an iPad tablet and GPS unit. Every effort was made to collect photo-identification images of as many individuals in a group as possible, and remote biopsy sampling methods were used to collect small skin and blubber samples using 27 kg – 68 kg pull crossbows equipped with a specialized 2.5 cm long corer-tipped bolts, typically from the stern of the vessel.

## Passive Acoustic Monitoring

Passive acoustic data were collected in the Onslow Bay survey area using two methods: a towed hydrophone array and bottom-mounted recorders.

### *Towed Array*

A four-element array was towed behind the survey vessel to allow acoustic detection of vocalizing cetaceans. The towed array (manufactured by Seiche Instruments, UK) consisted of four hydrophone elements with approximate linear sensitivity to frequencies between 1 kHz and 100 kHz. The array was towed 150 m behind the vessel and acoustic signals were routed to an analog-to-digital converter/mixer (MOTU Traveler, MOTU, Cambridge, MA) sampling at 192 kHz. These signals were then passed to two personal laptop computers equipped with software for real-time visualization/recording (*Ishmael 1.0*) and spatial localization (*WhalTrak 2.0*) of cetacean sounds. An acoustician (Dr. Lynne Williams Hodge) monitored the array and made recordings of all potential cetacean sounds detected and any other novel sounds.

### *Bottom-mounted Recorders*

To collect time-series of acoustic data in the Onslow Bay survey area, autonomous High-frequency Acoustic Recording Packages (HARPs; Wiggins and Hildebrand 2007) were utilized. The HARP data-logging system includes a 16-bit A/D converter, up to 1.9 TB of storage capacity, a hydrophone suspended 10m above the seafloor, an acoustic release system, ballast weights, and flotation. The data-loggers are capable of sampling up to 200 kHz and can be set to record continuously or on a duty cycle to accommodate variable deployment durations. These instruments combine high and low frequency hydrophone elements to detect the vocalizations of

both odontocete and mysticete whales. The units sample at rates high enough to capture the clicks of many odontocetes.

Two HARPs were deployed on 29 July 2010. One instrument was returned to Site A (33.7932 and -76.5162, 171 m depth) and one was deployed at a new, deeper site (Site D: 33.5807 and -76.5502, 338 m depth) (Table 1; Figure 3). Both instruments were recovered on 10 June 2011. On 18 August 2011, we deployed one HARP at another new, deeper site (site E: 33.7779 and -75.9264, 952 m depth) (Table 1; Figure 3). This instrument is currently in the field and is expected to be retrieved sometime during the spring of 2012. For all deployments in Year Four the instruments were programmed to record at a sampling rate of 200 kHz for five-minute periods separated by an inactive interval of five minutes.

*Table 1.* Harp deployments in the Onslow Bay survey area during Years 1-4.

Site	Deployment Date	Retrieval Date	Latitude	Longitude	Depth (m)	Sampling Rate	Duty Cycle	Amount of data
1A	9-Oct-07	27-May-08	33.79138	-76.52382	162m	200 kHz	5 min on/5 min off	2TB
2B	30-May-08	24-Nov-08	33.81107	-76.42829	232m	200 kHz	5 min on/5 min off	2TB
3A	24-Apr-09	16-Sep-09	33.7895	-76.5192	174m	200 kHz	5-min on/5-min off	2TB
4A	8-Nov-09	19-Jun-10	33.7873	-76.5241	171m	200 kHz	5-min on/10-min off	1.2TB
4C	8-Nov-09	19-Jun-10	33.6778	-76.4769	335m	200 kHz	5-min on/10-min off	2TB
5A	29-Jul-10	10-Jun-11	33.7932	-76.5162	171m	200 kHz	5-min on/5-min off	~2TB
5D	29-Jul-10	10-Jun-11	33.5807	-76.5502	338m	200 kHz	5-min on/5-min off	~2TB
6E	18-Aug-11		33.7779	-75.9264	952m	200 kHz	5-min on/5-min off	

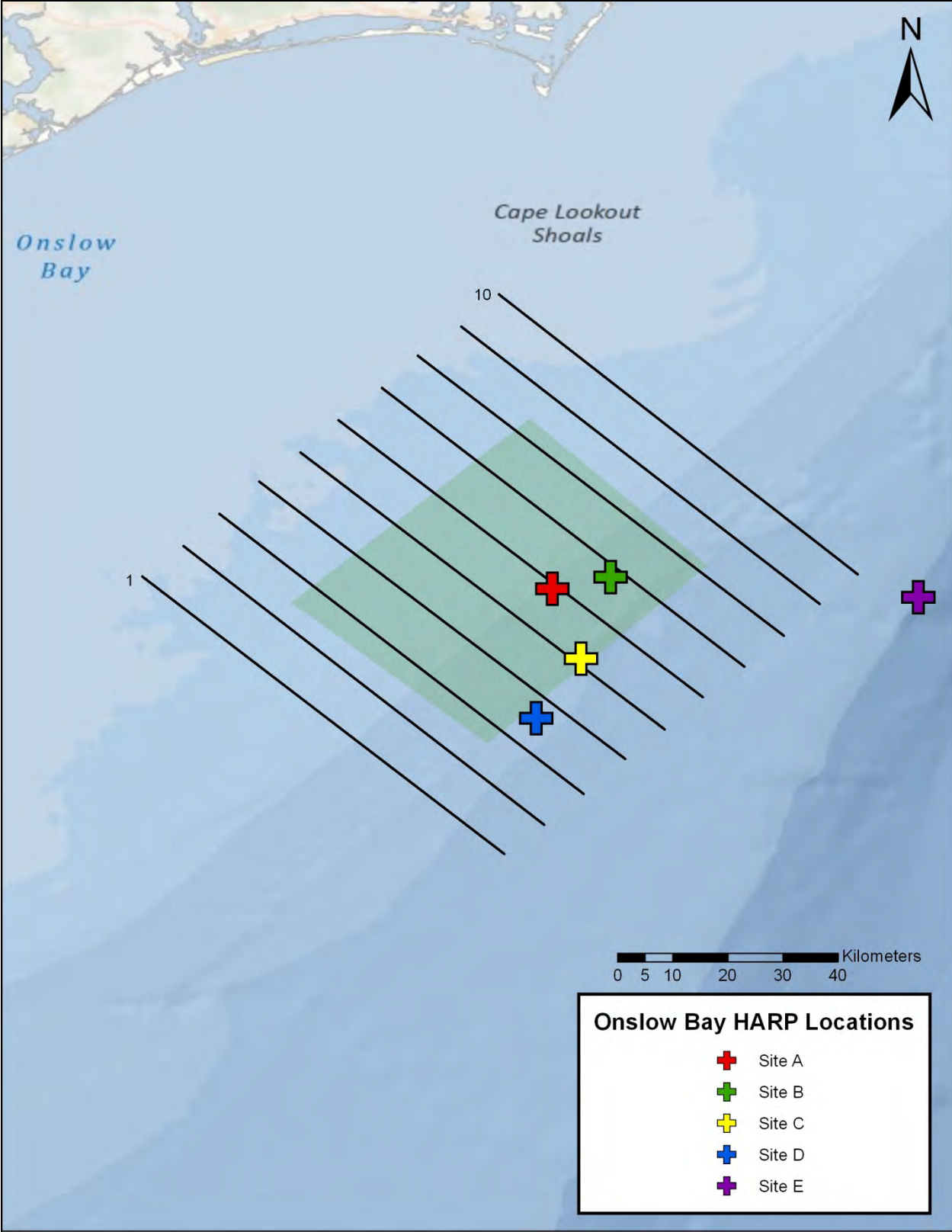


Figure 3. Location of HARP deployment sites in the Onslow Bay survey area.

## Data Analysis

Vessel survey effort and sighting data were compiled and mapped using *ArcGIS* 10.0 to illustrate the location of effort and sightings within the study area. All sighting data (including radial distance and bearing estimates for each cue) were forwarded to Dr. Charles Paxton at CREEM at the University of St. Andrews, UK for density estimation. Vessel based survey tracks and sighting locations from July 2010 through December 2011 have been posted on the digital data repository OBIS-SEAMAP (<http://seamap.env.duke.edu/>).

## Acoustic Analysis

### *Towed Array Analysis*

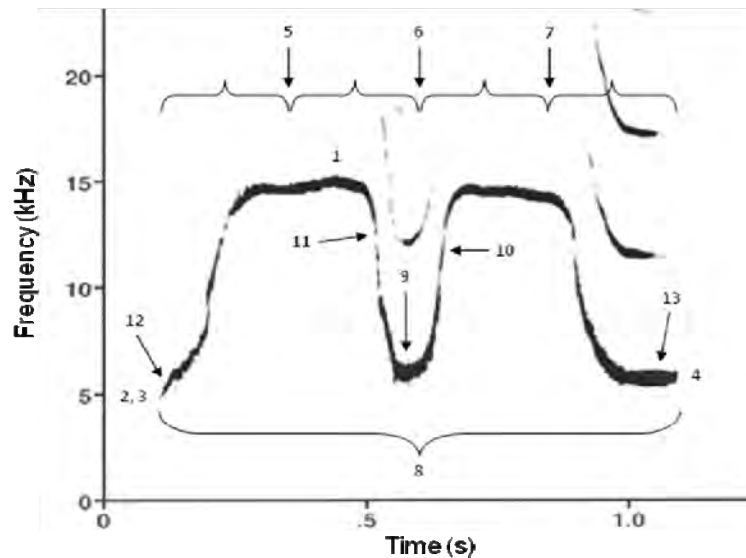
Towed hydrophone array recordings were analyzed with custom programs written in *MATLAB* (Mathworks, Natick, MA). To extract whistle and click features for use in automated species classification algorithms, individual clicks and whistles must be detected. A custom *MATLAB*-based spectral domain whistle and click detector was run on all towed array data. This detector had poor performance (high false alarm rates) due to high noise in the shallow water environment, possibly caused by snapping shrimp and proximity to the sea-surface. *Raven* 1.3 (Bioacoustics Research Program of the Cornell Lab of Ornithology, Ithaca, NY) is now being used to locate and save whistles from these towed array recordings. These whistles will be used to look for species-specific features in Atlantic delphinids in collaborative work with Dr. Julie Oswald (Bio-Waves, Inc.). Species-specific patterns in echolocation clicks, such as consistent peaks and notches, will also be examined, using techniques similar to those employed by Soldevilla *et al.* (2008). The Onslow Bay and JAX towed array recordings will be combined for

this analysis. Analysis of variance (ANOVA) will be used to determine if there are species-specific frequency differences in peaks and notches of echolocation clicks.

### *Whistle Analysis*

The software program *Raven* 1.3 was used to locate whistles in spectrograms derived from the towed array recordings. Individual whistles were saved as separate files. Up to 35 good quality whistles were randomly selected from each recording session and the whistle contours were extracted using a *MATLAB*-based program called *Beluga* (written by Volker Deecke and Vincent Janik). To look for species-specificity in whistles, 22 variables, 10 of which have not been commonly reported, were measured for each whistle contour using customized routines in *MATLAB* (Mathworks, Natick, MA). These variables included: the maximum, minimum, start, end, first quartile, second quartile, third quartile, and mean frequencies (kHz) and slopes (kHz/s); the frequency and slope range; the start and end slope sign; the duration(s); and the number of inflection points (Figure 4).

Comparisons of each whistle variable were performed using Kruskal-Wallis tests followed by multiple comparison tests with Bonferroni corrections (using *JMP* software, SAS, Cary, NC) on the significant results to determine which species had significantly different whistle variables. In addition, Classification And Regression Trees (CARTs) were constructed in *MATLAB* using the 22 measured variables. This analysis provided the percentage of total whistles assigned to the correct species (the correct classification rate). To determine if these correct classification rates for individual species were greater than expected by chance (calculated by dividing 100% by the number of species), chi-square tests with  $\alpha = 0.05$  were performed.



*Figure 4.* Spectrogram of a whistle showing several of the extracted variables, including: (1) maximum frequency, (2) minimum frequency, (3) start frequency, (4) end frequency, (5) location of 1st quartile measurements, (6) location of 2nd quartile measurements, (7) location of 3rd quartile measurements, (8) duration, (9) example of an inflection point, (10) maximum slope, (11) minimum slope, (12) start slope, and (13) end slope.

### *Click Analysis*

Customized routines in *MATLAB* were used to select clicks from the towed array recordings (see Soldevilla *et al.* 2008 for more details). Up to five clicks per click train were selected because trains could include clicks from multiple animals that were clicking at the same time (and thus had overlapping trains). Also, individual variation exists in the spectral structure of clicks depending on the animal's orientation to the hydrophone and thus the inclusion of more than one click from a train would likely capture such variation. The selected clicks were analyzed for species-specificity by determining the frequency values of consistent spectral peaks and notches in the frequency domain. For each species, histograms consisting of 750 Hz-wide bins were made showing the number of clicks with peaks or notches at each frequency value. These bins



were compared to a random uniform distribution using a one-tailed z-test. Bins that rose significantly above this uniform distribution indicated they occurred more often than expected by chance. Frequency bins that were significantly greater than the random uniform distribution and that had at least one adjacent frequency bin that was also significantly greater were considered consistent. To obtain the means and ranges for the consistent peaks and notches, a set of Gaussian curves was fit to each histogram that had consistent bands using Gaussian mixture models. The dominant Gaussian curve fit to each consistent peak or notch was used to obtain the mean and standard deviation for each peak or notch frequency value.

### *HARP Analysis*

HARP data require processing prior to analysis, including backing up data in original format, converting data to wav format, decimating wav data by a factor of 100 to aid in baleen whale detection, and creating long-term spectral averages (LTSAs). Prior to addition of the new compression code, each HARP deployment resulted in approximately two terabytes (TB) of data. Starting with the deployments in Year Four, the compression code was implemented which allowed for greater than two TB of data to be collected after the raw data were decompressed. This amount of data is impractical to analyze manually, so these data were compressed for visual overview by creating LTSAs from the *wav* files, which allowed for rapid review of the data. LTSAs are effectively compressed spectrograms created using the Welch algorithm (Welch 1967) by coherently averaging 500 spectra created from 2000-point, 0%-overlapped, Hann-windowed data and displaying these averaged spectra sequentially over time. The resulting LTSAs had resolutions of 5 s in time and 100 Hz in frequency (for the original data) and 5 s in time and 1 Hz in frequency (for the data decimated by a factor of 100). Using LTSAs, high-

energy acoustic events can easily be distinguished from background noise (Wiggins and Hildebrand 2007), allowing for an efficient review of these large data sets.

LTSAAs made using a *MATLAB*-based acoustic program called *Triton* (Hildebrand Lab at Scripps Institution of Oceanography, CA) were used to look for odontocete whistle and click events in the HARP data from the fourth deployment (Sites A and C). LTSAAs were inspected for high-energy events representing whistles and clicks. The start and end time were noted for each odontocete vocal event. The vocal events were then sorted into one of four groups - Risso's dolphins, sperm whales, *Kogia* spp., and unidentified delphinids. The vocal events were then examined for diel patterns in occurrence by dividing the recordings into one-minute bins and assigning bins with vocalizations present a score of 1 and bins with vocalizations absent a score of 0. Photoperiod status (dawn, day, dusk, and night) was assigned to each one-minute bin, based on data from the U.S. Naval Observatory (<http://aa.usno.navy.mil>). The overall duration of vocal events was corrected for effort by dividing by each photoperiod's recording effort for each date. Diel variation in this effort-corrected overall duration of vocal events (or occurrence) was examined using a Kruskal-Wallis test followed by multiple comparison tests with Bonferroni corrections (using *JMP* software) on the significant results.

LTSAAs were also made for the decimated data to look for baleen whale calls. As described for the odontocetes, the start and end time were noted for baleen whale vocal events. Vocal events were sorted by call type and assigned to a species (when possible) using the characteristics of published call types. Daily vocal durations were calculated and seasonal trends were examined during each deployment period for each call type.

## Data Storage

All acoustic, visual survey, and photographic data are archived on digital media and backed up on a Duke University network server.

## **Results**

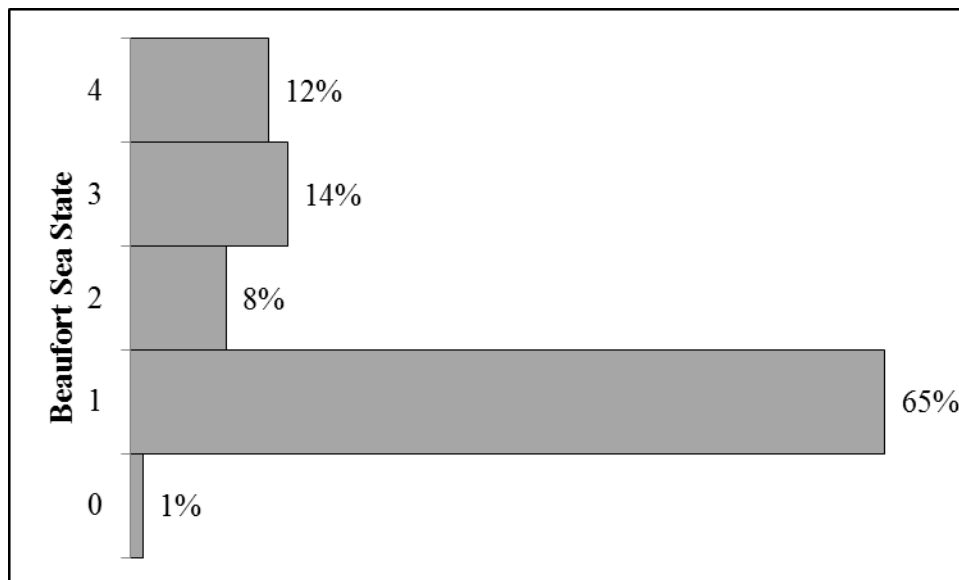
### Line Transect Vessel Survey Effort

Between 01 July 2010 and 30 April 2011, five tracklines were surveyed (Table 2) covering 333.4 km during approximately 24.9 field hours (20.5 hours on effort, 4.4 hours off effort).

Surveys were conducted in Beaufort Sea States (BSS) 0 to 4. Most survey effort was conducted in optimal sighting conditions of BSS 1 (65%), and the effort conducted in a BSS 3 or greater (26%) occurred during a single survey on 07 July 2010 (Figure 5).

*Table 2.* Vessel effort in the Onslow Bay survey area. Number of tracklines completed per year. Year 1 includes June 2007 through June 2008. Year 2 includes July 2008 through June 2009. Year 3 includes July 2009 through June 2010. Year 4 includes July 2010 – April 2011. Survey effort is rounded to the nearest integer.

<b>Trackline</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
<b>1</b>	1	1	2	0
<b>2</b>	2	2	1	1
<b>3</b>	3	3	2	0
<b>4</b>	4	2	2	1
<b>5</b>	4	4	1	1
<b>6</b>	3	2	1	1
<b>7</b>	4	1	4	0
<b>8</b>	2	2	3	1
<b>9</b>	3	4	2	0
<b>10</b>	4	2	3	0
<b>Total</b>	<b>30</b>	<b>23</b>	<b>21</b>	<b>5</b>



*Figure 5.* Distribution of sea state conditions (% of total on effort) for line-transect vessel surveys during Year Four in the Onslow Bay survey area.

### Photo-ID and Biopsy Survey Effort

Between 01 May 2011 and 31 December 2011, 420.6 km were surveyed during approximately 26.7 hours of photo-ID and biopsy surveys. Surveys were conducted in Beaufort Sea States (BSS) 2 to 4. Most survey effort was conducted in BSS 2 to 3 (91%); no effort was conducted in optimal (BSS 0 to 1) sighting conditions (Figure 6).

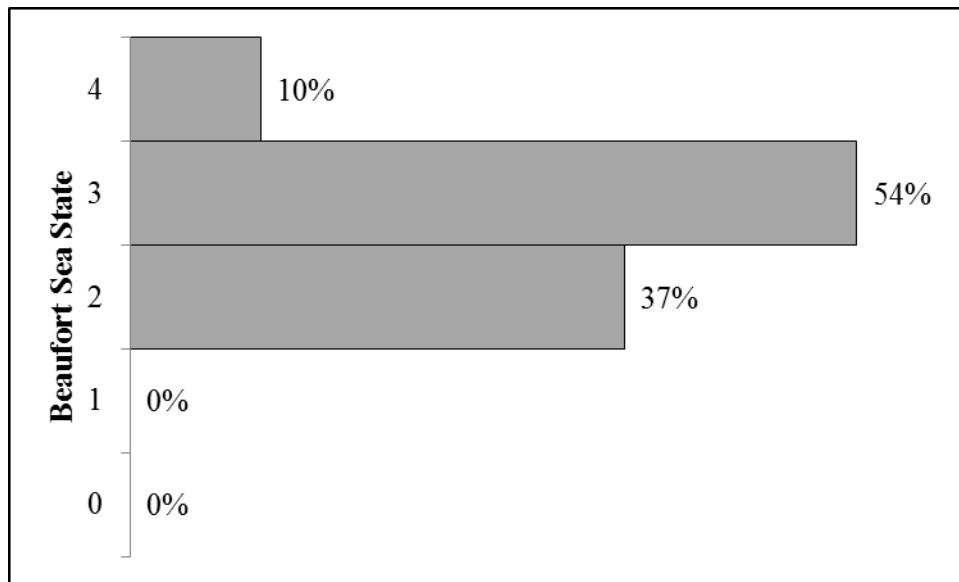


Figure 6. Distribution of sea state conditions (% of total on effort) for photo-ID vessel surveys during Year Four in the Onslow Bay survey area.

### Marine Mammal and Sea Turtle Line Transect Sightings

Eleven marine mammal sightings were observed during line-transect vessel surveys (nine on effort; two off effort) in Year Four (Table 3 and 4). Two species of cetaceans were detected visually in the study area: bottlenose dolphins (*Tursiops truncatus*, n = 6; 4 on effort) and Atlantic spotted dolphins (*Stenella frontalis*, n = 5 on effort). No mixed-species groups were observed (Table 3). Overall, sightings per unit effort was highest in Beaufort Sea State 1 and

lowest in BSS 3 and 4, although only one sighting was recorded in BSS 4 during Year Four (Figure 7).

Two sightings of loggerhead sea turtles (*Caretta caretta*) were recorded during line-transect vessel surveys (one on effort; one off effort) in Year Four (Tables 3 and 5). No other turtle species were observed.

#### Photo-ID and Biopsy Survey Sightings

Five marine mammal sightings were recorded during photo-ID and biopsy surveys in Year Four (Table 3 and 4). Two species of cetaceans were observed: bottlenose dolphins (n = 1) and Atlantic spotted dolphins (n = 4). No mixed-species groups were observed (Table 3). Sightings per unit effort was highest in BSS 2, and there were no sightings recorded in conditions greater than BSS 3 (Figure 8).

One sighting of a loggerhead sea turtle (*Caretta caretta*) was recorded during these vessel surveys in Year Four (Tables 3 and 5).

Table 3. Vessel-based cetacean and sea turtle sightings made from line-transect and photo-ID vessel surveys in the Onslow Bay survey area during Year Four, July 2010 through December 2011.

Date	Time	Latitude	Longitude	Line	Depth (m)	Temp (°C)	Species	Group Size	Effort
7-Jul-10	11:11	33.95380	-76.86047	5	35.3	29.4	<i>Stenella frontalis</i>	2	On
17-Aug-10	12:33	33.90750	-76.66831	6	40.4	30.6	<i>Tursiops truncatus</i>	4	Off
23-Sep-10	10:10	33.49621	-76.66118	2	295.5	30.1	<i>Tursiops truncatus</i>	21	On
23-Sep-10	13:13	33.79537	-77.04566	2	35.6	29.9	<i>Tursiops truncatus</i>	4	On
24-Sep-10	9:59	33.76561	-76.21007	8	561.6	30.2	<i>Tursiops truncatus</i>	2	On
24-Sep-10	10:13	33.76164	-76.15542	8	542.6	30.4	<i>Tursiops truncatus</i>	22	Off
24-Sep-10	12:39	33.97582	-76.48651	8	40.1	30.3	<i>Stenella frontalis</i>	15	On
24-Sep-10	13:30	33.98877	-76.50209	8	39.7	29.3	<i>Stenella frontalis</i>	3	On
24-Sep-10	13:44	34.00135	-76.51649	8	38.8	29.1	<i>Caretta caretta</i>	1	On
24-Sep-10	13:57	34.02712	-76.55010	8	38.2	29.2	<i>Stenella frontalis</i>	4	On
24-Sep-10	14:09	34.03299	-76.55619	8	38.2	29.1	<i>Caretta caretta</i>	1	Off
24-Sep-10	15:17	34.16008	-76.72719	8	32.3	28.5	<i>Stenella frontalis</i>	4	On
10-Oct-10	11:00	33.64702	-76.58209	4	245.1	28.9	<i>Tursiops truncatus</i>	6	On
22-May-11	13:17	33.72524	-76.68037	na	98.8	26.2	<i>Tursiops truncatus</i>	35	On
22-May-11	15:13	33.88683	-76.57582	na	46.5	25.9	<i>Stenella frontalis</i>	20	On
1-Jul-11	14:16	33.99230	-76.41005	na	45.7	29.2	<i>Stenella frontalis</i>	10	On
12-Sep-11	7:30	34.26344	-76.67474	na	30.2	26.9	<i>Stenella frontalis</i>	40	On
21-Nov-11	8:30	33.78930	-76.83564	na	na	na	<i>Stenella frontalis</i>	5	On
21-Nov-11	12:52	33.94693	-76.63520	na	41.3	25.1	<i>Caretta caretta</i>	1	On

Table 4. Number of sightings and mean group size for each species observed from Year 1 through Year 4 of line-transect and photo-ID vessel surveys in the Onslow Bay survey area.

Species	Sightings					Mean Group Size
	Year 1	Year 2	Year 3	Year 4 Line Transect	Year 4 Photo-ID	
<i>Globicephala</i> spp.	1	0	2	0	0	31.0
<i>Grampus griseus</i>	3	0	3	0	0	30.5
<i>Stenella frontalis</i>	6	17	17	5	4	16.5
<i>Tursiops truncatus</i>	23	14	29	6	1	11.2
<i>Steno bredanensis</i>	0	0	1	0	0	27.0
Unid. delphinid	3	2	3	0	0	1.7
<b>Total:</b>	<b>36</b>	<b>33</b>	<b>55</b>	<b>11</b>	<b>5</b>	

Table 5. Number of sea turtle sightings for each species observed from Year 1 through Year 4 of line-transect and photo-ID vessel surveys in the Onslow Bay survey area.

Species	Sightings				
	Year 1	Year 2	Year 3	Year 4 Line Transect	Year 4 Photo-ID
<i>Caretta caretta</i>	19	49	47	2	1
<i>Dermochelys coriacea</i>	0	0	2	0	0
Unid. sea turtle	1	0	1	0	0
<b>Total:</b>	<b>20</b>	<b>49</b>	<b>50</b>	<b>2</b>	<b>1</b>

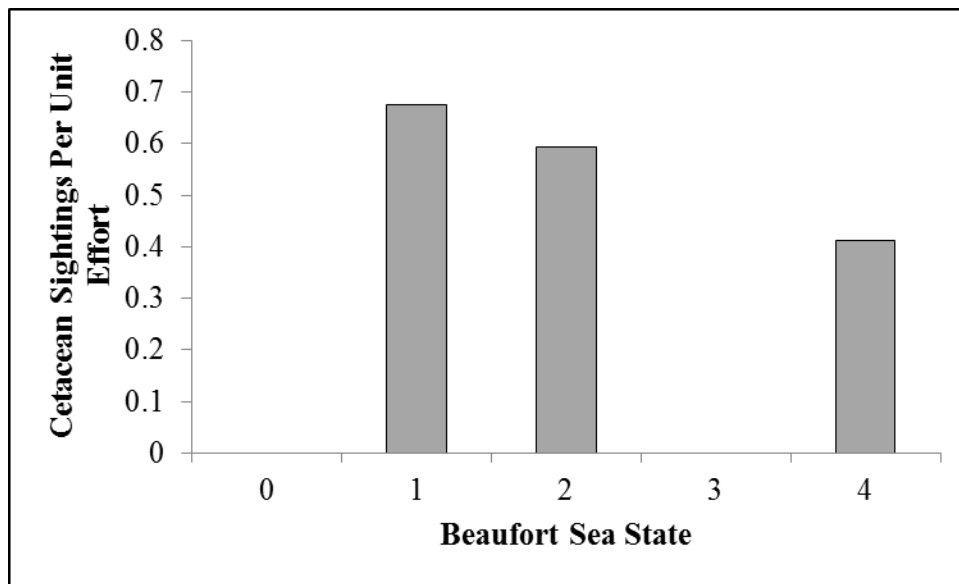
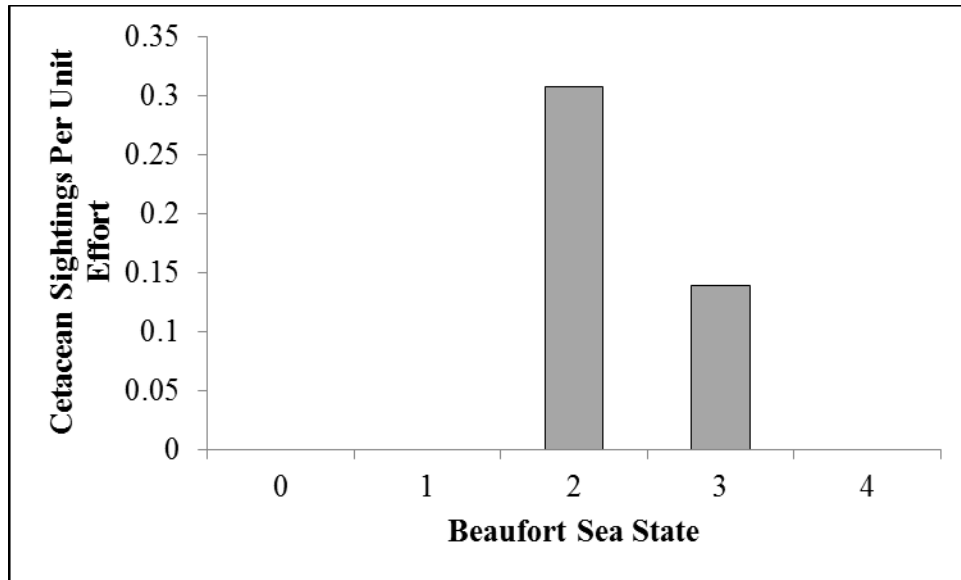


Figure 7. Number of cetacean sightings from line-transect vessel surveys in the Onslow Bay survey area in Year Four corrected for hours on effort in each Beaufort Sea State.





*Figure 8.* Number of cetacean sightings from photo-ID vessel surveys in the Onslow Bay survey area in Year Four corrected for hours on effort in each Beaufort Sea State.

Descriptive statistics for bottlenose dolphin and spotted dolphin sightings are presented in Figures 9 and 10, respectively. In general, bottlenose dolphins were detected in deeper waters than spotted dolphins (mean water depth of 296.5 m versus 38.5 m, respectively) and in slightly warmer water (mean values of 29.5°C and 28.6°C, respectively). Mean group size for bottlenose dolphins was greater than spotted dolphins (13.4 versus 11.4 individuals per group). Both species exhibited a bi-modal distribution of group size, with similar median values (bottlenose dolphins, 6 individuals; spotted dolphins, 5 individuals). Mean water depth and temperature for loggerhead sea turtles were 39.4 m and 27.8°C, respectively (Figure 11).

**Bottlenose dolphin (*Tursiops truncatus*)**

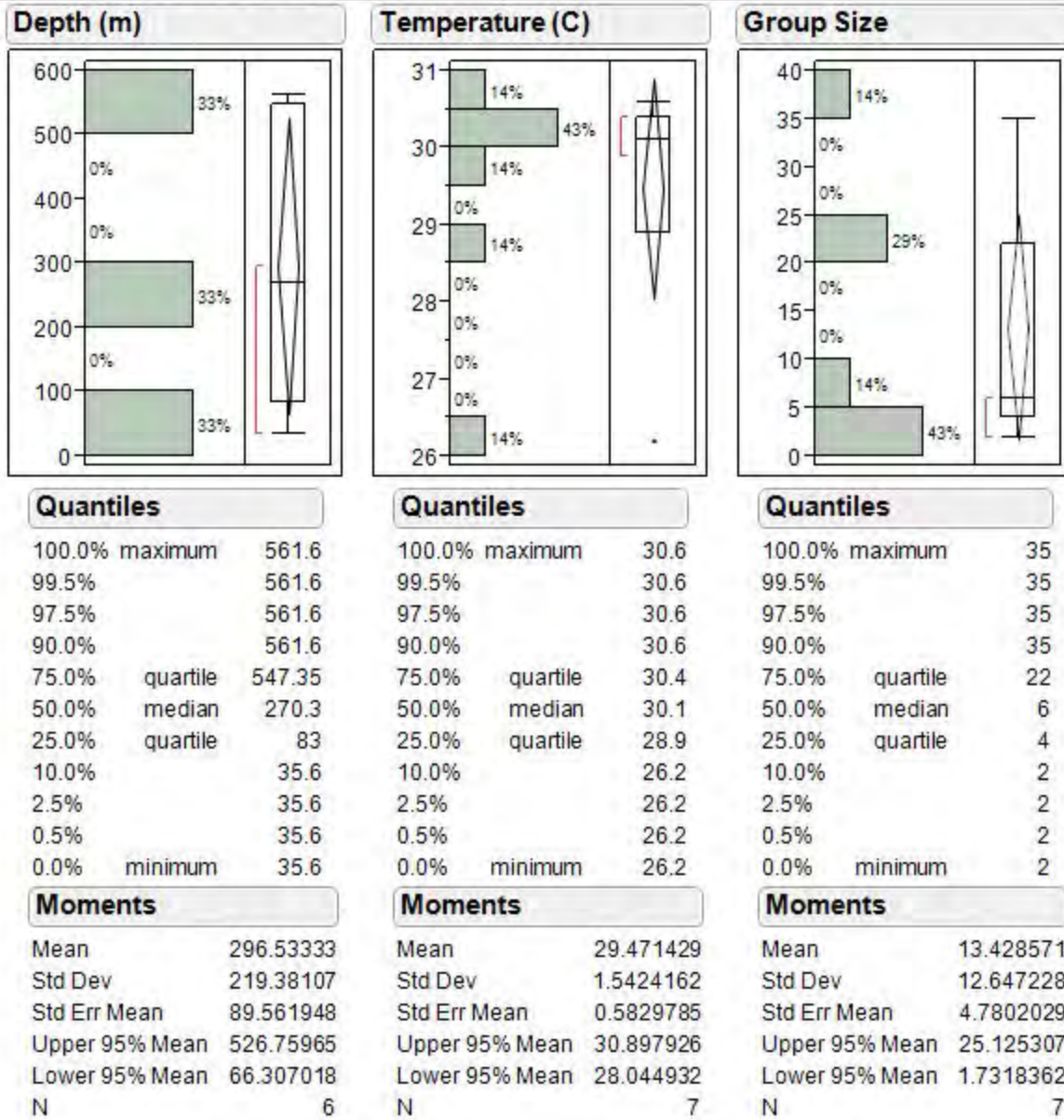


Figure 9. Descriptive statistics for depth, sea surface temperature, and group size estimates for bottlenose dolphin sightings during line-transect and photo-ID vessel surveys in the Onslow Bay survey area (July 2010 through December 2011).

### Atlantic spotted dolphin (*Stenella frontalis*)

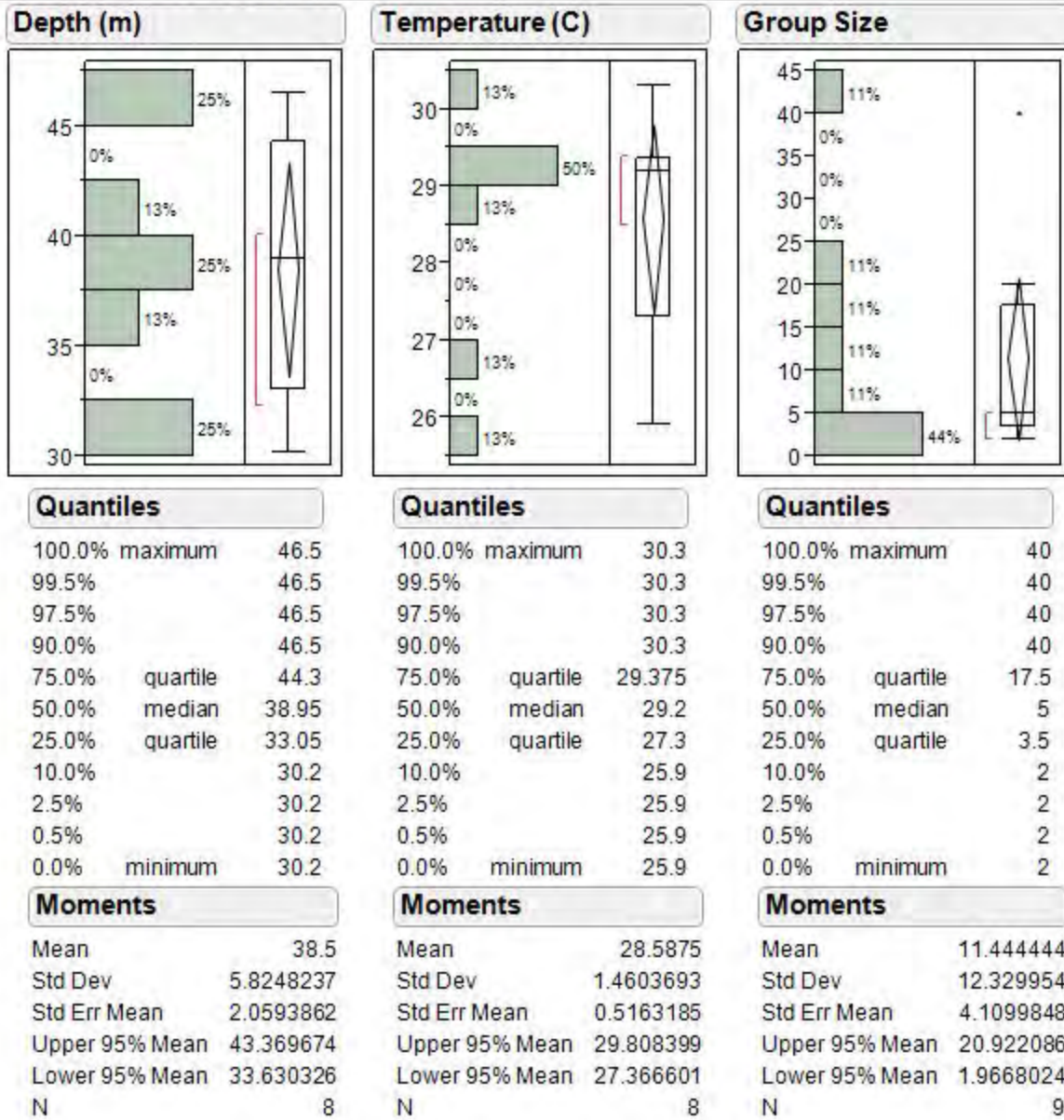


Figure 10. Descriptive statistics for depth, sea surface temperature, and group size estimates for Atlantic spotted dolphins sightings during line-transect and photo-ID vessel surveys in the Onslow Bay survey area (July 2010 through December 2011).

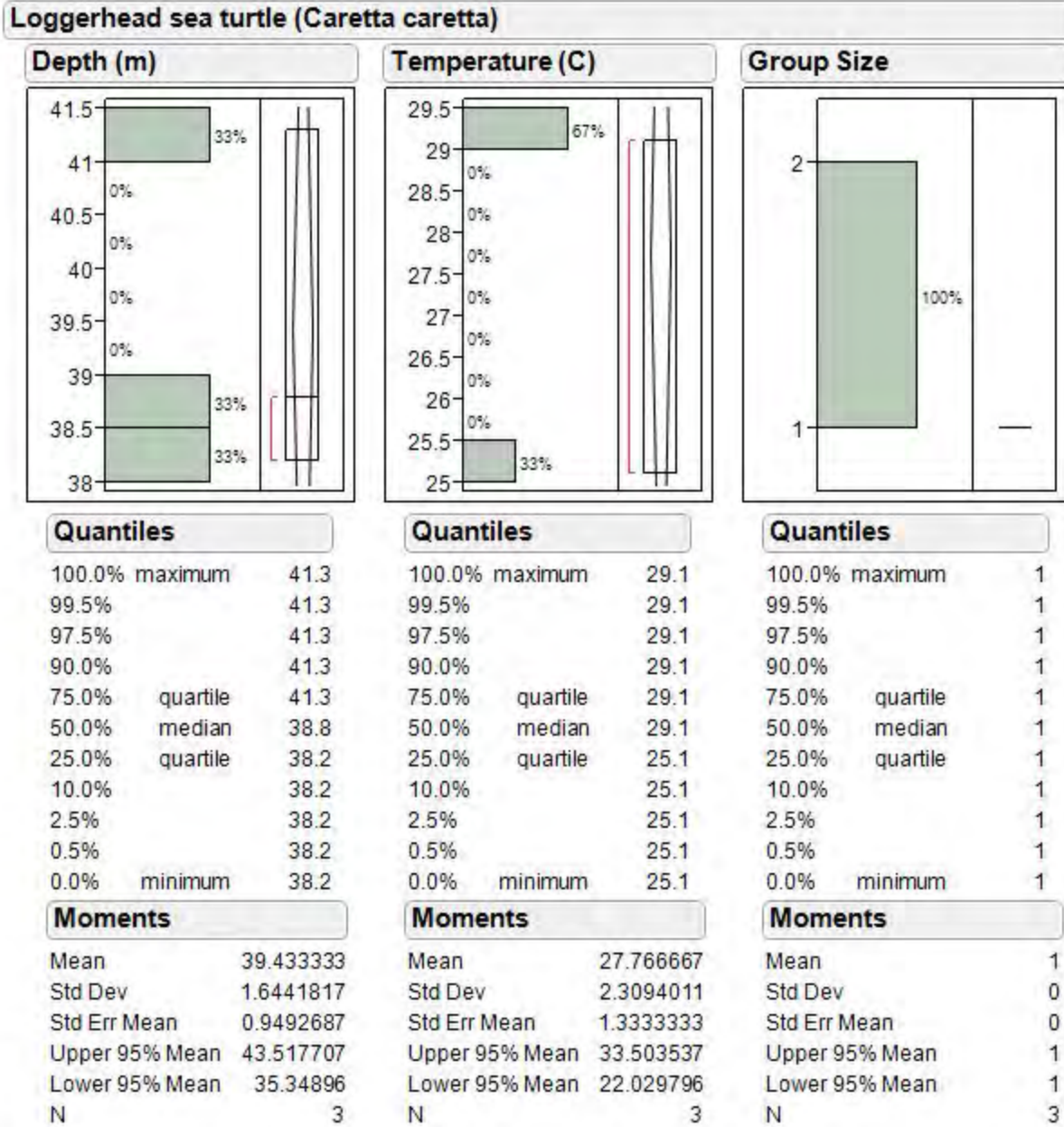


Figure 11. Descriptive statistics for depth, sea surface temperature, and group size estimates for loggerhead sea turtles sightings during line-transect and photo-ID vessel surveys in the Onslow Bay survey area (July 2010 through December 2011).

## Distributions and Habitat Associations of Cetaceans and Sea Turtles

The distribution of marine mammal sightings, by species, is presented in Figures 12, 13, 15, and 16. As was the case in previous years, spotted dolphins were restricted to relatively shallow shelf waters, whereas bottlenose dolphins ranged over a larger area with several groups detected in deeper waters (this likely reflects the presence of both the coastal and offshore ecotypes of this species in the study area). This inter-specific pattern of distribution has been consistent in all years of the monitoring program. The distribution of sea turtle sightings is depicted in Figures 14 and 17.

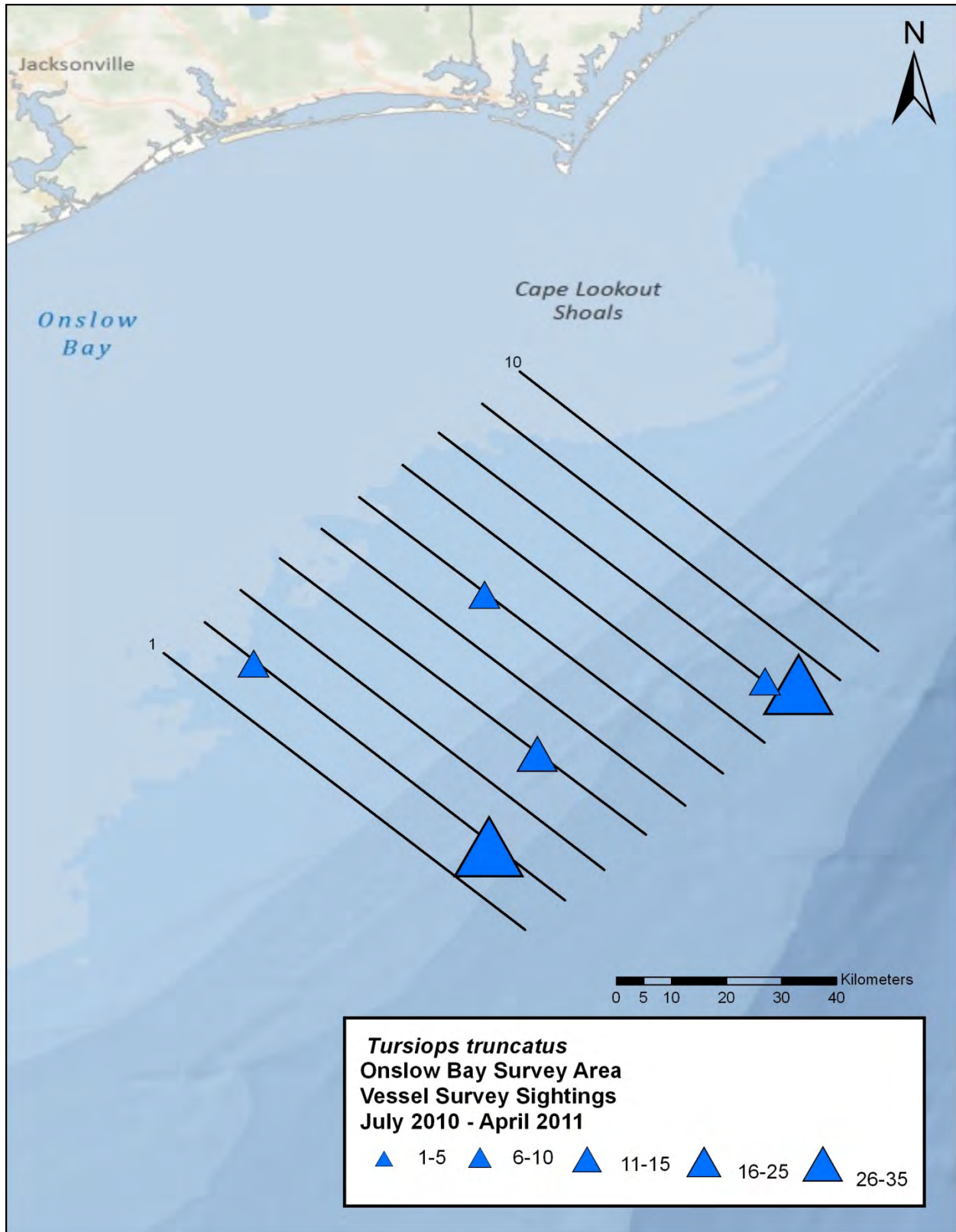


Figure 12. Distribution of bottlenose dolphin sightings indicating group size made during vessel-based line-transect surveys in the Onslow Bay survey area, July 2010 - April 2011.

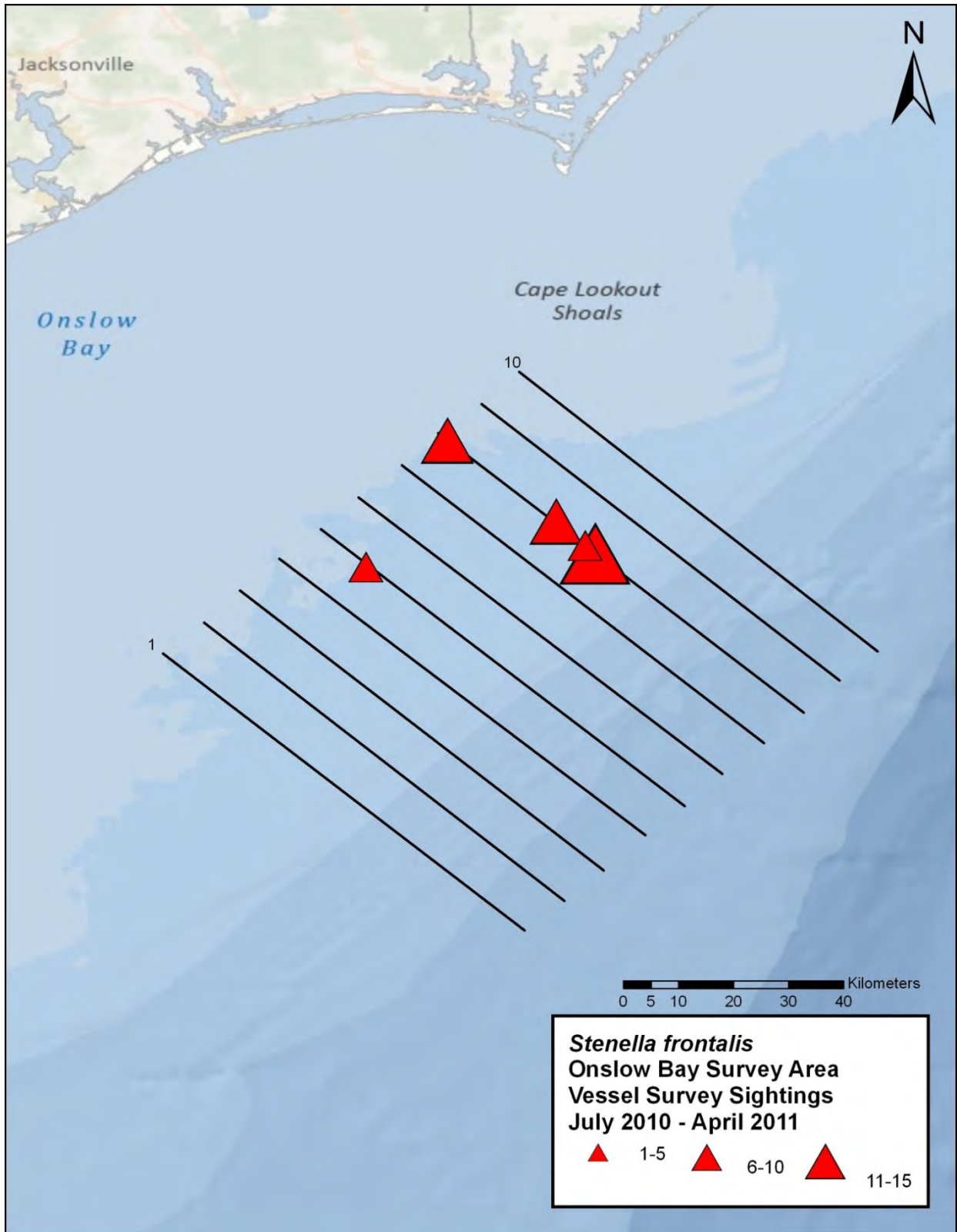


Figure 13. Distribution of Atlantic spotted dolphin sightings indicating group size made during vessel-based line-transect surveys in the Onslow Bay survey area, July 2010 - April 2011.

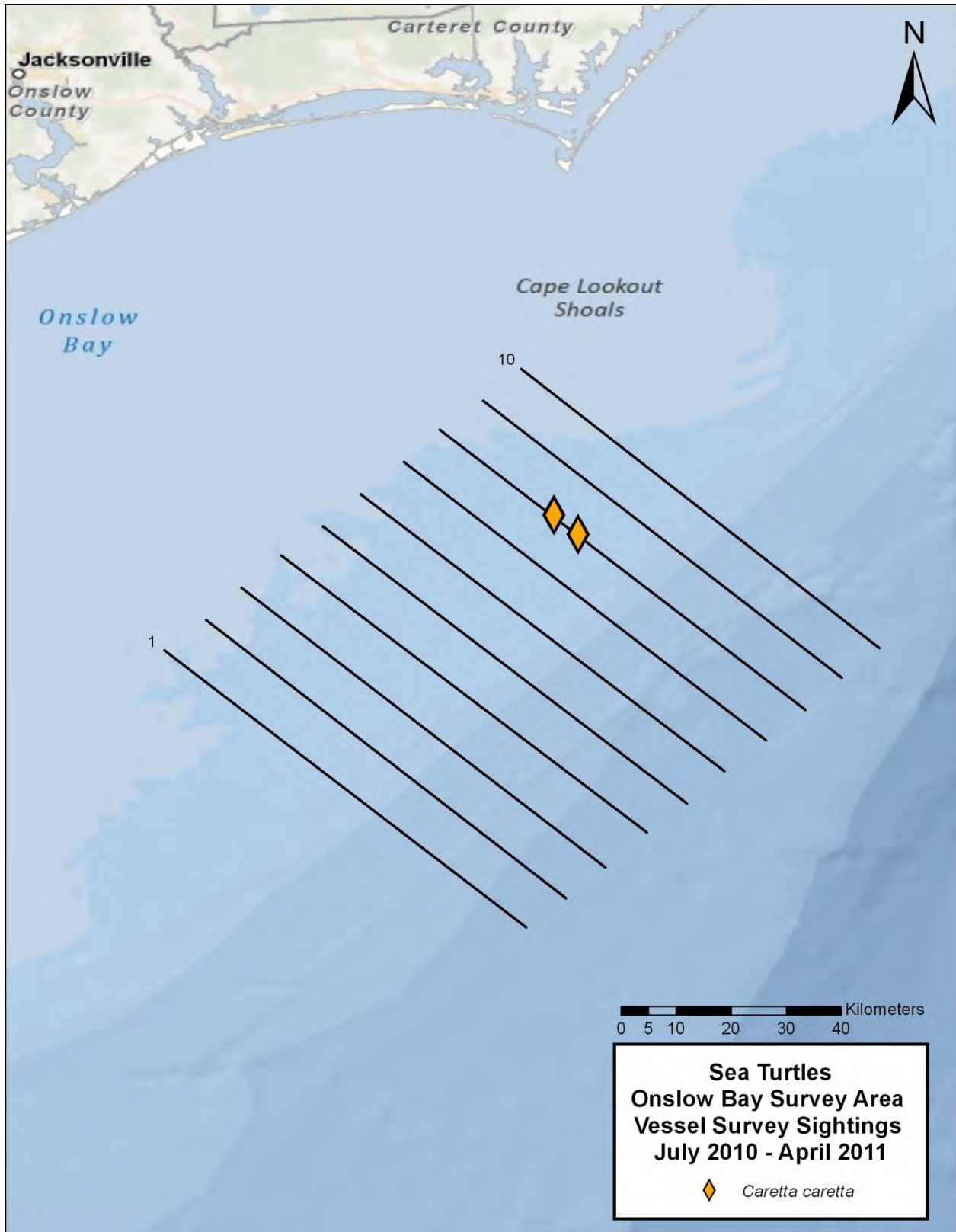


Figure 14. Distribution of loggerhead sea turtle sightings made during vessel-based line-transect surveys in the Onslow Bay survey area, July 2010 - April 2011.



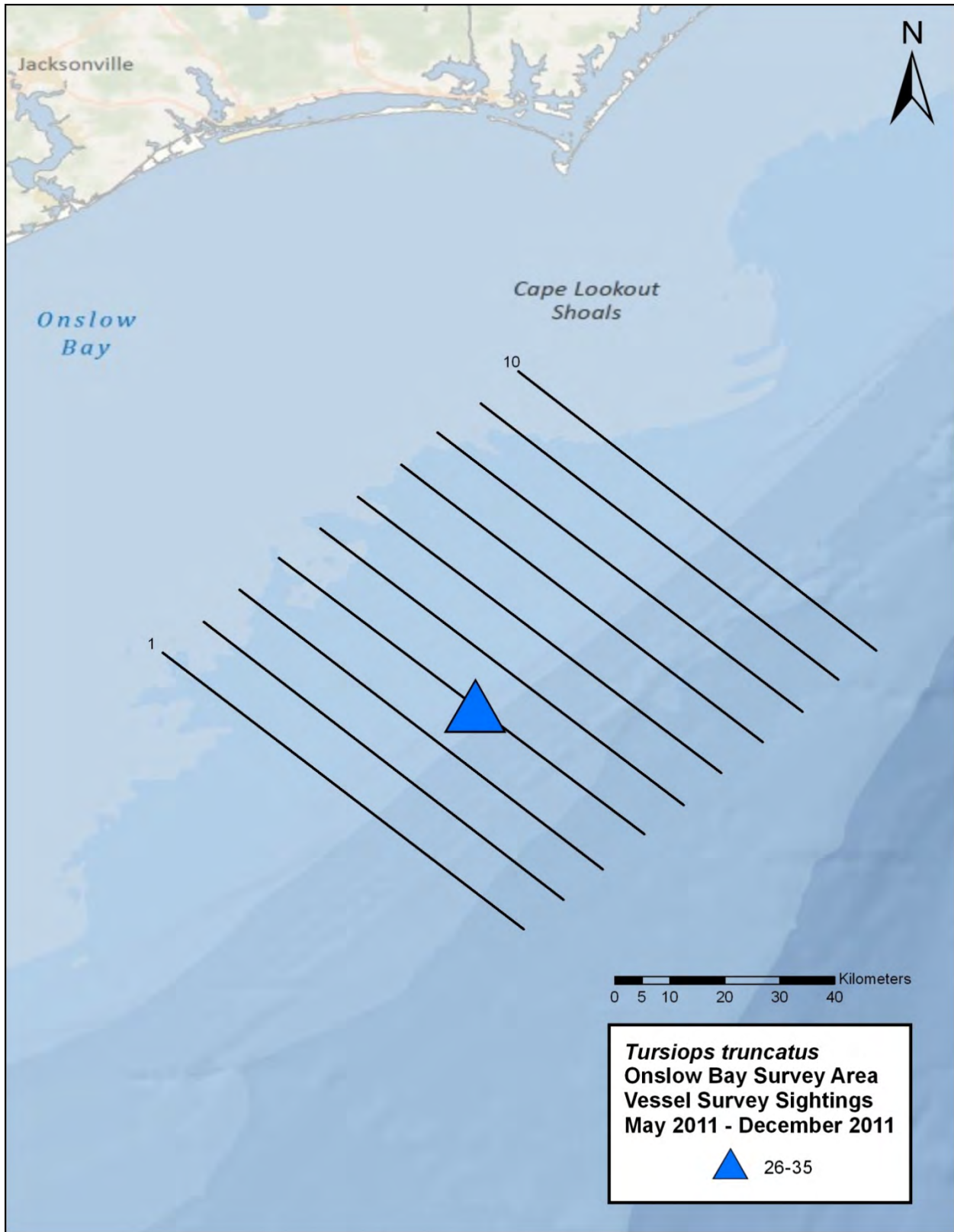


Figure 15. Distribution of bottlenose dolphin sightings indicating group size made during vessel-based photo-ID surveys in the Onslow Bay survey area, May 2011 - December 2011.

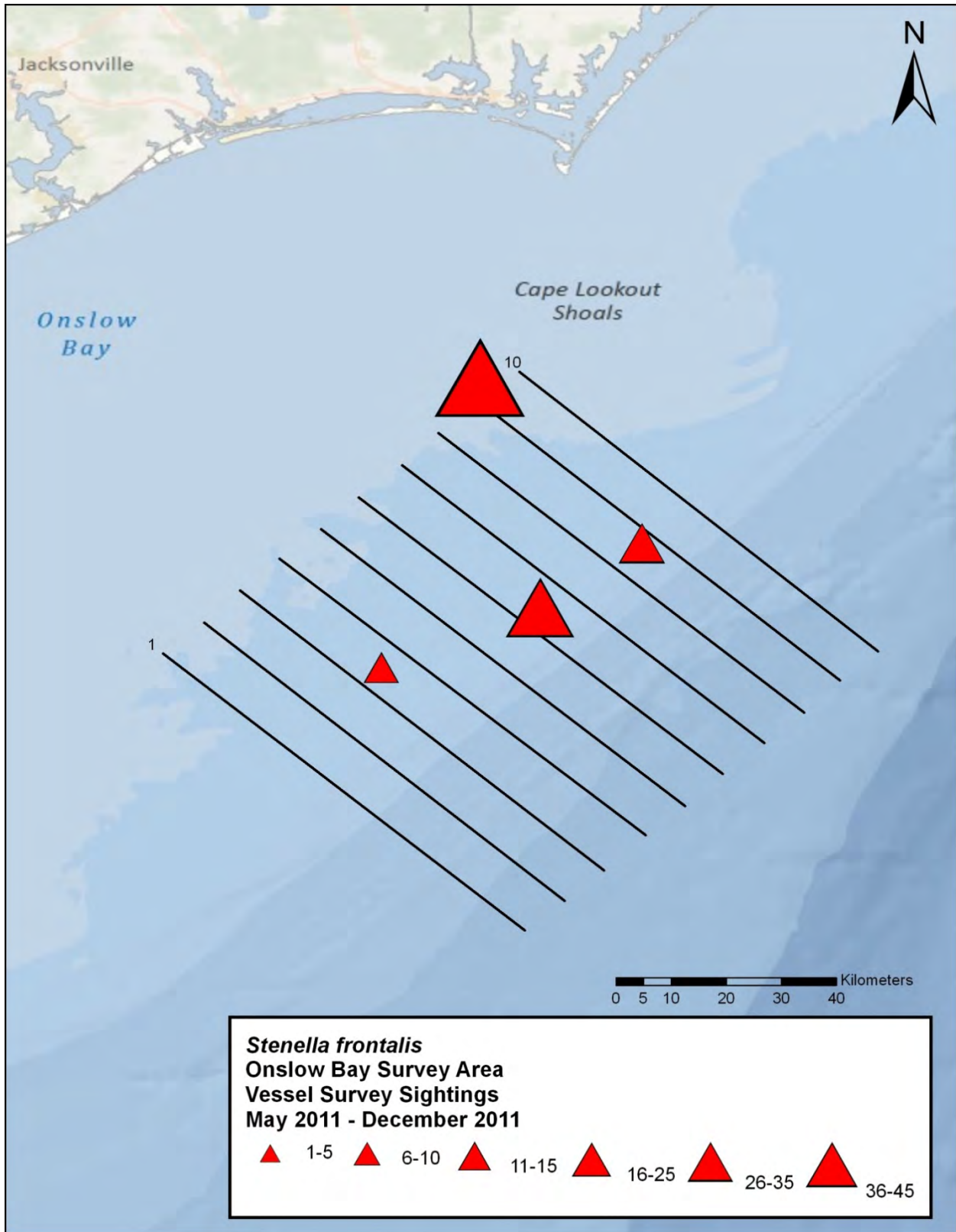


Figure 16. Distribution of Atlantic spotted dolphin sightings indicating group size made during vessel-based photo-ID surveys in the Onslow Bay survey area, May 2011 - December 2011.

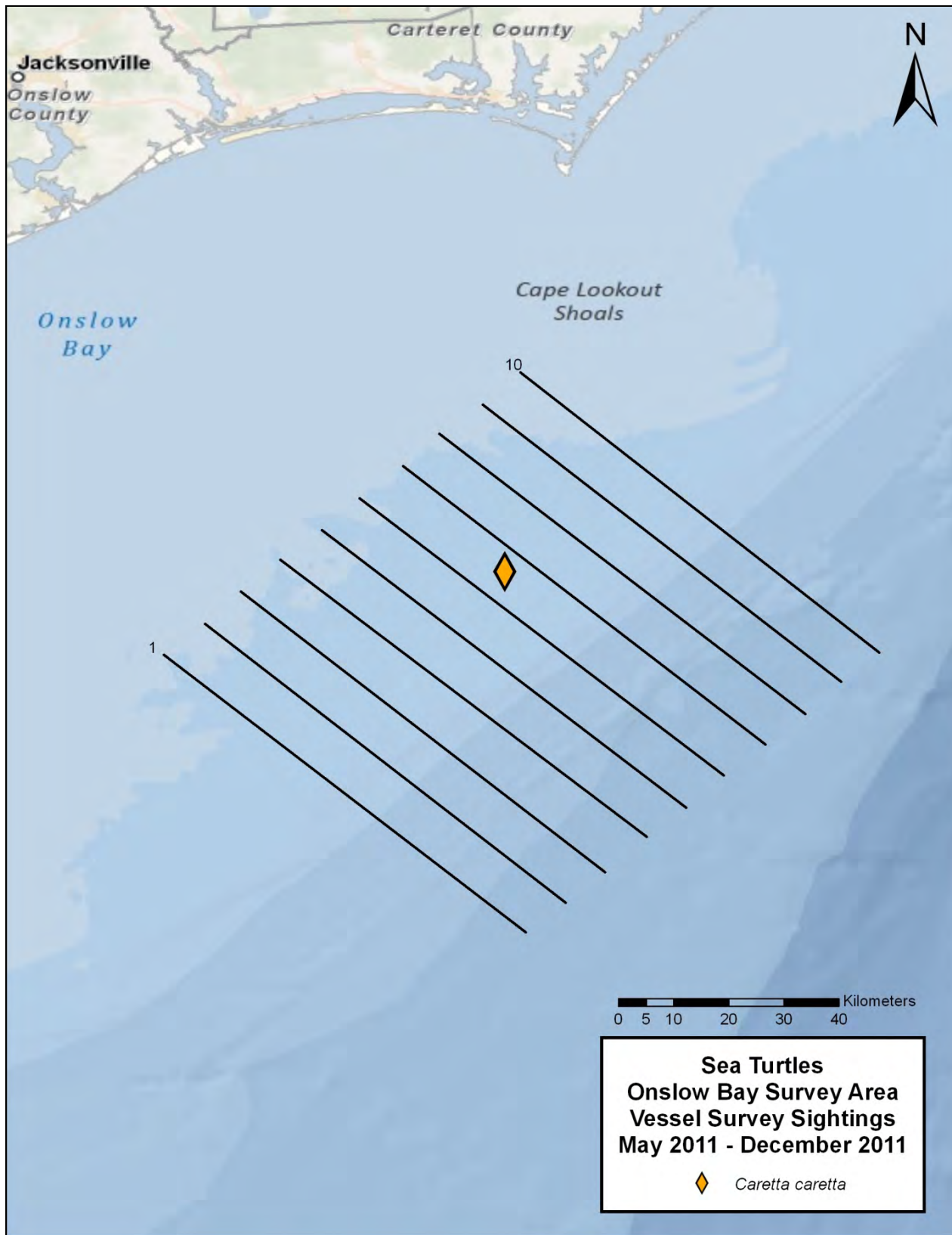


Figure 17. Distribution of loggerhead sea turtle sightings made during vessel-based photo-ID surveys in the Onslow Bay survey area, May 2011 - December 2011.

### Seasonality of Effort and Sightings

Due to unfavorable survey conditions, (e.g. Hurricane Irene made landfall at Cape Lookout, NC on August 27, 2011) offshore surveys were unable to be conducted over several months and we had limited effort throughout Year Four. Trends in seasonality of cetacean and sea turtle sightings are, therefore, difficult to interpret (Figures 18-21). Despite optimal sea state conditions during most surveys, spotted and bottlenose dolphins were the only cetaceans observed, and loggerheads were the only sea turtle species observed.

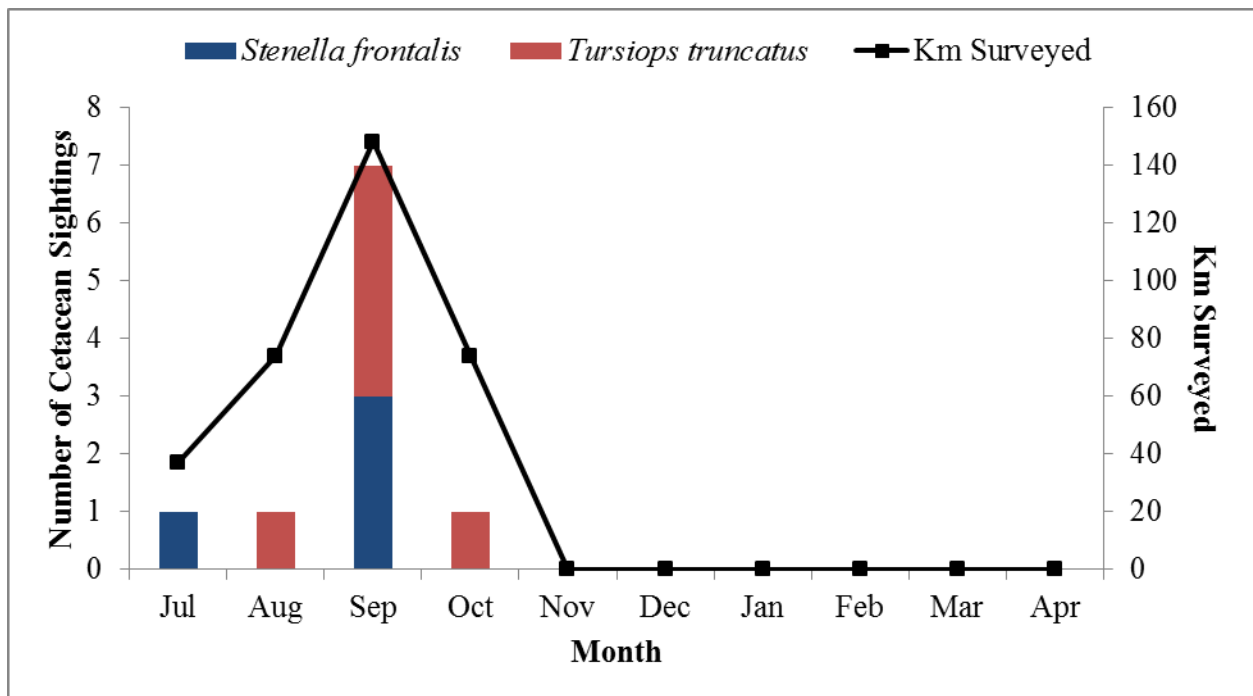


Figure 18. Number of cetacean sightings by month and effort (km surveyed) during line-transect surveys in Year Four in the Onslow Bay survey area.

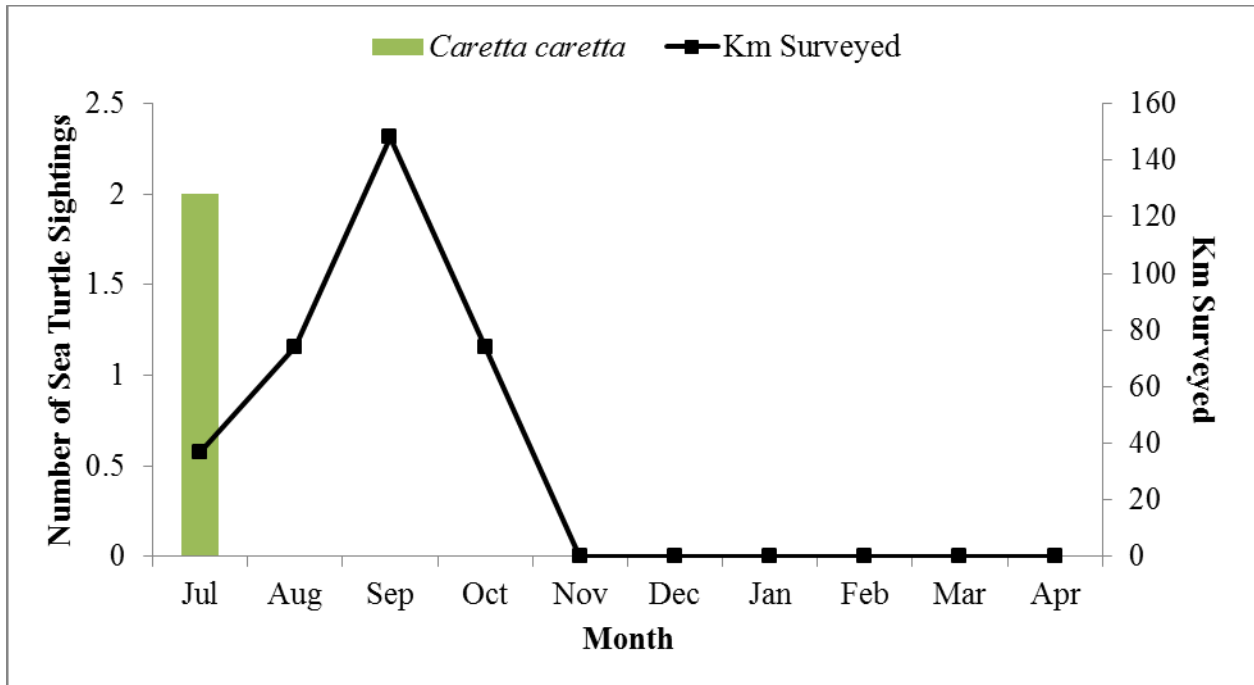


Figure 19. Number of sea turtle sightings by month displayed with effort (km surveyed) during line-transect surveys in Year Four in the Onslow Bay survey area.

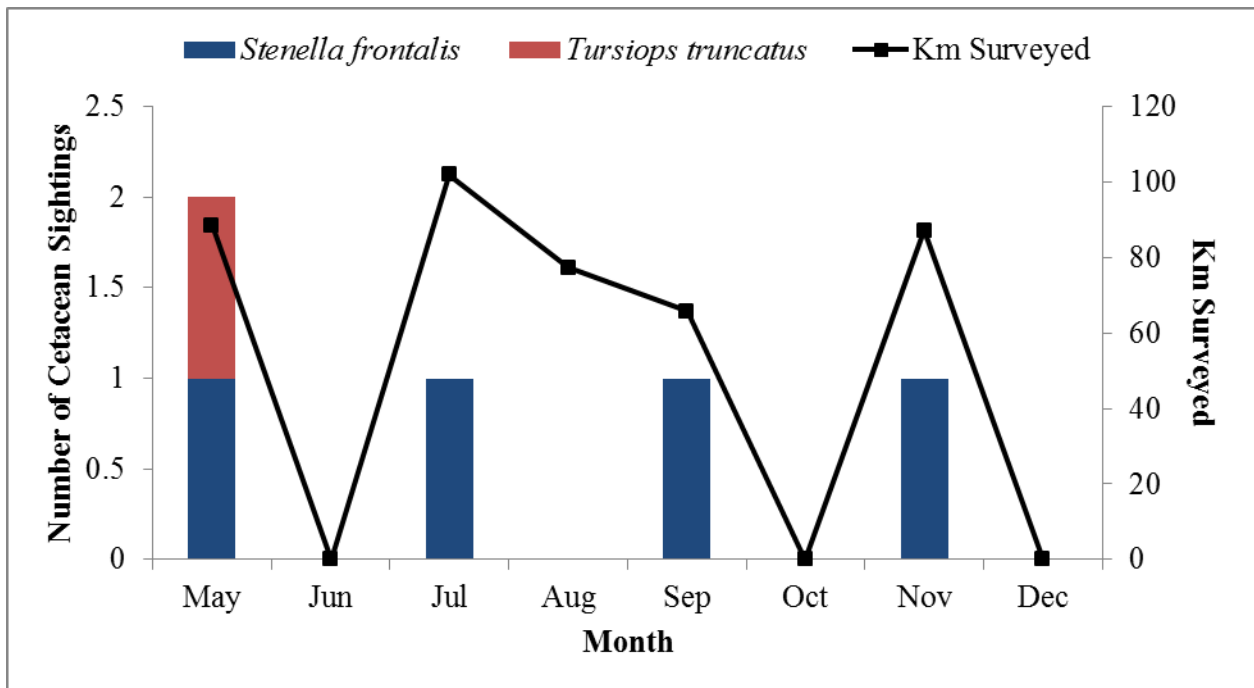


Figure 20. Number of cetacean sightings by month and effort (km surveyed) during photo-ID surveys in Year Four in the Onslow Bay survey area.

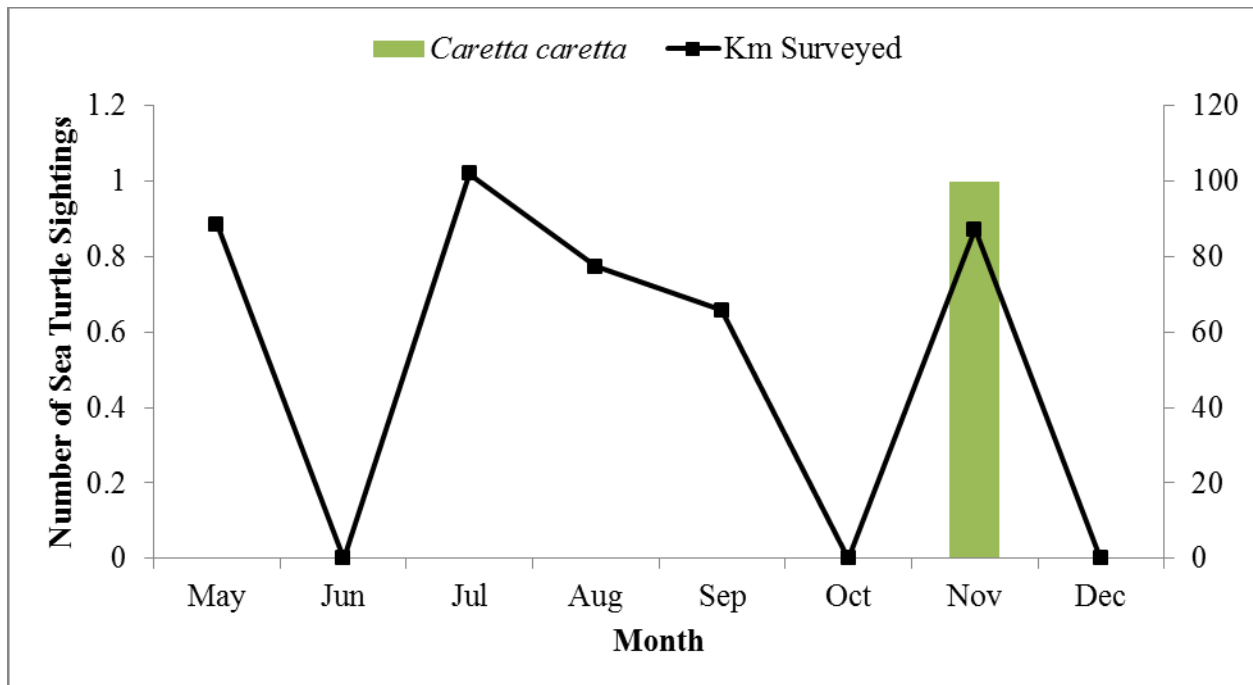


Figure 21. Number of sea turtle sightings by month displayed with effort (km surveyed) during photo-ID surveys in Year Four in the Onslow Bay survey area.

### Biopsy Sampling

Two biopsy samples were collected from Atlantic spotted dolphins on 12 September 2011 during a photo-ID survey in Onslow Bay (Table 6). Two full skin and blubber samples were collected from the sighting, ZTS-11-18 and ZTS-11-19, and will be analyzed for sex determination and stock identity in the coming months. Voucher specimens of these samples will be archived with the Southeast Fisheries Science Center in Lafayette, LA.

Table 6. Biopsy samples taken from animals in the Onslow Bay survey area during photo-ID vessel surveys, May 2011- December 2011.

Date	Time	Sample #	Species	Latitude	Longitude
12-Sep-11	7:51	ZTS-11-18	<i>Stenella frontalis</i>	34.26987	-76.65175
12-Sep-11	8:00	ZTS-11-19	<i>Stenella frontalis</i>	34.27420	-76.64799

### Photographic Effort

Approximately 1480 digital images were taken from 1 July 2010 – 31 December 2011 for species identification and individual recognition. Individuals were identified to species in all 16 encounters and images were obtained from all but one sighting of Atlantic spotted dolphins. Every attempt was made to photograph all animals encountered, both to validate species identification and to develop photo-identification catalogs for cetacean species in Onslow Bay.

Images of newly identified dolphins are added to existing photo-identification catalogs in Onslow Bay (Tables 7 and 8; Figure 22). Photo-identification analysis is now complete for all images taken through January 2012. Since the beginning of the monitoring program in 2007, seven bottlenose dolphins and two Atlantic spotted dolphins have been resighted; a biopsy sample was obtained from one of these spotted dolphins (Table 8). In total, approximately 6% of bottlenose dolphins (7 of 112) and 3% (2 of 68) of spotted dolphins identified in Onslow Bay have been re-sighted, despite quite limited sampling effort. Interestingly, two bottlenose dolphins (7-015 and 8-009) were seen together in both April 2009 and 2010.

Two dolphins photographed in the January 2012 survey have also been matched to the catalog. One of these individuals (Tt 1-004) has now been photographed on three separate occasions. In addition, one spotted dolphin (ZTS-11-019) biopsied and photographed on 12 September 2011 was matched to an animal photographed on 28 June 2001 and on 24 June 2002 (Sf-8004) during surveys conducted in near-shore coastal waters of Onslow Bay (Figure 23). Taken as a whole, therefore, these re-sightings suggest some degree of residency in the study area (Table 8).

Matched genetic and photo-id data will be particularly useful for understanding population structure and site fidelity of odontocetes in Onslow Bay and other Navy OPAREAs.

To date, no other species photographed have been re-sighted, although the number of sightings and catalog sizes for these species are very small. Images of the dorsal fins of stranded cetaceans in North Carolina are compared regularly to our photo-identification catalogs for Onslow Bay, but to date there have been no matches. Photo-id and genetic sampling surveys in the AFAST OPAREAs off of NC and FL will continue in 2012.

Table 7. Number of individual identifications from images taken during vessel-based surveys in Onslow Bay.

Species	Images	Sightings	Catalog size	Number of Matches
<i>Tursiops truncatus</i>	458	7	112	7
<i>Stenella frontalis</i>	1023	9	68	2

Table 8. Sighting dates of photo-id matches of bottlenose and spotted dolphins.

<i>Tursiops truncatus</i>			
ID	First sighting	Second sighting	Third sighting
1-004	1-Oct-09	11-Apr-10	31-Jan-12
4-002	15-Sep-09	1-Oct-09	
6-010	23-Sep-07	31-Jan-12	
6-018	29-Apr-09	10-Oct-10	
7-015*	28-Apr-09	20-Apr-10	
8-009*	28-Apr-09	20-Apr-10	
9-016	25-Jul-08	17-Aug-09	
<i>Stenella frontalis</i>			
ID	First sighting	Second sighting	Third sighting
9-013	9-Aug-09	1-Oct-09	
Sf-8004 (ZTS-11-09)	28-Jun-01	24-Jun-02	12-Sep-11

\*These two individuals were seen together on both dates.







Figure 22. Dorsal fin images of matched dolphins in the Onslow Bay survey area.

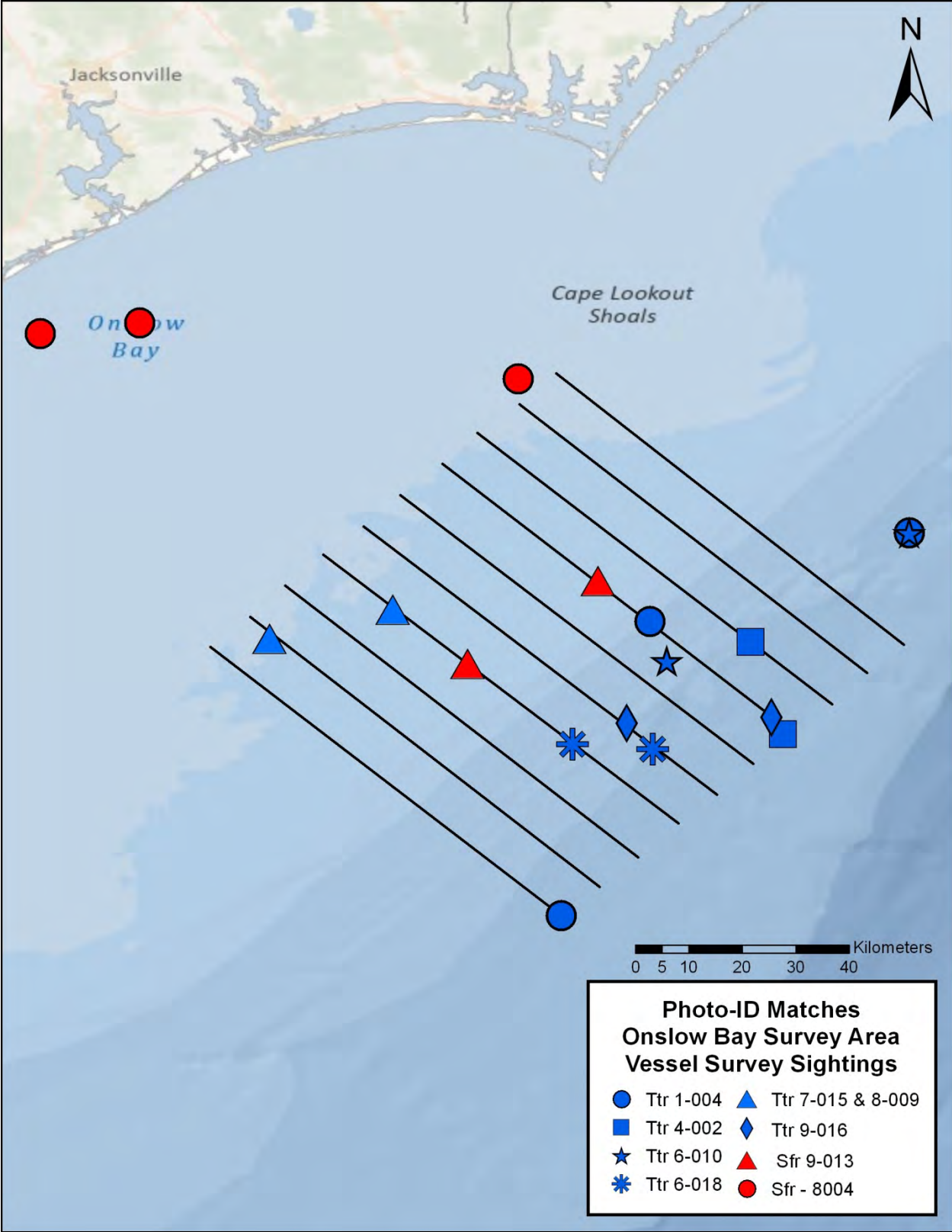


Figure 23. Photo-identification matches of dolphins in the Onslow Bay survey area.

## Passive Acoustic Monitoring

### *Towed Array Analysis*

During Year Four, two line-transect surveys were conducted with the towed hydrophone array in Onslow Bay, resulting in 7.93 hours of passive acoustic monitoring. During these two surveys, recordings were obtained from two groups of animals that were positively identified to species by the visual observers. One of these groups was identified as bottlenose dolphins and the other as Atlantic spotted dolphins (Table 9). Analysis of all of the towed hydrophone array data to date is described below in the whistle and click analysis sections. In addition, two groups were detected that were not visually confirmed to species.

*Table 9.* Number of recordings made using the towed hydrophone array in the Onslow Bay survey area, July 2010 - December 2011.

<b>Species</b>	<b>Total # of Days Detected</b>	<b>Total # of Detections</b>	<b>Total Duration of Recordings (h:mm)</b>
<i>Stenella frontalis</i>	1	1	0:18
<i>Tursiops truncatus</i>	1	1	0:43
Unidentified delphinid	1	2	1:32

### *Whistle Analysis*

Although only bottlenose and spotted dolphins were recorded during Year 4, for this analysis, all towed array recordings made between September 2007 and August 2010 were used to look for species-specificity in whistles of four species: Atlantic spotted dolphins, bottlenose dolphins, rough-toothed dolphins (*Steno bredanensis*), and short-finned pilot whales (*Globicephala macrorhynchus*). Risso's dolphins (*Grampus griseus*) were also recorded but no high quality

whistles were recorded in their presence, so this species was omitted from the analysis. A total of 624 whistles from 48 recording sessions were analyzed, with recordings from more than one recording session used for each species to examine species-specificity, except for rough-toothed dolphins, which were only sighted once (Table 10).

Table 11 summarizes the results of the species comparisons for each of the measured whistle contour variables. For two variables (minimum frequency and end frequency), the differences were statistically significant for every species pair-wise comparison, indicating that these variables could be useful for classifying the four species. In addition, nine additional variables exhibited statistically significant differences in all but one pair-wise comparison.

The optimal classification tree for interspecific comparisons examining all four species resulted in a correct classification rate of 74.2% ( $n = 624$ ) and included seven of the 22 variables: duration, third quartile frequency, maximum frequency, third quartile slope, end slope, first quartile slope, and mean frequency. Three of the seven variables in the optimal tree were novel variables: third quartile frequency, third quartile slope, and first quartile slope. All correct classification rates for individual species were significantly greater than the 25% expected by chance ( $\chi^2$  test,  $p < 0.001$ ) and ranged from 40.0% for rough-toothed dolphins to 92.3% for bottlenose dolphins (Table 12).

More work on species-specificity for whistles of Atlantic coast odontocetes is about to begin with Dr. Julie Oswald taking the lead. Recordings from different species are being supplied by Dr. Sofie Van Parijs (Protected Species Branch, NMFS/NEFSC), Drs. Melissa Soldevilla and

Lance Garrison (Protected Resources and Biodiversity Division, NMFS/SEFSC), and Dr. Lynne Williams Hodge (Duke).

Table 10. Number of recording sessions and whistles analyzed for each species.

<b>Species</b>	<b># Recording Sessions</b>	<b># Whistles Analyzed</b>
<i>Globicephala macrorhynchus</i>	6	89
<i>Stenella frontalis</i>	14	162
<i>Steno bredanensis</i>	1	35
<i>Tursiops truncatus</i>	27	338

*Table 11.* Results of Kruskal-Wallis tests and comparisons of 22 measured whistle variables for all six pair-wise species combinations. In this table, Gm = *Globicephala macrorhynchus*, Sf = *Stenella frontalis*, Sb = *Steno bredanensis*, Tt = *Tursiops truncatus*, and Q = quartile. \* Indicates significant differences for the Kruskal-Wallis tests. Shading indicates significant differences of the multiple comparison tests with Bonferroni corrections (family-wise error rate  $\alpha = 0.05$ ). Whistles for which there were missing values were not included.

	Kruskal-Wallis Results	Multiple Comparison Test Results with Bonferroni Corrections					
		Gm/Sf	Gm/Sb	Gm/Tt	Sf/Sb	Sf/Tt	Sb/Tt
Max Freq	p<0.001*						
Min Freq	p<0.001*						
Freq Range	p<0.001*						
Start Freq	p<0.001*						
End Freq	p<0.001*						
1st Q Freq	p<0.001*						
2nd Q Freq	p<0.001*						
3rd Q Freq	p<0.001*						
Mean Freq	p<0.001*						
Duration	p<0.001*						
# Inflection Points	p<0.001*						
Max Slope	p<0.001*						
Min Slope	p<0.001*						
Slope Range	p<0.001*						
Start Slope	p<0.001*						
End Slope	p<0.001*						
1st Q Slope	p=0.300	N/A	N/A	N/A	N/A	N/A	N/A
2nd Q Slope	p<0.001*						
3rd Q Slope	p<0.001*						
Mean Slope	p<0.001*						
Start Slope Sign	p<0.001*						
End Slope Sign	p<0.001*						

*Table 12.* Results of the eight terminal node classification tree examining interspecific differences in whistles of four species. The optimal tree was grown using seven variables (duration, third quartile frequency, maximum frequency, third quartile slope, end slope, first quartile slope, and mean frequency). The overall correct classification was 74.2%, n = 624 whistles. Individual correct classification rates are shown in bold. The percentage of correct classifications expected by chance is 25% for each species.

Actual Species	% Classified as			
	<i>G. macrorhynchus</i>	<i>S. frontalis</i>	<i>S. bredanensis</i>	<i>T. truncatus</i>
<i>G. macrorhynchus</i>	<b>84.3</b>	6.7	3.4	5.6
<i>S. frontalis</i>	10.5	<b>63.0</b>	0.6	25.9
<i>S. bredanensis</i>	51.4	8.6	<b>40.0</b>	0
<i>T. truncatus</i>	2.7	4.7	0.3	<b>92.3</b>

### Click Analysis

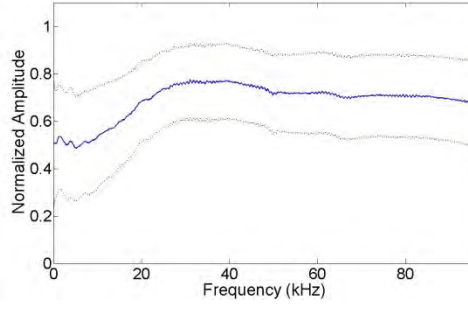
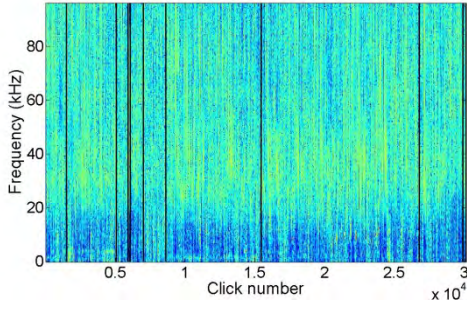
Clicks from five species recorded in Onslow Bay (Atlantic spotted dolphins, bottlenose dolphins, Risso's dolphins, rough-toothed dolphins, and short-finned pilot whales) were analyzed. Multiple recording sessions were included for each species to examine species-specificity except for rough-toothed dolphins, which were only sighted once (Table 13). Only Risso's dolphins were found to produce clicks with frequency values that consistently alternated between high (peaks) and low (notches) amplitudes (Figures 24c and 25c). For Risso's dolphins, the number of clicks that had peaks and notches at these frequency bands was greater than expected by chance. Peaks in this species' clicks appeared at 22.4 ( $\pm 0.9$ ), 26.0 ( $\pm 0.9$ ), and 32.6 ( $\pm 1.5$ ) kHz, while notches occurred at 20.4 ( $\pm 1.6$ ), 24.0 ( $\pm 1.0$ ), 26.8 ( $\pm 1.4$ ), 29.2 ( $\pm 2.1$ ), and 34.2 ( $\pm 2.0$ ) kHz (Figure 26).

Table 13. Number of recording sessions, group size, and number of clicks analyzed for each species.

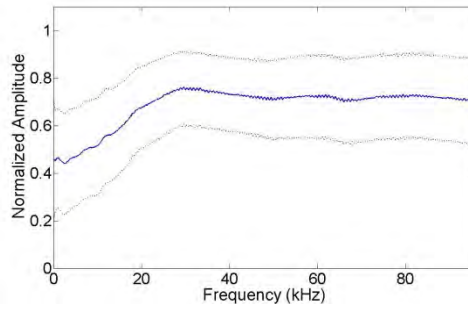
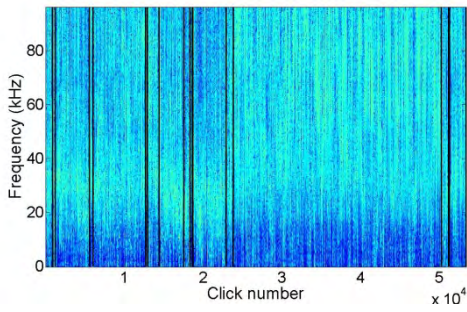
Species	# Recording Sessions	Mean Group Size	Total # Click Trains	# Click Trains Selected	# Clicks Selected
<i>Globicephala macrorhynchus</i>	4	28.5	590	134	670
<i>Grampus griseus</i>	3	25.3	392	102	510
<i>Stenella frontalis</i>	14	28.6	2168	524	2620
<i>Steno bredanensis</i>	1	27	496	54	270
<i>Tursiops truncatus</i>	24	10.8	3114	464	2320



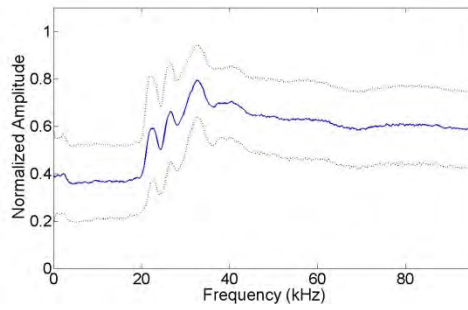
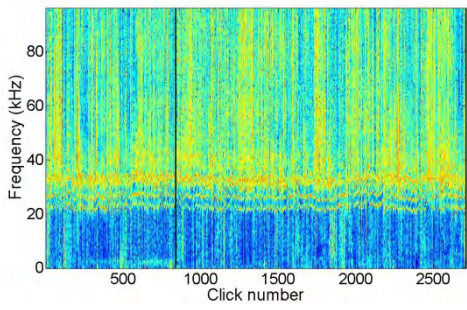
(a)



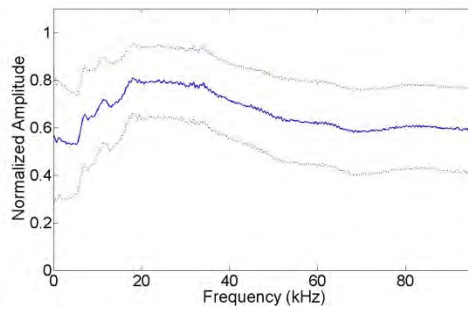
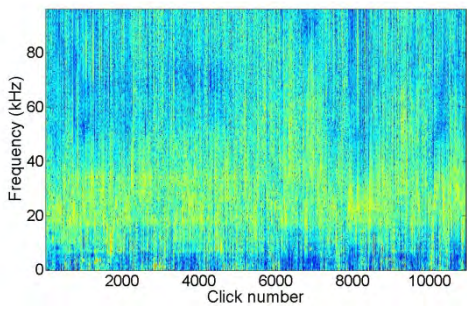
(b)

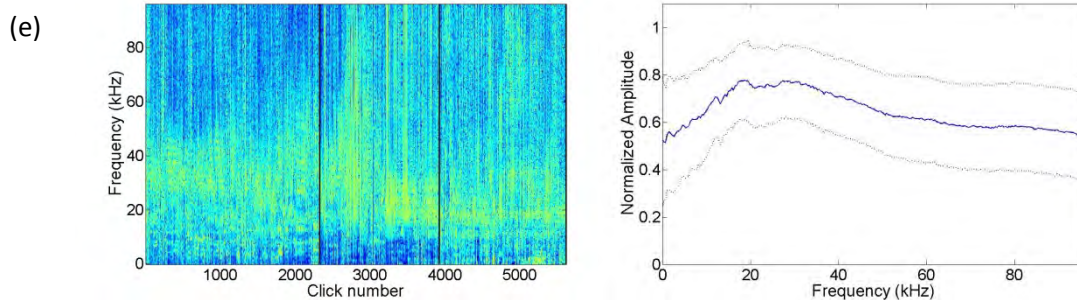


(c)

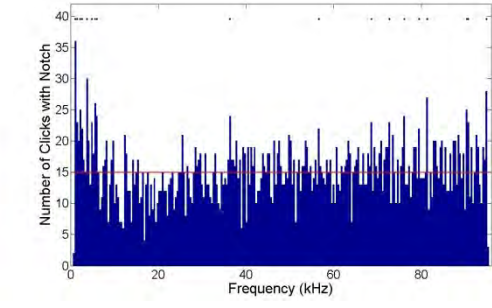
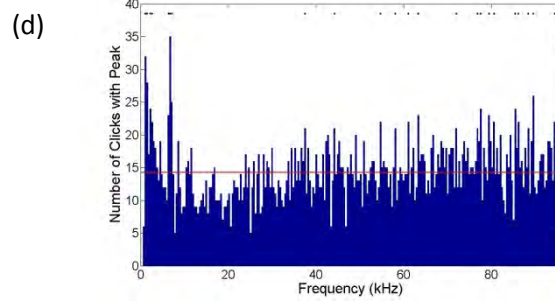
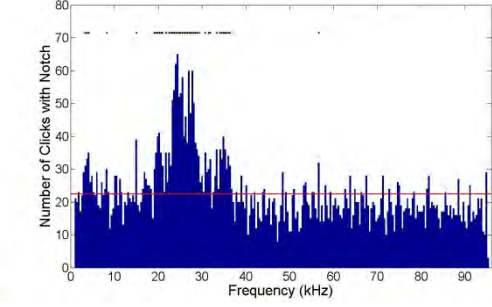
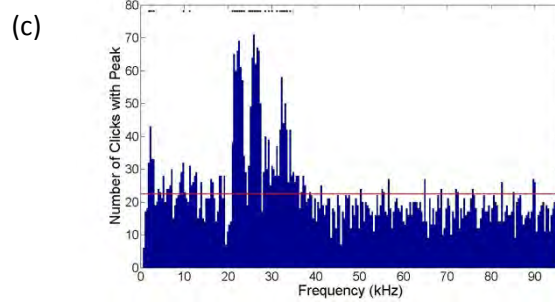
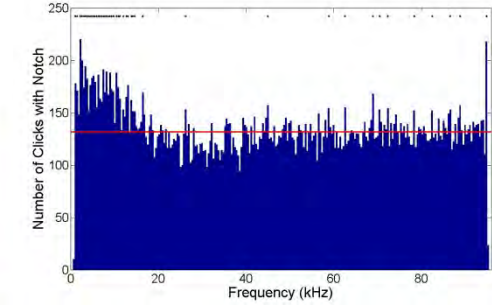
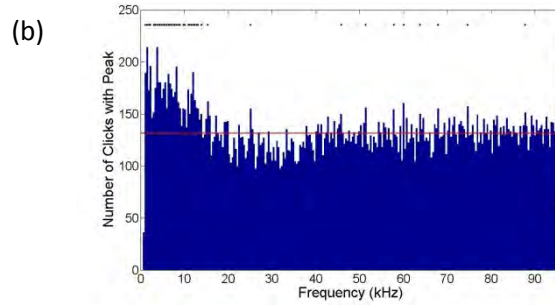
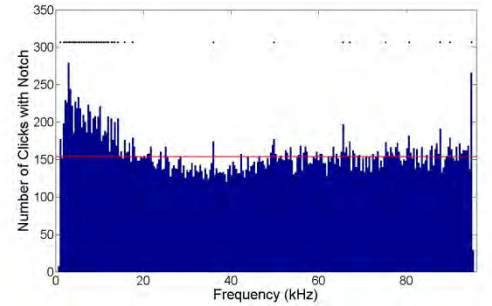
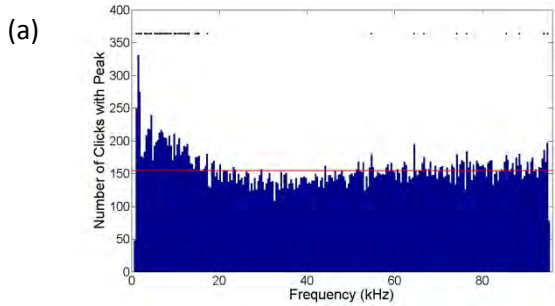


(d)





*Figure 24.* Concatenated spectrograms (after spectral mean subtraction, left) and mean normalized spectral plots (right) of clicks using Hann-windowed data for (a) Atlantic spotted dolphins, (b) bottlenose dolphins, (c) Risso's dolphins, (d) rough-toothed dolphins, and (e) short-finned pilot whales. For the figures on the left, oranges and yellows represent greater magnitudes. Frequency bands that alternate between high and low amplitudes are apparent between 20 and 35 kHz for Risso's dolphins. Breaks between recording sessions are indicated by black vertical lines. For the figures on the right, the solid line represents the mean normalized amplitude and the dotted lines represent one standard deviation.



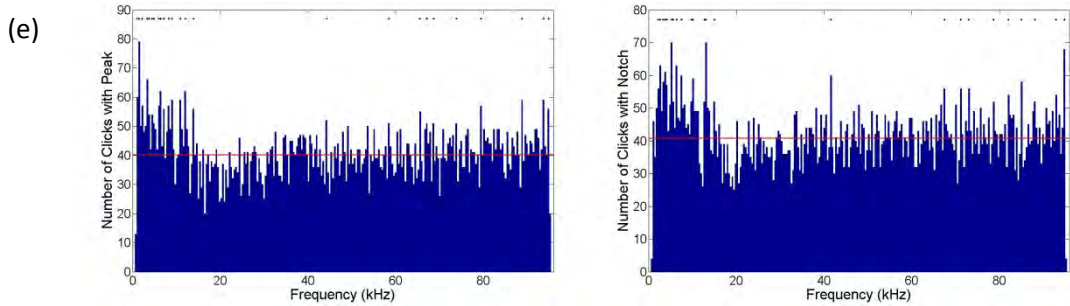


Figure 25. Histograms showing frequencies (kHz) of spectral peaks (left) and notches (right) for (a) Atlantic spotted dolphins, (b) bottlenose dolphins, (c) Risso's dolphins, (d) rough-toothed dolphins, and (e) short-finned pilot whales. The red line represents the mean of the expected random uniform distribution. Black diamonds near the top indicate frequency bars that had counts that were significantly greater than the random uniform distribution (one-tailed z-test,  $\alpha = 0.05$ ). Groups ( $\geq 2$ ) of consecutive black diamonds indicate frequencies that were considered to have consistent peaks and notches. Only peaks and notches with frequencies between 15-96 kHz were considered consistent due to boat noise and whistles at lower frequencies.

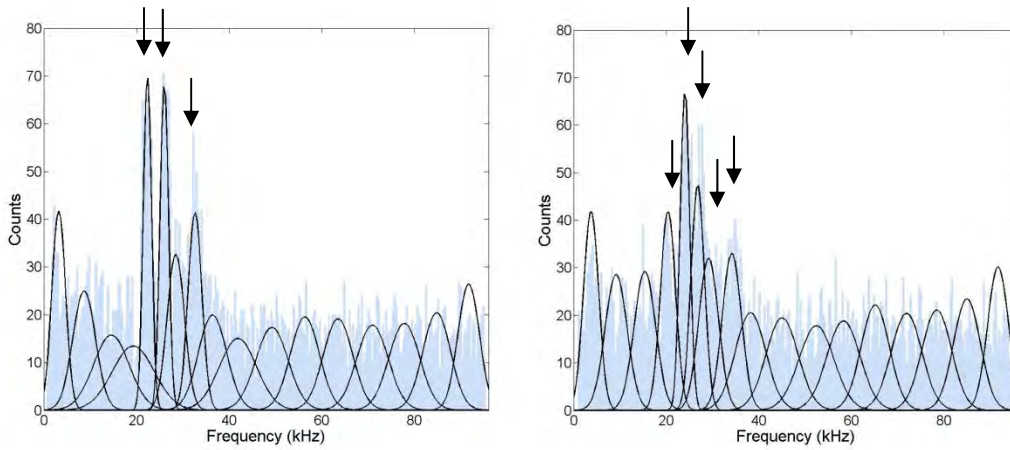
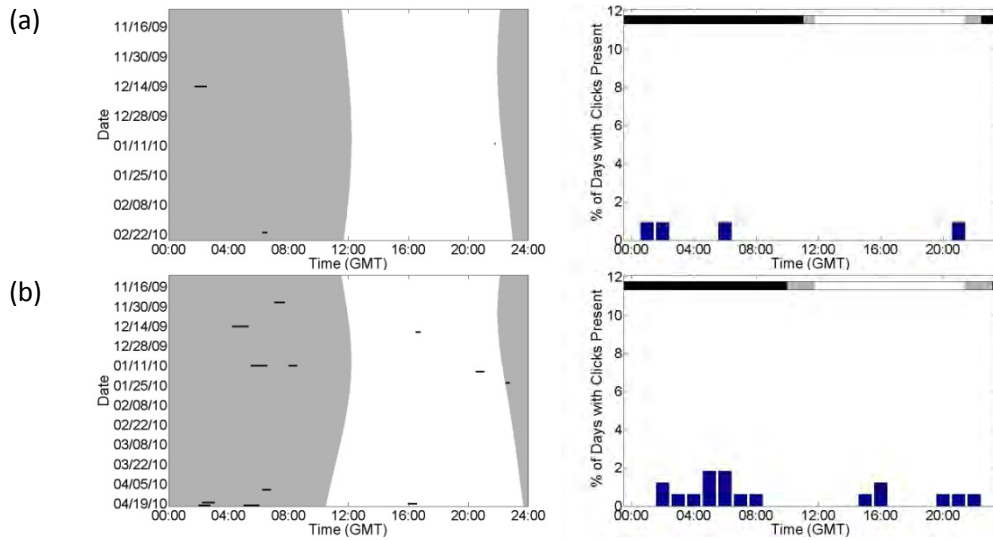


Figure 26. Curves of Gaussian mixture model fit to the (a) peak and (b) notch histograms for Risso's dolphins. For (a), arrows indicate consistent peaks and for (b), arrows indicate consistent notches.

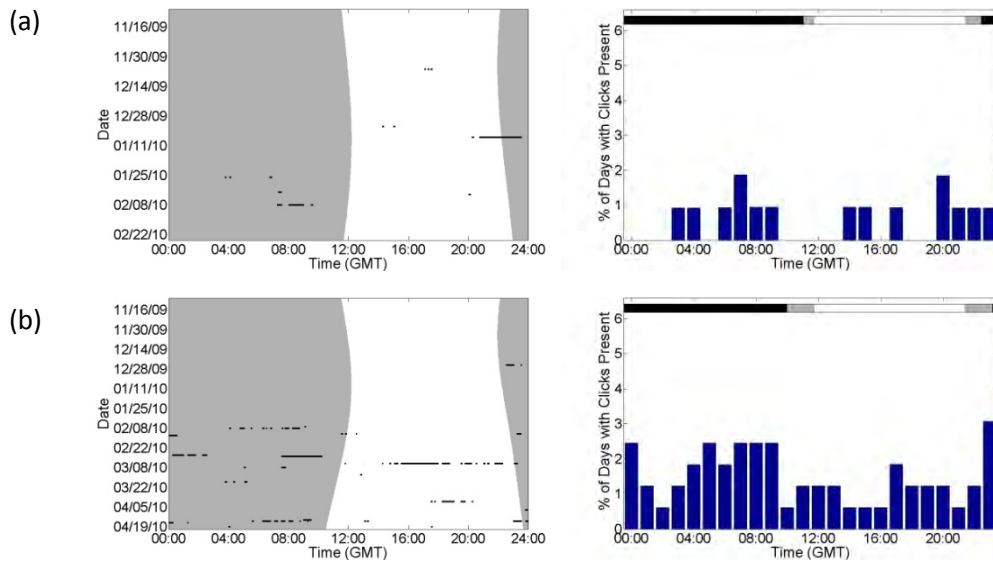
## *HARP Analysis - Odontocetes*

Vocal events from Risso's dolphins, sperm whales (*Physeter macrocephalus*), *Kogia* spp., and unidentified delphinids were detected in the HARP data from the fourth deployment at Site A and at Site C (Figures 27-30). For Risso's dolphins, the sample size of click events at Site A was too small for statistical analysis, but there was significant diel variation in the occurrence of click events at Site C (Kruskal-Wallis:  $p=0.012$ ), with a significantly greater number of minutes with clicks at night than during dawn. For sperm whales, there was no significant diel variation found in click occurrence at Site A (Kruskal-Wallis:  $p=0.082$ ), but there was significant variation at Site C (Kruskal-Wallis:  $p=0.005$ ), with significantly more clicks occurring during night than during dawn and day. For *Kogia* spp., the sample size for Site A was too small for statistical analysis, but Site C showed no significant diel variation in click occurrence (Kruskal-Wallis:  $p=0.246$ ). For unidentified delphinids, Site A showed significant variation in vocal event occurrence (Kruskal-Wallis:  $p=0.029$ ) with more events during night than day. Due to the apparent change in diel patterns in vocal events for this site (Figure 30a), the data also were divided into two parts - one part included data from November and December while the other part included data from January and February. When the data were divided into these two parts, two different patterns appeared: the November-December data had significantly more vocal events (Kruskal-Wallis:  $p<0.001$ ) during dawn than during day, dusk, or night, and the January-February data had significantly more vocal events (Kruskal-Wallis:  $p=0.003$ ) during night than during dawn or day. Also for unidentified delphinids, Site C showed significant variation in the occurrence of vocal events (Kruskal-Wallis:  $p<0.001$ ), with more vocal events occurring during night than during dawn, day, and dusk.

When looking at all of the data analyzed to date for odontocetes, several patterns emerge. For example, when all Risso's click events were combined together, there were significantly more click events (Kruskal-Wallis:  $p < 0.001$ ) during night than during dawn, day, or dusk and more click events during dusk than during dawn. When all of the sperm whale click events were combined, there were significantly more click events (Kruskal-Wallis:  $p < 0.001$ ) during night than during dawn, day, or dusk. When all *Kogia* spp. click events were combined together, no significant variation was found among photoperiods (Kruskal-Wallis:  $p = 0.075$ ). Finally, for unidentified delphinids, the occurrence of vocal events was greatest either at dawn or at night. The first basic pattern (an increase at dawn) was seen in the first deployment (Site A) and the first part of the fourth deployment at Site A which occurred at the same site during similar months (late fall-winter), while the second basic pattern (a nocturnal increase) was seen for the second deployment (summer at Site B), third deployment (spring-summer at Site A), and fourth deployment at Site C (fall-spring) as well as the second part of the fourth deployment at Site A (winter) (Table 1). For the data showing an increase in vocal events at dawn, beginning in mid-November, a strong pulse of longer-duration and clustered vocal events was evident in the late night-dawn-early morning period which was not seen in any of the other datasets, including the recordings from the fourth deployment at Site C that was made during the same time period as the fourth deployment at Site A (Figure 30). This absence of a crepuscular pulse at Site C suggests that perhaps animals moved toward the shelf break area at that time.

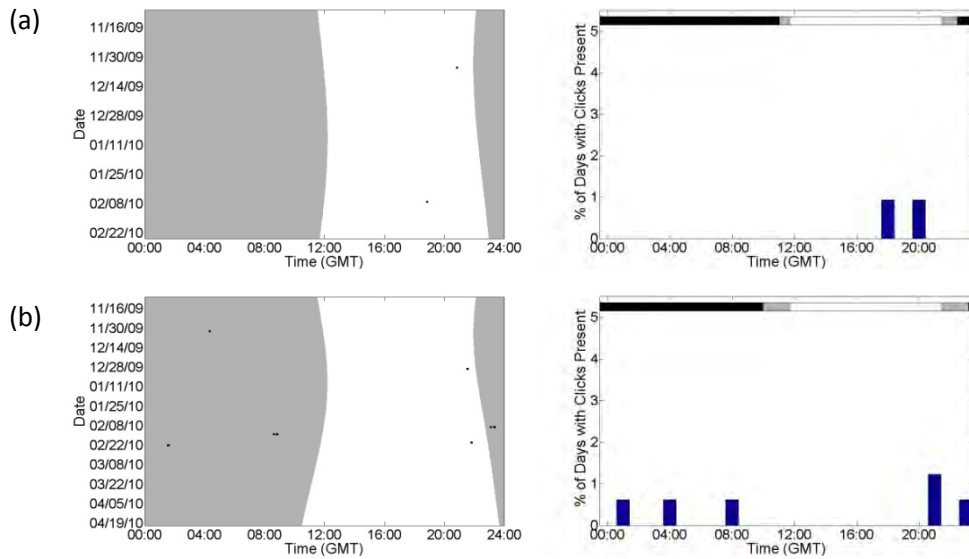


*Figure 27.* Time of Risso's click events (left) and diel pattern of Risso's click events (right) for (a) the fourth deployment at Site A and (b) the fourth deployment at Site C. In figures on the left, black bars represent duration of click events and shading indicates periods of darkness, determined from the U.S. Naval Observatory (<http://aa.usno.navy.mil>). In figures on the right, the blue vertical bars represent the percentage of days with click events present by time of day (GMT), and the horizontal bar indicates periods of light (white), periods of darkness (black), and periods that may be light or dark depending on the time of year (gray).

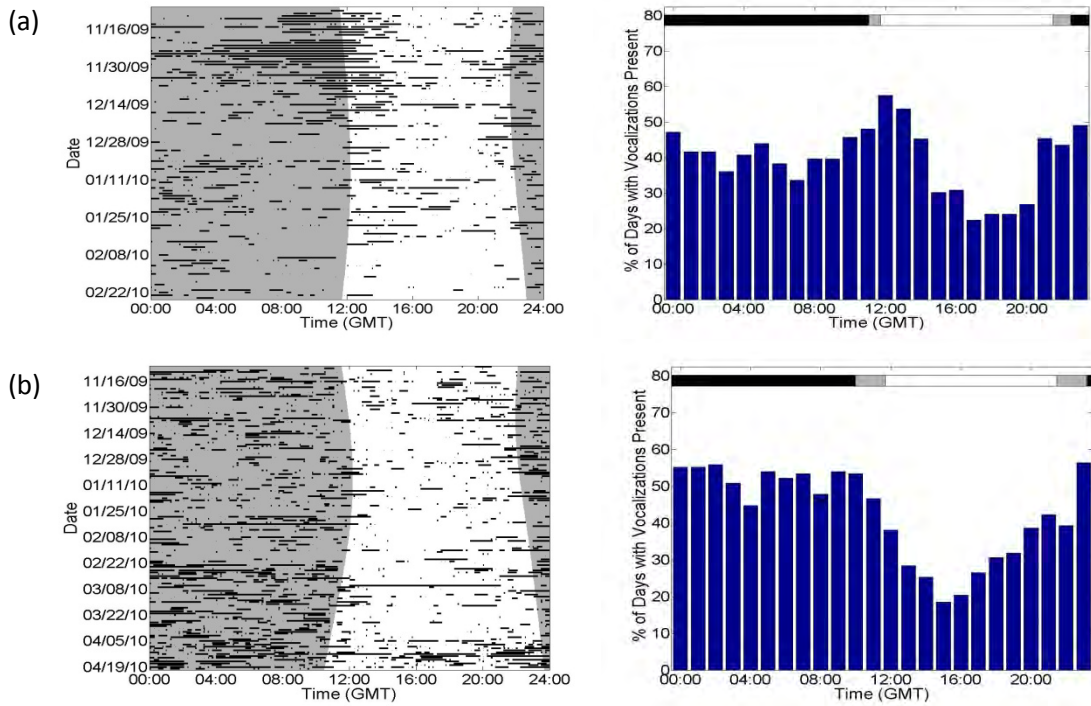


*Figure 28.* Time of sperm whale click events (left) and diel pattern of sperm whale click events (right) for (a) the fourth deployment at Site A and (b) the fourth deployment at Site C. In figures on the left, black bars represent duration of click events and shading indicates periods of darkness, determined from the U.S. Naval Observatory (<http://aa.usno.navy.mil>). In figures on the right, the blue vertical bars represent the percentage of days with click events present by time of day (GMT), and the horizontal bar indicates periods of light (white), periods of darkness (black), and periods that may be light or dark depending on the time of year (gray).





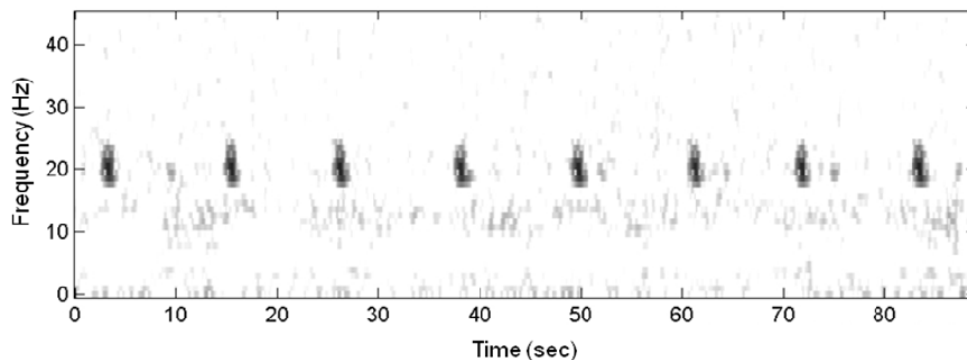
*Figure 29.* Time of *Kogia* click events (left) and diel pattern of *Kogia* click events (right) for (a) the fourth deployment at Site A and (b) the fourth deployment at Site C. In figures on the left, black bars represent duration of click events and shading indicates periods of darkness, determined from the U.S. Naval Observatory (<http://aa.usno.navy.mil>). In figures on the right, the blue vertical bars represent the percentage of days with click events present by time of day (GMT), and the horizontal bar indicates periods of light (white), periods of darkness (black), and periods that may be light or dark depending on the time of year (gray).



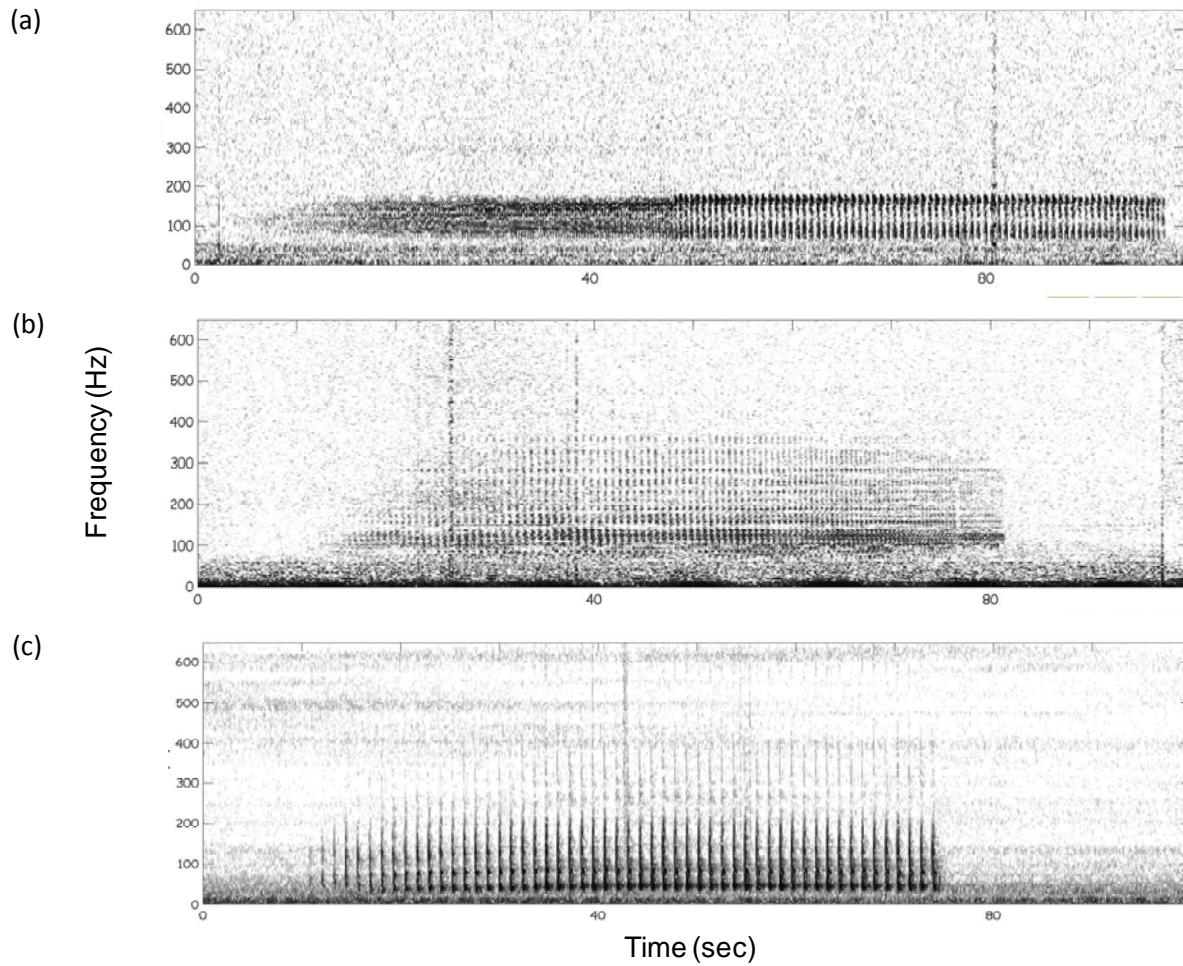
*Figure 30.* Time of unidentified delphinid vocal events (left) and diel pattern of unidentified delphinid vocal events (right) for (a) the fourth deployment at Site A and (b) the fourth deployment at Site C. In figures on the left, black bars represent duration of vocal events and shading indicates periods of darkness, determined from the U.S. Naval Observatory (<http://aa.usno.navy.mil>). In figures on the right, the blue vertical bars represent the percentage of days with vocal events present by time of day (GMT), and the horizontal bar indicates periods of light (white), periods of darkness (black), and periods that may be light or dark depending on the time of year (gray).

## *HARP Analysis - Mysticetes*

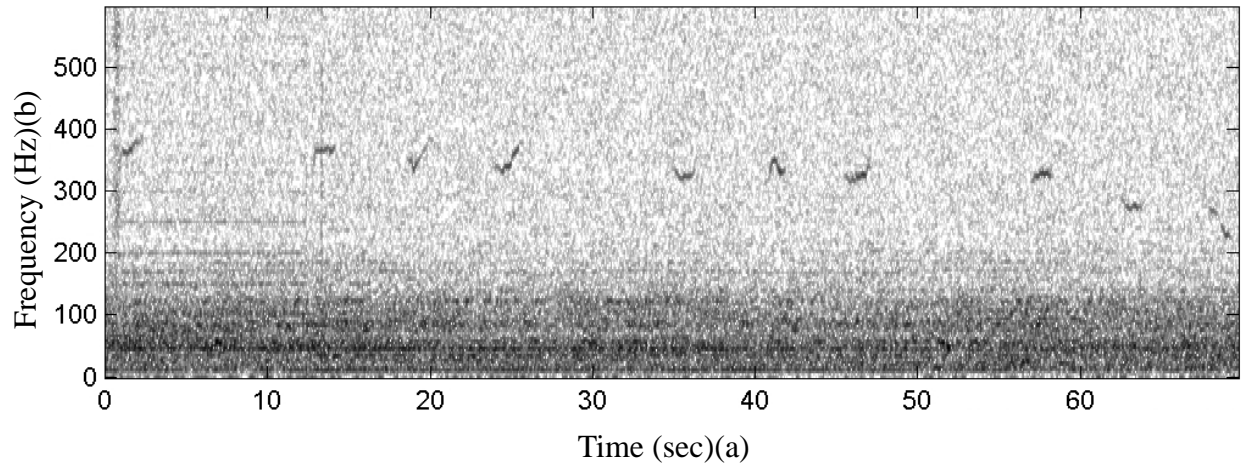
Analysis of the decimated HARP data from the first four deployments (including both instruments from the fourth deployment) has been completed. Sounds from fin (*Balaenoptera physalus*) (20-Hz pulses, Figure 31), minke (*Balaenoptera acutorostrata*) (pulse trains, Figure 32), humpback (*Megaptera novaeangliae*) (repetitive calls, Figure 33), and possibly sei (*Balaenoptera borealis*) (downsweeps, Figure 34) whales were recorded on three HARPs between November 2007 and April 2010 (Figures 35 – 38). Except for the humpback whale calls (which were detected only during the fourth deployment at Site C on 18 April 2010), these sounds were produced throughout the winter when these mysticetes are expected to be on their breeding grounds. Baleen whale calls were not heard on the two HARP deployments that occurred during the summer.



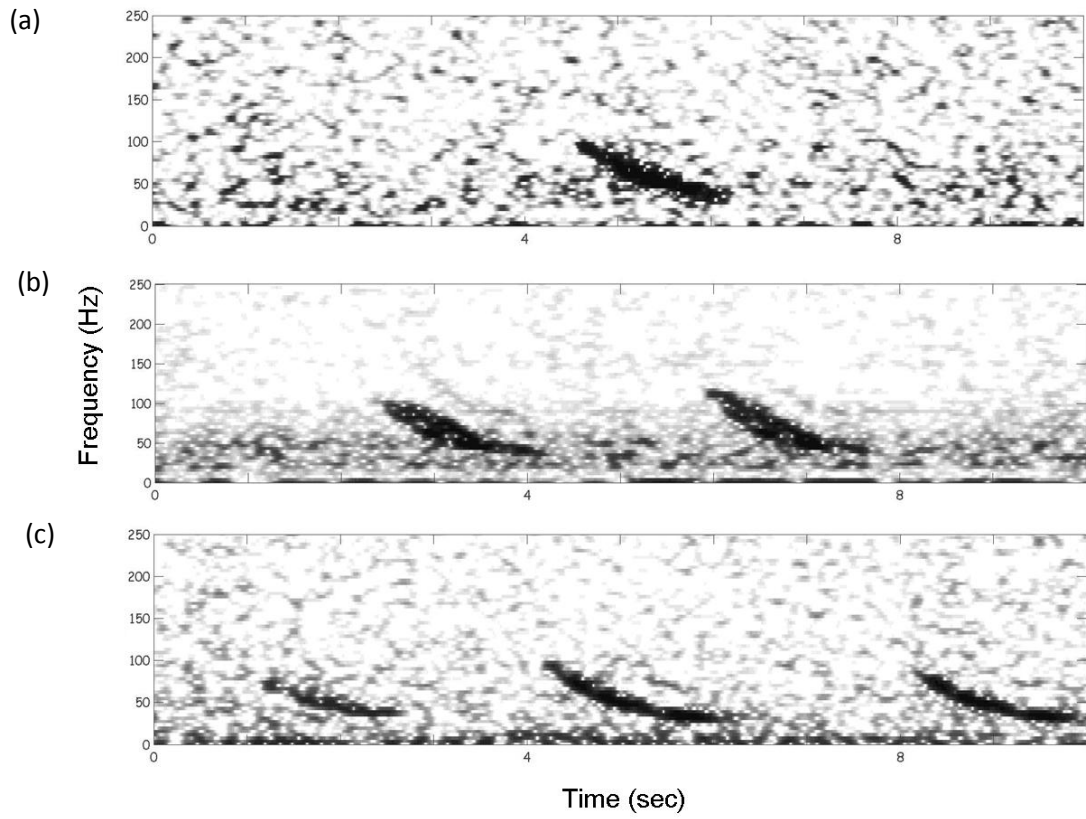
*Figure 31.* Spectrogram of eight 20-Hz pulses (FFT size 2048 samples, 90% overlap, Hann window).



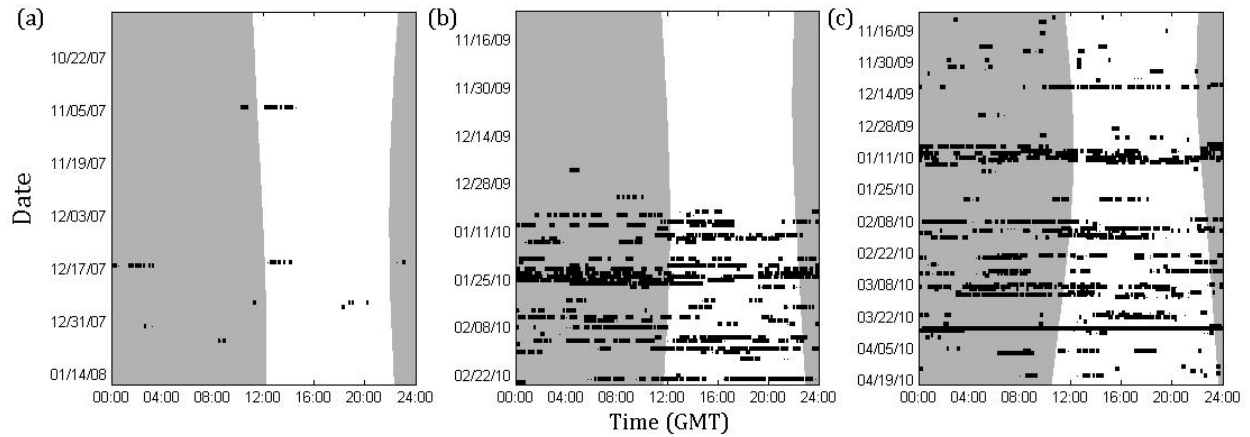
*Figure 32.* Spectrograms of different types of pulse trains showing (a) slow-down (from minke whale), (b) speed-up (from minke whale), and (c) consistent (possibly from minke whale) pulse trains (FFT size 512 samples, 75% overlap, Hann window).



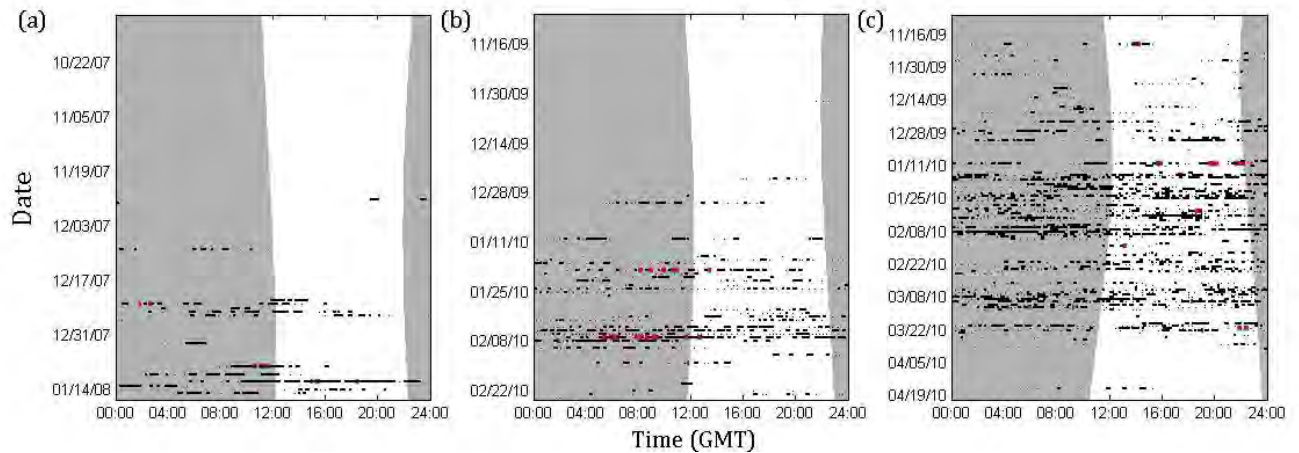
*Figure 33.* Spectrogram of humpback whale calls detected on 18 April 2010, in the HARP data from the fourth deployment at Site C.



*Figure 34.* Spectrograms of downsweeps occurring as a (a) single, (b) pair, and (c) triplet (FFT size 512 samples, 75% overlap, Hann window).



*Figure 35.* Occurrence of fin whale 20-Hz pulses detected in the (a) first deployment, (b) fourth deployment at Site A, and (c) fourth deployment at Site C. Black bars represent duration of vocal events and shading indicates periods of darkness, determined from the U.S. Naval Observatory (<http://aa.usno.navy.mil>).



*Figure 36.* Occurrence of minke whale pulse trains detected in the (a) first deployment, (b) fourth deployment at Site A, and (c) fourth deployment at Site C. Black bars represent duration of minke whale pulse trains (slow-down and speed-up) and red bars represent consistent pulse trains (possibly produced by minke whales). Shading indicates periods of darkness, determined from the U.S. Naval Observatory (<http://aa.usno.navy.mil>).

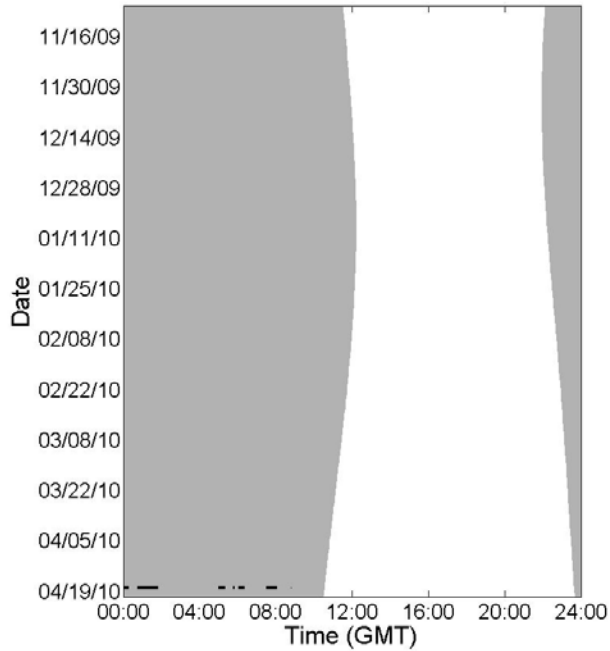


Figure 37. Occurrence of humpback whale calls detected in the fourth deployment located at Site C. Black bars represent duration of vocal events and shading indicates periods of darkness, determined from the U.S. Naval Observatory (<http://aa.usno.navy.mil>).

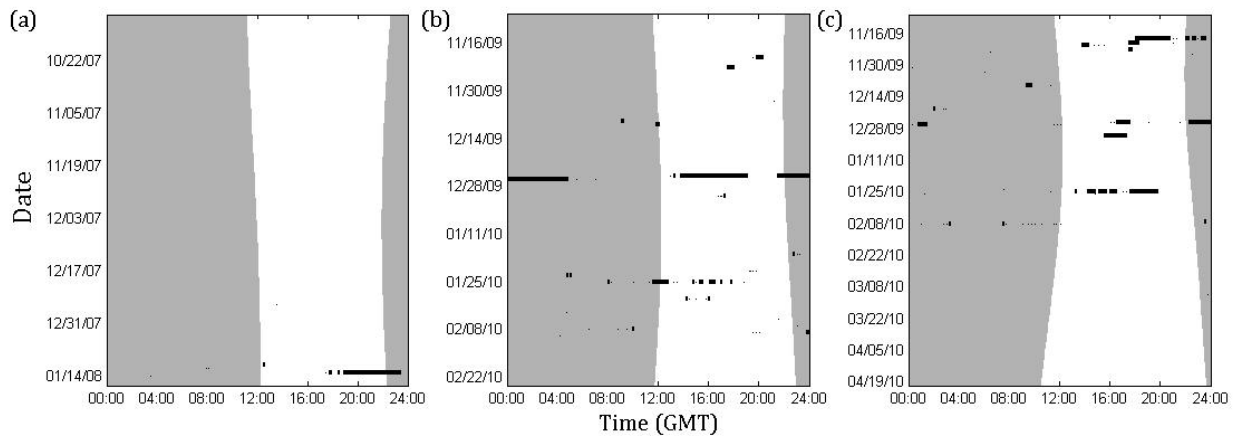


Figure 38. Occurrence of downsweeps, likely produced by sei whales, detected in the (a) first deployment, (b) fourth deployment at Site A, and (c) fourth deployment at Site C. Black bars represent duration of vocal events and shading indicates periods of darkness, determined from the U.S. Naval Observatory (<http://aa.usno.navy.mil>).



### *HARP Analysis - Current*

Analysis of the data from the fifth HARP deployments at Sites A and D is currently underway.

A cursory review of these datasets reveals vocal events from Risso's dolphins, pilot whales, sperm whales, fin whales, minke whales, and probable sei whales, as well as unidentified odontocetes.

## **Acknowledgements**

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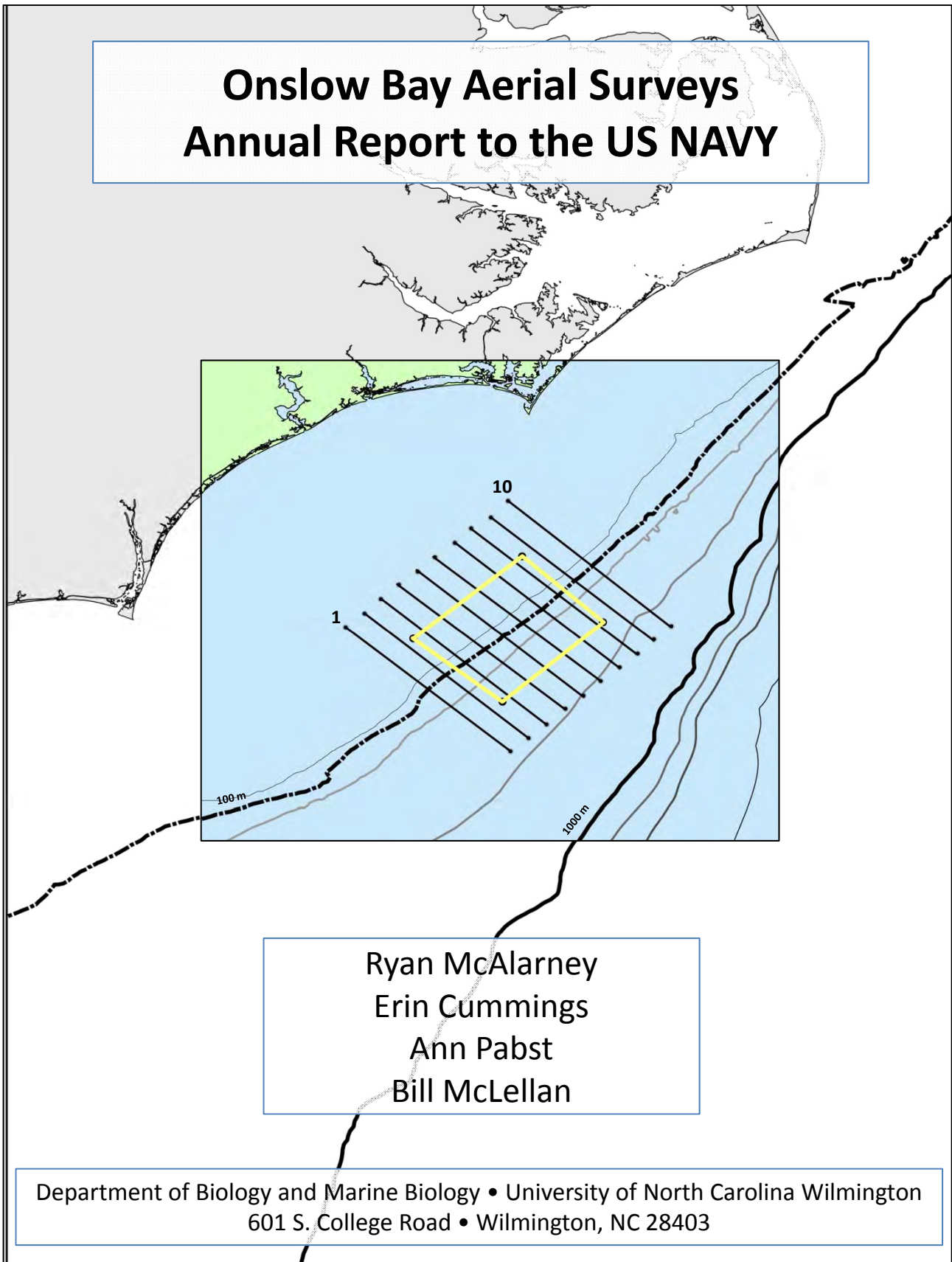
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# Onslow Bay Aerial Surveys Annual Report to the US NAVY



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## Summary of Onslow Bay Aerial Surveys

This document is an annual progress report to the U.S. Department of the Navy on aerial surveys carried out in North Carolina and Florida between July 2010 and December 2011. This chapter describes the aerial surveys conducted in Onslow Bay, North Carolina, which occurred between July 2010 and April 2011. The goal was to survey the entire survey site (ten tracklines) at least once per month. This goal was accomplished in seven of the ten months. In both February and April 2011 a single survey day was conducted, after which weather conditions prevented a complete set of ten tracklines from being flown. Unfavorable weather prevented any tracklines from being surveyed in December 2010. A total of 41 cetacean sightings of 1127 individuals (Table 1, Fig. 1) were observed while on effort in the study site. No right whales (*Eubalaena glacialis*) were encountered within this site. Five cetacean species were observed in the survey site while on effort including: bottlenose dolphins (*Tursiops truncatus*; 21 sightings of 679 individuals), Atlantic spotted dolphins (*Stenella frontalis*; ten sightings of 411 individuals), Risso's dolphins (*Grampus griseus*; two sightings of 12 individuals), humpback whales (*Megaptera novaeangliae*; one sighting of two individuals), and minke whales (*Balaenoptera acutorostrata*; one sighting of three individuals). There were five sightings totaling 20 individual animals where species identity could not be established with 100% certainty. Two of these sightings were of animals that were not small delphinids, and are listed here as "unidentified cetaceans". The remaining three sightings are listed as "unidentified delphinids".

A total of 234 sea turtles were observed during the study period. Of these, 181 were identified as loggerhead sea turtles (*Caretta caretta*); the remaining 53 are recorded as "unidentified sea turtles" (Tables 9, Fig. 11).

As previously demonstrated in other aerial survey studies, sightings drop off dramatically as the Beaufort Sea State (BSS) increases (e.g. Gómez de Segura *et al.* 2006, DeMaster *et al.* 2001). In the present study, as the BSS increased from one to three, cetacean sightings decreased from 12.77 to 3.31 per 1000 km surveyed, whereas sea turtle sightings decreased from 70.23 to 19.49 per 1000 km surveyed (Fig. 4b and 12b).

In addition to cetaceans and sea turtles, other pelagic marine vertebrates, including sharks, manta rays, and ocean sunfish, are reported here (Tables 10–12 and Fig. 13). The majority of vessels encountered in the survey range were recreational fishing vessels, which were predominantly observed shoreward of the 100 fathom depth contour (Table 13-15 and Fig. 14-16).



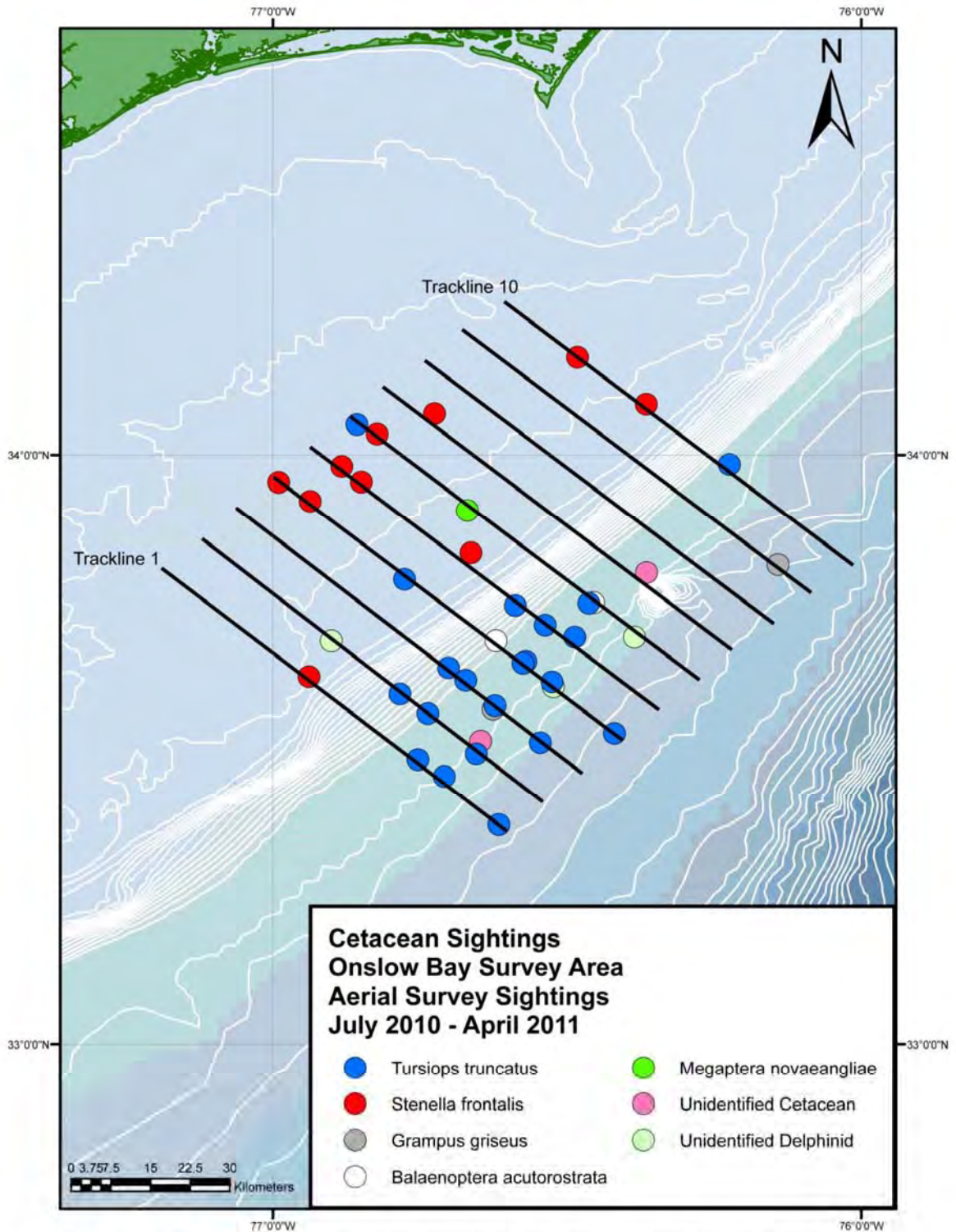


Figure 1. All Cetacean sightings during the 2010 - 2011 aerial surveys of Onslow Bay, North Carolina.



## **Methodology**

### Survey design and logistics

The University of North Carolina Wilmington (UNCW) provided experienced aerial observers and contracted Orion Aviation, Siler City, NC, to provide planes and certified pilots. Surveys were conducted using NOAA – SER Minimum Aircraft and Crew Provisions Guidelines, which require that aircraft are CFR Part 135 certified and that pilots have demonstrated experience working below 1000 ft in support of biological observational studies. Surveys were flown in a Cessna 337 Skymaster, at 305 m altitude and 185 km/hr speed, with a pilot, co-pilot and two observers. Each observer wore a Nomex ® fire retardant suit, a Switlik ® inflatable life jacket, a personal Emergency Positioning Beacon (EPIRB), as well as additional safety equipment. An inflatable life-raft, plane EPIRB, and satellite phone were also onboard at all times.

The survey site consisted of ten 74 km long track-lines spaced 6.5 km apart, which covers a roughly 4300 km<sup>2</sup> area of Onslow Bay (Fig. 2 and Table 2). Survey dates were chosen based upon weather and sea conditions, and access to restricted military areas within the site. Because the primary objective of the surveys was to locate and identify to species cetaceans and sea turtles, the sea state and consequent sighting conditions during surveys were key factors that dictated when to initiate and, if necessary, to abort surveys. Low sea states (*i.e.* winds preferably 5 – 10 knots, but no more than 15 knots and seas maximum 4 feet) were selected to optimize sighting conditions. Sighting rates of small cetaceans drop off to near zero in a Beaufort Sea State (BSS) of four or higher, as demonstrated by several previous aerial survey studies (e.g. Gómez de Segura *et al.* 2006, DeMaster *et al.* 2001). Once an appropriate weather window was identified, observers from UNCW and Orion Aviation pilots would coordinate to meet at a Fixed-base Operator (FBO) at the Wilmington, NC airport, from which all the surveys originated.

Table 2. Coordinates for trackline end points of the Onslow Bay, North Carolina survey site.

Transect Line	Western Way Point		Eastern Way Point	
	Latitude	Longitude	Latitude	Longitude
1	33.8119	-77.1926	33.3596	-76.6017
2	33.8620	-77.1249	33.4074	-76.5370
3	33.9146	-77.0666	33.4575	-76.4724
4	33.9671	-77.0020	33.5149	-76.4047
5	34.0148	-76.9342	33.5626	-76.3399
6	34.0673	-76.8726	33.6152	-76.2783
7	34.1198	-76.8017	33.6653	-76.2104
8	34.1723	-76.7431	33.7154	-76.1456
9	34.2119	-76.6721	33.7679	-76.0870
10	34.2724	-76.6104	33.8157	-76.0252

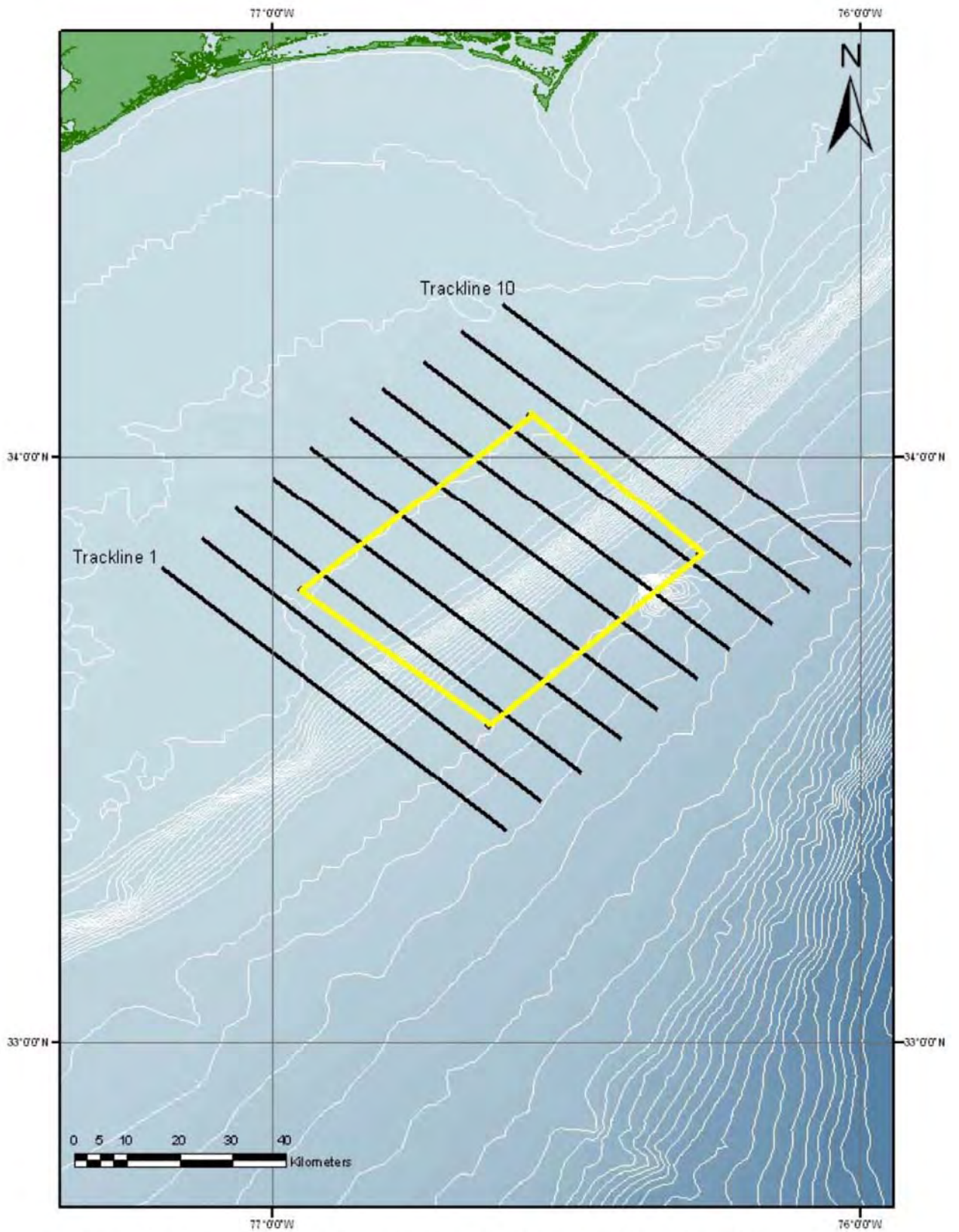


Figure 2. Survey tracklines 1-10 that cover Onslow Bay, North Carolina.

## Data collection

Each side of the plane was monitored by one observer with his or her own GPS unit, data sheet (see Appendix A), and binoculars, and each side was considered an independent strip transect. The start and end of transect lines, changes in environmental variables (*i.e.* cloud cover, BSS, visibility, and glare), and sightings of marine mammals, sea turtles and vessels in the survey site were recorded by each observer throughout the survey (see Appendix B for sighting codes). When a sighting cue was observed, horizontal and vertical angles between the plane and the sighting cue were recorded. Observers would then record a break track point and go off effort from the survey line to investigate the sighting. The plane would close on the sighting location and circle above the animal(s) to obtain photographic evidence of species. Initial and final locations of the sighting were recorded so that an approximation of the distance of the initial sighting from the track line, and any general movements of animal(s), could be calculated. During a marine mammal encounter, the observer on the left side of the plane was the designated data recorder and the right observer took digital photographs to confirm species identification. The camera used was a Canon 40D with a 100-400 mm image stabilizer lens. The minimum and maximum numbers of animals in each sighting were estimated by both observers in the field and recorded. After photographic and sighting data were collected, the plane returned to the initial sighting location on the trackline, taking another waypoint marking the return to on effort surveys. All data collected during a sighting were recorded on the Sighting Data Sheet (Appendix C).

The plane did not break track for sightings of sea turtles, other marine vertebrates (*e.g.* sharks and rays) or vessels, however, these types of sightings were recorded and logged.

## Data analysis

Upon completion of a daily survey, GPS waypoints were downloaded to a desktop computer utilizing the GPS Utility software program (GPS Utility Limited, UK) and subsequently transferred into Microsoft® Excel spread sheets. Observational data (*e.g.* start and stop track line, sightings, and weather conditions) were entered manually into the spread sheet for each GPS waypoint. All digital images collected during a survey were also downloaded and separated into individual folders for each sighting that day. The use of digital photography allowed for enlargement of images once in the lab, which enhanced the ability to identify animals to species. For each sighting, a group of best

images was selected based on visible diagnostic features. These images were used in conjunction with the preliminary species identification (ID) made in the field, based upon appearance, group size and behavior, to determine species identity. During the first year of surveys, observers from UNCW and Duke University met on two occasions to review sighting images and establish a clear set of diagnostic features to positively identify each cetacean species. These features were used by both teams during their photo analysis in the subsequent years. Unless the dolphin species identity could be unequivocally established, the designation “unidentified delphinids” was used. Unidentifiable species were often the result of high BSS conditions or low group size; both factors made relocation and photo documentation of the animals difficult. Images obtained during a sighting were similarly employed to calculate group numbers, and a best estimate of group size was established based on field observations and images.

Geographical Information System (GIS) maps of sightings of cetaceans, sea turtles, other marine vertebrates, and vessels within the survey site were created. Positional data were imported from Excel spread sheets into Arc GIS version 9.3 (ESRI<sup>®</sup>, Redlands, CA), and used to plot sightings.

The distances between the break track waypoint (2.0) and the initial position of each sighting (2.4) was calculated in Excel using the Haversine formula to calculate distances between two geographical reference points and was obtained through the online resource Scripts Movable Type (<http://www.movable-type.co.uk/scripts/latlong.html>). Since there is a bias in estimating the location of a group of mobile marine mammals from a fast moving airplane, the distances calculated between break track and sighting were recorded to 0.1 km. All data obtained during a marine mammal sighting (*e.g.* observational notes, group size, GPS coordinates and image numbers) were summarized in the Sighting Summary Sheet (See Appendices E and F for example and explanation). When all surveys for a month were completed, tables (mirroring those presented here) with sightings and effort were included in the monthly progress report compiled and sent by UNCW to HDR and the US Navy.

Off effort sightings (*i.e.* “10.0” and sightings made on effort transits to and from the range) were not included in spread sheets used for data analysis.

### Data storage

All data obtained during a flight (GPS coordinates and digital pictures) and transcribed notes (*e.g.* observations and sightings) were stored electronically in three separate places: on a networked computer hard drive (which is backed up twice a week), an external hard drive, and on separate CDRs or DVDs. Additionally, the original data sheets used in the plane [*i.e.* daily plane log (Appendix D), observer notes and sightings sheets] are stored in binders, as are electronically entered versions of the same, along with printed forms of all electronic files. All data are stored at UNCW. In addition, all survey data, once edited, are regularly posted online to OBIS SEAMAP (<http://seamap.env.duke.edu/>).

### **Results**

One complete set of survey tracklines were flown in all months from July 2010 to April 2011, except the months of December 2010 (no surveys flown due to weather), February 2011 (8 tracklines), and April 2011 (6 tracklines) for a total of 6713 km (Table 3). Survey conditions ranged from a Beaufort Sea State (BSS) 1 to 4, with the majority of the surveys flown in a BSS 2 or 3 [BSS 1: 469.9 km (7.0%), BSS 2: 2470 km (36.8%), BSS 3: 2719.2 km (40.5 %), BSS 4: 1054.2 km (15.7%)(Fig. 3a and 3b)]. An average BSS value was calculated each survey month to compare conditions across months. This process was done by taking the distance flown at each sea state multiplied by the BSS number (*i.e.* BSS 1 distances would be multiplied by 1); these values were then summed and divided by the total distance flown that month (Fig. 3c). Survey effort was terminated at BSS greater than 4. Cetacean sighting rates dropped off dramatically as BSS increased beyond a BSS 2, with 6 sightings made in a BSS 1 (12.77 sightings/1000 km flown), 26 in a BSS 2 (10.53 sightings/1000 km flown), 9 in a BSS 3 (3.31 sightings/1000 km flown) and no sightings in a BSS 4 (Fig. 4a - c). Summaries of sightings and survey conditions by day are compiled in Appendix G. Additional survey effort conducted offshore of the Onslow Bay survey site is summarized in Appendix H.

Table 3. Tracklines and km flown during aerial surveys of Onslow Bay, North Carolina between July 2010 and April 2011. Trackline numbers listed in the order in which they were flown.

Date	Tracklines flown AM	Tracklines flown PM	Total km flown W/O offshore
8-Jul-2010	1 to 6	7 to 10	742.7
20-Aug-2010	1, offshore, 10 to 8		295.0
21-Aug-2010	7 to 2		441.3
14-Sep-2010	6 to 10, 5		463.3
15-Sep-2010	4 to 1, 5 to 6		445.5
21-Oct-2010	10 to 8, 3 to 1	4 to 7	729.6
22-Oct-2010	1, 2		148.6
19-Nov-2010		10 to 7	296.3
20-Nov-2010	1 to 6,	1B, B, 10B	511.4
14-Jan-2011	10 to 5	4 to 1	734.1
24-Feb-2011	1 to 4	5 to 8	572.9
17-Mar-2011	1 to 4	5 to 10	741.3
18-Mar-2011	1, offshore, 10		147.9
20-Apr-2011	5 to 10		443.4
			6713.3

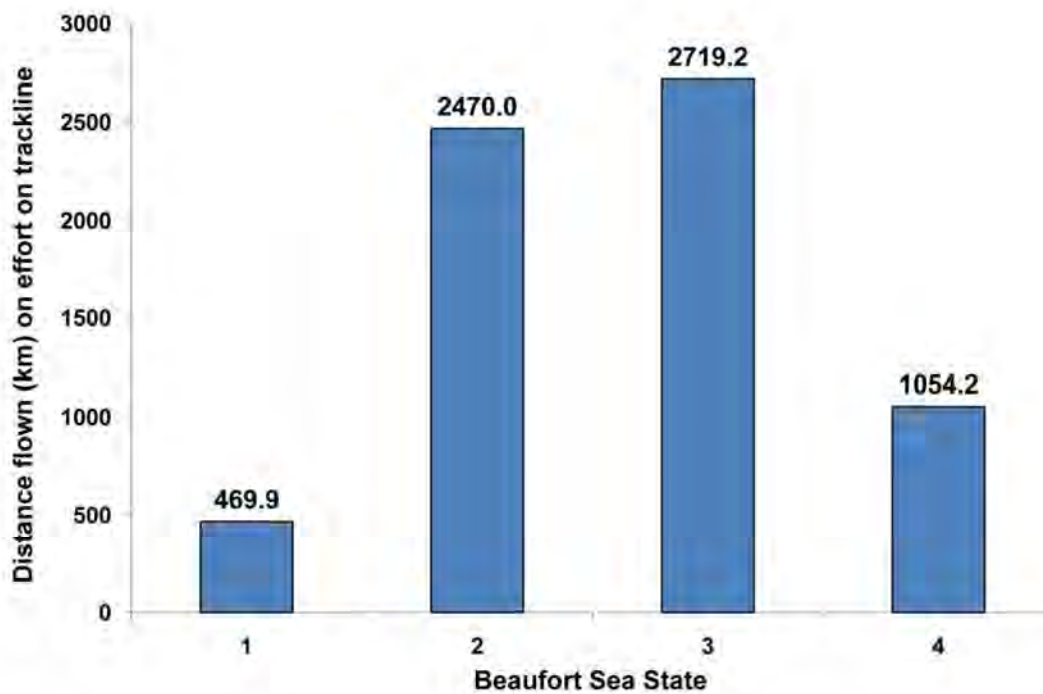


Figure 3a. Total distance surveyed per Beaufort Sea State during the July 2010 - April 2011 aerial surveys in Onslow Bay, North Carolina.

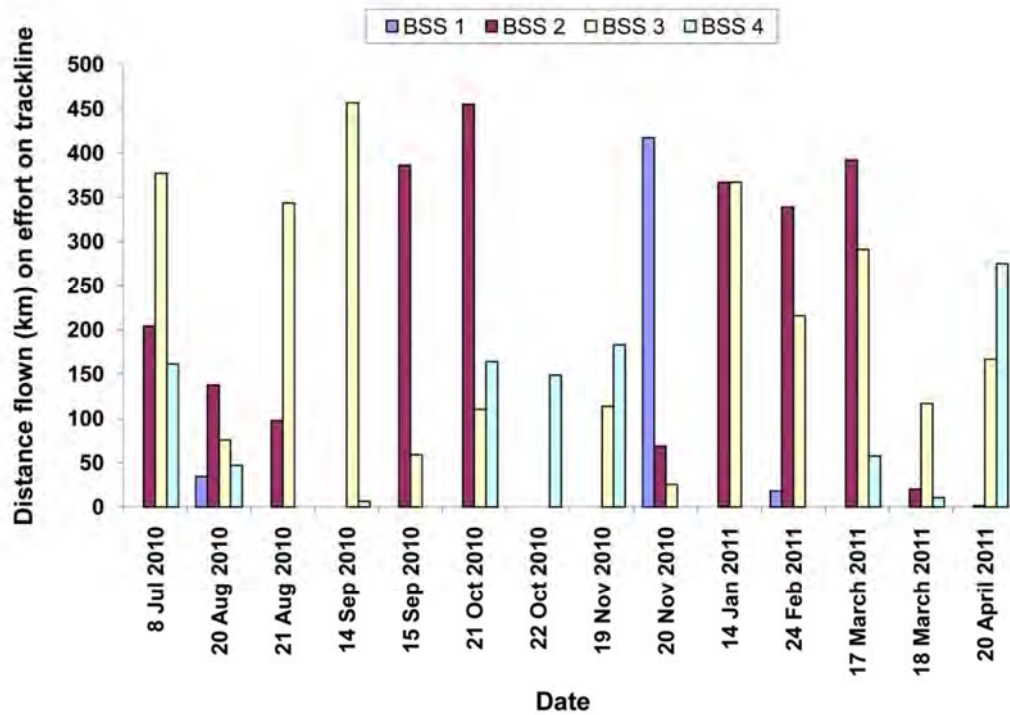


Figure 3b. Effort by Beaufort Sea State for each day during the July 2010 - April 2011 aerial surveys in Onslow Bay, North Carolina.



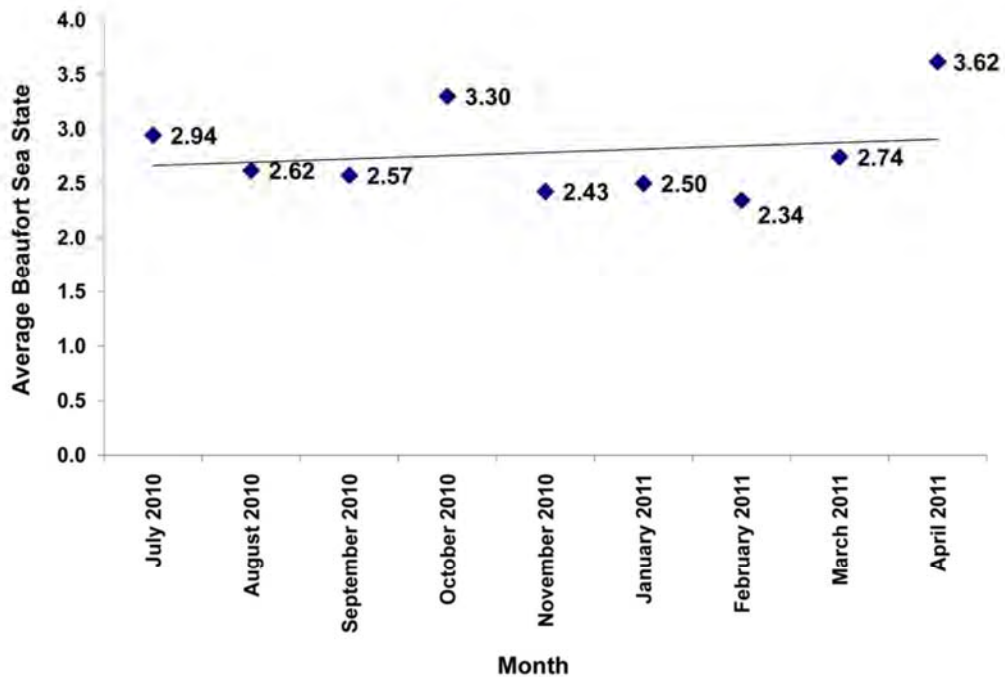


Figure 3c. Average Beaufort Sea State for each month during the July 2010 - April 2011 aerial surveys in Onslow Bay, North Carolina. Values were calculated using the formula  $AvgBSS = [(Distance @ BSS 1*1)+(Distance @ BSS 2*2)+...]/Total\ distance\ flown\ that\ day]$

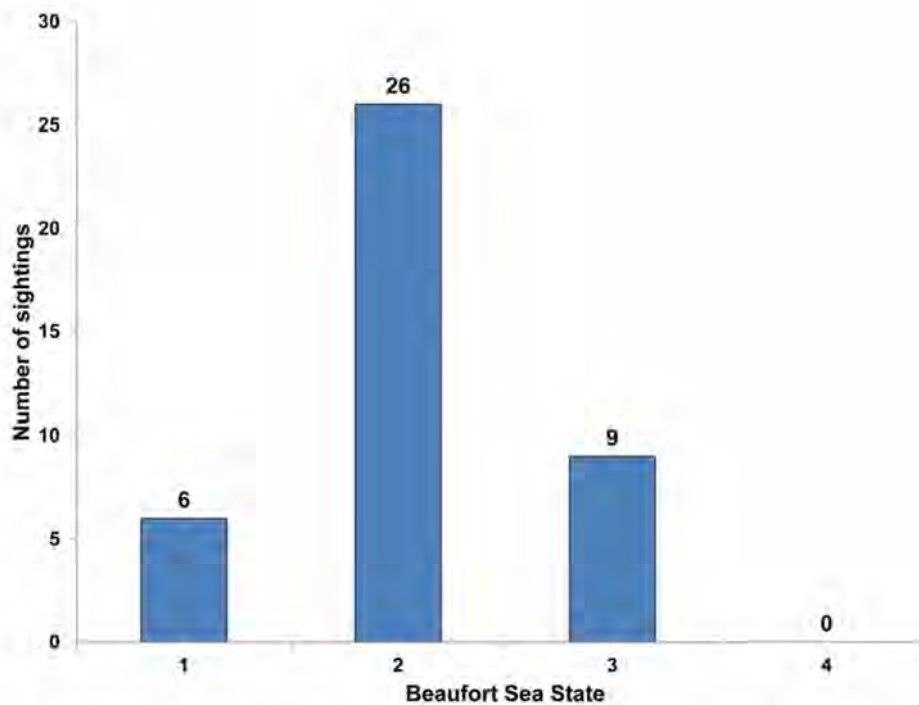


Figure 4a. Total number of cetacean sightings per Beaufort Sea State during the July 2010 - April 2011 aerial surveys in Onslow Bay, North Carolina.

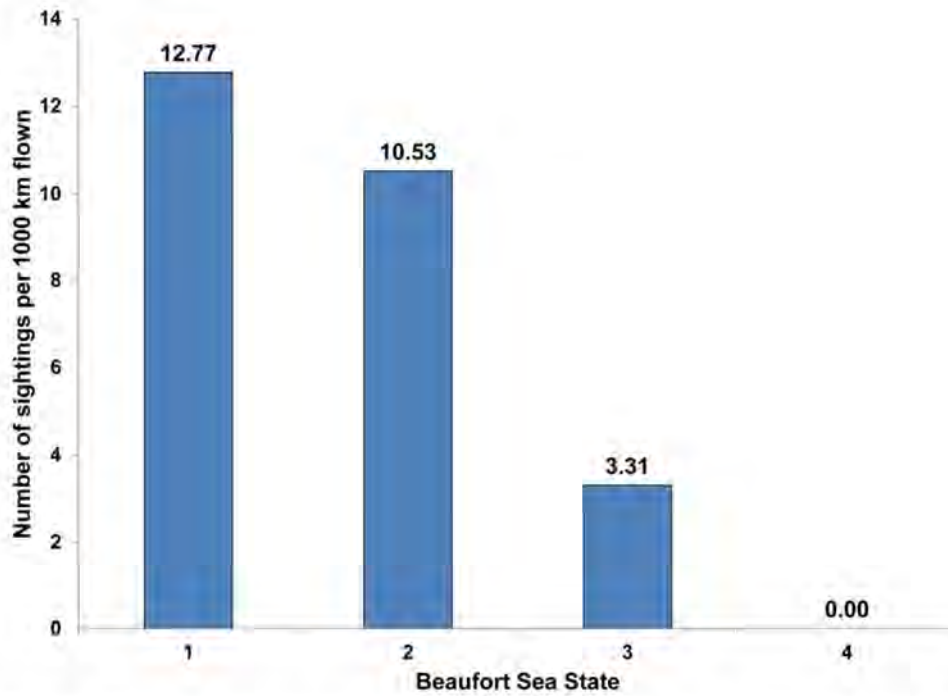


Figure 4b. Cetacean sightings per 1000 km flown by Beaufort Sea State during the July 2010 - April 2011 aerial surveys in Onslow Bay, North Carolina.

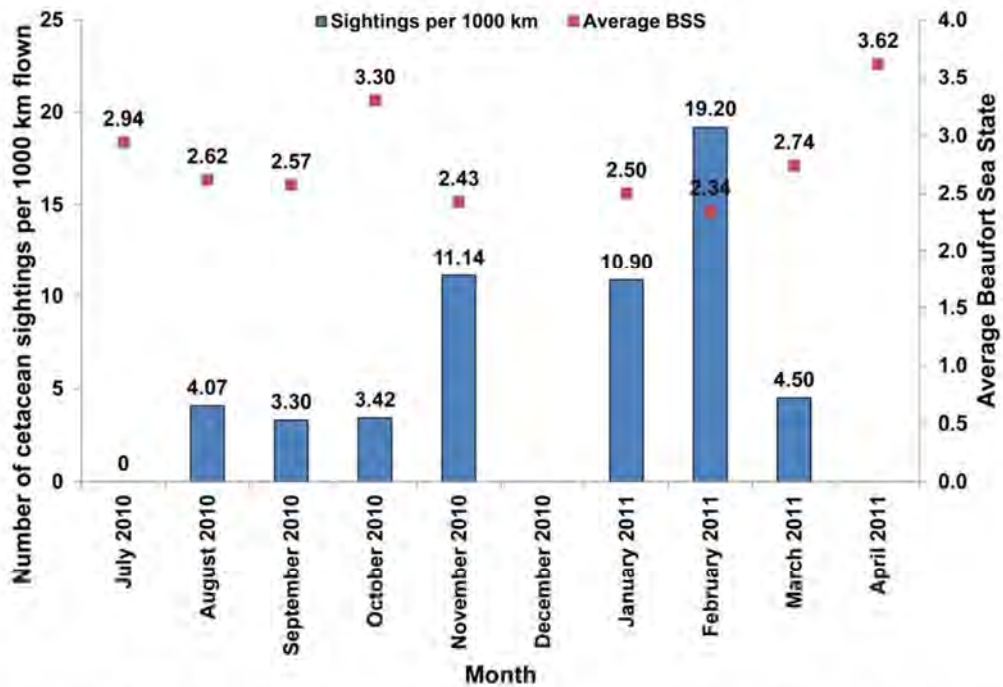


Figure 4c. Cetacean sightings per 1000 km surveyed and the average Beaufort Sea State per month during the July 2010 - April 2011 aerial surveys in Onslow Bay, North Carolina.

The mean sighting distance for all cetacean sightings was 0.7 km from the trackline and most sightings were made within 1.2 km of the plane (Fig.5a). The mean sighting distance from the trackline was slightly higher in a BSS 2 than in BSS 1 and 3, which had identical mean sighting distances (Fig. 5b). Average sighting distances were calculated after removing outliers. An outlier was defined as a value in excess of three standard deviations from the mean. This year, a single sighting was removed from these calculations as an outlier (*i.e.* sighting distance calculated as 2.1 km from the trackline). There were also three sightings for which only an assumed location was collected; these sightings were also omitted from our calculations.

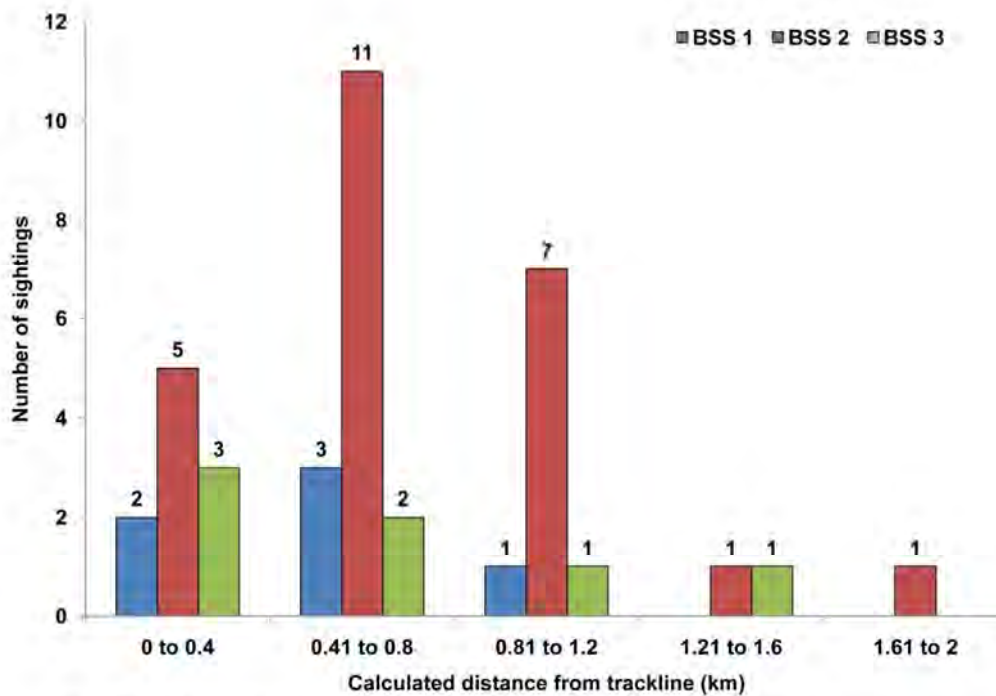


Figure 5a. Sighting distances by Beaufort Sea State for all cetacean sightings during the July 2010 - April 2011 aerial surveys in Onslow Bay, North Carolina.

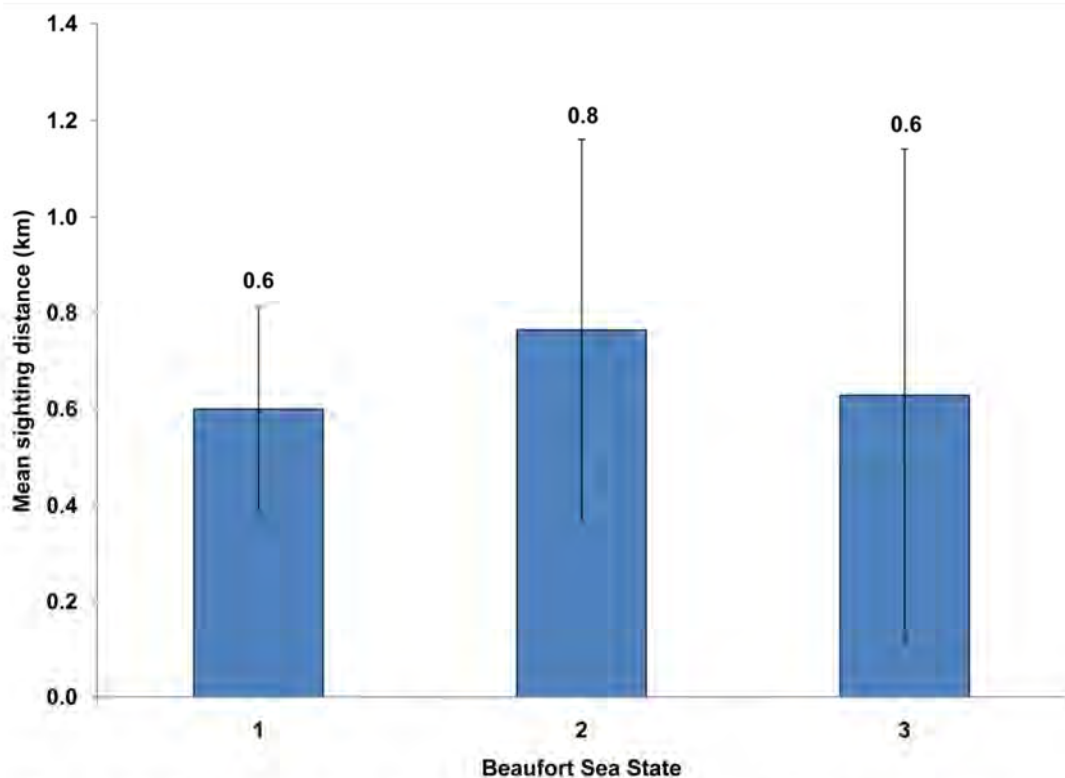


Figure 5b. Mean sighting distances by Beaufort Sea State for all cetacean sightings during the July 2010 - April 2011 aerial surveys in Onslow Bay, North Carolina. Error bars denote standard deviation for each category.

### Marine Mammal Sightings

During this survey period, two baleen whale species were encountered that had not previously been observed at the Onslow Bay survey site. On March 17, 2011 a pair of adult humpback whales (*Megaptera novaeangliae*) was observed on trackline six. These animals remained relatively stationary, coming to the surface regularly for 13 minutes before they dove out of site and were not relocated. On February 24, 2011 a minke whale (*Balaenoptera acutorostrata*) mom/calf pair was observed on trackline four, traveling just below the surface. No neonatal characteristics were observed on the calf, but its length (approximately 50% of the mother) suggests that it was likely a young of the year. Both animals surfaced together with the calf having an additional surfacing between each of its mother's breaths. Both animals remained at shallow depth throughout the encounter, and were easily visible beneath the surface due to their white pectoral fin coloration. The encounter lasted 25 minutes, through three surfacing events, before the team returned to the trackline. That same day, on trackline six, a single adult

minke whale was sighted. The animal surfaced once before diving from sight. The animal was not re-sighted after 18 minutes of searching. All identified species sighted are listed below in order of decreasing number of sightings (*i.e.* most commonly sighted species first). Total number of individuals is based upon the best estimate of group size. On two occasions animals were encountered for which no definitive species identification could be made. The animals were classified as unidentified cetaceans, as it was determined that they were not small delphinids. The first sighting occurred on August 21, 2010. Seven dark-bodied animals, traveling slowly in a tightly packed group, were encountered as they began a deep dive. The appearance of the animals is suggestive of short-finned pilot whales, which have been observed in that area during previous years. On February 24, 2010 an approximately 4 m light grey animal with a robust body appearance and rounded head was observed just below the surface. Submerged approximately 10 m below the surface was a second, much larger and darker animal, in close proximity to the first. No further observations were made as both animals dove away from the surface. The characteristics noted for these animals suggest that they were a species not yet observed during our surveys, and a definitive identification could not be made.

#### Bottlenose dolphins (*Tursiops truncatus*) (Table 4, Fig. 6)

The bottlenose dolphin was the most commonly observed cetacean species during the present study, based upon number of sightings and number of individuals. This species was observed 21 times for a total of 679 individuals. Group size ranged between 4 - 230 individuals (mean=14). Bottlenose dolphins were observed in August, October, November, February, and March of the current reporting period. Calves (defined as an individual less than or equal to one-half the total length of the associated adult) were observed in November and March. Based on the distance from shore (*i.e.* greater than 34 km), these bottlenose dolphins were most likely the offshore ecotype (Torres *et al.* 2003). As in previous years, many more sightings occurred offshore of the shelf break than over the continental shelf, and while smaller groups were encountered throughout the survey site, larger groups were seen more frequently in offshore waters. This spatial pattern and the abundance of this species have remained consistent with the preceding three years of survey effort (Pabst *et al.* 2008, McAlarney *et al.* 2009, McAlarney *et al.* 2010). The current best estimate of offshore bottlenose dolphin in the Western Atlantic Ocean,

between central Florida and Canada, is 81588 (CV=0.17) (Waring *et al.* 2008). The status of the offshore bottlenose dolphins stock in the Northwest Atlantic is unknown.

Table 4. All bottlenose dolphin (*Tursiops truncatus*) sightings in Onslow Bay, North Carolina for surveys conducted from July 2010 - April 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
21-Aug-10	11:18	20	33.649193	-76.570275	NW	4	2	90°	8
21-Oct-10	11:28	36	33.638377	-76.701693	NW	3	2	60°	18
20-Nov-10	9:05	10	33.561044	-76.736932	NW	2	2	45°	16
20-Nov-10	9:15	14	33.594334	-76.784286	NW	2	1	45°	12
20-Nov-10	9:50	26	33.617344	-76.672677	SE	3	1	90°	25
20-Nov-10	10:05	32	33.527289	-76.419771	NW	4	3	90°	50
20-Nov-10	10:20	36	33.645909	-76.575034	NW	4	2	60°	4
20-Nov-10	10:56	48	33.743850	-76.588069	SE	5	3	90°	28
20-Nov-10	13:45	68	33.454015	-76.708844	SE	1	3	90°	15
20-Nov-10	14:00	72	33.371993	-76.616156	SE	1	2	60°	9
20-Nov-10	15:17	96	33.984226	-76.224449	NW	10	2	90°	21
24-Feb-11	9:22	10	33.482840	-76.753731	SE	1	3	90°	32
24-Feb-11	9:41	17	33.492367	-76.654561	NW	2	3	90°	4
24-Feb-11	10:23	34	33.574638	-76.622563	SE	3	3	90°	18
24-Feb-11	10:31	39	33.511343	-76.545763	SE	3	1	90°	10
24-Feb-11	10:46	45	33.614701	-76.525724	NW	4	1	45°	79
24-Feb-11	11:23	54	33.788800	-76.776595	NW	4	2	90°	10
24-Feb-11	14:00	75	33.690618	-76.487107	SE	5	2	60°	230
17-Mar-11	13:47	34	33.710799	-76.537303	NW	5	2	90°	12
17-Mar-11	14:10	42	33.748012	-76.463278	SE	6	2	45°	33
17-Mar-11	14:44	51	34.051842	-76.857337	SE	6	2	45°	45

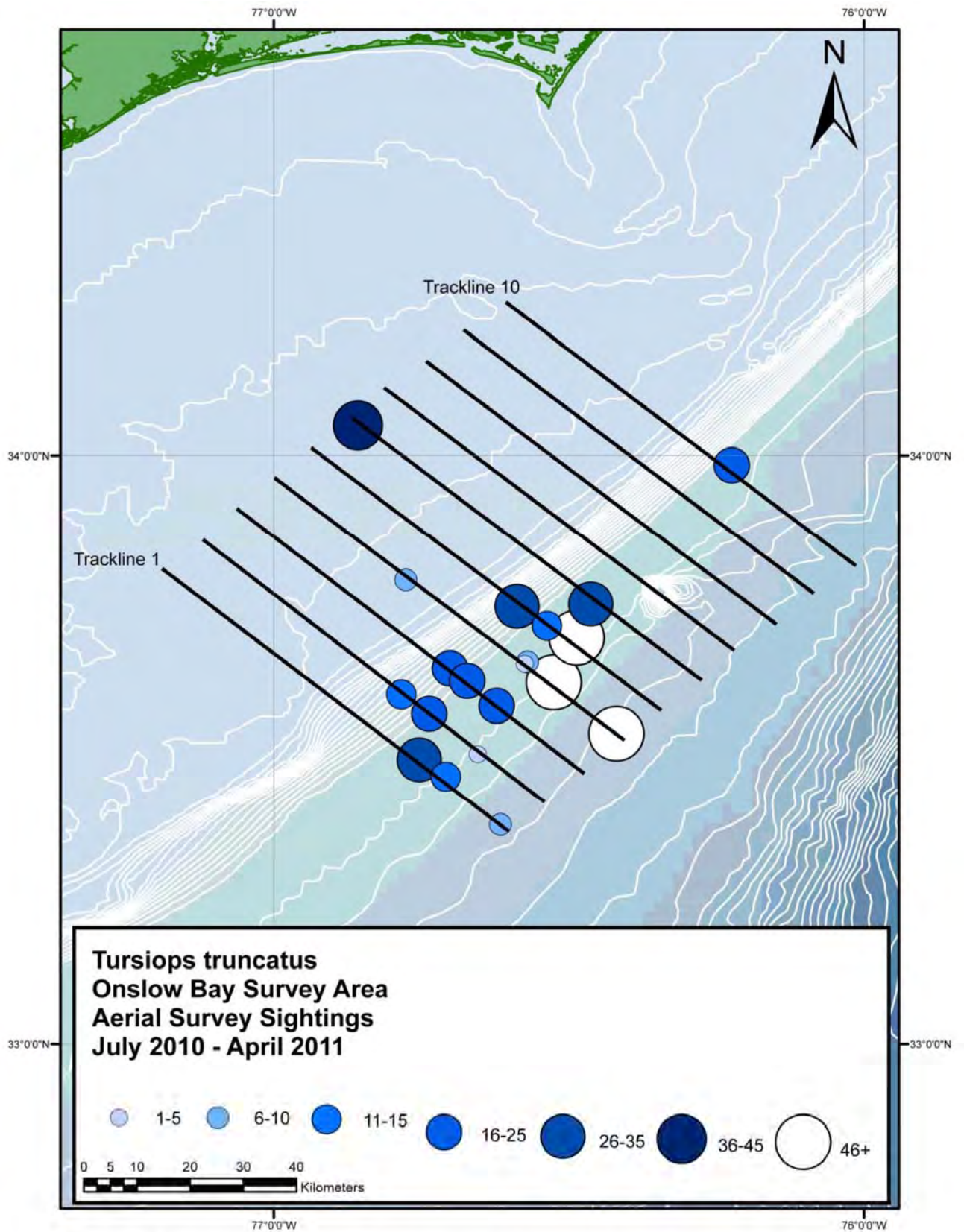


Figure 6. Bottlenose dolphin (*Tursiops truncatus*) sightings indicating group size.

Atlantic spotted dolphins (*Stenella frontalis*) (Table 5, Fig. 7)

The Atlantic spotted dolphin was the second most commonly encountered species in the survey site, both by number of sightings and number of individuals. Groups of spotted dolphins were sighted 10 times for a total of 411 individuals. This species was encountered in September, January, and February of the current reporting period. Group size ranged between two and 180 (mean=19). At least one calf was observed in both January and February. There are two distinct forms, or ecotypes, of the Atlantic spotted dolphin in the western North Atlantic: a heavily spotted, larger form that typically occurs on the continental shelf and is most often encountered around the 200 m isobath or shallower water, and a less spotted and smaller form which occurs further offshore and around islands (Perrin *et al.* 1987, 1994). It is likely, based upon the sighting pattern observed, that the Atlantic spotted dolphins observed during the present study belong to the continental shelf form. Atlantic spotted dolphins were not recorded during the 1998/1999 aerial surveys, although the lines flown did not extend as far west as in the current surveys (McLellan *et al.* 1999). This species has, though, been observed in every year of the current Onslow bay surveys. The abundance estimate for *S. frontalis* (both inshore and offshore ecotypes) in the western North Atlantic is 50978; the status of the stock(s) is/are unknown (Waring *et al.* 2007).

Table 5. All spotted dolphin (*Stenella frontalis*) sightings in Onslow Bay, North Carolina for surveys conducted from July 2010 - April 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
15-Sep-10	14:24	20	33.623457	-76.938743	NW	1	3	100°	37
15-Sep-10	14:58	26	33.954389	-76.849868	SE	5	1	60°	2
14-Jan-11	8:56	5	34.165669	-76.482446	SE	10	1	90°	22
14-Jan-11	9:05	10	34.086145	-76.365575	SE	10	2	90°	26
14-Jan-11	10:35	27	34.070243	-76.725518	NW	7	2	90°	25
14-Jan-11	10:51	34	34.035643	-76.822912	SE	6	1	90°	50
14-Jan-11	11:31	48	33.833874	-76.663780	NW	5	3	90°	180
14-Jan-11	11:51	55	33.980883	-76.883005	NW	5	2	90°	25
14-Jan-11	13:55	63	33.921761	-76.936736	SE	4	3	60°	15
24-Feb-11	11:34	59	33.953879	-76.990195	NW	4	3	90°	29



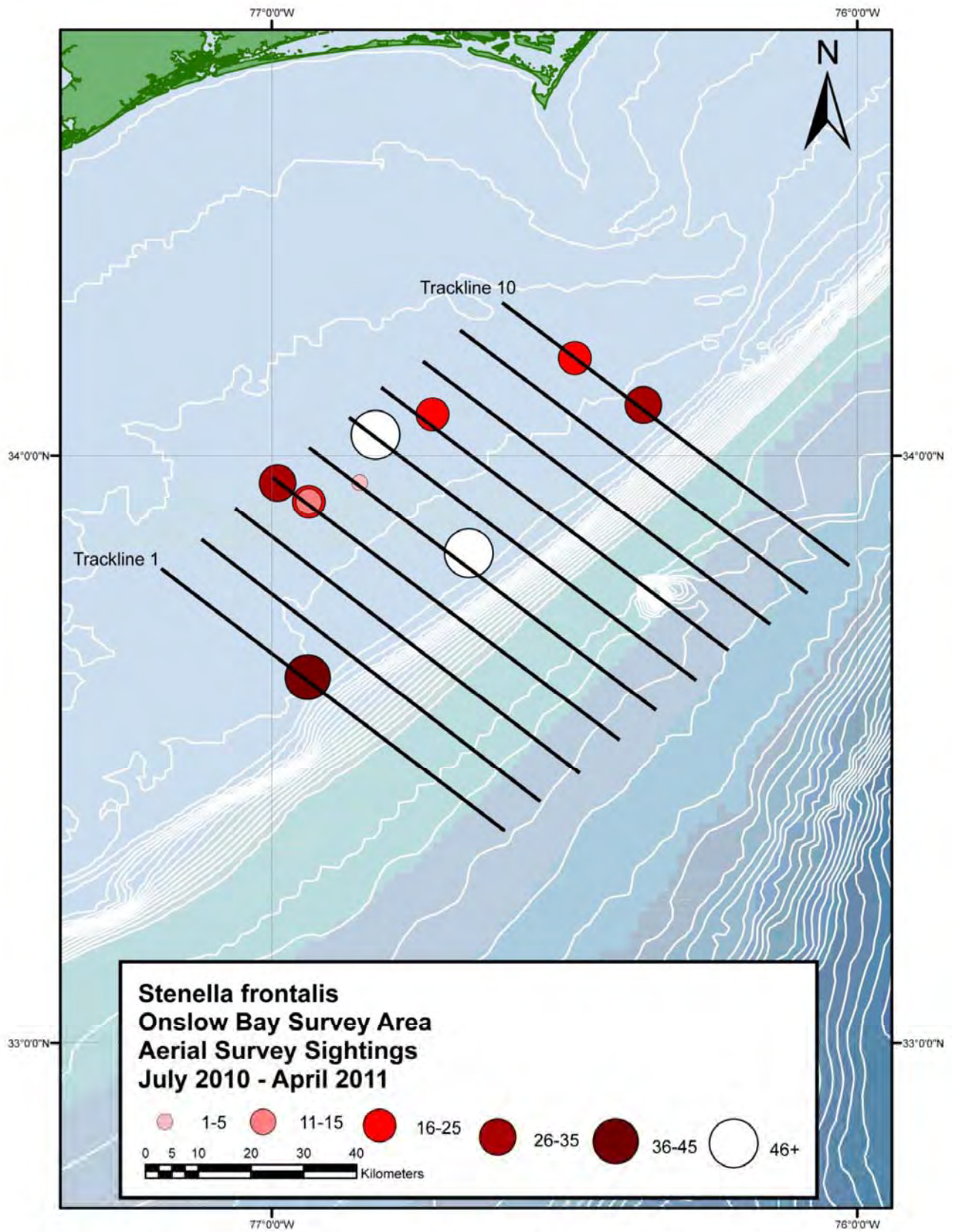


Figure 7. Spotted dolphin (*Stenella frontalis*) sightings indicating group size.

Risso's dolphins (*Grampus griseus*) (Table 6, Fig. 8)

There were two sightings of Risso's dolphins both occurring in the offshore waters of the site on October 21, 2010. Group sizes were two and ten individuals. Neither group sighted this year was observed with a calf present. This species has been recorded in the site in each of the preceding years, although they are seen less frequently, and in smaller groups, than both *Tursiops* and *Stenella frontalis* (Pabst *et al.* 2008, McAlarney *et al.* 2009, McAlarney *et al.* 2010).

All encounters occurred in offshore waters along the mid-Atlantic continental shelf edge, where Risso's dolphins have been found to reside year round, with some movement north during spring, summer and fall, and into the mid-Atlantic Bight during winter (Waring *et al.* 2007). The best available estimate for Risso's dolphins, based upon results from two US Atlantic surveys conducted in 2004, is 20479 (CV=0.59); the status of this stock is unknown (Waring *et al.* 2010).

Table 6. All Risso's dolphin (*Grampus griseus*) sightings in Onslow Bay, North Carolina for surveys conducted from July 2010 - April 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
21-Oct-10	9:39	10	33.813908	-76.141887	NW	9	3	90°	10
21-Oct-10	11:14	32	33.568532	-76.625898	NW	3	2	90°	2

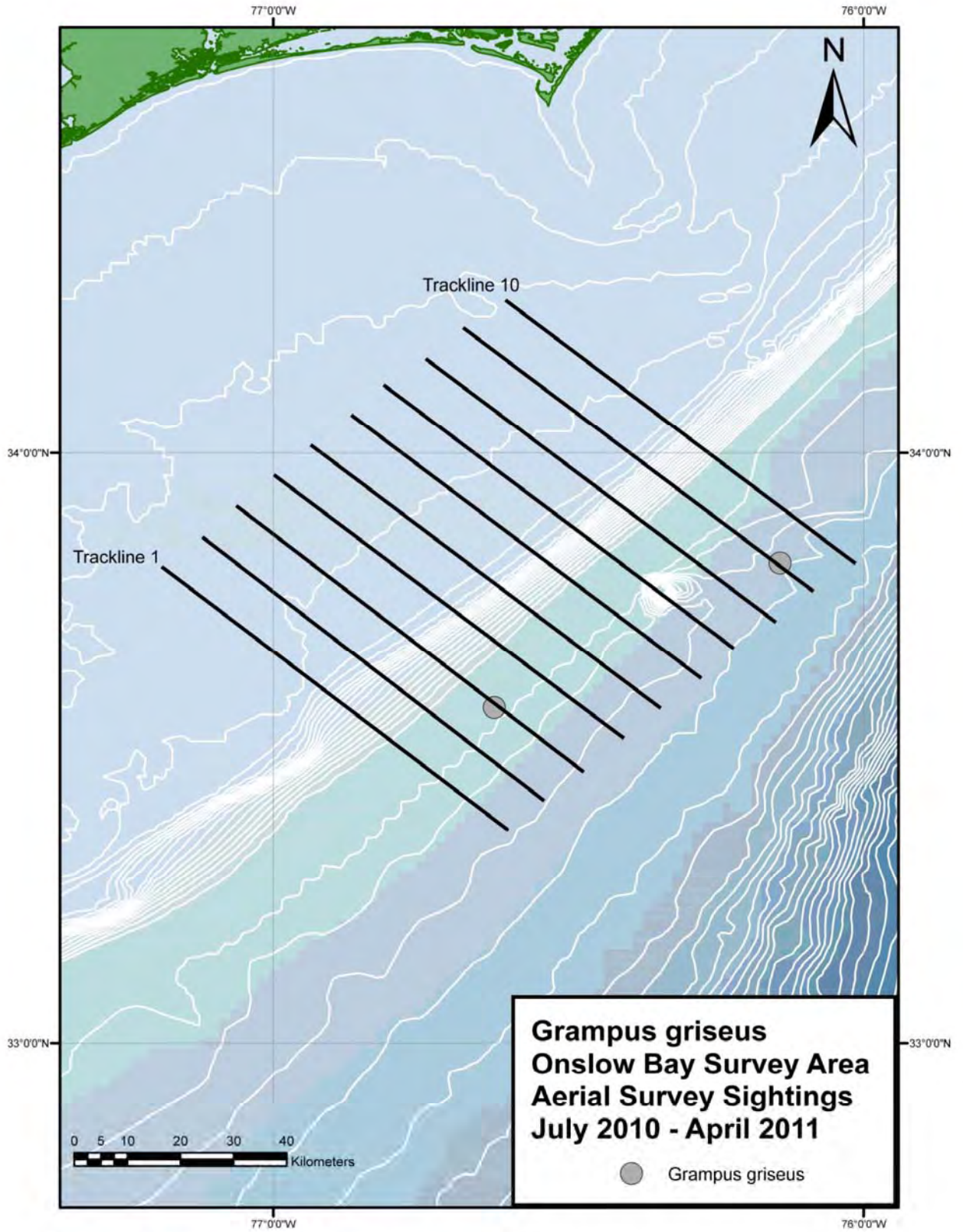


Figure 8. Risso's dolphin (*Grampus griseus*) sightings.

Minke whale (*Balaenoptera acutorostrata*) (Table 7, Fig. 9)

Two sightings of minke whales were recorded during this survey period and represent the first sightings of this species during our current effort in Onslow Bay. A mom/calf pair and a separate sighting of an adult individual were observed just off the shelf break. Minke whales inhabiting waters off the U.S. east coast are considered part of the Canadian East Coast stock, which occurs from the western portion of the Davis Strait (45°W) south to the Gulf of Mexico. The best available abundance estimate for this stock is 8987 (CV=0.32)(Waring *et al.* 2010).

Table 7. Minke whale (*Balaenoptera acutorostrata*) sightings in Onslow Bay, North Carolina for surveys conducted from July 2010 - April 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
24-Feb-11	10:55	49	33.684479	-76.620831	NW	4	2	90°	2
24-Feb-11	14:19	82	33.748897	-76.455229	NW	6	1	90°	1

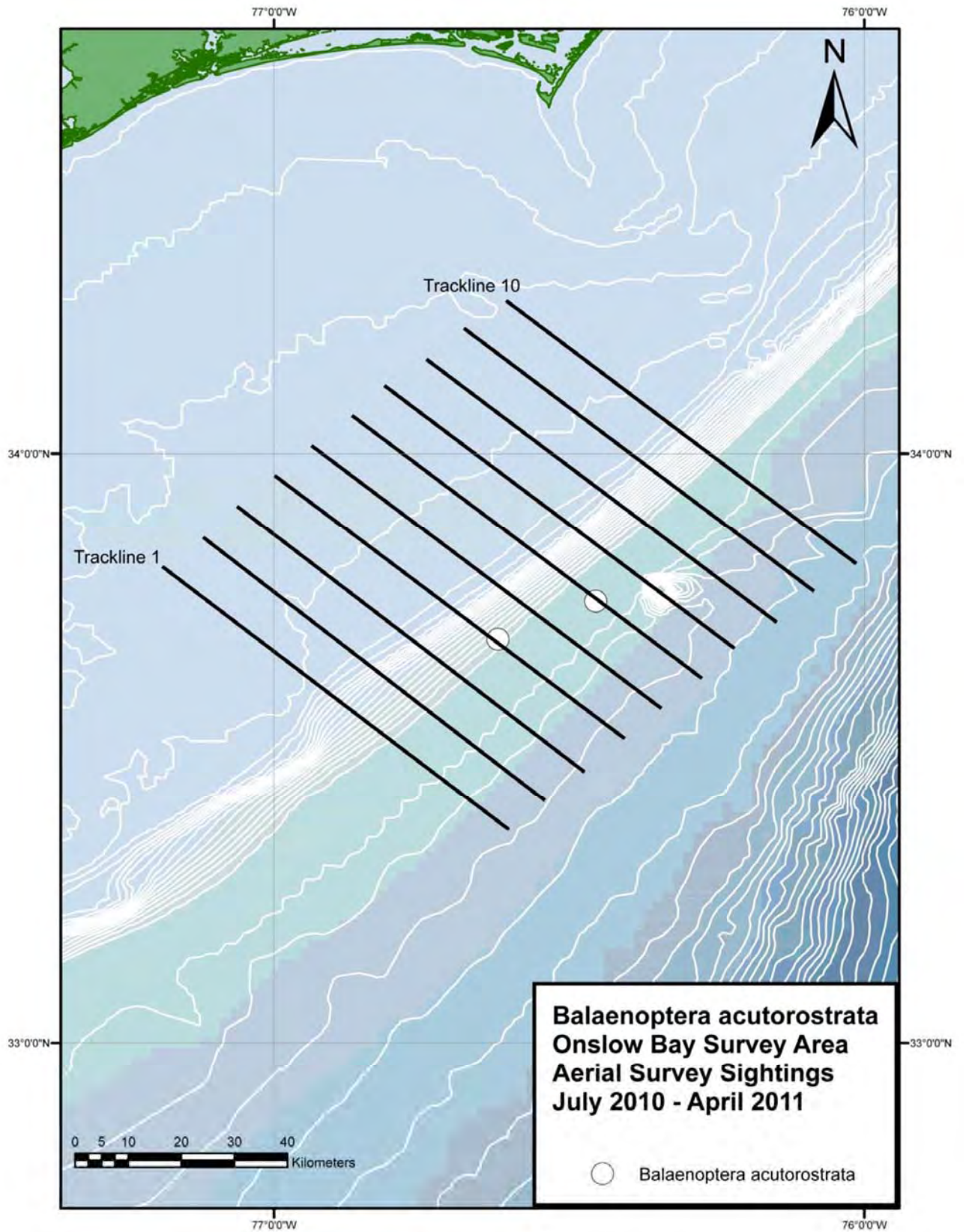


Figure 9. Minke whale (*Balaenoptera acutorostrata*) sightings.

Humpback whale (*Megaptera novaeangliae*) (Table 8, Fig. 10)

A pair of adult humpback whales was sighted over the continental shelf water of the survey site. While this species has been sighting in the coastal waters of Onslow Bay (unpublished data, UNCW), this is the first time it has been recorded during our current survey effort in this offshore site. Currently, humpback whales in the Western North Atlantic are treated as a single stock, despite genetic evidence identifying smaller sub stocks (Waring *et al.* 2010). Population estimates vary depending upon methods utilized, and range between 7698 (genetic tagging methods) and 11570 (photographic mark-recapture methods) (reviewed in Waring *et al.* 2010). This species is listed as endangered under the Endangered Species Act.

Table 8. Humpback whale (*Megaptera novaeangliae*) sighting in Onslow Bay, North Carolina for surveys conducted from July 2010 - April 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
17-Mar-11	14:23	47	33.906008	-76.669755	SE	6	3	45°	2

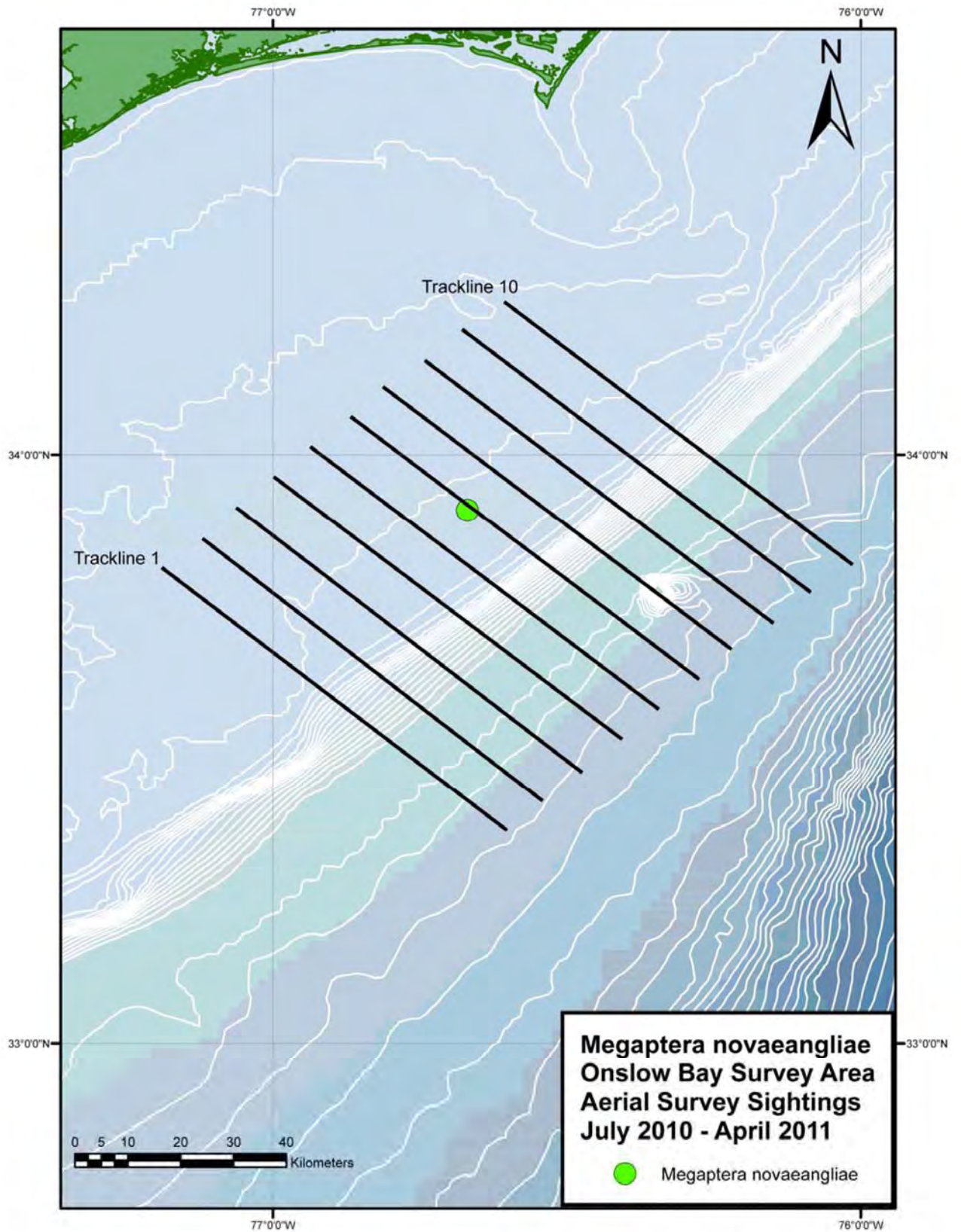


Figure 10. Humpback whale (*Megaptera novaeangliae*) sighting.

### Sea Turtles (Table 9, Figs. 11 and 12a-c)

The most common sea turtle off the North Carolina coast is the loggerhead sea turtle (*Caretta caretta*), and fall into the Northwest Atlantic Ocean distinct population segment (DPS) which is separated into five separate recovery units (NOAA 2011). The northern recovery unit (defined as loggerheads originating from nests between southern VA through the FL/GA border) is listed as threatened under the US Endangered Species Act (National Marine Fisheries Service and U.S. Fish and Wildlife Service 2008). Other sea turtle species present in the mid-Atlantic are the green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), hawksbill (*Eretmochelys imbricata*), and Kemp's Ridley (*Lepidochelys kempii*) (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991, 1992a, 1992b, 1993, 2008). Two hundred and thirty four sea turtles were seen in the survey site from July 2010 – April 2011. Of these, 181 were identified as loggerhead sea turtles, and 53 were recorded as “unidentified sea turtles”.

Sea turtles were observed in seven of the nine months surveyed in this reporting period, although abundance fluctuated throughout the year. The lowest densities were observed in June, August, September and April (0, 0, 4.40 and 6.77 sea turtles/1000 km respectively), and the highest densities occurred in January, February and March (64.02, 122.19 and 70.86 sea turtles/1000 km respectively). The majority of sea turtles were observed shoreward of the continental shelf break. As expected, sea turtle sightings were strongly correlated with Beaufort Sea State.



Table 9. All loggerhead sea turtle (*Caretta caretta*) sightings in Onslow Bay, North Carolina for surveys conducted from July 2010 - April 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
14-Sep-10	9:38	6	33.638513	-76.441811	NW	5	2	90°	1
14-Sep-10	10:19	13	34.045289	-76.572782	SE	8	2	90°	1
14-Sep-10	11:08	24	34.175098	-76.481502	SE	10	1	90°	1
15-Sep-10	13:26	12	33.803430	-77.045227	SE	2	2	90°	1
21-Oct-10	9:12	3	34.208447	-76.528420	SE	10	2	60°	1
21-Oct-10	9:15	4	34.142273	-76.442742	SE	10	2	90°	1
21-Oct-10	9:22	4	33.986115	-76.241765	SE	10	2	90°	1
21-Oct-10	9:23	5	33.967972	-76.219487	SE	10	3	90°	1
21-Oct-10	9:27	6	33.881302	-76.109208	SE	10	3	90°	1
21-Oct-10	9:52	13	33.871335	-76.220558	NW	9	2	75°	1
21-Oct-10	10:12	15	34.150538	-76.581982	NW	9	1	90°	1
21-Oct-10	10:14	18	34.192168	-76.636515	NW	9	1	90°	1
21-Oct-10	10:26	22	34.037172	-76.565180	SE	8	1	60°	1
21-Oct-10	10:28	19	33.986482	-76.498170	SE	8	2	90°	1
22-Oct-10	9:20	4	33.609331	-76.927399	SE	1	2	90°	1
20-Nov-10	9:22	19	33.653403	-76.852100	NW	2	1	90°	1
20-Nov-10	9:22	16	33.648191	-76.845233	NW	2	2	90°	1
20-Nov-10	9:22	17	33.660726	-76.862223	NW	2	2	60°	3
20-Nov-10	9:23	20	33.683106	-76.891586	NW	2	2	90°	1
20-Nov-10	9:27	18	33.763246	-76.995835	NW	2	1	90°	4
20-Nov-10	9:35	21	33.897747	-77.046757	SE	3	1	90°	1
20-Nov-10	9:37	23	33.859642	-76.995668	SE	3	2	90°	1
20-Nov-10	10:29	35	33.768939	-76.737900	NW	4	1	90°	1
20-Nov-10	10:32	41	33.824522	-76.811327	NW	4	1	90°	1
20-Nov-10	10:33	37	33.848291	-76.842858	NW	4	1	60°	2
20-Nov-10	10:34	43	33.874004	-76.877642	NW	4	1	90°	1
20-Nov-10	10:37	44	33.925695	-76.945830	NW	4	1	90°	1
20-Nov-10	10:39	38	33.966552	-76.998827	NW	4	2	90°	1
20-Nov-10	10:45	41	33.943750	-76.841153	SE	5	3	90°	4
20-Nov-10	10:50	42	33.839999	-76.704574	SE	5	2	90°	3
20-Nov-10	10:50	43	33.830325	-76.691503	SE	5	1	90°	1
20-Nov-10	11:24	52	33.843880	-76.576572	NW	6	2	90°	1
20-Nov-10	13:31	59	33.733173	-77.090335	SE	1	1	90°	1
20-Nov-10	13:38	65	33.559905	-76.863509	SE	1	2	90°	1
14-Jan-11	9:40	15	34.063839	-76.477720	NW	9	2	60°	1
14-Jan-11	9:42	16	34.111119	-76.541089	NW	9	1	90°	3
14-Jan-11	9:45	16	34.164724	-76.612029	NW	9	1	90°	1
14-Jan-11	9:51	19	34.147125	-76.713873	SE	8	1	90°	2
14-Jan-11	9:58	20	33.983754	-76.492322	SE	8	1	90°	2
14-Jan-11	10:32	24	34.036183	-76.694704	NW	7	1	90°	1
14-Jan-11	10:33	25	34.059413	-76.724498	NW	7	1	90°	1
14-Jan-11	10:44	30	34.097414	-76.775415	NW	7	1	60°	1
14-Jan-11	10:55	37	34.008381	-76.791485	SE	6	2	90°	2
14-Jan-11	10:55	35	34.002353	-76.784055	SE	6	2	90°	1
14-Jan-11	10:57	38	33.962465	-76.732330	SE	6	1	75°	2
14-Jan-11	11:02	41	33.850397	-76.584250	SE	6	1	90°	3
14-Jan-11	11:27	40	33.772420	-76.616253	NW	5	1	90°	1
14-Jan-11	11:40	51	33.899045	-76.782669	NW	5	2	60°	3
14-Jan-11	11:41	43	33.919890	-76.811349	NW	5	2	90°	2

Table 9 (Continued). All loggerhead sea turtle (*Caretta caretta*) sightings in Onslow Bay, North Carolina for surveys conducted from July 2010 - April 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
14-Jan-11	14:36	65	33.696255	-76.782737	NW	3	1	90°	1
14-Jan-11	14:36	66	33.711718	-76.803939	NW	3	2	90°	4
14-Jan-11	14:45	67	33.896123	-77.043701	NW	3	2	60°	1
14-Jan-11	14:53	73	33.768162	-77.000595	SE	2	1	90°	2
14-Jan-11	14:56	70	33.701709	-76.914640	SE	2	1	90°	1
14-Jan-11	15:25	77	33.617809	-76.939637	NW	1	1	60°	1
24-Feb-11	9:13	4	33.646569	-76.974561	SE	1	1	110°	1
24-Feb-11	9:14	5	33.618935	-76.938437	SE	1	2	90°	2
24-Feb-11	9:15	7	33.597017	-76.909920	SE	1	2	90°	4
24-Feb-11	9:54	18	33.675894	-76.884657	NW	2	2	90°	4
24-Feb-11	9:56	20	33.737374	-76.964016	NW	2	2	60°	3
24-Feb-11	9:58	24	33.767216	-77.002908	NW	2	3	60°	3
24-Feb-11	9:58	21	33.780268	-77.019627	NW	2	1	90°	3
24-Feb-11	10:12	27	33.777383	-76.885820	SE	3	2	45°	2
24-Feb-11	10:13	29	33.738566	-76.834942	SE	3	3	90°	4
24-Feb-11	10:14	30	33.722991	-76.814817	SE	3	3	90°	7
24-Feb-11	11:27	45	33.823472	-76.811523	NW	4	1	90°	3
24-Feb-11	11:30	47	33.909657	-76.926834	NW	4	2	90°	3
24-Feb-11	11:32	48	33.936554	-76.962420	NW	4	1	90°	2
24-Feb-11	14:45	70	33.939406	-76.704795	NW	6	2	90°	2
24-Feb-11	14:49	72	34.027767	-76.821492	NW	6	2	90°	2
17-Mar-11	10:43	11	33.894761	-77.045043	NW	3	2	90°	1
17-Mar-11	10:50	14	33.760309	-76.869333	SE	3	2	90°	1
17-Mar-11	11:21	17	33.755109	-76.720625	SE	4	1	90°	1
17-Mar-11	11:22	18	33.781783	-76.754548	SE	4	1	90°	1
17-Mar-11	11:26	20	33.863079	-76.863503	NW	4	2	90°	1
17-Mar-11	11:28	20	33.890740	-76.904585	SE	4	2	90°	2
17-Mar-11	13:32	26	33.981530	-76.883782	NW	5	2	90°	3
17-Mar-11	13:34	28	33.933650	-76.821523	NW	5	2	90°	4
17-Mar-11	13:36	30	33.902461	-76.783902	NW	5	2	90°	4
17-Mar-11	13:39	31	33.849383	-76.716858	NW	5	1	90°	4
17-Mar-11	13:40	32	33.818611	-76.678426	NW	5	2	90°	3
17-Mar-11	14:20	45	33.865390	-76.606475	SE	6	2	45°	3
17-Mar-11	14:53	56	34.096856	-76.767596	NW	7	2	90°	3
17-Mar-11	14:57	58	34.024504	-76.674396	NW	7	2	90°	3
17-Mar-11	14:58	59	34.008353	-76.654004	NW	7	1	90°	3
17-Mar-11	14:59	60	33.991532	-76.632180	NW	7	2	45°	5
17-Mar-11	15:00	61	33.965575	-76.598819	NW	7	2	90°	3
17-Mar-11	15:47	67	34.170745	-76.615344	NW	9	2	90°	7
17-Mar-11	16:27	60	34.231002	-76.557888	NW	10	2	45°	3

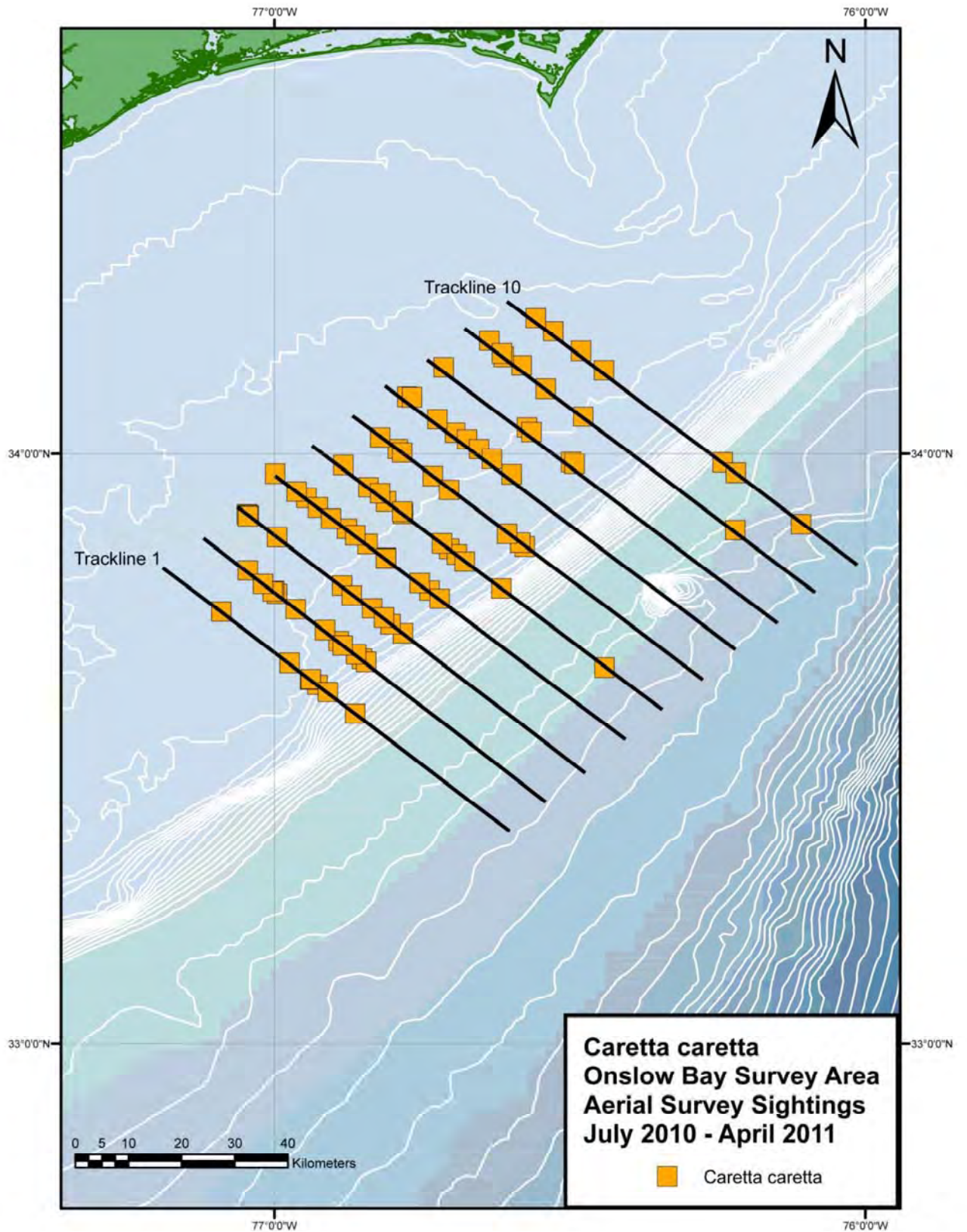


Figure 11. Loggerhead (*Caretta caretta*) sea turtle sightings.

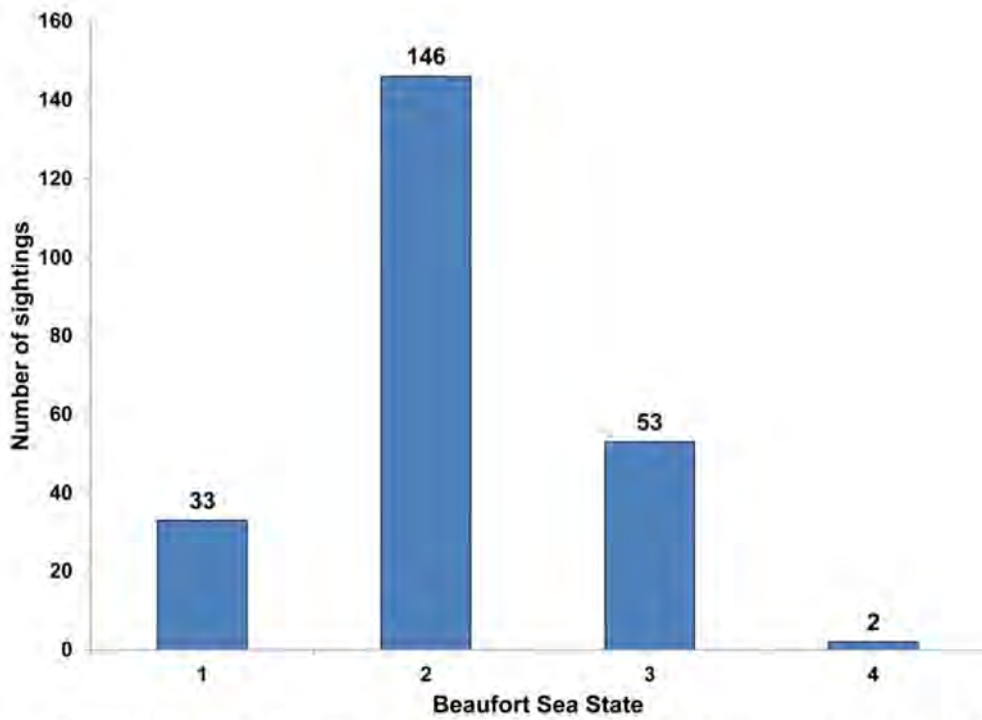


Figure 12a. Total number of sea turtle sightings by Beaufort Sea State in Onslow Bay, North Carolina from July 2010 – April 2011.

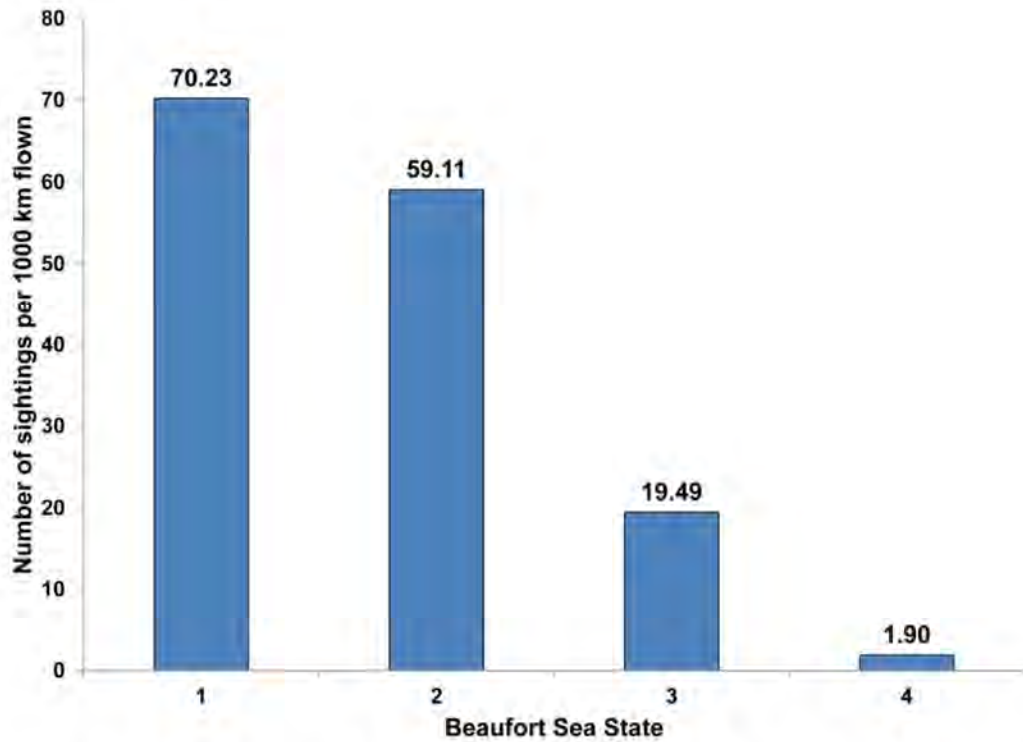


Figure 12b. Sea turtle sightings per 1000 km flown by Beaufort Sea State in Onslow Bay, North Carolina from July 2010 – April 2011.

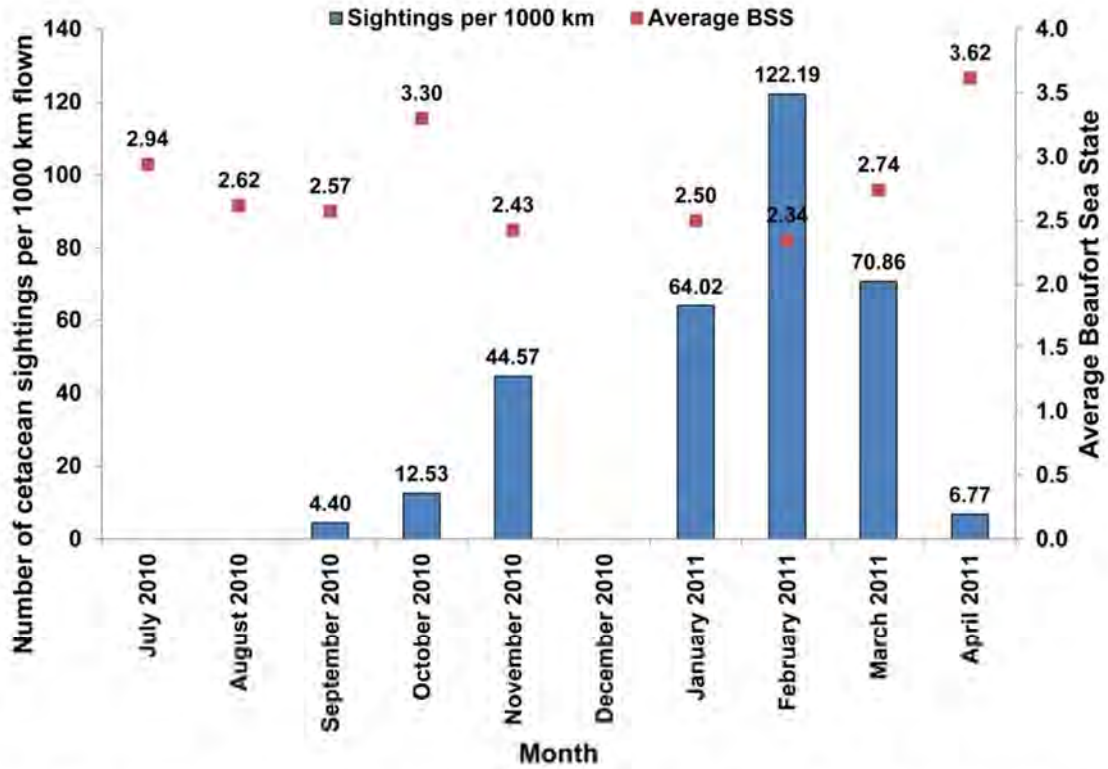


Figure 12c. Sea turtle sightings per 1000 km surveyed and the average Beaufort Sea State per month in Onslow Bay, North Carolina from July 2010 – April 2011.

Other Marine Vertebrate Sightings (Tables 10-12, Fig. 13)

Cartilaginous fishes

Eleven sharks were observed throughout the survey period; hammerhead sharks (*Sphyrna* spp.) accounted for ten of these sightings (n=6) (Table 10). Seventeen manta rays (*Manta birostris*) were observed during the survey period (Table 11).

Other fishes

Ocean sunfish (*Mola mola*) were encountered eight times with no discernable spatial or temporal trends (Table 12).

Table 10. All shark sightings in Onslow Bay, North Carolina for surveys conducted from July 2010 - April 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	Comments
21-Oct-10	10:36	24	33.825020	-76.287405	SE	8	2	100°	1	Hammerhead
21-Oct-10	10:37	25	33.809123	-76.267057	SE	8	2	90°	1	Hammerhead
21-Oct-10	10:39	26	33.757493	-76.200292	SE	8	1	90°	1	Hammerhead
19-Nov-10	13:28	8	33.910782	-76.272922	NW	9	1	90°	1	Hammerhead
20-Nov-10	8:33	4	33.783835	-77.156892	SE	1	1	90°	1	Hammerhead
20-Nov-10	10:31	36	33.803754	-76.783356	NW	4	1	90°	1	Hammerhead
14-Jan-11	10:27	24	33.940773	-76.570494	NW	7	3	90°	1	Hammerhead
14-Jan-11	11:05	37	33.806472	-76.526353	SE	6	2	90°	1	
14-Jan-11	11:12	42	33.637597	-76.304722	SE	6	1	90°	1	Hammerhead
24-Feb-11	10:16	31	33.686083	-76.766711	SE	3	2	90°	1	Hammerhead
17-Mar-11	10:28	8	33.631662	-76.824928	SE	2	1	90°	1	Hammerhead

Table 11. All manta ray (*Manta birostris*) sightings in Onslow Bay, North Carolina for surveys conducted from July 2010 - April 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
15-Sep-10	13:09	8	33.693220	-76.780754	NW	3	1	90°	3
21-Oct-10	9:54	14	33.912738	-76.273632	NW	9	3	90°	1
21-Oct-10	10:33	23	33.887020	-76.368562	SE	8	1	90°	1
21-Oct-10	16:07	53	33.808680	-76.525500	NW	6	1	90°	1
19-Nov-10	13:14	5	33.934087	-76.176768	SE	10	2	110°	1
20-Nov-10	8:48	6	33.460365	-76.733371	SE	1	2	90°	1
20-Nov-10	9:01	10	33.504706	-76.661242	NW	2	1	60°	1
24-Feb-11	9:19	8	33.518459	-76.807212	SE	1	2	90°	1
24-Feb-11	9:31	13	33.408864	-76.664466	SE	1	1	90°	1
24-Feb-11	9:52	17	33.650542	-76.851981	NW	2	2	90°	1
24-Feb-11	9:54	19	33.695428	-76.909585	NW	2	3	90°	1
24-Feb-11	10:19	32	33.618848	-76.679533	SE	3	1	90°	1
24-Feb-11	10:29	37	33.512415	-76.541591	SE	3	1	90°	1
17-Mar-11	10:11	8	33.394346	-76.648536	SE	1	1	90°	1
20-Apr-11	10:28	7	33.735835	-76.429228	NW	6	2	90°	1

Table 12. All ocean sunfish (*Mola mola*) sightings in Onslow Bay, North Carolina for surveys conducted from July 2010 - April 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
14-Jan-11	10:58	39	33.947028	-76.710266	SE	6	1	90°	1
14-Jan-11	11:23	45	33.696766	-76.516908	NW	5	2	60°	1
24-Feb-11	9:29	10	33.465931	-76.744455	SE	1	2	90°	1
24-Feb-11	9:31	11	33.410923	-76.667128	SE	1	3	90°	1
24-Feb-11	10:10	25	33.813568	-76.932616	SE	3	2	90°	1
24-Feb-11	14:07	78	33.640495	-76.439886	SE	5	2	90°	2
17-Mar-11	15:11	62	33.756267	-76.325650	NW	7	1	90°	1
17-Mar-11	16:10	58	34.052056	-76.324417	NW	10	1	90°	1

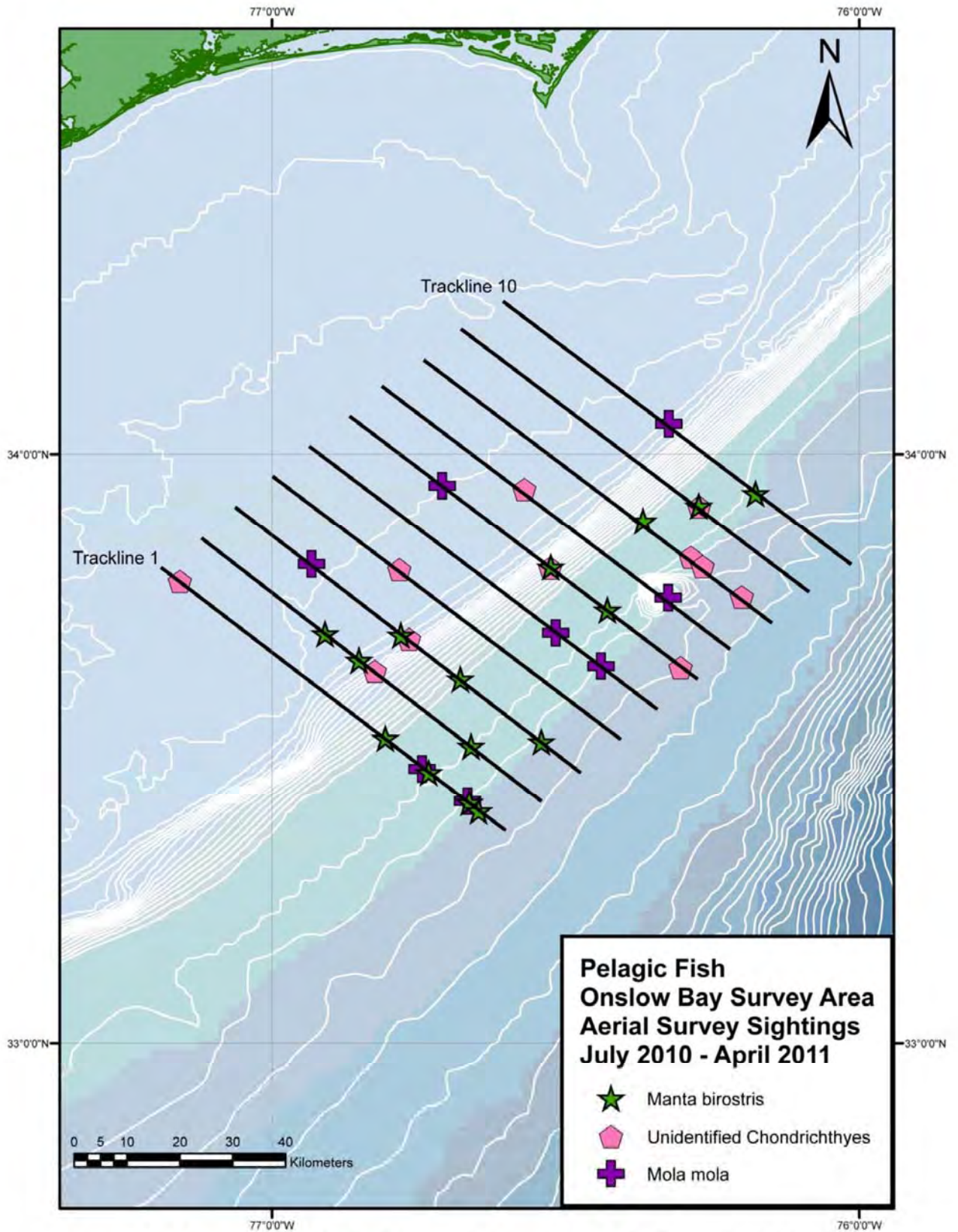


Figure 13. Manta ray (*Manta birostris*), ocean sunfish (*Mola mola*) and unidentified sharks.



### Vessel Sightings

Commercial (Table 13, Fig. 14)

A total of 55 commercial vessels were seen during the study. This category includes tankers, container/cargo vessels, and car carriers.

Table 13. All commercial vessel sightings in Onslow Bay, North Carolina for surveys conducted from July 2010 - April 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	Comments
8-Jul-10	11:07	10	33.663388	-76.739410	SE	3	2	60°	1	Commercial fishing vessel
8-Jul-10	11:29	13	33.713336	-76.665421	NW	4	2	90°	1	Commercial fishing vessel
8-Jul-10	15:15	35	34.014656	-76.535270	NW	8	2	45°	1	Cargo vessel
8-Jul-10	15:31	40	34.095723	-76.518877	SE	9	2	60°	1	Cargo vessel
8-Jul-10	15:41	39	33.871460	-76.223572	SE	9	2	45°	1	Japanese vessel
8-Jul-10	16:03	45	34.114270	-76.406300	NW	10	3	45°	1	Container vessel
20-Aug-10	13:04	5	33.433464	-76.697932	SE	1	2	45°	1	Container vessel
20-Aug-10	14:35	19	34.168995	-76.476519	NW	10	3	60°	1	Tug and barge
20-Aug-10	15:12	27	33.802402	-76.257983	NW	8	3	45°	1	Cargo vessel
20-Aug-10	15:26	29	34.090001	-76.634209	NW	8	2	45°	2	Tug and barge
21-Aug-10	10:31	10	33.799092	-76.518309	NW	6	4	90°	1	Cargo vessel
21-Aug-10	10:37	7	33.946792	-76.712741	NW	6	4	60°	1	Container vessel
21-Aug-10	10:57	11	33.808392	-76.633743	SE	5	2	90°	1	Container vessel
21-Aug-10	11:01	13	33.700130	-76.520260	SE	5	1	90°	1	Car carrier
21-Aug-10	11:11	17	33.522672	-76.413697	NW	4	3	90°	1	Research vessel
21-Aug-10	11:34	25	33.825775	-76.813473	NW	4	3	60°	1	Cargo vessel
21-Aug-10	11:34	26	33.841103	-76.834517	NW	4	3	60°	1	Cargo vessel
21-Aug-10	11:47	21	33.816419	-76.938654	SE	3	1	90°	1	Container vessel
21-Aug-10	12:09	25	33.426334	-76.559513	NW	2	3	90°	1	Tanker
15-Sep-10	13:05	9	33.618595	-76.684220	NW	3	3	45°	1	Cargo vessel
15-Sep-10	13:54	14	33.629855	-76.819773	SE	2	1	45°	1	Tanker
21-Oct-10	9:18	5	34.061140	-76.338605	SE	10	2	60°	1	Cargo vessel
21-Oct-10	9:27	6	33.872565	-76.097503	SE	10	1	60°	1	Large cargo vessel
21-Oct-10	11:37	30	33.748137	-76.849183	NW	3	3	60°	2	Tug and barge
21-Oct-10	15:15	53	33.818748	-76.677693	NW	5	3	45°	1	Container vessel
21-Oct-10	15:50	50	33.849820	-76.449015	SE	7	1	90°	1	Cargo vessel
22-Oct-10	9:13	4	33.765998	-77.131975	SE	1	4	60°	1	Cargo vessel
22-Oct-10	9:29	5	33.424180	-76.685477	SE	1	3	60°	1	Cargo vessel
20-Nov-10	9:20	17	33.613308	-76.801781	NW	2	2	45°	1	Cargo vessel
20-Nov-10	10:04	29	33.521454	-76.415298	NW	4	4	90°	1	Cargo vessel
20-Nov-10	10:25	34	33.682313	-76.623688	NW	4	3	60°	1	Cargo vessel
14-Jan-11	9:35	14	33.951650	-76.330403	NW	9	4	90°	1	Container vessel
14-Jan-11	9:58	19	33.986068	-76.495420	SE	8	4	60°	1	Cargo vessel
14-Jan-11	10:22	23	33.840417	-76.438661	NW	7	4	60°	1	Cargo vessel
14-Jan-11	11:00	40	33.899719	-76.647574	SE	6	2	45°	1	Tanker
14-Jan-11	14:32	62	33.612438	-76.674459	NW	3	4	60°	2	Tug and barge
24-Feb-11	9:50	20	33.596377	-76.782237	NW	2	3	45°	1	Large cargo vessel
24-Feb-11	9:58	25	33.784197	-77.024714	NW	2	4	60°	2	Tug and barge
24-Feb-11	14:15	64	33.660306	-76.337050	NW	6	4	45°	1	Container vessel
24-Feb-11	14:44	69	33.914207	-76.671579	NW	6	2	45°	1	Tanker
24-Feb-11	14:46	71	33.951549	-76.720974	NW	6	4	45°	1	Tanker
17-Mar-11	9:55	4	33.730428	-77.086613	SE	1	3	45°	1	Cargo vessel
17-Mar-11	9:59	5	33.655630	-76.988891	SE	1	3	45°	1	Cargo vessel
17-Mar-11	10:02	6	33.583675	-76.893306	SE	1	4	45°	1	Cargo vessel
17-Mar-11	13:35	29	33.925152	-76.811418	NW	5	3	45°	1	Container vessel
17-Mar-11	16:22	59	34.167528	-76.478415	NW	10	3	60°	1	Cargo vessel
17-Mar-11	16:24	72	34.097652	-76.386396	SE	10	4	45°	1	Container vessel

Table 13 (Continued). All commercial vessel sightings in Onslow Bay, North Carolina for surveys conducted from July 2010 - April 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	Comments
20-Apr-11	10:50	11	34.078941	-76.746680	SE	7	2	45	1	Container vessel
20-Apr-11	11:03	14	33.822118	-76.415834	SE	7	3	45°	1	Container vessel
20-Apr-11	11:09	16	33.697803	-76.256130	SE	7	4	45°	1	Container vessel
20-Apr-11	11:21	17	33.860110	-76.329869	NW	8	1	45	1	Container vessel

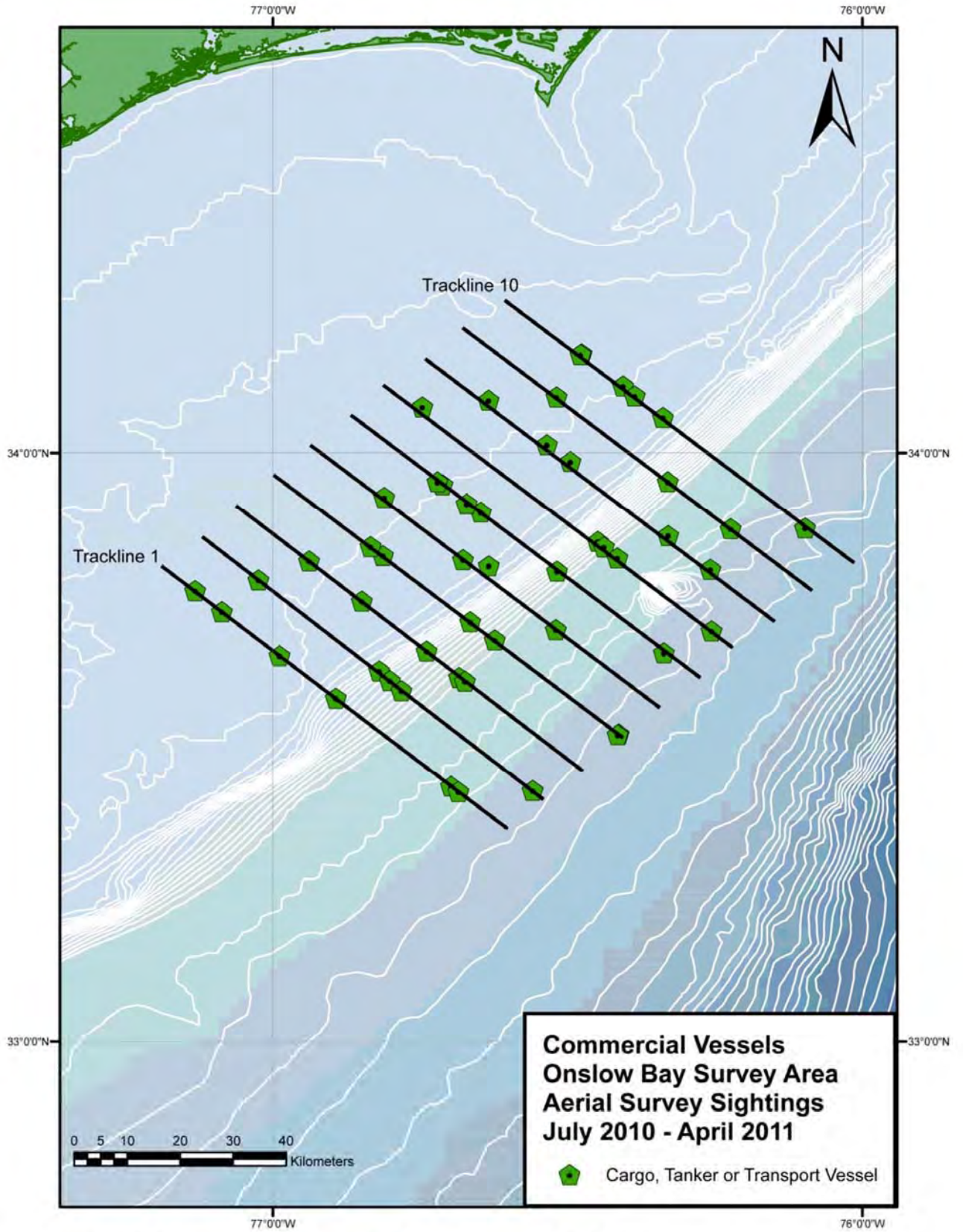


Figure 14. Large commercial shipping vessel sightings.

Military (Table 14, Fig. 15)

Seventeen U.S. Military vessels were observed in the study site.

Table 14. All military vessel sightings in Onslow Bay, North Carolina for surveys conducted from July 2010 - April 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	Comments
8-Jul-10	14:38	28	34.110666	-76.790627	SE	7	2	45°	1	Military vessel
8-Jul-10	15:04	32	33.763983	-76.208199	NW	8	4	90°	3	Military vessel
8-Jul-10	15:19	36	34.092153	-76.637110	NW	8	4	90°	1	Military vessel
8-Jul-10	15:28	39	34.155300	-76.597629	SE	9	2	60°	1	Military vessel
8-Jul-10	15:42	40	33.849685	-76.194416	SE	9	1	90°	1	Military vessel
8-Jul-10	15:52	45	33.885096	-76.113122	NW	10	2	90°	1	Military vessel
8-Jul-10	16:00	48	34.040589	-76.312013	NW	10	2	60°	1	Military vessel
8-Jul-10	16:08	46	34.218154	-76.540125	NW	10	3	30°	1	Military vessel
14-Sep-10	9:20	4	33.848144	-76.579384	SE	6	3	45°	1	Military vessel
14-Sep-10	10:55	20	34.119503	-76.544101	NW	9	2	60°	1	Coast guard vessel
21-Oct-10	10:05	14	34.024078	-76.417410	NW	9	2	60°	1	Military vessel
21-Oct-10	10:12	16	34.159062	-76.592772	NW	9	2	60°	1	Military vessel, frigate
21-Oct-10	10:13	17	34.171053	-76.608302	NW	9	4	90°	1	Warship
21-Oct-10	10:22	21	34.115440	-76.668157	SE	8	2	90°	1	Warship
24-Feb-11	11:20	41	33.755909	-76.723042	NW	4	3	45°	1	Resight of aircraft carrier

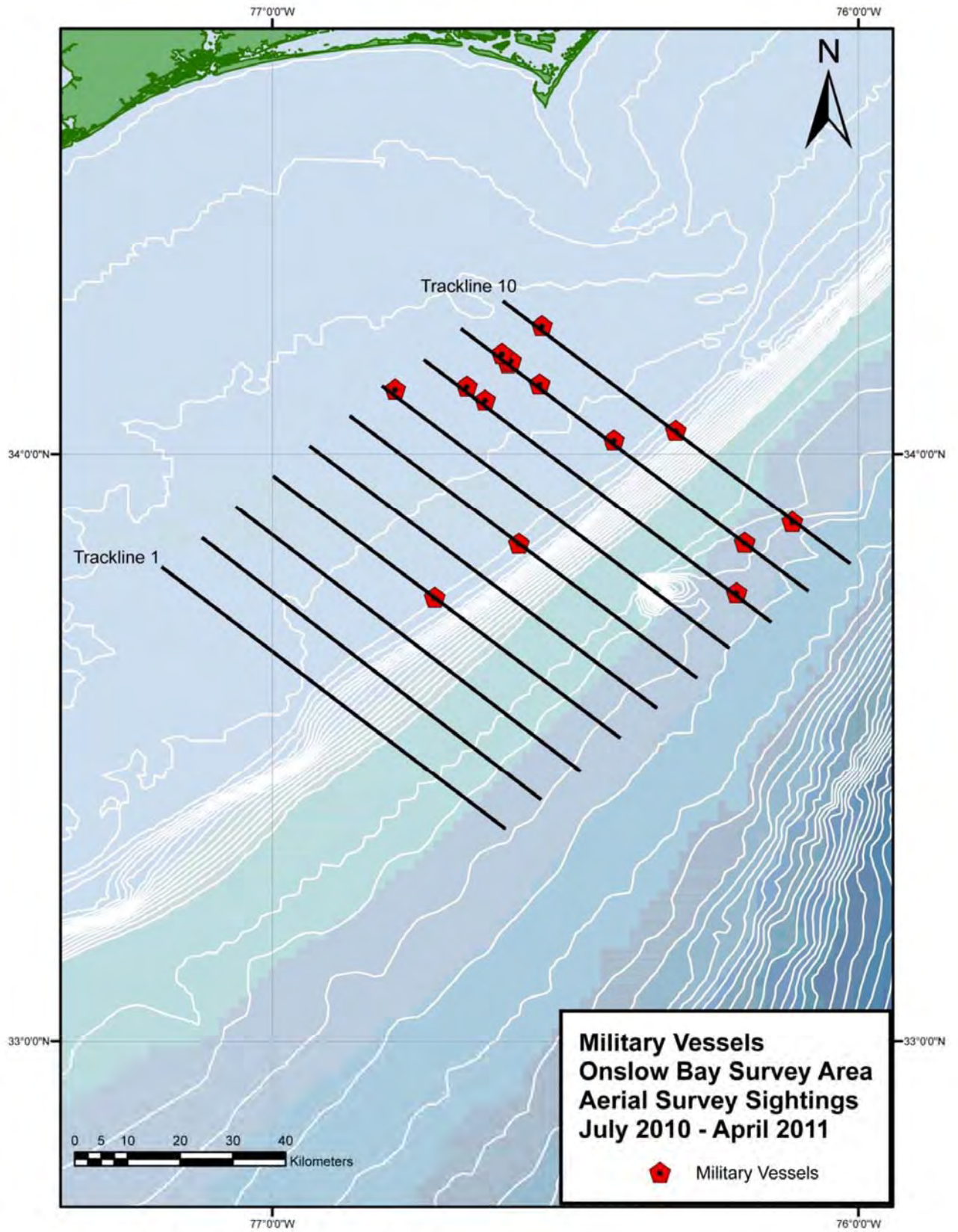


Figure 15. Military vessel sightings.

### Recreational (Table 15, Fig. 16)

The most commonly sighted types of vessel in the survey site were recreational fishing vessels (n=94), with the majority of sightings occurring at or shoreward of the continental shelf break.

Table 15. All other vessel sightings in Onslow Bay, North Carolina for surveys conducted from July 2010 - April 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	Comments
8-Jul-10	10:48	7	33.774973	-77.010900	NW	2	4	90°	1	Recreational fishing vessel
8-Jul-10	10:52	6	33.859873	-77.121421	NW	2	2	60°	1	Recreational fishing vessel
8-Jul-10	11:40	13	33.964217	-76.996774	NW	4	2	60°	1	Recreational fishing vessel
8-Jul-10	12:22	21	33.913250	-76.668804	SE	6	3	60°	2	Recreational fishing vessel
8-Jul-10	12:23	22	33.945935	-76.711722	SE	6	2	90°	1	Recreational fishing vessel
8-Jul-10	16:10	47	34.251800	-76.582975	NW	10	1	45°	1	Recreational fishing vessel
20-Aug-10	14:28	16	34.032884	-76.301813	NW	10	2	60°	1	Recreational fishing vessel
21-Aug-10	11:38	27	33.915350	-76.932314	NW	4	2	45°	1	Recreational fishing vessel
14-Sep-10	9:57	9	33.868878	-76.476736	NW	7	2	45°	1	Recreational fishing vessel
14-Sep-10	9:57	9	33.867282	-76.474611	NW	7	3	90°	1	Recreational fishing vessel
14-Sep-10	9:58	10	33.886748	-76.500131	NW	7	2	60°	1	Recreational fishing vessel
14-Sep-10	9:58	10	33.885761	-76.498801	NW	7	2	60°	1	Recreational fishing vessel
14-Sep-10	10:23	13	33.964601	-76.466827	SE	8	3	90°	1	Recreational fishing vessel
14-Sep-10	10:24	14	33.937610	-76.432084	SE	8	3	60°	1	Recreational fishing vessel
14-Sep-10	10:48	16	33.992361	-76.379358	NW	9	3	45°	1	Recreational fishing vessel
14-Sep-10	10:48	18	33.981576	-76.365523	NW	9	1	90°	1	Recreational fishing vessel
14-Sep-10	10:49	19	33.993923	-76.381309	NW	9	3	90°	1	Recreational fishing vessel
14-Sep-10	11:05	19	34.254665	-76.579002	SE	10	3	60°	1	Recreational fishing vessel
14-Sep-10	11:05	23	34.247981	-76.572055	SE	10	2	60°	1	Recreational fishing vessel
14-Sep-10	11:13	20	34.062070	-76.336080	SE	10	2	60°	1	Recreational fishing vessel
15-Sep-10	12:42	4	33.744215	-76.702639	SE	4	3	60°	1	Recreational fishing vessel
15-Sep-10	13:07	7	33.661745	-76.740072	NW	3	4	45°	1	Recreational fishing vessel
15-Sep-10	13:19	9	33.896886	-77.047003	NW	3	1	90°	1	Recreational fishing vessel
21-Oct-10	11:33	28	33.669902	-76.748297	NW	3	2	45°	1	Recreational fishing vessel
21-Oct-10	11:34	29	33.703298	-76.791032	NW	3	1	90°	1	Recreational fishing vessel
21-Oct-10	11:35	40	33.705280	-76.793777	NW	3	2	60°	1	Recreational fishing vessel
21-Oct-10	11:59	43	33.633382	-76.827898	SE	2	2	60°	1	Recreational fishing vessel
21-Oct-10	11:59	35	33.632787	-76.827158	SE	2	4	60°	1	Recreational fishing vessel
21-Oct-10	15:42	59	34.020528	-76.671258	SE	7	3	60°	1	Recreational fishing vessel
21-Oct-10	15:47	60	33.913182	-76.531590	SE	7	2	90°	1	Recreational fishing vessel
22-Oct-10	9:13	3	33.750922	-77.111977	SE	1	4	90°	1	Recreational fishing vessel
19-Nov-10	13:32	7	33.975158	-76.358223	NW	9	4	90°	1	Recreational fishing vessel
19-Nov-10	13:48	11	34.123447	-76.679240	SE	8	2	60°	1	Recreational fishing vessel
19-Nov-10	13:55	12	33.985447	-76.498332	SE	8	1	60°	1	Recreational fishing vessel
19-Nov-10	13:57	13	33.944840	-76.444598	SE	8	3	60°	2	Recreational fishing vessel
20-Nov-10	8:43	5	33.579261	-76.888163	SE	1	1	60°	2	Recreational fishing vessel
20-Nov-10	9:39	22	33.824717	-76.949694	SE	3	2	60°	1	Recreational fishing vessel
20-Nov-10	9:44	24	33.704213	-76.792278	SE	3	2	60°	1	Recreational fishing vessel
20-Nov-10	9:44	23	33.713201	-76.804338	SE	3	1	90°	1	Recreational fishing vessel
20-Nov-10	9:45	24	33.697659	-76.783860	SE	3	2	90°	2	Recreational fishing vessel
20-Nov-10	10:53	44	33.784223	-76.630147	SE	5	3	60°	3	Recreational fishing vessel
20-Nov-10	11:23	51	33.817008	-76.537971	NW	6	3	90°	10	Recreational fishing vessel
20-Nov-10	11:24	54	33.830687	-76.558592	NW	6	3	60°	3	Recreational fishing vessel
20-Nov-10	11:31	55	33.968518	-76.740924	NW	6	1	60°	1	Recreational fishing vessel
20-Nov-10	11:34	57	34.048925	-76.847810	NW	6	3	60°	1	Recreational fishing vessel
20-Nov-10	13:28	63	33.790042	-77.164559	SE	1	2	90°	1	Recreational fishing vessel
20-Nov-10	15:27	82	34.217285	-76.538351	NW	10	4	60°	3	Recreational fishing vessel



Table 15 (Continued). All other vessel sightings in Onslow Bay, North Carolina for surveys conducted from July 2010 - April 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	Comments
14-Jan-11	9:13	9	34.038861	-76.308109	SE	10	3	60°	2	Recreational fishing vessel
14-Jan-11	9:34	13	33.943363	-76.318944	NW	9	3	60°	1	Recreational fishing vessel
14-Jan-11	10:28	25	33.951370	-76.584254	NW	7	3	60°	1	Recreational fishing vessel
14-Jan-11	10:30	23	33.998320	-76.646747	NW	7	2	90°	1	Recreational fishing vessel
14-Jan-11	11:27	46	33.770648	-76.614015	NW	5	2	45°	1	Recreational fishing vessel
14-Jan-11	14:05	56	33.751468	-76.712889	SE	4	3	60°	2	Recreational fishing vessel
14-Jan-11	14:34	63	33.662519	-76.739156	NW	3	4	60°	4	Recreational fishing vessel
14-Jan-11	14:54	74	33.749286	-76.975855	SE	2	2	60°	1	Recreational fishing vessel
24-Feb-11	9:06	4	33.785393	-77.156925	SE	1	3	45°	1	Recreational fishing vessel
24-Feb-11	15:00	89	34.010434	-76.657268	SE	7	3	90°	1	Sailboat
17-Mar-11	13:34	27	33.945641	-76.836151	NW	5	3	60°	2	Recreational fishing vessel
17-Mar-11	14:56	57	34.046273	-76.700968	NW	7	1	45°	1	Recreational fishing vessel
17-Mar-11	15:38	65	34.115782	-76.670124	SE	8	1	90°	1	Recreational fishing vessel
17-Mar-11	15:45	52	34.180696	-76.627788	SE	9	3	60°	3	Recreational fishing vessel
17-Mar-11	15:48	68	34.142699	-76.579510	NW	9	4	90°	2	Recreational fishing vessel
17-Mar-11	16:21	71	34.045325	-76.316186	SE	10	1	45°	1	Recreational fishing vessel
18-Mar-11	9:01	5	33.603342	-76.922115	SE	1	4	90°	1	Recreational fishing vessel
18-Mar-11	10:27	14	34.245497	-76.575076	NW	10	3	90°	1	Recreational fishing vessel
20-Apr-11	11:44	23	34.126158	-76.555367	SE	9	3	90°	2	Recreational fishing vessel
20-Apr-11	12:17	27	34.069236	-76.343362	NW	10	3	90°	1	Sailboat

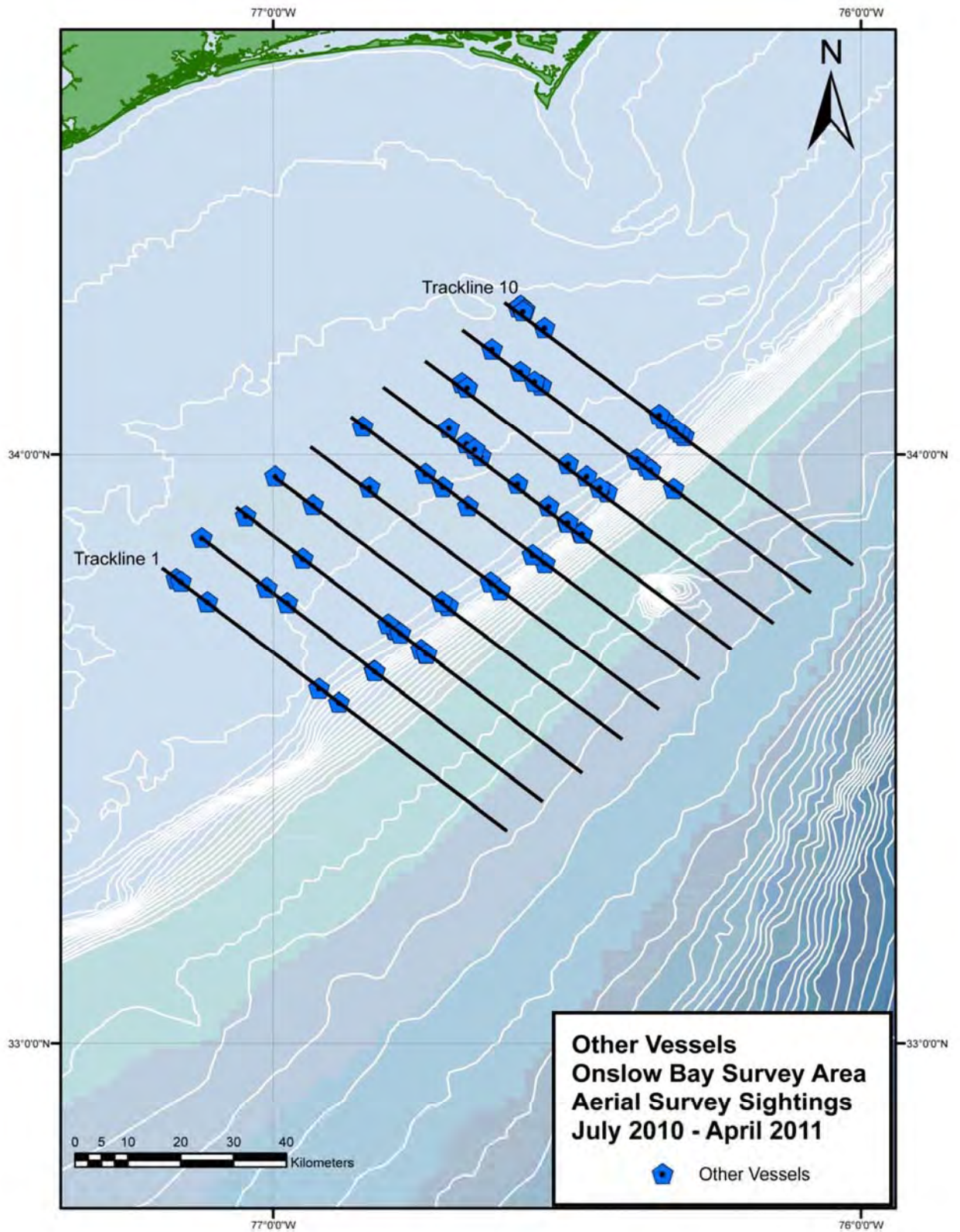


Figure 16. Other vessel sightings.

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## ABSTRACT

### **Analysis of the UNCW and Duke University aerial and shipboard surveys of the USWTR on the Atlantic Coast of the USA for the period June 2007 to April 2011 (also including the UNCW aerial survey data 1998 –1999)**

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The USWTR aerial and shipboard surveys for 2007 – 2011 were carried out by the University of North Carolina at Wilmington (UNCW) and Duke University, respectively. The aim of these surveys was to establish baseline data on the density of marine mammals in the USWTR region (Fig. 1). Analysis of these data, combined with that of aerial surveys for Onslow Bay in 1998 and 1999, allowed maps of animal density to be estimated. The species of interest were bottlenose dolphins (*Tursiops truncatus*), spotted dolphins (*Stenella frontalis*), pilot and beaked whales combined and loggerhead turtles (*Caretta caretta*). As well as estimating abundance, the statistical models developed also provided some evidence of the environmental conditions to explain the patterns in animal distribution.

To generate an estimated density map for each species/taxa of interest the data were analysed by first estimating the probability of detection associated with each sighting and then estimating abundance per segment of realised trackline within the truncation distance. The estimated density maps were obtained from a two stage modelling process of these segments: firstly, probability of presence was modelled (as a logistic generalized additive model (GAM)) and secondly, estimated density within a segment, given that animals were present, was modelled. Predictions were obtained from these two models for the region of interest and the product of these two prediction surfaces gave an estimated relative density map of the region. Abundance was obtained by numerically integrating under this density surface. Note that the resulting abundances were relative (rather than absolute) because they do not take into account imperfect detection on the trackline and the amount of time animals are submerged (and therefore unavailable for detection). Estimates of variance for the predicted abundances were obtained from bootstrapping.

Detection functions were estimated from the multi-year USWTR survey data with additional aerial sightings data from the UNCW right whale surveys and the 1998/1999 UNCW aerial surveys of Wallop Island and additional shipboard sightings data surveys that took place off Cape Hatteras. Detection functions were fitted separately to the aerial sightings and the shipboard sightings but were not fitted to all of the detected species owing to a paucity of data. Instead detection functions were fitted to the species groups, *dolphins* and *whales* (Table 1). Due to the shape of the perpendicular distance distributions for turtles and the lack of sightings of whales from the shipboard surveys, detection was assumed to be certain and constant (ie a strip transect) in these cases.

For the two stage modelling process of segments, the variables considered for inclusion as explanatory variables in the models were longitude, latitude, depth, year, day of year and survey platform (eg. ship or plane). If survey platform was selected in the model, then predicted values were obtained for a ship as it was thought that availability of animals at the surface would be higher for ship-based surveys than aerial surveys. Estimates of species abundance were obtained for the core USWTR region and an outer region.

Depending on the spatial models chosen, estimates were obtained either as an average for the entire time period or for each month (September 1998 to July 1999 and June 2007 to April 2011). Estimated bottlenose dolphin numbers varied between 203 (95% CI: 70 - 500, July 2007) and 1,384 (275 – 3,800, April 2011) for the core USWTR region and from 543 (160 – 1,170, July 2007) to 3,605 (760 – 9,010, April 2011) for the outer region. Spotted dolphins were not detected in 1998/1999 but from 2007 numbers varied from 15 (0 – 52, June 2007) to 1,229 (100 – 4,860, January 2011) in the core region and from 31 (0 - 110, June 2007) to

2,455 (215 – 8,690, January 2011) in the outer region. Estimated loggerhead turtle numbers varied from 14 (8 - 30 July 2007) to 895 (530 – 1,320; March 2011) in the core USWTR region and from 27 (15 - 55; July 2007) to 1,615 (980 – 2,330; March 2011) in the outside region. Figure 2 shows the time series of abundance estimates for these species. Pilot and beaked whale abundance was estimated as an average for the entire time period and was estimated to be 4 (1 – 7) in the inner region and 8 (3 – 13) in the outer region.

Small sample sizes result in very little power to detect trend in abundance but there was no evidence of a decline in any species and may provide evidence for an increase in dolphin and turtle numbers.

Table 1 Numbers of groups for each species group detected within the truncation distance.

Species group	Aerial		Ship	
	Truncation distance (m)	No. of sightings	Truncation distance (m)	No. of sightings
Dolphins	1200	306	300	87
Whales	1500	40	200	7
Turtles	200-400	682	50	50

Figure 1. Realised effort segments for a) Aerial surveys, USWTR (grey) and Onslow 1998/1999 (green) and b) USWTR Shipboard surveys (grey). Individual points represent the midpoints of each segment. The boxes indicate the boundaries of the inner core USWTR region and the outer region and the blue line is the coast.

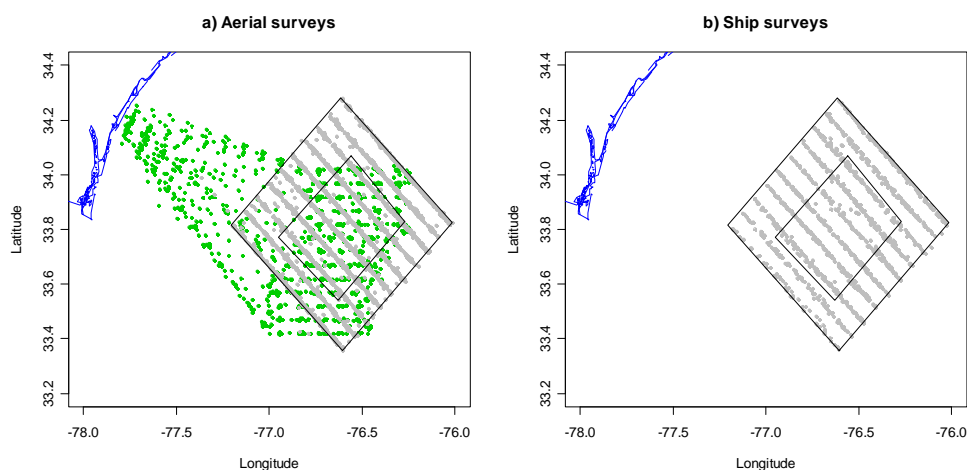
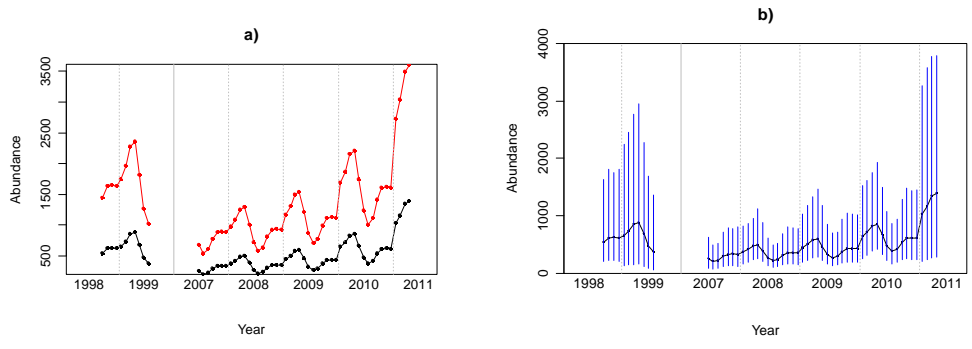
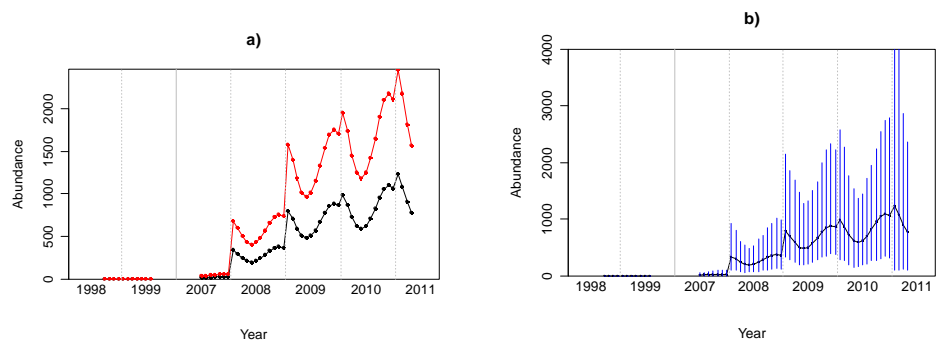


Figure 2. Estimated abundance of bottlenose dolphins, spotted dolphins and loggerhead turtles: a) inside core USWTR region (black) and immediately outside (red) (error bars are not shown for clarity); b) abundances inside core region with 95% confidence intervals (blue).

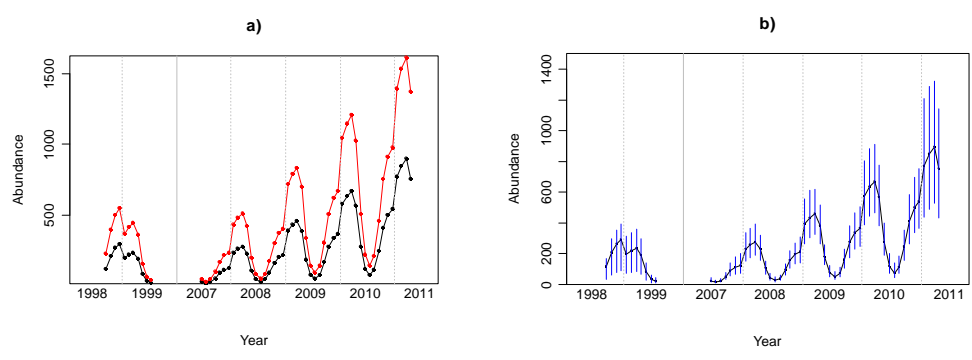
### Bottlenose dolphins



### Spotted dolphins



### Loggerhead turtles



**PROTECTED SPECIES MONITORING IN THE JACKSONVILLE  
OPAREA OFF JACKSONVILLE, FLORIDA  
JULY 2010 THROUGH DECEMBER 2011**



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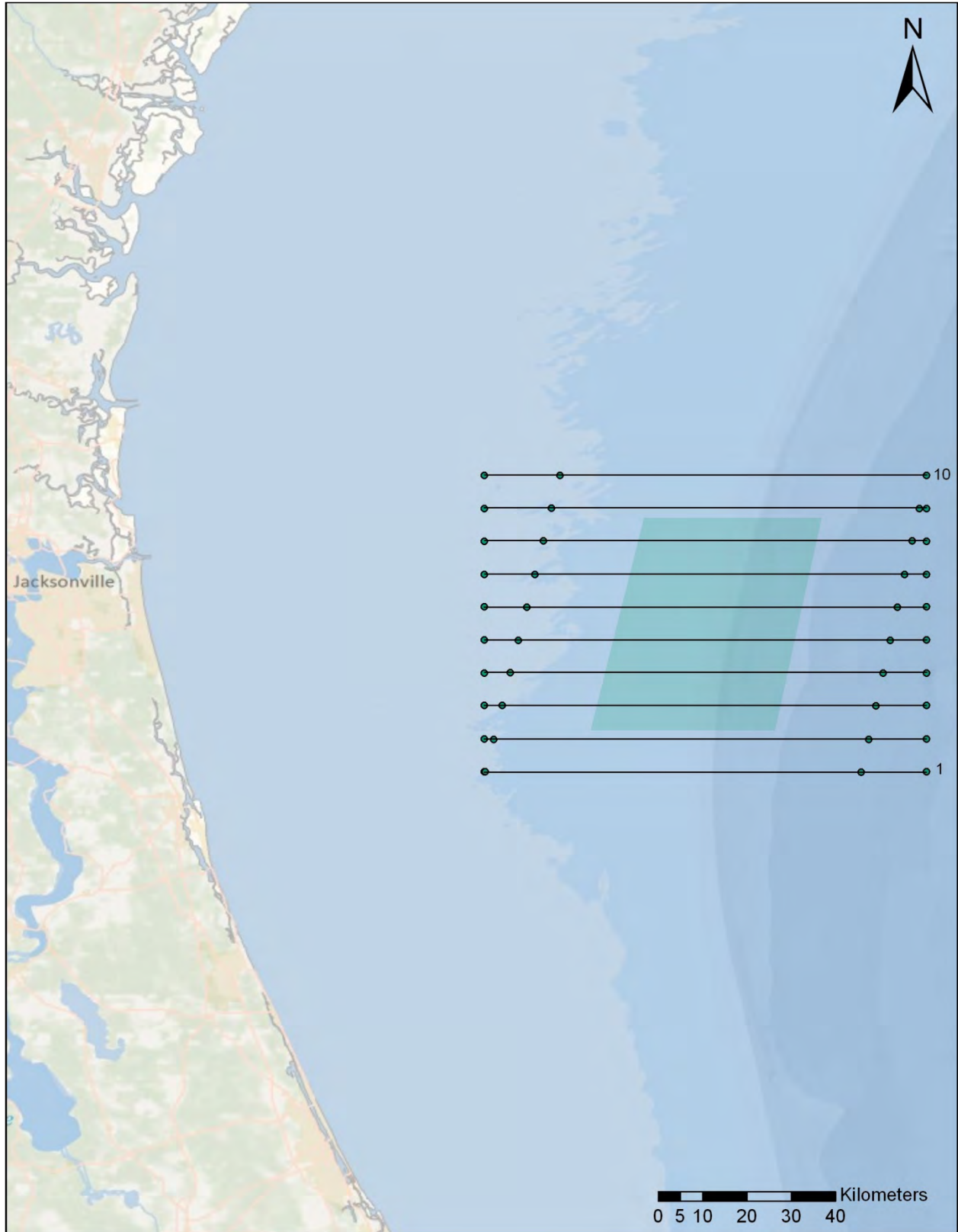


## **Jacksonville Vessel Surveys**

### **Methodology**

#### Study Area

The study area within the Jacksonville OPAREA (JAX) consists of ten 39 nm (72.5 km) long tracklines, spaced four nm (7.4 km) apart, which cover approximately 2675 nm<sup>2</sup> (4960 km<sup>2</sup>). The survey area straddles the continental shelf and Blake Plateau and includes both neritic shelf waters and more pelagic offshore waters (Figure 1). Aerial survey tracklines in this study area were slightly longer (86 km) than those flown in Onslow Bay (74 km) to ensure contiguous coverage with the Early Warning System (EWS) aerial surveys for North Atlantic right whales (*Eubalaena glacialis*). Every effort was made to cover the extended 86 km tracklines during vessel-based surveys in Jacksonville.



*Figure 1.* Map of the Jacksonville, Florida survey area, depicting the extended tracklines (86 km) surveyed during shipboard surveys. The proposed USWTR is indicated by the shaded green box.

## **Vessel Survey Data Collection**

### Visual Surveys

Vessel-based survey platforms provide a greater probability of sighting deep-diving species than aerial surveys (Barlow and Gisiner 2006). Shipboard observers are also more likely to be able to confirm species identity, particularly for animals that are difficult to distinguish from the air.

Vessel platforms also allow for the possibility of passive acoustic as well as visual monitoring. Additionally, vessel-based platforms allow for photographic identification and the use of remote biopsy sampling techniques for species and gender identification. To ensure maximum detection rates, we employed a traditional visual survey approach, supplemented by passive acoustic monitoring using a towed hydrophone array. Visual surveys for marine mammals and sea turtles were conducted at a speed of approximately 10 knots.

### *Line Transect Surveys*

Visual line-transect surveys for cetaceans and other marine megafauna were conducted from the R/V *Volute*, a modified 13-m Duffy sport fishing vessel (Figure 2). Observations were made from the flying bridge (4.0 m above water line) by naked eye and 7x50 binoculars. Two observers (one port and one starboard) scanned constantly from straight ahead to 90° abeam either side of the trackline. A center observer monitored the trackline, coordinated with the vessel skipper and acted as data recorder. Observations were conducted following standard distance sampling methods for cetaceans, similar to those described in Barlow and Gisiner (2006). The location, species and behavior of each cetacean group were recorded. If turtles were encountered, the location and species were recorded. Each observer estimated cetacean group size independently and individual estimates were averaged at the end of the survey to generate an overall estimate of group size. Environmental conditions (weather, sea state, depth, and sea

surface temperature) were recorded every 30 minutes, at each sighting, or whenever sighting conditions changed. Sighting and environmental data were entered into an at-sea data collection system (*VisSurvey*, developed by Dr. Lance Garrison, NOAA/SEFSC), and linked with the onboard GPS.

In addition, we monitored use of the survey area by individual cetaceans using photo-identification techniques. This approach can identify individual sperm, beaked and humpback whales, bottlenose, spotted and Risso's dolphins, pilot whales, and other species of odontocetes. Thus, whenever possible, we obtained photographs of cetaceans for individual photo-identification; we also use these photographs to confirm species identification at each sighting and to compare identification features with those used by the aerial survey team. Photographs were taken with Canon or Nikon digital SLRs (equipped with 100-400 mm zoom lenses) in 24-bit color at a resolution of 3072 X 2048 pixels and saved in .jpg format.



*Figure 2. Vessel survey platform R/V Volute.*

### *Photo-ID and Biopsy Surveys*

At the end of April 2011 we transitioned from conducting line-transect surveys to a focused effort on biopsy and photo-identification sampling for the remainder of the reporting period. We are focusing on residency and population structure with our shipboard surveys because we: (1) are obtaining adequate data with which to estimate density from aerial line transect sampling; (2) are interested in addressing questions of residency as photo-identification data from Onslow Bay and Jacksonville suggest some degree of residency in that area despite a low level of sampling; and (3) are not observing a large number of deep-diving marine mammal species during line-transect surveys in either Onslow Bay or Jacksonville that are likely to be missed during aerial surveys.

Vessel-based photo-ID and biopsy surveys began 01 May 2011 and extended through the reporting period. Survey methods were consistent with line-transect survey protocol, but survey effort was not confined to established tracklines. The use of the *VisSurvey* software program for data collection during line-transect surveys was no longer required for opportunistic visual sampling, and therefore, suspended. Instead sightings and environmental data were recorded using a combination of datasheets, an iPad tablet, and GPS unit. We made every effort to collect photo-identification images of as many individuals in a group as possible, and we used remote biopsy samples techniques to collect small skin and blubber samples using 27 – 68 kg pull crossbows equipped with specialized 2.5 cm long corer-tipped bolts.

## Passive Acoustic Monitoring

Passive acoustic data were collected in the Jacksonville survey area using two methods: a towed hydrophone array and autonomous bottom-mounted recorders.

### *Towed Array*

A four-element hydrophone array was towed behind the survey vessel whenever possible during line-transect surveys (July 2010 – April 2011) to allow acoustic detection of nearby cetaceans.

The towed array (Seiche Instruments, UK) consisted of four hydrophone elements with approximate linear sensitivity to frequencies between 1 and 100 kHz (this is the same model of hydrophone array employed in Onslow Bay). The array was towed 150 m behind the vessel and acoustic signals were routed to an analog-to-digital converter/mixer (MOTU Traveler, MOTU, Cambridge, MA) sampling at 192 kHz. These signals were then passed to a personal computer outfitted with software (*Ishmael* 1.0) for real-time visualization/recording of cetacean sounds.

Acoustic monitoring was conducted by members of the Jacksonville survey team as part of their on-board rotation. Survey team members monitored the array over half-hour periods and made recordings of all potential cetacean sounds detected, as well as other novel sounds.

### *Bottom-mounted Recorders*

To collect time-series of acoustic data in the Jacksonville survey area, autonomous High Frequency Acoustic Recording Packages (HARPs; Wiggins and Hildebrand 2007) were utilized. The HARP moored data-logging system includes a 16-bit A/D converter, up to 1.9 TB of storage capacity, a hydrophone suspended 10 m above the seafloor, an acoustic release system, ballast weights and flotation. The data-loggers are capable of sampling up to 200 kHz and can be set to

record continuously or on a duty cycle to accommodate variable deployment durations. A combination of high and low frequency hydrophone elements allow detection of both odontocete and mysticete whale vocalizations and sample rates are high enough to capture the echolocation clicks of most odontocete species.

During this reporting period, HARPs were retrieved and deployed at two sites between lines 5 and 6 in the Jacksonville survey area (Table 1). The first Site (B) is located at 80.427 W and 30.258'N and 40 m depth and the second Site (A) is at 80.216' W and 30.280'N and 85 m depth (Figure 3). In all deployments, the instruments were programmed to record at a sample rate of 200 kHz for five-minute periods separated by an inactive interval of ten minutes, resulting in data with a 0.01-100 kHz bandwidth and a 1/3 duty cycle.

*Table 1.* HARP deployments in the Jacksonville, Florida survey area.

Site	Deployment Date	Retrieval Date	Latitude	Longitude	Depth (m)	Sampling Rate	Duty Cycle	Amount of Data
1A	30-Mar-09	16-Sep-09	30.2771	-80.2158	80	200 kHz	5 min on/10 min off	0.8 TB
1B	30-Mar-09	16-Sep-09	30.2582	-80.4282	40	200 kHz	5 min on/10 min off	2 TB
2A	16-Sep-09	21-Feb-10	30.2805	-80.2160	85	200 kHz	5 min on/10 min off	1.3 TB
2B	23-Sep-09	21-Feb-10	30.2580	-80.4280	40	200 kHz	5 min on/10 min off	0 TB
3A	21-Feb-10	26-Aug-10	30.2811	-80.2153	90	200 kHz	5 min on/10 min off	2 TB
4B	9-Mar-10	26-Aug-10	30.2592	-80.4257	40	200 kHz	5 min on/10 min off	2 TB
5A	26-Aug-10	1-Feb-11	30.2682	-80.2089	91	200 kHz	5 min on/10 min off	~2 TB
5B	26-Aug-10	1-Feb-11	30.2571	-80.4327	37	200 kHz	5 min on/10 min off	~2 TB
6A	1-Feb-11	14-Jul-11	30.2782	-80.2209	91	200 kHz	5 min on/10 min off	~2 TB
6B	1-Feb-11	14-Jul-11	30.2577	-80.4278	37	200 kHz	5 min on/10 min off	~2 TB

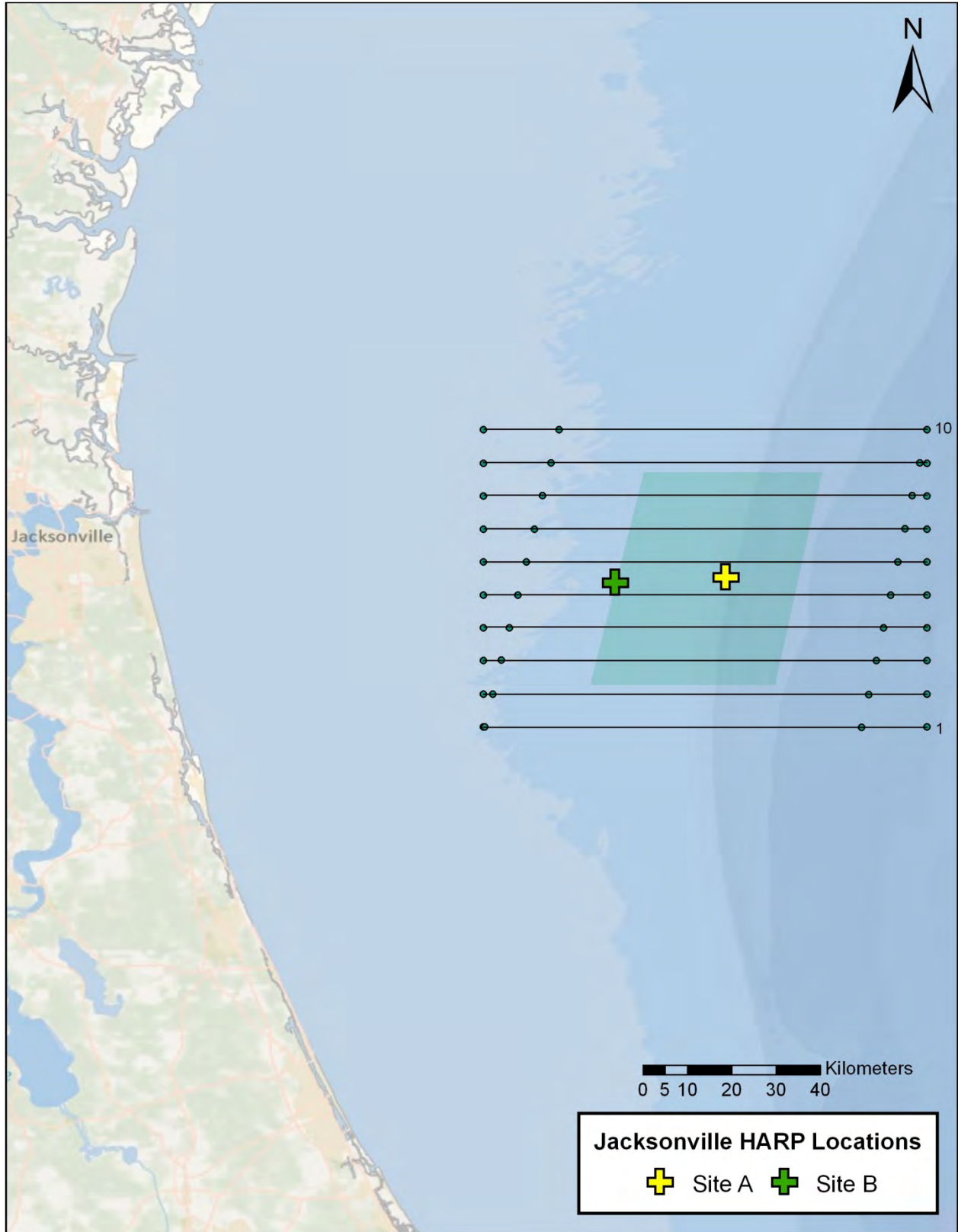


Figure 3. Location of HARP deployment sites in the Jacksonville, Florida survey area.



## Data Analysis

Vessel survey effort and sighting data were compiled and mapped using *ArcGIS* 10.0 to illustrate the location of effort and sightings within the study area. All sighting data (including radial distance and bearing estimates for each cue) were forwarded to Dr. Charles Paxton at CREEM at the University of St. Andrews, UK for density estimation. Vessel based survey tracks and sighting locations from July 2010 through December 2011 have also been posted on the online data repository OBIS-SEAMAP (<http://seamap.env.duke.edu/>).

## Acoustic Analysis

### *Towed Array Analysis*

Towed hydrophone array recordings were analyzed with custom programs written in *MATLAB* (Mathworks, Natick, MA). To extract whistle and click features for use in automated species classification algorithms, individual clicks and whistles must be detected. A custom *MATLAB*-based spectral domain whistle and click detector was run on all towed array data. This detector had poor performance (high false alarm rates) due to high noise in the shallow water environment, possibly caused by snapping shrimp and proximity to the sea-surface. Instead, *Raven* 1.3 (Bioacoustics Research Program of the Cornell Lab of Ornithology, Ithaca, NY) is now being used to locate and save whistles from these towed array recordings. These whistles will be examined for species-specific features in work about to begin with Dr. Julie Oswald. This work will also explore species-specific patterns, such as consistent peaks and notches, in echolocation clicks using techniques, similar to those described by Soldevilla *et al.* (2008). The Onslow Bay and JAX towed array recordings will be combined for this analysis. Analyses of

variance (ANOVAs) will be used to determine if there are species-specific frequency differences in peaks and notches of echolocation clicks.

### *HARP Analysis*

HARP data require processing prior to analysis, including backing up all data in original format, converting data to *wav* format, decimating *wav* data by factors of 10 and 100 to aid in baleen whale detection and creating long-term spectral averages (LTSAs) (described below). Each HARP deployment results in approximately two terabytes (TB) of data, which are impractical to analyze manually in original form. Therefore, these data are compressed for visual inspection by creating LTSAs (Wiggins and Hildebrand 2007) from the *wav* files. LTSAs are compressed spectrograms created using the Welch algorithm (Welch 1967) by coherently averaging 500 spectra created from 2000-point, 0%-overlapped, Hann-windowed data and displaying these averaged spectra sequentially over time. The resulting LTSAs had resolutions of 5 s in time and 100 Hz, 10 Hz and 1 Hz in frequency, for the original, decimation factor (df) 10 and df 100 data, respectively. High energy acoustic events can easily be distinguished from background noise using LTSAs (Wiggins and Hildebrand 2007), allowing efficient review of large data sets.

LTSAs made using a *MATLAB*-based acoustic program called *Triton* (Hildebrand Lab at Scripps Institution of Oceanography, CA) were used to review the HARP data from JAX01A, JAX03A, and JAX04B depolyments. LTSAs were inspected for high-energy events representing odontocete whistles and clicks, shipping noise, sonar, and weather events (rain, wind, or waves). The start and end day and time were noted for each event. Diel and longer term trends in occurrence are presented for all acoustic events, and calling bout durations and inter-bout

intervals are presented for odontocete whistles and clicks. Ambient noise profiles were made for each deployment for high frequency (1-100 kHz, including JAX05A and JAX05B), mid-frequency (0.5-10 kHz), and low frequency (0.01-1 kHz) bandwidths.

### Data Storage

All acoustic, visual survey, and photographic data are archived on digital media, and backed up on a Duke University network server.

## **Results**

### Line Transect Vessel Survey Effort

Between 1 July 2010 and 30 April 2011, 13 vessel surveys were performed (858 km), totaling nearly 52 hours of marine mammal and sea turtle surveys (46 hrs on effort, 6 hours off effort) (Table 2). Vessel surveys were conducted in Beaufort Sea States (BSS) 1 to 4, with most effort (82%) performed in a BSS 2 to 3 and 14% in optimal (BSS 0-1) sighting conditions (Figure 4).

Table 2. Tracklines and kilometers surveyed during line-transect vessel surveys in the Jacksonville, Florida survey area, July 2010 – April 2011.

Date	Trackline	Total (km)	Survey Time
6-Jul-10	8	60.8	3:40
8-Jul-10	6	84.9	5:04
12-Jul-10	4	79.3	4:22
14-Aug-10	7	37.0	2:39
10-Oct-10	2	64.0	4:14
12-Oct-10	9	52.6	3:13
13-Oct-10	7	57.4	4:01
18-Dec-10	10	68.9	3:37
20-Jan-11	8	67.9	3:47
30-Jan-11	5	71.5	3:45
14-Mar-11	9	70.6	3:42
18-Mar-11	1	72.4	4:53
19-Mar-11	3	70.5	4:46

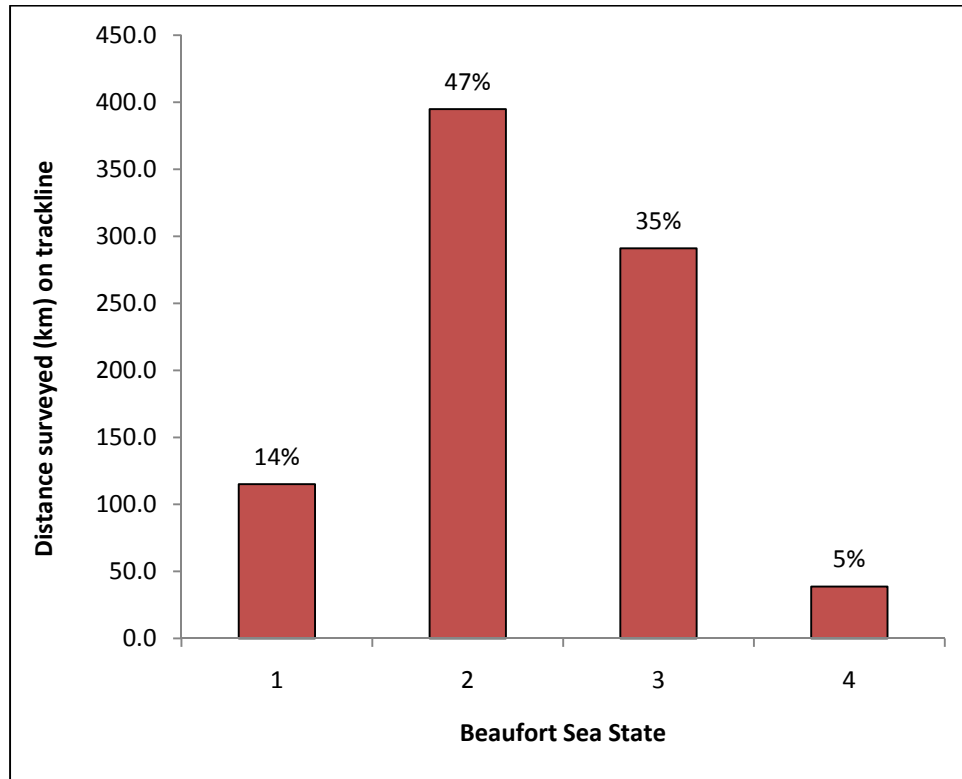


Figure 4. Total distance surveyed per Beaufort Sea State during line-transect vessel surveys in the Jacksonville, Florida survey area, July 2010 – April 2011.

### Photo-ID and Biopsy Survey Effort

Between 01 May 2011 and 31 December 2011, no surveys using the new methodology focusing on photo-identification and biopsy sampling were conducted due to a combination of poor weather conditions and survey vessel availability.

### Marine Mammal and Sea Turtle Line Transect Sightings

Twenty-eight cetacean sightings were made during line-transect surveys (26 on effort, 2 off effort) (Table 3). Two cetacean species were encountered: bottlenose dolphins (*Tursiops truncatus*; n=10; all on effort) and Atlantic spotted dolphins (*Stenella frontalis*; n=17; 15 on effort). In addition, unidentified delphinids were recorded on a single occasion while on effort. No mixed species groups were observed (Table 4). Sightings per unit effort were highest in a Beaufort Sea State of 2, with no sightings observed in BSS 4 (Figure 5).

Forty sea turtles were observed in the study area (37 on effort; 3 off effort) (Tables 3 and 5). Loggerhead sea turtles (*Caretta caretta*, n=25; 23 on effort) were most frequently recorded, followed by leatherbacks (*Dermochelys coriacea*; n=7; all on effort). In addition, eight unidentified sea turtles were recorded (seven on effort).

Table 3. Cetacean and sea turtle sightings from line-transect surveys in the Jacksonville, Florida survey area.

Date	Time	Latitude	Longitude	Line	Depth (m)	Temp (C°)	Common Name	Group Size	Effort
06-Jul-10	15:06	30.459210	-80.384780	8	40	27.3	Loggerhead sea turtle	1	On
06-Jul-10	15:59	30.457817	-80.521895	8	36	28.7	Bottlenose dolphin	7	On
06-Jul-10	16:21	30.448217	-80.562863	8	35	28.7	Atlantic spotted dolphin	15	Off
08-Jul-10	15:24	30.298120	-80.374713	6	43	28.1	Atlantic spotted dolphin	10	On
08-Jul-10	16:18	30.300952	-80.464900	6	38	28.4	Atlantic spotted dolphin	8	On
08-Jul-10	17:23	30.305677	-80.656960	6	33	28.7	Unidentified delphinid	2	On
12-Jul-10	15:26	30.150446	-80.390450	4	43	29.8	Atlantic spotted dolphin	17	On
14-Aug-10	13:28	30.364245	-80.587388	7	36	30.1	Leatherback sea turtle	1	On
10-Oct-10	14:23	30.031189	-80.295710	2	No data	No data	Atlantic spotted dolphin	55	On
10-Oct-10	15:00	30.023427	-80.406493	2	43	30.4	Leatherback sea turtle	1	On
10-Oct-10	15:14	30.019744	-80.449191	2	40	30.4	Unidentified sea turtle	1	On
10-Oct-10	15:16	30.019877	-80.452515	2	40	30.4	Loggerhead sea turtle	1	On
10-Oct-10	15:26	30.017871	-80.485715	2	40	30.2	Unidentified sea turtle	1	On
10-Oct-10	15:50	30.014441	-80.556888	2	40	29.9	Unidentified sea turtle	1	Off
10-Oct-10	16:06	30.014679	-80.590578	2	38	29	Atlantic spotted dolphin	32	On
10-Oct-10	16:24	30.013397	-80.621896	2	34	29.3	Unidentified sea turtle	1	On
10-Oct-10	16:27	30.013442	-80.629620	2	35	29.3	Leatherback sea turtle	1	On
10-Oct-10	16:28	30.013187	-80.631886	2	35	29.3	Leatherback sea turtle	1	On
12-Oct-10	13:07	30.508709	-80.153555	9	100	29.7	Loggerhead sea turtle	1	On
12-Oct-10	13:56	30.507399	-80.298600	9	44	29	Loggerhead sea turtle	1	On
12-Oct-10	15:11	30.505367	-80.507790	9	35	28.5	Atlantic spotted dolphin	4	On
13-Oct-10	13:19	30.384909	-80.017695	7	350	29.5	Bottlenose dolphin	10	On
13-Oct-10	14:56	30.369397	-80.281928	7	46	27.4	Atlantic spotted dolphin	11	On
13-Oct-10	15:13	30.366515	-80.298313	7	42	28	Atlantic spotted dolphin	1	On
13-Oct-10	15:36	30.365497	-80.346340	7	42	28	Atlantic spotted dolphin	28	On
13-Oct-10	15:44	30.367700	-80.367780	7	40	27.2	Unidentified sea turtle	1	On
13-Oct-10	16:37	30.368697	-80.521731	7	36	28.4	Atlantic spotted dolphin	4	On
13-Oct-10	17:02	30.365789	-80.570281	7	35	26.6	Bottlenose dolphin	3	On
13-Oct-10	17:11	30.364094	-80.593126	7	36	28.1	Bottlenose dolphin	2	On
18-Dec-10	15:20	30.570332	-80.249725	10	45	23.1	Loggerhead sea turtle	1	On
20-Jan-11	16:17	30.434164	-80.183160	8	90	No data	Loggerhead sea turtle	1	On
20-Jan-11	16:22	30.433147	-80.200943	8	66	No data	Loggerhead sea turtle	1	On
20-Jan-11	16:24	30.433960	-80.203440	8	63	No data	Loggerhead sea turtle	1	On
20-Jan-11	16:25	30.434349	-80.201185	8	64	No data	Bottlenose dolphin	7	On
20-Jan-11	16:40	30.432354	-80.228212	8	49	No data	Loggerhead sea turtle	1	Off
20-Jan-11	16:59	30.430939	-80.293312	8	41	No data	Unidentified sea turtle	1	On
20-Jan-11	17:04	30.431515	-80.311662	8	43	No data	Unidentified sea turtle	1	On

Date	Time	Latitude	Longitude	Line	Depth (m)	Temp (C°)	Common Name	Group Size	Effort
20-Jan-11	17:05	30.431569	-80.314342	8	43	No data	Loggerhead sea turtle	1	On
20-Jan-11	17:08	30.431864	-80.324618	8	43	No data	Loggerhead sea turtle	1	On
20-Jan-11	17:10	30.431629	-80.331010	8	42	No data	Unidentified sea turtle	1	On
20-Jan-11	17:24	30.430800	-80.380847	8	39	No data	Leatherback sea turtle	1	On
20-Jan-11	17:37	30.432569	-80.425163	8	37	No data	Leatherback sea turtle	1	On
20-Jan-11	17:44	30.433707	-80.447288	8	39	No data	Leatherback sea turtle	1	On
30-Jan-11	15:13	30.237409	-80.267497	5	51	21.2	Loggerhead sea turtle	1	On
30-Jan-11	15:57	30.229119	-80.392660	5	42	17.4	Bottlenose dolphin	3	On
30-Jan-11	16:06	30.230197	-80.423403	5	40	18.7	Loggerhead sea turtle	1	On
30-Jan-11	16:35	30.231654	-80.522741	5	36	18.4	Loggerhead sea turtle	1	On
14-Mar-11	14:02	30.504240	-80.201100	9	53	27	Loggerhead sea turtle	1	On
14-Mar-11	14:21	30.498642	-80.264958	9	45	25.2	Loggerhead sea turtle	1	On
14-Mar-11	14:33	30.500407	-80.307000	9	42	21.6	Loggerhead sea turtle	1	On
14-Mar-11	14:40	30.500929	-80.334462	9	41	20.8	Loggerhead sea turtle	1	On
14-Mar-11	15:19	30.497974	-80.463931	9	36	24	Loggerhead sea turtle	1	On
18-Mar-11	13:41	29.960266	-80.317640	1	49	22.9	Atlantic spotted dolphin	13	On
18-Mar-11	14:32	29.962617	-80.452758	1	40	23.3	Atlantic spotted dolphin	13	On
18-Mar-11	14:37	29.962946	-80.468815	1	40	22.9	Loggerhead sea turtle	1	On
18-Mar-11	14:47	29.959904	-80.471961	1	40	22.9	Bottlenose dolphin	2	On
18-Mar-11	15:28	29.962886	-80.569365	1	37	23.5	Loggerhead sea turtle	1	On
18-Mar-11	15:48	29.966482	-80.606741	1	37	23.1	Loggerhead sea turtle	1	Off
18-Mar-11	16:17	29.963524	-80.666746	1	36	22.1	Bottlenose dolphin	2	On
18-Mar-11	16:28	29.966926	-80.686155	1	34	21.9	Bottlenose dolphin	7	On
19-Mar-11	13:40	30.094966	-80.345900	3	40	23.5	Loggerhead sea turtle	1	On
19-Mar-11	14:12	30.094912	-80.427132	3	40	22.9	Atlantic spotted dolphin	10	On
19-Mar-11	14:36	30.091197	-80.459400	3	40	23.1	Atlantic spotted dolphin	3	On
19-Mar-11	14:55	30.090951	-80.479763	3	38	23.1	Atlantic spotted dolphin	11	Off
19-Mar-11	14:59	30.091822	-80.492740	3	40	10	Loggerhead sea turtle	1	On
19-Mar-11	15:17	30.098712	-80.522160	3	39	23.1	Bottlenose dolphin	15	On
19-Mar-11	15:48	30.098136	-80.620448	3	36	23.4	Loggerhead sea turtle	1	On
19-Mar-11	15:49	30.098734	-80.622369	3	40	23.4	Atlantic spotted dolphin	22	On

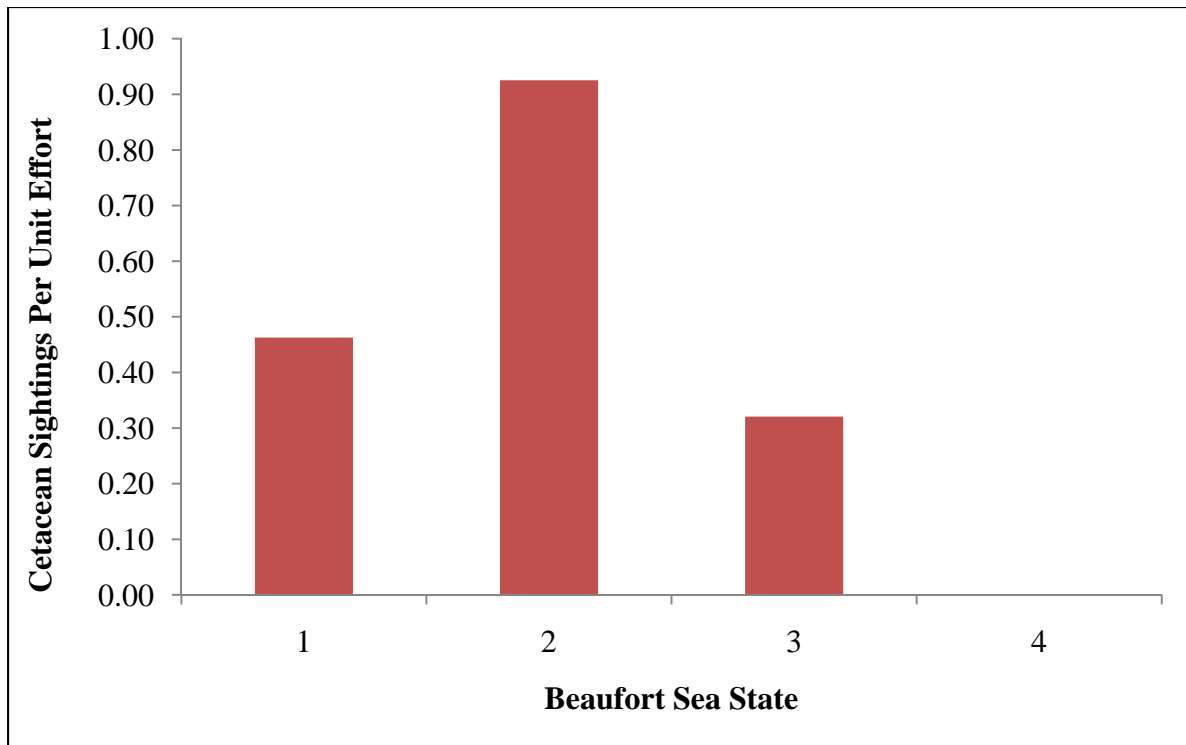
Table 4. Number of cetacean sightings and mean group size for each species observed during Year 1 (July 2009 – June 2010) and Year 2 (July 2010 – December 2011) of vessel surveys in the Jacksonville, Florida survey area.

Species	Sightings		Mean Group Size
	Year 1	Year 2	
<i>Stenella frontalis</i>	24	17	9.4
<i>Tursiops truncatus</i>	15	10	6.3
<i>Globicephala macrorhynchus</i>	3	0	33.3
<i>Grampus griseus</i>	2	0	21.5
Unidentified delphinid	12	1	1.8
<b>Total:</b>	<b>56</b>	<b>28</b>	

Table 5. Number of sea turtles observed by species during Year 1 (July 2009 – June 2010) and Year 2 (July 2010 – December 2011) of vessel surveys in the Jacksonville, Florida survey area.

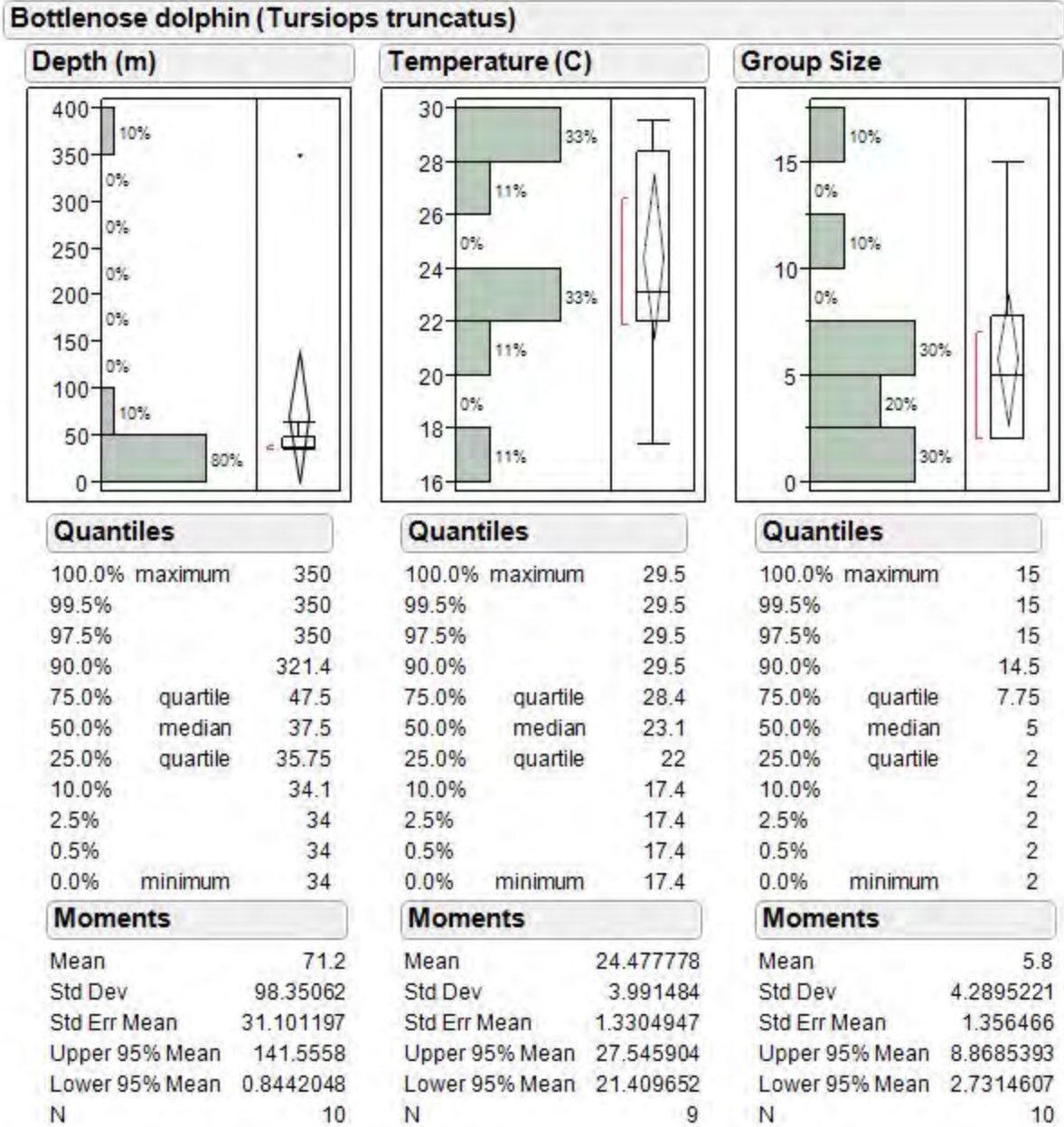
Species	Common Name	Sightings	
		Year 1	Year 2
<i>Caretta caretta</i>	Loggerhead sea turtle	48	25
<i>Dermochelys coriacea</i>	Leatherback sea turtle	5	7
<i>Lepidochelys kempii</i>	Kemp's Ridley sea turtle	1	0
Unidentified sea turtle	Unidentified sea turtle	3	8
	<b>Total:</b>	<b>57</b>	<b>40</b>





*Figure 5.* Number of cetacean sightings, corrected for hours on effort, observed in each Beaufort Sea State for line-transect vessel surveys in the Jacksonville, Florida survey area.

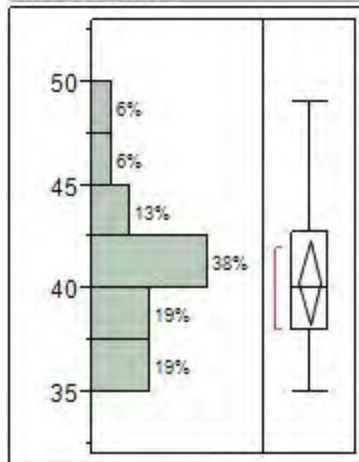
Descriptive statistics for bottlenose dolphins and spotted dolphins are presented in Figures 6 and 7, respectively. In general, bottlenose dolphins were found in deeper (mean water depth of 71.2 m versus 40.3 m) and slightly cooler waters (24.5°C versus 26.4°C) than Atlantic spotted dolphins. All spotted dolphins were encountered in 35 – 49 m depth. Mean group size of bottlenose dolphins was smaller than spotted dolphins (5.8 versus 15.1, respectively). Mean water depth and temperature for loggerhead sea turtles were 47.9 m and 23.3°C, respectively (Figure 8).



*Figure 6.* Descriptive statistics for depth, sea surface temperature, and group size estimates for bottlenose dolphin sightings during vessel line-transect surveys in the Jacksonville, Florida survey area.

### Atlantic spotted dolphin (*Stenella frontalis*)

#### Depth (m)



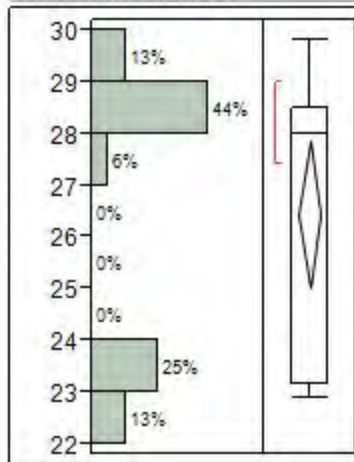
#### Quantiles

100.0%	maximum	49
99.5%		49
97.5%		49
90.0%		46.9
75.0%	quartile	42.75
50.0%	median	40
25.0%	quartile	38
10.0%		35
2.5%		35
0.5%		35
0.0%	minimum	35

#### Moments

Mean	40.3125
Std Dev	3.8248094
Std Err Mean	0.9562023
Upper 95% Mean	42.350597
Lower 95% Mean	38.274403
N	16

#### Temperature (C)



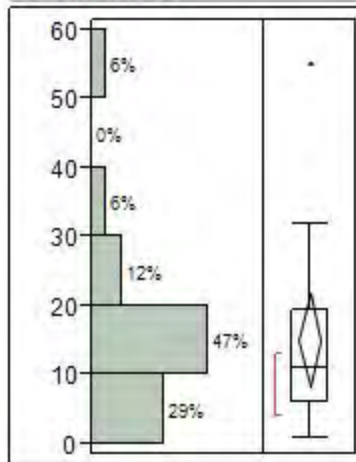
#### Quantiles

100.0%	maximum	29.8
99.5%		29.8
97.5%		29.8
90.0%		29.24
75.0%	quartile	28.475
50.0%	median	28
25.0%	quartile	23.15
10.0%		22.9
2.5%		22.9
0.5%		22.9
0.0%	minimum	22.9

#### Moments

Mean	26.4375
Std Dev	2.7067508
Std Err Mean	0.6766877
Upper 95% Mean	27.879826
Lower 95% Mean	24.995174
N	16

#### Group Size



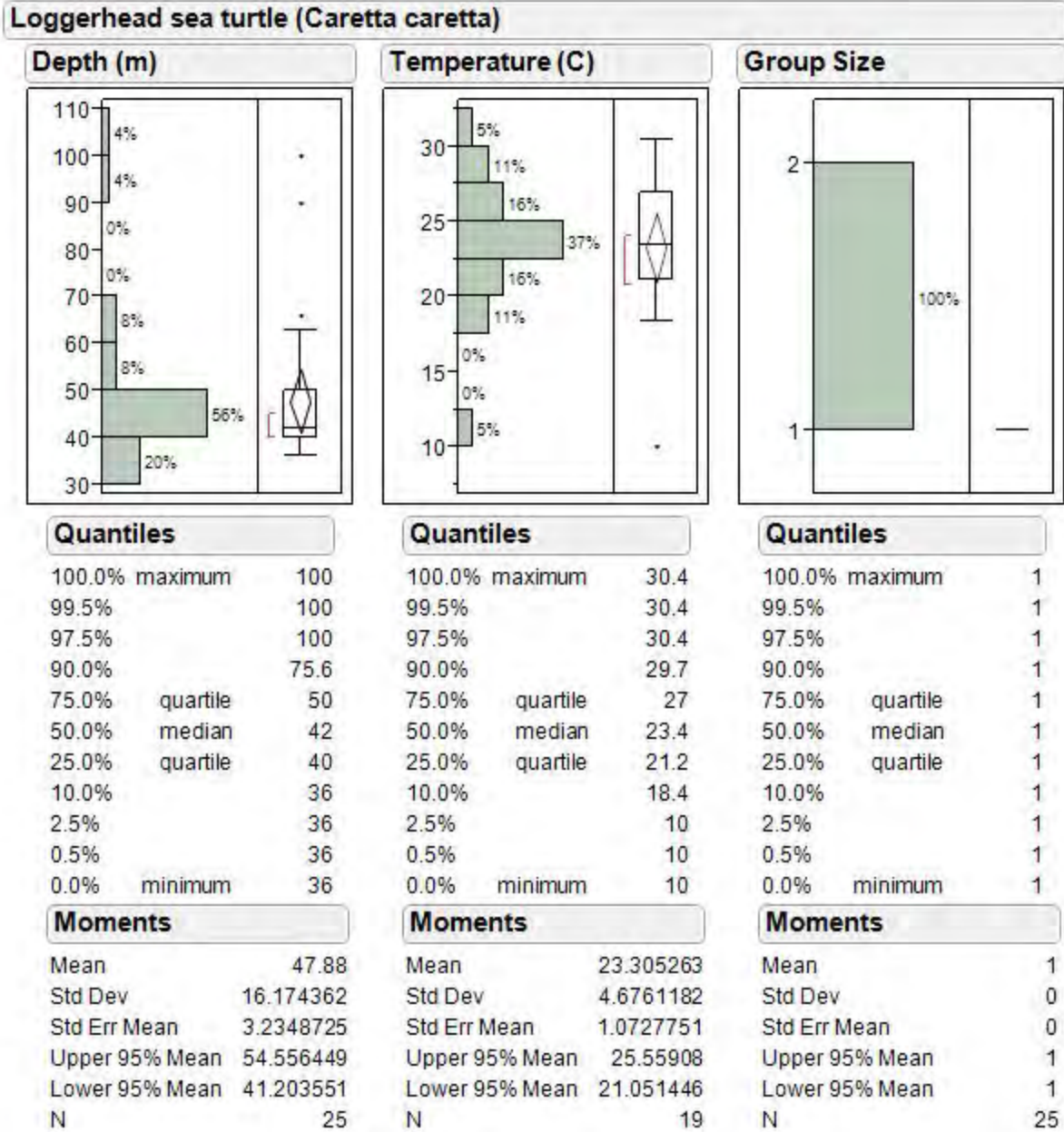
#### Quantiles

100.0%	maximum	55
99.5%		55
97.5%		55
90.0%		36.6
75.0%	quartile	19.5
50.0%	median	11
25.0%	quartile	6
10.0%		2.6
2.5%		1
0.5%		1
0.0%	minimum	1

#### Moments

Mean	15.117647
Std Dev	13.303582
Std Err Mean	3.2265926
Upper 95% Mean	21.957718
Lower 95% Mean	8.2775764
N	17

Figure 7. Descriptive statistics for depth, sea surface temperature, and group size estimates for Atlantic spotted dolphin sightings during vessel line-transect surveys in the Jacksonville, Florida survey area.



*Figure 8.* Descriptive statistics for depth, sea surface temperature, and group size estimates for loggerhead sea turtle sightings during vessel line-transect surveys in the Jacksonville, Florida survey area.

## Distributions and Habitat Associations of Cetaceans and Sea Turtles

The distribution of marine mammals and sea turtles are presented in Figures 9 through 12.

Similar to previous years, Atlantic spotted dolphins were largely restricted to the relatively shallow shelf waters, whereas bottlenose dolphins were encountered throughout the survey area with some groups detected in deeper offshore waters. All sea turtles were observed in relatively shallow waters over the continental shelf.

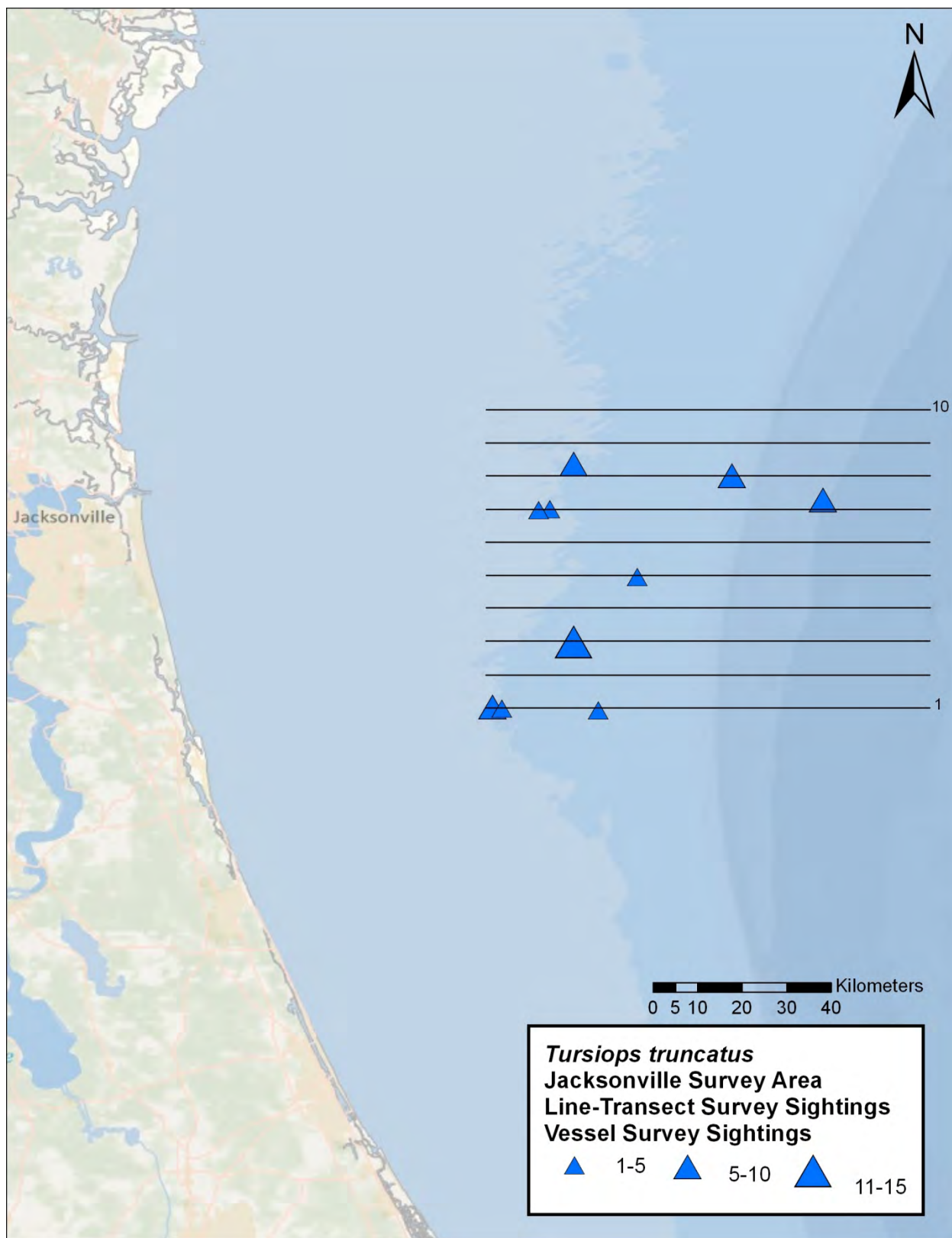


Figure 9. Distribution of bottlenose dolphin sightings indicating group size made during line-transect vessel surveys in the Jacksonville, Florida survey area.

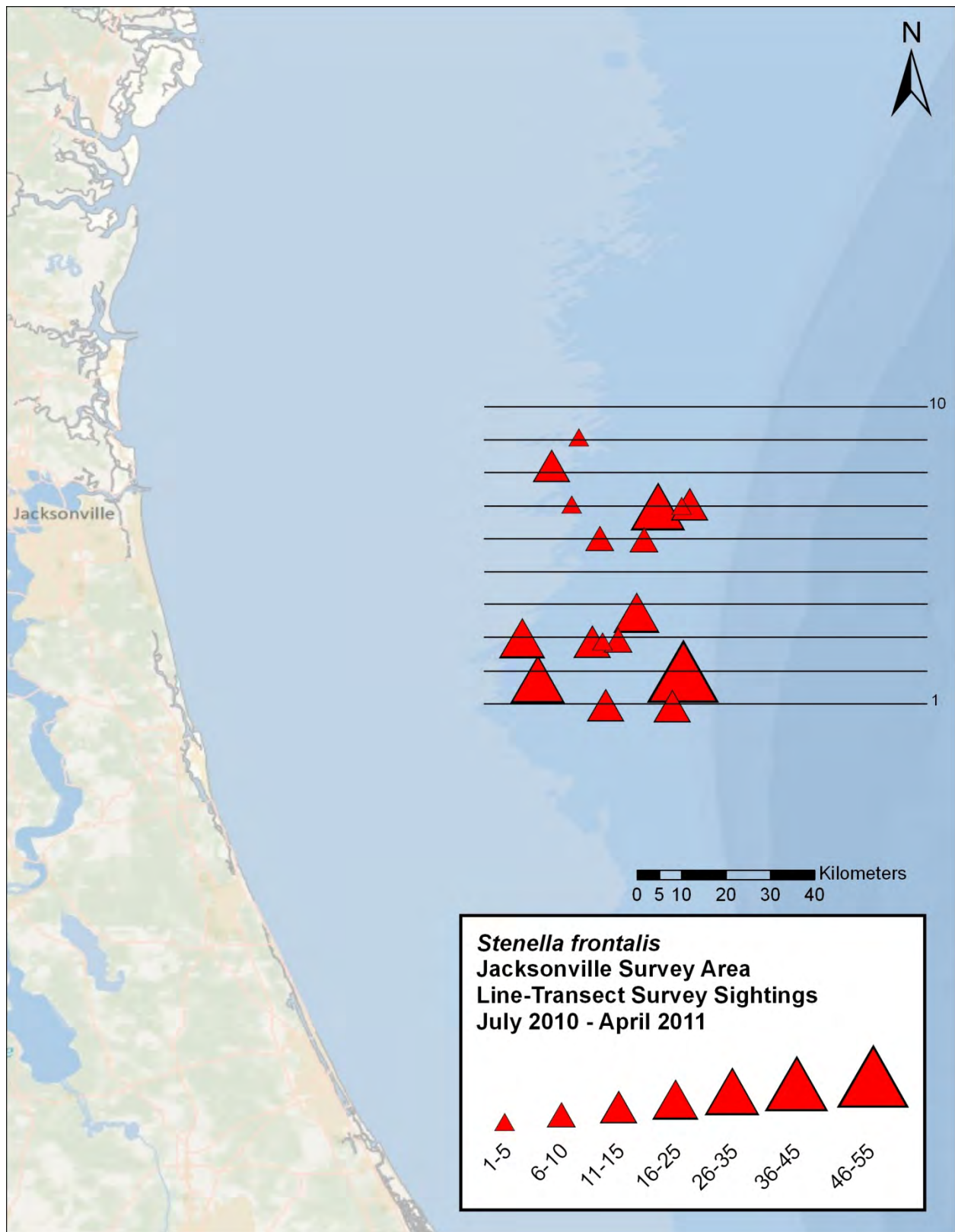


Figure 10. Distribution of Atlantic spotted dolphin sightings indicating group size made during line-transect vessel surveys in the Jacksonville, Florida survey area.

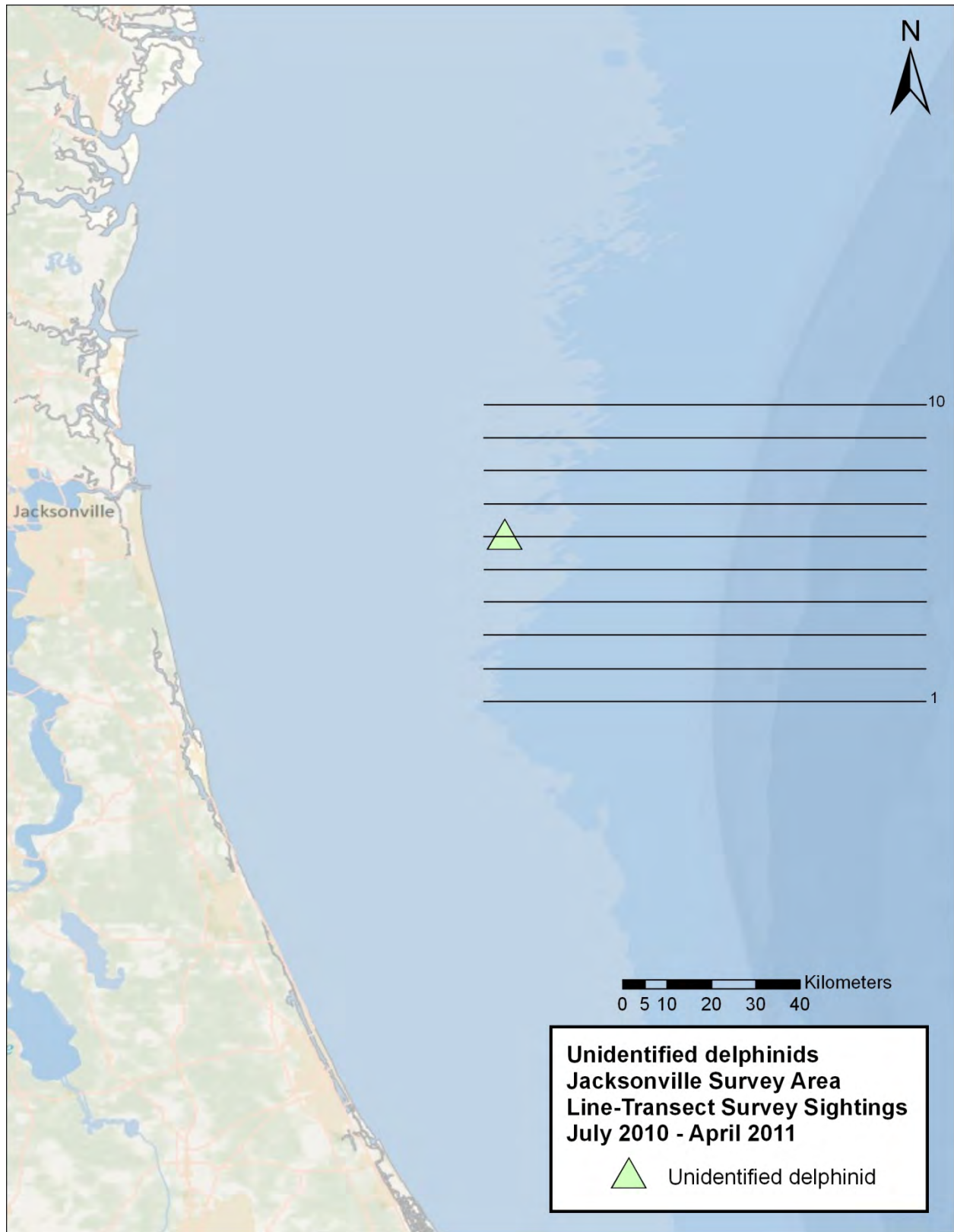


Figure 11. Distribution of unidentified delphinid sightings made during line-transect vessel surveys in the Jacksonville, Florida survey area.



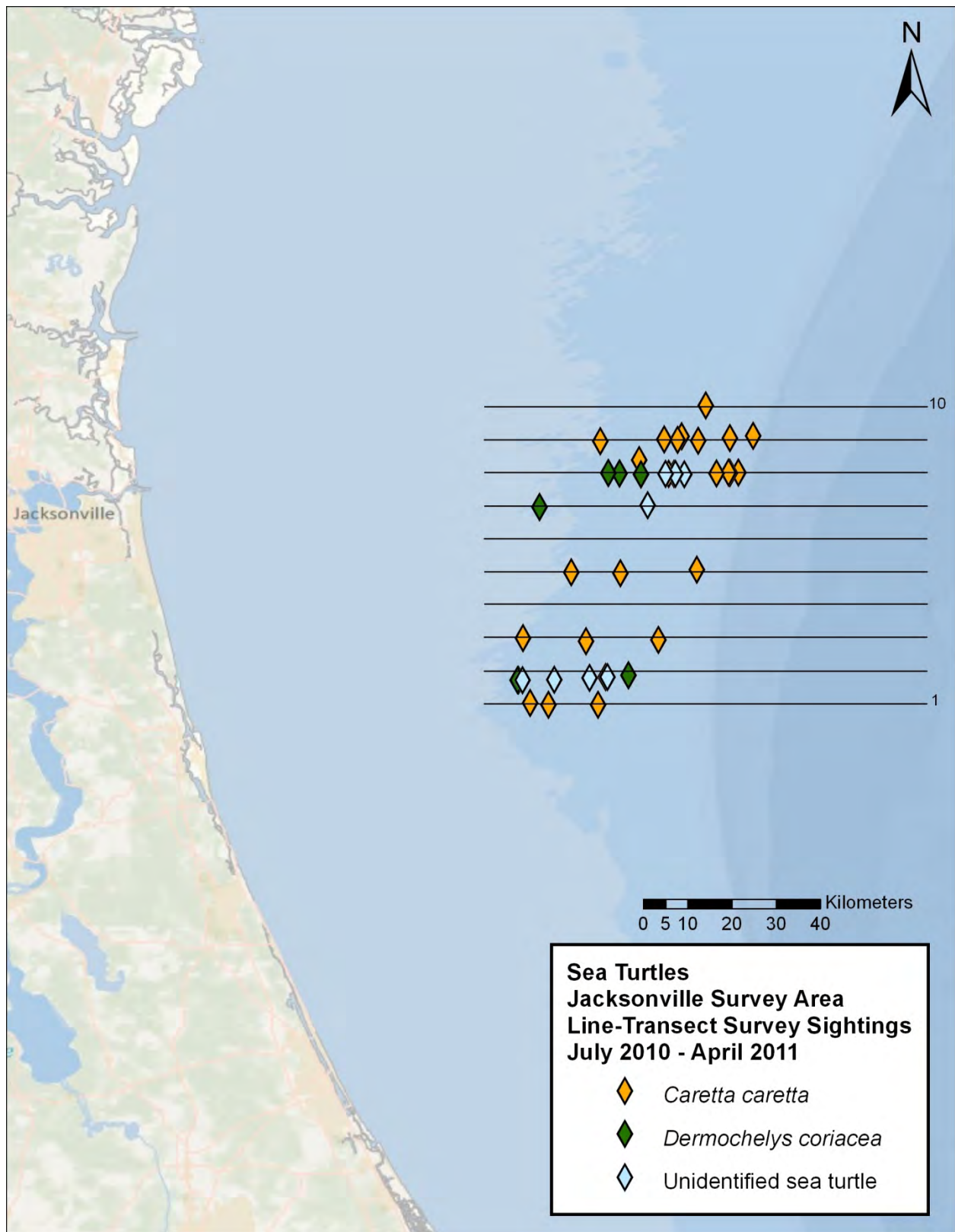


Figure 12. Distribution of sea turtle sightings made during line-transect vessel surveys in the Jacksonville, Florida survey area.

### Seasonality of Effort and Sightings

Due to unfavorable survey conditions, there was no line-transect survey effort in several months of the reporting period. It is difficult, therefore, to identify seasonal trends in cetacean or sea turtle distribution. The number of sightings is depicted below by species for both cetaceans and sea turtles during each month of line-transect surveys (Figure 13a and b).

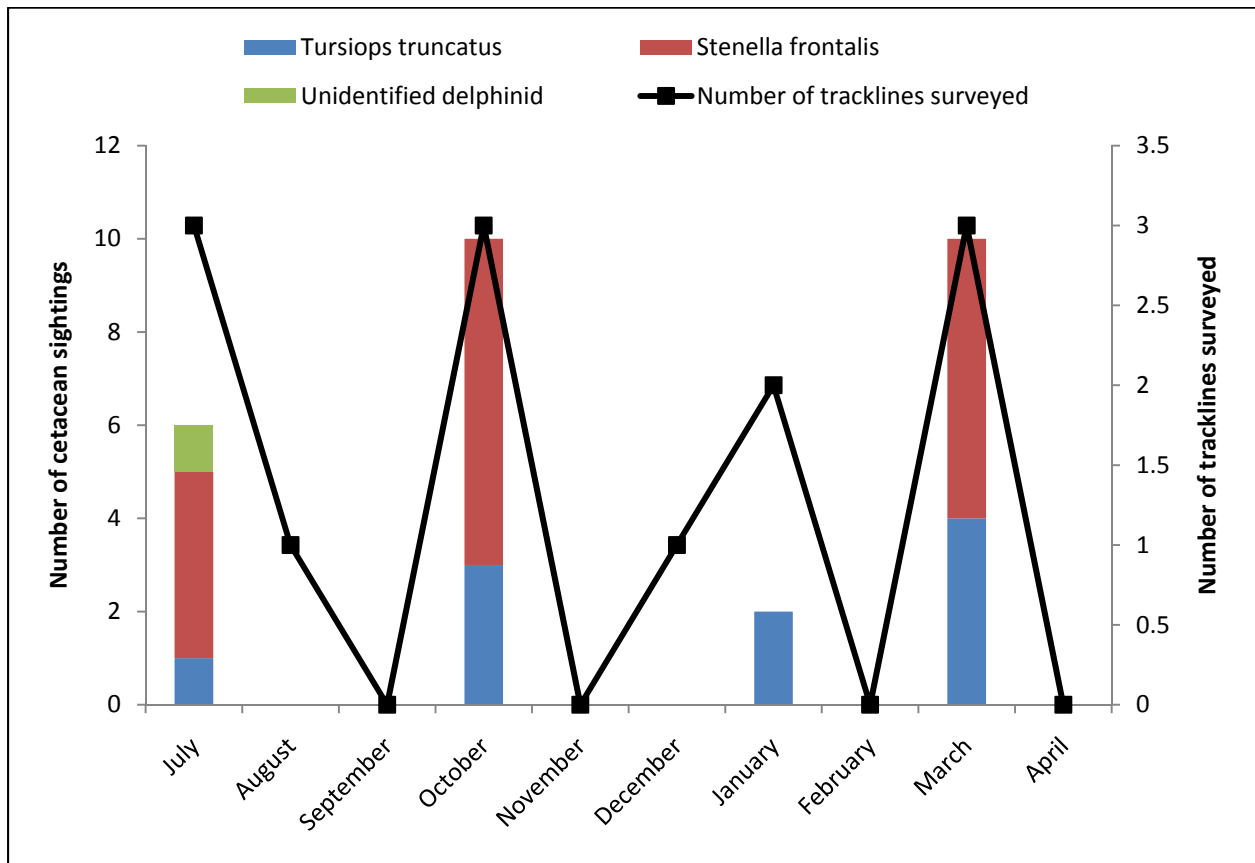


Figure 13a. Number of cetacean sightings by month and effort (number of tracklines surveyed) for line-transect vessel surveys conducted in the Jacksonville, Florida survey area.

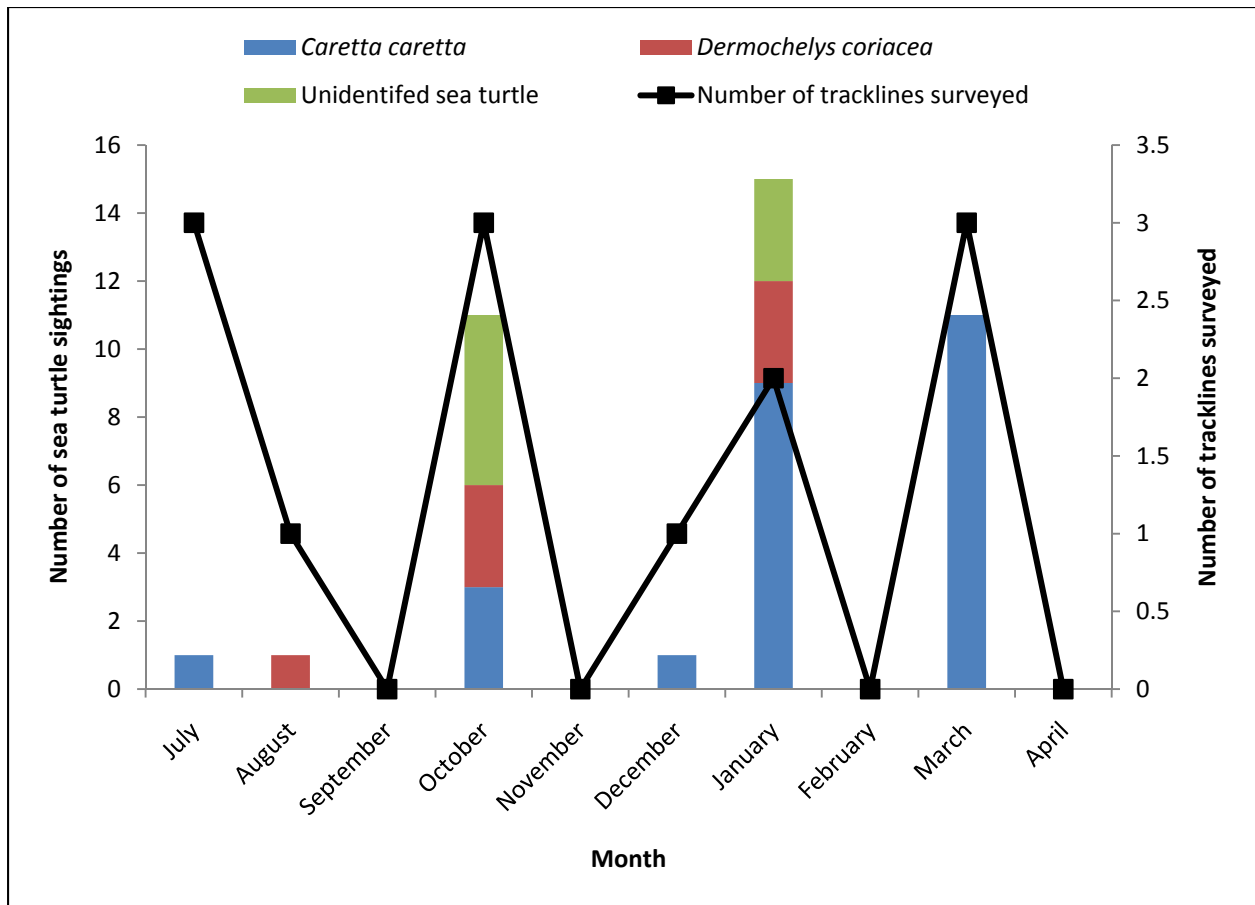


Figure 13b. Number of sea turtle sightings by month and effort (number of tracklines surveyed) for line-transect vessel surveys conducted in the Jacksonville, Florida survey area.

### Photographic Effort

Approximately 4930 digital images were taken for species confirmation and individual identification during vessel surveys (Table 6). Photo-identification catalogues for *Stenella frontalis* and *Tursiops truncatus* currently consist of 41 and 21 individuals, respectively. Two individual spotted dolphins have been resighted within the Jacksonville survey area (Figure 14). Sfr 3-001 was observed first on 10 October 2010 and again on 19 March 2011; Sfr 8-005 was photographed during surveys on two consecutive days: 18 March 2011 and 19 March 2011. Future efforts include developing a short-finned pilot whale (*Globicephala macrorhynchus*) catalogue and comparing photo-identification catalogues between survey areas in Onslow Bay, NC and Jacksonville, FL. Photo-id and biopsy sampling surveys will continue, so that we improve our understanding of the residency and movement patterns of offshore delphinids in this region of the western North Atlantic.

*Table 6.* Number of images taken per species during vessel surveys in the Jacksonville, Florida survey area for Year 1 (July 2009 – June 2010) and Year 2 (July 2010 – December 2011).

Species	Year 1			Year 2		
	Images	Catalog Size	Matches	Images	Catalog Size	Matches
<i>Tursiops truncatus</i>	779	0	0	332	21	0
<i>Stenella frontalis</i>	781	0	0	1267	41	2
<i>Globicephala macrorhynchus</i>	1368	0	0	0	0	0
<i>Grampus griseus</i>	405	0	0	0	0	0

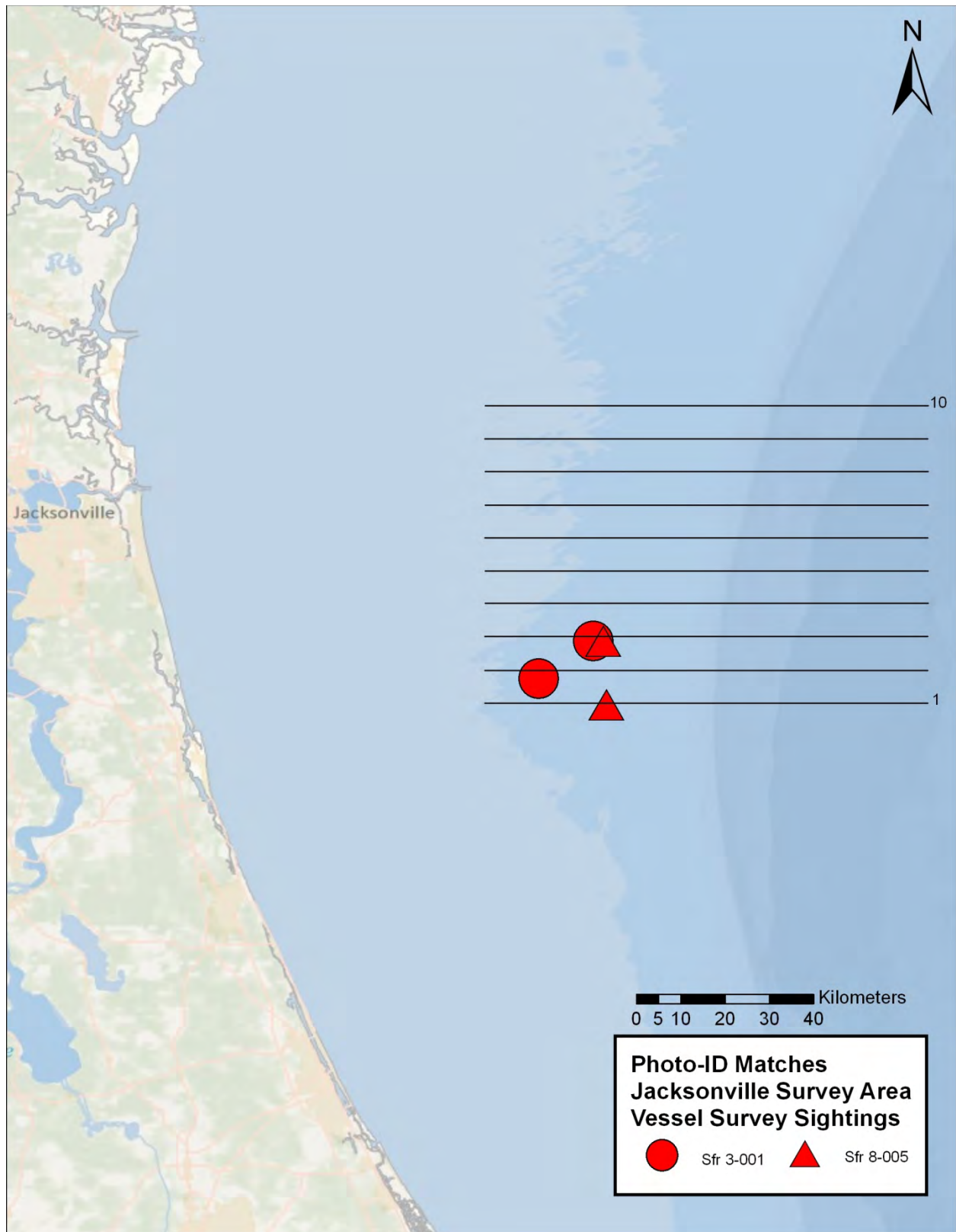


Figure 14a. Locations of matched *Stenella frontalis* dolphins within the Jacksonville, Florida survey area.



*Figure 14b.* Dorsal fin images of re-sighted *Stenella frontalis* dolphins within the Jacksonville, Florida survey area.

## Passive Acoustic Monitoring

### *Towed Array Analysis*

Three line-transect surveys were conducted with the towed hydrophone array resulting in 1.52 hours of passive acoustic monitoring. During these three surveys, recordings were obtained from two groups of animals positively identified to species by visual observers. One of these groups was identified as *Tursiops truncatus*, and the other as *Stenella frontalis* (Table 7). Hardware issues with the towed array system prevented recordings being made during other surveys.

Whistles and clicks obtained during these recordings will be used in future analyses of species-specific features, as described above.

*Table 7.* Number of confirmed species recordings made using the towed hydrophone array in the Jacksonville, Florida survey area, July 2010 - December 2011.

<b>Species</b>	<b>Total # of Days Detected</b>	<b>Total # of Detections</b>	<b>Total Duration of Recordings (h:mm)</b>
<i>Stenella frontalis</i>	1	1	0:10
<i>Tursiops truncatus</i>	1	1	0:07

### *HARP Analysis - High Frequency (1-100 kHz bandwidth) - General Occurrence Patterns*

Table 8 summarizes the number of days of recordings and the proportion of time in which odontocete clicks and whistles were present. Both the total number of detections and the recording duration of whistles and clicks decreased by more than half compared to the HARP deployment one year earlier during the same seasons. The percentage of days with click bouts present did not change, but days with whistles present decreased by 15%. This suggests that the daily occurrence of dolphins did not change from year to year, but that detectability did. The

decrease in detectability in spring-summer 2010 from spring-summer 2009 could be due to differences in the hydrophone used in the two deployments (a new hydrophone with different pre-amplifier settings was used to replace the one bitten by a shark), a decrease in the vocal behavior of animals, a slight change in spatial distribution such that animals are farther away from the HARP, or differences in acoustic propagation conditions. Concurrently, high frequency (>2 kHz) noise from shipping decreased from 128.7 hours (3.4%) to 91.8 hours (2.4%) between the two deployments. This suggests that either the change in hydrophone or propagation conditions as the most parsimonious explanation for the decrease in detection of odontocete calls.

High-frequency (>2 kHz) noise from shipping was detected in 22 (2%), 100 (5%), and 182 (5%) hours of recordings during JAX01A, JAX02A, and JAX03A deployments, respectively.

Recording duration of shipping noise, delphinid clicks and whistles increased from JAX01A to JAX02A and JAX03A. JAX01A and JAX03A deployments were concurrent with JAX01B and JAX04B deployments and show an inverse trend which supports the prior suggestion that there may have been an offshore shift in both ship and delphinid distributions from spring-summer 2009 to spring-summer 2010 or an inverse change in propagation conditions between the two years. One important caveat is that recordings from JAX01A are assumed to have been collected on the expected schedule, but errors in header writing prevent us from knowing whether this actually occurred. It is possible that these errors could have led to a deviation from the expected schedule and differences in occurrence among the three deployments at site A are an artifact of this error. An analysis of the ambient noise variability (below) suggests that the assumption of normal data collection is reasonable.



*Table 8.* Number of days and hours recorded, total number of click and whistle bouts, number of days with, and number of hours with vocal events for HARPs analyzed in the Jacksonville survey area, July 2010 – December 2011.

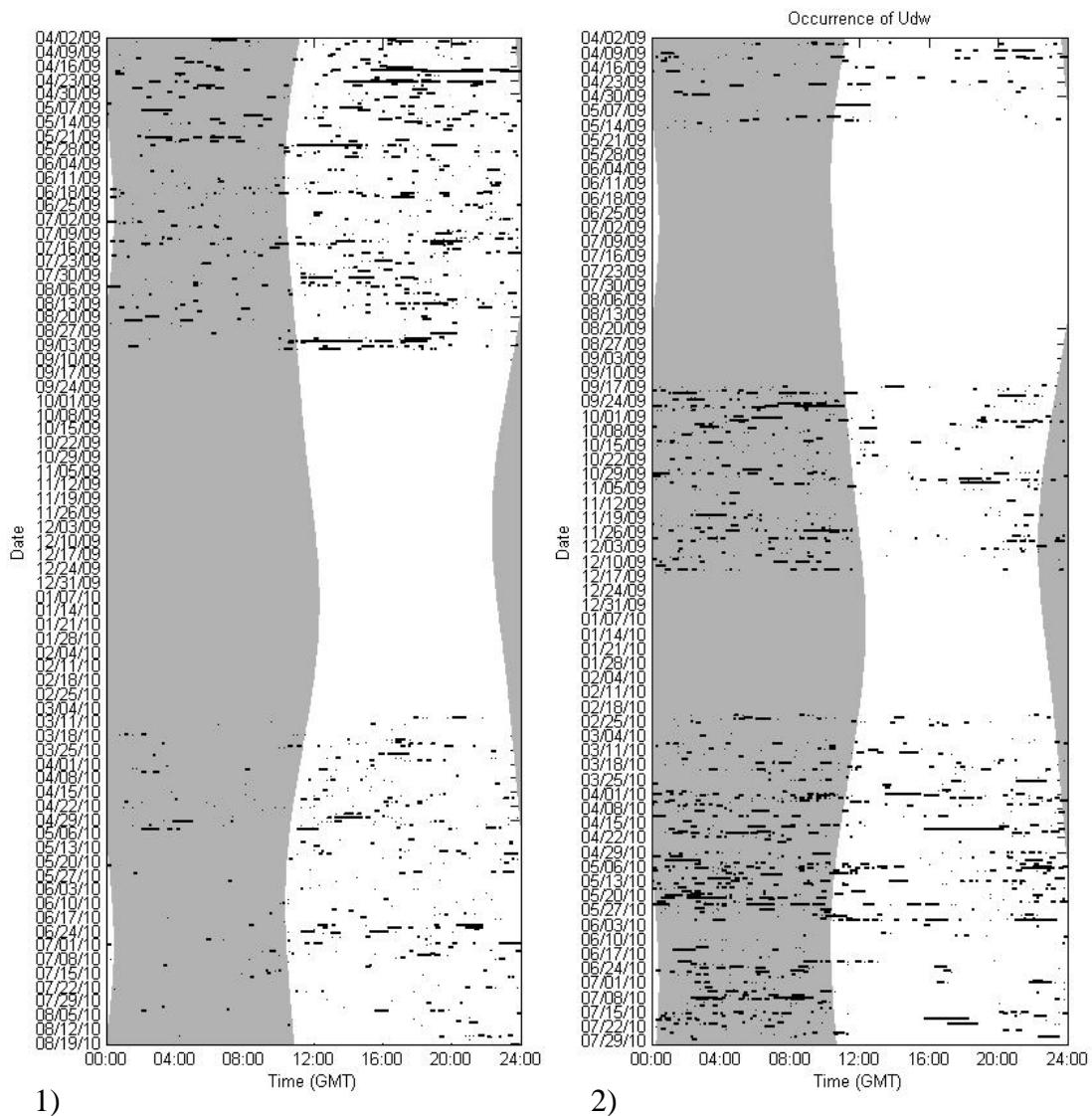
	<b>JAX01A</b>	<b>JAX02A</b>	<b>JAX03A</b>	<b>All A</b>	<b>JAX01B</b>	<b>JAX04B</b>	<b>All B</b>
# Days Recorded	54	91	159	304	161	164	325
# Days with Click Detections	49	91	157	297	154	153	307
# Days with Whistle Detections	31	79	139	250	146	125	271
Recording Effort (hrs)	1273	2152	3808	7233	3837	3907	7743
Click bout recordings (hrs)	250	631	1175	2056	475	203	678
Whistle bout recordings (hrs)	26	83	185	295	163	55	218
Total # of Click Bouts	388	827	1669	2884	1401	886	2287
Total # of Whistle Bouts	105	437	809	1351	687	397	1084

### *Temporal variability*

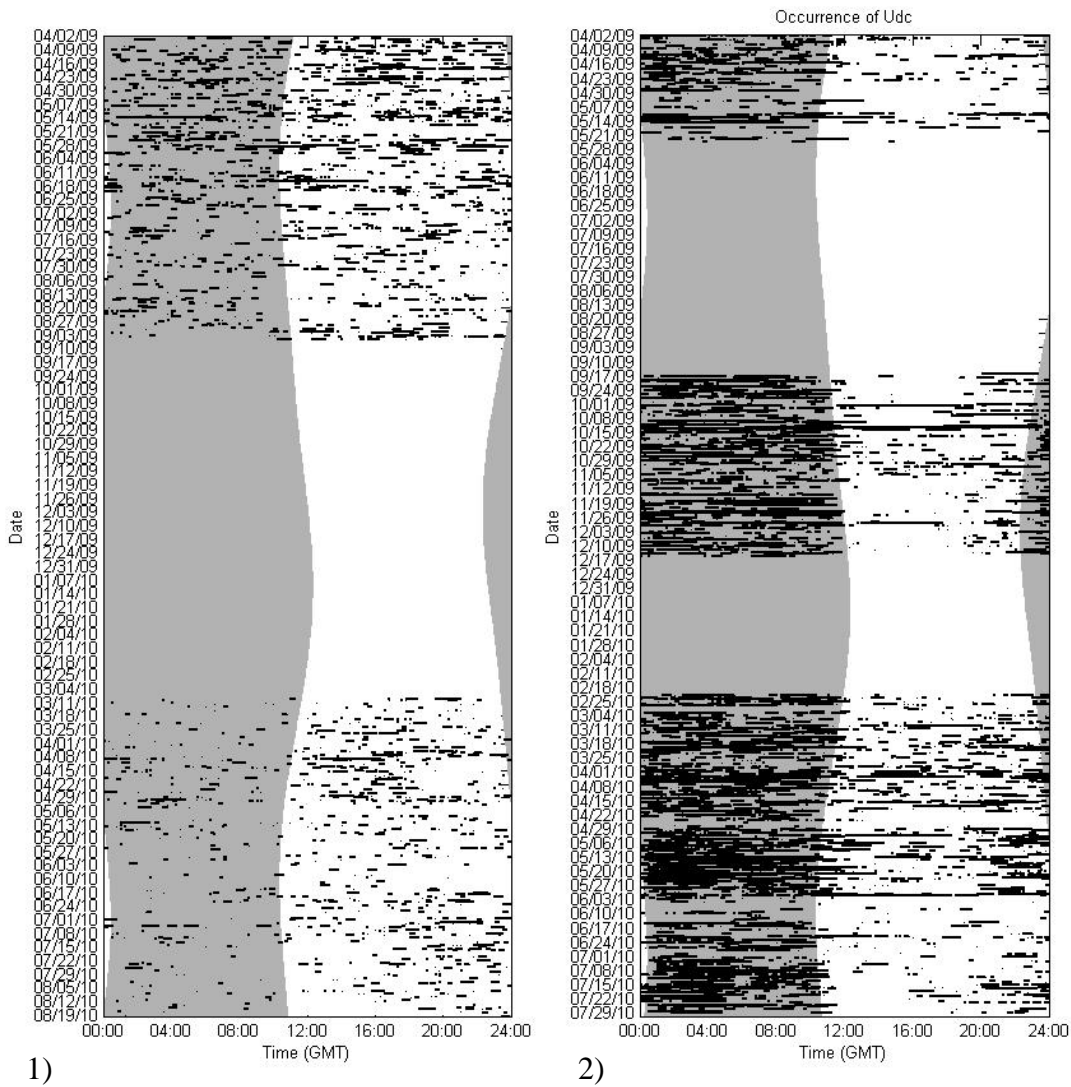
The detailed timing of acoustic events, including delphinid whistles, delphinid echolocation clicks (unidentified dolphins, unidentified dolphins with 4-6 kHz peaks, unidentified dolphins with 18-20 kHz peaks, and unidentified dolphins with low frequency (<20 kHz) energy), shipping noise, sonar (including: mid-frequency active sonar; 12 kHz, 28 kHz, and 50 kHz fish- and depth-sounders; and 75 kHz ADCP sources), and weather events (rain, wind, or waves) are presented in Figures 15-19 as a function of date and time of day. The frequent occurrence of short duration whistle and echolocation click bouts is evident with overall greater acoustic

activity and longer duration click bouts evident at the offshore site. Weather activity has the potential to increase ambient noise resulting in a decrease in detectability of animal sounds and is presented for comparison in Figure 19.

A summary of diel occurrence of acoustic events suggests differences in occurrence patterns across call types and deployments (Figures 20 and 21). At the inshore site, whistles and clicks occur more frequently during the day than at night. At the offshore site whistles occur uniformly throughout the day and night with only a slight nocturnal increase, but clicks exhibit a strong nocturnal increase (Figures 20 and 21). These differences may represent differences in call usage or detectability (*e.g.* due to ambient noise masking) and may reflect site-specific, season-specific, or species-specific differences. Future work analyzing data from continuing deployments, species classification results and trends in ambient noise levels should provide insights into the causes of these diel differences.



*Figure 15.* Occurrence of unidentified delphinid whistle bouts from LTSA spectral analysis at (1) inshore Site B and (2) offshore Site A. Black lines represent timing of whistle bouts, gray shading represents night, and large periods without detections represent missing data. Whistle bouts from all HARP deployments analyzed to date are presented here.



*Figure 16.* Occurrence of unidentified delphinid click bouts from LTSA spectral analysis at (1) inshore Site B and (2) offshore Site A. Black lines represent timing of click bouts, gray shading represents night, and large periods without detections represent missing data. Click bouts from all HARP deployments analyzed to date are presented here.

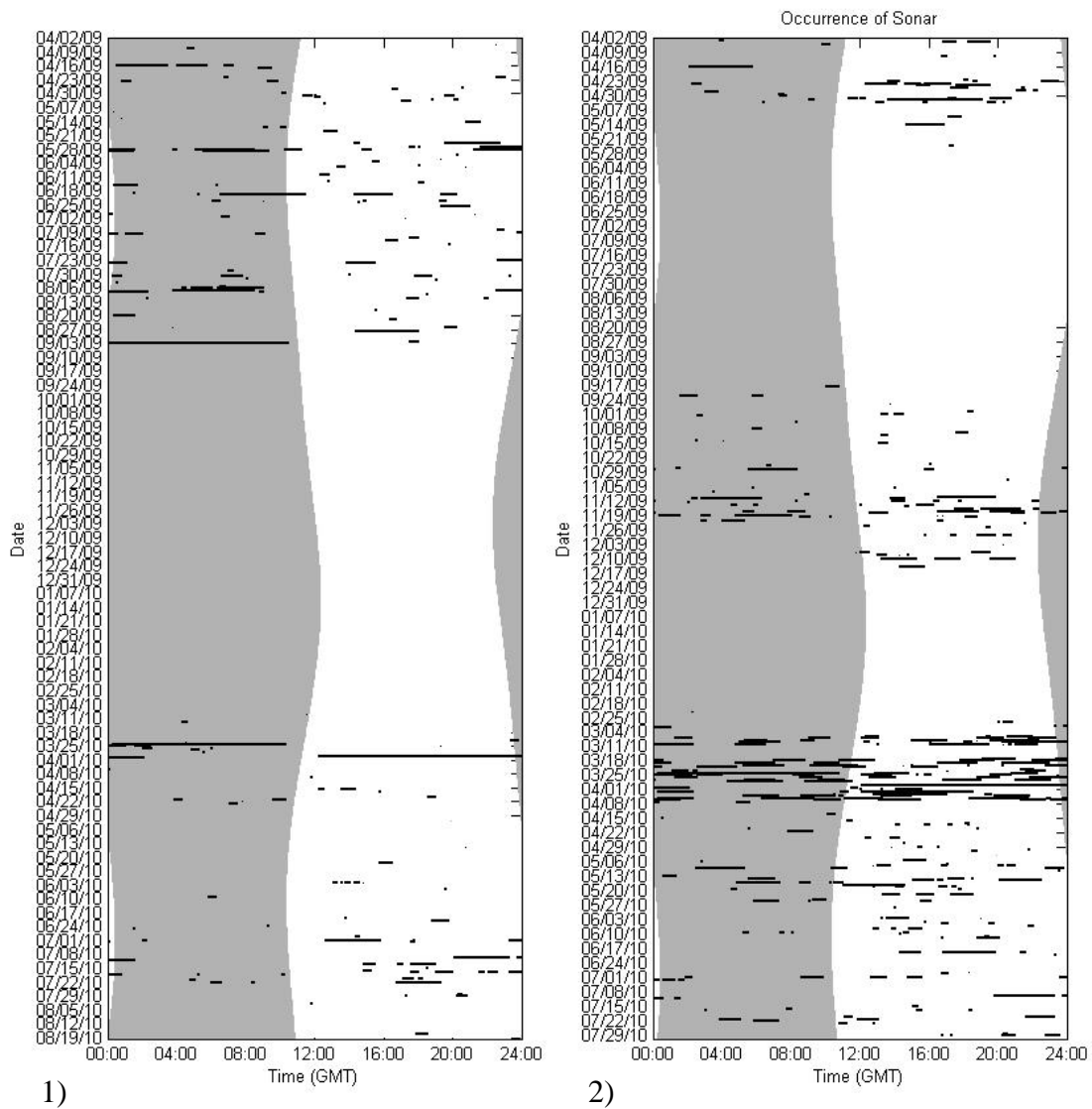


Figure 17. Occurrence of all mid and high frequency sonar events (including mid-frequency active sonar, 12 kHz, 28 kHz, and 50 kHz fish- and depth-sounders, and 75 kHz ADCP sources) from LTSA spectral analysis at (1) inshore Site B and (2) offshore Site A. Black lines represent timing of sonar events, gray shading represents night, and large periods without detections represent missing data. Analysis of mid-frequency active sonar is not complete. Sonar events from all HARP deployments analyzed to date are presented here.

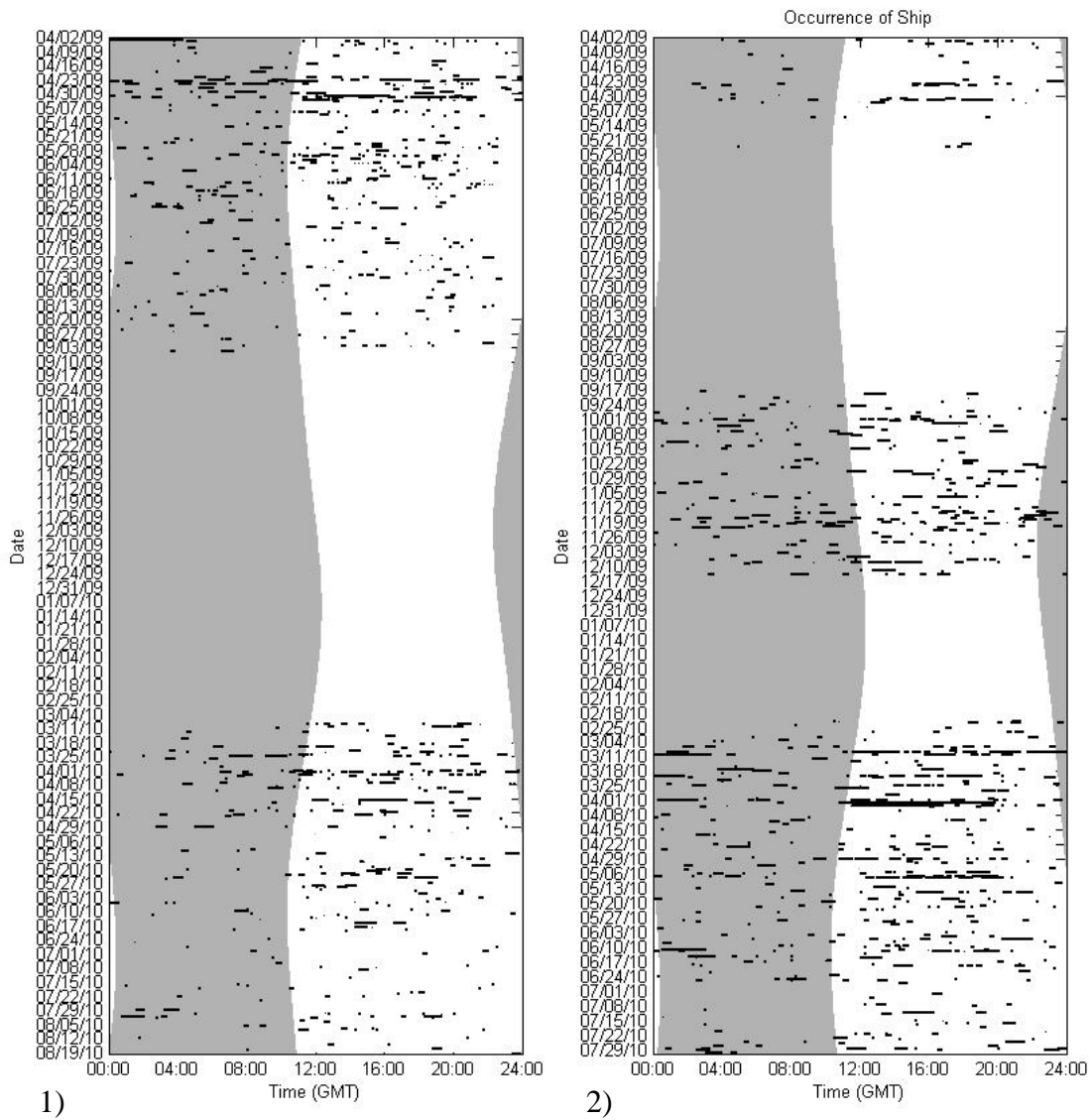


Figure 18. Occurrence of vessel noise including higher frequency energy (greater than 2 kHz) from LTSA spectral analysis at (1) inshore Site B and (2) offshore Site A. Black lines represent timing of ship events, gray shading represents night, and large periods without detections represent missing data. Vessel noise from all HARP deployments analyzed to date are presented here.

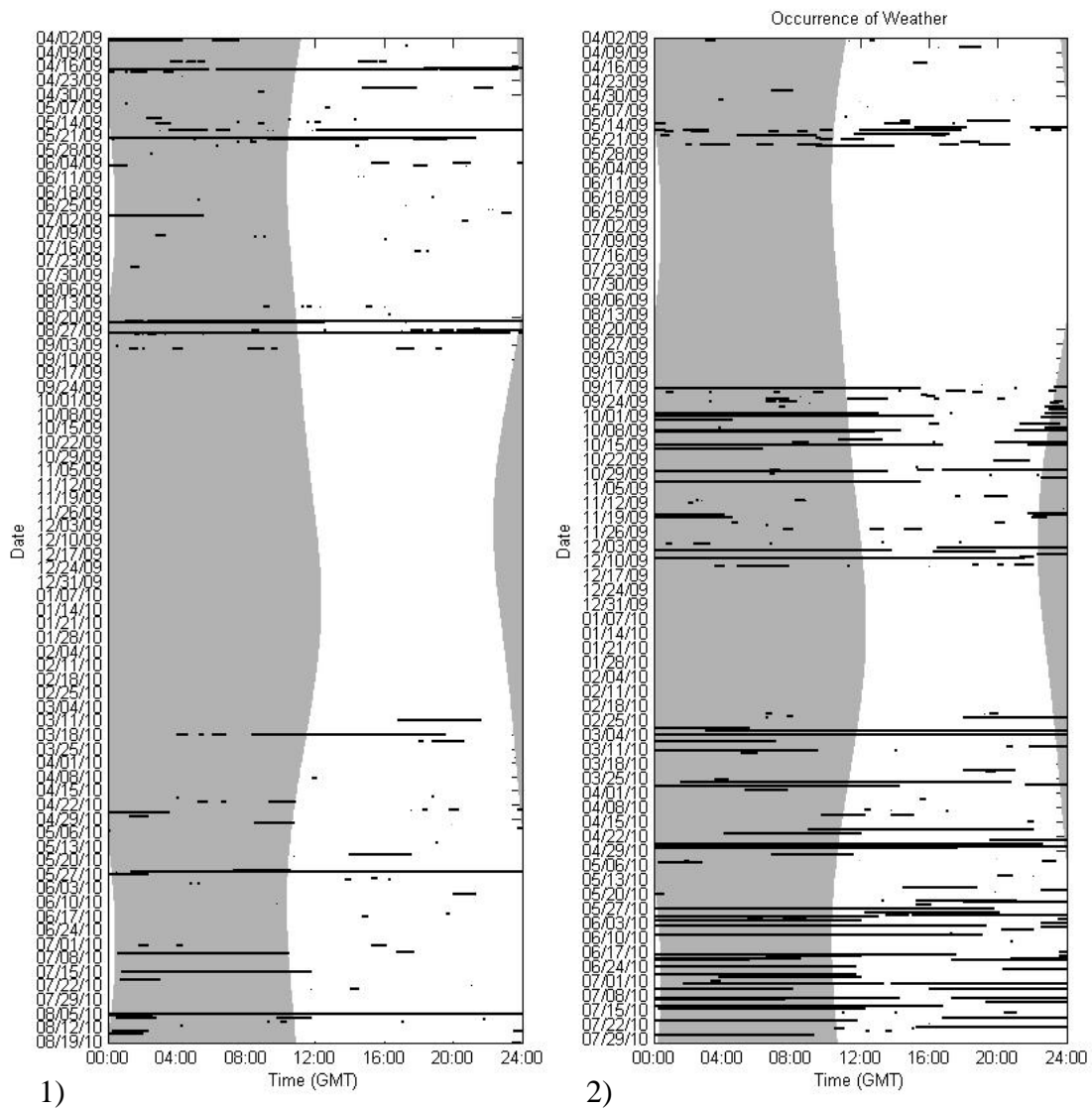


Figure 19. Occurrence of weather events including higher energy caused by wind, waves, and rain from LTSA spectral analysis at (1) inshore Site B and (2) offshore Site A. Black lines represent timing of weather events, gray shading represents night, and large periods without detections represent data. Weather events from all HARP deployments analyzed to date are presented here.

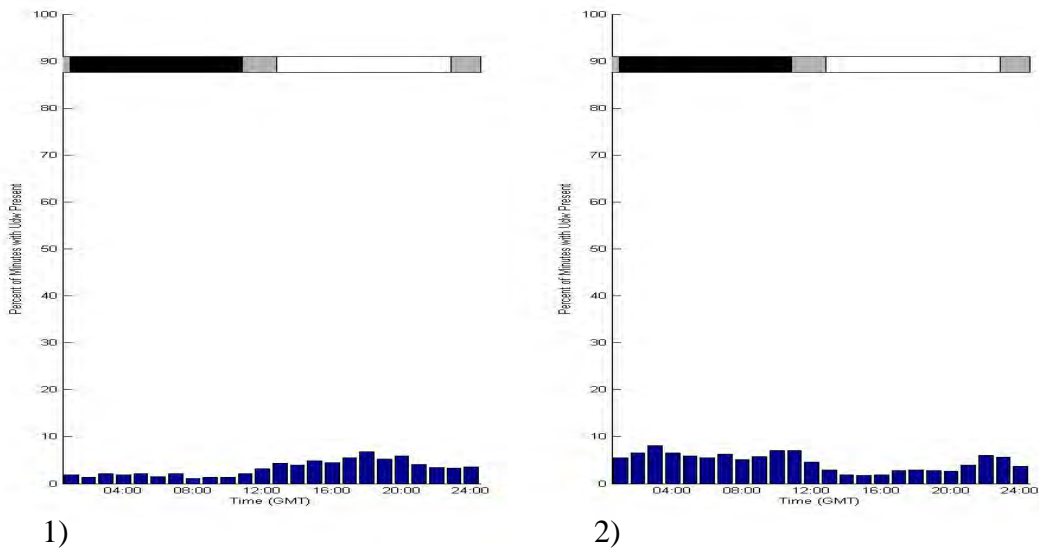


Figure 20. Diel occurrence of unidentified delphinid whistles represented by percent of days with detections present per hour at (1) inshore Site B and (2) offshore Site A. Shading bar across top indicates night (black), day (white), and times that may be either day or night depending on season (gray). Whistle bouts from all HARP deployments analyzed to date are presented here.

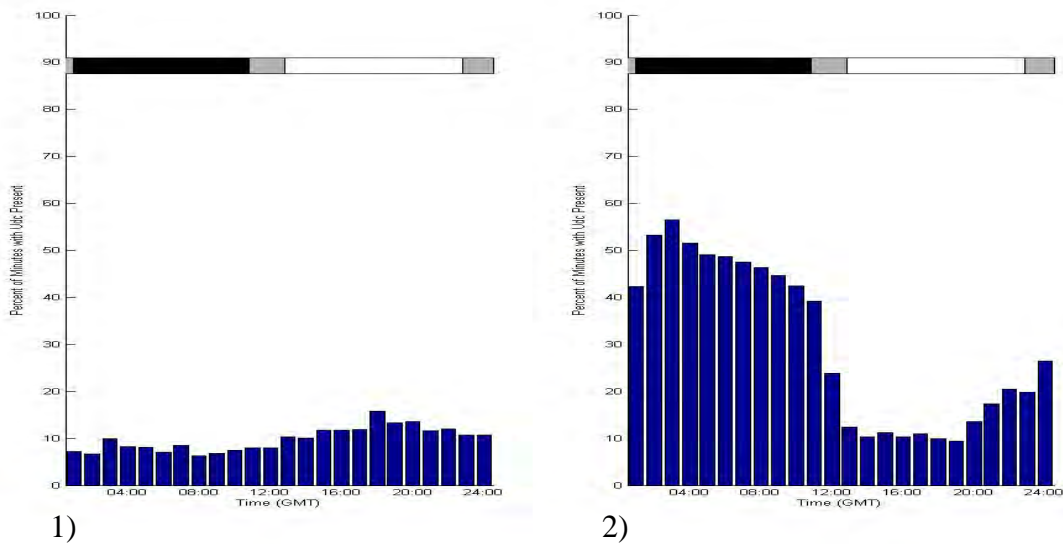


Figure 21. Diel occurrence of unidentified delphinid clicks represented by percent of days with detections present per hour at (1) inshore Site B and (2) offshore Site A. Shading bar across top indicates night (black), day (white), and times that may be either day or night depending on season (gray). Click events from all HARP deployments analyzed to date are presented here.



## *Ambient Noise Analysis*

To examine the ambient noise conditions and expected changes in call detectability, hourly median spectral values were calculated for the duration of each deployment. During JAX01B and JAX04B deployments, an overall increase in noise above 10 kHz is evident, with lower ambient noise during March through May and increasing noise from June through September (Figures 22 and 23). During the JAX05B deployment, noise decreases again at the end of September with lower overall ambient noise from October through January (Figure 24). This increase in noise corresponds with Florida's rainy season. Shorter duration (~1-2 week) increases in noise are also seen which likely indicate storm events. At the lower frequency end (1-20 kHz), the ambient noise conditions generally show the opposite trend, with higher energy from October to May, though increases are also evident periodically throughout the remainder of the year. This frequency band typically corresponds to wind energy. Other features to note include a daily pattern of increased noise at night, including a strong noise band around 4-5 kHz. These daily, week-long and seasonal increases in noise will lead to decreased detectability of animal calls. One might expect: (1) fewer whistles and clicks to be detected at night, particularly whistles in the 4-5 kHz range; (2) fewer clicks to be detected during summer/early fall; and (3) fewer whistles to be detected during fall-early spring. At the offshore site, the diel pattern of increasing noise at night is also evident, although frequently obscured by weather (Figures 25-28). The weather noise is sporadic and lower in energy as at the shallow site (Site B). No obvious seasonal trend is apparent in ambient noise at Site A. High energy at 2 kHz is apparent during the JAX01A and JAX03A deployments which indicate that the low-frequency hydrophone was probably failing at the beginning of this project.

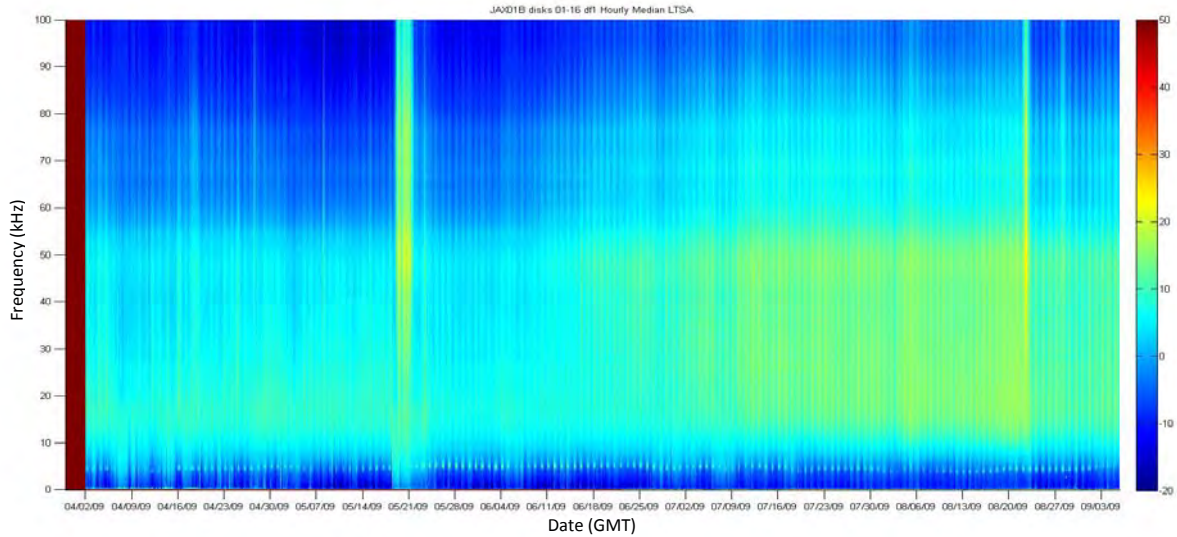


Figure 22. Hourly median ambient noise levels throughout JAX01B (inshore) deployment from 2 April 2009 – 4 September 2009. Diel variability in ambient noise conditions is apparent with increased energy at night across frequencies, with a peak at approximately 5 kHz. Overall ambient noise levels increase during the summer and several louder weather events are evident.

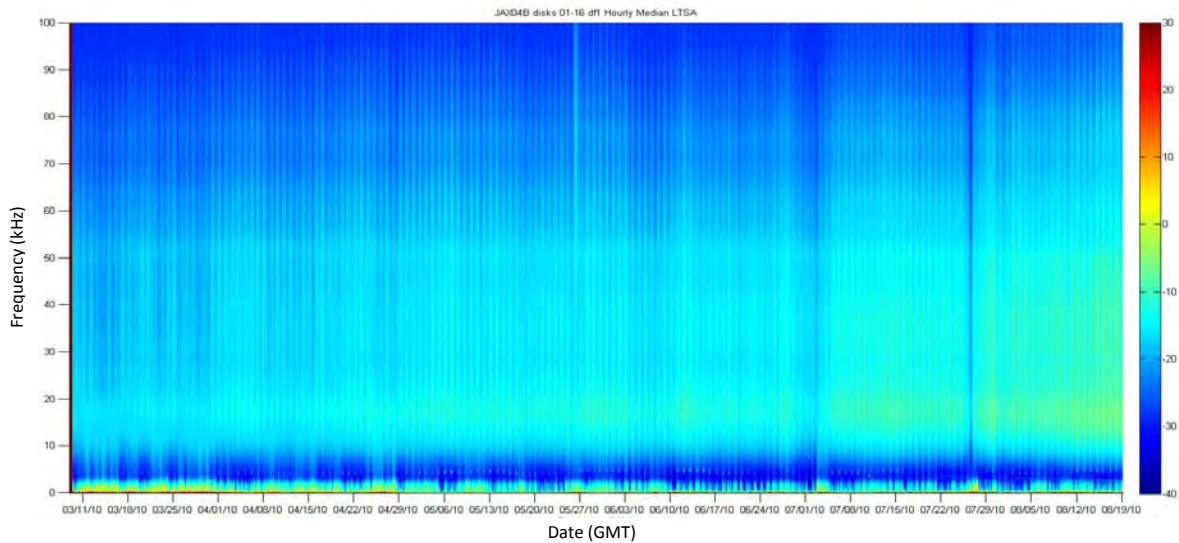
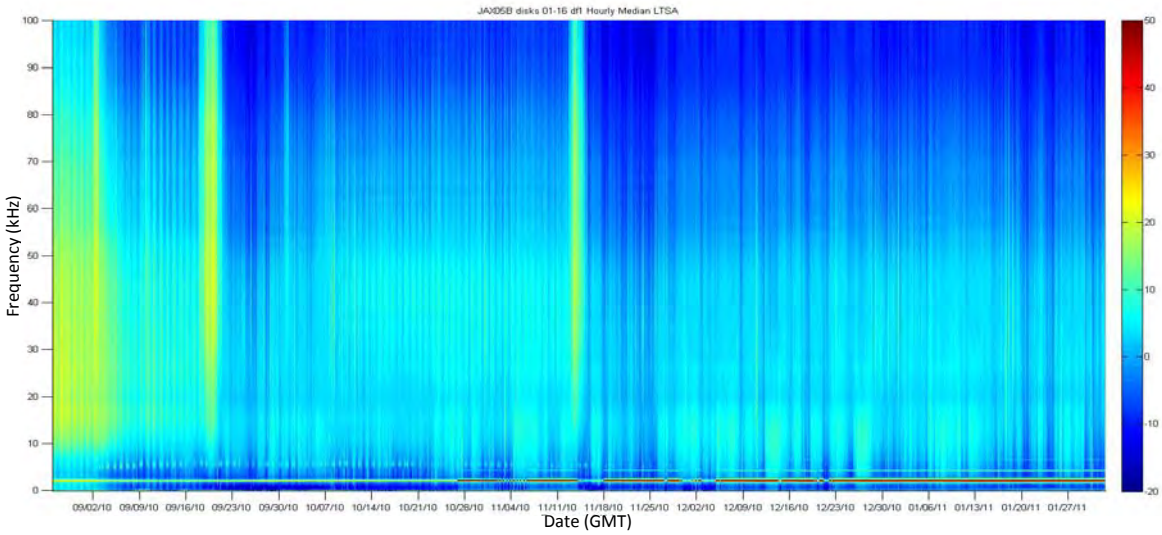
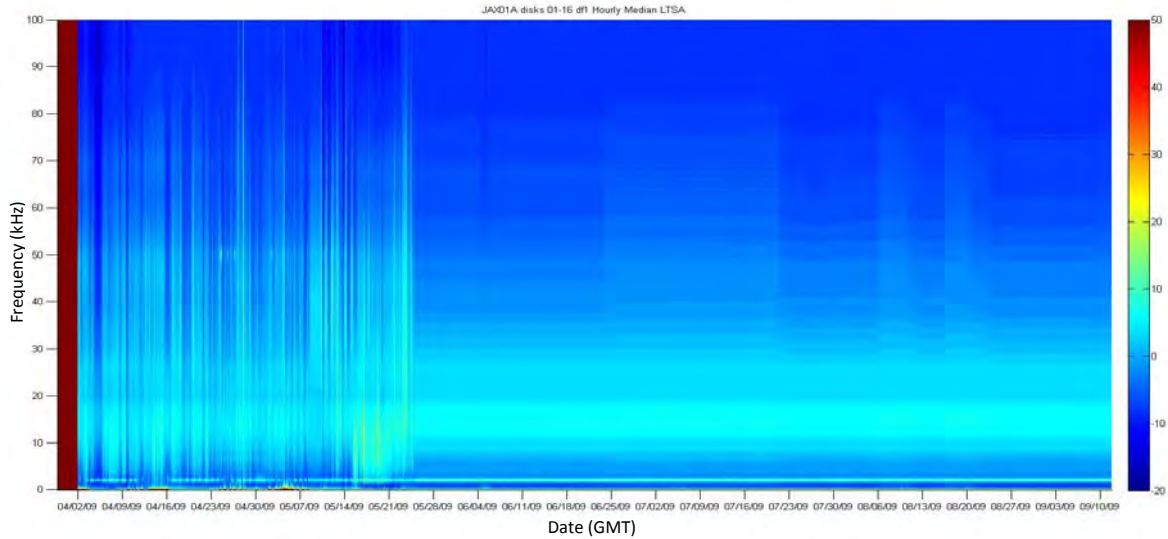


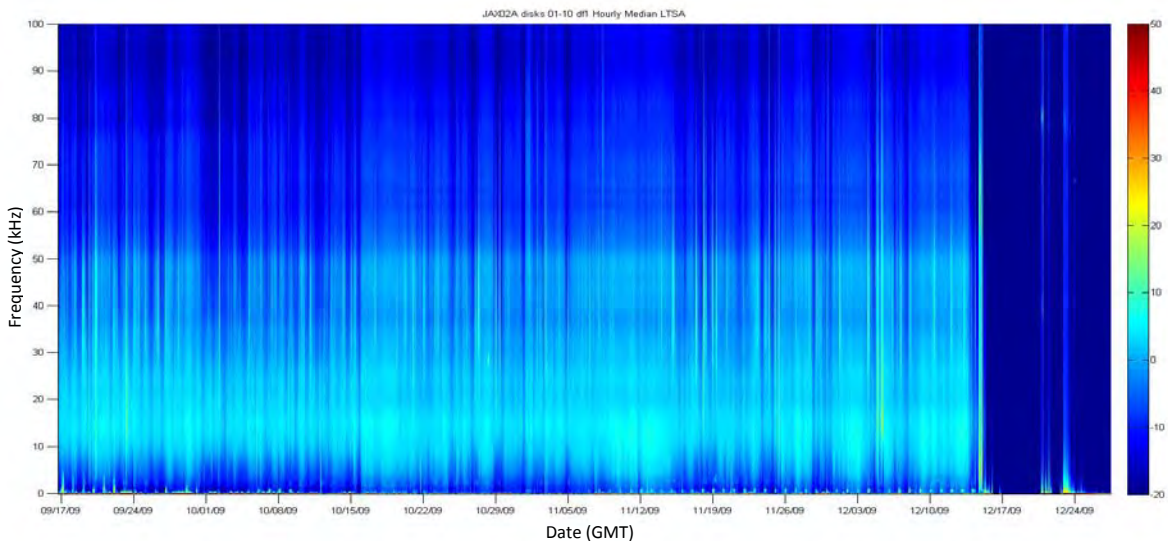
Figure 23. Hourly median ambient noise levels throughout JAX04B (inshore) deployment from 10 March 2010 - 20 August 2010. Diel variability in ambient noise conditions is apparent with increased energy at night across frequencies, with a peak at approximately 5 kHz. Overall ambient noise levels increase during July and August. Note lower relative energy scale on this deployment which includes a new hydrophone with lower noise properties.



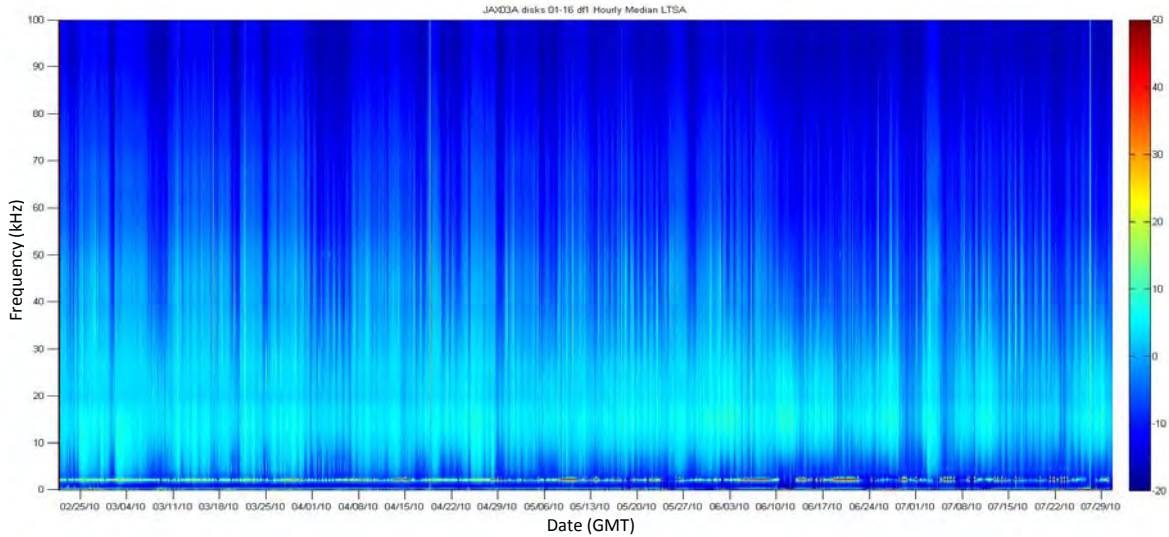
*Figure 24.* Hourly median ambient noise levels throughout JAX05B (inshore) deployment from 25 August 2010 - 30 January 30 2011. Diel variability in ambient noise conditions is apparent with increased energy at night across frequencies, with a peak at approximately 5 kHz. The 5 kHz energy is not evident after December 2010, though it may be masked by increase ambient noise from 2-20 kHz at this time. Overall ambient noise levels are highest during August and early September, and several louder weather events are evident which may represent precipitation. Energy at 2 kHz indicates failure of the low-frequency hydrophone which was discovered during recovery of this deployment.



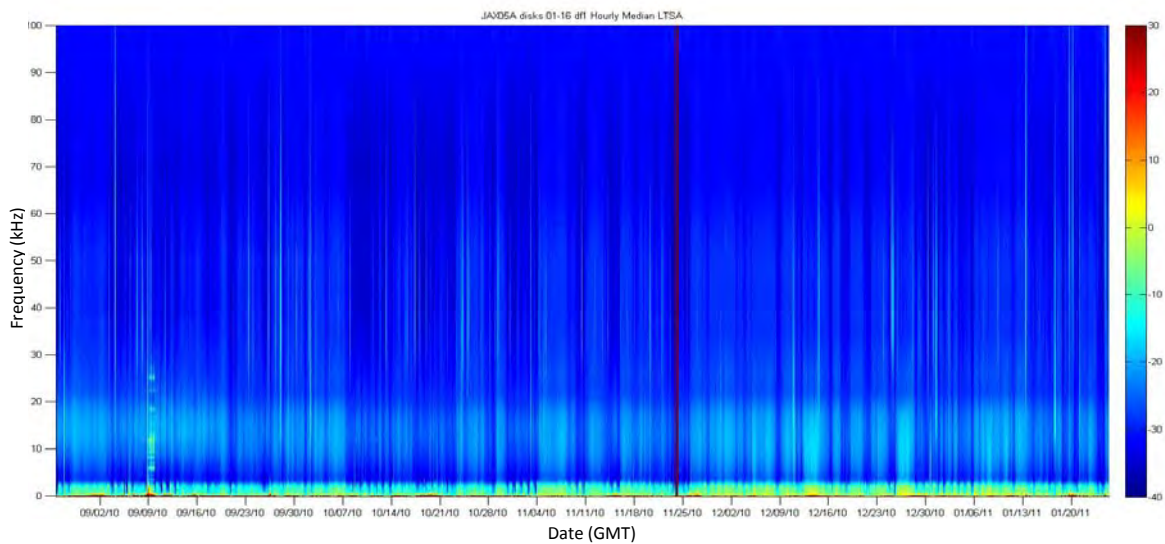
*Figure 25.* Hourly median ambient noise levels throughout JAX01A (offshore) deployment from 2 April - 11 September 2009. This deployment included a defective memory chip resulting in bad timing information and eventually bad audio recordings. Timing information was manually set, assuming the set duty cycle with no errors which appears reasonable. Data appear useable up to May 25, 2009 after which the bits were completely stuck and no new data were recorded. Diel variability in ambient noise conditions is apparent with increased energy at night. Energy at 2 kHz may indicate improper working of the low-frequency hydrophone, as discovered during recovery of the JAX05B deployment.



*Figure 26.* Hourly median ambient noise levels throughout JAX02A (offshore) deployment from 17 September - 25 December 2009. Around 14 December 2009, a shark bit the hydrophone resulting in saltwater intrusion which eventually compromised the hydrophone. Diel variability in ambient noise conditions is apparent with increased energy at night.



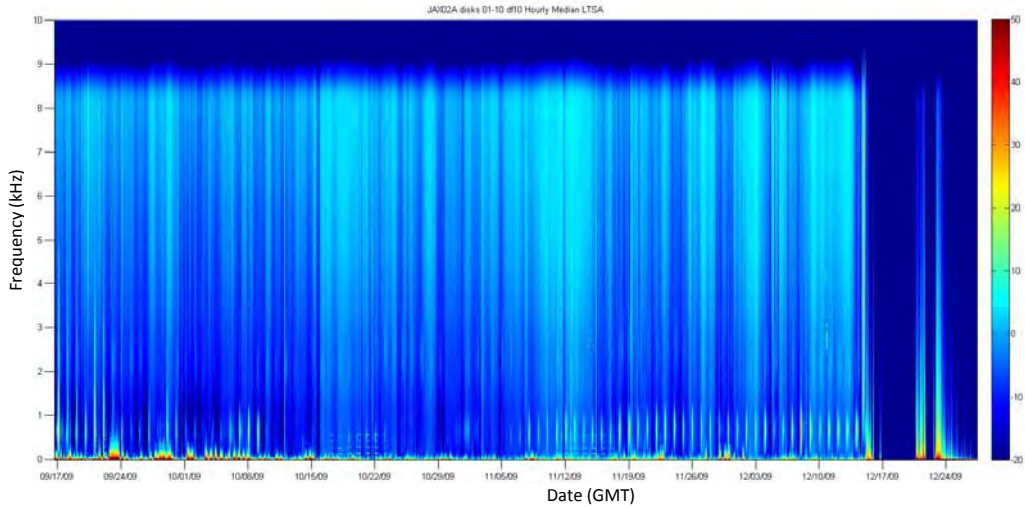
*Figure 27.* Hourly median ambient noise levels throughout JAX03A (offshore) deployment from February 22 - July 20, 2010. Diel variability in ambient noise conditions is apparent with increased energy at night. Overall ambient noise levels are higher in the winter and spring. Energy at 2 kHz may indicate improper working of the low-frequency hydrophone, as discovered during recovery of the JAX05B deployment.



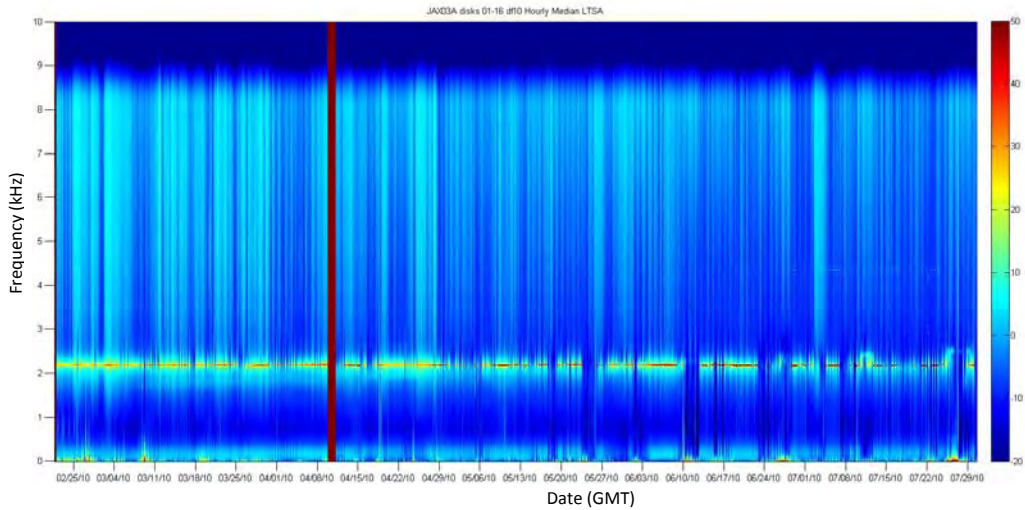
*Figure 28.* Hourly median ambient noise levels throughout JAX05A (offshore) deployment from Aug 25, 2010 to January 28, 2011. Diel variability in ambient noise conditions is apparent with increased energy at night though some of this variability appears masked by weather or tidal noise during some periods. Overall ambient noise levels appear consistent throughout the deployment. Note lower relative energy scale on this deployment which includes a new hydrophone with lower noise properties.

### *HARP Analysis - Mid and Low Frequency - Ambient Noise Analysis*

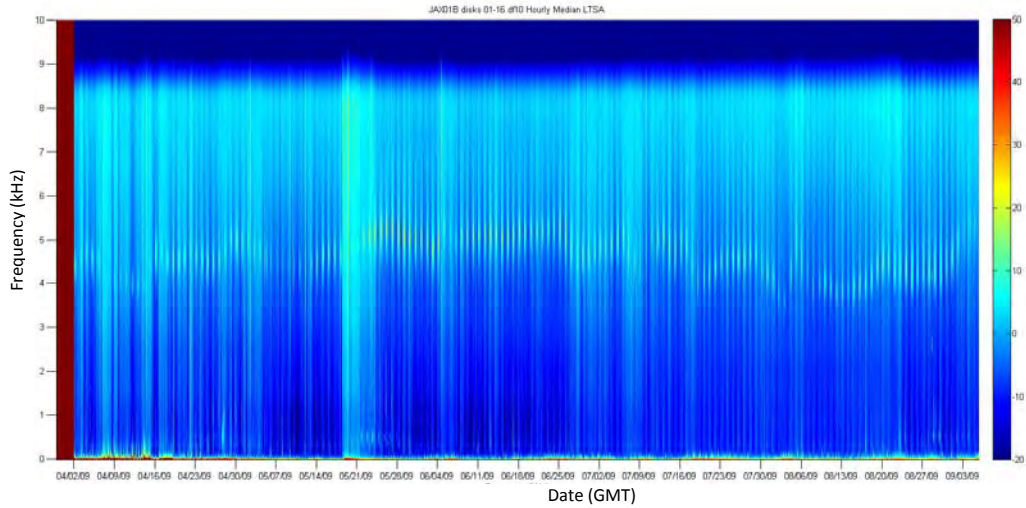
To examine the ambient noise conditions and expected changes in call detectability, hourly median spectral values were calculated for decimated mid- and low frequency LTSAs for the JAX02A, JAX03A, JAX01B and JAX04B deployments. Results of the mid-frequency analysis show that a diel trend in increased energy centered at about 600 Hz is evident throughout the JAX02A deployment (Figure 29). Sporadic weather events are also evident with increasing noise from fall to winter. This noise decreases into spring and summer during the JAX03A deployment (Figure 30). The 600 Hz energy is not evident during this deployment; but the 2 kHz oscillation indicating a failing low-frequency hydrophone is present through most of the deployment. This suggests there is little, if any, quality low-frequency data available from this deployment. At Site B, the diel trend in 4-5 kHz energy is evident as are sporadic weather events (Figures 31-32). Energy below 3 kHz is high during the JAX04B deployment and appears higher during spring than during summer (Figure 32). In the lower frequency range, a diel pattern is found at Site A for noise centering around 150 Hz which also appears to follow a monthly trend. Energy below 200 Hz is strong and a prior analysis suggested this was related to tidal flow (Figure 33). Data from JAX03A are relatively invariant, likely due to a non-functioning hydrophone (Figure 34). At Site B, diel patterns of increasing nocturnal noise continue to be seen in this frequency range with increased energy at about 200 Hz that may be related to fish calling. Noise below 100 Hz is generally high and appears stronger during spring than summer (Figures 35-36).



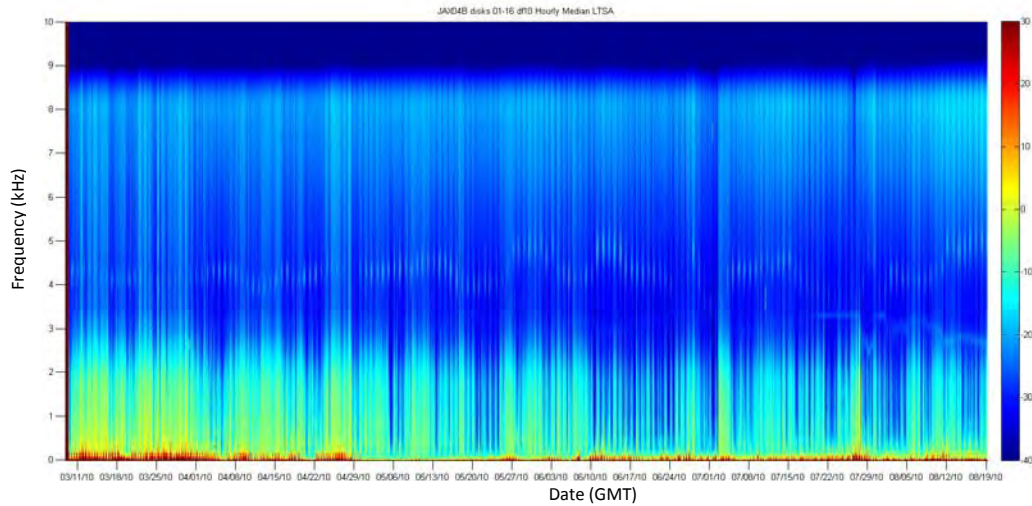
*Figure 29.* Hourly median ambient noise levels for mid-frequency data throughout JAX02A (offshore) deployment from September 17 - December 25, 2009. Around 14 December 2009, a shark bit the hydrophone resulting in saltwater intrusion which eventually compromised the hydrophone. Diel variability in ambient noise conditions is apparent with increased energy at night, with a peak at approximately 0.5 kHz. Overall energy appears to increase from fall to winter.



*Figure 30.* Hourly median ambient noise levels for mid-frequency data throughout JAX03A (offshore) deployment from February 22 - July 20, 2010. Diel variability in ambient noise conditions is apparent with increased energy at night. Overall ambient noise levels are higher in the winter and spring. Energy at 2 kHz may indicate improper working of the low-frequency hydrophone, as discovered during recovery of the JAX05B deployment. Red bar in early April represents missing data.

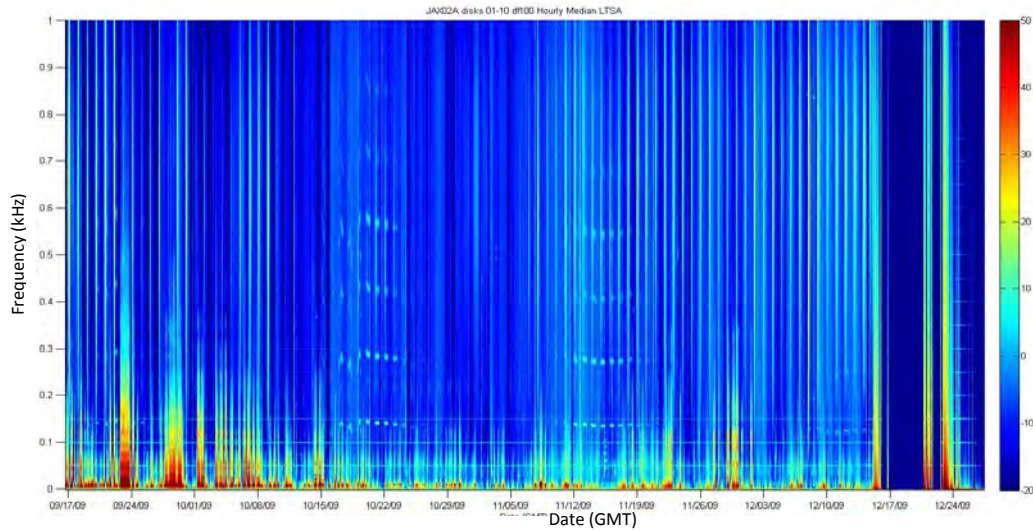


*Figure 31.* Hourly median ambient noise levels for mid-frequency data throughout JAX01B (inshore) deployment from April 2 - September 4, 2009. Diel variability in ambient noise conditions is apparent with increased energy at night across frequencies, with a peak at approximately 4-5 kHz. Low frequency ambient noise levels are higher during spring.

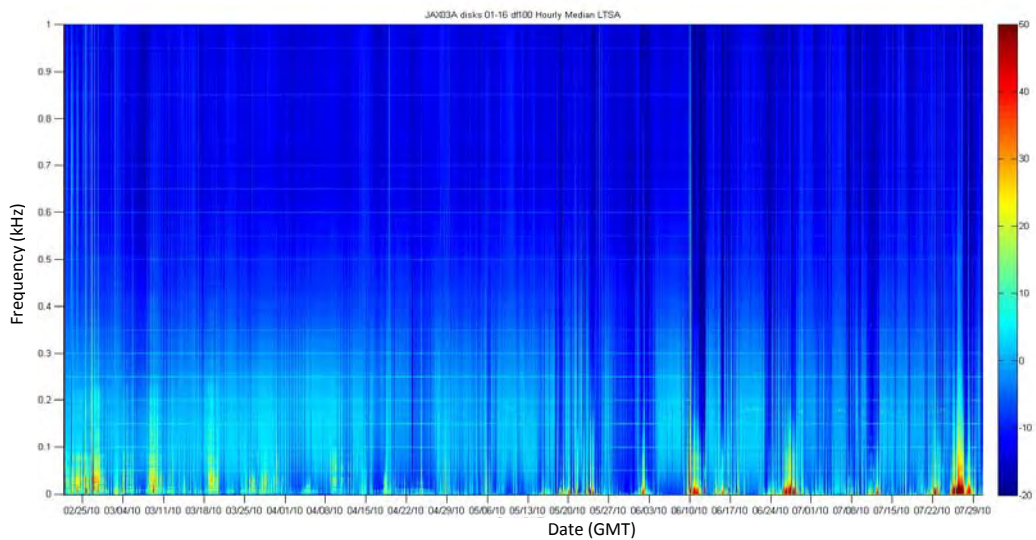


*Figure 32.* Hourly median ambient noise levels for mid-frequency data throughout JAX04B (inshore) deployment from March 10 - August 20, 2010. Diel variability in ambient noise conditions is apparent with increased energy at night across frequencies, with a peak at approximately 4-5 kHz. Low frequency ambient noise levels are higher during spring. Note lower relative energy scale on this deployment which includes a new hydrophone with lower noise properties.

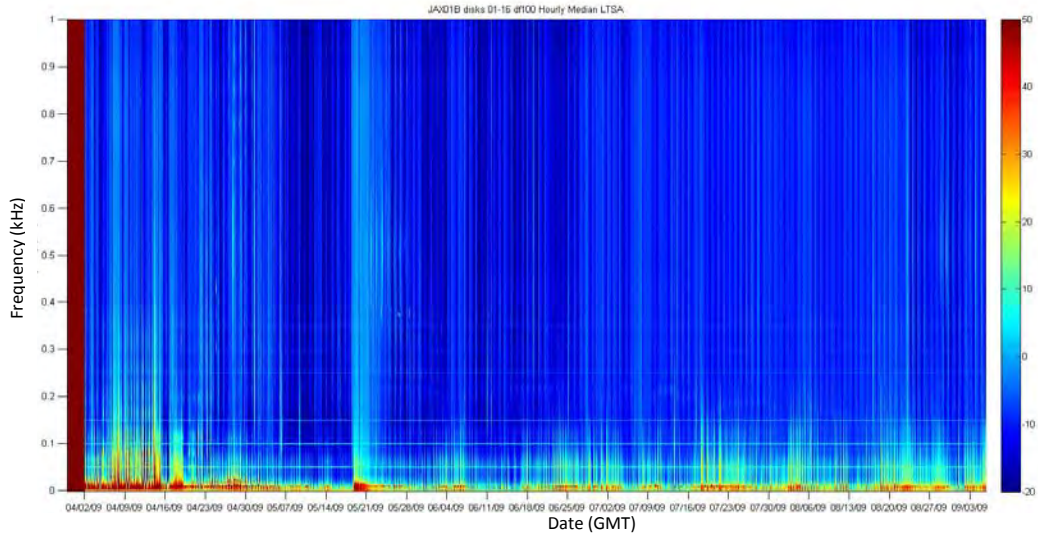




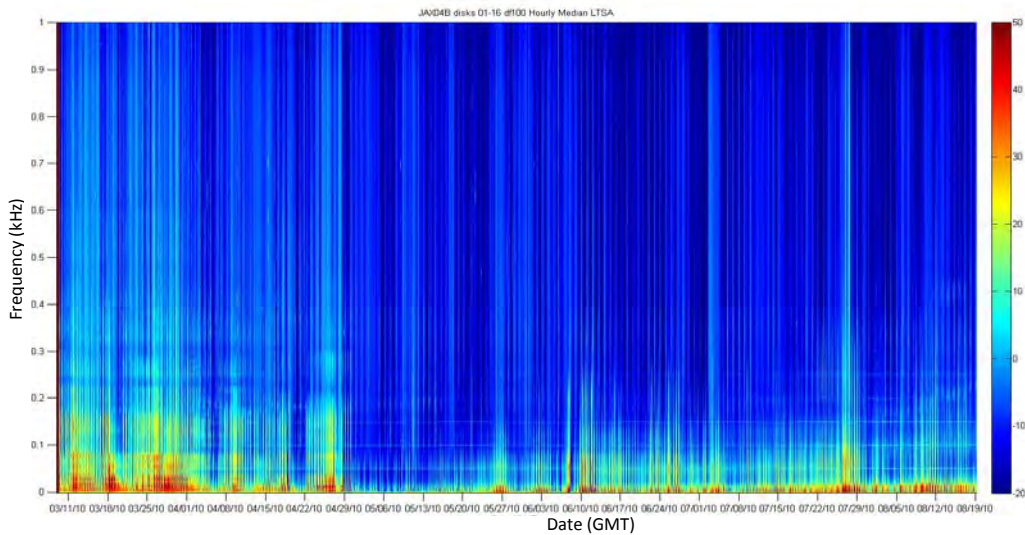
*Figure 33.* Hourly median ambient noise levels for low-frequency data throughout JAX02A (offshore) deployment from September 17 - December 25, 2009. Around 14 December 2009, a shark bit the hydrophone resulting in saltwater intrusion which eventually compromised the hydrophone. Diel variability in ambient noise conditions is apparent with increased energy at night, with a peak at approximately 150 Hz (and harmonics) over some periods following a monthly cycle. Low-frequency energy appears to decrease from fall to winter.



*Figure 34.* Hourly median ambient noise levels for low-frequency data throughout JAX03A (offshore) deployment from February 22 - July 20, 2010. Diel variability in ambient noise conditions is apparent with increased energy at night, with a peak at approximately 150-200 Hz over some periods. Overall ambient noise levels exhibit low seasonal variability. Energy at 2 kHz in prior hourly LTSAs may indicate improper working of the low-frequency hydrophone, as discovered during recovery of the JAX05B deployment.



*Figure 35.* Hourly median ambient noise levels for low-frequency data throughout JAX01B (inshore) deployment from April 2 - September 4, 2009. Diel variability in ambient noise conditions is apparent with increased energy at night across frequencies, with a peak at approximately 150-200 Hz. Low frequency ambient noise levels are higher during spring.



*Figure 36.* Hourly median ambient noise levels for low-frequency data throughout JAX04B (inshore) deployment from March 10 - August 20, 2010. Diel variability in ambient noise conditions is apparent with increased energy at night across frequencies, with a peak at approximately 150-200 Hz. Low frequency ambient noise levels are higher during spring. Note lower relative energy scale on this deployment which includes a new hydrophone with lower noise properties.

## **Acknowledgements**

We thank Joel Bell (Naval Facilities Engineering Command Atlantic) for support and guidance. Dr. Lance Garrison modified *VisSurvey* for our use. Dr. John Hildebrand and Chris Garsha were invaluable for assistance with the HARPs. Special thanks to captains Alex Loer and Matt Weingartner of Oceanworks Group, Inc. for camaraderie aboard the R/V *Volute*. We also thank Ryan McAlarney and Erin Cummings for their assistance with surveys. Surveys were conducted under NOAA Scientific Permit No. 948-1692-00, held by the University of North Carolina Wilmington, and a NOAA General Authorization 808-1798-01, 808-1798-02, and 16185 held by Duke University.

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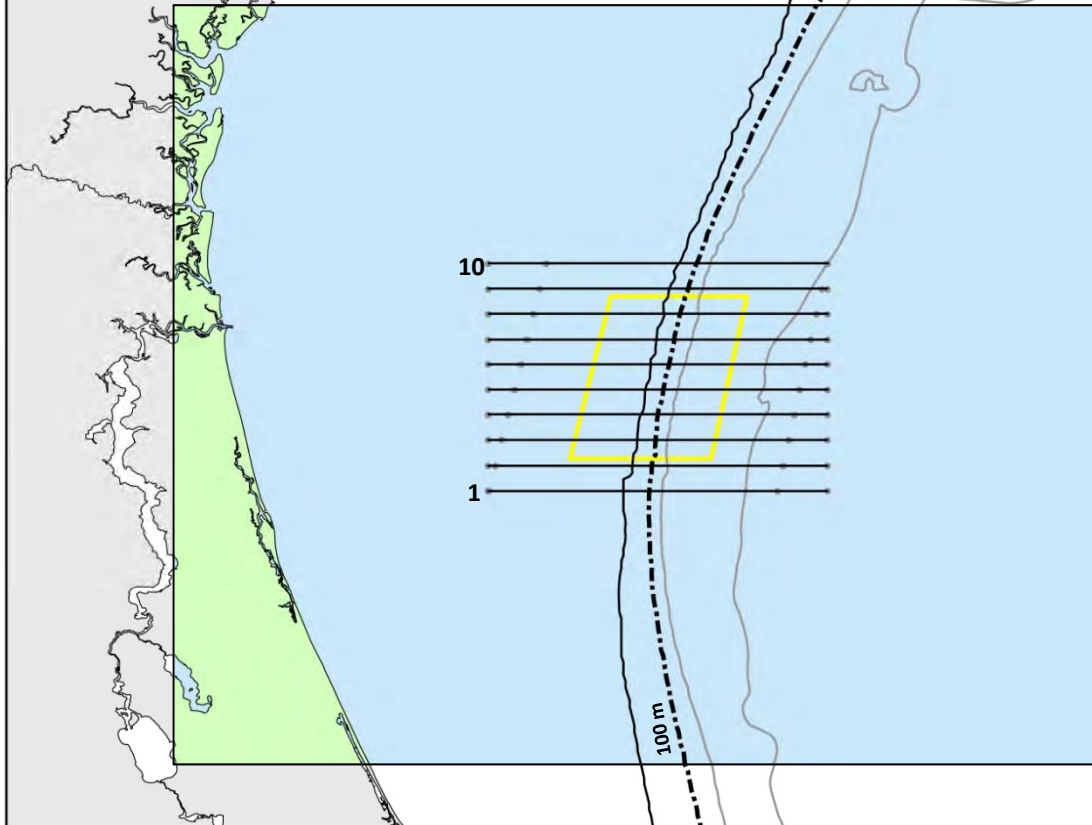
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Welch, P.D. 1967. The use of fast Fourier transform for the estimation of power spectra: A method based on time averaging over short, modified periodograms: *IEEE Transactions on Audio Electroacoustics*, AU-15, pp. 70-73.

# Jacksonville Aerial Surveys Annual Report to the US NAVY



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## Summary of JAX Aerial Surveys

This document is an annual progress report to the U.S. Department of the Navy on aerial surveys conducted in the offshore waters of Jacksonville, Florida between July 2010 and December 2011. The goal was to survey the entire site (10 tracklines) twice per calendar month. During the months of March, November and December of 2011 no surveys were conducted due to unfavorable weather conditions. At least one complete set of tracklines were flown for the remaining nine months of the current reporting period. Thus, a total of 248 tracklines (20998 km) were surveyed during the reporting period.

A total of 241 sightings of 3198 cetaceans were recorded while on effort in the study area (Table 1, Fig. 1). Seven species of cetaceans were observed including: bottlenose dolphins (*Tursiops truncatus*; 111 sightings of 928 individuals), Atlantic spotted dolphins (*Stenella frontalis*; 88 sightings of 1671 individuals), rough-toothed dolphins (*Steno bredanensis*; three sightings of 114 individuals), Risso's dolphins (*Grampus griseus*; 16 sightings of 282 individuals), short-finned pilot whales (*Globicephala macrorhynchus*; eight sightings of 173 individuals), minke whales (*Balaenoptera acutorostrata*; three sightings of five individuals), and humpback whales (*Megaptera novaeangliae*; one sighting of a single individual). There were ten sightings (23 individual dolphins) where species identity could not be established with 100 percent certainty (*i.e.* "unidentified delphinids"). On one occasion a single animal that was clearly not a delphinid was observed but not identified to species; this sighting is labeled here as an "unidentified cetacean". There was also an off effort sighting of a single North Atlantic right whale (*Eubalaena glacialis*) approximately 20 km off the coast that was made while transiting to and from the survey site. There were nine off effort cetacean sightings (*Tursiops truncatus*, n=6; *Grampus griseus*, n=2; and *Globicephala macrorhynchus*, n=1) that were observed in or near the survey site. Off effort sighting data are not included in maps, tables or density calculations. The number of cetacean sightings varied by month; the highest number of encounters occurred in December 2010 and August 2011.

A total of 1149 sea turtles were recorded during the study period. Of these turtle sightings, 906 were identified as loggerheads (*Caretta caretta*), 45 as leatherbacks (*Dermochelys coriacea*), two as Kemp's Ridley (*Lepidochelys kempii*), and 196 as "unidentified sea turtles" (Tables 11-13, Fig. 13-15). Sea turtles were observed during each month surveyed, with highest abundances observed in July 2010 and February 2011 (Fig. 16a-c).

As previously demonstrated in other aerial survey studies, sightings drop off dramatically as the Beaufort Sea State increases (e.g. Gómez de Segura *et al.* 2006, DeMaster *et al.* 2001). In the present study, as BSS increased from 0 to 3, cetacean sightings decreased from 16.53 to 6.86 per 1000 km surveyed, and sea turtle sightings decreased from 113.31 to 13.57 per 1000 km surveyed (Fig. 4b & 16b).

In addition to cetaceans and sea turtles, other pelagic marine vertebrates (e.g. multiple species of sharks, manta rays, and ocean sunfish) were observed (Tables 14-17, Fig. 17). Commercial, Navy and recreational vessels were also encountered in the survey area (Tables 18-20, Figs. 18-20).



Table 1. Total number of sightings and individuals for each species by month from July 2010 - December 2011 for the Jacksonville, Florida survey area.

	2010												Total
	July	August	September	October	November	December	July	August	September	October	November	December	
<i>Tursiops truncatus</i>	5	12	9	5	0	14	5	12	9	5	0	14	111
# of Sightings	39	74	89	41	0	142	39	74	89	41	0	142	928
# of Individuals	2	4	6	4	1	10	2	4	6	4	1	10	88
<i>Stenella frontalis</i>	40	24	104	94	58	128	40	24	104	94	58	128	1671
# of Sightings	1	0	0	1	0	0	1	0	0	1	0	0	3
# of Individuals	26	0	0	45	0	0	26	0	0	45	0	0	114
<i>Steno brenadensis</i>	0	3	1	0	0	0	0	3	1	0	0	0	16
# of Sightings	0	69	37	0	0	0	0	69	37	0	0	0	282
# of Individuals	1	1	3	1	0	0	1	1	3	1	0	0	8
<i>Globicephala macrorhynchus</i>	50	23	71	11	0	0	50	23	71	11	0	0	173
# of Sightings	0	0	0	0	0	2	0	0	0	0	0	2	3
# of Individuals	0	0	0	0	0	4	0	0	0	0	0	4	5
<i>Balaenoptera acutorostrata</i>	0	0	0	0	0	0	0	0	0	0	0	0	1
# of Sightings	0	0	0	0	0	1	0	0	0	0	0	1	8
# of Individuals	0	0	0	0	0	1	0	0	0	0	0	1	10
<i>Megaptera novaeangliae</i>	0	0	0	0	0	0	0	0	0	0	0	0	23
# of Sightings	2	1	0	1	0	3	2	1	0	1	0	3	1
# of Individuals	3	1	0	2	0	8	3	1	0	2	0	8	1
Unidentified delphinid	0	0	0	0	0	0	0	0	0	0	0	0	114
# of Sightings	11	21	19	12	1	30	11	21	19	12	1	30	16
# of Individuals	158	191	301	193	58	283	158	191	301	193	58	283	282
Total sightings													114
Total individuals													114

	2011												Total
	January	February	March	April	May	June	July	August	September	October	November	December	
<i>Tursiops truncatus</i>	8	11	7	5	1	7	7	16	7	4			111
# of Sightings	52	60	40	52	3	68	68	148	58	62			928
# of Individuals	9	10	14	7	0	4	4	7	9	1			88
<i>Stenella frontalis</i>	213	162	310	177	0	96	96	108	107	50			1671
# of Sightings	0	0	0	0	0	0	0	0	0	1			3
# of Individuals	0	0	0	0	0	0	0	0	0	43			114
<i>Steno brenadensis</i>	1	0	1	2	0	3	3	1	1	3			16
# of Sightings	8	0	8	9	0	71	71	4	45	31			282
# of Individuals	0	0	0	1	0	0	0	1	0	0			8
<i>Globicephala macrorhynchus</i>	0	0	0	5	0	0	0	13	0	0			173
# of Sightings	0	1	0	0	0	0	0	0	0	0			3
# of Individuals	0	1	0	0	0	0	0	0	0	0			5
<i>Balaenoptera acutorostrata</i>	0	0	0	0	0	0	0	0	0	0			1
# of Sightings	0	0	0	0	0	0	0	0	0	0			1
# of Individuals	0	0	0	0	0	0	0	0	0	0			1
<i>Megaptera novaeangliae</i>	0	0	0	0	0	0	0	0	0	0			10
# of Sightings	0	0	0	0	0	0	0	0	0	1			23
# of Individuals	0	0	0	0	0	0	0	2	0	1			1
Unidentified delphinid	0	0	0	0	0	0	0	1	0	0			1
# of Sightings	0	0	0	0	0	0	0	1	0	0			1
# of Individuals	18	22	0	22	15	1	15	27	17	10			241
Total sightings	273	223	0	358	243	3	241	276	210	187			3198
Total individuals													3198

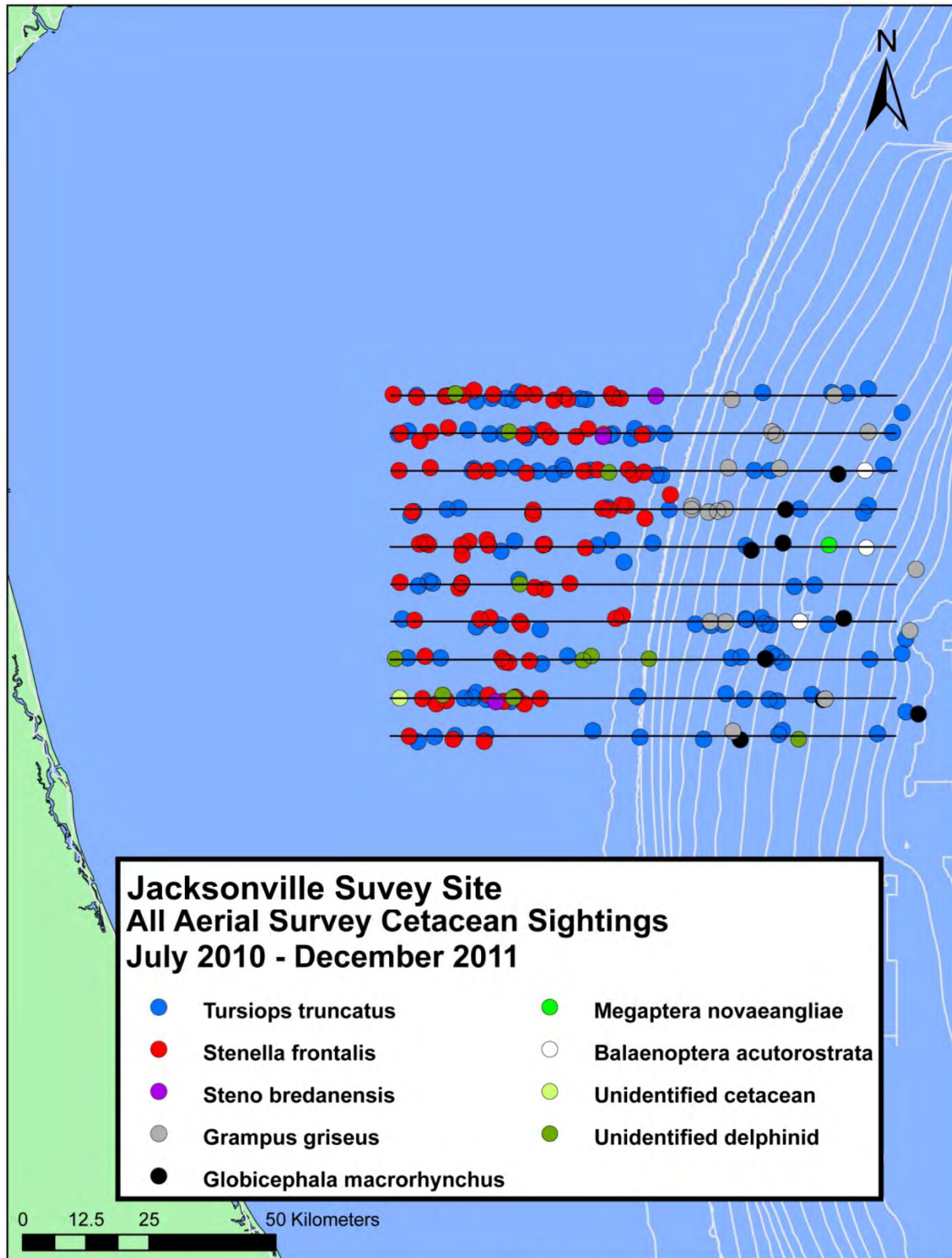


Figure 1. All cetacean sightings during aerial surveys conducted in Jacksonville, Florida from July 2010 – December 2011.

## **Methodology**

### Survey design and logistics

The Jacksonville offshore survey area consists of ten 86 km long tracklines spaced 7.4 km apart covering 5727 km<sup>2</sup>. (Table 2, Fig. 2). The site is located offshore of the primary calving grounds for the highly endangered North Atlantic right whale (*Eubalaena glacialis*), which is located off the coast of the southeastern US (reviewed in Waring *et al.* 2010). Aerial Early Warning System (EWS) surveys have been conducted in northern Florida and southern Georgia for the past 15 years to warn mariners in real time about the presence of right whales in the region. These surveys are conducted on a daily basis, weather permitting, from December through March. Aerial survey effort in the Jacksonville offshore survey area provided additional coverage, both of the surrounding geographic region and during the months preceding and following the EWS surveys.

To establish safety and communication protocols for transits through EWS areas, the offshore survey team met with researchers from the Florida Wildlife Service prior to the start of EWS surveys. The protocols outlined: coordination between survey team leaders on the morning of a survey, plane to plane communication at the start of an aerial survey and the maintenance of a 1000 m altitude for the offshore survey plane while transiting through the EWS area between December and March. The protocols also established the 9.3 km “buffer zone” between the western margin of the offshore survey area and the eastern margin of the EWS surveys.

All aerial surveys were based out of the local Fixed-base Operator (FBO) in Fernandina Beach, Florida. Prior to an aerial survey, pilots with Orion aviation would contact SeaLord at FACFASJAX in Jacksonville, Florida, to get event codes for passage out of and into U.S. territorial waters.

From July 2010 – April 2011 aerial and vessel surveys were conducted by a single team based in Fernandina Beach, FL; beginning in May 2011 vessel and aerial effort were conducted by teams based in North Carolina. Except for the geographic and logistical details described above, the JAX offshore aerial surveys mirror those carried out at the Onslow Bay site. Please see the Methods section for a complete description of survey methods in the Onslow Bay, North Carolina site.

Table 2. Coordinates for trackline endpoints of the Jacksonville, Florida survey site.

Transect Line	Western Way Point		Eastern Way Point	
	Latitude	Longitude	Latitude	Longitude
1	29.9650110	-80.7000000	29.9650110	-79.8014160
2	30.0312638	-80.7000000	30.0312638	-79.8014160
3	30.0996944	-80.7000000	30.0996944	-79.8014160
4	30.1657638	-80.7000000	30.1657638	-79.8014160
5	30.2322277	-80.7000000	30.2322277	-79.8014160
6	30.2994770	-80.7000000	30.2994770	-79.8014160
7	30.3651528	-80.7000000	30.3651528	-79.8014160
8	30.4327972	-80.7000000	30.4327972	-79.8014160
9	30.4988666	-80.7000000	30.4988666	-79.8014160
10	30.5662330	-80.7000000	30.5662330	-79.8014160

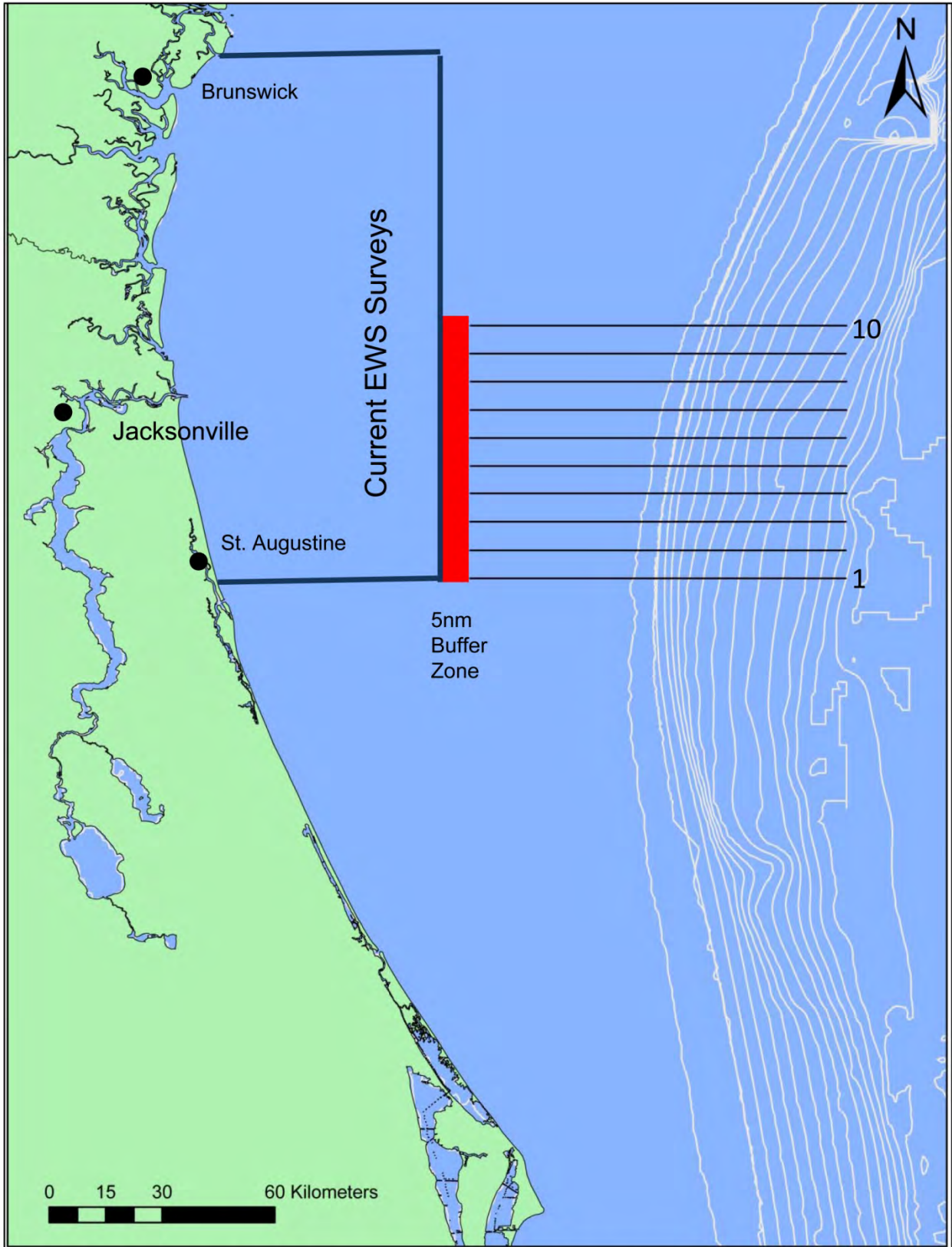


Figure 2. Tracklines 1 – 10 that compose the Jacksonville, Florida survey site.

## Results

A total of 248 tracklines comprising 20995 km were surveyed during the 18 month reporting period from July 2010 through December 2011. Minimum coverage of ten tracklines was achieved in 15 of 18 months; effort in the remaining three months was precluded by unfavorable survey conditions (Table 3). Twenty tracklines were flown during six of the 15 months surveyed, covering the full survey area twice.

An average Beaufort Sea State (BSS) value was calculated each survey month as a way to compare conditions across time. The average was calculated by taking the distance flown at each sea state multiplied by the BSS number (*i.e.* BSS 1 distances would be multiplied by 1). These values were summed and divided by the total distance flown that month. Survey effort was terminated when BSS values persisted above a 4. Survey conditions ranged from a BSS 0 to 5, with the majority of the surveys flown in a BSS 2 [BSS 0: 424 km (2%), BSS 1: 4374 km (21%), BSS 2: 8243 km (39%), BSS 3: 6264 km (30%), BSS 4: 1486 km (7%), BSS 5: 207 km (1%) (Fig. 3a-c)]. Cetacean sighting rates dropped off dramatically as BSS increased, with 16.53 sightings/1000 km surveyed in BSS 0, 20.81 sightings/1000 km surveyed in BB1, 12.13 sightings/1000 km surveyed in BSS 2, 6.86 sightings/1000 km surveyed in BSS 3, 1.35 sightings/1000 km surveyed in BSS 4 and no sightings being recorded in a BSS 5 (Fig. 4a-c).

The mean sighting distance for all cetacean sightings was 0.68 km (SD=0.36) and most sightings were made within 1.2 km of the plane (Fig.5a). The mean sighting distance varied less than 0.1 km across the BSS values recorded (Fig. 5b). Average sighting distances were calculated after removing outliers. An outlier was defined as a value in excess of three standard deviations from the mean. Three sighting distances were removed from these calculations as outliers (*i.e.* sighting distances calculated at 2.7, 2.9 and 5.6 km from the trackline).

Table 3. Tracklines and km flown during aerial surveys of the Jacksonville, Florida survey site from July 2010 to December 2011. Trackline numbers are listed in the order in which they were flown.

Date	Tracklines flown AM	Tracklines flown PM	Total km flown per day
28-Jul-2010		10 to 5	507.6
29-Jul-2010	1 to 6		513.7
3-Aug-2010		1 to 6	511.3
4-Aug-2010	10 to 5	4 to 1	849.7
5-Aug-2010	7 to 10		343.8
8-Sep-2010		1 to 4	291.7
9-Sep-2010	10 to 7	6 to 3	664.9
10-Sep-2010	10 to 5, 2,1		685.7
18-Oct-2010		1 to 4	329.9
19-Oct-2010	5 to 10	7 to 10	860.9
20-Oct-2010	10 to 7		344.4
18-Nov-10	10 to 5	4 to 1	860.1
21-Dec-10	10 to 5	4 to 3	683.1
29-Dec-10		1 to 6	513.5
30-Dec-10	10 to 7	6 to 3	675.6
15-Jan-11		10 to 5	516.2
16-Jan-11	1 to 4		344.1
31-Jan-11	10 to 5	4 to 1	836.5
22-Feb-11		1 to 4	345.5
26-Feb-11		5 to 8	337.5
27-Feb-11		1 to 4, 8 to 9	500.2
8-Apr-11	1 to 4	5 to 8	685.3
9-Apr-11	10 to 5	4 to 1	855.9
19-May-11	1 to 6		513.3
20-May-11	10 to 5	4 to 1	820.4
21-Jun-11	10 to 7	1 to 2	512.4
22-Jun-11	1 to 6		517.2
20-Jul-11	10 to 5	4 to 1	860.9
21-Jul-11	1 to 6	7 to 10	853.4
17-Aug-11	10 to 5	4 to 1	856.9
18-Aug-11	1 to 6	7 to 10	794.0
29-Sep-11	1 to 6	7 to 10	853.5
30-Sep-11		10 to 5	509.5
17-Oct-11	1 to 6	7 to 10	846.7
		Total	20995.0

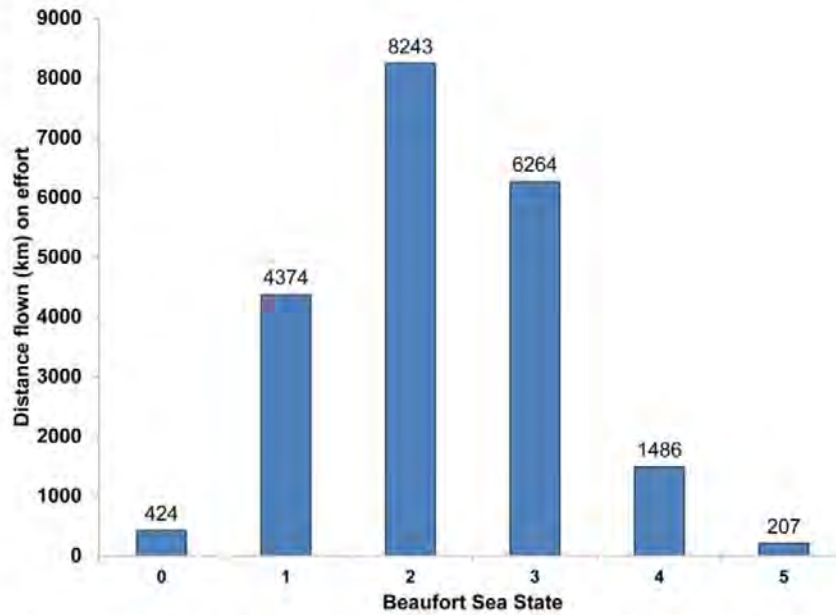


Figure 3a. Total distance surveyed per Beaufort Sea State during the July 2010 to December 2011 aerial surveys of the Jacksonville, Florida survey site.

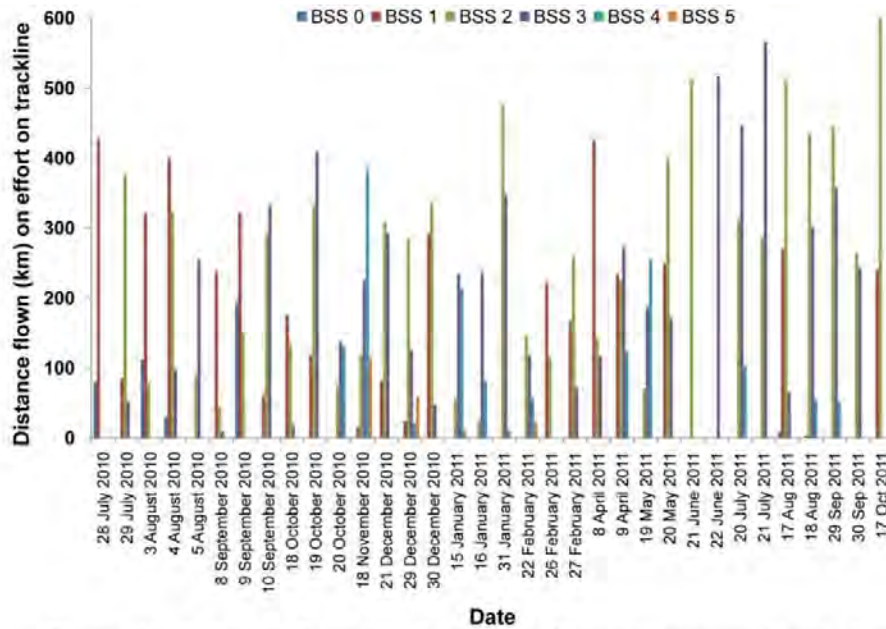


Figure 3b. Effort by Beaufort Sea State for each survey day during the July 2010 to December 2011 aerial surveys of the Jacksonville, Florida survey site.



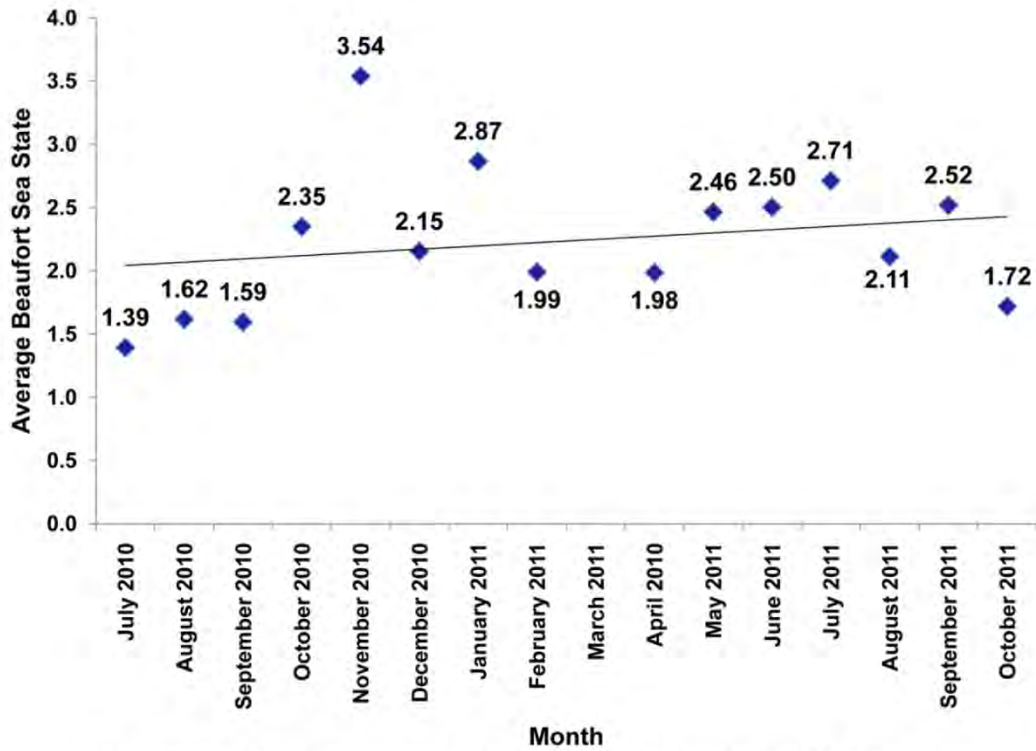


Figure 3c. Average Beaufort Sea State for each month during the July 2010 to December 2011 aerial surveys of the Jacksonville, Florida survey site. Values were calculated using the formula  $AvgBSS = \{(Distance @ BSS1 * 1) + (Distance @ BSS2 * 2) + \dots / Total\}$  distance flown that day}.

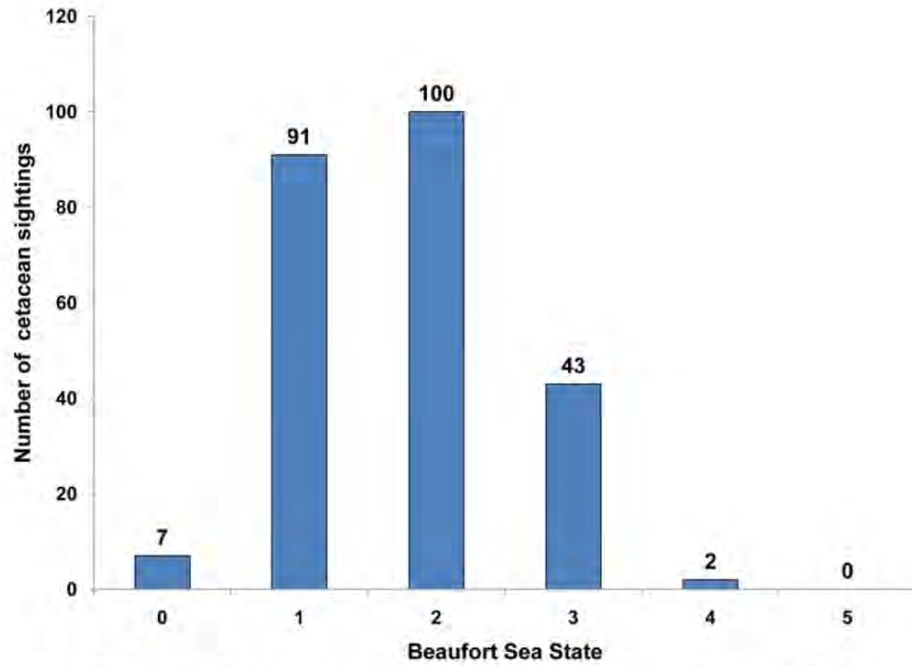


Figure 4a. Total number of cetacean sightings per Beaufort Sea State during aerial surveys conducted from July 2010 to December 2011 in the Jacksonville, Florida survey site.

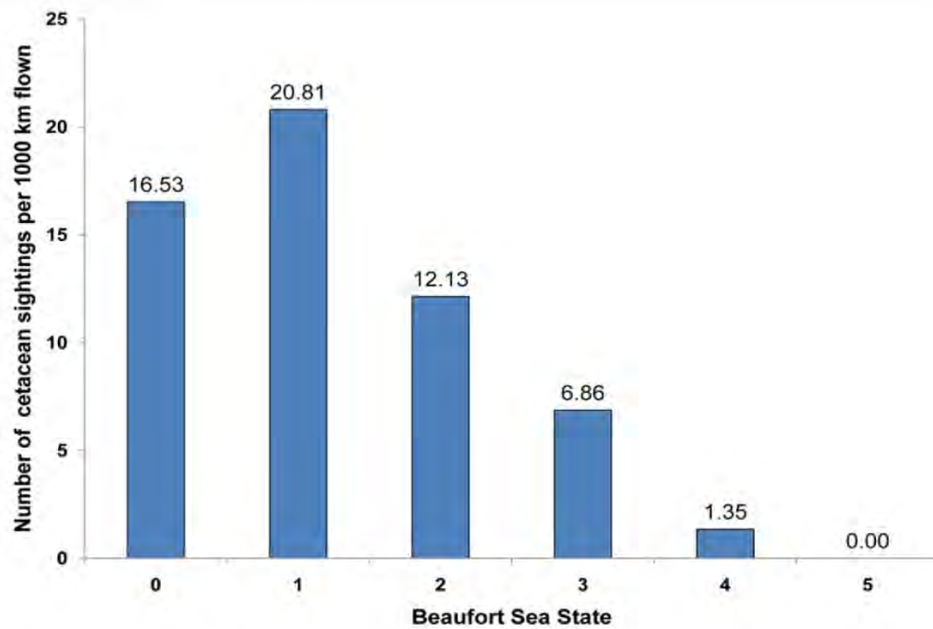


Figure 4b. Cetacean sightings per 1000 km flown by Beaufort Sea State from July 2010 to December 2011 during aerial surveys in the Jacksonville, Florida survey site.

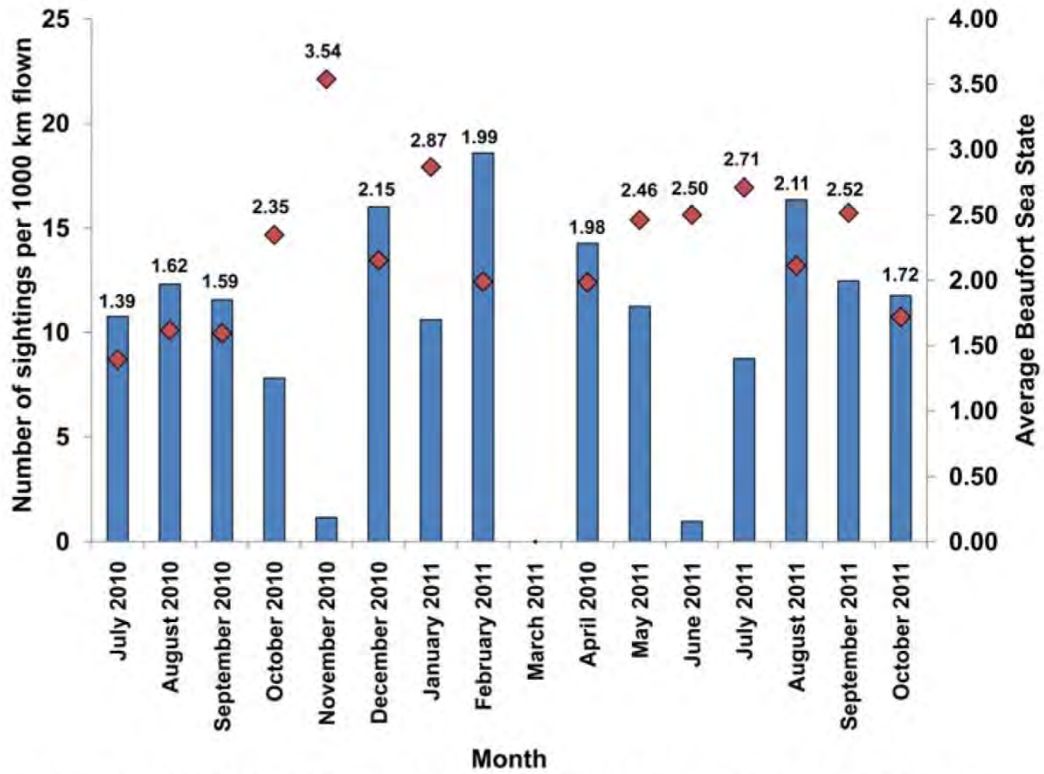


Figure 4c. Cetacean sightings per 1000 km surveyed and the average Beaufort Sea State per month from July 2010 to December 2011 during aerial surveys in the Jacksonville, Florida survey site.

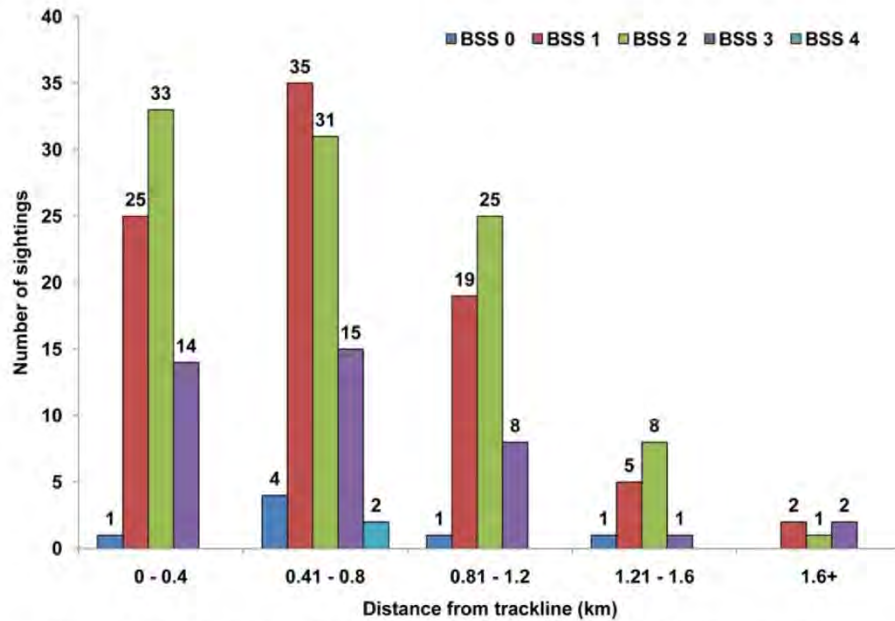


Figure 5a. Sighting distances by Beaufort Sea State for cetacean sightings from July 2010 to December 2011 during aerial surveys in the Jacksonville, Florida survey site. Three outliers (distance > 3 standard deviations) were omitted from the calculations.

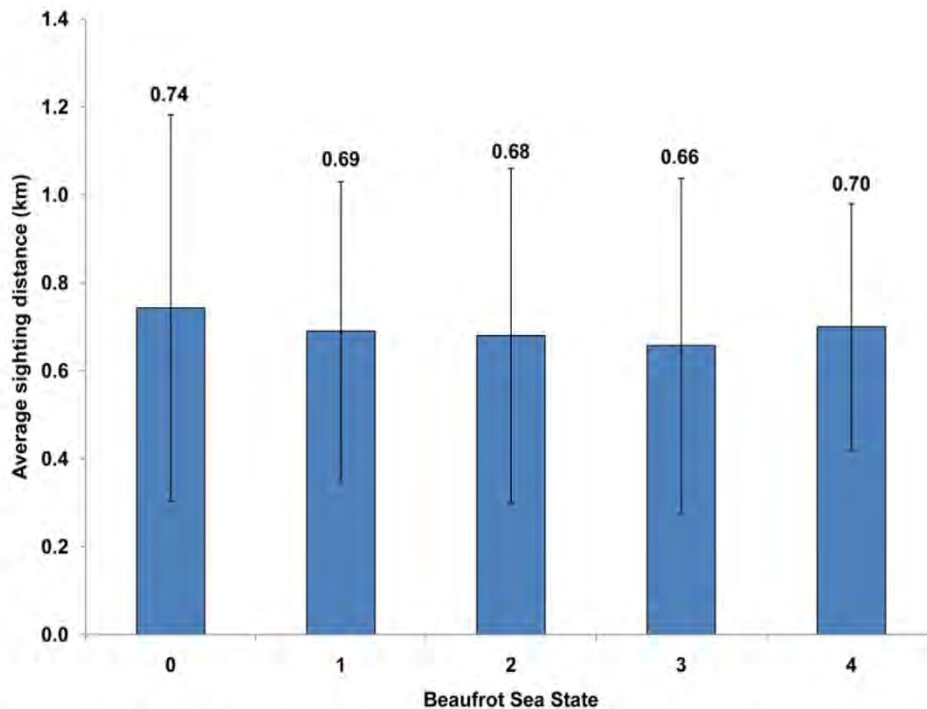


Figure 5b. Mean sighting distance by Beaufort Sea State of cetacean sightings from July 2010 to December 2011 in the Jacksonville, Florida survey site.

## Marine Mammal Sightings

A total of 241 sightings of 3198 individual cetaceans, representing seven species were observed while on effort during the reporting period. The endangered humpback whale was sighted for the first time in the study area during this reporting period. All identified species sighted are listed below in order of decreasing number of sightings (*i.e.* most commonly sighted species first). Total number of individuals is based upon the best estimate of group size. Summaries for individual sightings are in Appendix K. Daily sightings are summarized in Appendix L.

### Bottlenose dolphin (*Tursiops truncatus*) (Table 4, Fig. 6)

Bottlenose dolphins were the most frequently encountered cetaceans (111 sightings for a total of 928 individuals). Group size ranged from 1 to 43 (mean=8.36) and the most common group sizes encountered were three or four individuals (n=15 sightings). Based on the distance from shore (*e.g.* greater than 34 km), the bottlenose dolphins observed in this study are most likely of the offshore ecotype (Torres *et al.* 2003). Bottlenose dolphins were encountered throughout the study area and showed no strong spatial or group size variation across the range. (Fig. 6). This species was encountered during each month surveyed except November 2010. The current best estimate of offshore bottlenose dolphins in the Western Atlantic Ocean, between central Florida and Canada, is 81588 (CV=0.17) (NOAA Stock Assessment Report; Waring *et al.* 2008). The status of the offshore bottlenose dolphins stock in the Northwest Atlantic is unknown (Waring *et al.* 2008).

Table 4. All bottlenose dolphin (*Tursiops truncatus*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
28-Jul-10	13:03	25	30.561963	-80.362140	E	10	3	120°	4
28-Jul-10	13:41	37	30.495012	-80.321756	W	9	2	90°	4
28-Jul-10	15:09	73	30.362017	-80.658427	W	7	1	90°	7
29-Jul-10	12:04	31	30.163065	-80.034489	W	4	1	90°	17
29-Jul-10	13:04	40	30.232059	-79.946156	E	5	1	90°	7
3-Aug-10	13:50	27	30.103074	-80.669104	E	3	2	90°	9
3-Aug-10	13:58	31	30.102898	-80.611146	E	3	2	110°	8
3-Aug-10	14:19	43	30.100609	-80.031909	E	3	2	100°	4
3-Aug-10	14:43	49	30.161981	-80.109361	W	4	2	140°	14
4-Aug-10	10:21	19	30.508844	-80.265349	W	9	1	90°	3
4-Aug-10	10:30	23	30.492811	-80.456700	W	9	1	100°	2
4-Aug-10	10:53	31	30.428820	-80.410074	E	8	2	120°	2
4-Aug-10	11:00	34	30.435945	-80.390245	E	8	1	90°	3
4-Aug-10	11:46	47	30.365388	-80.204530	W	7	2	90°	12
4-Aug-10	13:10	79	30.235185	-80.625116	W	5	1	110°	5
4-Aug-10	13:20	83	30.230547	-80.650354	W	5	1	95°	5
4-Aug-10	15:03	94	30.157833	-80.547499	E	4	2	90°	7
8-Sep-10	12:54	4	29.965209	-80.584939	E	1	1	110°	3
8-Sep-10	14:45	25	30.101518	-80.033725	E	3	2	75°	6
9-Sep-10	8:49	8	30.559272	-80.481691	E	10	1	110°	6
9-Sep-10	11:45	46	30.438106	-80.552150	E	8	2	85°	6
9-Sep-10	12:36	59	30.369277	-80.314187	W	7	3	90°	20
9-Sep-10	13:10	64	30.355374	-80.663553	W	7	2	120°	6
9-Sep-10	15:24	86	30.302525	-80.331754	E	6	2	45°	8
9-Sep-10	15:41	91	30.306444	-80.233738	E	6	2	120°	9
9-Sep-10	17:27	117	30.104426	-80.076755	W	3	3	90°	25
18-Oct-10	13:02	19	30.038068	-79.950917	W	2	3	90°	8
18-Oct-10	14:14	43	30.105502	-80.013435	E	3	1	90°	8
18-Oct-10	14:20	47	30.095035	-80.001863	E	3	1	110°	8
18-Oct-10	14:46	58	30.170842	-80.066972	W	4	1	90°	4
19-Oct-10	10:55	27	30.571964	-79.888432	W	10	3	20°	13
21-Dec-10	11:28	31	30.435426	-80.344608	E	8	1	90°	12
21-Dec-10	12:17	45	30.368144	-80.578741	W	7	2	120°	2
21-Dec-10	13:13	57	30.241160	-80.471661	W	5	3	90°	3
29-Dec-10	13:06	13	29.968734	-79.834176	E	1	2	100°	7
29-Dec-10	13:43	24	30.032205	-80.553900	W	2	3	90°	12
30-Dec-10	8:55	5	30.562893	-80.519634	E	10	2	120°	4
30-Dec-10	9:38	24	30.502363	-79.807404	W	9	3	90°	9
30-Dec-10	10:18	40	30.498913	-80.451449	W	9	2	90°	2
30-Dec-10	10:31	44	30.504672	-80.668439	W	9	1	100°	2
30-Dec-10	10:56	61	30.426356	-80.227854	E	8	2	130°	1
30-Dec-10	11:01	65	30.426861	-80.217773	E	8	2	120°	13
30-Dec-10	11:29	75	30.372719	-79.850767	W	7	3	90°	15
30-Dec-10	14:09	105	30.310022	-80.479380	E	6	3	110°	43
16-Jan-11	9:20	11	29.973825	-80.340072	E	1	1	90°	20
31-Jan-11	9:57	9	30.560639	-80.351907	E	10	2	100°	2
31-Jan-11	10:44	28	30.499485	-80.305212	W	9	1	90°	1
31-Jan-11	15:06	104	30.171833	-80.068726	E	4	2	90°	1
31-Jan-11	15:40	121	30.106392	-80.384853	W	3	3	120°	4

Table 4 (continued). All bottlenose dolphin (*Tursiops truncatus*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
31-Jan-11	16:32	155	30.026680	-80.011872	E	2	2	70°	5
22-Feb-11	15:06	33	30.031494	-80.568841	W	2	2	90°	3
26-Feb-11	14:29	23	30.239116	-80.631891	W	5	2	100°	6
26-Feb-11	15:05	39	30.311289	-80.305520	E	6	2	90°	2
26-Feb-11	15:17	46	30.301623	-80.067897	E	6	1	90°	9
26-Feb-11	15:55	57	30.358155	-80.447163	W	7	2	100°	7
27-Feb-11	13:30	7	29.967210	-80.530466	E	1	1	90°	3
27-Feb-11	14:18	26	30.033213	-80.476815	W	2	2	90°	6
27-Feb-11	15:31	59	30.174200	-80.040481	W	4	3	90°	16
27-Feb-11	15:40	63	30.162715	-80.157747	W	4	3	120°	1
27-Feb-11	16:35	84	30.440695	-80.475763	E	8	2	70°	3
27-Feb-11	16:47	89	30.433840	-80.438006	E	8	3	60°	4
8-Apr-11	10:36	14	30.007336	-79.783349	W	2	2	100°	17
8-Apr-11	11:49	41	30.102726	-80.094447	E	3	1	100°	4
8-Apr-11	16:02	100	30.366095	-80.599045	E	7	1	90°	3
8-Apr-11	16:38	114	30.359322	-79.859038	E	7	2	120°	7
8-Apr-11	16:57	120	30.434931	-80.053184	W	8	2	75°	4
9-Apr-11	14:28	64	30.162229	-79.922369	E	4	1	70°	3
9-Apr-11	15:16	80	30.029456	-80.529475	E	2	3	70°	2
19-May-11	13:23	10	29.974699	-80.003449	E	1	3	90°	4
20-May-11	9:00	24	30.499995	-80.212291	W	9	2	100°	4
20-May-11	9:28	34	30.434336	-80.554982	E	8	2	100°	4
20-May-11	10:03	48	30.444134	-79.822932	E	8	2	90°	20
20-May-11	13:22	106	30.153661	-80.434027	E	4	2	90°	20
21-Jun-11	14:53	21	29.962702	-80.256426	E	1	1	90°	3
20-Jul-11	9:57	24	30.366602	-80.105149	W	7	1	90°	23
20-Jul-11	13:54	62	30.100653	-79.847793	W	3	1	90°	11
20-Jul-11	14:16	67	30.092634	-80.431332	W	3	3	120°	3
20-Jul-11	15:25	83	29.954577	-80.651344	W	1	2	90°	8
21-Jul-11	10:00	15	30.160364	-80.130149	W	4	2	110°	14
21-Jul-11	10:45	21	30.229362	-79.981972	E	5	3	100°	6
21-Jul-11	13:46	43	30.438755	-80.505104	W	8	2	90°	3
17-Aug-11	8:54	4	30.567801	-80.653477	E	10	1	90°	15
17-Aug-11	9:11	13	30.574196	-80.472735	E	10	1	90°	15
17-Aug-11	10:01	28	30.491920	-80.271451	W	9	2	90°	2
17-Aug-11	10:21	36	30.499007	-80.685826	W	9	2	45°	1
17-Aug-11	13:59	70	30.171744	-80.678577	E	4	2	90°	4
17-Aug-11	14:07	74	30.168431	-80.535960	E	4	2	90°	9
17-Aug-11	14:32	78	30.161176	-80.024868	E	4	2	60°	6
17-Aug-11	15:34	92	30.025702	-80.486462	E	2	2	60°	3
17-Aug-11	15:58	100	30.029594	-80.027030	E	2	1	45°	4
17-Aug-11	16:19	106	29.967220	-80.009970	W	1	1	90°	10
18-Aug-11	9:44	17	30.029663	-80.070879	W	2	1	90°	24
18-Aug-11	10:42	38	30.110885	-80.022385	E	3	2	100°	10
18-Aug-11	15:08	89	30.500294	-80.498198	E	9	1	90°	3
18-Aug-11	15:16	94	30.497217	-80.309981	E	9	1	90°	16
18-Aug-11	15:54	106	30.562645	-80.494513	W	10	1	100°	8
18-Aug-11	16:02	110	30.557425	-80.547583	W	10	3	100°	18
29-Sep-11	13:38	44	30.366795	-79.972312	E	7	1	90°	1

Table 4 (continued). All bottlenose dolphin (*Tursiops truncatus*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
29-Sep-11	15:04	74	30.572807	-80.038414	W	10	3	90°	15
30-Sep-11	12:40	6	30.572877	-79.915296	W	10	3	90°	16
30-Sep-11	13:20	17	30.499540	-80.523346	E	9	1	90°	10
30-Sep-11	13:30	21	30.506798	-80.562044	E	9	2	45°	8
30-Sep-11	14:51	46	30.291755	-80.503113	E	6	2	45°	1
17-Oct-11	9:48	6	29.958840	-80.143059	E	1	2	90°	15
17-Oct-11	11:43	34	30.160961	-80.504487	W	4	3	90°	4
17-Oct-11	15:11	68	30.434682	-80.024715	W	8	1	90°	3
17-Oct-11	16:09	84	30.579420	-79.850618	W	10	3	100°	40



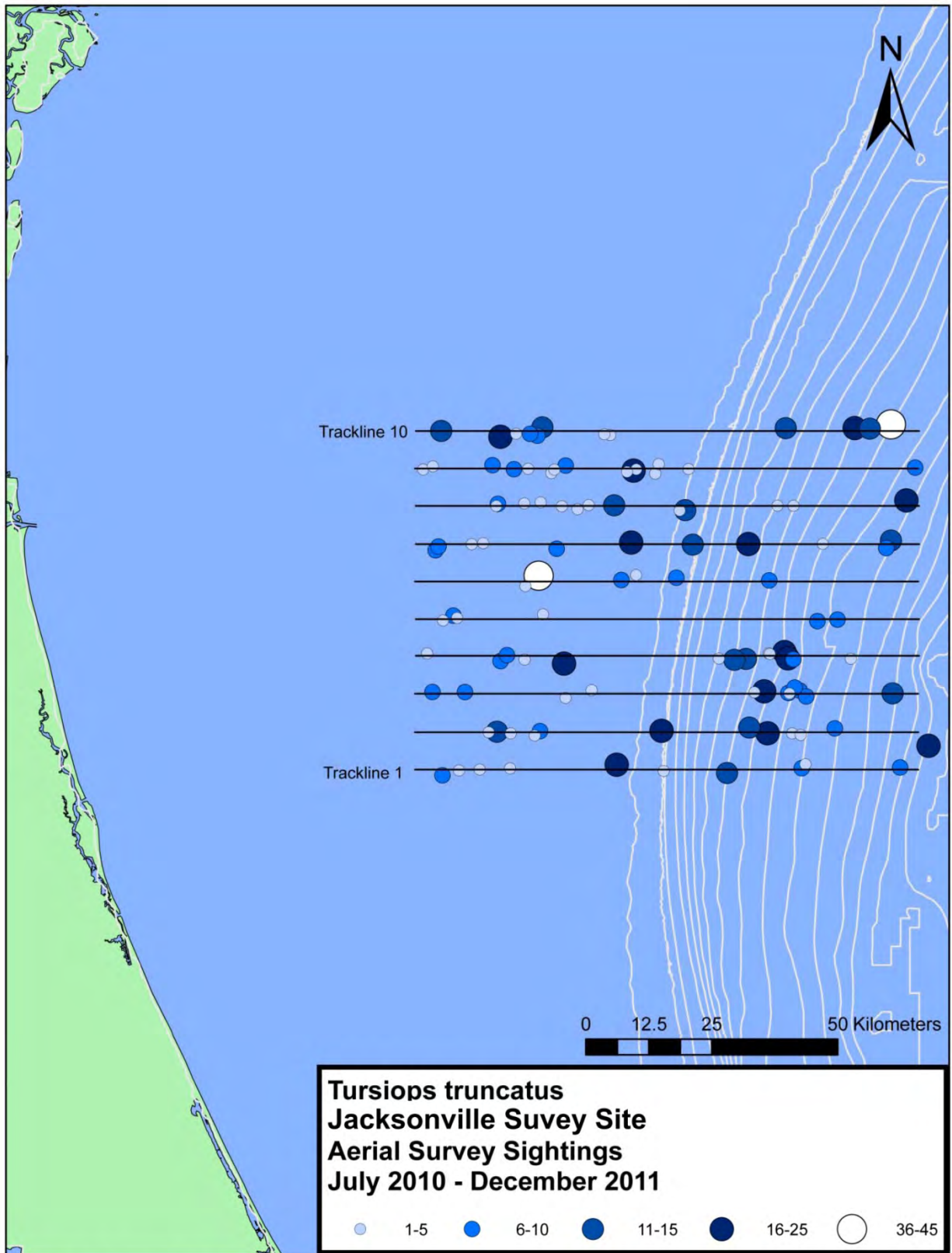


Figure 6. Bottlenose dolphin (*Tursiops truncatus*) sightings indicating group size.

Atlantic Spotted Dolphin (*Stenella frontalis*) (Table 5, Fig. 7)

The Atlantic spotted dolphin was the second most frequently sighted, and numerically most abundant, species encountered in the survey area (88 sightings for a total of 1671 individuals). Group size ranged from 1 to 75 (mean=18.98). Spotted dolphins were seen in every month surveyed except June 2011. This species was encountered exclusively in shallow water over the continental shelf (Fig. 7). There are two distinct forms, or ecotypes, of the Atlantic spotted dolphin in the western North Atlantic: a heavily spotted form that typically occurs on the continental shelf and is most often encountered around the 200 m isobath or in shallower water, and a less spotted, smaller form which occurs further offshore and around islands (Perrin *et al.* 1987, 1994). It is likely, based upon the features observed, that the spotted dolphins seen during the present study belong to the continental shelf variety. The abundance estimate for *S. frontalis* (both the inshore and the offshore forms) in the western North Atlantic is 50978 (CV=0.42); the status of the stock(s) is/are unknown (Waring *et al.* 2007).

Table 5. All Atlantic spotted dolphin (*Stenella frontalis*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
28-Jul-10	12:52	13	30.576911	-80.551686	E	10	3	90°	31
28-Jul-10	12:58	21	30.559232	-80.409551	E	10	2	90°	9
3-Aug-10	14:57	56	30.174048	-80.522888	W	4	3	45°	6
3-Aug-10	15:15	69	30.227607	-80.443721	E	5	3	90°	5
4-Aug-10	9:31	5	30.569290	-80.443675	E	10	1	90°	10
4-Aug-10	12:16	60	30.302515	-80.573540	E	6	1	90°	3
9-Sep-10	9:02	13	30.561181	-80.384668	E	10	2	75°	11
9-Sep-10	9:12	18	30.570181	-80.307318	E	10	1	90°	20
9-Sep-10	11:17	35	30.502875	-80.628567	W	9	3	90°	5
9-Sep-10	11:28	39	30.500845	-80.681718	W	9	2	60°	19
9-Sep-10	15:01	75	30.307905	-80.637999	E	6	3	110°	27
9-Sep-10	15:11	80	30.285440	-80.572777	E	6	2	130°	22
18-Oct-10	12:32	6	29.955300	-80.533353	E	1	3	100°	14
18-Oct-10	15:03	65	30.161994	-80.466740	W	4	2	120°	35
19-Oct-10	15:20	53	30.569500	-80.516943	W	10	1	30°	18
19-Oct-10	15:26	57	30.568212	-80.571374	W	10	2	90°	27
18-Nov-10	11:22	27	30.234708	-80.380993	W	5	2	75°	58
21-Dec-10	10:48	15	30.508612	-80.348717	W	9	2	120°	8
21-Dec-10	11:05	23	30.510515	-80.597130	W	9	2	90°	3
21-Dec-10	11:33	36	30.436438	-80.276994	E	8	2	110°	7
30-Dec-10	9:09	13	30.562619	-80.291194	E	10	2	130°	5
30-Dec-10	10:04	32	30.498796	-80.321313	W	9	1	90°	40
30-Dec-10	10:11	36	30.494795	-80.369824	W	9	3	90°	25
30-Dec-10	11:46	82	30.372465	-80.280112	W	7	2	90°	6
30-Dec-10	11:50	86	30.365033	-80.310898	W	7	2	90°	3
30-Dec-10	14:16	109	30.304107	-80.425841	E	6	3	90°	10
30-Dec-10	14:19	113	30.297977	-80.353320	E	6	1	90°	21
16-Jan-11	10:02	22	30.030912	-80.433461	W	2	2	120°	10
31-Jan-11	10:38	24	30.498119	-80.251884	W	9	1	90°	50
31-Jan-11	11:12	39	30.431978	-80.248953	E	8	2	90°	40
31-Jan-11	12:00	58	30.361811	-80.661452	W	7	1	90°	6
31-Jan-11	13:00	82	30.234102	-80.573657	W	5	3	90°	25
31-Jan-11	15:47	125	30.094753	-80.489454	W	3	1	110°	18
31-Jan-11	15:56	129	30.105711	-80.638341	W	3	2	90°	26
31-Jan-11	16:04	135	30.030698	-80.643081	E	2	1	90°	3
31-Jan-11	16:11	139	30.027308	-80.600764	E	2	1	90°	35
22-Feb-11	14:40	24	30.021563	-80.461713	W	2	2	90°	25
22-Feb-11	14:51	28	30.025984	-80.499021	W	2	2	140°	6
26-Feb-11	14:21	17	30.235706	-80.573331	W	5	1	95°	4
26-Feb-11	14:41	30	30.304738	-80.648357	E	6	2	100°	5
26-Feb-11	16:16	67	30.430237	-80.458247	E	8	2	90°	35
27-Feb-11	14:27	30	30.037012	-80.525749	W	2	1	110°	7
27-Feb-11	14:47	44	30.096030	-80.497417	E	3	1	45°	16
27-Feb-11	15:49	68	30.177897	-80.287122	W	4	3	140°	25
27-Feb-11	15:52	71	30.172691	-80.299677	W	4	2	90°	17
27-Feb-11	16:02	75	30.171754	-80.541038	W	4	2	90°	22
8-Apr-11	10:01	6	29.958717	-80.588615	E	1	2	110°	26
8-Apr-11	11:15	24	30.021469	-80.618234	W	2	2	100°	30
8-Apr-11	12:34	53	30.167375	-80.470162	W	4	2	60°	2

Table 5 (Continued). All Atlantic spotted dolphin (*Stenella frontalis*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
8-Apr-11	14:43	71	30.236528	-80.682972	E	5	3	110°	8
8-Apr-11	15:45	91	30.311985	-80.528641	W	6	2	90°	4
8-Apr-11	16:21	108	30.373425	-80.289226	E	7	2	45°	75
8-Apr-11	17:12	125	30.427251	-80.267361	W	8	1	130°	40
8-Apr-11	17:28	131	30.434722	-80.684533	W	8	1	90°	25
9-Apr-11	10:03	11	30.494210	-80.415287	W	9	2	90°	40
9-Apr-11	10:20	17	30.487590	-80.647595	W	9	1	70°	5
9-Apr-11	10:30	23	30.439739	-80.629138	E	8	2	80°	11
9-Apr-11	12:22	49	30.226524	-80.578210	W	5	1	90°	9
9-Apr-11	14:58	71	30.102658	-80.502276	W	3	2	120°	27
19-May-11	12:49	4	29.964261	-80.666475	E	1	1	110°	50
20-May-11	8:09	5	30.569307	-80.694923	E	10	2	120°	7
20-May-11	8:17	9	30.564627	-80.653456	E	10	1	90°	21
20-May-11	10:34	63	30.364594	-80.446151	W	7	2	90°	30
20-May-11	10:49	72	30.309490	-80.560544	E	6	3	90°	7
20-May-11	10:56	78	30.302858	-80.429018	E	6	1	90°	30
20-May-11	11:36	89	30.224460	-80.424656	W	5	4	110°	32
20-Jul-11	9:02	11	30.505652	-80.426843	W	9	2	90°	13
20-Jul-11	10:27	33	30.367646	-80.322849	W	7	1	90°	13
21-Jul-11	13:03	32	30.350203	-80.247303	E	7	3	90°	35
21-Jul-11	14:51	54	30.571109	-80.463937	W	10	2	90°	35
17-Aug-11	9:04	9	30.566900	-80.599104	E	10	1	90°	17
17-Aug-11	11:23	51	30.357457	-80.446147	W	7	2	90°	16
18-Aug-11	10:01	24	30.033624	-80.477832	W	2	2	90°	17
18-Aug-11	12:18	60	30.302488	-80.525608	W	6	2	90°	12
18-Aug-11	14:12	70	30.391684	-80.202370	E	7	3	100°	28
18-Aug-11	14:40	79	30.436006	-80.331779	W	8	1	100°	10
18-Aug-11	16:09	115	30.567225	-80.592630	W	10	2	45°	8
29-Sep-11	11:29	31	30.303628	-80.631996	W	6	1	100°	16
29-Sep-11	14:08	52	30.433527	-80.356491	W	8	1	90°	1
29-Sep-11	14:20	56	30.433188	-80.549888	W	8	2	90°	7
29-Sep-11	15:20	83	30.563689	-80.303858	W	10	2	100°	1
29-Sep-11	15:25	87	30.569054	-80.391592	W	10	2	100°	35
29-Sep-11	15:34	91	30.566402	-80.602615	W	10	2	60°	15
30-Sep-11	13:10	13	30.497738	-80.463178	E	9	1	100°	4
30-Sep-11	13:46	30	30.434095	-80.526551	E	8	1	45°	18
30-Sep-11	13:51	36	30.443182	-80.393243	E	8	3	90°	10
17-Oct-11	10:45	21	30.097670	-80.452633	E	3	2	90°	50

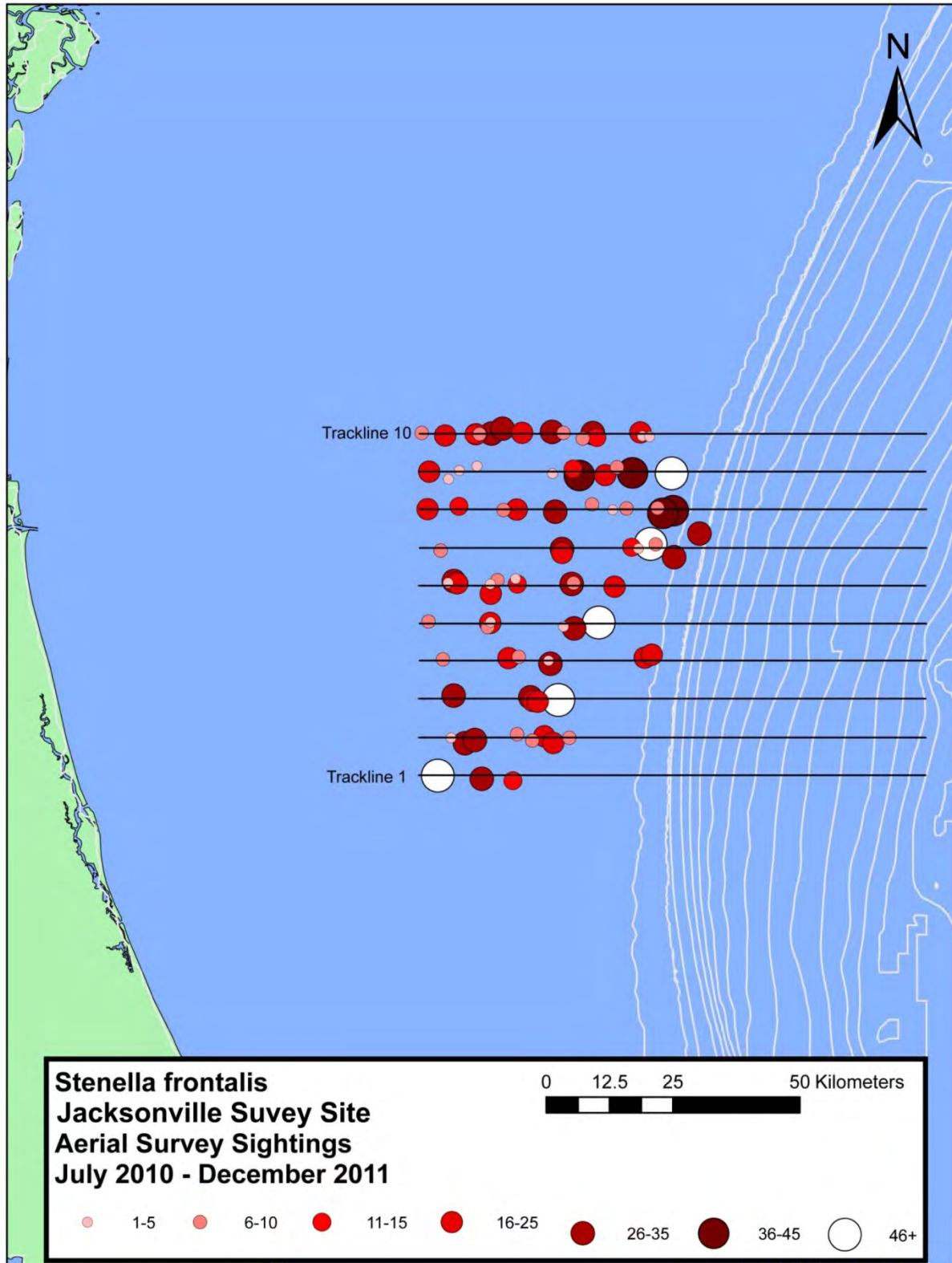


Figure 7. Atlantic spotted dolphin (*Stenella frontalis*) sightings indicating group size.

Risso's Dolphin (*Grampus griseus*) (Table 6, Fig. 8)

This species was encountered 16 times for a total of 282 individuals (Table 8). Group size in this species ranged from four to 45 individuals (mean=17.6). Risso's dolphins were recorded in eight of the 15 months surveyed, and have only been recorded in deeper, offshore waters. Risso's dolphin have been found to reside along the mid-Atlantic continental shelf edge year round, with some movement north during spring, summer and fall, and into the mid-Atlantic bight during winter (Waring *et al.* 2010). The best available estimate for Risso's dolphins, based on results from two US Atlantic surveys conducted in 2004, is 20479 (CV=0.59) (Waring *et al.* 2010). The status of this species in the western Atlantic is unknown (Waring *et al.* 2010).

*Table 6.* All Risso's dolphin (*Grampus griseus*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
4-Aug-10	10:07	14	30.503344	-80.022060	W	9	2	75°	14
4-Aug-10	16:24	112	30.029908	-79.927285	E	2	3	100°	14
5-Aug-10	10:03	9	30.438946	-80.008208	W	8	2	90°	41
8-Sep-10	15:53	35	30.166545	-80.104081	W	4	1	75°	37
31-Jan-11	10:16	18	30.568143	-79.910576	E	10	1	100°	8
8-Apr-11	12:18	49	30.167368	-80.130928	W	4	2	75°	8
20-May-11	9:49	41	30.439923	-80.099134	E	8	2	100°	5
20-May-11	14:43	124	29.973099	-80.091205	W	1	2	110°	4
20-Jul-11	9:57	24	30.366602	-80.105149	W	7	1	90°	23
20-Jul-11	10:10	28	30.371936	-80.164104	W	7	1	90°	28
21-Jul-11	13:13	36	30.361196	-80.134629	E	7	3	90°	20
17-Aug-11	9:44	22	30.503179	-79.850363	W	9	1	90°	4
29-Sep-11	15:08	78	30.560653	-80.093260	W	10	2	100°	45
17-Oct-11	14:35	58	30.365875	-80.164744	E	7	3	90°	11
17-Oct-11	14:41	62	30.362687	-80.118399	E	7	1	60°	10
17-Oct-11	15:52	79	30.497693	-80.014938	E	9	3	90°	10

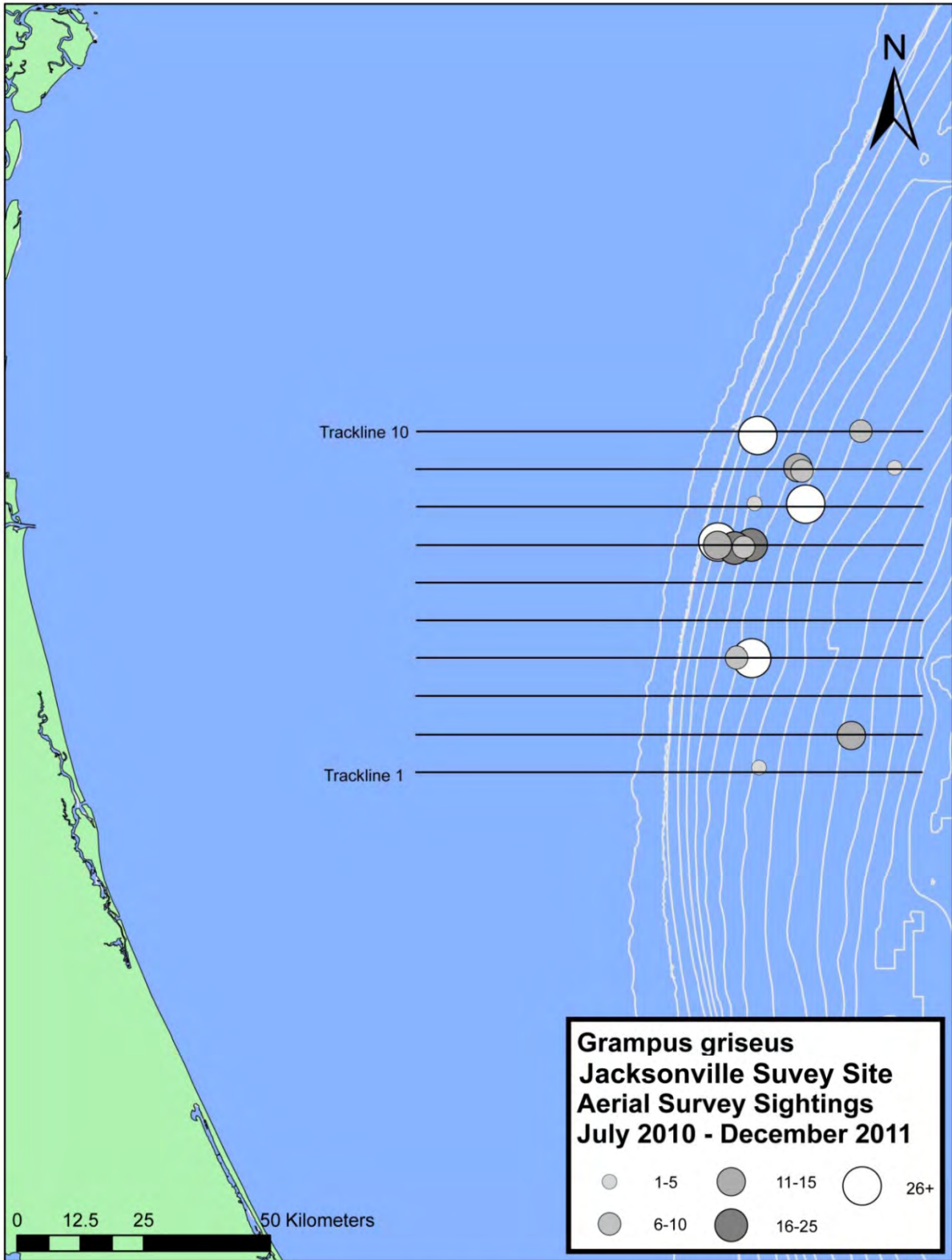


Figure 8. Risso's dolphin (*Grampus griseus*) sightings.

Short-finned Pilot Whale (*Globicephala macrorhynchus*) (Table 7, Fig. 9)

Short-finned pilot whales were encountered eight times for a total of 173 individuals. Group sizes ranged from five to 50 individuals with a mean group size of 21.6. Sightings of pilot whales in the western North Atlantic occur primarily near the continental shelf break (Waring *et al.* 2010) as is the case with our sightings (Fig. 9). Due to the difficulty of differentiating short-finned and long-finned pilot whales (*Globicephala melas*) at sea, NMFS reports stock numbers and status as *Globicephala* spp. (Waring *et al.* 2010). The abundance estimate of *Globicephala* spp. (24,674, CV=0.45) is based upon shipboard surveys along the outer continental shelf of the U.S. Atlantic between Florida and Maryland in 2004 (Waring *et al.* 2010). These estimates were combined with spatial distribution analysis as well as genetic analyses to generate the current value of 24,674. The status of short-finned pilot whales in the U.S. Atlantic is currently unknown (Waring *et al.* 2010).

*Table 7.* All short-finned pilot whale (*Globicephala macrorhynchus*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
28-Jul-10	14:30	62	30.428555	-79.904506	E	8	2	90°	50
3-Aug-10	15:46	80	30.293612	-80.058466	W	6	3	135°	23
8-Sep-10	13:21	10	29.958024	-80.078054	E	1	3	100°	20
8-Sep-10	14:45	25	30.101518	-80.033725	E	3	2	75°	30
9-Sep-10	15:55	96	30.306173	-80.002039	E	6	1	100°	21
18-Oct-10	14:36	54	30.173050	-79.894166	W	4	2	70°	11
20-May-11	10:16	54	30.365678	-79.997541	W	7	2	45°	5
18-Aug-11	9:33	12	30.028955	-79.930610	W	2	1	90°	13



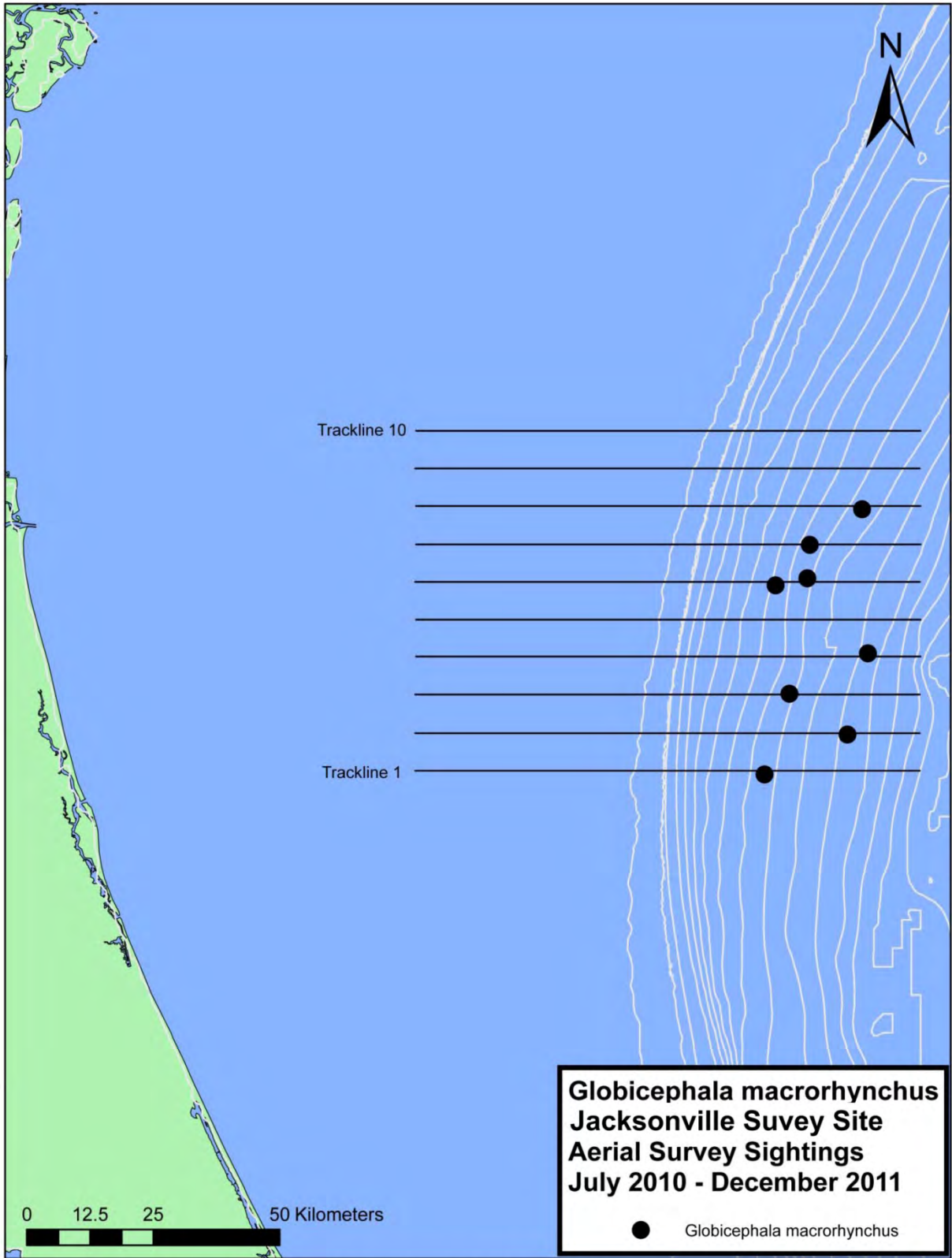


Figure 9. Short-finned pilot whale (*Globicephala macrorhynchus*) sightings.

Rough-toothed Dolphin (*Steno bredanensis*) (Table 8, Fig. 10)

A single sighting of this species occurred in three separate months (July 2010, October 2010 and October 2011) for a total of 114 individuals (Table 8). All three sightings occurred inside of the 100m isobath in the continental shelf waters (Fig. 10). This species is rarely observed off the U.S. east coast and the current best abundance estimate (n=274, CV=1.03) is based on a ship board survey conducted in waters south of Maryland in 1998. The status of rough-toothed dolphins in the western North Atlantic is currently unknown (Waring *et al.* 2008).

*Table 8.* All rough-toothed dolphin (*Steno bredanensis*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
28-Jul-10	13:41	37	30.495012	-80.321756	W	9	2	90°	23
18-Oct-10	13:28	25	30.025375	-80.512558	W	2	3	120°	45
17-Oct-11	16:20	87	30.566635	-80.227814	W	10	2	90°	43

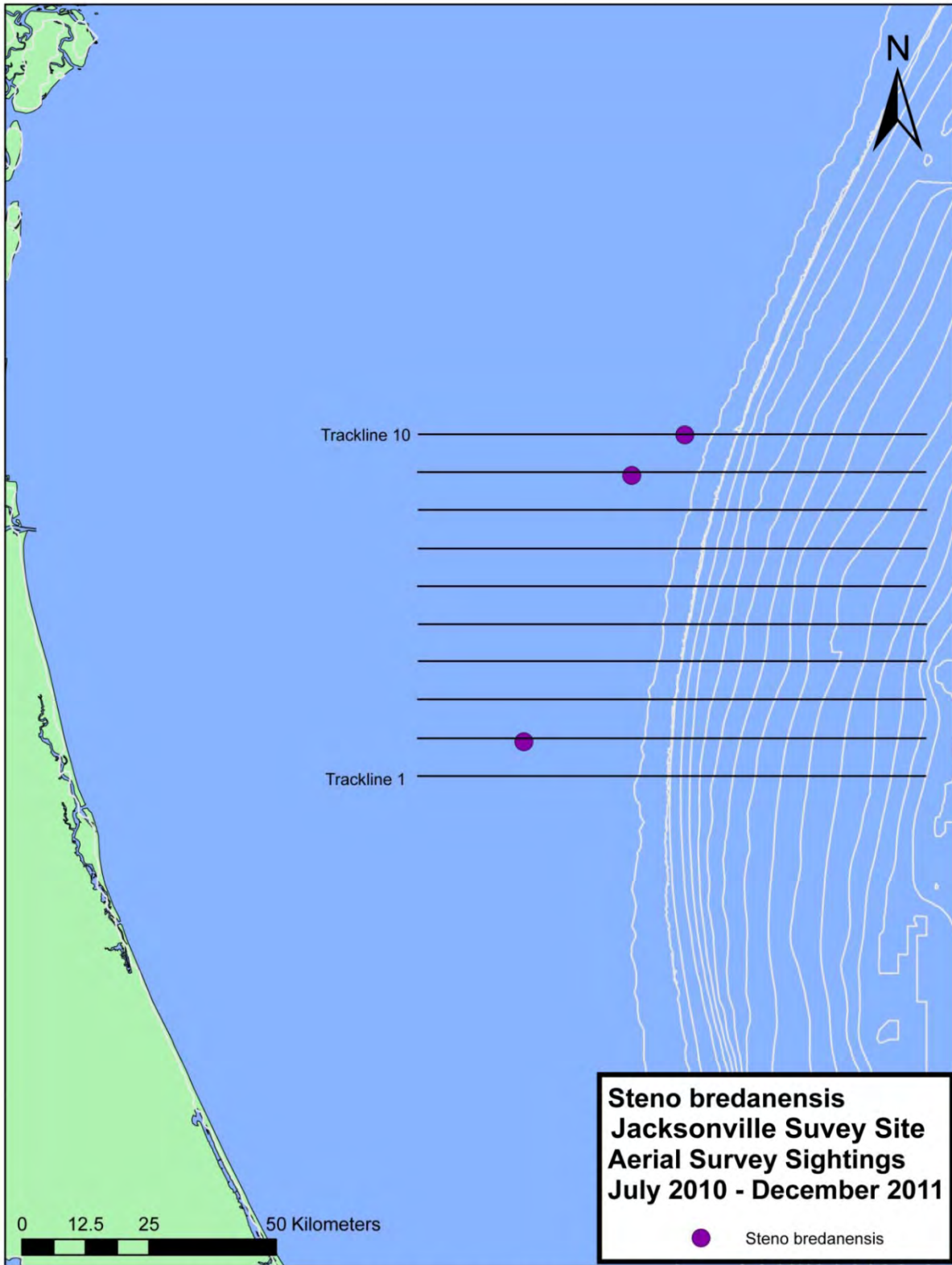


Figure 10. Rough-toothed dolphin (*Steno bredanensis*) sightings.

Minke Whale (*Balaenoptera acutorostrata*) (Table 9, Fig. 11)

Minke whales were observed three times (n=five individuals) during our current reporting period. This species was observed exclusively from December to February. Minke whales inhabiting waters off the U.S. east coast are considered part of the Canadian East Coast stock, which occurs from to the western portion of the Davis Strait (45°W) south to the Gulf of Mexico. The best available abundance estimate for this stock is 8987 (CV=0.32)(Waring *et al.* 2010).

*Table 9. All minke whale (*Balaenoptera acutorostrata*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.*

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
30-Dec-10	11:14	69	30.434864	-79.856500	E	8	2	120°	2
30-Dec-10	15:04	128	30.298252	-79.854173	E	6	3	90°	2
27-Feb-11	15:23	55	30.167562	-79.972130	W	4	1	90°	1

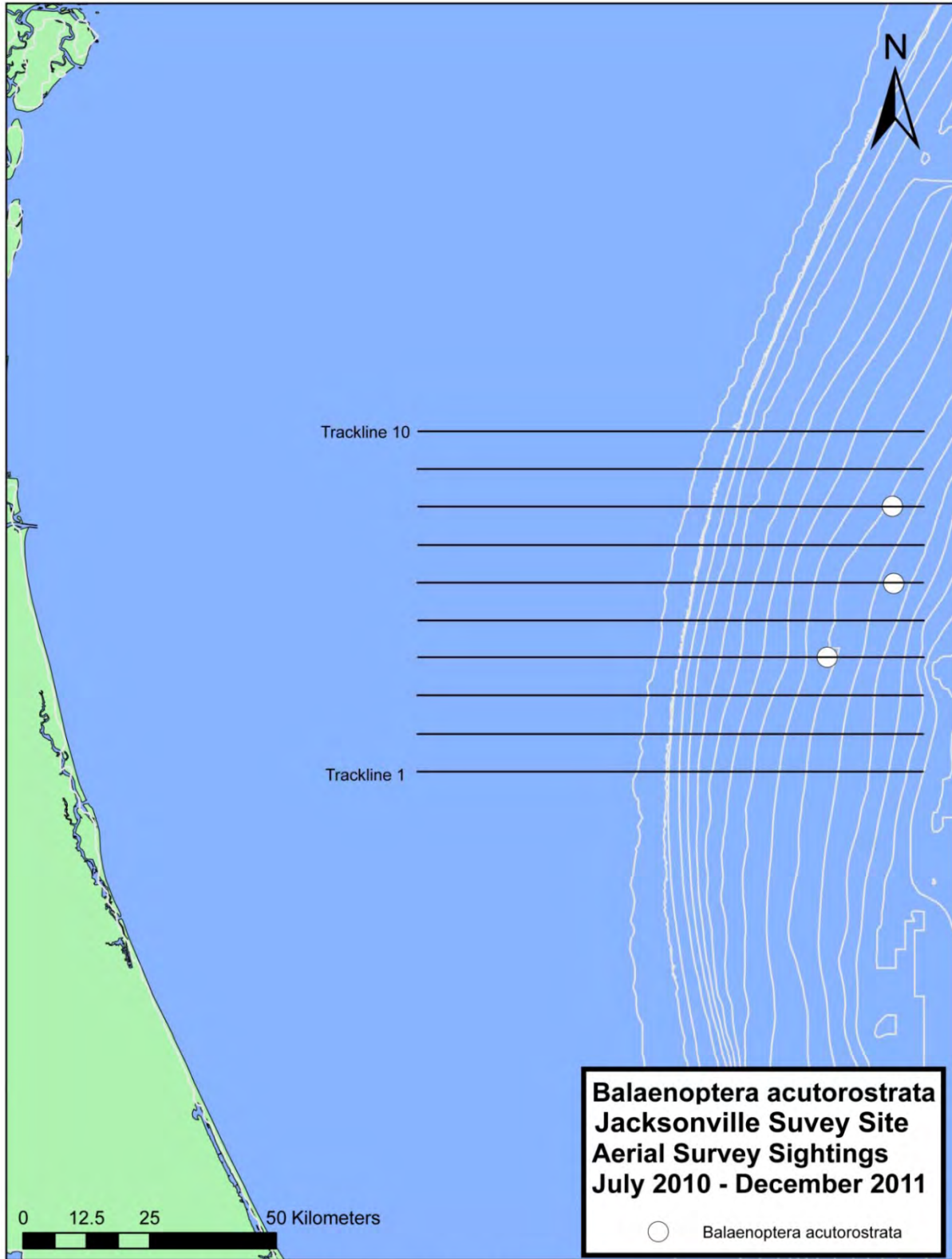


Figure 11. Minke whale (*Balaenoptera acutorostrata*) sightings.

Humpback whale (*Megaptera novaeangliae*) (Table 10, Fig. 12)

A single adult humpback whale was sighted over the continental slope, and represents the first sighting of this species in the survey area. Currently, humpback whales in the western North Atlantic are treated as a single stock despite genetic evidence identifying smaller sub stocks (Waring *et al.* 2010). Population estimates vary depending upon methods utilized, and range between 7698 (genetic tagging methods) and 11570 (photographic mark-recapture methods) (reviewed in Waring *et al.* 2010). This species is listed as endangered under the Endangered Species Act.

*Table 10.* Humpback whale (*Megaptera novaeangliae*) sighting in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
30-Dec-10	14:43	124	30.302666	-79.920360	E	6	1	90°	1

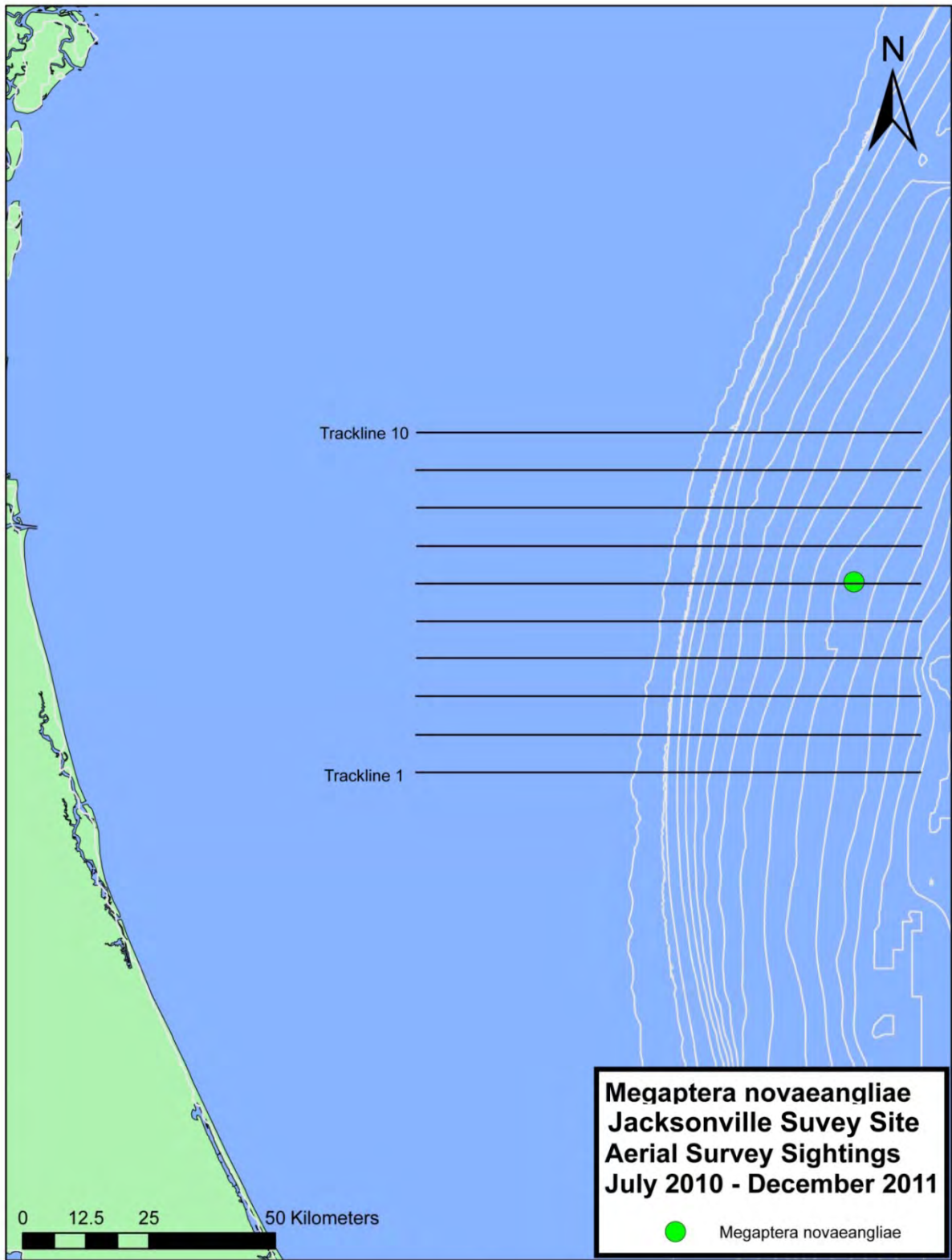


Figure 12. Humpback whale (*Megaptera novaeangliae*) sighting.

### Unidentified cetacean

The category of “unidentified cetaceans” is assigned to sightings where no positive species identification could be made but where observers could say with certainty that the animals were not small delphinids. A single sighting of one animal on the inshore end of trackline two was recorded as an unidentified cetacean during this reporting period.

### Unidentified delphinids

No photos were taken during sightings where dolphins could not be relocated after the initial sighting. The designation “unidentified delphinid” was used when a positive species identification could not be established from the images obtained. Ten groups for 23 individuals are classified as unidentified delphinids.



### Sea Turtles (Tables 11-13, Figs. 13-16c)

A total of 1149 sea turtles were observed during the reporting period. Sighting rates were negatively correlated with Beaufort Sea State, with rates declining at higher sea states (Figs. 16a-b). The low sighting rate calculated for a Beaufort Sea State 0 is due to little survey coverage in this sea state (*i.e.* 424 km or 2% of 20998 total km surveyed). Sea turtles were recorded in every month surveyed with the highest sighting rates occurring in July 2010 and February 2011 (Fig. 16c). Observation rates ranged from a low of 8.14 /1000 km flown in November 2010 to 119.45 /1000km in July 2010 (Fig. 16c). Loggerhead sea turtles (*Caretta caretta*) constituted the majority of sea turtle sightings (78.8%), followed by unidentified sea turtles, leatherback sea turtles (*Dermochelys coriacea*) (3.9%), and the Kemp's Ridley sea turtle (*Lepidochelys kempii*) (<1%). Turtles labeled as unidentified were typically either of small size, submerged, or too far away for the observers to make an accurate identification to species. Sea turtle species are listed below in decreasing number of sightings.

### Loggerhead Sea Turtle (*Caretta caretta*) (Table 11, Fig.13)

A total of 906 loggerhead sea turtles were observed. This species was observed in every month that aerial surveys were conducted. Loggerheads were predominantly recorded in the shallower waters over the continental shelf although a low number occurred beyond the shelf break (Fig. 15). For management purposes, loggerheads along the U.S. Atlantic east coast fall into the Northwest Atlantic Ocean distinct population segment (DPS), which is separated into five separate recovery units (NOAA 2011). The current best estimate for nests in the Peninsular Florida Recovery Unit (defined as loggerheads originating from nests between the Georgia/Florida border south to, but not including, the Florida keys) is 64513 annually from 1989 to 2007. Results from index nesting beach surveys show a decline in nesting (NMFS 2008). Loggerhead sea turtles are currently listed as threatened under the Endangered Species Act (NMFS 2008).

Table 11. All loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
28-Jul-10	12:45	4	30.566060	-80.638826	E	10	1	90°	1
28-Jul-10	12:46	7	30.566030	-80.632879	E	10	1	90°	1
28-Jul-10	12:46	8	30.566038	-80.617884	E	10	1	90°	1
28-Jul-10	12:46	9	30.566109	-80.599173	E	10	1	90°	1
28-Jul-10	12:46	5	30.566154	-80.598804	E	10	2	120°	1
28-Jul-10	12:47	10	30.566138	-80.585242	E	10	1	90°	1
28-Jul-10	12:47	11	30.566165	-80.566445	E	10	1	90°	1
28-Jul-10	12:47	6	30.566166	-80.581102	E	10	1	90°	1
28-Jul-10	12:54	16	30.566518	-80.520662	E	10	2	90°	4
28-Jul-10	12:55	9	30.566413	-80.476608	E	10	2	90°	1
28-Jul-10	12:57	12	30.566522	-80.437869	E	10	1	90°	1
28-Jul-10	12:58	19	30.566619	-80.411940	E	10	2	90°	4
28-Jul-10	12:58	13	30.566616	-80.417084	E	10	2	80°	1
28-Jul-10	13:08	18	30.566752	-80.304235	E	10	2	120°	1
28-Jul-10	13:12	19	30.566582	-80.128464	E	10	1	90°	1
28-Jul-10	13:47	40	30.499901	-80.385784	W	9	1	90°	3
28-Jul-10	13:48	27	30.499807	-80.420679	W	9	1	90°	1
28-Jul-10	13:49	28	30.499783	-80.467661	W	9	2	90°	1
28-Jul-10	13:57	31	30.499397	-80.523001	W	9	2	100°	1
28-Jul-10	13:58	32	30.499575	-80.538028	W	9	1	90°	1
28-Jul-10	13:59	45	30.499567	-80.594807	W	9	1	90°	2
28-Jul-10	14:00	46	30.499509	-80.615172	W	9	2	90°	1
28-Jul-10	14:00	35	30.499369	-80.635609	W	9	1	60°	1
28-Jul-10	14:01	36	30.499296	-80.655144	W	9	1	90°	1
28-Jul-10	14:05	49	30.433269	-80.678894	E	8	1	90°	1
28-Jul-10	14:06	50	30.432730	-80.653910	E	8	1	90°	1
28-Jul-10	14:06	39	30.432726	-80.651665	E	8	2	80°	1
28-Jul-10	14:08	51	30.432779	-80.590561	E	8	1	90°	1
28-Jul-10	14:08	41	30.432764	-80.587007	E	8	2	90°	1
28-Jul-10	14:08	42	30.432800	-80.572904	E	8	1	120°	1
28-Jul-10	14:09	52	30.432888	-80.553103	E	8	1	90°	2
28-Jul-10	14:09	53	30.432906	-80.537360	E	8	1	90°	3
28-Jul-10	14:14	47	30.433195	-80.447111	E	8	2	120°	1
28-Jul-10	14:19	60	30.433238	-80.284971	E	8	1	90°	1
28-Jul-10	14:59	68	30.365982	-80.445327	W	7	2	90°	2
28-Jul-10	14:59	52	30.365976	-80.427615	W	7	1	90°	1
28-Jul-10	15:00	69	30.365926	-80.496361	W	7	2	90°	2
28-Jul-10	15:00	54	30.365930	-80.466742	W	7	1	60°	1
28-Jul-10	15:01	70	30.365992	-80.519360	W	7	1	90°	1
28-Jul-10	15:03	71	30.365770	-80.582755	W	7	1	90°	2
28-Jul-10	15:05	57	30.365508	-80.652803	W	7	1	90°	1
28-Jul-10	15:17	78	30.299697	-80.664286	E	6	1	90°	1
28-Jul-10	15:17	63	30.299545	-80.660602	E	6	1	90°	1
28-Jul-10	15:19	79	30.299674	-80.593029	E	6	1	90°	1
28-Jul-10	15:19	65	30.299685	-80.601288	E	6	2	90°	2
28-Jul-10	15:19	66	30.299676	-80.579090	E	6	1	90°	2
28-Jul-10	15:21	67	30.299778	-80.510566	E	6	2	80°	1
28-Jul-10	15:22	82	30.299811	-80.496444	E	6	1	90°	1
28-Jul-10	15:46	87	30.233315	-79.825415	W	5	1	90°	1

Table 11 (Continued). All loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
28-Jul-10	16:04	91	30.231989	-80.370299	W	5	1	110°	1
28-Jul-10	16:05	92	30.233085	-80.442417	W	5	1	90°	1
28-Jul-10	16:07	93	30.233208	-80.492184	W	5	1	90°	2
28-Jul-10	16:08	94	30.232875	-80.533015	W	5	1	110°	1
28-Jul-10	16:09	82	30.232841	-80.587354	W	5	2	100°	1
28-Jul-10	16:10	95	30.232838	-80.608761	W	5	1	110°	1
28-Jul-10	16:10	83	30.232925	-80.618039	W	5	1	90°	1
28-Jul-10	16:11	84	30.232669	-80.643901	W	5	1	70°	2
29-Jul-10	10:13	4	29.965125	-80.561796	E	1	2	110°	1
29-Jul-10	10:14	3	29.965330	-80.499533	E	1	1	120°	1
29-Jul-10	10:16	4	29.965178	-80.459576	E	1	1	135°	1
29-Jul-10	10:59	10	30.038243	-80.547768	W	2	2	90°	1
29-Jul-10	11:13	16	30.031753	-80.654462	W	2	2	100°	1
29-Jul-10	11:13	17	30.031675	-80.662220	W	2	2	110°	1
29-Jul-10	11:13	13	30.031705	-80.680302	W	2	1	90°	1
29-Jul-10	11:14	18	30.031555	-80.694308	W	2	2	90°	1
29-Jul-10	11:18	21	30.099235	-80.643002	E	3	1	100°	1
29-Jul-10	11:21	23	30.099646	-80.533409	E	3	1	100°	1
29-Jul-10	11:23	24	30.099508	-80.474124	E	3	2	90°	1
29-Jul-10	12:32	25	30.166783	-80.377111	W	4	2	90°	1
29-Jul-10	12:52	37	30.232605	-80.371753	E	5	2	100°	1
29-Jul-10	13:37	35	30.300445	-80.465683	W	6	2	90°	1
29-Jul-10	13:40	36	30.300249	-80.565652	W	6	2	90°	1
3-Aug-10	12:47	4	29.964928	-80.635992	E	1	2	90°	1
3-Aug-10	12:48	5	29.964911	-80.620146	E	1	2	90°	1
3-Aug-10	12:48	6	29.965025	-80.605339	E	1	2	90°	1
3-Aug-10	12:50	5	29.965154	-80.539364	E	1	2	90°	1
3-Aug-10	12:50	7	29.965132	-80.543223	E	1	2	90°	1
3-Aug-10	12:51	6	29.965153	-80.509681	E	1	1	90°	1
3-Aug-10	12:53	7	29.965348	-80.435636	E	1	1	100°	1
3-Aug-10	12:53	8	29.965396	-80.425209	E	1	2	90°	1
3-Aug-10	12:54	8	29.965366	-80.406353	E	1	2	90°	1
3-Aug-10	13:35	15	30.032136	-80.445029	W	2	2	90°	3
3-Aug-10	13:36	16	30.032014	-80.467859	W	2	1	90°	1
3-Aug-10	13:40	19	30.032011	-80.561181	W	2	1	90°	1
3-Aug-10	13:42	20	30.031853	-80.604695	W	2	1	90°	1
3-Aug-10	13:43	22	30.031676	-80.657112	W	2	1	100°	1
3-Aug-10	13:44	22	30.031574	-80.676204	W	2	3	90°	1
3-Aug-10	13:45	23	30.032331	-80.705457	W	2	1	100°	1
3-Aug-10	14:02	35	30.099892	-80.553942	E	3	1	90°	1
3-Aug-10	14:03	36	30.099873	-80.541196	E	3	1	90°	2
3-Aug-10	14:03	29	30.099983	-80.522596	E	3	1	90°	1
3-Aug-10	14:04	38	30.099895	-80.492962	E	3	1	90°	1
3-Aug-10	14:05	40	30.100081	-80.470427	E	3	2	90°	1
3-Aug-10	14:23	34	30.101502	-80.004931	E	3	2	90°	2
3-Aug-10	14:51	41	30.166749	-80.350159	W	4	2	90°	1
3-Aug-10	14:52	42	30.166698	-80.379261	W	4	2	90°	1
3-Aug-10	14:54	53	30.166779	-80.449637	W	4	1	130°	1
3-Aug-10	14:54	54	30.166651	-80.462989	W	4	2	90°	1

Table 11 (Continued). All loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
3-Aug-10	14:54	45	30.166690	-80.462801	W	4	2	90°	1
3-Aug-10	15:01	49	30.166324	-80.616756	W	4	2	90°	2
3-Aug-10	15:02	59	30.166105	-80.646636	W	4	1	120°	1
3-Aug-10	15:02	50	30.166193	-80.638621	W	4	1	90°	1
3-Aug-10	15:03	51	30.166141	-80.672463	W	4	1	90°	1
3-Aug-10	15:07	62	30.231961	-80.666068	E	5	1	90°	1
3-Aug-10	15:09	63	30.232162	-80.612133	E	5	1	100°	1
3-Aug-10	15:09	54	30.232230	-80.601522	E	5	2	90°	1
3-Aug-10	15:11	65	30.232449	-80.539951	E	5	2	110°	1
3-Aug-10	15:11	55	30.232543	-80.515927	E	5	2	90°	1
3-Aug-10	15:12	56	30.232525	-80.481436	E	5	2	90°	1
3-Aug-10	15:13	67	30.232570	-80.446974	E	5	1	90°	1
3-Aug-10	15:19	59	30.232487	-80.420596	E	5	2	90°	2
3-Aug-10	15:20	72	30.232721	-80.383234	E	5	1	100°	1
3-Aug-10	15:20	73	30.232609	-80.364177	E	5	1	110°	1
3-Aug-10	15:56	84	30.300598	-80.368726	W	6	1	90°	1
3-Aug-10	15:56	67	30.300601	-80.364853	W	6	2	90°	1
3-Aug-10	15:57	68	30.300501	-80.399066	W	6	1	90°	1
3-Aug-10	15:59	85	30.300256	-80.458606	W	6	1	130°	1
3-Aug-10	15:59	69	30.300320	-80.457111	W	6	1	90°	2
3-Aug-10	16:02	70	30.300255	-80.556984	W	6	1	90°	1
3-Aug-10	16:03	86	30.300004	-80.594715	W	6	1	140°	1
3-Aug-10	16:03	88	30.299926	-80.617495	W	6	1	110°	2
3-Aug-10	16:03	71	30.299982	-80.597270	W	6	2	90°	1
4-Aug-10	9:24	4	30.566293	-80.617806	E	10	1	90°	1
4-Aug-10	9:24	5	30.566341	-80.606494	E	10	1	90°	1
4-Aug-10	9:25	6	30.566346	-80.584151	E	10	1	90°	1
4-Aug-10	9:26	8	30.566439	-80.537950	E	10	2	90°	1
4-Aug-10	9:27	3	30.566533	-80.497443	E	10	2	90°	1
4-Aug-10	9:39	11	30.566751	-80.324533	E	10	2	90°	1
4-Aug-10	9:42	12	30.566728	-80.210031	E	10	2	90°	1
4-Aug-10	9:43	8	30.566756	-80.165908	E	10	1	90°	1
4-Aug-10	9:46	13	30.566604	-80.065005	E	10	1	90°	1
4-Aug-10	9:47	14	30.566599	-80.020557	E	10	1	110°	1
4-Aug-10	10:12	17	30.499861	-80.105910	W	9	2	90°	1
4-Aug-10	10:25	25	30.499991	-80.351699	W	9	2	90°	1
4-Aug-10	10:37	26	30.499429	-80.592215	W	9	1	90°	1
4-Aug-10	10:45	34	30.432746	-80.653063	E	8	1	90°	2
4-Aug-10	10:47	35	30.432918	-80.571196	E	8	1	90°	2
4-Aug-10	11:40	50	30.366024	-80.082707	W	7	2	90°	1
4-Aug-10	11:53	50	30.366033	-80.374984	W	7	1	90°	1
4-Aug-10	11:59	52	30.365725	-80.567125	W	7	1	90°	1
4-Aug-10	12:00	53	30.365645	-80.612291	W	7	1	90°	1
4-Aug-10	12:00	53	30.365650	-80.608681	W	7	2	90°	2
4-Aug-10	12:01	54	30.365575	-80.640032	W	7	1	90°	1
4-Aug-10	12:06	56	30.299084	-80.686563	E	6	1	90°	1
4-Aug-10	12:21	60	30.299743	-80.465810	E	6	2	90°	1
4-Aug-10	12:23	63	30.299945	-80.413516	E	6	1	90°	1
4-Aug-10	12:25	64	30.299915	-80.346742	E	6	1	90°	1

Table 11 (Continued). All loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
4-Aug-10	12:32	67	30.300009	-80.136446	E	6	1	90°	1
4-Aug-10	13:00	71	30.233411	-80.319350	W	5	1	90°	1
4-Aug-10	13:01	72	30.233347	-80.345688	W	5	1	90°	1
4-Aug-10	13:02	73	30.233185	-80.402930	W	5	2	90°	1
4-Aug-10	13:06	75	30.232960	-80.533600	W	5	1	90°	1
4-Aug-10	13:07	76	30.232937	-80.580964	W	5	1	90°	1
4-Aug-10	13:08	77	30.232785	-80.607062	W	5	1	90°	1
4-Aug-10	13:08	74	30.232942	-80.587842	W	5	1	90°	1
4-Aug-10	14:59	92	30.165689	-80.657749	E	4	1	90°	1
4-Aug-10	15:01	85	30.165888	-80.562137	E	4	1	90°	2
4-Aug-10	15:08	97	30.166126	-80.502835	E	4	2	90°	1
4-Aug-10	15:09	88	30.166215	-80.471241	E	4	1	90°	2
4-Aug-10	15:09	89	30.166042	-80.452635	E	4	2	90°	2
4-Aug-10	15:52	94	30.100469	-80.532256	W	3	2	90°	1
4-Aug-10	15:52	95	30.100475	-80.541018	W	3	1	90°	1
4-Aug-10	15:53	96	30.100416	-80.557729	W	3	2	90°	1
4-Aug-10	15:54	97	30.100187	-80.588704	W	3	1	90°	1
4-Aug-10	15:55	98	30.099927	-80.641918	W	3	2	90°	2
4-Aug-10	16:01	107	30.031176	-80.674667	E	2	2	90°	1
4-Aug-10	16:51	107	29.965947	-80.300815	W	1	2	90°	1
4-Aug-10	17:01	108	29.965318	-80.689947	W	1	1	90°	1
5-Aug-10	10:11	12	30.433982	-80.242804	W	8	2	90°	1
8-Sep-10	12:50	4	29.966581	-80.671030	E	1	1	90°	2
8-Sep-10	12:51	5	29.966790	-80.642296	E	1	1	90°	1
8-Sep-10	12:52	6	29.967074	-80.607165	E	1	1	90°	1
8-Sep-10	14:32	21	30.102018	-80.331960	E	3	2	80°	1
8-Sep-10	16:03	40	30.164955	-80.340898	W	4	2	130°	1
8-Sep-10	16:04	33	30.164969	-80.366890	W	4	1	80°	1
8-Sep-10	16:16	42	30.165372	-80.587017	W	4	1	95°	1
9-Sep-10	8:45	4	30.567774	-80.608723	E	10	1	100°	1
9-Sep-10	8:47	6	30.567964	-80.509517	E	10	2	90°	2
9-Sep-10	9:01	11	30.568446	-80.402734	E	10	1	100°	1
9-Sep-10	9:09	16	30.566240	-80.361911	E	10	1	90°	1
9-Sep-10	9:27	10	30.568688	-80.227177	E	10	2	90°	1
9-Sep-10	11:12	23	30.498087	-80.523951	W	9	1	90°	1
9-Sep-10	11:14	33	30.498059	-80.592615	W	9	1	95°	1
9-Sep-10	11:15	25	30.498009	-80.607319	W	9	1	90°	1
9-Sep-10	11:24	29	30.497680	-80.672133	W	9	2	90°	2
9-Sep-10	11:59	38	30.434925	-80.355234	E	8	2	90°	1
9-Sep-10	12:01	52	30.434946	-80.286350	E	8	1	95°	1
9-Sep-10	12:03	53	30.434920	-80.213088	E	8	1	100°	1
9-Sep-10	14:58	73	30.300709	-80.681341	E	6	1	85°	1
9-Sep-10	15:19	83	30.301703	-80.465099	E	6	1	100°	1
9-Sep-10	15:22	84	30.301891	-80.348374	E	6	2	85°	1
9-Sep-10	15:22	60	30.301870	-80.352869	E	6	2	90°	1
9-Sep-10	15:38	89	30.301985	-80.273748	E	6	1	80°	1
9-Sep-10	16:22	70	30.231550	-80.213982	W	5	2	90°	2
9-Sep-10	16:26	71	30.231669	-80.376513	W	5	1	90°	1
9-Sep-10	16:29	103	30.231546	-80.460335	W	5	1	85°	1

Table 11 (Continued). All loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude - 1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
9-Sep-10	16:35	74	30.231050	-80.686910	W	5	2	90°	2
9-Sep-10	16:41	108	30.167460	-80.596540	E	4	1	95°	1
9-Sep-10	16:43	78	30.167565	-80.504839	E	4	2	90°	2
10-Sep-10	10:26	12	30.364501	-80.439790	W	7	1	110°	1
10-Sep-10	11:27	21	30.231314	-80.553265	W	5	2	90°	1
10-Sep-10	11:27	22	30.231104	-80.578754	W	5	1	90°	1
10-Sep-10	11:38	26	30.033054	-80.640607	E	2	2	90°	2
10-Sep-10	11:40	27	30.033152	-80.547176	E	2	2	90°	1
18-Oct-10	12:36	9	29.964705	-80.418051	E	1	3	110°	1
18-Oct-10	12:37	5	29.965844	-80.381552	E	1	2	90°	1
18-Oct-10	12:38	6	29.966641	-80.360920	E	1	2	90°	1
18-Oct-10	12:39	11	29.967298	-80.318366	E	1	1	70°	1
18-Oct-10	12:40	12	29.967562	-80.283966	E	1	1	90°	1
18-Oct-10	13:35	29	30.032742	-80.659987	W	2	1	90°	1
18-Oct-10	14:10	40	30.100878	-80.106061	E	3	1	90°	1
18-Oct-10	14:42	35	30.166818	-79.981493	W	4	2	90°	1
18-Oct-10	15:11	45	30.166539	-80.587807	W	4	2	90°	1
18-Oct-10	15:13	46	30.166630	-80.652268	W	4	1	90°	1
19-Oct-10	9:23	8	30.300029	-80.575962	W	6	2	120°	1
19-Oct-10	13:33	37	30.367191	-80.549040	E	7	1	90°	1
19-Oct-10	14:33	46	30.492166	-80.528082	E	9	2	90°	1
19-Oct-10	15:17	43	30.567072	-80.460372	W	10	2	45°	1
19-Oct-10	15:18	44	30.566953	-80.484509	W	10	1	90°	1
18-Nov-10	8:47	2	30.566017	-80.663696	E	10	1	90°	1
18-Nov-10	8:54	4	30.566650	-80.383205	E	10	2	90°	1
18-Nov-10	9:31	12	30.499912	-80.416049	W	9	2	90°	1
18-Nov-10	9:59	15	30.433001	-80.040357	E	8	1	90°	1
18-Nov-10	10:25	21	30.366467	-80.374825	W	7	2	90°	1
18-Nov-10	10:28	22	30.365960	-80.474296	W	7	3	90°	1
18-Nov-10	10:29	23	30.365933	-80.503937	W	7	2	90°	1
21-Dec-10	10:13	9	30.566615	-80.419618	E	10	2	90°	1
21-Dec-10	10:19	11	30.566655	-80.162673	E	10	1	90°	1
21-Dec-10	10:44	15	30.500082	-80.273992	W	9	2	100°	1
21-Dec-10	10:58	21	30.499508	-80.376568	W	9	2	90°	1
21-Dec-10	11:01	22	30.499440	-80.479355	W	9	1	90°	1
21-Dec-10	11:02	18	30.499097	-80.522188	W	9	2	90°	1
21-Dec-10	11:02	23	30.499495	-80.533364	W	9	2	100°	1
21-Dec-10	11:03	19	30.500007	-80.570782	W	9	2	90°	1
21-Dec-10	11:14	29	30.499482	-80.650043	W	9	1	90°	1
21-Dec-10	11:25	29	30.433188	-80.437960	E	8	2	90°	1
21-Dec-10	11:32	34	30.433169	-80.300485	E	8	2	90°	1
21-Dec-10	12:09	42	30.366295	-80.334287	W	7	2	80°	1
21-Dec-10	12:10	40	30.365846	-80.381900	W	7	1	90°	1
21-Dec-10	12:12	42	30.366265	-80.456993	W	7	1	90°	1
21-Dec-10	12:34	51	30.299203	-80.509580	E	6	1	90°	1
21-Dec-10	12:38	52	30.299098	-80.358631	E	6	1	90°	1
21-Dec-10	12:40	53	30.299540	-80.279930	E	6	1	90°	1
21-Dec-10	13:07	51	30.232879	-80.307462	W	5	2	110°	1
21-Dec-10	15:41	62	30.100790	-80.278333	W	3	1	90°	1

Table 11 (Continued). All loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
29-Dec-10	12:36	5	29.966836	-80.407213	E	1	3	90°	1
29-Dec-10	12:37	6	29.964841	-80.383397	E	1	2	90°	1
29-Dec-10	13:35	14	30.031841	-80.323731	W	2	3	90°	1
29-Dec-10	13:40	15	30.031792	-80.488313	W	2	2	90°	1
29-Dec-10	13:54	19	30.029794	-80.673515	W	2	1	90°	1
29-Dec-10	14:03	30	30.099961	-80.508531	E	3	3	120°	1
29-Dec-10	14:03	31	30.098953	-80.494248	E	3	1	130°	1
29-Dec-10	14:05	32	30.098477	-80.419212	E	3	1	90°	1
29-Dec-10	14:59	42	30.230968	-80.648902	E	5	1	130°	1
29-Dec-10	15:05	44	30.231583	-80.446258	E	5	1	90°	1
29-Dec-10	15:53	35	30.301315	-80.632418	W	6	1	90°	1
30-Dec-10	9:05	10	30.566504	-80.358845	E	10	1	90°	1
30-Dec-10	9:24	17	30.567033	-80.147850	E	10	1	90°	3
30-Dec-10	9:58	17	30.500009	-80.167716	W	9	2	90°	1
30-Dec-10	9:59	19	30.499799	-80.195258	W	9	1	90°	1
30-Dec-10	10:00	20	30.500455	-80.227556	W	9	1	70°	1
30-Dec-10	10:25	28	30.499953	-80.504669	W	9	1	90°	1
30-Dec-10	10:27	29	30.499651	-80.582232	W	9	2	60°	1
30-Dec-10	10:29	30	30.499455	-80.650346	W	9	1	90°	1
30-Dec-10	10:41	50	30.432833	-80.588273	E	8	1	90°	1
30-Dec-10	10:42	51	30.432938	-80.553769	E	8	1	90°	1
30-Dec-10	10:55	41	30.433294	-80.262975	E	8	2	110°	1
30-Dec-10	11:43	53	30.366392	-80.220094	W	7	1	100°	1
30-Dec-10	11:45	56	30.366477	-80.266340	W	7	2	130°	1
30-Dec-10	11:53	62	30.366179	-80.362848	W	7	2	100°	1
30-Dec-10	12:04	67	30.366342	-80.549808	W	7	1	90°	1
30-Dec-10	12:04	68	30.366108	-80.566493	W	7	2	100°	1
30-Dec-10	12:05	69	30.366054	-80.604936	W	7	1	90°	1
30-Dec-10	15:54	142	30.165966	-80.397294	E	4	1	90°	1
15-Jan-11	12:43	14	30.498677	-80.589508	W	9	1	90°	1
15-Jan-11	12:51	17	30.429464	-80.624916	E	8	2	75°	1
15-Jan-11	12:54	19	30.434580	-80.503338	E	8	1	90°	1
15-Jan-11	13:39	26	30.364705	-80.624028	W	7	3	110°	1
15-Jan-11	13:50	29	30.300718	-80.505796	E	6	1	90°	1
15-Jan-11	13:57	32	30.301304	-80.235411	E	6	1	90°	1
15-Jan-11	14:31	37	30.231968	-80.447529	W	5	1	110°	1
16-Jan-11	9:09	6	29.965874	-80.629504	E	1	1	90°	1
16-Jan-11	10:08	15	30.030654	-80.495997	W	2	2	120°	1
16-Jan-11	10:10	16	30.030465	-80.564686	W	2	1	90°	2
16-Jan-11	10:11	25	30.030581	-80.585095	W	2	1	90°	1
31-Jan-11	10:04	8	30.567617	-80.275119	E	10	2	90°	1
31-Jan-11	10:07	10	30.567475	-80.161273	E	10	2	130°	1
31-Jan-11	10:08	15	30.567605	-80.137428	E	10	1	90°	1
31-Jan-11	10:45	31	30.500076	-80.332382	W	9	2	90°	1
31-Jan-11	10:48	25	30.498798	-80.477174	W	9	1	90°	1
31-Jan-11	10:52	26	30.498452	-80.608619	W	9	1	70°	1
31-Jan-11	11:04	35	30.434179	-80.465965	E	8	2	90°	1
31-Jan-11	11:09	37	30.434416	-80.281121	E	8	2	90°	1
31-Jan-11	12:09	48	30.300565	-80.600835	E	6	2	75°	1

Table 11 (Continued). All loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
31-Jan-11	12:18	52	30.300959	-80.279119	E	6	1	90°	1
31-Jan-11	12:19	71	30.300927	-80.230412	E	6	2	90°	1
31-Jan-11	12:52	62	30.231885	-80.375229	W	5	1	90°	1
31-Jan-11	12:55	80	30.231586	-80.489020	W	5	2	90°	1
31-Jan-11	12:56	64	30.231659	-80.517978	W	5	2	90°	1
31-Jan-11	13:03	85	30.231226	-80.657225	W	5	2	90°	3
31-Jan-11	13:03	68	30.231268	-80.660506	W	5	2	90°	1
31-Jan-11	14:48	90	30.166430	-80.675526	E	4	1	90°	1
31-Jan-11	14:48	91	30.166428	-80.658743	E	4	2	90°	2
31-Jan-11	14:49	92	30.166457	-80.637597	E	4	3	90°	1
31-Jan-11	14:51	93	30.167293	-80.550326	E	4	2	90°	2
31-Jan-11	14:52	74	30.167572	-80.509541	E	4	1	90°	1
31-Jan-11	14:53	94	30.167586	-80.487293	E	4	2	90°	3
31-Jan-11	14:56	96	30.167359	-80.354739	E	4	2	90°	1
31-Jan-11	15:00	100	30.167274	-80.229883	E	4	2	90°	1
31-Jan-11	15:36	117	30.102364	-80.297123	W	3	1	90°	3
31-Jan-11	15:37	119	30.099545	-80.357763	W	3	1	90°	2
31-Jan-11	15:37	94	30.099564	-80.355657	W	3	1	90°	1
31-Jan-11	15:43	97	30.099876	-80.428187	W	3	2	90°	1
31-Jan-11	15:50	102	30.099224	-80.585887	W	3	1	90°	1
22-Feb-11	13:09	8	30.497871	-80.366356	W	9	1	90°	1
22-Feb-11	13:44	10	29.966818	-80.660606	E	1	1	90°	1
22-Feb-11	13:45	12	29.967308	-80.626261	E	1	2	90°	2
22-Feb-11	13:46	13	29.966994	-80.566500	E	1	2	90°	3
22-Feb-11	14:30	26	30.035297	-80.326647	W	2	1	95°	1
22-Feb-11	14:58	31	30.032073	-80.535932	W	2	1	90°	1
22-Feb-11	15:12	36	30.031150	-80.591389	W	2	1	90°	1
22-Feb-11	15:25	38	30.101537	-80.474860	E	3	1	80°	1
22-Feb-11	16:11	46	30.165337	-80.516026	W	4	1	90°	1
26-Feb-11	13:29	6	30.567788	-80.232145	E	10	1	75°	1
26-Feb-11	14:12	12	30.231829	-80.313792	W	5	1	95°	1
26-Feb-11	14:17	13	30.231852	-80.495478	W	5	1	90°	1
26-Feb-11	14:17	14	30.231898	-80.501625	W	5	1	100°	1
26-Feb-11	14:27	21	30.235487	-80.621822	W	5	1	90°	1
26-Feb-11	14:52	34	30.301322	-80.575981	E	6	1	90°	1
26-Feb-11	14:52	24	30.300654	-80.420155	E	6	1	75°	1
26-Feb-11	14:56	25	30.301641	-80.429819	E	6	1	60°	1
26-Feb-11	14:57	37	30.301615	-80.420155	E	6	1	90°	1
26-Feb-11	15:11	42	30.301793	-80.254187	E	6	2	90°	1
26-Feb-11	15:51	36	30.366117	-80.363477	W	7	2	80°	1
26-Feb-11	15:59	39	30.366209	-80.479756	W	7	1	75°	1
26-Feb-11	16:04	42	30.365467	-80.683258	W	7	1	90°	1
26-Feb-11	16:13	64	30.434617	-80.504245	E	8	1	100°	1
26-Feb-11	16:23	49	30.434936	-80.300403	E	8	1	95°	1
27-Feb-11	13:27	5	29.966347	-80.574907	E	1	2	90°	1
27-Feb-11	13:27	5	29.966375	-80.563818	E	1	2	90°	2
27-Feb-11	13:37	8	29.965274	-80.495560	E	1	2	90°	2
27-Feb-11	13:38	9	29.966494	-80.452263	E	1	1	90°	2
27-Feb-11	13:38	10	29.966401	-80.463228	E	1	2	90°	4



Table 11 (Continued). All loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
27-Feb-11	13:40	11	29.966561	-80.384777	E	1 2	110°	3	
27-Feb-11	13:41	12	29.966590	-80.350686	E	1 2	110°	5	
27-Feb-11	13:42	11	29.966507	-80.317926	E	1 2	90°	2	
27-Feb-11	13:42	13	29.966566	-80.298922	E	1 2	110°	3	
27-Feb-11	13:43	13	29.966479	-80.266772	E	1 2	90°	2	
27-Feb-11	13:49	15	29.966408	-80.052856	E	1 1	90°	1	
27-Feb-11	14:08	20	30.031455	-80.157431	W	2 1	90°	2	
27-Feb-11	14:11	23	30.031410	-80.246792	W	2 1	90°	2	
27-Feb-11	14:12	24	30.031295	-80.307353	W	2 1	90°	2	
27-Feb-11	14:12	21	30.031319	-80.289172	W	2 1	75°	2	
27-Feb-11	14:13	26	30.031327	-80.347275	W	2 1	90°	1	
27-Feb-11	14:13	22	30.031198	-80.332198	W	2 1	75°	1	
27-Feb-11	14:15	27	30.031353	-80.402040	W	2 1	90°	2	
27-Feb-11	14:15	23	30.031259	-80.418648	W	2 2	85°	2	
27-Feb-11	14:34	35	30.033009	-80.573731	W	2 1	90°	1	
27-Feb-11	14:36	38	30.030550	-80.645545	W	2 2	90°	4	
27-Feb-11	14:42	39	30.100403	-80.679259	E	3 2	90°	2	
27-Feb-11	14:42	41	30.100199	-80.673186	E	3 2	90°	8	
27-Feb-11	14:43	40	30.100683	-80.642881	E	3 1	90°	1	
27-Feb-11	14:46	42	30.100919	-80.521558	E	3 2	75°	2	
27-Feb-11	14:51	43	30.101108	-80.422833	E	3 2	90°	1	
27-Feb-11	15:00	46	30.101363	-80.288381	E	3 2	90°	3	
27-Feb-11	15:00	49	30.101345	-80.298866	E	3 2	90°	2	
27-Feb-11	16:17	69	30.165543	-80.645988	W	4 1	90°	3	
27-Feb-11	16:30	82	30.433979	-80.617953	E	8 1	90°	2	
27-Feb-11	16:56	93	30.434435	-80.165085	E	8 2	90°	2	
27-Feb-11	17:23	80	30.499116	-80.389218	W	9 1	90°	1	
8-Apr-11	10:16	7	29.965628	-80.345769	E	1 1	90°	1	
8-Apr-11	10:59	16	30.032166	-80.385954	W	2 1	75°	1	
8-Apr-11	11:13	22	30.031897	-80.565697	W	2 2	75°	1	
8-Apr-11	11:33	34	30.099829	-80.563002	E	3 1	120°	1	
8-Apr-11	11:41	36	30.100368	-80.288343	E	3 3	90°	1	
8-Apr-11	12:30	35	30.166681	-80.366156	W	4 1	75°	1	
8-Apr-11	12:47	39	30.166306	-80.602228	W	4 1	90°	1	
8-Apr-11	14:54	52	30.232333	-80.653807	E	5 1	75°	1	
8-Apr-11	14:55	75	30.232493	-80.619538	E	5 1	90°	1	
8-Apr-11	14:58	53	30.232385	-80.506370	E	5 1	80°	2	
8-Apr-11	15:01	77	30.232612	-80.423495	E	5 1	90°	1	
8-Apr-11	15:36	88	30.300571	-80.299291	W	6 1	130°	1	
8-Apr-11	15:42	89	30.300304	-80.508909	W	6 1	100°	1	
8-Apr-11	15:51	63	30.299962	-80.546441	W	6 1	100°	1	
8-Apr-11	15:52	94	30.300026	-80.580529	W	6 2	90°	1	
8-Apr-11	15:55	65	30.299806	-80.676812	W	6 1	90°	1	
8-Apr-11	16:00	98	30.367471	-80.651386	E	7 1	90°	1	
8-Apr-11	16:12	103	30.365576	-80.531460	E	7 1	90°	1	
8-Apr-11	16:12	70	30.365451	-80.550049	E	7 1	60°	1	
8-Apr-11	16:13	104	30.365465	-80.502398	E	7 4	90°	1	
8-Apr-11	16:13	71	30.365412	-80.498101	E	7 1	90°	1	
8-Apr-11	16:17	105	30.365579	-80.367364	E	7 1	90°	1	

Table 11 (Continued). All loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
8-Apr-11	16:19	106	30.365664	-80.312941	E	7	1	90°	2
8-Apr-11	16:30	111	30.365491	-80.097127	E	7	2	110°	1
8-Apr-11	17:09	123	30.433837	-80.195421	W	8	1	90°	1
8-Apr-11	17:22	128	30.433617	-80.511859	W	8	2	110°	1
8-Apr-11	17:22	90	30.433600	-80.525009	W	8	2	100°	1
9-Apr-11	9:15	4	30.566299	-80.625208	E	10	1	90°	1
9-Apr-11	9:30	6	30.566644	-80.112980	E	10	1	90°	1
9-Apr-11	10:29	22	30.432826	-80.644487	E	8	2	140°	1
9-Apr-11	10:44	28	30.433342	-80.295976	E	8	2	90°	1
9-Apr-11	11:22	36	30.365708	-80.524888	W	7	2	85°	1
9-Apr-11	11:24	38	30.365659	-80.600996	W	7	2	80°	1
9-Apr-11	11:35	40	30.299591	-80.512338	E	6	2	85°	1
9-Apr-11	11:39	41	30.298151	-80.382236	E	6	2	65°	1
9-Apr-11	12:26	46	30.232698	-80.639705	W	5	3	90°	1
9-Apr-11	14:02	52	30.164790	-80.683810	E	4	2	100°	1
9-Apr-11	14:03	60	30.165788	-80.652395	E	4	1	80°	1
9-Apr-11	14:03	53	30.165740	-80.637335	E	4	3	90°	1
9-Apr-11	14:10	62	30.166000	-80.387061	E	4	2	70°	1
9-Apr-11	15:06	64	30.100137	-80.646144	W	3	2	90°	1
9-Apr-11	15:07	65	30.100068	-80.667747	W	3	2	90°	1
9-Apr-11	15:12	77	30.031304	-80.641287	E	2	2	90°	1
9-Apr-11	15:24	84	30.031637	-80.445007	E	2	1	90°	1
9-Apr-11	15:25	85	30.031764	-80.408565	E	2	1	80°	1
9-Apr-11	16:02	94	29.965911	-80.401763	W	1	2	90°	1
9-Apr-11	16:06	95	29.965834	-80.522033	W	1	1	90°	1
9-Apr-11	16:07	97	29.965749	-80.557951	W	1	1	80°	1
9-Apr-11	16:09	100	29.965600	-80.616516	W	1	2	80°	1
9-Apr-11	16:11	79	29.965455	-80.697509	W	1	3	140°	1
19-May-11	12:59	6	29.964633	-80.630986	E	1	2	90°	1
19-May-11	13:50	15	30.031720	-80.420043	W	2	2	90°	1
20-May-11	8:21	13	30.563317	-80.594384	E	10	1	90°	1
20-May-11	8:22	7	30.570936	-80.533392	E	10	2	90°	1
20-May-11	8:23	8	30.569593	-80.507757	E	10	1	90°	3
20-May-11	8:25	16	30.566482	-80.426244	E	10	2	90°	1
20-May-11	8:30	17	30.569400	-80.251935	E	10	2	90°	1
20-May-11	8:31	11	30.570856	-80.194309	E	10	1	90°	1
20-May-11	8:54	20	30.499565	-80.116498	W	9	1	90°	1
20-May-11	9:08	23	30.499577	-80.332452	W	9	2	45°	1
20-May-11	9:13	24	30.503105	-80.516748	W	9	3	90°	3
20-May-11	9:14	25	30.503081	-80.548323	W	9	2	90°	3
20-May-11	9:16	29	30.501133	-80.623520	W	9	1	90°	2
20-May-11	9:18	30	30.498873	-80.690317	W	9	1	90°	2
20-May-11	9:32	37	30.432442	-80.523462	E	8	1	90°	2
20-May-11	9:40	33	30.433467	-80.331421	E	8	1	90°	1
20-May-11	9:43	34	30.436814	-80.247596	E	8	1	90°	3
20-May-11	10:24	58	30.359595	-80.234776	W	7	2	90°	1
20-May-11	10:26	59	30.363308	-80.318090	W	7	2	90°	1
20-May-11	10:27	60	30.364440	-80.341010	W	7	2	90°	1
20-May-11	10:28	61	30.365062	-80.358036	W	7	2	90°	1

Table 11 (Continued). All loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
20-May-11	10:38	48	30.367065	-80.566512	W	7	2	60°	3
20-May-11	10:46	68	30.297975	-80.649067	E	6	1	90°	1
20-May-11	10:47	69	30.298844	-80.631170	E	6	1	90°	2
20-May-11	10:47	51	30.300188	-80.602648	E	6	2	90°	3
20-May-11	10:54	76	30.299032	-80.445236	E	6	2	90°	2
20-May-11	11:01	56	30.294179	-80.379454	E	6	3	90°	2
20-May-11	11:32	65	30.230868	-80.337989	W	5	2	90°	3
20-May-11	13:02	97	30.163427	-80.660120	E	4	2	90°	1
20-May-11	13:03	98	30.164600	-80.624201	E	4	2	90°	2
20-May-11	13:03	73	30.163652	-80.640505	E	4	1	90°	3
20-May-11	13:04	99	30.166266	-80.583449	E	4	2	90°	3
20-May-11	13:05	100	30.165525	-80.557704	E	4	2	90°	2
20-May-11	13:58	83	30.101198	-80.356753	W	3	2	90°	1
20-May-11	14:00	84	30.100958	-80.422810	W	3	1	90°	3
20-May-11	14:04	86	30.100802	-80.610242	W	3	1	90°	3
20-May-11	14:10	115	30.024418	-80.663238	E	2	2	90°	5
20-May-11	14:13	116	30.027429	-80.533176	E	2	2	90°	1
20-May-11	14:17	119	30.025733	-80.449377	E	2	2	90°	1
20-May-11	14:54	100	29.986176	-80.315247	W	1	1	90°	3
20-May-11	14:56	129	29.980720	-80.423502	W	1	1	90°	1
20-May-11	14:57	102	29.980417	-80.431152	W	1	1	90°	4
20-May-11	14:58	131	29.975730	-80.490040	W	1	1	90°	1
20-May-11	14:59	132	29.976062	-80.513108	W	1	1	90°	2
20-May-11	15:07	104	29.963615	-80.657766	W	1	2	90°	1
20-May-11	15:08	135	29.968576	-80.688942	W	1	1	90°	1
20-May-11	15:08	105	29.967360	-80.683368	W	1	1	90°	1
21-Jun-11	9:57	3	30.565614	-80.539043	E	10	1	90°	1
21-Jun-11	10:40	7	30.501802	-80.511094	W	9	1	110°	1
21-Jun-11	11:06	12	30.430739	-80.425020	E	8	1	90°	1
21-Jun-11	14:41	21	29.962703	-80.616160	E	1	1	90°	1
21-Jun-11	14:42	22	29.962624	-80.582059	E	1	1	90°	1
21-Jun-11	14:45	23	29.962816	-80.478623	E	1	1	90°	2
21-Jun-11	14:48	24	29.963266	-80.376980	E	1	1	90°	1
21-Jun-11	14:49	25	29.963335	-80.351298	E	1	1	90°	1
21-Jun-11	15:45	31	30.034162	-80.677171	W	2	1	90°	1
22-Jun-11	11:16	12	30.230267	-80.329166	E	5	1	90°	1
22-Jun-11	11:57	16	30.301741	-80.584482	W	6	1	90°	1
20-Jul-11	9:14	11	30.499873	-80.550273	W	9	2	90°	1
20-Jul-11	9:17	14	30.499632	-80.656476	W	9	1	90°	1
20-Jul-11	10:25	31	30.366516	-80.293864	W	7	2	90°	1
20-Jul-11	10:40	37	30.366396	-80.435558	W	7	1	90°	1
20-Jul-11	10:45	38	30.365933	-80.637356	W	7	1	45°	1
20-Jul-11	13:29	53	30.165666	-80.527449	E	4	3	90°	1
20-Jul-11	13:30	54	30.165821	-80.491398	E	4	2	60°	1
20-Jul-11	13:31	55	30.165857	-80.445849	E	4	2	60°	4
20-Jul-11	13:33	56	30.166005	-80.372607	E	4	1	90°	6
20-Jul-11	14:14	49	30.101023	-80.423350	W	3	2	90°	2
20-Jul-11	14:23	70	30.099880	-80.516003	W	3	2	90°	1
20-Jul-11	14:28	71	30.100297	-80.687030	W	3	2	90°	2

Table 11 (Continued). All loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
20-Jul-11	14:34	54	30.031057	-80.580981	E	2	2	90°	3
20-Jul-11	14:37	76	30.031183	-80.462095	E	2	2	90°	4
20-Jul-11	14:41	77	30.031322	-80.338196	E	2	1	90°	3
20-Jul-11	15:21	81	29.965944	-80.602271	W	1	2	90°	1
21-Jul-11	8:30	4	29.965011	-80.448075	E	1	1	90°	1
21-Jul-11	9:09	11	30.032517	-80.415447	W	2	2	90°	1
21-Jul-11	9:23	18	30.099443	-80.585964	E	3	2	90°	1
21-Jul-11	10:11	25	30.167043	-80.380911	W	4	3	90°	3
21-Jul-11	10:17	27	30.166719	-80.572771	W	4	1	90°	2
21-Jul-11	11:15	37	30.300884	-80.320357	W	6	2	90°	1
21-Jul-11	11:22	38	30.300257	-80.579987	W	6	1	90°	3
21-Jul-11	11:24	39	30.300194	-80.646221	W	6	1	60°	2
21-Jul-11	13:57	55	30.433714	-80.587289	W	8	2	90°	3
21-Jul-11	14:09	60	30.498872	-80.455609	E	9	2	90°	2
21-Jul-11	14:17	62	30.499061	-80.172581	E	9	1	45°	1
21-Jul-11	14:46	66	30.567579	-80.399094	W	10	2	60°	1
17-Aug-11	9:02	7	30.565724	-80.612346	E	10	2	90°	1
17-Aug-11	9:06	7	30.565881	-80.585782	E	10	1	90°	3
17-Aug-11	9:09	8	30.568741	-80.488367	E	10	1	90°	2
17-Aug-11	9:15	16	30.563146	-80.437980	E	10	2	45°	1
17-Aug-11	9:57	26	30.499239	-80.186864	W	9	1	90°	1
17-Aug-11	10:06	32	30.501027	-80.349122	W	9	1	45°	1
17-Aug-11	10:06	22	30.500888	-80.355941	W	9	1	90°	2
17-Aug-11	10:08	34	30.499303	-80.435222	W	9	2	45°	1
17-Aug-11	10:13	24	30.499601	-80.613717	W	9	2	90°	2
17-Aug-11	10:28	29	30.432504	-80.635589	E	8	2	60°	3
17-Aug-11	10:29	41	30.432474	-80.628287	E	8	2	45°	1
17-Aug-11	10:34	43	30.434456	-80.450754	E	8	1	90°	2
17-Aug-11	10:34	44	30.435008	-80.426299	E	8	1	90°	1
17-Aug-11	11:27	39	30.365777	-80.557872	W	7	2	90°	1
17-Aug-11	11:35	56	30.300873	-80.658987	E	6	1	90°	1
17-Aug-11	12:24	48	30.229886	-80.600048	W	5	2	60°	1
17-Aug-11	12:26	49	30.230205	-80.685807	W	5	3	90°	1
17-Aug-11	14:05	56	30.167096	-80.558009	E	4	3	90°	1
17-Aug-11	14:15	76	30.168099	-80.453457	E	4	2	90°	2
17-Aug-11	14:16	59	30.167820	-80.427686	E	4	1	90°	3
17-Aug-11	14:59	66	30.096845	-80.302581	W	3	1	90°	1
17-Aug-11	15:03	67	30.104058	-80.425937	W	3	1	90°	4
17-Aug-11	15:05	68	30.102558	-80.517492	W	3	2	60°	2
17-Aug-11	15:08	69	30.097777	-80.616981	W	3	2	90°	3
17-Aug-11	15:27	88	30.032429	-80.677258	E	2	1	90°	1
17-Aug-11	15:29	74	30.033600	-80.603071	E	2	2	90°	3
17-Aug-11	15:30	89	30.033939	-80.593851	E	2	2	45°	1
17-Aug-11	15:32	90	30.033809	-80.514284	E	2	2	90°	1
17-Aug-11	15:47	96	30.033285	-80.381384	E	2	1	90°	1
17-Aug-11	16:31	85	29.965288	-80.333939	W	1	2	90°	3
17-Aug-11	16:36	86	29.964796	-80.515443	W	1	3	90°	3
17-Aug-11	16:38	111	29.966710	-80.568780	W	1	1	90°	1
18-Aug-11	9:04	3	29.963450	-80.565897	E	1	1	90°	3

Table 11 (Continued). All loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
18-Aug-11	9:08	5	29.967366	-80.421225	E	1	1	90°	2
18-Aug-11	9:10	4	29.970272	-80.348470	E	1	2	45°	1
18-Aug-11	9:11	7	29.970764	-80.322390	E	1	1	90°	3
18-Aug-11	9:57	21	30.031406	-80.384422	W	2	1	90°	2
18-Aug-11	9:57	12	30.031338	-80.364304	W	2	1	90°	1
18-Aug-11	10:09	28	30.031369	-80.576541	W	2	2	90°	4
18-Aug-11	10:09	15	30.030599	-80.583251	W	2	2	90°	1
18-Aug-11	10:11	16	30.028927	-80.639644	W	2	1	90°	1
18-Aug-11	10:17	31	30.096113	-80.665818	E	3	1	90°	3
18-Aug-11	10:20	20	30.103202	-80.538321	E	3	2	45°	2
18-Aug-11	10:22	21	30.104325	-80.484565	E	3	1	90°	1
18-Aug-11	11:10	32	30.168182	-80.330197	W	4	1	90°	1
18-Aug-11	11:13	45	30.164358	-80.416435	W	4	1	90°	3
18-Aug-11	11:13	34	30.163268	-80.430200	W	4	1	90°	1
18-Aug-11	11:16	35	30.163628	-80.541499	W	4	2	60°	2
18-Aug-11	11:19	47	30.166326	-80.630271	W	4	2	90°	3
18-Aug-11	11:26	38	30.231150	-80.621084	E	5	3	60°	2
18-Aug-11	11:27	50	30.231647	-80.604949	E	5	3	90°	2
18-Aug-11	12:11	47	30.301314	-80.489350	W	6	2	90°	1
18-Aug-11	13:59	57	30.369864	-80.618647	E	7	2	60°	1
18-Aug-11	14:01	58	30.370584	-80.532780	E	7	2	90°	1
18-Aug-11	14:02	67	30.370532	-80.482387	E	7	2	90°	3
18-Aug-11	14:05	68	30.370071	-80.372267	E	7	1	90°	3
18-Aug-11	14:37	66	30.433621	-80.251964	W	8	1	90°	1
18-Aug-11	14:47	83	30.435587	-80.406547	W	8	1	90°	2
18-Aug-11	14:47	69	30.435629	-80.408666	W	8	2	45°	1
18-Aug-11	14:52	70	30.432343	-80.591836	W	8	2	90°	1
18-Aug-11	14:54	85	30.431213	-80.657758	W	8	2	90°	2
18-Aug-11	15:04	73	30.500667	-80.512825	E	9	1	90°	1
18-Aug-11	15:13	92	30.500630	-80.364348	E	9	1	90°	2
18-Aug-11	15:52	104	30.566069	-80.473927	W	10	1	90°	3
18-Aug-11	15:52	85	30.566310	-80.462781	W	10	1	90°	2
18-Aug-11	16:08	113	30.567230	-80.583904	W	10	1	90°	2
29-Sep-11	9:38	9	30.031704	-80.439366	W	2	1	90°	1
29-Sep-11	9:51	12	30.101070	-80.593138	E	3	2	90°	1
29-Sep-11	10:27	17	30.164638	-80.327114	W	4	2	90°	1
29-Sep-11	10:29	19	30.165355	-80.389031	W	4	2	90°	1
29-Sep-11	10:31	20	30.164817	-80.458554	W	4	2	60°	3
29-Sep-11	10:35	17	30.164623	-80.610378	W	4	1	90°	1
29-Sep-11	10:41	23	30.233283	-80.659800	E	5	1	90°	1
29-Sep-11	10:48	21	30.232651	-80.393361	E	5	2	90°	1
29-Sep-11	10:50	24	30.233062	-80.344901	E	5	2	90°	3
29-Sep-11	11:21	29	30.299234	-80.371533	W	6	2	90°	3
29-Sep-11	11:23	26	30.299291	-80.434733	W	6	2	90°	2
29-Sep-11	13:15	38	30.366111	-80.497510	E	7	1	90°	1
29-Sep-11	13:23	41	30.365869	-80.459998	E	7	1	90°	3
29-Sep-11	13:23	35	30.366166	-80.436141	E	7	2	90°	1
29-Sep-11	13:25	42	30.367543	-80.375219	E	7	2	90°	3
29-Sep-11	14:14	45	30.433270	-80.438060	W	8	2	90°	1

Table 11 (Continued). All loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
29-Sep-11	14:30	61	30.496935	-80.595272	E	9	2	90°	2
29-Sep-11	14:33	62	30.501518	-80.471165	E	9	2	90°	2
29-Sep-11	15:29	66	30.568546	-80.428485	W	10	2	90°	1
29-Sep-11	15:29	67	30.567809	-80.449738	W	10	2	90°	2
29-Sep-11	15:30	68	30.566468	-80.488219	W	10	2	90°	3
29-Sep-11	15:32	69	30.565295	-80.543866	W	10	1	90°	1
30-Sep-11	12:21	3	30.566751	-80.600272	W	10	1	90°	1
30-Sep-11	12:25	1	30.567970	-80.464621	E	10	2	100°	1
30-Sep-11	13:07	8	30.498591	-80.391286	W	9	2	90°	2
30-Sep-11	13:09	9	30.499322	-80.458424	W	9	2	90°	2
30-Sep-11	13:35	16	30.498948	-80.618736	W	9	1	90°	1
30-Sep-11	13:43	27	30.434298	-80.604430	E	8	2	90°	2
30-Sep-11	13:43	19	30.434308	-80.596629	E	8	2	45°	1
30-Sep-11	13:50	34	30.434257	-80.423374	E	8	1	90°	1
30-Sep-11	14:34	29	30.364026	-80.444215	W	7	1	90°	1
30-Sep-11	14:45	44	30.297559	-80.597321	E	6	2	90°	1
30-Sep-11	14:47	33	30.301185	-80.534749	E	6	1	45°	2
30-Sep-11	14:52	36	30.299378	-80.465556	E	6	2	45°	3
30-Sep-11	14:56	48	30.300901	-80.345038	E	6	1	90°	1
30-Sep-11	15:29	55	30.232714	-80.366305	W	5	2	90°	1
30-Sep-11	15:29	45	30.232719	-80.366978	W	5	1	90°	4
30-Sep-11	15:36	56	30.230386	-80.617708	W	5	2	60°	2
17-Oct-11	9:35	3	29.965284	-80.580642	E	1	2	90°	1
17-Oct-11	9:38	3	29.966110	-80.466365	E	1	2	90°	1
17-Oct-11	9:41	5	29.966022	-80.381953	E	1	2	90°	1
17-Oct-11	9:44	6	29.965657	-80.266205	E	1	2	90°	1
17-Oct-11	10:22	13	30.031681	-80.263838	W	2	1	90°	1
17-Oct-11	10:27	13	30.031147	-80.416332	W	2	1	90°	1
17-Oct-11	10:34	15	30.033538	-80.666439	W	2	1	90°	1
17-Oct-11	10:42	19	30.100285	-80.531554	E	3	2	90°	2
17-Oct-11	10:52	20	30.100321	-80.417718	E	3	2	90°	2
17-Oct-11	11:36	27	30.165484	-80.467844	W	4	1	90°	3
17-Oct-11	11:55	39	30.233466	-80.589218	E	5	2	90°	1
17-Oct-11	11:56	40	30.235228	-80.532857	E	5	1	90°	2
17-Oct-11	11:59	41	30.237357	-80.427994	E	5	1	90°	2
17-Oct-11	12:33	47	30.299728	-80.366458	W	6	2	90°	1
17-Oct-11	12:35	40	30.301910	-80.428242	W	6	1	45°	1
17-Oct-11	14:30	56	30.366456	-80.328760	E	7	2	90°	1
17-Oct-11	15:22	56	30.432073	-80.448196	W	8	2	90°	2
17-Oct-11	15:24	70	30.432859	-80.499521	W	8	2	90°	1
17-Oct-11	15:32	74	30.497972	-80.652627	E	9	2	60°	1
17-Oct-11	15:34	75	30.499587	-80.563584	E	9	1	90°	1
17-Oct-11	16:32	90	30.564243	-80.491197	W	10	1	90°	1
17-Oct-11	16:34	71	30.564585	-80.564397	W	10	2	90°	3

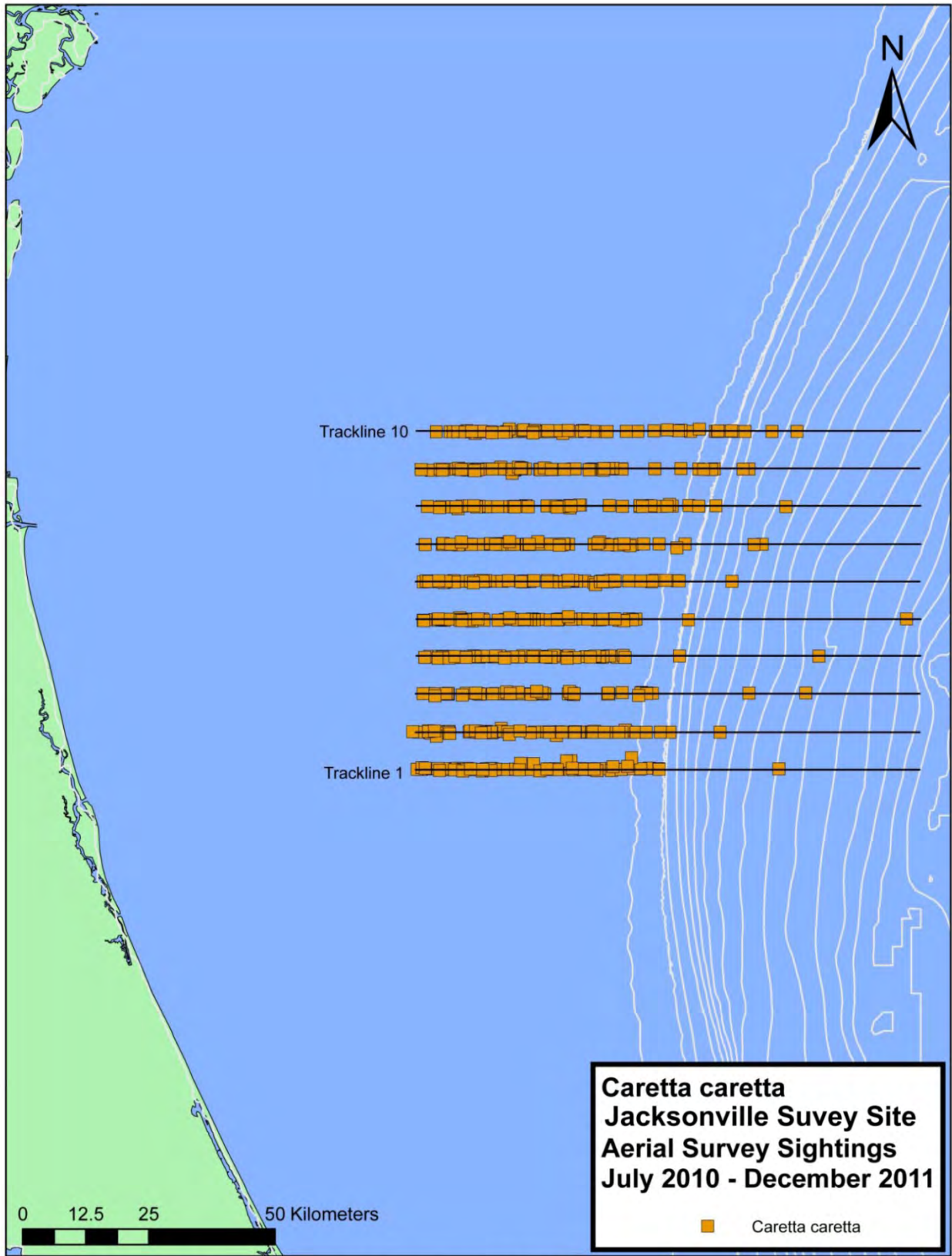


Figure 13. Loggerhead sea turtle (*Caretta caretta*) sightings.

Leatherback Sea Turtle (*Dermochelys coriacea*) (Table 12, Fig. 14)

A total of 45 leatherback sea turtles were recorded mainly in the inshore waters of the survey site. This species was observed in every month surveyed during the current reporting period except for July, August and November of 2010 and September of 2011. The most recent population estimates for the North Atlantic is a range of 34,000 to 94,000 adult leatherbacks (Turtle Expert Working Group 2007). Leatherback nesting beaches in the Atlantic, as well as worldwide, have experienced severe to moderate declines over the past several decades and this species is listed as endangered under the Endangered Species Act (NMFS 1992).



Table 12. All leatherback sea turtle (*Dermochelys coriacea*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
8-Sep-10	16:04	34	30.164993	-80.395468	W	4	1	90°	1
9-Sep-10	11:56	51	30.433302	-80.477210	E	8	2	90°	1
9-Sep-10	16:18	69	30.231432	-80.068385	W	5	3	90°	1
9-Sep-10	16:34	73	30.231160	-80.666152	W	5	1	90°	1
18-Oct-10	12:39	10	29.967095	-80.332057	E	1	2	90°	1
18-Oct-10	14:01	38	30.101976	-80.421491	E	3	1	90°	1
18-Oct-10	14:59	41	30.164511	-80.365173	W	4	2	90°	1
18-Oct-10	15:09	44	30.165736	-80.517338	W	4	2	90°	1
21-Dec-10	12:11	43	30.366225	-80.418890	W	7	2	90°	1
30-Dec-10	12:06	70	30.365919	-80.621155	W	7	2	120°	1
30-Dec-10	15:48	141	30.165743	-80.615990	E	4	1	90°	1
31-Jan-11	10:31	17	30.498793	-80.064842	W	9	2	130°	1
31-Jan-11	14:54	95	30.167780	-80.450586	E	4	2	90°	1
31-Jan-11	16:02	133	30.031272	-80.660210	E	2	2	90°	1
31-Jan-11	16:15	142	30.032605	-80.461696	E	2	2	90°	1
31-Jan-11	16:20	149	30.032608	-80.252951	E	2	1	90°	1
31-Jan-11	17:01	123	29.964732	-80.325029	W	1	1	90°	1
26-Feb-11	16:09	46	30.434388	-80.634695	E	8	1	100°	1
8-Apr-11	17:18	89	30.433829	-80.369985	W	8	1	90°	1
20-May-11	8:23	9	30.568551	-80.487928	E	10	1	90°	1
20-May-11	9:15	26	30.502137	-80.594772	W	9	2	90°	1
20-May-11	14:03	85	30.100869	-80.544252	W	3	3	90°	1
20-May-11	14:10	89	30.025693	-80.653680	E	2	2	90°	1
21-Jun-11	11:00	11	30.431047	-80.629434	E	8	1	90°	1
21-Jul-11	10:13	26	30.166989	-80.447232	W	4	1	90°	1
17-Aug-11	14:23	60	30.165547	-80.199566	E	4	1	90°	1
17-Aug-11	14:56	65	30.094358	-80.180583	W	3	3	90°	1
17-Aug-11	16:26	84	29.964671	-80.150416	W	1	1	90°	1
17-Aug-11	16:33	110	29.962540	-80.384560	W	1	2	90°	1
18-Aug-11	9:07	4	29.965274	-80.460184	E	1	1	90°	1
18-Aug-11	9:10	6	29.969546	-80.374012	E	1	1	90°	1
18-Aug-11	10:25	32	30.102597	-80.354238	E	3	2	90°	1
18-Aug-11	11:27	39	30.231816	-80.599948	E	5	2	90°	1
17-Oct-11	10:26	12	30.030858	-80.394612	W	2	1	90°	1
17-Oct-11	10:53	24	30.100558	-80.399157	E	3	1	90°	1
17-Oct-11	11:32	26	30.166403	-80.313562	W	4	1	90°	1
17-Oct-11	11:33	32	30.165898	-80.360974	W	4	1	90°	1
17-Oct-11	14:21	53	30.366029	-80.642414	E	7	1	90°	1
17-Oct-11	14:22	54	30.366138	-80.612691	E	7	2	90°	1
17-Oct-11	15:25	71	30.434184	-80.555784	W	8	2	90°	1
17-Oct-11	15:37	76	30.500393	-80.451484	E	9	1	90°	1
17-Oct-11	15:37	59	30.500455	-80.457373	E	9	1	90°	1
17-Oct-11	15:45	60	30.499871	-80.147733	E	9	2	90°	1
17-Oct-11	16:27	70	30.567168	-80.268947	W	10	3	90°	1
17-Oct-11	16:33	91	30.564535	-80.530931	W	10	2	90°	1

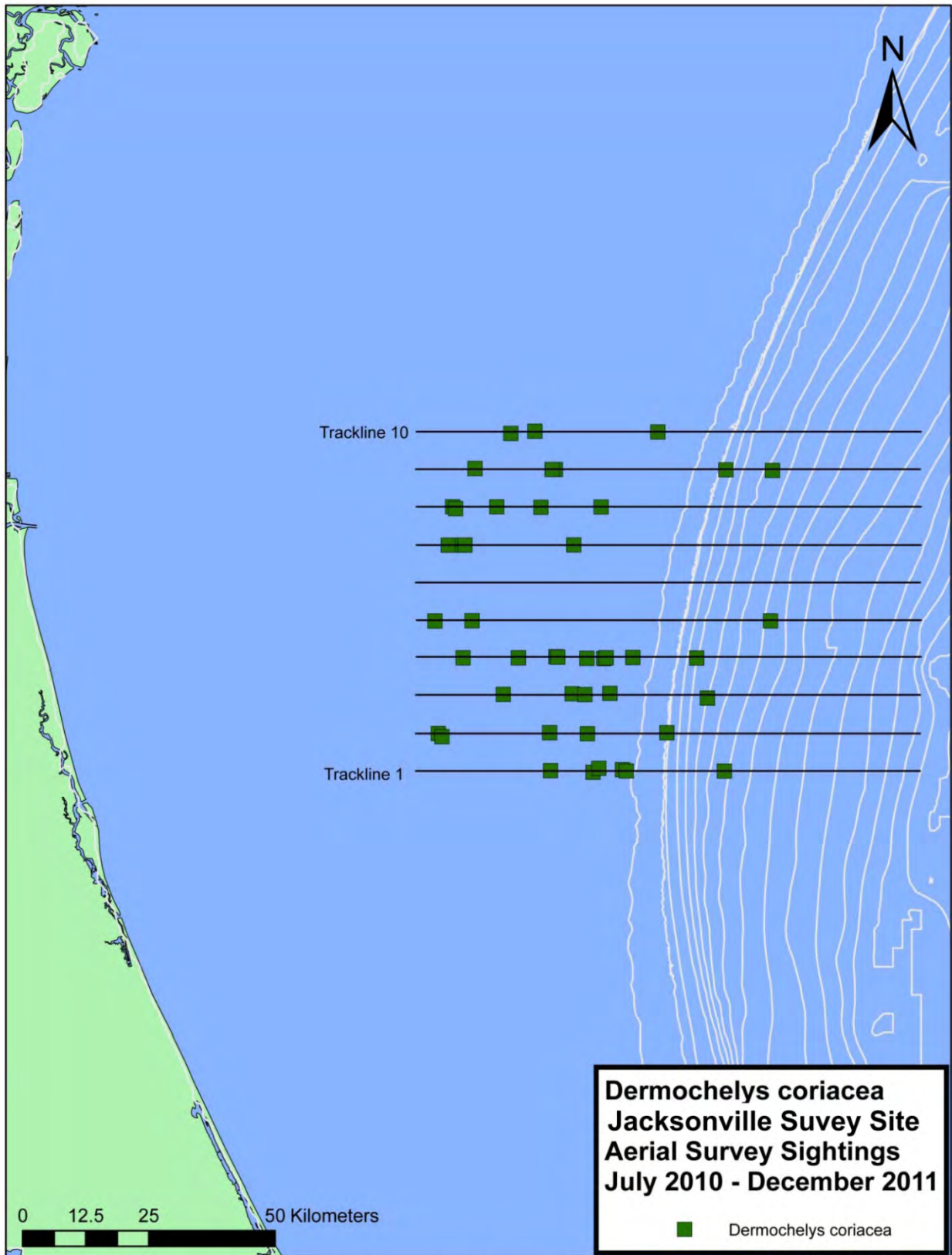


Figure 14. Leatherback sea turtle (*Dermochelys coriacea*) sightings.

Kemp's Ridley Sea Turtle (*Lepidochelys kempii*) (Table 13, Fig. 15)

Two Kemp's Ridley sea turtles were recorded while on effort on 9 September 2010. Since 1978-1991, sharp drops in nesting rates were observed; however, this population appears to be in the early stages of recovery. During the 2006 season 12143 nests were recorded in Mexico, marking the highest number of nests since the program began in 1978 (NOAA Fisheries). The Kemp's Ridley sea turtle is listed as endangered under the Endangered Species Act (NMFS 1992).

Table 13. Kemp's ridley sea turtle (*Lepidochelys kempii*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
9-Sep-10	15:19	59	30.301661	-80.445950	E	6	1	90°	1
9-Sep-10	16:28	102	30.231546	-80.424170	W	5	1	95°	1

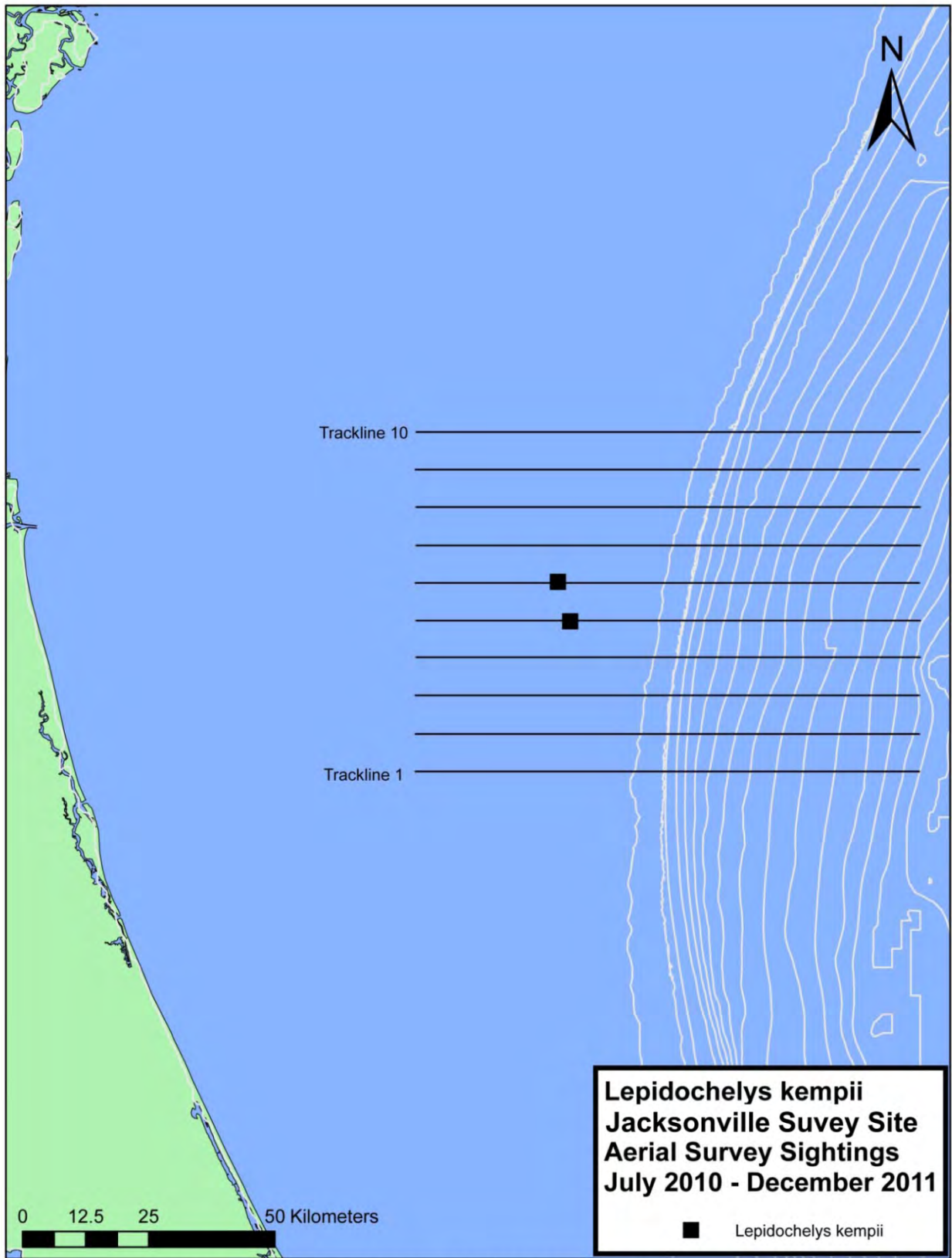


Figure 15. Kemp's ridley sea turtle (*Lepidochelys kempii*) sightings.

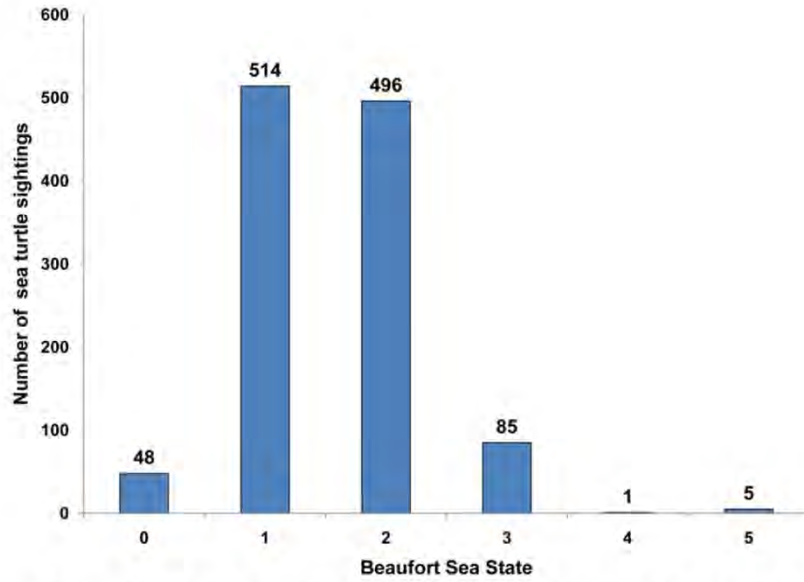


Figure 16a. Total number of sea turtle sightings per Beaufort Sea State during aerial surveys conducted from July 2010 to December 2011 in the Jacksonville, Florida survey site.

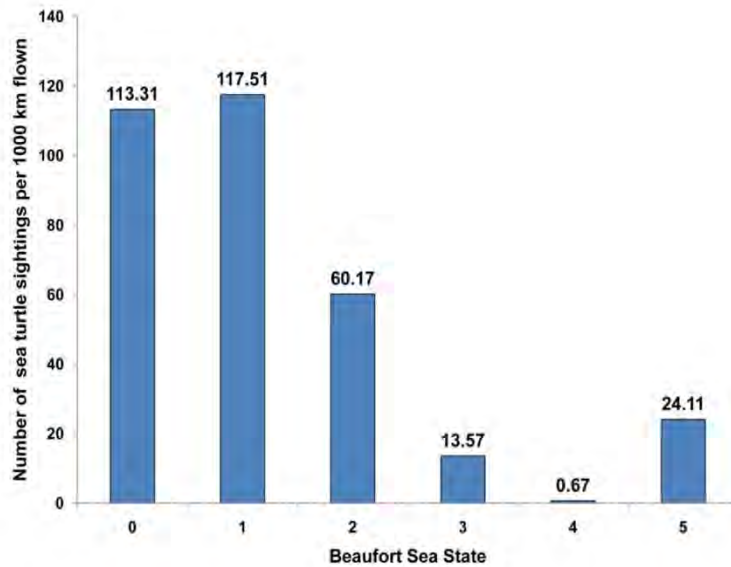


Figure 16b. Sea turtle sightings per 1000 km flown by Beaufort sea State from July 2010 to December 2011 during aerial surveys in the Jacksonville, Florida survey site.

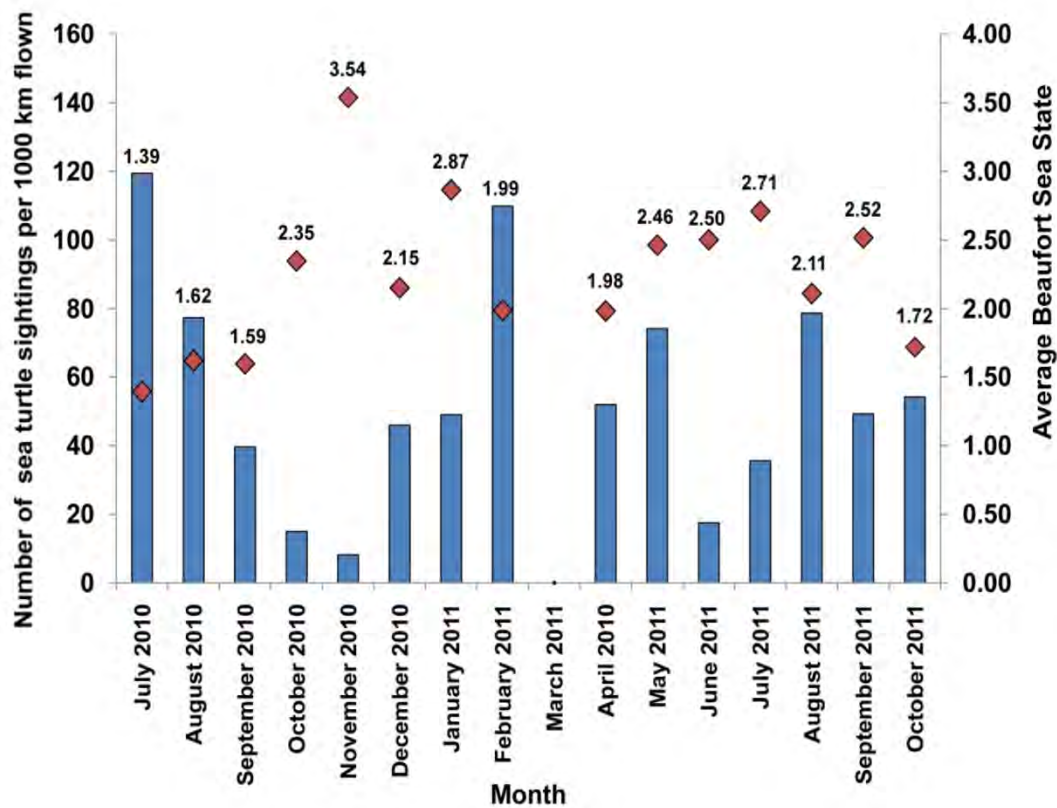


Figure 16c. Sea turtle sightings per 1000 km surveyed and the average Beaufort Sea State per month from July 2010 to December 2011 during aerial surveys in the Jacksonville, Florida survey site.

### Unidentified sea turtles

A total of 196 unidentified sea turtles were observed during the reporting period. Unidentified sea turtles were recorded during every survey month except November 2010 and July 2011.

### Other Marine Vertebrate Sightings (Tables 14-17, Fig. 17)

#### Chondrichthyan fishes

A total of 70 sharks were recorded during the reporting period (Table 14, Fig. 17). Fifty-seven were identified as hammerhead sharks (*Sphyrna* spp.) and one as a whale shark (*Rhincodon typus*) with all others listed as unidentified sharks. The whale shark sighting (identified as a juvenile) occurred in February 2011, just inshore of the shelf break (Table 15, Fig. 17). Sharks were seen throughout the study period with no discernable spatial or temporal trends. Thirteen manta rays (*Manta birostris*) were observed during the study period and occurred in eight of the 15 months surveyed (Table 16, Fig. 17).

#### Other fishes

Twenty three ocean sunfish (*Mola mola*) were recorded during the survey period and encountered nine of the 15 months surveyed with more sightings during the winter months (Table 17, Fig. 17).

Table 14. All other cartilaginous fish sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate	Comments
29-Jul-10	10:53	9	30.032246	-80.340569	W	2	2	90°	1	Hammerhead
5-Aug-10	9:58	7	30.433305	-79.903766	W	8	1	90°	1	Shark
8-Sep-10	16:09	42	30.160624	-80.524435	W	4	2	90°	1	Shark
9-Sep-10	13:02	45	30.364368	-80.515428	W	7	2	90°	1	Hammerhead
9-Sep-10	13:05	46	30.364046	-80.619519	W	7	2	90°	1	Shark
18-Oct-10	13:23	17	30.032910	-80.407249	W	2	3	90°	1	
29-Dec-10	15:08	29	30.234004	-80.336674	E	5	2	90°	1	Hammerhead
29-Dec-10	15:08	45	30.233459	-80.341198	E	5	1	90°	1	Hammerhead
30-Dec-10	11:44	55	30.366178	-80.244557	W	7	1	90°	2	Rays
30-Dec-10	14:00	102	30.299512	-80.685813	E	6	1	90°	40	Cownose Rays
15-Jan-11	13:57	31	30.301508	-80.257957	E	6	2	100°	1	Hammerhead
31-Jan-11	10:33	18	30.498658	-80.147986	W	9	1	90°	1	Shark
31-Jan-11	10:34	19	30.498720	-80.183721	W	9	2	100°	3	Hammerhead
31-Jan-11	11:15	42	30.432785	-80.206956	E	8	2	90°	5	
31-Jan-11	11:16	43	30.434318	-80.178403	E	8	1	90°	1	Hammerhead
31-Jan-11	11:34	49	30.364440	-79.962435	W	7	1	90°	1	Shark
31-Jan-11	12:17	66	30.301090	-80.329923	E	6	2	90°	1	Shark
31-Jan-11	12:19	70	30.300994	-80.242041	E	6	2	90°	1	
31-Jan-11	12:21	53	30.301109	-80.187169	E	6	1	90°	1	Hammerhead
31-Jan-11	12:49	58	30.229481	-80.250741	W	5	3	90°	3	Hammerhead
31-Jan-11	12:55	79	30.231513	-80.481764	W	5	1	90°	2	
31-Jan-11	14:58	98	30.167148	-80.305318	E	4	2	90°	1	Hammerhead
31-Jan-11	15:00	101	30.167270	-80.223746	E	4	2	90°	2	Hammerhead
31-Jan-11	15:03	102	30.167148	-80.132041	E	4	2	90°	1	Hammerhead
31-Jan-11	15:12	107	30.167071	-79.881298	E	4	2	90°	1	Hammerhead
31-Jan-11	15:29	112	30.099650	-80.228034	W	3	2	90°	1	Hammerhead
31-Jan-11	15:29	86	30.099631	-80.218761	W	3	1	90°	1	Hammerhead
31-Jan-11	15:32	88	30.104161	-80.234043	W	3	1	90°	4	Hammerhead
31-Jan-11	15:35	91	30.093684	-80.266905	W	3	2	90°	4	Hammerhead
31-Jan-11	15:36	118	30.100152	-80.321755	W	3	1	90°	3	Hammerhead
31-Jan-11	15:36	92	30.101422	-80.288381	W	3	2	90°	1	Hammerhead
31-Jan-11	15:37	93	30.100158	-80.322076	W	3	1	90°	1	Hammerhead
31-Jan-11	16:16	143	30.032575	-80.421423	E	2	1	90°	1	Hammerhead
31-Jan-11	16:18	145	30.032823	-80.318909	E	2	1	90°	5	Hammerhead
31-Jan-11	16:20	147	30.032648	-80.274259	E	2	1	90°	1	
31-Jan-11	16:20	148	30.032627	-80.257555	E	2	2	90°	6	Hammerhead
31-Jan-11	16:56	162	29.964983	-80.240323	W	1	2	90°	1	
31-Jan-11	16:56	119	29.964970	-80.242905	W	1	1	90°	1	Hammerhead
31-Jan-11	16:57	120	29.964951	-80.256779	W	1	1	90°	1	Hammerhead
31-Jan-11	16:57	121	29.965149	-80.272111	W	1	2	120°	18	Hammerhead
22-Feb-11	13:14	10	30.495920	-80.490680	W	9	2	100°	1	Hammerhead
26-Feb-11	14:09	11	30.231947	-80.194509	W	5	2	100°	1	Hammerhead
26-Feb-11	16:26	73	30.434851	-80.172864	E	8	2	90°	1	Hammerhead
27-Feb-11	13:42	12	29.966544	-80.307920	E	1	2	90°	1	Hammerhead
27-Feb-11	13:44	14	29.966463	-80.227500	E	1	1	90°	1	Hammerhead
27-Feb-11	13:44	14	29.966512	-80.250865	E	1	2	90°	1	Shark
27-Feb-11	15:00	50	30.101360	-80.281716	E	3	2	90°	3	
27-Feb-11	15:00	50	30.101360	-80.281716	E	3	2	90°	1	Hammerhead
27-Feb-11	15:42	57	30.167646	-80.194278	W	4	1	90°	1	



Table 14 (Continued). All other cartilaginous fish sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate	Comments
27-Feb-11	15:43	59	30.165776	-80.227473	W	4	2	90°	1	
27-Feb-11	15:43	66	30.166111	-80.211182	W	4	2	90°	7	Hammerhead
27-Feb-11	16:55	92	30.434509	-80.191169	E	8	2	90°	1	Hammerhead
8-Apr-11	12:27	34	30.166775	-80.295266	W	4	1	80°	1	Hammerhead
8-Apr-11	12:47	39	30.166306	-80.602228	W	4	2	100°	100	Cownose rays
8-Apr-11	14:57	76	30.232367	-80.540059	E	5	2	90°	1	Hammerhead
8-Apr-11	15:02	78	30.232719	-80.376896	E	5	1	90°	1	Hammerhead
8-Apr-11	15:03	79	30.232700	-80.349961	E	5	1	90°	1	Hammerhead
8-Apr-11	15:03	80	30.232713	-80.338924	E	5	1	90°	1	Hammerhead
8-Apr-11	15:04	82	30.232737	-80.305262	E	5	2	110°	1	Hammerhead
8-Apr-11	15:05	54	30.232761	-80.256798	E	5	2	90°	2	Hammerhead
8-Apr-11	15:53	64	30.300013	-80.609889	W	6	2	90°	1	Hammerhead
8-Apr-11	16:26	75	30.367205	-80.272303	E	7	2	75°	1	Hammerhead
8-Apr-11	16:30	76	30.365458	-80.102346	E	7	2	90°	1	Hammerhead
8-Apr-11	16:33	112	30.365316	-80.013120	E	7	2	90°	2	
8-Apr-11	16:33	77	30.365297	-80.013393	E	7	1	80°	1	Hammerhead
8-Apr-11	17:15	88	30.433691	-80.296489	W	8	2	100°	1	Hammerhead
9-Apr-11	9:53	12	30.499821	-80.169237	W	9	2	110°	1	Hammerhead
9-Apr-11	9:58	14	30.499800	-80.339860	W	9	2	90°	1	Hammerhead
9-Apr-11	10:14	14	30.499516	-80.523421	W	9	2	90°	1	Hammerhead
9-Apr-11	15:11	68	30.031646	-80.659830	E	2	2	90°	1	Hammerhead
9-Apr-11	16:08	99	29.965669	-80.590841	W	1	1	90°	1	Hammerhead
20-May-11	8:32	12	30.570784	-80.168473	E	10	1	45°	1	Shark
20-May-11	8:34	13	30.568895	-80.098241	E	10	1	90°	1	Hammerhead
20-May-11	11:06	81	30.303351	-80.192779	E	6	3	90°	1	
21-Jun-11	15:34	30	30.034426	-80.284312	W	2	1	90°	1	Hammerhead
29-Sep-11	14:46	67	30.499939	-80.074366	E	9	1	90°	1	Shark
30-Sep-11	14:27	27	30.364552	-80.182561	W	7	1	90°	1	Hammerhead
17-Oct-11	10:03	9	29.965393	-79.937672	E	1	2	90°	1	Shark
17-Oct-11	10:27	14	30.031233	-80.424927	W	2	1	75°	1	Hammerhead
17-Oct-11	10:53	21	30.100574	-80.376063	E	3	2	90°	1	Hammerhead
17-Oct-11	11:15	28	30.101720	-79.860129	E	3	2	90°	1	Hammerhead
17-Oct-11	12:32	39	30.299529	-80.330316	W	6	1	90°	1	Shark
17-Oct-11	12:36	41	30.301898	-80.463466	W	6	2	90°	1	Shark

Table 15. Whale shark (*Rhincodon typus*) sighting in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
27-Feb-11	14:53	47	30.101220	-80.383363	E	3	3	90°	1

Table 16. Manta ray (*Manta birostris*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate
28-Jul-10	12:58	14	30.566598	-80.407248	E	10	1	90°	1
19-Oct-10	15:31	60	30.566154	-80.655702	W	10	2	100°	1
30-Dec-10	14:36	122	30.299825	-80.128149	E	6	1	90°	1
31-Jan-11	16:15	111	30.032574	-80.456458	E	2	1	90°	1
26-Feb-11	16:03	41	30.364816	-80.632452	W	7	1	90°	1
27-Feb-11	15:44	60	30.165735	-80.237339	W	4	2	90°	3
8-Apr-11	11:42	38	30.108765	-80.257539	E	3	2	90°	1
8-Apr-11	15:32	87	30.300541	-80.181404	W	6	1	120°	1
9-Apr-11	11:12	31	30.366247	-80.202606	W	7	3	100°	1
17-Aug-11	11:10	36	30.367296	-80.195549	W	7	2	90°	1
29-Sep-11	11:01	22	30.234130	-79.882262	E	5	2	90°	1

Table 17. All ocean sunfish (*Mola mola*) sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Sighting Cue	Best Estimate
18-Oct-10	12:58	11	30.029928	-79.837923	W	2	2	90°	3	1
30-Dec-10	10:47	37	30.425880	-80.512416	E	8	1	90°	3	1
31-Jan-11	9:54	7	30.567589	-80.357380	E	10	1	90°	3	1
31-Jan-11	10:04	12	30.566240	-80.293554	E	10	2	90°	3	1
31-Jan-11	10:05	9	30.567763	-80.252980	E	10	2	120°	3	1
31-Jan-11	10:08	14	30.567473	-80.156747	E	10	1	90°	3	1
31-Jan-11	10:35	20	30.498827	-80.209754	W	9	2	90°	3	1
31-Jan-11	10:58	29	30.434112	-80.664184	E	8	2	120°	3	1
31-Jan-11	11:10	32	30.434226	-80.252405	E	8	1	30°	3	1
31-Jan-11	11:48	54	30.364965	-80.352725	W	7	2	90°	3	1
31-Jan-11	11:48	41	30.364973	-80.353330	W	7	2	90°	3	1
31-Jan-11	11:48	42	30.364890	-80.377127	W	7	1	70°	3	1
31-Jan-11	12:11	49	30.300566	-80.544952	E	6	2	110°	3	1
31-Jan-11	12:57	65	30.231568	-80.554468	W	5	2	130°	3	1
26-Feb-11	14:52	33	30.301731	-80.611191	E	6	2	120°	3	1
27-Feb-11	17:11	96	30.499338	-79.922662	W	9	1	90°	3	1
27-Feb-11	17:31	98	30.498066	-80.692220	W	9	1	90°	3	1
8-Apr-11	17:25	129	30.433429	-80.602164	W	8	2	110°	3	1
20-May-11	8:24	10	30.565845	-80.455952	E	10	2	90°	2	1
20-May-11	10:53	75	30.298816	-80.498598	E	6	2	90°	3	1
18-Aug-11	10:38	36	30.103765	-80.141827	E	3	1	90°	2	1
29-Sep-11	15:15	61	30.566270	-80.219609	W	10	3	90°	3	1
17-Oct-11	12:25	37	30.299540	-80.052735	W	6	1	90°	3	1

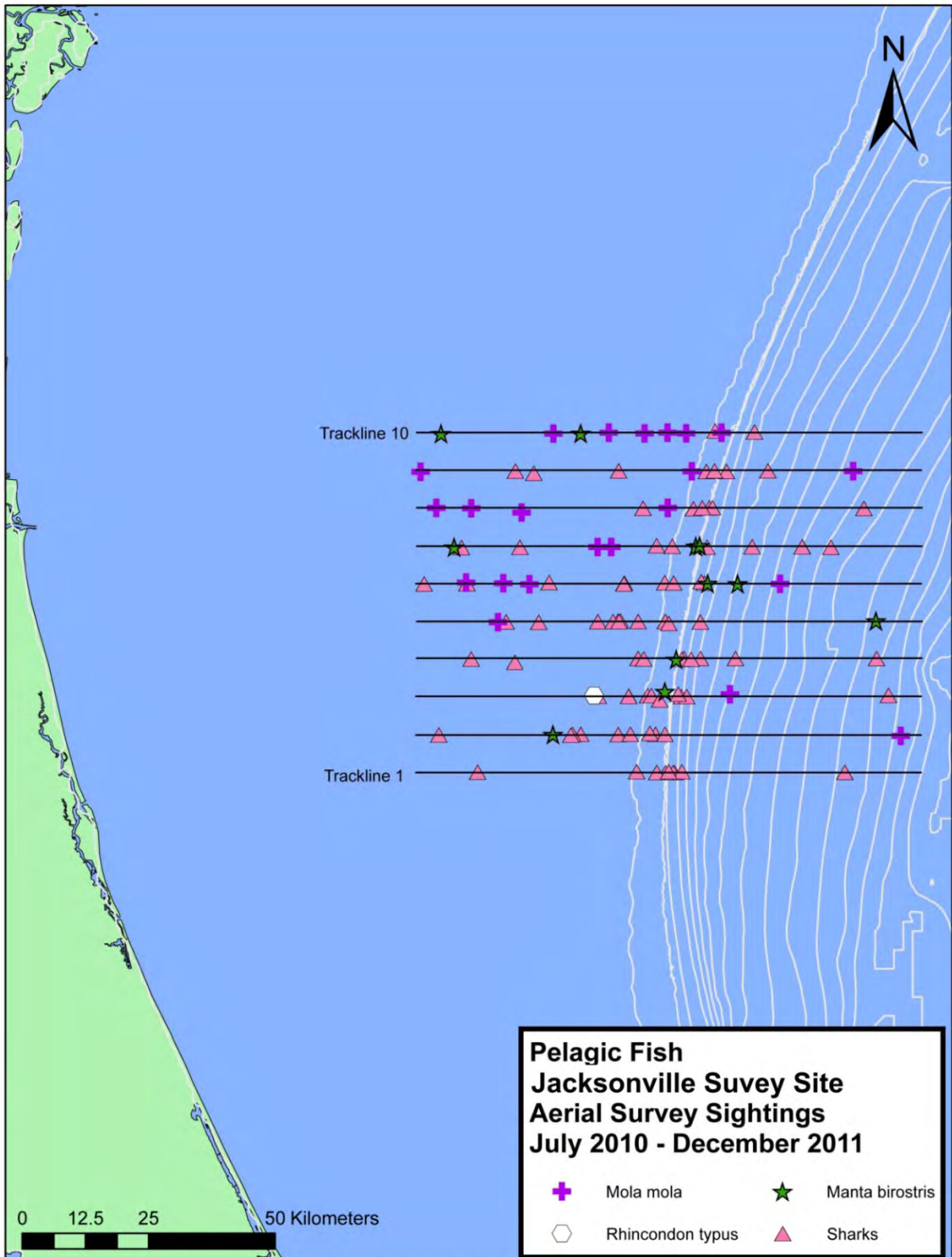


Figure 17. Whale shark (*Rhincodon typus*), other cartilaginous fish, manta ray (*Manta birostris*) and ocean sunfish (*Mola mola*) sightings.

## Vessel Sightings

### Commercial (Table 18, Fig. 18)

A total of 43 commercial vessels (*e.g.* tankers, car carriers, and container vessels) were observed in the study site.

Table 18. All commercial vessel sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate	Comments
28-Jul-10	12:44	4	30.565490	-80.695467	E	10	4	90°	1	Cargo
28-Jul-10	12:45	6	30.566013	-80.638665	E	10	3	75°	1	Cargo
28-Jul-10	13:35	24	30.499908	-80.118364	W	9	4	90°	1	Tanker
28-Jul-10	13:59	33	30.499537	-80.574283	W	9	4	60°	1	Tanker
28-Jul-10	14:47	67	30.365993	-80.034107	W	7	3	65°	1	Cargo
28-Jul-10	16:08	81	30.232859	-80.545019	W	5	3	45°	1	Container vessel
3-Aug-10	12:48	4	29.965030	-80.606365	E	1	4	90°	1	Container vessel
3-Aug-10	13:42	21	30.031644	-80.625433	W	2	3	90°	1	Container vessel
5-Aug-10	9:41	4	30.365621	-80.160385	E	7	3	90°	1	Car Carrier
8-Sep-10	14:02	16	30.031167	-80.132342	W	2	1	120°	1	Ocean going tug and barge
9-Sep-10	9:48	14	30.497920	-80.053432	W	9	3	45°	1	Freighter
10-Sep-10	10:17	15	30.364404	-80.118541	W	7	3	45°	1	Car carrier
10-Sep-10	11:24	20	30.231461	-80.467462	W	5	2	25°	1	Tanker
10-Sep-10	11:55	25	30.033522	-79.994359	E	2	4	60°	1	Container vessel
10-Sep-10	12:06	32	29.963929	-79.902332	W	1	4	45°	1	Cargo vessel
18-Oct-10	14:05	39	30.103926	-80.268310	E	3	3	90°	1	Yacht
19-Oct-10	10:30	20	30.501997	-80.505851	E	9	4	30°	1	Frigate
20-Oct-10	9:24	10	30.498442	-80.512361	W	9	4	30°	1	Tug and Barge
20-Oct-10	10:03	13	30.365672	-79.861371	W	7	3	110°	1	Frigate
18-Nov-10	11:05	30	30.233136	-79.832819	W	5	4	30°	1	Cargo vessel
18-Nov-10	13:35	38	30.169134	-80.303731	E	4	1	75°	1	Submarine and Tenders
18-Nov-10	15:09	47	29.965169	-80.617708	W	1	4	90°	1	Car Carrier
21-Dec-10	11:59	38	30.366371	-79.969208	W	7	3	90°	1	Tanker
21-Dec-10	12:45	47	30.299626	-80.068558	E	6	3	90°	1	Tanker
29-Dec-10	14:52	39	30.165496	-80.605369	W	4	3	60°	1	Yacht
30-Dec-10	9:28	20	30.566433	-80.001726	E	10	2	45°	1	Cargo vessel
30-Dec-10	15:59	103	30.166084	-80.212702	E	4	3	100°	1	Tanker
31-Jan-11	9:50	5	30.567168	-80.495652	E	10	4	90°	1	Frigate
31-Jan-11	10:19	14	30.565100	-79.841555	E	10	2	90°	1	Container vessel
22-Feb-11	16:17	48	30.167938	-80.683331	W	4	4	90°	1	Frigate
26-Feb-11	14:16	13	30.231705	-80.454194	W	5	1	45°	1	Long-liner
8-Apr-11	9:59	4	29.965175	-80.643473	E	1	4	20°	1	Cargo vessel
9-Apr-11	16:01	93	29.967750	-80.336201	W	1	1	90°	1	Cruise ship (Carnival)
19-May-11	15:14	34	30.232740	-79.999633	E	5	3	90°	1	Tanker
19-May-11	15:27	26	30.299145	-79.984646	W	6	3	90°	1	Tanker
20-May-11	11:04	57	30.298047	-80.269368	E	6	3	90°	1	Tanker
22-Jun-11	10:00	5	30.034408	-80.541781	W	2	4	45°	1	Cargo vessel
20-Jul-11	9:33	14	30.432855	-80.251544	E	8	2	90°	1	Frigate
20-Jul-11	9:39	15	30.432715	-79.996462	E	8	4	90°	1	Container vessel
29-Sep-11	9:13	3	29.967517	-79.987492	E	1	3	60°	1	Cargo vessel
29-Sep-11	9:14	4	29.967820	-79.918136	E	1	3	45°	1	Cargo vessel
29-Sep-11	10:36	18	30.163923	-80.655827	W	4	1	60°	1	Cargo vessel
29-Sep-11	10:56	25	30.232847	-80.114296	E	5	4	45°	1	Container vessel

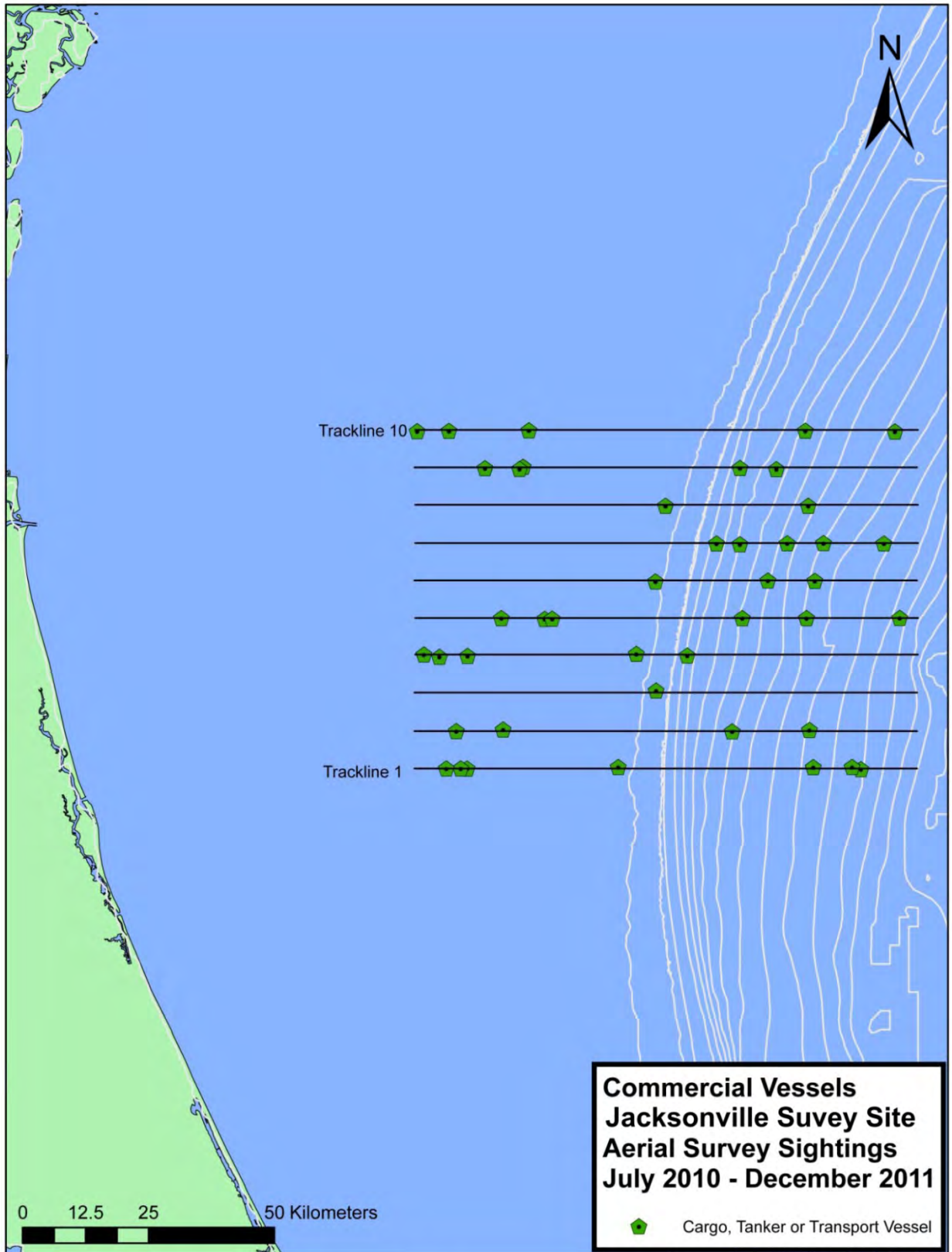


Figure 18. All commercial vessel sightings.

Military (Table 19, Fig, 19)

A total of 17 U.S. military vessels were seen during the reporting period.

Table 19. All military vessel sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate	Comments
28-Jul-10	16:01	90	30.235885	-80.299050	W	5	2	65°	1	Navy Frigate
29-Jul-10	10:56	11	30.038856	-80.433986	W	2	1	45°	1	Navy war ship
29-Jul-10	12:29	23	30.166835	-80.298436	W	4	4	90°	1	Navy Frigate
3-Aug-10	14:47	40	30.166825	-80.178625	W	4	2	90°	1	Coast Guard Cutter
3-Aug-10	15:22	74	30.232591	-80.324781	E	5	3	30°	1	Navy warship
18-Oct-10	12:47	13	29.967740	-80.040724	E	1	3	90°	1	Navy vessel
18-Oct-10	13:32	28	30.031870	-80.567187	W	2	3	90°	1	Navy vessel
18-Oct-10	14:54	61	30.168124	-80.276690	W	4	3	60°	1	Navy surface vessel
19-Oct-10	11:23	24	30.560288	-80.531442	W	10	3	45°	1	Navy surface vessel
31-Jan-11	9:51	5	30.567153	-80.456212	E	10	3	60°	1	Navy vessel
31-Jan-11	12:12	63	30.300714	-80.515425	E	6	3	90°	1	Navy vessel
31-Jan-11	12:13	64	30.300809	-80.462511	E	6	3	90°	1	Navy vessel
22-Feb-11	15:14	35	30.031141	-80.641882	W	2	4	30°	1	Warship
22-Feb-11	16:11	47	30.165295	-80.519878	W	4	4	90°	1	Warship
20-Jul-11	8:54	9	30.500211	-80.217063	W	9	3	45°	1	Warship
21-Jul-11	10:19	28	30.166454	-80.660394	W	4	3	45°	1	Warship
18-Aug-11	11:59	44	30.303171	-80.063903	W	6	3	45°	1	Military cruiser



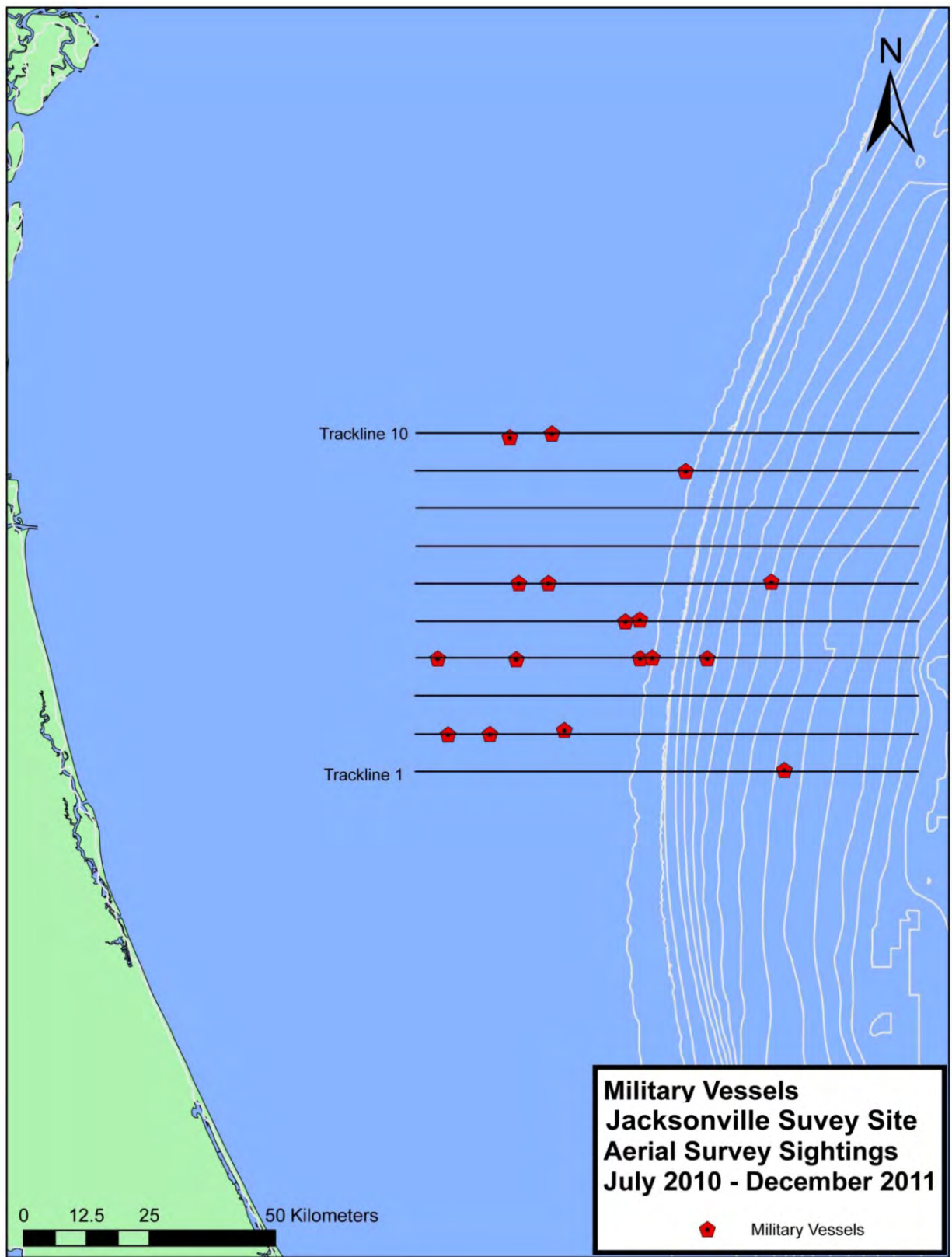


Figure 19. All military vessel sightings.

#### Other Vessels (Table 20, Fig. 20)

A total of 197 other vessels were recorded in the survey area. Recreational sport fishing vessels constituted the majority of these sightings (n=189). This category also included head boats, sailing vessels and yachts.

Table 20. All other vessel sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate	Comments
28-Jul-10	15:58	75	30.233265	-80.223030	W	5	4	90°	1	Sailing vessel
29-Jul-10	11:36	17	30.099833	-79.975358	E	3	3	75°	1	Recreational fishing vessel
3-Aug-10	14:16	31	30.100273	-80.087479	E	3	2	90°	1	Recreational fishing vessel
3-Aug-10	14:52	43	30.166635	-80.385223	W	4	4	90°	1	Recreational fishing vessel
3-Aug-10	15:23	60	30.232596	-80.256640	E	5	3	90°	1	Recreational fishing vessel
4-Aug-10	12:29	64	30.300276	-80.245305	E	6	1	30°	1	Recreational fishing vessel
4-Aug-10	15:40	102	30.100713	-80.099475	W	3	2	90°	1	Recreational fishing vessel
5-Aug-10	10:32	15	30.499115	-80.558034	E	9	3	90°	1	Recreational fishing vessel
9-Sep-10	11:13	24	30.498093	-80.560535	W	9	3	45°	1	Recreational fishing vessel
10-Sep-10	9:27	7	30.498471	-80.325703	W	9	4	45°	1	Recreational fishing vessel
10-Sep-10	12:17	29	29.964460	-80.253697	W	1	4	80°	1	Recreational fishing vessel
10-Sep-10	12:18	34	29.964319	-80.290518	W	1	3	75°	1	Recreational fishing vessel
18-Oct-10	12:28	4	29.965425	-80.608936	E	1	3	120°	1	Recreational fishing vessel
19-Oct-10	9:36	11	30.366576	-80.438000	E	7	3	110°	1	Recreational fishing vessel
19-Oct-10	13:35	31	30.369953	-80.455671	E	7	2	60°	1	Recreational fishing vessel
18-Nov-10	8:48	3	30.566110	-80.618163	E	10	1	90°	1	Sailing vessel
18-Nov-10	9:01	6	30.566371	-80.151136	E	10	3	90°	1	Recreational fishing vessel
18-Nov-10	9:48	13	30.432803	-80.456733	E	8	3	90°	1	Recreational fishing vessel
18-Nov-10	14:28	42	30.031731	-80.373837	E	2	3	90°	1	Recreational fishing vessel
29-Dec-10	12:40	7	29.967027	-80.275728	E	1	3	80°	1	Recreational fishing vessel
29-Dec-10	14:50	38	30.166496	-80.543666	W	4	3	90°	1	Recreational fishing vessel
30-Dec-10	9:23	9	30.565851	-80.170097	E	10	3	90°	2	Recreational fishing vessel
30-Dec-10	9:58	18	30.500056	-80.180945	W	9	1	60°	1	Recreational fishing vessel
30-Dec-10	9:59	30	30.499561	-80.199635	W	9	2	30°	1	Recreational fishing vessel
30-Dec-10	10:01	21	30.500121	-80.262387	W	9	1	90°	1	Recreational fishing vessel
30-Dec-10	10:49	56	30.433200	-80.443112	E	8	2	90°	3	Recreational fishing vessel
30-Dec-10	10:53	57	30.432814	-80.309332	E	8	2	45°	3	Recreational fishing vessel
30-Dec-10	10:53	40	30.432964	-80.302495	E	8	4	90°	1	Recreational fishing vessel
30-Dec-10	10:55	59	30.433075	-80.229754	E	8	2	90°	3	Recreational fishing vessel
30-Dec-10	10:55	42	30.433298	-80.246387	E	8	2	90°	1	Recreational fishing vessel
30-Dec-10	11:43	79	30.366255	-80.193661	W	7	2	90°	4	Recreational fishing vessel
30-Dec-10	11:43	52	30.366260	-80.193238	W	7	3	90°	1	Recreational fishing vessel
30-Dec-10	11:44	54	30.366097	-80.228858	W	7	3	90°	2	Recreational fishing vessel
30-Dec-10	14:03	103	30.299521	-80.599106	E	6	2	45°	1	Recreational fishing vessel
30-Dec-10	14:31	121	30.300459	-80.282457	E	6	3	90°	6	Recreational fishing vessel
30-Dec-10	14:32	87	30.300039	-80.262664	E	6	3	60°	7	Recreational fishing vessel
30-Dec-10	15:25	95	30.233560	-80.304767	W	5	3	90°	1	Recreational fishing vessel
30-Dec-10	15:28	135	30.232969	-80.412877	W	5	2	45°	3	Recreational fishing vessel
30-Dec-10	15:48	100	30.165601	-80.594277	E	4	1	90°	1	Recreational fishing vessel
30-Dec-10	15:55	101	30.165612	-80.336784	E	4	2	100°	2	Recreational fishing vessel
30-Dec-10	16:38	108	30.100207	-80.659195	W	3	4	90°	1	Recreational fishing vessel
15-Jan-11	12:22	11	30.499023	-80.158746	W	9	3	45°	1	Recreational fishing vessel
15-Jan-11	12:37	12	30.498833	-80.392243	W	9	2	60°	1	Recreational fishing vessel
15-Jan-11	12:45	14	30.498133	-80.655514	W	9	3	30°	1	Sailing vessel
15-Jan-11	13:28	23	30.364941	-80.209332	W	7	3	40°	1	Recreational fishing vessel
15-Jan-11	13:28	25	30.364959	-80.232316	W	7	2	90°	2	Recreational fishing vessel
15-Jan-11	13:41	26	30.364619	-80.663882	W	7	1	90°	1	Sailing vessel
15-Jan-11	13:55	30	30.301004	-80.304610	E	6	3	45°	1	Recreational fishing vessel
15-Jan-11	14:27	38	30.232137	-80.284264	W	5	2	90°	1	Recreational fishing vessel

Table 20 (Continued). All other vessel sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate	Comments
16-Jan-11	9:13	8	29.966224	-80.484019	E	1	3	45°	1	Recreational fishing vessel
16-Jan-11	9:16	9	29.966296	-80.388965	E	1	1	45°	1	Recreational fishing vessel
16-Jan-11	9:25	7	29.965555	-80.307916	E	1	3	90°	1	Recreational fishing vessel
16-Jan-11	9:56	12	30.030822	-80.252136	W	2	3	50°	1	Recreational fishing vessel
16-Jan-11	10:28	19	30.101678	-80.323243	E	3	2	30°	1	Recreational fishing vessel
16-Jan-11	10:29	20	30.101754	-80.281416	E	3	3	90°	1	Recreational fishing vessel
16-Jan-11	10:58	26	30.165261	-80.255472	W	4	3	70°	1	Recreational fishing vessel
16-Jan-11	11:04	28	30.165494	-80.456204	W	4	2	45°	1	Head boat
31-Jan-11	11:00	30	30.433976	-80.599540	E	8	4	80°	1	Recreational fishing vessel
31-Jan-11	11:06	36	30.434197	-80.373601	E	8	3	90°	1	Recreational fishing vessel
31-Jan-11	11:16	44	30.434444	-80.171630	E	8	4	90°	1	Recreational fishing vessel
31-Jan-11	12:18	68	30.300984	-80.269926	E	6	2	90°	1	Recreational fishing vessel
31-Jan-11	16:38	116	30.032253	-79.879649	E	2	3	90°	1	Recreational fishing vessel
31-Jan-11	17:02	125	29.965035	-80.377410	W	1	2	90°	1	Recreational fishing vessel
26-Feb-11	14:10	10	30.231773	-80.231627	W	5	1	60°	2	Recreational fishing vessel
26-Feb-11	14:11	11	30.231906	-80.282455	W	5	3	45°	1	Recreational fishing vessel
26-Feb-11	14:34	19	30.234507	-80.655201	W	5	4	75°	1	Recreational fishing vessel
26-Feb-11	15:12	43	30.301641	-80.245132	E	6	2	45°	1	Recreational fishing vessel
26-Feb-11	15:49	54	30.366084	-80.313047	W	7	3	75°	1	Recreational fishing vessel
27-Feb-11	13:45	15	29.966474	-80.198709	E	1	3	90°	1	Recreational fishing vessel
27-Feb-11	14:07	20	30.031181	-80.128454	W	2	3	90°	1	Recreational fishing vessel
27-Feb-11	14:10	21	30.031432	-80.218541	W	2	4	90°	1	Recreational fishing vessel
27-Feb-11	14:10	22	30.031402	-80.230333	W	2	2	90°	1	Recreational fishing vessel
27-Feb-11	14:16	24	30.031164	-80.463912	W	2	3	120°	1	Recreational fishing vessel
27-Feb-11	15:43	58	30.166079	-80.213777	W	4	2	90°	1	Recreational fishing vessel
8-Apr-11	10:20	9	29.965620	-80.211054	E	1	2	60°	1	Recreational fishing vessel
8-Apr-11	17:10	85	30.433868	-80.242748	W	8	2	75°	1	Recreational fishing vessel
9-Apr-11	9:54	9	30.499806	-80.193642	W	9	3	90°	1	Recreational fishing vessel
9-Apr-11	10:14	15	30.499493	-80.535787	W	9	2	100°	1	Recreational fishing vessel
9-Apr-11	10:40	27	30.433294	-80.409209	E	8	4	90°	1	Recreational fishing vessel
9-Apr-11	11:17	35	30.366162	-80.353404	W	7	3	120°	1	Recreational fishing vessel
9-Apr-11	15:28	87	30.031682	-80.300365	E	2	3	120°	1	Recreational fishing vessel
9-Apr-11	15:58	92	29.966080	-80.266845	W	1	3	130°	1	Recreational fishing vessel
9-Apr-11	16:02	77	29.965906	-80.396170	W	1	2	45°	1	Recreational fishing vessel
19-May-11	13:08	8	29.966696	-80.301760	E	1	3	45°	1	Recreational fishing vessel
19-May-11	13:09	6	29.967280	-80.279960	E	1	4	90°	5	Recreational fishing vessel
19-May-11	13:47	12	30.033422	-80.332008	W	2	3	90°	1	Recreational fishing vessel
19-May-11	14:04	19	30.100334	-80.558946	E	3	3	90°	1	Recreational fishing vessel
19-May-11	14:06	20	30.100539	-80.487071	E	3	3	45°	1	Recreational fishing vessel
19-May-11	14:12	22	30.099185	-80.283534	E	3	1	90°	1	Recreational fishing vessel
19-May-11	14:12	15	30.100634	-80.253103	E	3	1	90°	1	Recreational fishing vessel
19-May-11	14:38	18	30.166904	-80.190354	W	4	2	90°	1	Recreational fishing vessel
19-May-11	14:41	26	30.166642	-80.280596	W	4	2	90°	1	Recreational fishing vessel
19-May-11	14:41	19	30.166764	-80.291958	W	4	2	90°	2	Recreational fishing vessel
19-May-11	14:44	27	30.167098	-80.395708	W	4	1	90°	1	Recreational fishing vessel
19-May-11	15:43	28	30.299351	-80.571209	W	6	4	90°	1	Recreational fishing vessel
20-May-11	10:48	70	30.301447	-80.578374	E	6	1	90°	1	Recreational fishing vessel
20-May-11	11:05	58	30.302565	-80.221156	E	6	3	90°	1	Recreational fishing vessel
20-May-11	11:28	85	30.233429	-80.189324	W	5	3	90°	2	Recreational fishing vessel

Table 20 (Continued). All other vessel sightings in the Jacksonville, Florida survey site for aerial surveys conducted from July 2010 to December 2011.

Date	Time	Waypoint	Latitude	Longitude -1	Heading	Track Number	Vertical Angle	Horizontal Angle	Best Estimate	Comments
20-May-11	11:29	64	30.232900	-80.224430	W	5	2	45°	4	Recreational fishing vessel
20-May-11	13:29	78	30.161614	-80.305470	E	4	1	90°	3	Recreational fishing vessel
20-May-11	13:56	82	30.100432	-80.267398	W	3	3	90°	9	Recreational fishing vessel
20-May-11	14:11	90	30.026371	-80.633307	E	2	1	90°	2	Recreational fishing vessel
20-May-11	14:21	93	30.024531	-80.299280	E	2	2	45°	3	Recreational fishing vessel
20-May-11	14:54	99	29.980061	-80.298407	W	1	3	90°	4	Recreational fishing vessel
20-May-11	15:01	103	29.973375	-80.593986	W	1	2	90°	1	Recreational fishing vessel
21-Jun-11	10:36	6	30.502263	-80.351837	W	9	1	45°	1	Recreational fishing vessel
21-Jun-11	15:29	26	30.034493	-80.113358	W	2	2	90°	1	Boat
22-Jun-11	11:18	13	30.230213	-80.256038	E	5	2	90°	1	Recreational fishing vessel
20-Jul-11	11:12	29	30.299258	-79.880416	E	6	2	90°	1	Yacht
20-Jul-11	14:35	75	30.031036	-80.548514	E	2	1	45°	1	Recreational fishing vessel
21-Jul-11	9:10	13	30.032439	-80.449864	W	2	3	90°	1	Recreational fishing vessel
21-Jul-11	9:20	17	30.100590	-80.682947	E	3	3	90°	1	Recreational fishing vessel
21-Jul-11	10:23	31	30.231921	-80.661534	E	5	2	90°	2	Recreational fishing vessel
21-Jul-11	11:13	26	30.300794	-80.260015	W	6	4	90°	1	Recreational fishing vessel
21-Jul-11	12:50	44	30.364697	-80.651267	E	7	3	90°	3	Recreational fishing vessel
21-Jul-11	13:43	50	30.434046	-80.430881	W	8	3	60°	1	Recreational fishing vessel
21-Jul-11	13:44	51	30.434039	-80.455902	W	8	2	90°	1	Recreational fishing vessel
21-Jul-11	14:05	48	30.498612	-80.617196	E	9	4	90°	1	
21-Jul-11	14:05	49	30.498614	-80.609290	E	9	2	90°	5	Recreational fishing vessel
21-Jul-11	14:06	58	30.498745	-80.582644	E	9	3	60°	2	Recreational fishing vessel
21-Jul-11	14:07	59	30.498808	-80.528031	E	9	1	90°	3	Recreational fishing vessel
21-Jul-11	14:09	50	30.498875	-80.461164	E	9	3	90°	5	Recreational fishing vessel
17-Aug-11	10:04	31	30.499101	-80.289240	W	9	2	45°	2	Recreational fishing vessel
18-Aug-11	10:07	27	30.039313	-80.510340	W	2	2	45°	1	Recreational fishing vessel
18-Aug-11	10:11	17	30.029192	-80.650827	W	2	4	45°	1	Recreational fishing vessel
18-Aug-11	12:24	63	30.298411	-80.531411	W	6	3	90°	1	Recreational fishing vessel
18-Aug-11	14:35	65	30.433147	-80.184232	W	8	2	45°	1	Salvage vessel
18-Aug-11	14:37	77	30.433581	-80.273173	W	8	3	45°	1	Recreational fishing vessel
18-Aug-11	14:49	84	30.433833	-80.476121	W	8	2	45°	1	Recreational fishing vessel
18-Aug-11	15:20	78	30.498947	-80.255452	E	9	1	90°	1	Headboat
29-Sep-11	8:56	3	29.961832	-80.652782	E	1	3	60°	1	Recreational fishing vessel
17-Oct-11	10:28	14	30.031729	-80.468606	W	2	1	90°	1	Recreational fishing vessel

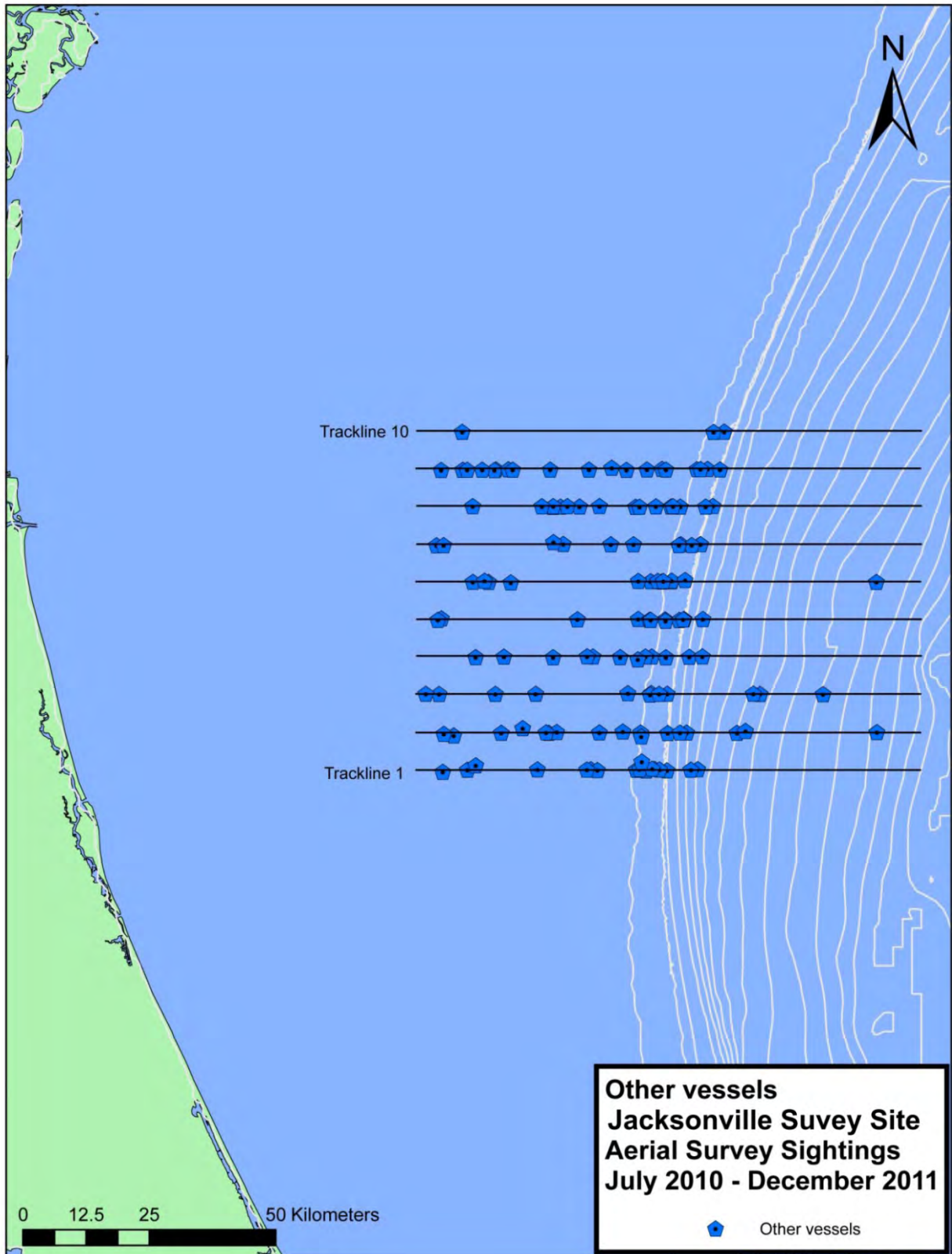


Figure 20. All other vessel sightings.

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## ABSTRACT

### **Analysis of the UNCW and Duke University aerial and shipboard surveys of the Jacksonville USWTR for the period January 2009 to June 2011**

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Aerial and shipboard surveys of the Jacksonville USWTR region (Fig. 1) were carried out throughout 2009 to mid 2011 by the University of North Carolina at Wilmington (UNCW) and Duke University, respectively. Aerial surveys were conducted monthly (weather permitting) from January 2009 to June 2011 and shipboard surveys from July 2009 to March 2011. The aim of these surveys was to collect data to estimate density and abundance of marine animals in the region and investigate how density changed throughout the year. There were sufficient numbers of detections of loggerhead turtles, all turtles combined and all dolphins combined to estimate monthly abundance using density surface modelling techniques (Table 1). Conventional distance sampling (CDS) methods (Buckland *et al.* 2001) were used to estimate monthly abundances for bottlenose dolphins and spotted dolphins using the aerial survey data. Estimates were obtained for the inner core USWTR region and the outer region.

Density surface modelling (DSM) allows animal density to vary both temporally and spatially across the survey region. To generate an estimated density map for each species/taxa of interest the count method of Hedley *et al.* (2004) was used. Firstly, the probability of detection associated with each sighting was estimated from a detection function model and this was then used to estimate abundance in small sections, or segments, of the trackline. These estimated abundances formed the response variable in a generalized additive model (GAM) with survey platform (ie. aerial or ship), location, habitat and temporal variables as potential explanatory variables. After model selection, the chosen model was used to estimate density for the region of interest and abundance was obtained by numerically integrating under the predicted density surface. If survey platform was included in the model, then predicted values were obtained assuming a ship to reduce problems associated with availability bias and detection on the trackline. Note that the resulting abundances were relative (rather than absolute) because they did not take into account imperfect detection on the transect line nor availability at the surface.

Twenty-seven aerial surveys and 14 shipboard surveys were carried out with 45,500km and 2,440km of trackline searched, respectively. Nearly 2,000 groups of turtles were detected with 76% being identified as loggerhead turtles. Over 500 groups of dolphins were detected with 81% being either bottlenose or spotted dolphins with approximately 220 groups of each of these species (Table 1). Detection functions were fitted separately to the aerial and shipboard sightings and to different species or species group (Table 2). Due to the shape of the perpendicular distance distributions for turtles detected during the aerial survey, detection was assumed to be constant and certain within a narrow strip. All the density surface models used to estimate abundance included terms for survey platform, month, location and depth.

Average monthly abundance estimates are given in Table 3 (CDS estimates from the aerial survey data) and Table 4 (DSM estimates obtained from both the aerial and shipboard data). These estimates (also shown in Figure 2) indicated seasonal patterns in abundance with dolphins being more abundant in spring and autumn than in summer or winter. The highest estimate of dolphins was 23,758 animals ( $cv=0.27$ ) in April and the lowest estimate was 4,144 animals ( $cv=0.35$ ) in June. Turtles were more abundant in May (2,856 ( $cv=0.23$ )) and least abundant in November (636 animals ( $cv=0.36$ )). These seasonal patterns may be linked to sea surface temperature which is highest between June and August and lowest in February and the spatial patterns observed in the density surface maps indicated that both dolphins and turtles were more abundant in shallower waters.

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Table 1 Summary of search effort and number of detections (no truncation) by year.

Survey platform	Year	Number of surveys	Search effort (km)	All dolphin species	Bottlenose dolphins	Spotted dolphins	All turtle species	Loggerhead turtles
Aerial	2009	10	15884	116	40	47	703	554
	2010	12	22714	262	129	98	884	661
	2011	5	6877	77	31	40	290	206
	Total	27	45476	455	200	185	1877	1421
Ship	2009	4	780	15	6	8	23	20
	2010	8	1315	36	13	22	37	27
	2011	2	346	12	6	6	24	18
	Total	14	2440	63	25	36	84	65
Total		41	47916	518	225	221	1961	1486

Table 2 Summary of detection function models; truncation distances, detection function (DF) form (HN=half normal, HZ=hazard rate and strip=strip transect) and effective strip half width (esw). Percentage coefficients are given in parentheses.

Species	Platform	Truncation (m)	DF form	Esw (m)
Bottlenose dolphins	Aerial	1000	HN	676.1 (6.8)
Spotted dolphins	Aerial	1150	HN	747.2 (7.0)
Dolphin	Aerial	1035	HN	706.3 (4.4)
	Ship	50	HN	25.6 (14.0)
Turtles	Aerial	140 - 410	Strip	-
	Ship	145	HZ	48.3 (16.1)
Loggerhead turtles	Aerial	140 - 410	Strip	-
	Ship	100	HZ	48.7 (17.9)

Table 3 Estimates of average monthly abundance and 95% confidence intervals (CI) for a) bottlenose dolphins and b) spotted dolphins obtained from the aerial survey data using the conventional distance sampling estimator. Percentage CVs are given in parentheses.

## a) Bottlenose dolphins

Month	Inner region		Outer region		Total	
	Abundance	95% CI	Abundance	95% CI	Abundance	95% CI
January	37 (46.5)	16 – 88	170 (22.3)	110 – 261	207 (21.1)	137 – 311
February	37 (44.1)	16 – 84	184 (23.2)	117 – 288	221 (22.6)	143 – 342
March	18 (100.2)	3 – 90	138 (72.5)	39 – 493	153 (65.4)	48 – 493
April	86 (32.4)	46 – 159	308 (27.0)	183 – 519	393 (22.9)	252 – 612
May	55 (54.9)	20 – 150	172 (36.0)	87 – 341	227 (31.7)	123 – 416
June	7 (100.6)	1 – 38	42 (46.9)	18 – 101	50 (42.7)	22 – 110
July	0		165 (29.3)	94 – 290	163 (29.8)	92 – 290
August	12 (101.6)	2 – 62	167 (35.8)	85 – 330	179 (32.9)	96 – 336
September	41 (52.1)	16 – 106	106 (28.7)	61 – 184	147 (26.2)	89 – 244
October	0		101 (52.2)	39 – 264	103 (51.0)	40 – 265
November	0		0		0	
December	42 (61.4)	14 - 126	124 (39.0)	59 - 260	166 (33.3)	88 - 313

## b) Spotted dolphins

Month	Inner region		Outer region		Total	
	Abundance	95% CI	Abundance	95% CI	Abundance	95% CI
January	12 (101.0)	2 – 59	164 (33.4)	86 – 309	174 (31.8)	95 – 320
February	55 (49.1)	22 – 136	287 (24.9)	177 – 464	342 (23.3)	218 – 536
March	261 (37.8)	128 – 534	330 (35.3)	168 – 646	604 (25.6)	369 – 991
April	179 (29.9)	101 – 317	488 (24.4)	305 – 782	668 (20.1)	452 – 986
May	102 (53.6)	38 – 272	390 (37.3)	192 – 792	491 (30.3)	274 – 878
June	0		78 (40.3)	36 – 167	79 (40.4)	37 – 169
July	0		112 (59.3)	38 – 327	110 (60.3)	37 – 329
August	0		222 (29.3)	126 – 389	222 (29.5)	126 – 390
September	76 (51.6)	29 – 196	364 (22.7)	235 – 566	440 (21.6)	290 – 668
October	103 (73.8)	28 – 376	282 (32.5)	151 – 524	384 (33.9)	201 – 734
November	29 (100.9)	6 – 148	0		29 (100.4)	6 – 151
December	77 (60.4)	26 - 231	126 (50.9)	49 - 323	206 (41.2)	95 - 447

Table 4 Estimates of average monthly abundance and 95% 'percentile' CI for a) dolphins, b) turtles and c) Loggerhead turtles obtained from the density surface modelling. Percentage CVs are given in parentheses.

## a) Dolphins

Month	Inner region		Outer region		Total	
	Abundance	95% CI	Abundance	95% CI	Abundance	95% CI
January	3386 (26.8)	1864 – 5468	9265 (25.3)	5328 – 14575	12652 (25.2)	7333 – 19844
February	3630 (30.9)	1903 – 6191	9931 (27.8)	5430 – 16224	13561 (28.1)	7466 – 22534
March	6157 (27.6)	3330 – 9906	16845 (26.6)	9734 – 27306	23001 (26.3)	13111 – 37029
April	6359 (30.0)	3284 – 10610	17398 (26.6)	9868 – 27855	23758 (27.1)	13309 – 37550
May	6676 (29.1)	3691 – 11261	18266 (24.5)	10779 – 27389	24942 (25.3)	14530 – 38367
June	1109 (36.5)	485 – 2101	3035 (35.2)	1356 – 5689	4144 (35.2)	1844 – 7721
July	2405 (30.7)	1133 – 4033	6580 (29.6)	3365 – 10690	8985 (29.5)	4504 – 14391
August	2681 (28.9)	1459 – 4388	7335 (28.7)	3974 – 12659	10015 (28.3)	5431 – 17215
September	5249 (25.1)	3048 – 8276	14362 (23.1)	8718 – 21647	19611 (23.1)	11668 – 29470
October	5032 (33.9)	2263 – 8931	13767 (31.7)	6817 – 23309	18799 (31.9)	9056 – 32375
November	1529 (64.1)	15 – 3702	4182 (60.5)	44 – 9434	5711 (61.2)	58 – 13100
December	2589 (40.8)	1109 - 5330	7085 (36.6)	3101 - 13527	9674 (37.4)	4137 - 18528

## b) Turtles

Month	Inner region		Outer region		Total	
	Abundance	95% CI	Abundance	95% CI	Abundance	95% CI
January	306 (25.1)	183 – 505	1079 (22.2)	662 – 1675	1385 (22.7)	848 – 2171
February	433 (26.0)	251 – 716	1529 (24.0)	918 – 2401	1962 (24.3)	1169 – 3104
March	450 (22.2)	283 – 700	1588 (20.7)	1017 – 2338	2038 (20.8)	1300 – 3009
April	612 (24.7)	351 – 969	2160 (23.3)	1227 – 3357	2772 (23.4)	1581 – 4268
May	631 (23.4)	393 – 969	2226 (22.6)	1342 – 3421	2856 (22.6)	1730 – 4382
June	353 (22.4)	228 – 540	1247 (21.1)	820 – 1877	1601 (21.2)	1066 – 2420
July	615 (23.7)	367 – 961	2171 (22.9)	1372 – 3321	2787 (22.9)	1759 – 4283
August	475 (23.1)	298 – 745	1676 (21.0)	1094 – 2515	2151 (21.3)	1403 – 3256
September	433 (25.2)	260 – 680	1529 (22.5)	937 – 2262	1962 (23.0)	1207 – 2938
October	378 (30.4)	199 – 659	1335 (29.3)	693 – 2283	1714 (29.4)	889 – 2923
November	141 (37.7)	64 – 281	496 (36.0)	229 – 938	636 (36.2)	295 – 1219
December	228 (24.7)	136 - 366	805 (22.7)	500 - 1229	1033 (23.0)	640 - 1598

## c) Loggerhead turtles

Month	Inner region		Outer region		Total	
	Abundance	95% CI	Abundance	95% CI	Abundance	95% CI
January	159 (29.5)	89 – 271	580 (27.2)	323 – 952	739 (27.5)	414 – 1227
February	315 (29.3)	171 – 554	1152 (28.4)	623 – 2046	1467 (28.4)	796 – 2611
March	371 (27.6)	208 – 617	1358 (26.3)	769 – 2249	1729 (26.4)	990 – 2848
April	319 (32.6)	164 – 586	1166 (31.5)	597 – 2008	1485 (31.6)	759 – 2540
May	446 (28.0)	250 – 775	1631 (26.8)	930 – 2701	2077 (26.9)	1184 – 3436
June	274 (25.1)	164 – 445	1004 (24.6)	609 – 1622	1278 (24.5)	774 – 2063
July	485 (28.0)	269 – 806	1774 (27.1)	999 – 2876	2259 (27.1)	1278 – 3629
August	354 (27.3)	205 – 578	1294 (26.0)	762 – 2062	1647 (26.1)	967 – 2633
September	283 (29.8)	157 – 509	1035 (27.9)	599 – 1750	1318 (28.2)	766 – 2259
October	235 (33.8)	113 – 436	861 (33.4)	413 – 1546	1096 (33.3)	527 – 1961
November	77 (45.2)	27 – 173	283 (44.5)	102 – 610	361 (44.5)	128 – 800
December	144 (29.1)	82 - 247	526 (27.4)	297 - 901	670 (27.6)	381 - 1147

Figure 1 Region of interest for the Jacksonville USWTR off the coast of Florida (shown in blue).

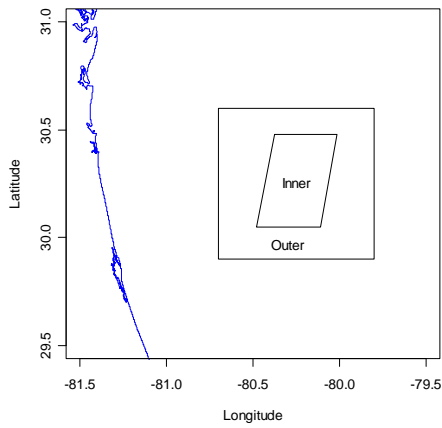
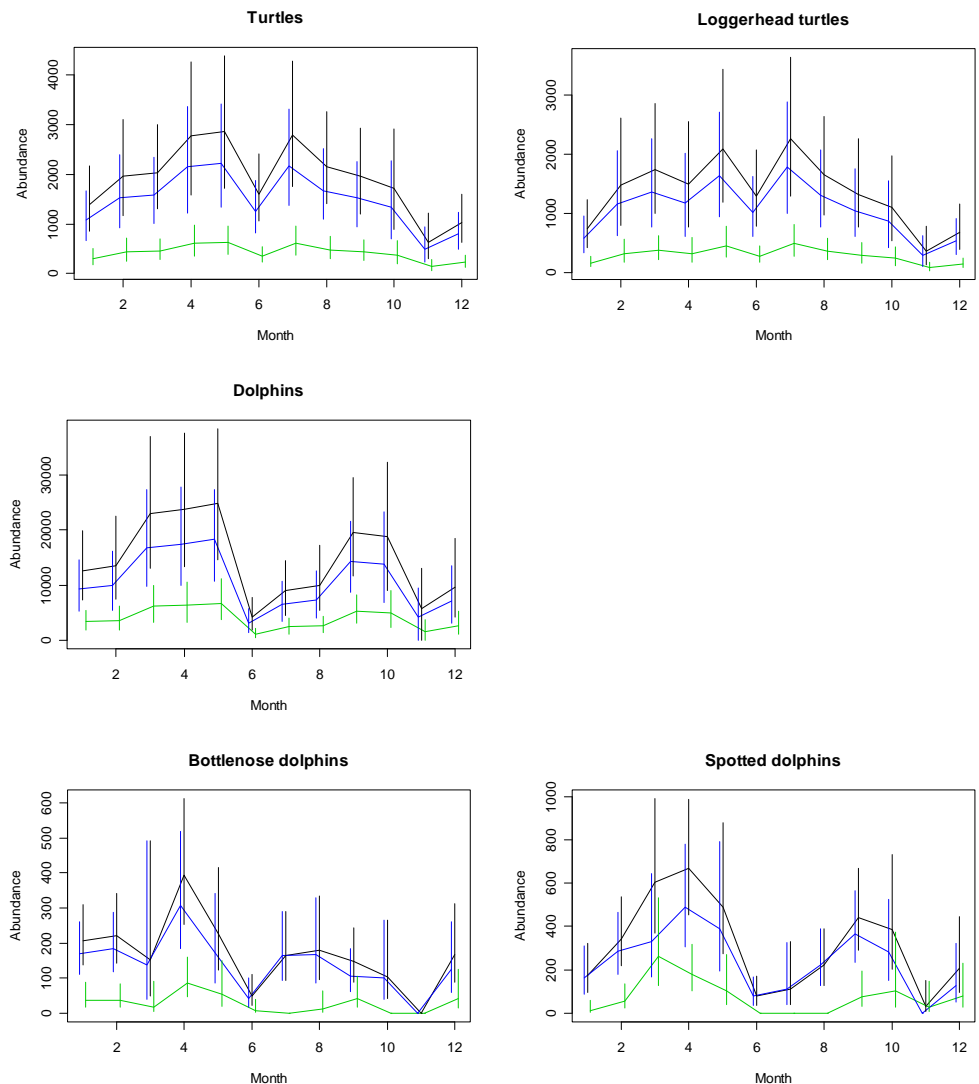
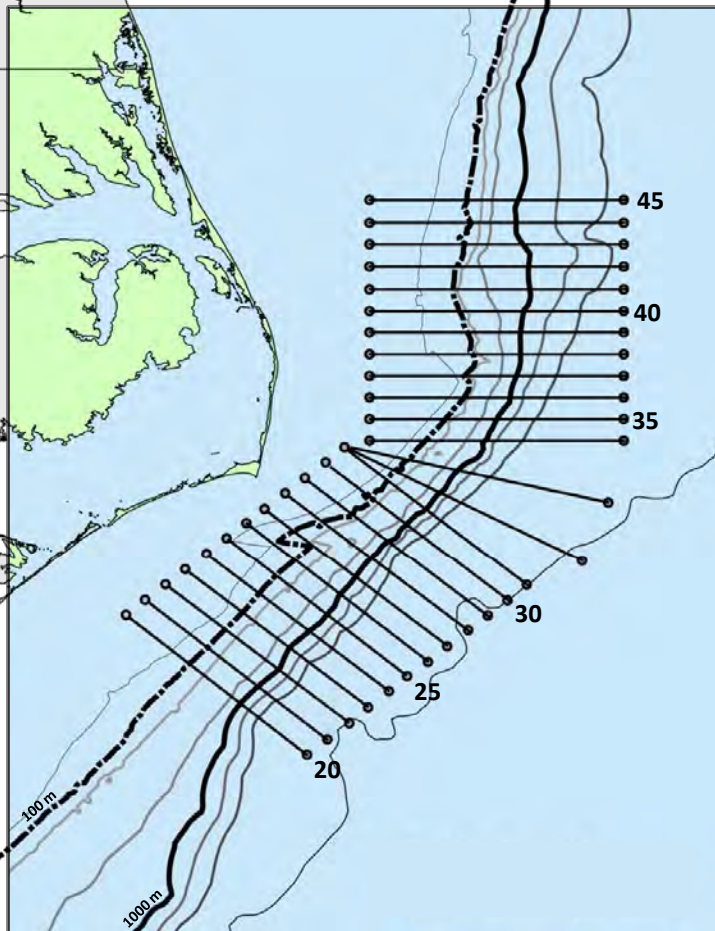


Figure 2 Estimates of average monthly abundance with 95% CI (vertical lines); green = inner region, blue = outer region and black = total region. Note abundances for bottlenose and spotted dolphins these are relative abundances obtained using data from the aerial survey only and the CDS estimator.



# Cape Hatteras Aerial Surveys Annual Report to the US NAVY



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## Summary of Cape Hatteras Aerial Surveys

This chapter describes the aerial surveys conducted in Cape Hatteras, North Carolina, between May 2011 and December 2011. The aim was to conduct two days of effort each month, flying a subset of 26 tracklines that cover the area. This goal was achieved in five of the eight months. Unfavorable weather conditions precluded any survey effort from being conducted during the three remaining months (August 2011, September 2011 and December 2011). A total of 64 tracklines (5027 km) were covered in the Cape Hatteras survey site during this reporting period. While survey conditions were dominated by Beaufort Sea State (BSS) 3, there was effort in both BSS 4 and 5. Other aerial surveys have demonstrated that the rate of cetacean sightings is negatively affected by an increase in the BSS (e.g. Gómez de Segura *et al.* 2006, DeMaster *et al.* 2001). This trend also was apparent in the present effort, as sightings dropped from 29.42 to 5.69 sightings per 1000 km as BSS increased from 2 to 5.

A total of 66 sightings of 1270 cetaceans were encountered while on effort during the ten days of aerial surveys in the study area (Table 1, Fig. 1). Thirteen species of cetaceans were documented including short-finned pilot whales (*Globicephala macrorhynchus*; 17 sightings of 327 individuals), bottlenose dolphins (*Tursiops truncatus*; 13 sightings of 272 individuals), sperm whales (*Physeter macrocephalus*; ten sightings of 18 individuals), Atlantic spotted dolphins (*Stenella frontalis*; three sightings of 84 individuals), mesoplodont beaked whales (*Mesoplodon spp*; three sightings of four individuals), Cuvier's beaked whales (*Ziphius cavirostris*; two sightings of five individuals), spinner dolphins (*Stenella longirostris*; one sighting of 70 individuals), Clymene dolphins (*Stenella clymene*; one sighting of 70 individuals), rough-toothed dolphins (*Steno bredanensis*; one sighting of four individuals), Fraser's dolphins (*Lagenodelphis hosei*; one sighting of 75 individuals), common dolphins (*Delphinus delphis*; one sighting of 300 individuals), dwarf or pygmy sperm whale (*Kogia spp*; one sighting of one individual), and fin whale (*Balaenoptera physalus*; one sighting of one individual). There were seven sightings (35 individuals) where species identity could not be established with 100% certainty. Four of these sightings were of animals of considerable size and are listed here as "unidentified cetaceans". The remaining three sightings are listed as "unidentified delphinids".



Thirty nine sea turtle sightings were recorded during this survey period. Twenty nine were identified as loggerhead (*Caretta caretta*) sea turtles, and three as leatherback (*Dermochelys coriacea*) sea turtles. No species identification could be established for the remaining seven sightings, and they are listed here as “unidentified sea turtles”. (Tables 17-18, Fig. 19).

In addition to cetaceans and sea turtles, other pelagic marine vertebrates (e.g. a small number of shark species, manta rays, and ocean sunfish) were observed (Tables 19-21, Fig 21). Commercial, Coast Guard and recreational vessels were also encountered in the survey area (Tables 22-24, Fig. 22-24).

**Table 1.** Total number of sightings and individuals for each species by month from May 2011 – December 2011 for the Hatteras survey area. Asterisk denotes a sighting that was off effort.

		2011								Total
		May	June	July	August	September	October	November	December	
<i>Globicephala macrorhynchus</i>	Sightings	6	1	6			3	1		17
	# of individuals	118	10	176			20	3		327
<i>Tursiops truncatus</i>	Sightings		3	5				7*		15
	# of individuals		27	86				159*		272
<i>Physeter macrocephalus</i>	Sightings	2		7*				1		10
	# of individuals	3		14*				1		18
<i>Stenella frontalis</i>	Sightings	1						2		3
	# of individuals	50						34		84
<i>Mesoplodon</i> spp.	Sightings	2		1						3
	# of individuals	3		3						6
<i>Ziphius cavirostris</i>	Sightings		1				1			2
	# of individuals		4				1			5
<i>Stenella longirostris</i>	Sightings						1			1
	# of individuals						70			70
<i>Stenella clymene</i>	Sightings						1			1
	# of individuals						70			70
<i>Steno bredanensis</i>	Sightings	1								1
	# of individuals	4								4
<i>Lagenodelphis hosei</i>	Sightings	1								1
	# of individuals	75								75
<i>Delphinus delphis</i>	Sightings	1								1
	# of individuals	300								300
<i>Kogia</i> spp.	Sightings						1			1
	# of individuals						1			1
<i>Balaenoptera physalus</i>	Sightings						1			1
	# of individuals						1			1
Unidentified delphinid	Sightings	1					2	2		5
	# of individuals	4					11	18		33
Unidentified cetacean	Sightings	2*	2							4
	# of individuals	2*	2							4
Total sightings		17	7	19	0	0	10	13	0	66
Total individuals		559	43	279	0	0	174	215	0	1270

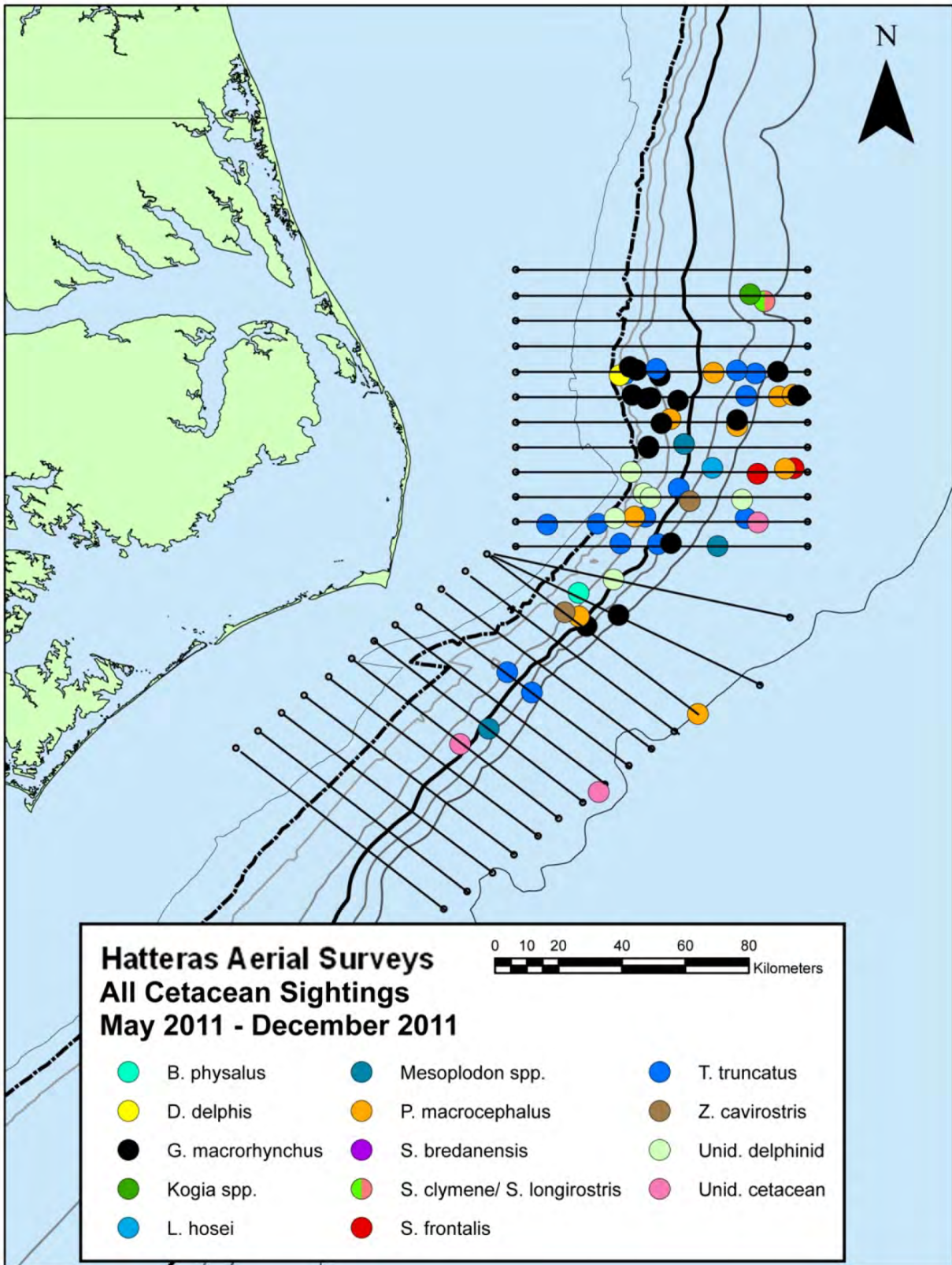


Figure 1. All cetacean sightings during aerial surveys of the Hatteras survey area from May 2011 – December 2011.

## **Methodology**

### Survey Design and Logistics

Aerial survey effort was initiated in the waters off Cape Hatteras, North Carolina in May of 2011 to assess the distribution and abundance of offshore cetacean species and sea turtles. These surveys are included in the Navy's Atlantic Fleet Active Sonar Training (AFAST) Monitoring Program, established to document marine species that could potentially be impacted by naval activities. The approximately 16000 km<sup>2</sup> survey area covers continental shelf waters as well as deeper waters beyond the shelf break. Placement of the survey area was designed to incorporate a large portion of the Cape Hatteras Special Research Area (CHSRA) in support of current research assessing fishery interactions between short-finned pilot whales and the local greenstick fisheries. The survey area excludes coastal waters to minimize survey effort in areas where the spatial distribution and relative abundance of coastal bottlenose dolphins has previously been established (Torres *et al.* 2003; Torres *et al.* 2005). Twenty six tracklines, ranging from 73.5 to 81.5 km long and orientated perpendicular to the coastline were evenly placed across the survey site.

Survey flights originated from the Fixed-base Operator (FBO) in Wilmington, NC. with additional effort being conducted from the Dare County Regional Airport in Manteo, NC. Utilizing both airports maximized "on effort" survey time by decreasing transit time to and from the tracklines surveyed. A complete description of survey methods can be found in the Methodology section in the Onslow Bay Aerial Survey chapter of this report.

*Table 2.* Coordinates for trackline end points for the Hatteras survey area.

Transect Line		Eastern Waypoint		Western Waypoint	
Line	Latitude	Longitude	Latitude	Longitude	
20	34.770853	-75.954044	34.315878	-75.364928	
21	34.819136	-75.891558	34.365250	-75.298656	
22	34.870261	-75.824811	34.418267	-75.226703	
23	34.919967	-75.760906	34.469392	-75.166111	
24	34.972511	-75.691319	34.522408	-75.097944	
25	35.023633	-75.625994	34.571642	-75.039247	
26	35.073339	-75.562089	34.617083	-74.971081	
27	35.118783	-75.502444	34.668208	-74.908594	
28	35.169908	-75.435697	34.721228	-74.840431	
29	35.219611	-75.371792	34.768564	-74.77605	
30	35.270736	-75.303628	34.817794	-74.711672	
31	35.319019	-75.242561	34.868919	-74.649186	
32	35.319019	-75.242561	34.948447	-74.469303	
33	35.319019	-75.242561	35.139689	-74.384097	
34	35.340331	-75.161133	35.340331	-74.333672	
35	35.410389	-75.161133	35.410389	-74.333672	
36	35.48045	-75.161133	35.48045	-74.333672	
37	35.550508	-75.161133	35.550508	-74.333672	
38	35.620569	-75.161133	35.620569	-74.333672	
39	35.690628	-75.161133	35.690628	-74.333672	
40	35.762581	-75.161133	35.762581	-74.333672	
41	35.832642	-75.161133	35.832642	-74.333672	
42	35.906486	-75.161133	35.906486	-74.333672	
43	35.978439	-75.161133	35.978439	-74.333672	
44	36.048500	-75.161133	36.048500	-74.333672	
45	36.122344	-75.161133	36.122344	-74.333672	

### Trackline Effort in Hatteras Survey Area

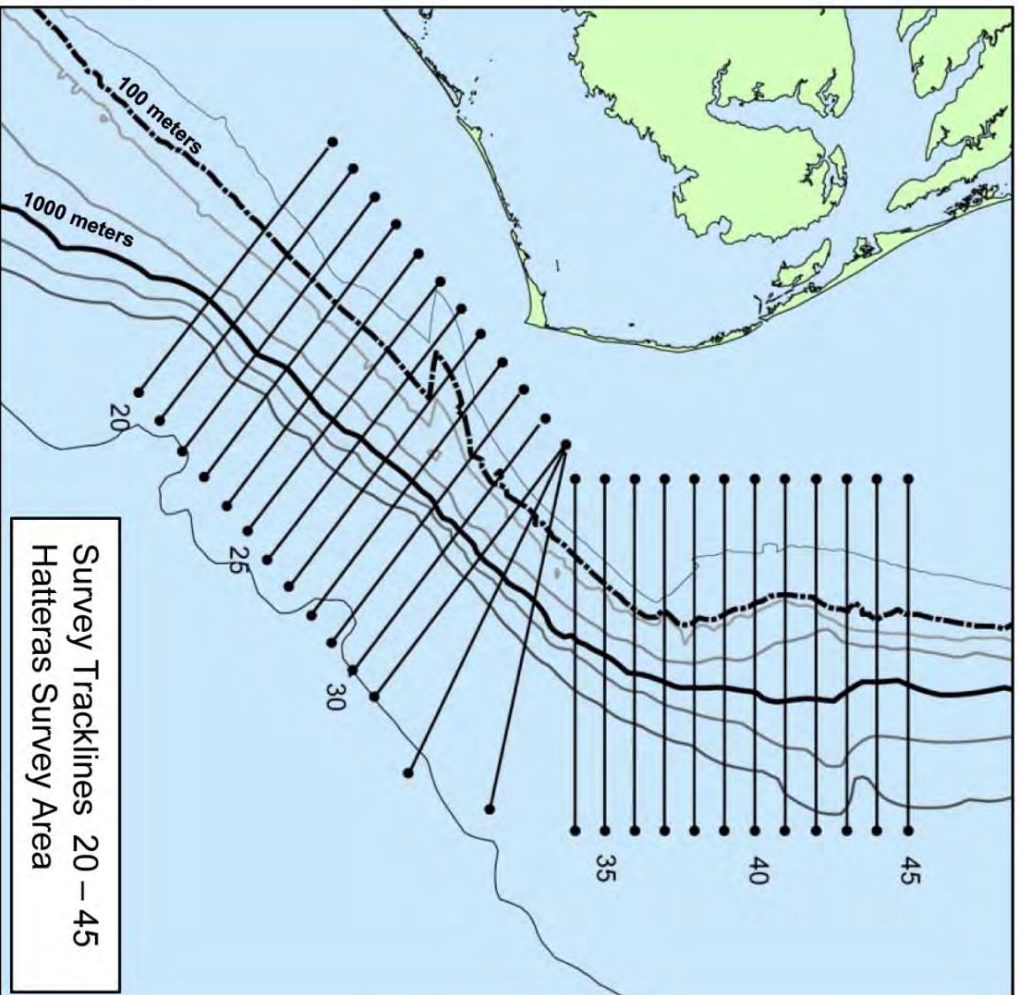
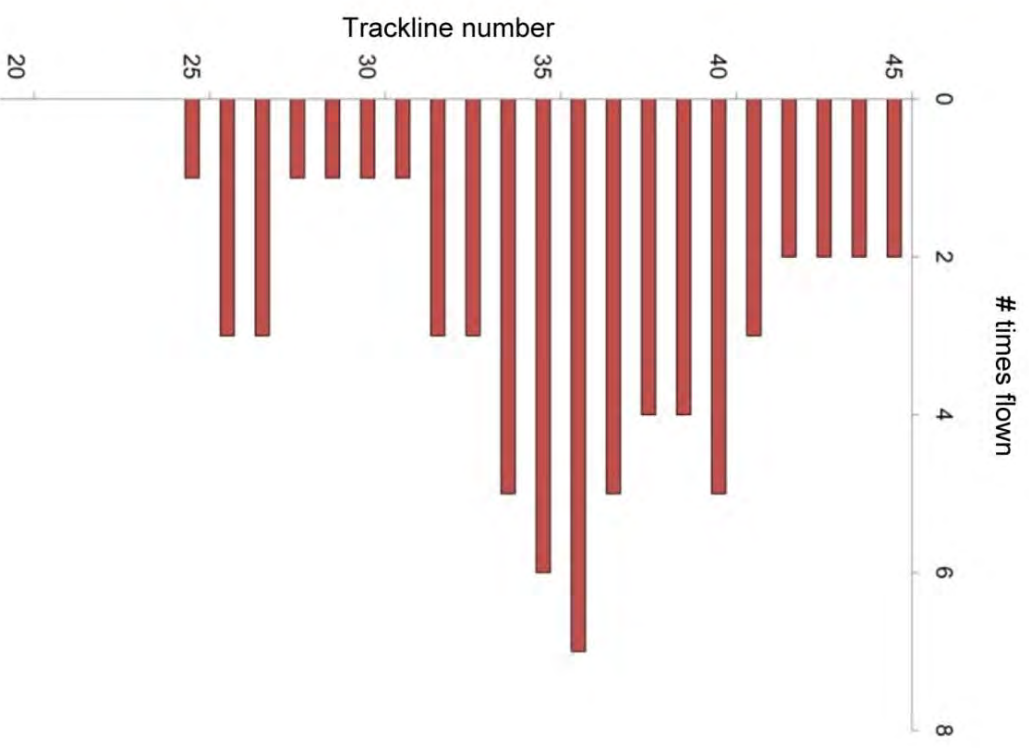


Figure 2. Survey tracklines in the Hatteras survey area.

## Results

Sixty four tracklines totaling 5027 km were surveyed from May 2011 to December 2011. The goal of two days of effort in the Cape Hatteras survey area each month was achieved in five of these eight months (Table 3). Unfavorable survey conditions prevented any aerial surveys from being conducted during the remaining three months.

An average Beaufort Sea State (BSS) value was calculated each month as a way to compare conditions across time. This average was calculated by taking the distance flown at each sea state multiplied by the BSS number (*i.e.* BSS 1 x distances would be multiplied by 1). These values were summed and then divided by the total distance flown that month. Weather patterns during the first three months allowed effort to be focused in favorable “weather windows” with lower sea state conditions. In subsequent months, periods of suitable survey conditions were increasingly difficult to predict, and prevented surveys from being conducted in August and September. Despite the higher sea states in October and November, days with the lowest forecasted conditions were flown to ensure coverage of the survey area. Although these days were dominated by BSS 4 or 5, a number of cetacean sightings were still recorded. Surveys could not be flown in December due to unfavorable survey conditions. Survey conditions for this reporting period ranged from a BSS 1 to 5, with the majority of the surveys flown in a BSS 3 [BSS 1: 45 km (1%), BSS 2: 850 km (17%), BSS 3: 1557 km (31%), BSS 4: 1336 km (27%), BSS 5: 1229 km (24%)(Fig. 3a-c)]. Cetacean sighting rates dropped off as BSS increased, with 29.42 sightings/1000 km surveyed in BSS 2, 15.32 sightings/1000 km surveyed in BSS 3, 7.49 sightings/1000 km surveyed in BSS 4, and 5.69 sightings/1000 km surveyed in BSS 5(Fig. 4a-c). A small amount of effort was conducted in a BSS 1 (45.4 km), but no cetacean sightings were recorded during this period.

Mean sighting distance for all cetacean sightings was 1 km (SD=0.58). Sighting distances for Beaufort Sea States 2 and 3 were slightly shorter than those for BSS 4 and 5 (Fig.5a-b). Average sighting distances are normally calculated after removing outliers, defined as any value in excess of three standard deviations from the mean (Mean=1.0 km, SD=0.58\*3=1.74, Outlier >2.74). None of the sighting distances were identified as outliers during this reporting period. Ten sightings for which assumed locations was collected or sightings that were off effort are excluded from these calculations.

Table 3. Tracklines and km flown during aerial surveys of the Hatteras survey area between May 2011 and December 2011. Trackline numbers are listed in the order in which they were flown.

Date	Tracklines Flown AM	Tracklines Flown PM	Total km Flown
26-May-2011	34 to 36	27, 26	341.1
27-May-2011	41 to 38	36, 37	440.4
14-Jun-2011	25 to 28	29 to 33	672.9
15-Jun-2011	34 to 37	N/A	298.5
30-Jul-2011	40, 39	38 to 35	445.7
31-Jul-2011	34 to 36	27, 26	602.1
25-Oct-2011	N/A	36 to 41	442.5
26-Oct-2011	45 to 40	32 to 35	746.8
12-Nov-2011	45 to 42	40 to 38	592.8
13-Nov-2011	37 to 34	33, 32	444.5
			5027.4

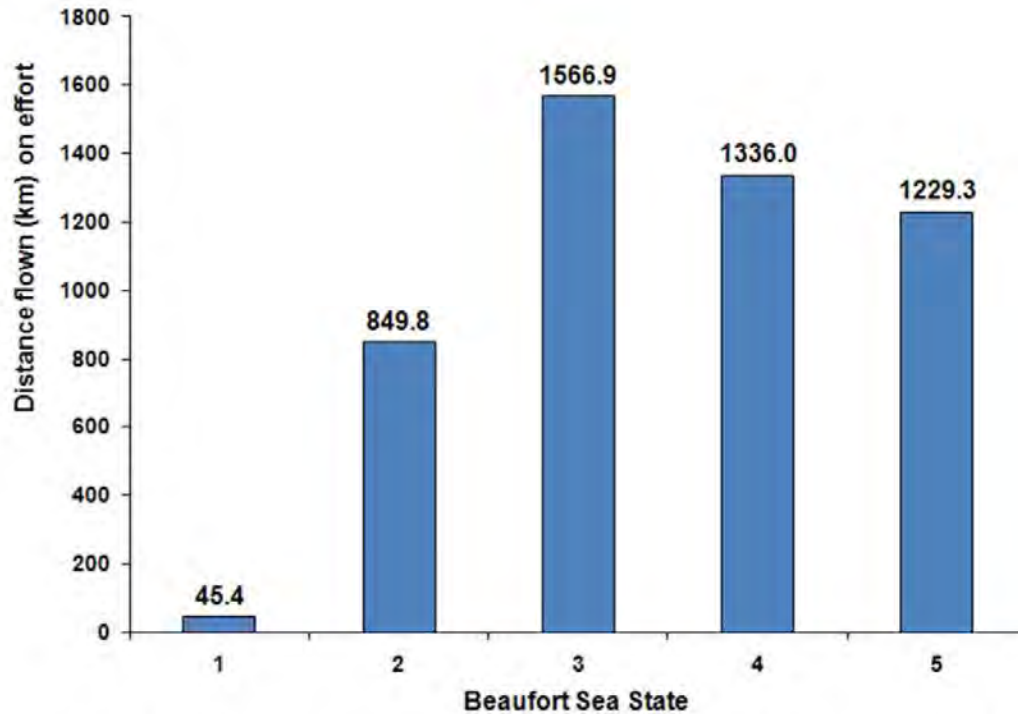


Figure 3a. Total distance surveyed per Beaufort Sea State during the May 2011 - December 2011 aerial surveys in the Hatteras survey area.

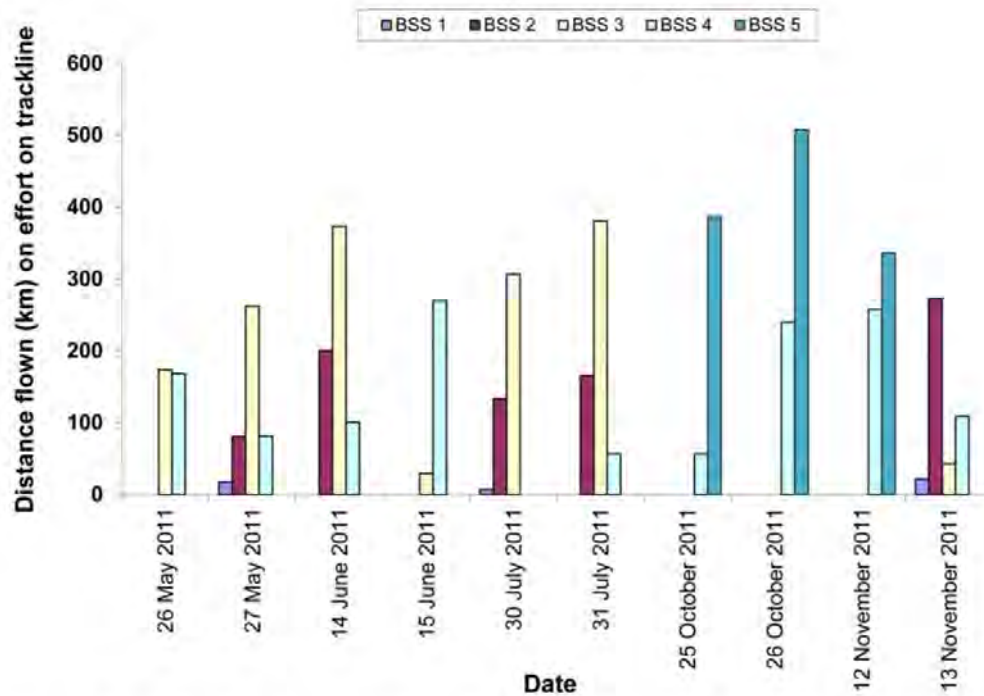


Figure 3b. Effort by Beaufort Sea State for each day during the May 2011 - December 2011 aerial surveys in the Hatteras survey area.



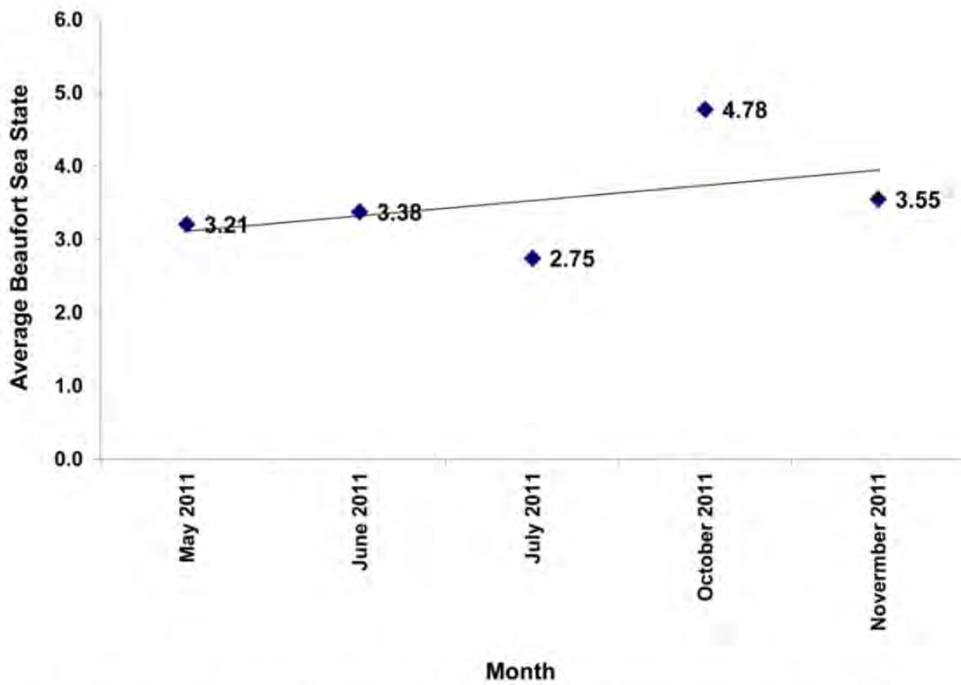


Figure 3c. Average Beaufort Sea State for each month during the May 2011 - December 2011 aerial surveys in the Hatteras survey area. Values were calculated using the formula  $AvgBSS = [(Distance @ BSS 1 \times 1) + (Distance @ BSS 2 \times 2) + \dots] / Total \text{ distance flown that day}$

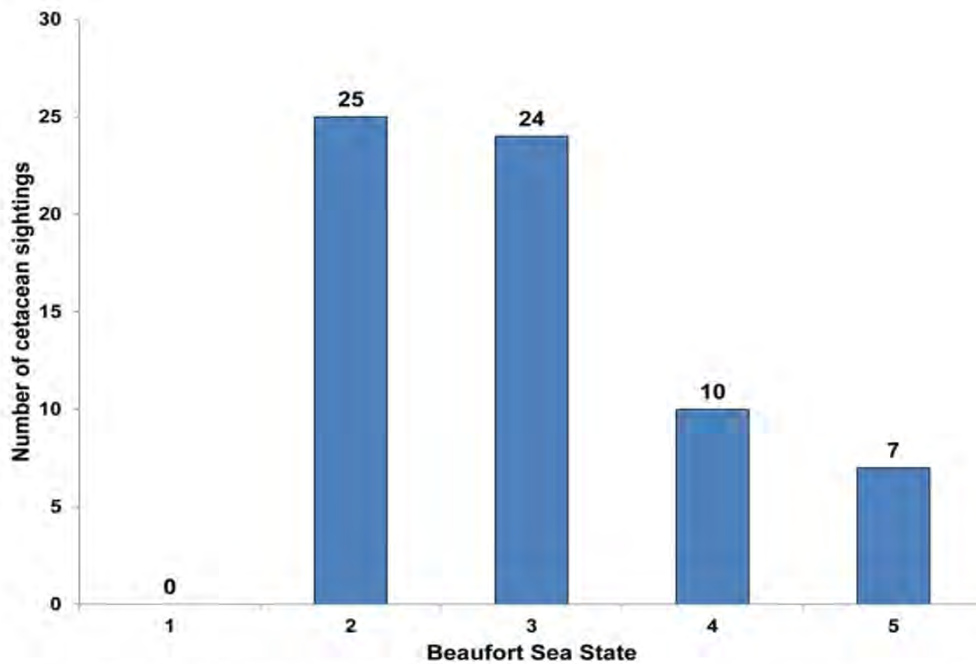


Figure 4a. Total number of cetacean sightings per Beaufort Sea State during the May 2011 - December 2011 aerial surveys in the Hatteras survey area.

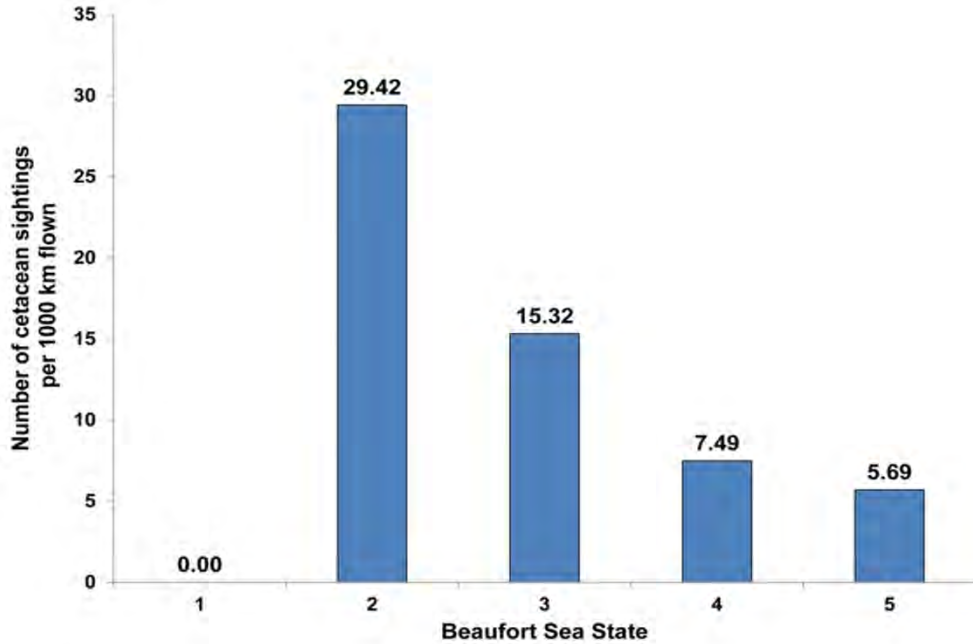


Figure 4b. Cetacean sightings per 1000 km flown by Beaufort Sea State during the May 2011 - December 2011 aerial surveys in the Hatteras survey area.

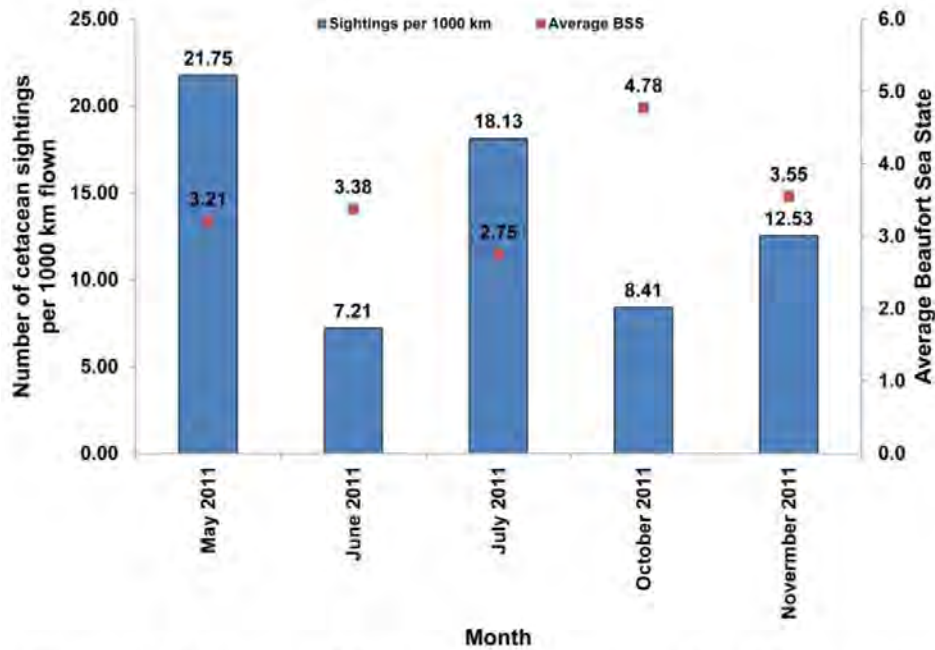


Figure 4c. Cetacean sightings per 1000 km surveyed and the average Beaufort Sea State per month during the May 2011 - December 2011 aerial surveys in the Hatteras survey area.

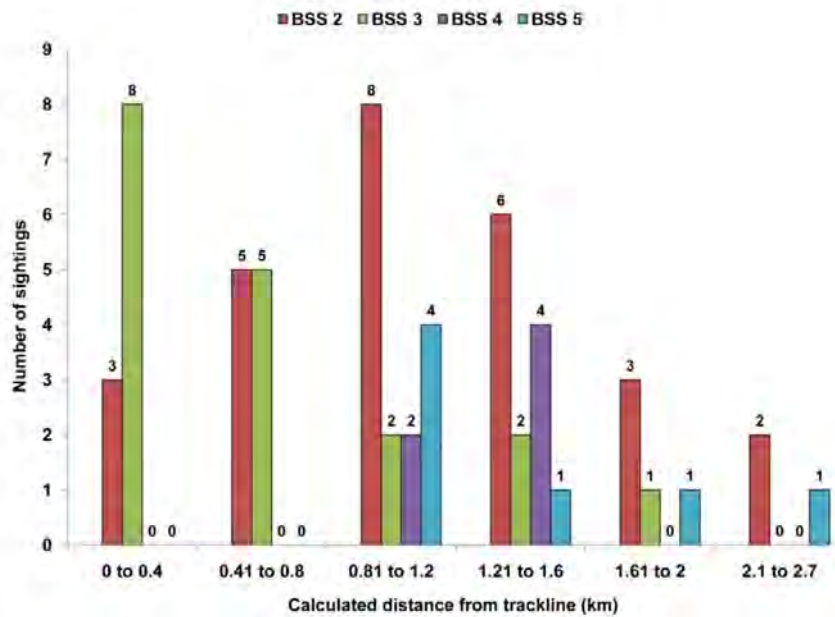


Figure 5a. Sighting distances by Beaufort Sea State for 55 of 66 cetacean sightings during the May 2011 - December 2011 aerial surveys in the Hatteras survey area.

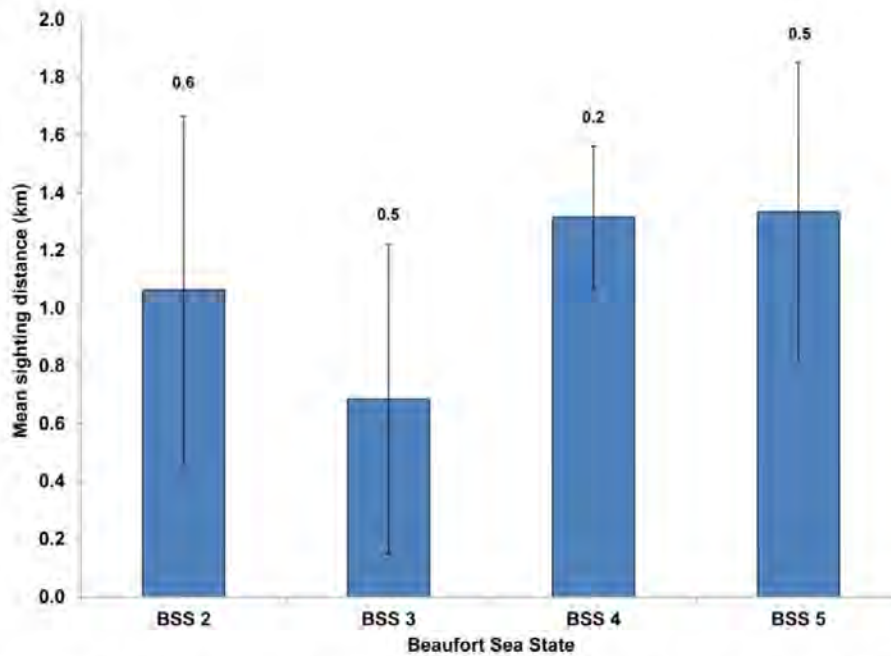


Figure 5b. Mean sighting distances by Beaufort Sea State for 55 of 66 cetacean sightings during the May 2011 - December 2011 aerial surveys in the Hatteras survey area. Error bars denote standard deviation for each category.

## Marine Mammal Sightings

A total of 66 sightings of 1270 individual cetaceans representing thirteen species were observed while on effort during the reporting period. Two endangered species – sperm (*Physeter macrocephalus*) and fin (*Balaenoptera physalus*) whales – were encountered in the survey area. All identified species sighted are listed below in order of decreasing number of sightings (*i.e.* most commonly sighted species first). Total number of individuals is based upon the best estimate of group size. Summaries for individual sightings are in Appendix I. Daily sightings are summarized in Appendix J.

### Short-finned pilot whale (*Globicephala macrorhynchus*) (Table 4, Fig. 6)

The short-finned pilot whale was the most commonly observed cetacean species during the present study, based both on number of sightings (17) and number of individuals (327). This species was recorded during all five of the months in which surveys were conducted. Group sizes ranged from three to 90 individuals (mean=19).

Sightings of pilot whales in the western North Atlantic occur primarily near the continental shelf break (Waring *et al.* 2010), and sightings in the Cape Hatteras survey area followed this pattern. Pilot whales were observed from the 100 m isobath to waters greater than 2000 m deep (Fig. 6). As both species of *Globicephala* have been reported in the waters north of Cape Hatteras, careful examination of all photos was conducted to determine whether long-finned pilot whales (*Globicephala melas*) were encountered. As a result all sightings were identified as *Globicephala macrorhynchus*. The difficulty of differentiating short-finned and long-finned pilot whales at sea results in NMFS reporting stock numbers and status for both species grouped as *Globicephala* spp. (Waring *et al.* 2010). The abundance estimate of *Globicephala* spp. (24674, CV=0.45) is based upon shipboard surveys along the outer continental shelf of the U.S. Atlantic between Florida and Maryland in 2004 (Waring *et al.* 2010). These estimates were combined with spatial distribution analysis, as well as genetic analyses, to generate the current value of 24674. The status of short-finned pilot whales in the U.S. Atlantic is currently unknown (Waring *et al.* 2010).

Table 4. Short-finned pilot whale (*Globicephala macrorhynchus*) sightings in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
27-May-11	9:54	9	35.847822	-74.838262	E	41	2	90°	46
27-May-11	10:08	14	35.823289	-74.753615	E	41	2	90°	13
27-May-11	10:45	25	35.761017	-74.779985	W	40	2	45°	13
27-May-11	10:52	29	35.768861	-74.831074	W	40	1	90°	23
27-May-11	11:21	38	35.688751	-74.748692	E	39	2	90°	13
27-May-11	11:40	47	35.698266	-74.534039	E	39	2	90°	10
14-Jun-11	15:19	49	35.116018	-74.960536	SE	31	2	100°	10
30-Jul-11	10:09	5	35.827493	-74.853076	E	40	3	90°	90
30-Jul-11	10:19	9	35.839234	-74.818899	E	40	3	100°	25
30-Jul-11	11:29	41	35.753212	-74.701881	W	39	3	90°	4
30-Jul-11	11:41	45	35.758390	-74.789591	W	39	1	45°	6
30-Jul-11	14:23	67	35.619175	-74.785925	W	37	3	90°	43
31-Jul-11	10:20	16	35.147153	-74.870689	E	32	2	90°	8
25-Oct-11	12:33	13	35.623382	-74.785817	E	38	1	100°	13
26-Oct-11	12:35	29	35.767674	-74.360549	W	40	1	90°	4
26-Oct-11	12:14	23	35.834532	-74.419003	E	41	2	60°	3
13-Nov-11	11:33	52	35.349782	-74.721951	W	34	1	90°	3

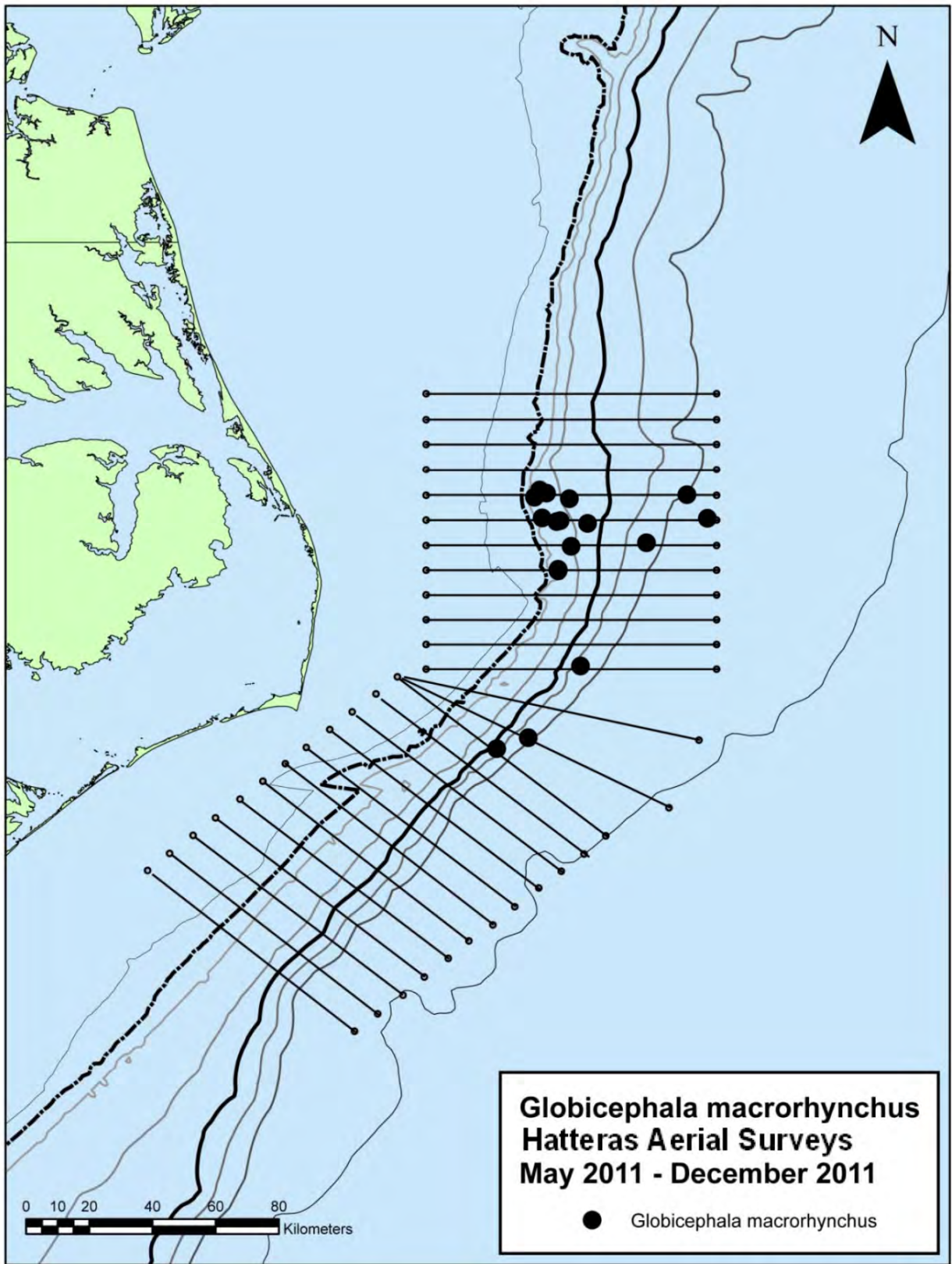


Figure 6. Short-finned pilot whale (*Globicephala macrorhynchus*) sightings.

Bottlenose dolphins (*Tursiops truncatus*) (Table 5, Fig. 7)

This species was observed 15 times, for a total of 272 individuals, and was observed during three of the five survey months of this reporting period. Group size ranged between two to 40 individuals (mean=18). The majority of sightings occurred farther than 37 km from shore and in waters beyond the 100 m isobath. Based on the distance from shore (*i.e.* greater than 34 km), these bottlenose dolphins were most likely the offshore ecotype (Torres *et al.* 2003). The current best estimate of offshore bottlenose dolphin in the western Atlantic, between central Florida and Canada, is 81588 (CV=0.17) (Waring *et al.* 2008). The status of the offshore bottlenose dolphins stock in the Northwest Atlantic is unknown.

Table 5. All bottlenose dolphin (*Tursiops truncatus*) sightings in the Hatteras survey area for surveys conducted from May 2011 - December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
14-Jun-11	11:36	23	34.928116	-75.116029	NW	28	3	90°	18
14-Jun-11	11:48	25	34.985284	-75.185588	NW	28	2	90°	2
14-Jun-11	15:03	45	35.154789	-75.023044	SE	31	2	90°	7
30-Jul-11	10:09	5	35.827493	-74.853076	E	40	3	90°	11
30-Jul-11	10:34	13	35.842294	-74.763221	E	40	2	90°	25
30-Jul-11	10:48	18	35.837776	-74.534692	E	40	2	90°	8
30-Jul-11	10:56	22	35.829427	-74.482279	E	40	2	45°	12
30-Jul-11	11:19	37	35.766473	-74.508376	W	39	2	90°	30
13-Nov-11	10:25	21	35.504660	-74.699905	W	36	1	90°	30
13-Nov-11	10:44	27	35.402847	-75.072340	E	35	3	90°	20
13-Nov-11	10:53	31	35.404918	-74.930050	E	35	2	100°	40
13-Nov-11	11:03	39	35.424565	-74.794380	E	35	2	90°	15
13-Nov-11	11:14	43	35.420423	-74.509397	E	35	3	90°	12
13-Nov-11	11:37	54	35.347230	-74.758430	W	34	3	90°	12
13-Nov-11	11:43	58	35.349374	-74.864955	W	34	2	45°	30

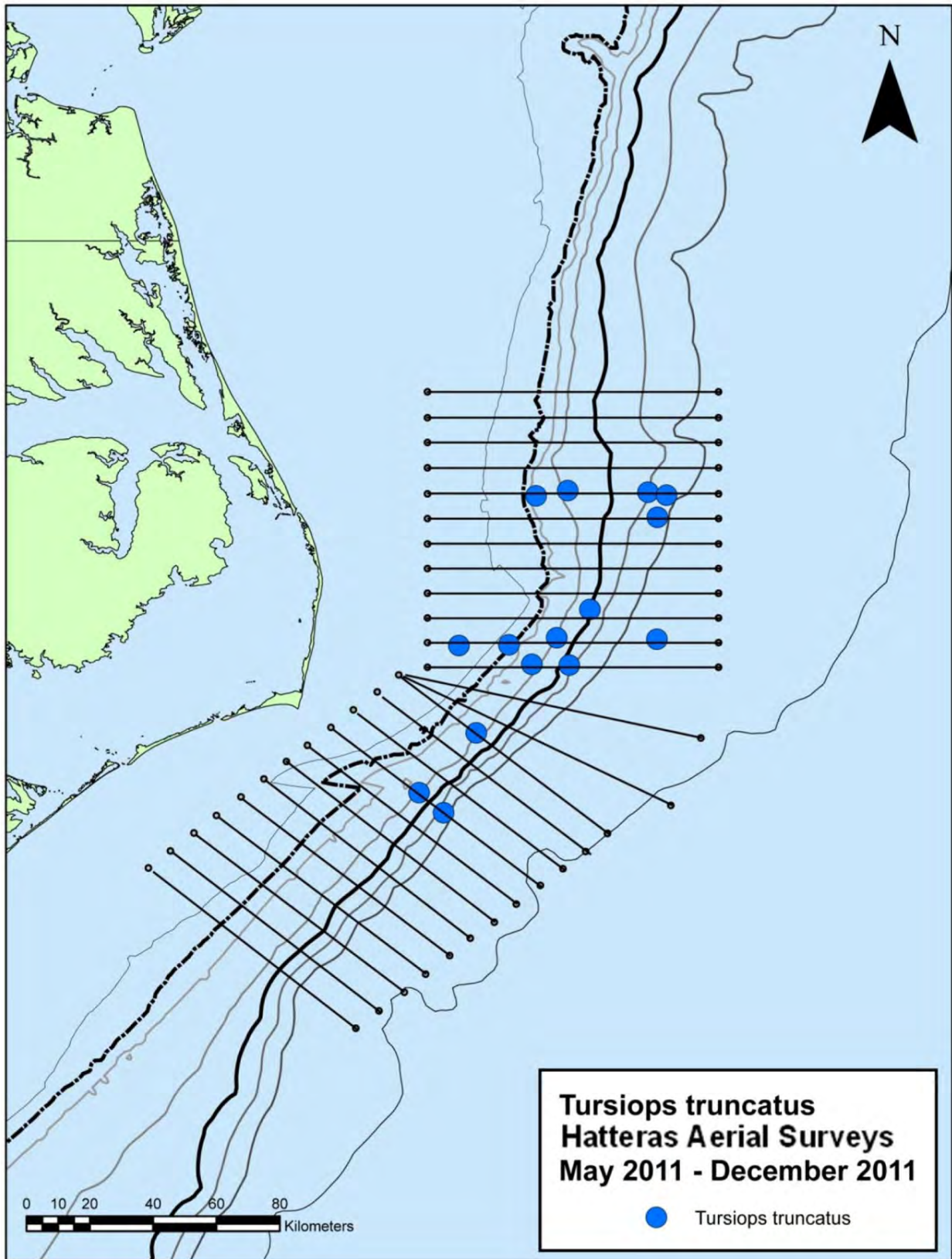


Figure 7. Bottlenose dolphin (*Tursiops truncatus*) sightings.



Sperm whale (*Physeter macrocephalus*) (Table 6, Fig. 8)

This species was observed 10 times, for a total of 18 individuals, and was seen in three of the five months surveyed during this reporting period. These animals were observed either as individuals, pairs, or groups of three. All sightings were recorded beyond the continental shelf, in depths greater than 100 m. Sperm whales are listed as endangered under the Endangered Species Act, and the current best population estimate in the western North Atlantic is 4804 (CV=0.38) (Waring *et al.* 2007).

Table 6. Sperm whale (*Physeter macrocephalus*) sightings in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
27-May-11	10:18	19	35.831716	-74.600833	E	41	2	90°	2
27-May-11	11:25	42	35.700880	-74.723435	E	39	3	90°	1
30-Jul-11	11:08	29	35.769256	-74.376584	W	39	2	45°	1
30-Jul-11	11:11	32	35.764706	-74.414867	W	39	1	90°	3
30-Jul-11	13:56	58	35.681309	-74.533918	E	38	3	60°	2
30-Jul-11	15:02	76	35.560734	-74.398325	E	36	3	90°	2
31-Jul-11	10:16	15	35.146405	-74.870301	E	32	2	90°	3
31-Jul-11	11:01	27	35.143140	-74.982232	W	31	2	60°	1
31-Jul-11	10:48	24	34.867745	-74.645303	W	31	2	90°	2
13-Nov-11	10:59	36	35.424983	-74.824943	E	35	3	90°	1

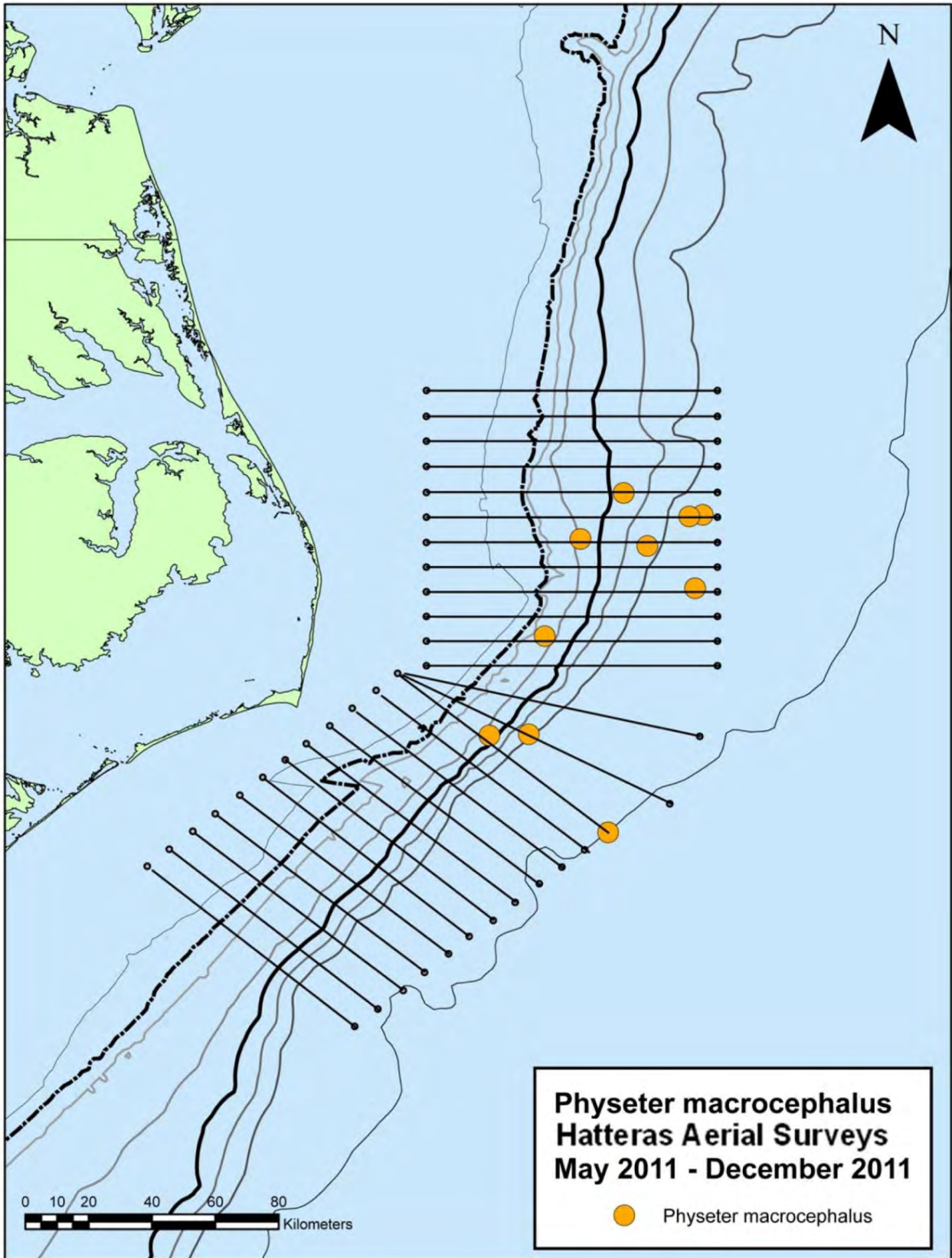


Figure 8. Sperm whale (*Physeter macrocephalus*) sightings.

Atlantic spotted dolphins (*Stenella frontalis*) (Table 7, Fig. 9)

Groups of spotted dolphins were observed in May and November 2011 three times totaling 50 individuals. Group size ranged between 13 and 50 (mean=28). There are two distinct forms, or ecotypes, of the Atlantic spotted dolphin in the western north Atlantic: a heavily spotted, larger form that typically occurs on the continental shelf and is most often encountered around the 200 m isobath or shallower water, and a less spotted and smaller form which occurs further offshore and around islands (Perrin *et al.* 1987, 1994). The absence of spots, size of animals and distance from shore suggests these spotted dolphins belong to the offshore body form. The abundance estimate for *S. frontalis* (both inshore and offshore ecotypes) in the western north Atlantic is 50978; the status of the stock(s) is/are unknown (Waring *et al.* 2007).

*Table 7.* All spotted dolphin (*Stenella frontalis*) sightings in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
27-May-11	12:07	54	35.630056	-74.684793	W	38	1	45°	50
13-Nov-11	9:42	8	35.545902	-74.476016	E	37	1	100°	13
13-Nov-11	10:05	13	35.562103	-74.373883	E	37	3	100°	21

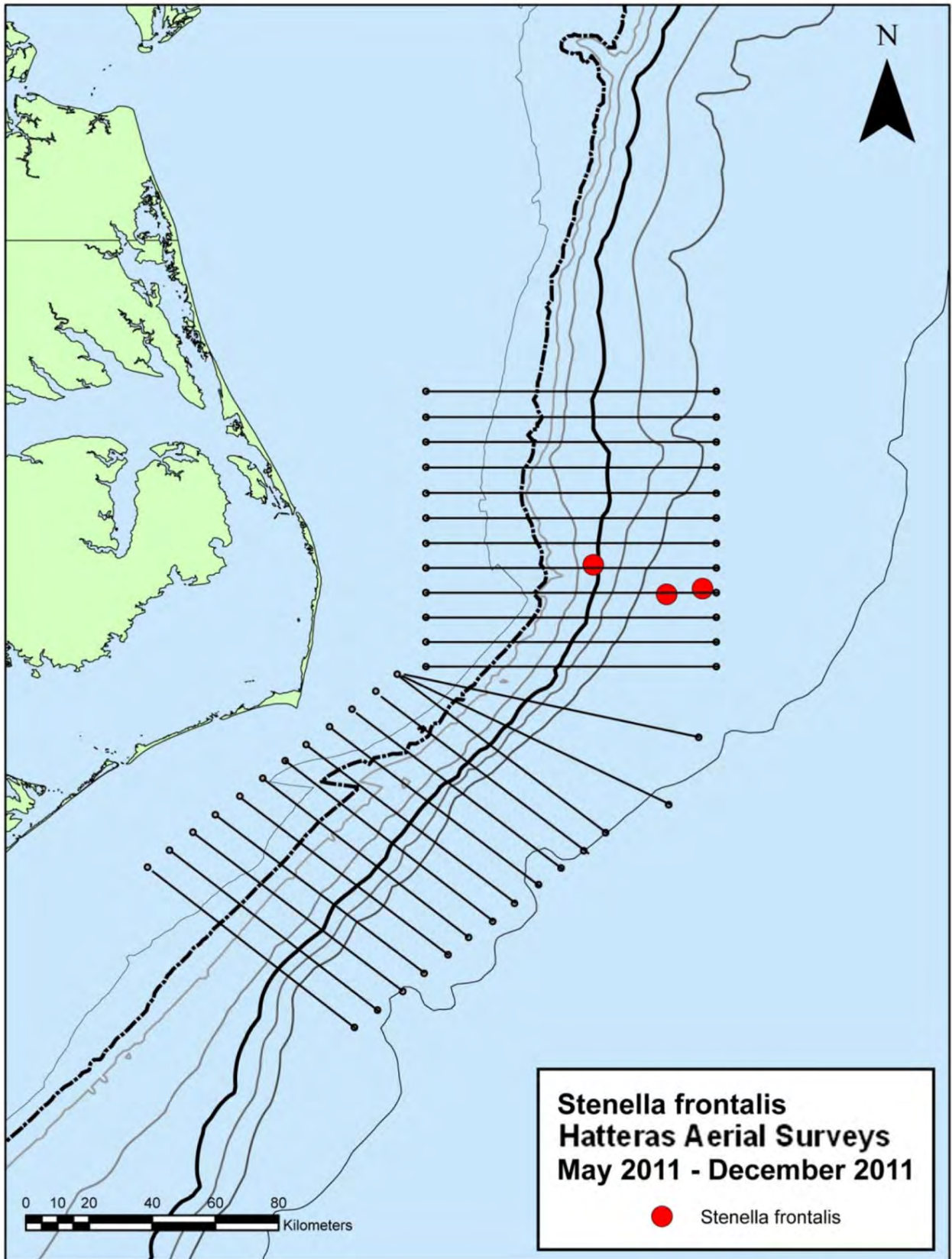


Figure 9. Spotted dolphin (*Stenella frontalis*) sightings.

Beaked whale (*Mesoplodon* spp.) (Table 8, Fig. 10)

Animals were identified as belonging to the genus *Mesoplodon* on three occasions. Sightings occurred near or offshore of the 1000 m isobath and ranged from one to three animals. The difficulty in differentiating the various species of beaked whales (*Mesoplodon* spp. and *Ziphius* sp.) has lead NMFS to create a single combined stock estimate for all species in the western Atlantic. Surveys conducted in 2004 from Maryland to Florida resulted in an estimate abundance at 674 animals (CV=0.36). The status of the various beaked whales stock in the Northwest Atlantic is unknown (Waring *et al.* 2009).

Table 8. *Mesoplodon* spp. sightings in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
26-May-11	10:18	3	35.341992	-74.589329	E	34	1	90°	2
27-May-11	12:07	54	35.630056	-74.684793	W	38	1	90°	1
31-Jul-11	14:57	56	34.825875	-75.238322	W	26	1	90°	3

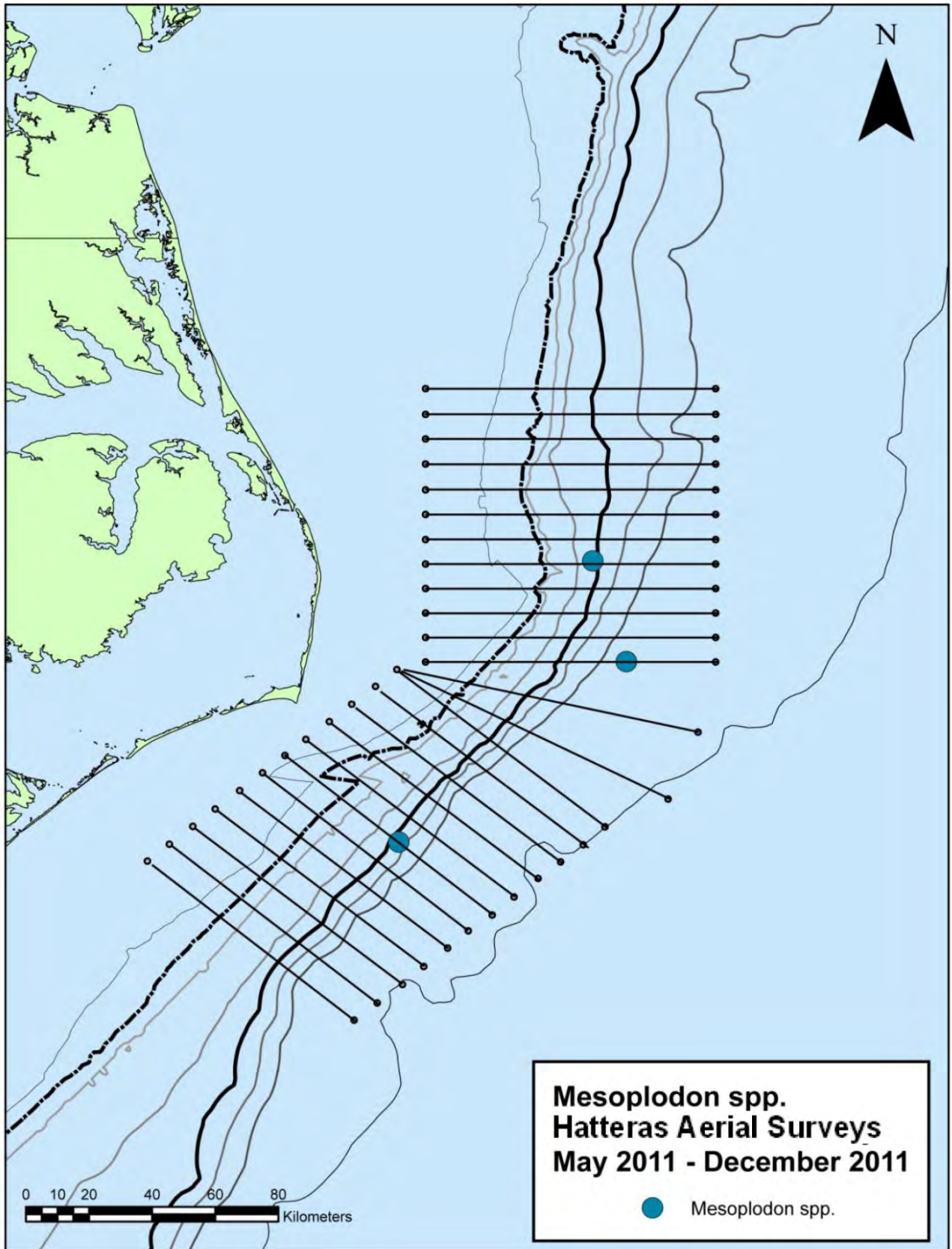


Figure 10. *Mesoplodon* spp. sightings.

Cuvier's beaked whale (*Ziphius cavirostris*) (Table 9, Fig. 11)

Two sightings in the Cape Hatteras survey area were positively identified as Cuvier's beaked whales. A single animal was observed just beyond the 1000 m isobath in June, while a single animal was recorded inside this isobath in October. See above for NMFS stock assessment information for this species.

Table 9. Cuvier's beaked whale (*Ziphius cavirostris*) sightings in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
14-Jun-11	15:03	45	35.154789	-75.023044	SE	31	2	90°	4
25-Oct-11	11:40	6	35.468725	-74.668304	E	36	2	90°	1

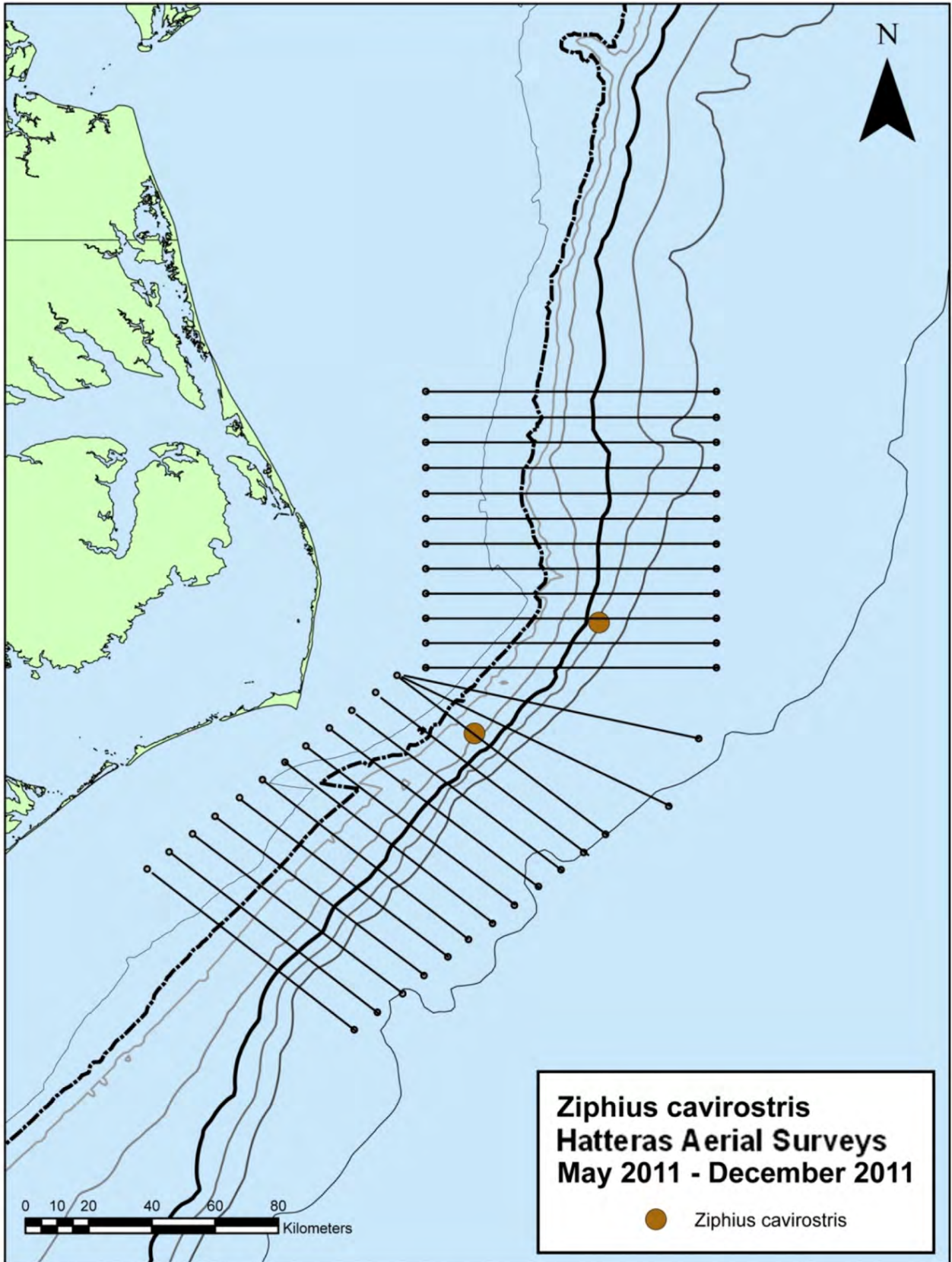


Figure 11. Cuvier's beaked whale (*Ziphius cavirostris*) sightings.



Common dolphins (*Delphinus delphis*) (Table 10, Fig. 12)

One group of 300 common dolphins was observed in May just beyond the 100 m isobath. The current best estimate of common dolphins in the western Atlantic Ocean, between central Florida and Canada, is 120743 (CV=0.23) (Waring *et al.* 2010). The status of the common dolphins stock in the Northwest Atlantic is unknown.

Table 10. All common dolphin (*Delphinus delphis*) sightings in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
27-May-11	9:42	5	35.824427	-74.867357	Æ	41	2	90°	300

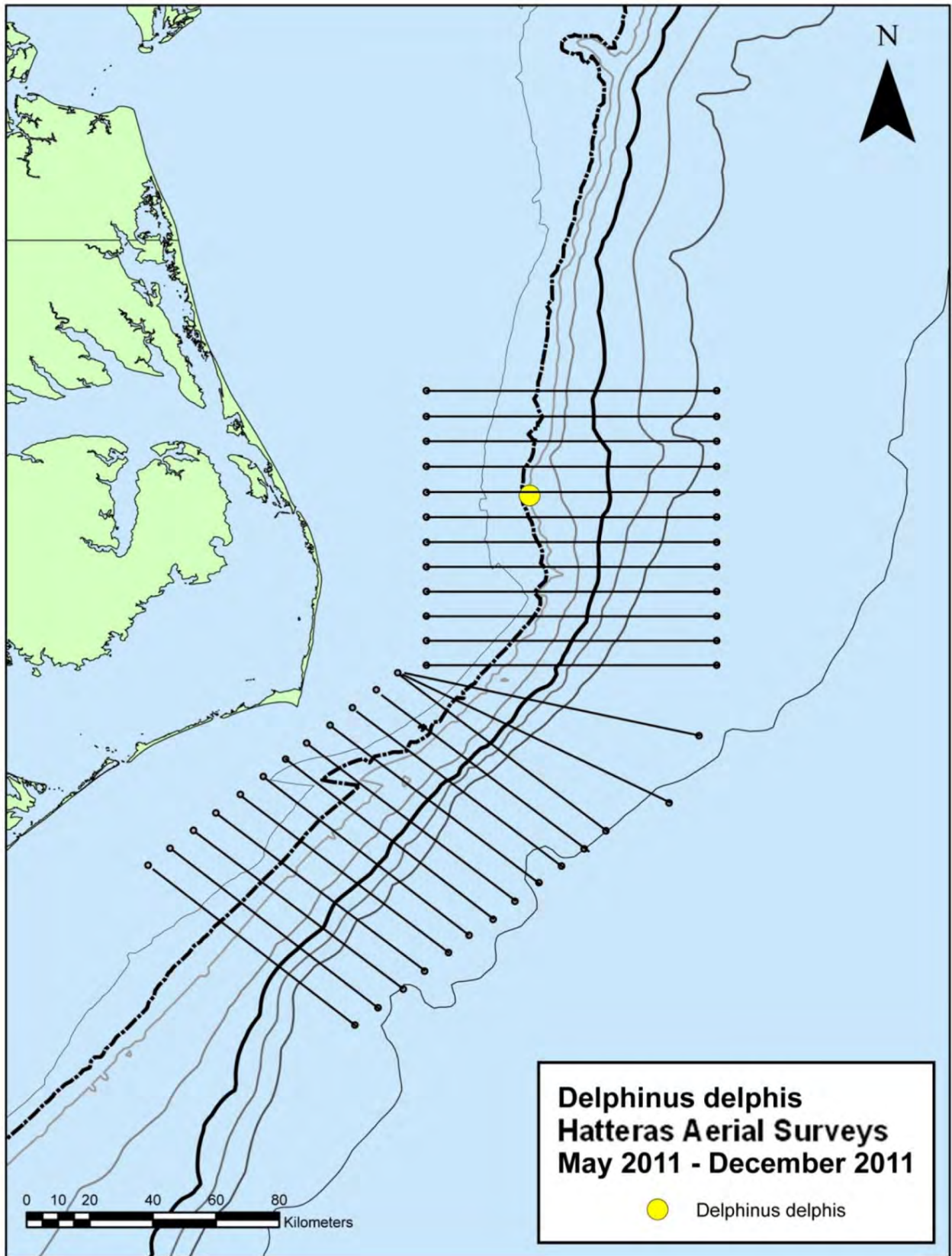


Figure 12. Common dolphin (*Delphinus delphis*) sightings .

Spinner dolphin (*Stenella longirostris*) (Table 11, Fig. 13)

This species was observed in the northern offshore waters of the survey area, in a mixed group with Clymene dolphins (*Stenella clymene*). Each species appeared to represent similar proportion of the group and, as such, our best estimate of group size was divided equally between the two species (Total 140: 70 *S. longirostris*, 70 *S. clymene*). Photographs collected during the sighting revealed that each species aggregated into distinct sub groups of 10-20 animals within the larger herd. These animals occur, but are infrequently seen, in deep waters (>2000 km) along the western north Atlantic coast. There is currently insufficient data to determine the population size of this species in the western north Atlantic and the status of the stock is unknown. (Waring *et al.* 2007).

Table 11. Spinner dolphin (*Stenella longirostris*) sighting in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
26-Oct-11	10:19	7	36.033285	-74.456628	W	44	2	90°	70

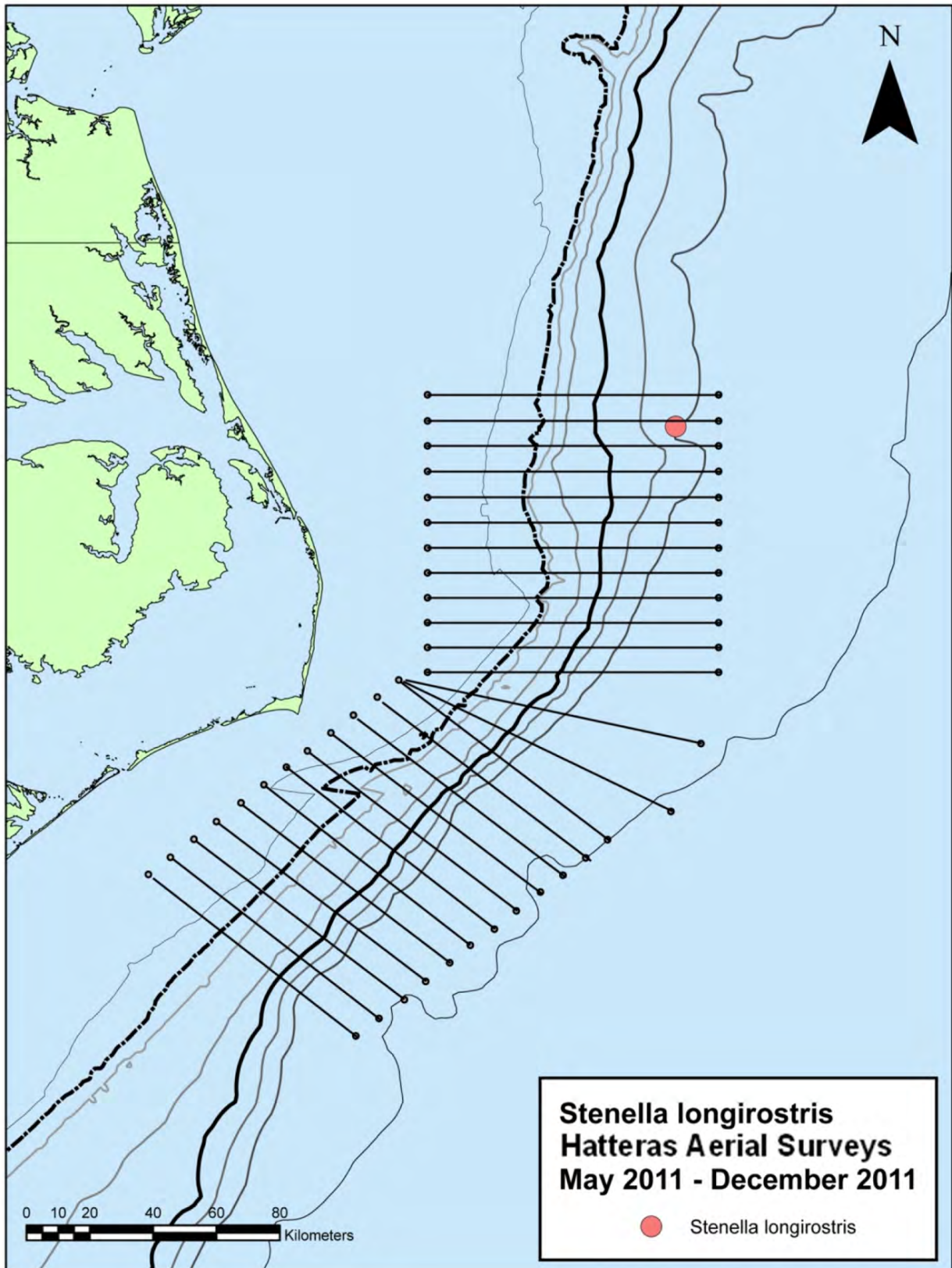


Figure 13. Spinner dolphin (*Stenella longirostris*) sighting.

Clymene dolphin (*Stenella clymene*) (Table 12, Fig. 14)

This species was observed in the northern offshore waters of the survey area in a mixed group with spinner dolphin (*Stenella longirostris*). Each species appeared to represent a similar proportion of the group and, as such, our best estimate of group size was divided equally between the two species (Total 140: 70 *S. longirostris*, 70 *S. clymene*). Photographs collected during the sighting revealed that each species aggregated into distinct sub groups of 10-20 animals within the larger herd. Sighting and stranding reports of this species suggest that Clymene dolphins routinely occur in the western north Atlantic. NOAA vessel surveys conducted in 1998 from Maryland to Florida only recorded this species along the continental slope off Cape Hatteras. The historic estimate of this species in the US Atlantic is 6086 (CV=0.93). There are currently insufficient data to determine the population size of this species in the western north Atlantic and the status of the stock is unknown (Waring *et al.* 2007).

Table 12. Clymene dolphin (*Stenella clymene*) sighting in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
26-Oct-11	10:19	7	36.033285	-74.456628	W	44	2	90°	70

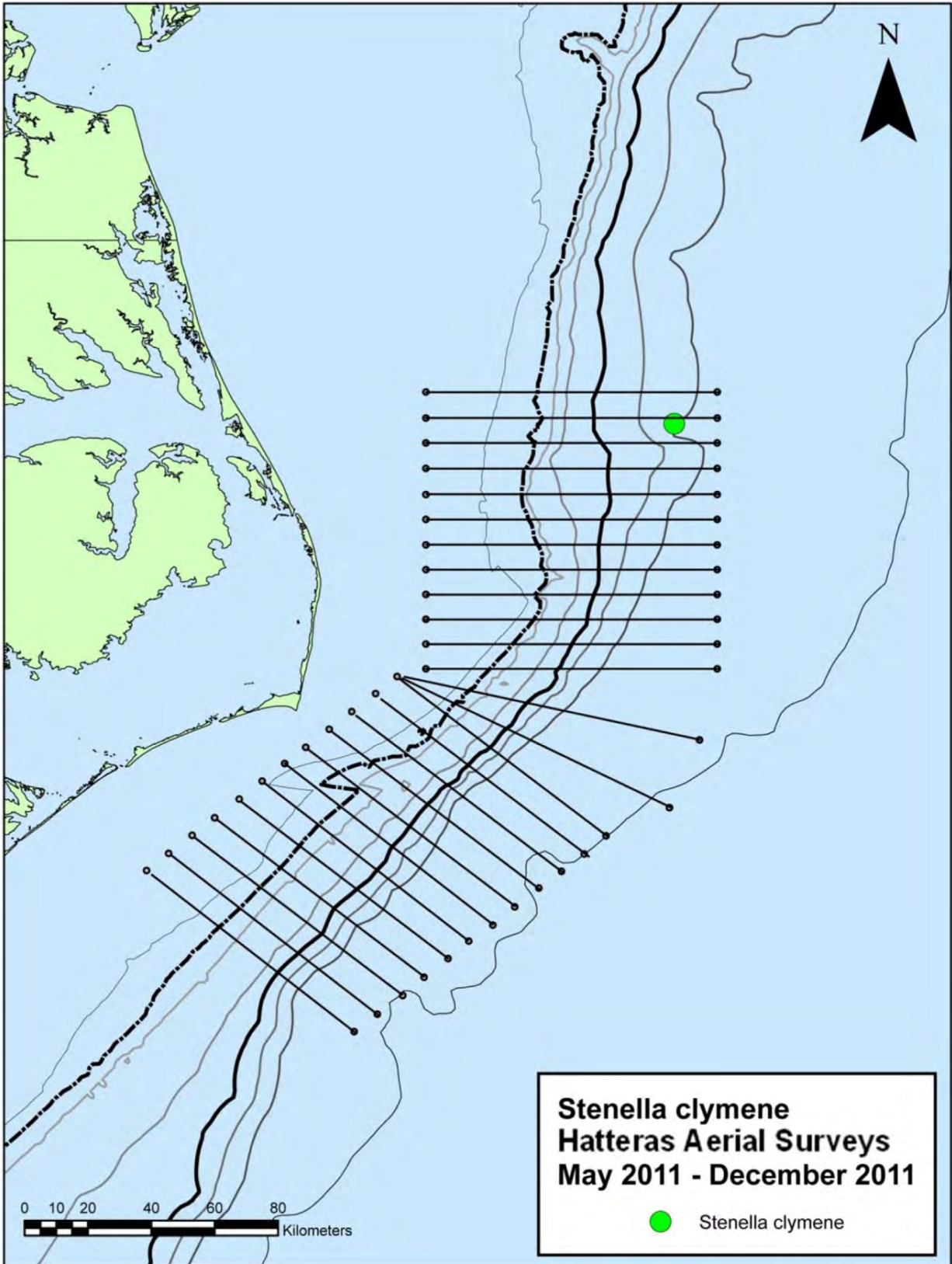


Figure 14. Clymene dolphin (*Stenella clymene*) sighting.

Rough-toothed dolphin (*Steno bredanensis*) (Table 13, Fig. 15)

A single group of four rough-toothed dolphins was observed in May just beyond the 100 m isobath. This species is rarely observed off the U.S. east coast, and the current best abundance estimate (n=274, CV=1.03) is based on a single sighting from one shipboard survey conducted in waters south of Maryland in 1998. The status of rough-toothed dolphins in the western North Atlantic is presently unknown (Waring *et al.* 2008).

Table 13. Rough-toothed dolphin (*Steno bredanensis*) sighting in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
27-May-11	11:40	47	35.698266	-74.534039	E	39	1	90°	4

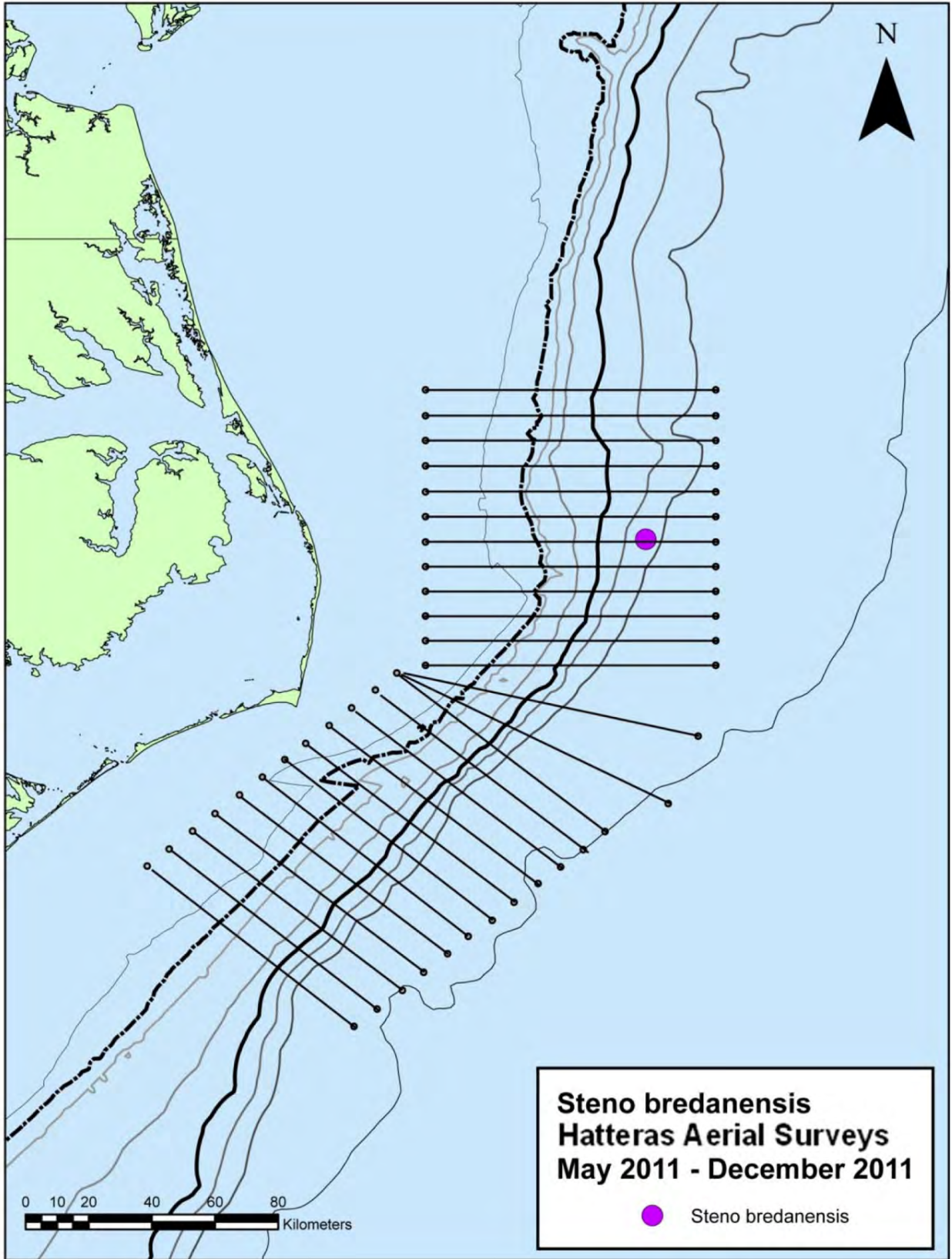


Figure 15. Rough-toothed dolphin (*Steno bredanensis*) sighting.



Fraser's dolphin (*Lagenodelphis hosei*) (Table 14, Fig. 16)

A single sighting of 75 animals was observed offshore of the 1500 m isobath. Waring *et al.* (2007) state that only a single sighting of this species has been recorded in eastern US waters, which occurred off Cape Hatteras in 3300 m of water. Currently no species estimate exists for the western north Atlantic and the status of its stock remains unknown (Waring *et al.* 2007).

Table 14. Fraser's dolphin (*Lagenodelphis hosei*) sighting in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
27-May-11	14:20	63	35.562988	-74.604346	E	37	3	90°	75

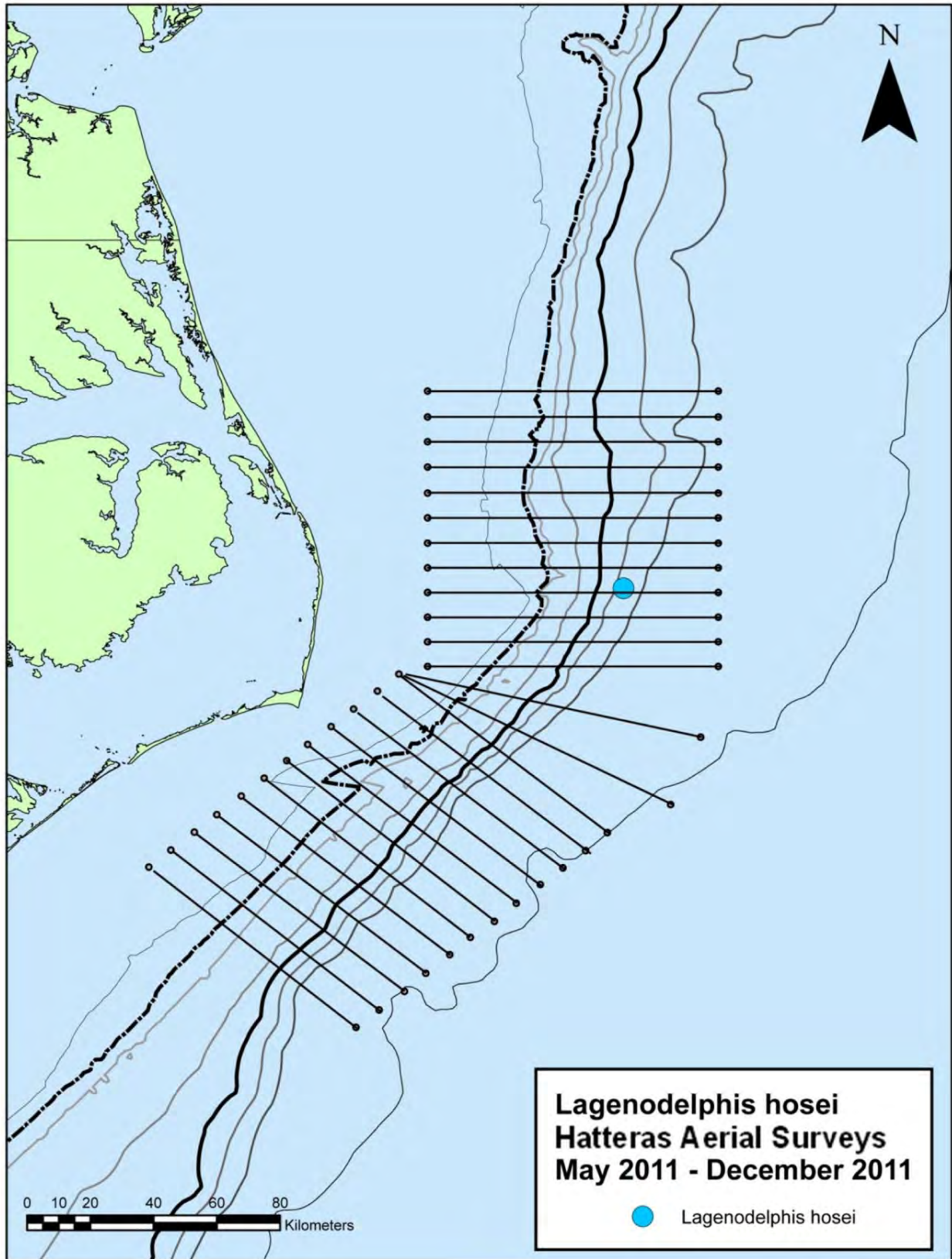


Figure 16. Fraser's dolphin (*Lagenodelphis hosei*) sighting.

Pygmy and Dwarf Sperm Whales (*Kogia* spp.)(Table 15, Fig 17)

A single kogiid whale, which could not be identified to species, was observed beyond the 1500 m isobath in the northern portion of the Cape Hatteras survey site. As pygmy (*Kogia breviceps*) and dwarf sperm whales (*Kogia sima*) are difficult to differentiate at sea, NMFS population estimates for these species are combined. The best available abundance estimate for *Kogia* spp. in the western Atlantic is 395 animals (CV=0.40). This estimate represents the sum of two figures generated from surveys conducted in 2004 which report *Kogia* spp. numbers in the southern US Atlantic as 37 (CV=0.74) and northern US Atlantic as 358 (CV=0.44)(Waring *et al.* 2007). The status of both kogiid species is currently unknown (Waring *et al.* 2007).

Table 15. *Kogia* spp. sighting in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
26-Oct-11	10:35	11	36.053662	-74.497680	W	44	2	90°	1

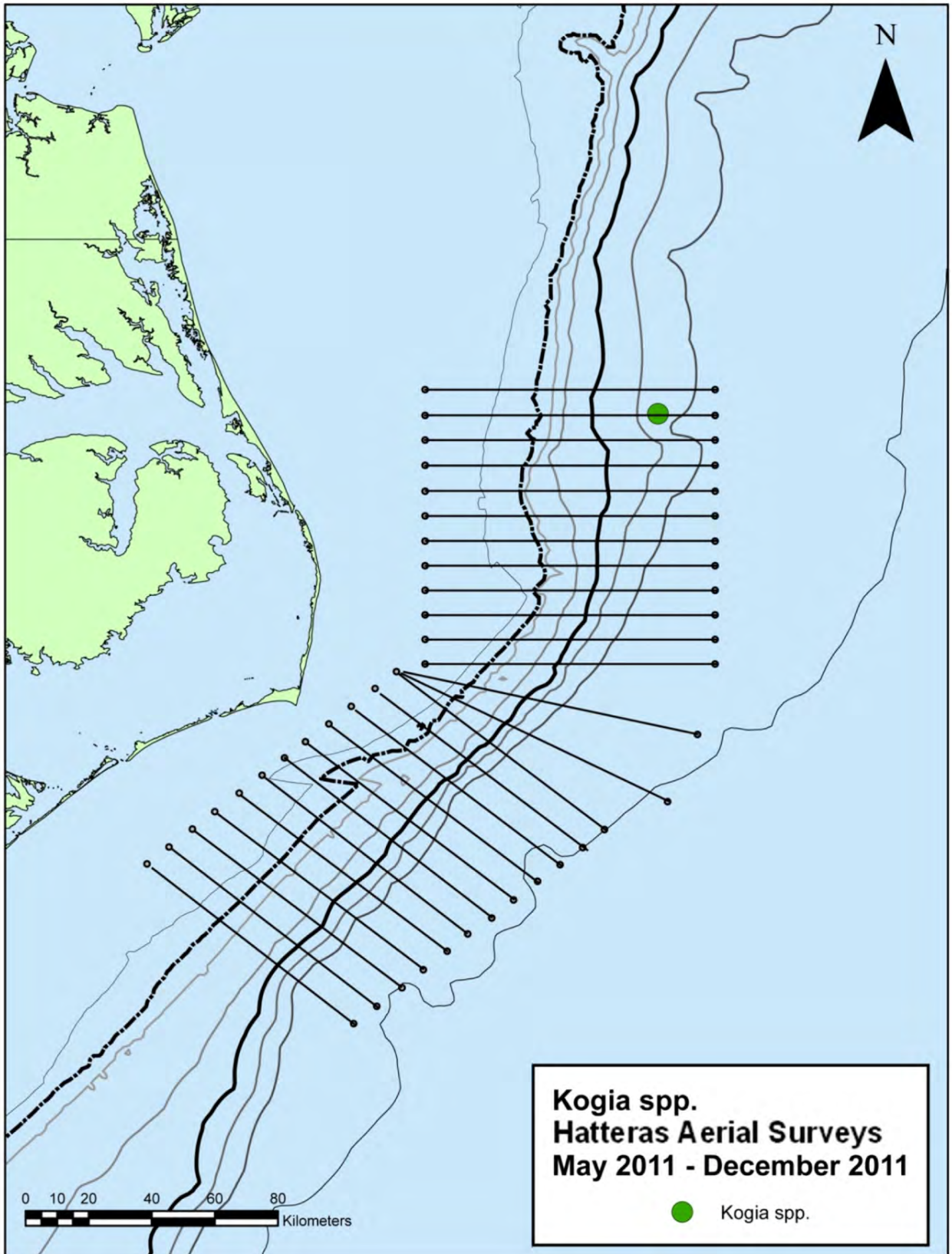


Figure 17. *Kogia* spp. sighting.

Fin Whale (*Balaenoptera physalus*) (Table 16, Fig. 18)

A single fin whale was observed in October 2011 beyond the 100 m isobath of the Hatteras survey site. Fin whales are listed as endangered under the Endangered Species Act, and the current best population estimate in the western north Atlantic is 3985 (CV=0.24) (Waring *et al.* 2010). The status of fin whales is currently unknown (Waring *et al.* 2010). Waring *et al.* (2010) note that this species is common in offshore waters north of the Cape Hatteras. Near shore sightings of this species have also been recorded off the mouth of the Chesapeake Bay during right whale aerial surveys in 2001 (McLellan *et al.*, 2001), 2002 (McLellan *et al.*, 2002), 2005-06 (McLellan *et al.*, 2006), and 2006-07 (McLellan *et al.*, 2007).

*Table 16.* Fin whale (*Balaenoptera physalus*) sighting in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
26-Oct-11	14:35	38	35.209452	-74.983697	E	32	2	90°	1

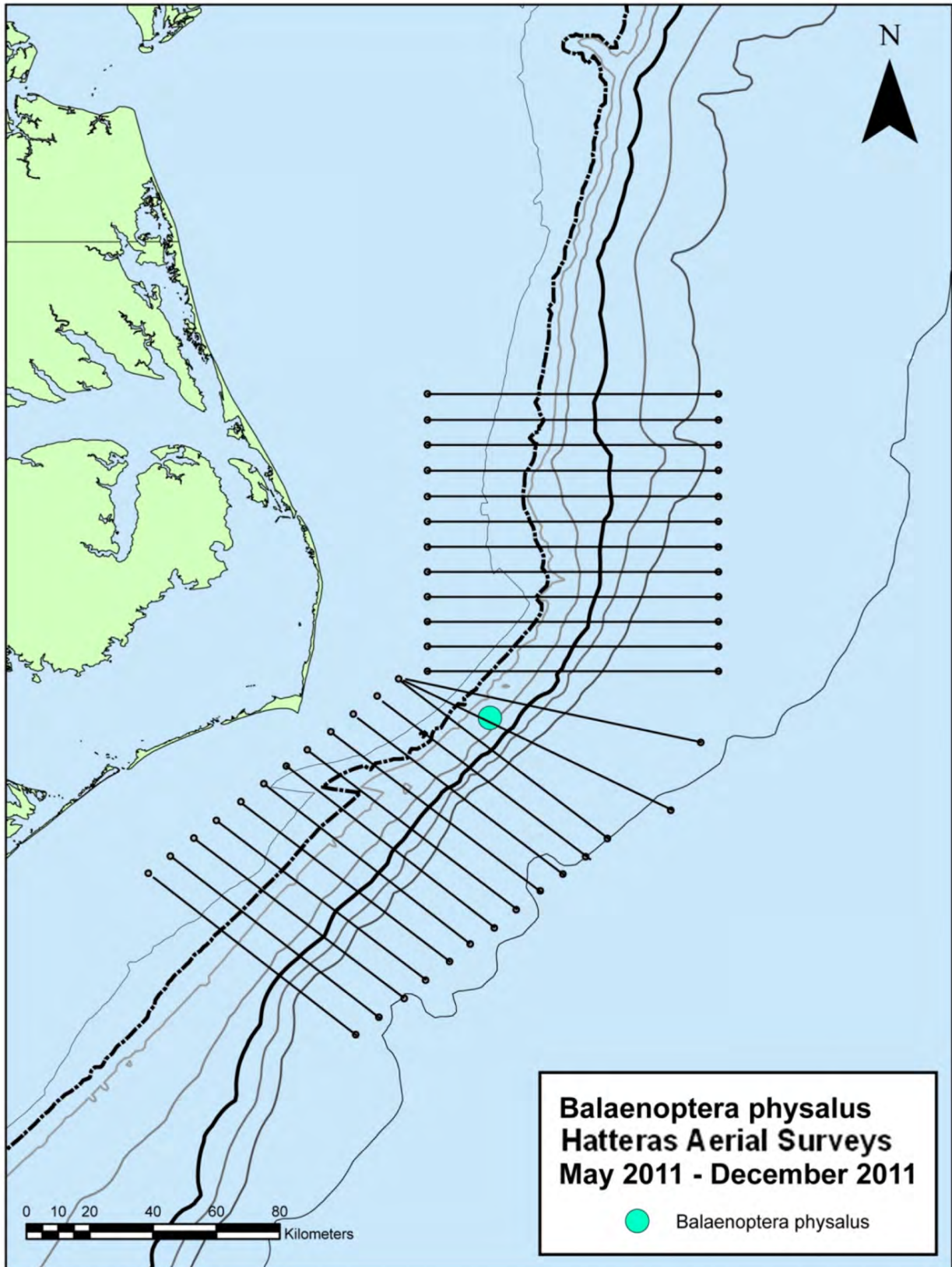


Figure 18. Fin whale (*Balaenoptera physalus*) sighting.

### Sea Turtles (Tables 17-18, Figs. 19 and 20a-c)

Thirty nine sea turtles were observed during the reporting period. Sighting rates were negatively correlated with Beaufort Sea State, with rates declining at sea states greater than BSS 2 (Figs. 20a-b). The high sighting rate calculated for a Beaufort Sea State 1 was due to a brief productive period of effort in this sea state (11 sea turtle sightings in 45.4 km). Sea turtles were recorded in every month surveyed; the highest sighting rates occurred in the summer months of May, June and July (Fig. 20c). Loggerhead sea turtles (*Caretta caretta*) constituted the majority of sea turtle sightings (74%). The only other sea turtle species that was identified in the Cape Hatteras survey site was the leatherback sea turtles (*Dermochelys coriacea*) (7.6%) and for the remaining 18% of sightings, species identification could not be made with 100% certainty and are, therefore, listed as “unidentified sea turtles”.

### Loggerhead sea turtles (*Caretta caretta*)(Table 17, Fig. 19)

Sightings of loggerhead sea turtles occurred in four of the five months surveyed, for a total of 29 animals. The majority of sightings were over the continental shelf inside of the 100 m isobath. For management purposes, loggerheads along the U.S. Atlantic east coast fall into the Northwest Atlantic Ocean distinct population segment (DPS), which is separated into five separate recovery units (NOAA 2011). The Northern Recovery Unit (defined as loggerheads originating from nests between southern VA through the FL/GA border) is currently listed as threatened under the Endangered Species Act (NMFS 2008).

Table 17. Loggerhead sea turtle (*Caretta caretta*) sightings in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
27-May-11	9:34	3	35.835266	-75.124045	E	41	2	90°	1
27-May-11	9:35	3	35.836552	-75.087009	E	41	2	90°	3
27-May-11	9:36	4	35.835776	-75.049181	E	41	2	90°	4
27-May-11	9:38	5	35.835099	-74.962938	E	41	3	90°	3
27-May-11	10:58	32	35.765202	-75.027065	W	40	2	90°	1
27-May-11	11:00	24	35.763215	-75.108749	W	40	1	90°	2
27-May-11	11:06	27	35.695171	-75.091161	E	39	1	90°	1
14-Jun-11	14:46	41	35.288607	-75.198856	SE	31	1	90°	2
14-Jun-11	14:47	47	35.273869	-75.179852	SE	31	1	90°	1
14-Jun-11	16:07	57	35.304731	-75.207323	NW	32	1	90°	1
14-Jun-11	16:08	60	35.306071	-75.210438	NW	32	2	90°	1
14-Jun-11	16:13	60	35.296437	-75.152838	SE	33	2	90°	1
15-Jun-11	9:32	3	35.336853	-75.117561	E	34	1	90°	1
15-Jun-11	9:34	3	35.339465	-75.029025	W	34	2	90°	1
31-Jul-11	10:03	11	35.289371	-75.180516	E	32	1	90°	1
31-Jul-11	10:33	13	35.034067	-74.647836	E	32	1	90°	1
31-Jul-11	11:09	31	35.279238	-75.188611	W	31	1	90°	1
31-Jul-11	11:15	23	35.258476	-75.284707	SE	30	1	90°	1
12-Nov-11	10:35	3	36.126493	-75.117137	E	45	3	90°	1
13-Nov-11	9:17	3	35.552712	-74.836032	E	37	2	90°	1



Leatherback Sea Turtle (*Dermochelys coriacea*) (Table 18, Fig. 19)

Three leatherback sea turtles were observed in both inshore and offshore waters of the survey site. This species was observed only in October 2011 and November 2011. The most recent population estimates for the North Atlantic ranges from 34000 to 94000 adult leatherbacks (Turtle Expert Working Group 2007). Leatherbacks throughout their range are listed as endangered under the Endangered Species Act (NMFS 1992).

Table 18. Leatherback sea turtle (*Dermochelys coriacea*) sightings in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
25-Oct-11	12:46	16	35.618351	-74.505412	E	38	2	90°	1
13-Nov-11	10:52	19	35.408820	-74.940878	E	35	1	90°	1
13-Nov-11	10:52	29	35.408742	-74.926543	E	35	2	90°	1

Unidentified sea turtles

Turtles labeled as unidentified were typically either of small size, submerged, or too far away for observers to make an accurate identification to species. Seven sightings of individual animals in the Cape Hatteras survey site are listed as unidentified.

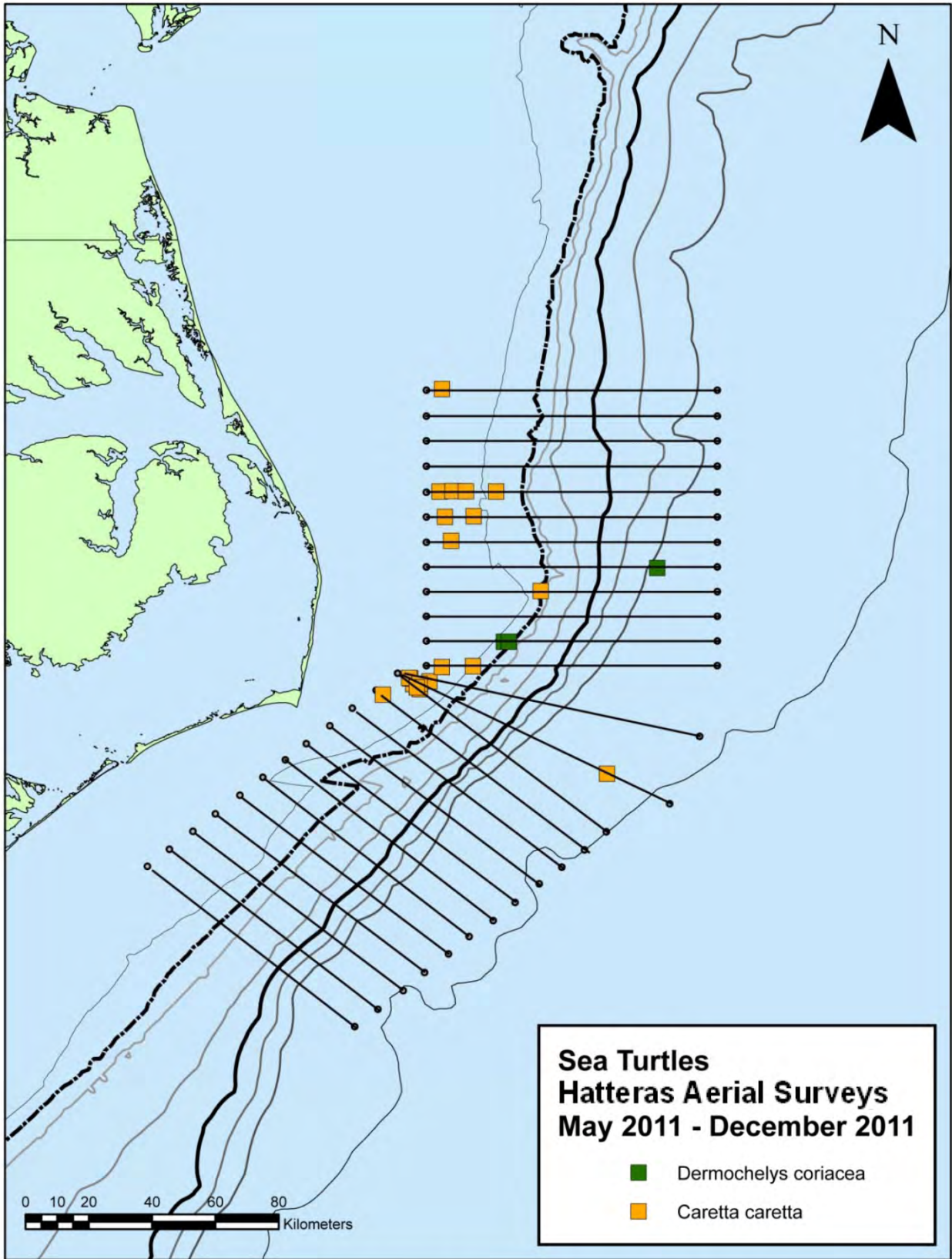


Figure 19. Loggerhead (*Caretta caretta*), and leatherback (*Dermochelys coriacea*) sea turtle sightings.

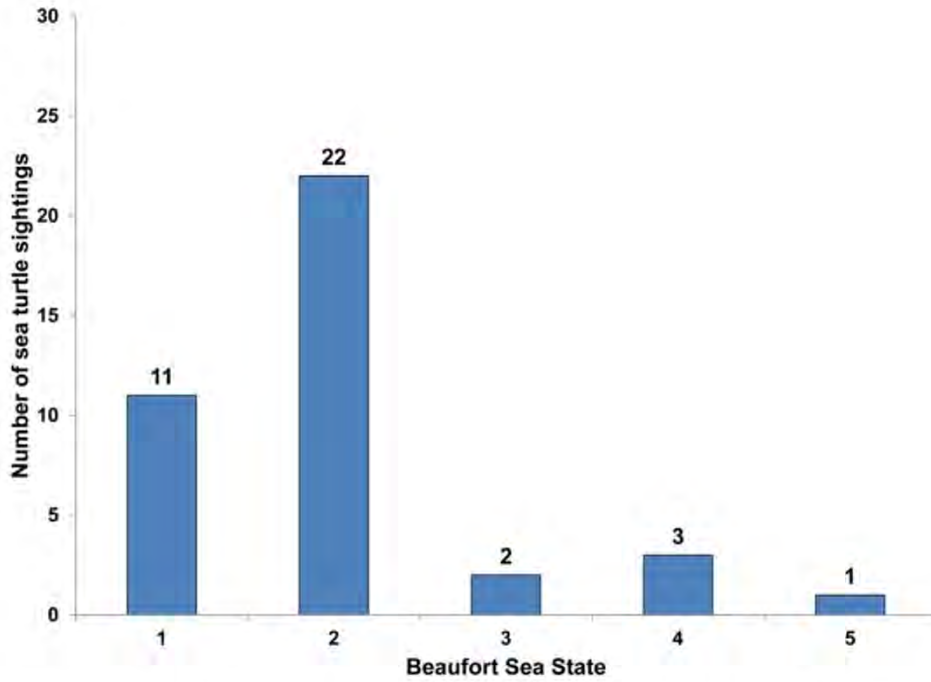


Figure 20a. Total number of sea turtle sightings by Beaufort Sea State in the Hatteras survey area from May 2011 – December 2011.

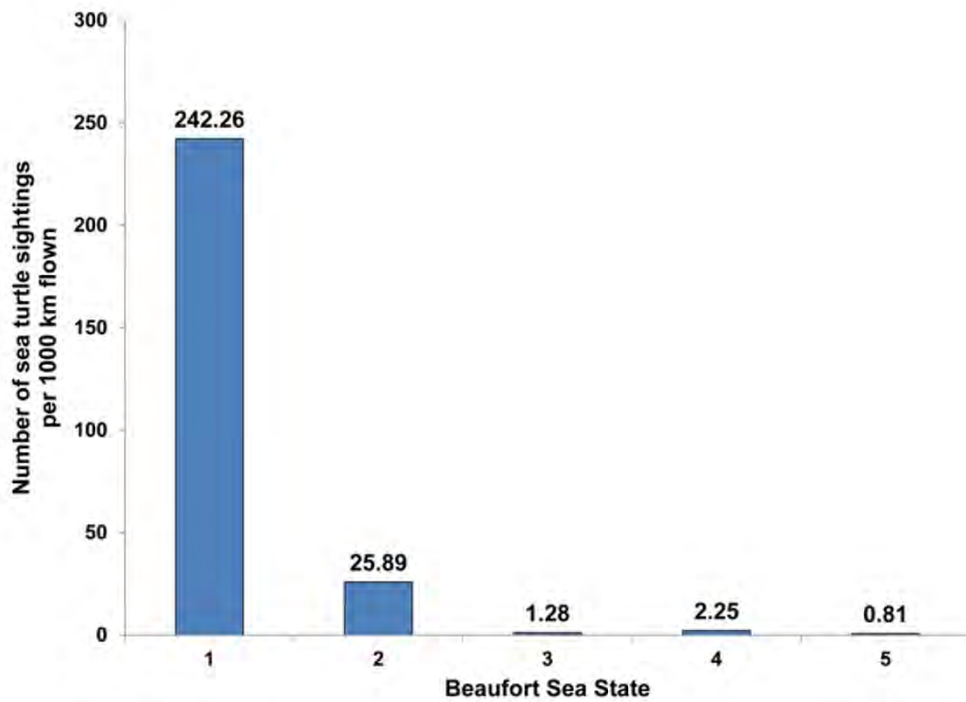


Figure 20b. Sea turtle sightings per 1000 km flown by Beaufort Sea State in the Hatteras survey area from May 2011 – December 2011.

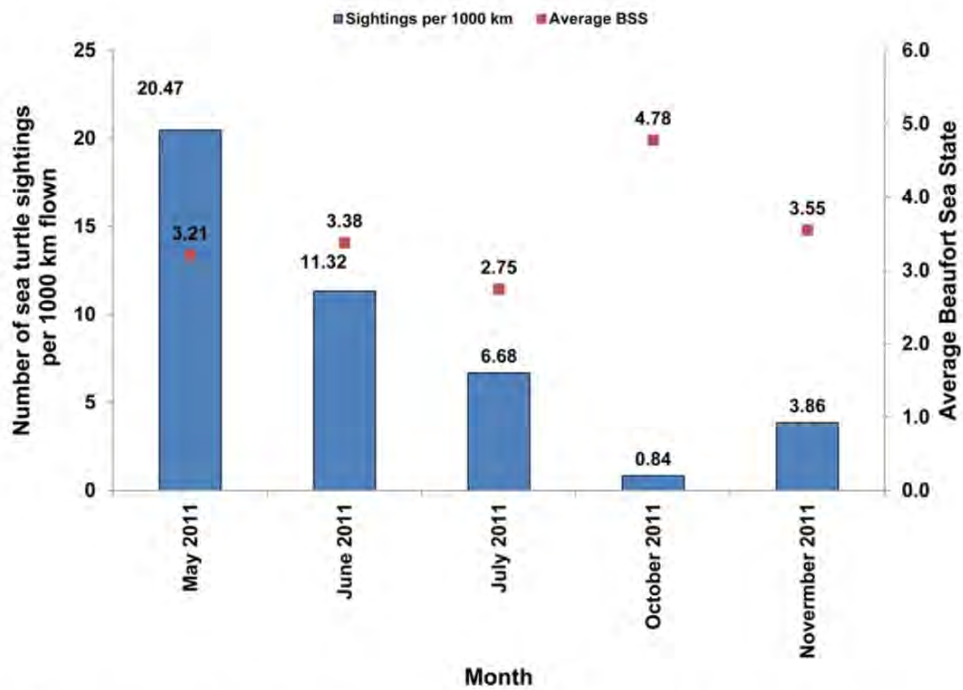


Figure 20c. Sea turtle sightings per 1000 km surveyed and the average Beaufort Sea State per month in the Hatteras survey area from May 2011 – April 2011.

### Other Marine Vertebrate Sightings (Tables 19-21, Fig. 21)

#### Chondrichthyan fishes

Four unidentified shark sightings were recorded during the reporting period. Sharks were seen in the area inshore and offshore of the 100 m isobath in three of the five months surveyed. Eight manta rays (*Manta birostris*) were observed during the study period, and occurred in four of the five months surveyed.

#### Other fishes

Two sightings of ocean sunfish (*Mola mola*) were recorded; one over the continental shelf and one beyond the shelf break. Both sightings occurred in November.

Table 19. All manta ray (*Manta birostris*) sightings in the Hatteras survey area for surveys conducted from May 2011 - December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
27-May-11	10:14	17	35.822887	-74.689854	E	41	3	90°	1
27-May-11	12:10	40	35.620388	-74.789110	W	38	1	90°	1
14-Jun-11	16:19	64	35.255037	-74.948243	SE	33	2	90°	1
15-Jun-11	11:17	19	35.553374	-74.764459	E	37	1	90°	1
30-Jul-11	10:44	16	35.833922	-74.606571	E	40	2	90°	1
25-Oct-11	11:26	2	35.477263	-74.844782	E	36	1	90°	1
25-Oct-11	13:26	21	35.759315	-74.828225	E	40	1	100°	1
26-Oct-11	15:33	46	35.340174	-75.031868	E	34	1	90°	1

Table 20. All ocean sunfish (*Mola mola*) sightings in the Hatteras survey area for surveys conducted from May 2011 - December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
12-Nov-11	14:13	28	35.691470	-74.975732	E	39	2	90°	1
13-Nov-11	11:07	41	35.410439	-74.667624	E	35	1	90°	1

Table 21. All shark sightings in the Hatteras survey area for surveys conducted from May 2011 - December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
14-Jun-11	16:03	59	35.242711	-75.080107	NW	32	2	90°	1
14-Jun-11	16:14	63	35.293805	-75.121135	SE	33	1	90°	1
26-Oct-11	11:40	16	35.904697	-74.940530	W	42	2	90°	1
13-Nov-11	11:47	34	35.348731	-74.911101	W	34	1	90°	2

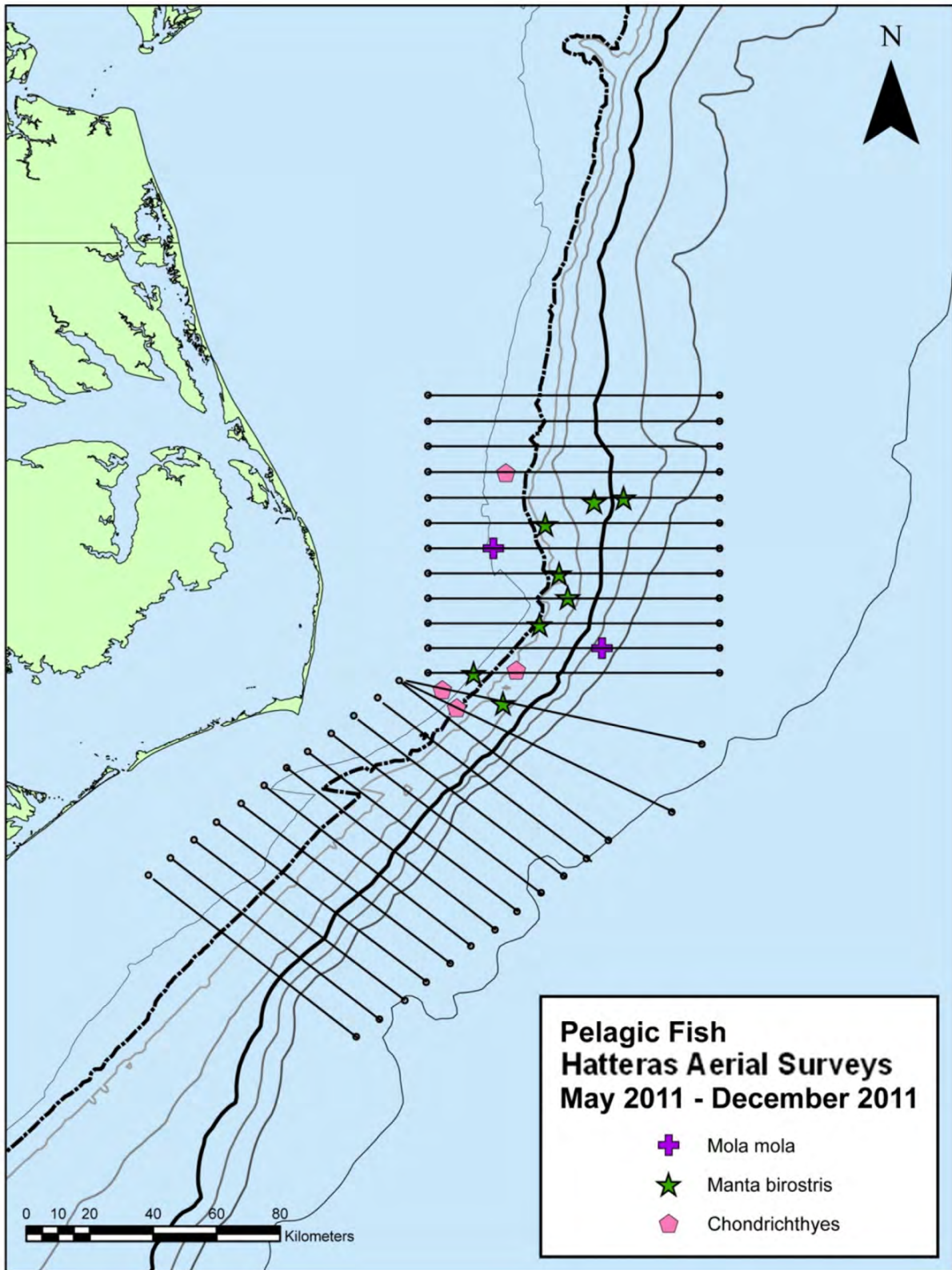


Figure 21. Manta ray (*Manta birostris*), ocean sunfish (*Mola mola*) and unidentified sharks.

Vessel Sightings Commercial (Table 22, Fig. 22)

A total of 26 commercial vessels (*e.g.* tankers, car carriers, and container vessels) were observed in the survey site.

Table 22. All commercial vessel sightings in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	Comments
26-May-11	10:40	9	35.410862	-74.343232	W	35	4	45°	1	Cargo vessel
26-May-11	11:15	13	35.409792	-75.121083	W	35	1	45°	1	Container vessel
27-May-11	10:06	12	35.835506	-74.777834	E	41	3	45°	1	Cargo vessel
14-Jun-11	11:28	22	34.812961	-74.960295	NW	28	1	45°	1	Cargo vessel
14-Jun-11	11:46	26	34.945855	-75.134433	NW	28	3	45°	1	Car carrier
14-Jun-11	14:50	48	35.208742	-75.094464	SE	31	2	45°	1	Cargo vessel
15-Jun-11	9:32	4	35.334979	-75.089461	E	34	2	45°	1	Tanker
15-Jun-11	9:47	6	35.339672	-74.560032	E	34	1	45°	1	Tug and Barge
15-Jun-11	10:07	9	35.409130	-74.636518	W	35	3	45°	1	Container vessel
15-Jun-11	10:10	10	35.406223	-74.753444	W	35	3	45°	1	Tanker
15-Jun-11	11:24	21	35.552237	-75.009878	W	37	1	45°	1	Container vessel
30-Jul-11	14:35	46	35.621772	-75.076715	E	37	2	30°	1	Cargo vessel
30-Jul-11	15:22	81	35.481485	-74.776390	W	35	2	90°	1	Commercial fishing vessel
31-Jul-11	10:09	12	35.208270	-75.010994	E	32	2	30°	1	Cargo vessel
31-Jul-11	14:28	49	34.888980	-75.451691	E	25	3	30°	1	Container vessel
31-Jul-11	14:33	51	34.776056	-75.306427	E	25	3	60°	1	Cargo vessel
25-Oct-11	13:58	25	35.825125	-74.987344	W	41	3	90°	1	Cargo vessel
26-Oct-11	9:59	3	36.125657	-74.774803	E	45	3	60°	1	Cargo vessel
26-Oct-11	14:29	36	35.276023	-75.142477	E	32	2	30°	1	Cargo vessel
26-Oct-11	15:12	43	35.183773	-74.612527	W	33	3	60°	1	Cargo vessel
26-Oct-11	15:54	40	35.406956	-74.384210	W	35	3	90°	1	Tanker
12-Nov-11	13:22	16	35.835797	-75.145915	E	41	4	30°	1	Car carrier
12-Nov-11	14:41	25	35.619878	-74.484653	W	38	3	60°	1	Cargo vessel
13-Nov-11	10:05	10	35.550246	-74.343219	E	37	1	45°	1	Tanker
13-Nov-11	11:25	49	35.342477	-74.434910	W	34	2	90°	1	Tanker
13-Nov-11	14:04	70	35.165502	-74.499394	E	33	1	30°	1	Tanker

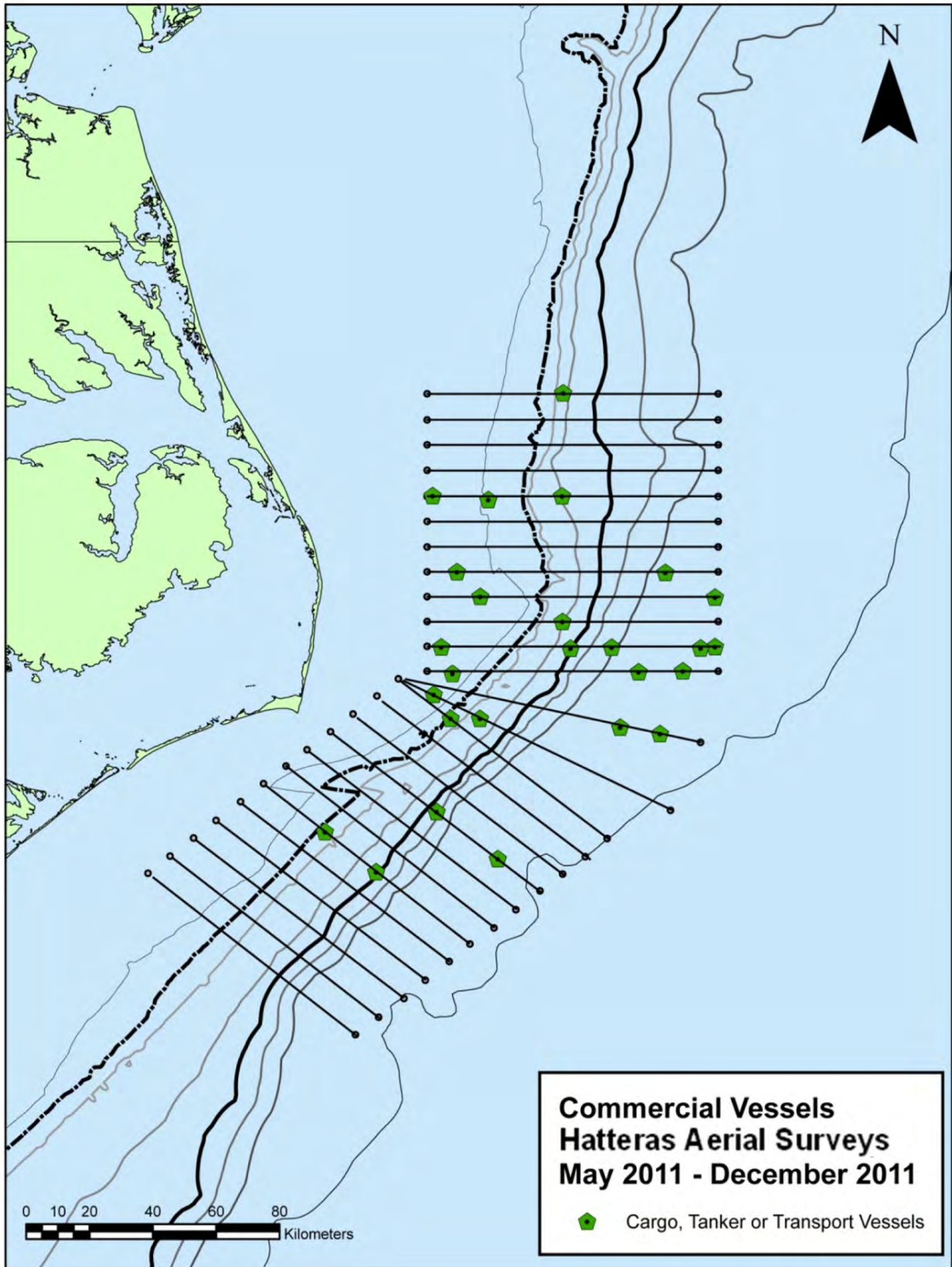


Figure 22. Large commercial shipping vessel sightings.



Military / Coast Guard Vessels (Table 23, Fig. 23)

A total of three Coast Guard vessels were observed in the survey site.

*Table 23.* All military vessel sightings in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	Comments
31-Jul-11	14:24	47	34.957679	-75.540629	E	25	2	90°	3	Coast guard vessel

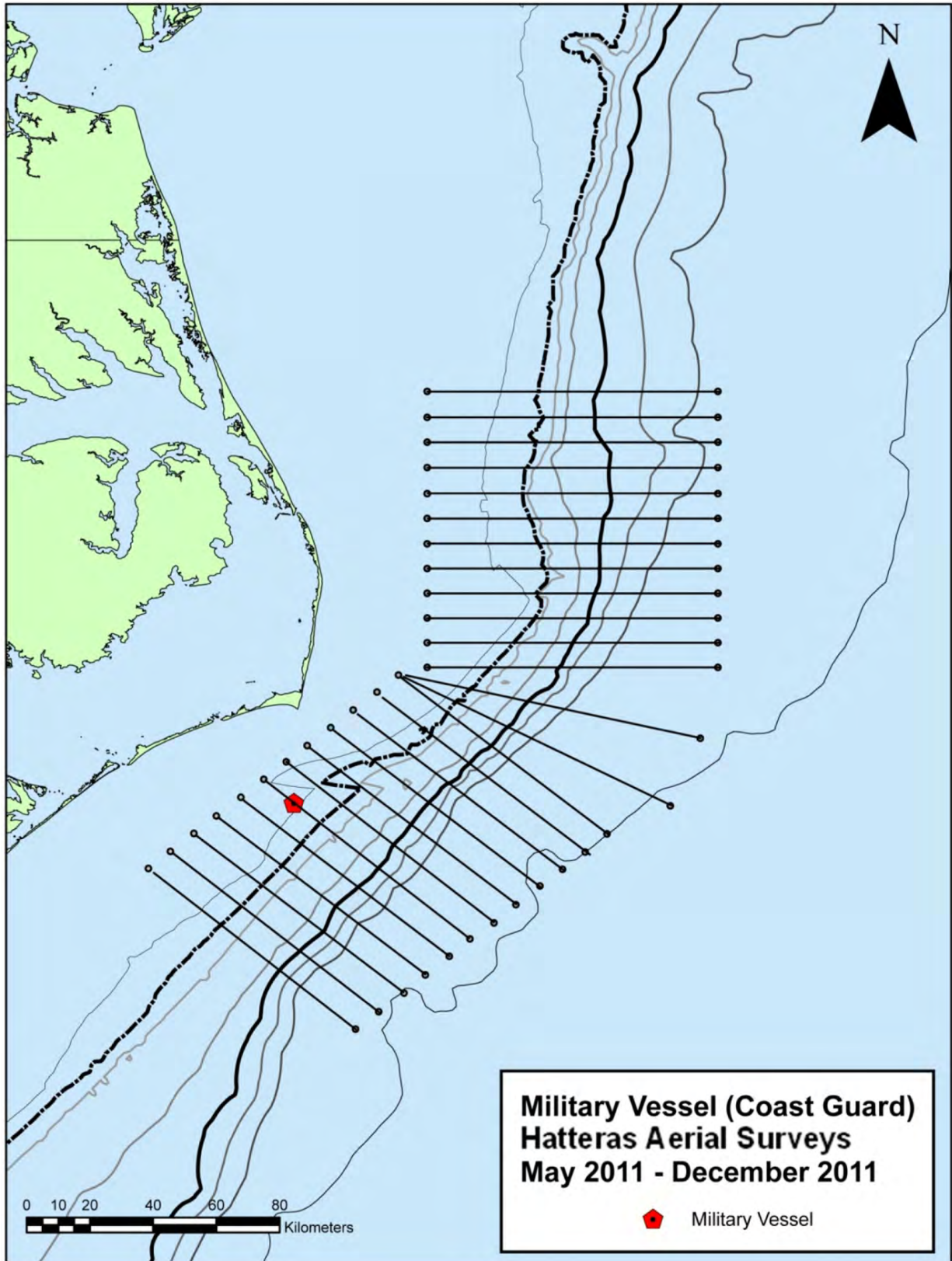


Figure 23. Military vessel sightings.

Other Vessels (Table 24, Fig. 24)

A total of 134 other vessels were recorded in the survey site. Recreational sport fishing vessels constituted the majority of these sightings (n=126). This category also included sailing vessels and yachts.

Table 24. All other vessel sightings in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	Comments
26-May-11	10:06	3	35.346372	-75.120198	E	34	3	45°	1	Sailboat
26-May-11	11:20	16	35.480553	-75.136101	E	36	2	90°	1	Yatch
26-May-11	11:22	16	35.486235	-75.032858	E	36	2	45°	1	Sailboat
26-May-11	11:25	17	35.484961	-74.896708	E	36	3	45°	3	Recreational fishing vessel
26-May-11	11:27	17	35.484613	-74.836795	E	36	3	90°	4	Recreational fishing vessel
26-May-11	14:16	27	34.960812	-75.289966	SE	27	3	45°	1	Recreational fishing vessel
27-May-11	10:49	20	35.762870	-74.804895	W	40	3	45°	2	Recreational fishing vessel
27-May-11	12:11	56	35.620252	-74.821748	W	38	1	90°	1	Recreational fishing vessel
14-Jun-11	10:02	3	34.968514	-75.552176	SE	25	3	90°	1	Recreational fishing vessel
14-Jun-11	10:05	4	34.908900	-75.474351	SE	25	2	90°	1	Recreational fishing vessel
14-Jun-11	10:07	5	34.872944	-75.428824	SE	25	2	45°	3	Recreational fishing vessel
14-Jun-11	10:50	12	34.967569	-75.423493	NW	26	3	90°	4	Recreational fishing vessel
14-Jun-11	10:53	14	35.011530	-75.481388	NW	26	2	90°	1	Research vessel
14-Jun-11	11:01	18	35.058323	-75.422883	SE	27	2	90°	3	Recreational fishing vessel
14-Jun-11	11:02	16	35.049926	-75.410519	SE	27	3	90°	12	Recreational fishing vessel
14-Jun-11	11:06	17	34.962921	-75.295040	SE	27	2	60°	4	Recreational fishing vessel
14-Jun-11	11:33	23	34.892041	-75.067426	NW	28	3	45°	1	Sailboat
14-Jun-11	11:56	29	35.022578	-75.234582	NW	28	2	60°	1	Sailboat
14-Jun-11	11:57	30	35.037335	-75.259169	NW	28	3	90°	3	Recreational fishing vessel
14-Jun-11	13:55	36	35.147494	-75.278825	SE	29	2	90°	2	Recreational fishing vessel
14-Jun-11	13:58	38	35.093894	-75.201350	SE	29	1	45°	1	Recreational fishing vessel
14-Jun-11	14:35	43	35.144533	-75.141469	NW	30	2	60°	1	Recreational fishing vessel
14-Jun-11	14:49	42	35.235933	-75.130074	SE	31	1	45°	1	Sailboat
15-Jun-11	9:35	4	35.340626	-75.008142	W	34	2	45°	3	Recreational fishing vessel
15-Jun-11	9:36	5	35.339434	-74.967722	E	34	2	45°	2	Recreational fishing vessel
15-Jun-11	10:12	11	35.405101	-74.810764	W	35	3	90°	12	Recreational fishing vessel
15-Jun-11	10:13	7	35.404037	-74.853787	E	35	3	60°	3	Recreational fishing vessel
15-Jun-11	10:21	8	35.404905	-75.104701	E	35	2	60°	1	Recreational fishing vessel
15-Jun-11	10:34	12	35.476340	-74.845040	W	36	3	60°	2	Recreational fishing vessel
15-Jun-11	10:34	16	35.476257	-74.850648	E	36	2	90°	6	Recreational fishing vessel
30-Jul-11	11:50	48	35.763507	-74.846218	W	39	3	90°	1	Recreational fishing vessel
30-Jul-11	13:35	32	35.688834	-75.056915	W	38	3	90°	1	Recreational fishing vessel
30-Jul-11	13:40	54	35.692087	-74.875270	E	38	1	45°	1	Recreational fishing vessel
30-Jul-11	14:21	65	35.621042	-74.777179	W	37	2	90°	5	Recreational fishing vessel
30-Jul-11	14:27	44	35.623139	-74.807441	E	37	3	90°	12	Recreational fishing vessel
30-Jul-11	14:33	45	35.619511	-75.017943	E	37	3	90°	1	Recreational fishing vessel
30-Jul-11	14:47	72	35.552000	-74.901495	E	36	1	90°	2	Recreational fishing vessel
30-Jul-11	14:50	73	35.549736	-74.803852	E	36	2	90°	1	Recreational fishing vessel
30-Jul-11	14:50	49	35.549742	-74.795559	W	36	1	60°	1	Recreational fishing vessel
30-Jul-11	14:51	74	35.550246	-74.759226	E	36	3	90°	1	Recreational fishing vessel
31-Jul-11	10:05	10	35.252400	-75.102948	E	32	1	90°	2	Recreational fishing vessel
31-Jul-11	11:06	30	35.204550	-75.089525	W	31	3	60°	1	Recreational fishing vessel
31-Jul-11	11:18	34	35.199548	-75.210744	E	30	1	90°	1	Recreational fishing vessel
31-Jul-11	11:18	25	35.190858	-75.199424	SE	30	1	45°	1	Recreational fishing vessel
31-Jul-11	11:55	41	35.124749	-75.244794	W	29	3	60°	1	Recreational fishing vessel
31-Jul-11	11:55	29	35.114327	-75.230812	NW	29	1	45°	1	Recreational fishing vessel
31-Jul-11	14:21	35	35.015819	-75.622441	SE	25	2	45°	1	Recreational fishing vessel
31-Jul-11	14:26	48	34.921385	-75.493381	E	25	2	45°	2	Recreational fishing vessel

Table 24 (Continued). All other vessel sightings in the Hatteras survey area for surveys conducted from May 2011 – December 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	Comments
31-Jul-11	15:21	44	35.035513	-75.511377	NW	26	2	90°	1	Recreational fishing vessel
26-Oct-11	11:08	17	35.976825	-74.810271	E	43	1	90°	1	Recreational fishing vessel
26-Oct-11	12:53	25	35.758463	-74.805317	W	40	2	90°	1	Recreational fishing vessel
12-Nov-11	11:29	8	35.979401	-74.882151	E	43	3	90°	1	Recreational fishing vessel
12-Nov-11	11:31	9	35.978955	-74.763175	E	43	2	60°	1	Recreational fishing vessel
12-Nov-11	11:54	13	35.906487	-74.682165	W	42	3	90°	1	Recreational fishing vessel
12-Nov-11	11:57	14	35.906436	-74.786799	W	42	3	45°	2	Recreational fishing vessel
12-Nov-11	13:23	19	35.834200	-75.073810	E	41	1	45°	1	Recreational fishing vessel
12-Nov-11	13:58	24	35.763115	-74.837779	W	40	1	60°	1	Recreational fishing vessel
12-Nov-11	14:11	27	35.688284	-75.081311	E	39	1	90°	1	Recreational fishing vessel
12-Nov-11	14:59	26	35.621398	-75.147600	W	38	1	60°	1	Recreational fishing vessel
13-Nov-11	10:17	19	35.482555	-74.643452	W	36	3	90°	1	Sailboat
13-Nov-11	10:57	34	35.408048	-74.843006	E	35	2	90°	1	Recreational fishing vessel
13-Nov-11	11:46	32	35.345437	-74.880097	W	34	1	45°	2	Recreational fishing vessel
13-Nov-11	14:32	73	35.216832	-75.025445	W	32	2	60°	1	Yacht

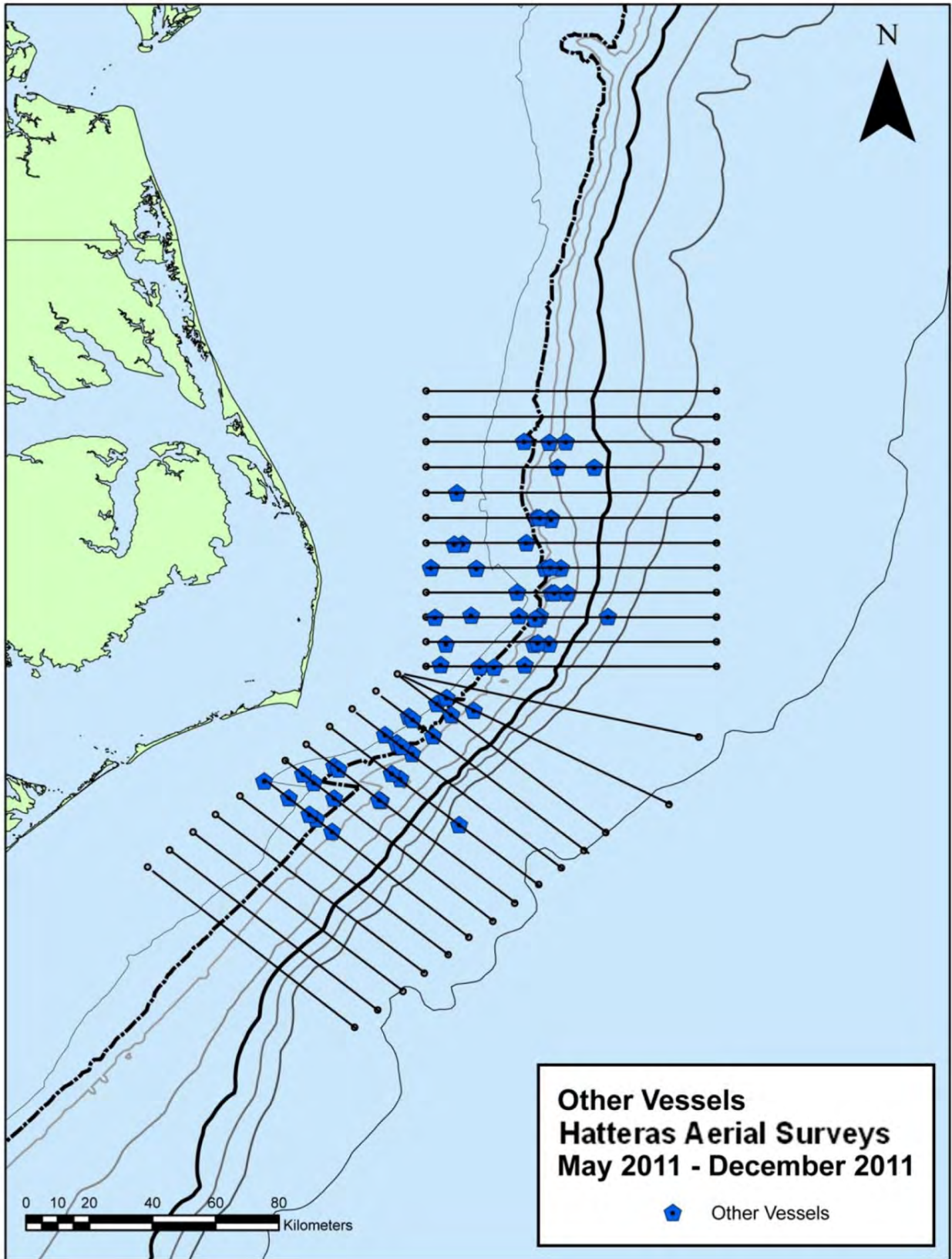


Figure 24. Other vessel sightings.

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**Codes for Variables on USWTR Aerial Survey Data Sheet****Date:** YYYYMMDD**Track#:** opportunistic track line=99**Event:**

1.1 = On effort/on track

1.2 = Off effort

3.1 = Change in environmental conditions

10.0 = Opportunistic sighting(s)

PF = Preflight

XB = Cross Beach

WU = Wheels Up

WD = Wheels Down

TE = Transit Leg on Effort

2.0 = Sighting-breaking track/off effort (real time)

2.2 = Sighting of commercial fishing vessel

2.3 = Vessel sighting

2.4 = Sighting of marine mammal (real location)

2.41 = Location of Sighting Cue, No Animals sighted

2.42 = Break from sighting

2.7 = Sighting of sea turtle (real location)

2.8 = Sighting of large vessel (Military, commercial, etc.)

2.9 = Unidentified sighting, requires comments

**Sighted by:** 1= pilot      2= co-pilot      3= observer left side      4= observer right side**Confidence of cue**

1 = definite

2 = probable

3 = possible/unsure

**Visibility:**

1 = clear to horizon

2 = half the distance to the horizon

3 = less than half the distance to the horizon

**Sea State:**

0 = slick, calm, mirror-like

1 = small waves

2 = whitecaps 0-33%, waves 1-2 feet

3 = whitecaps 33-50%, waves 2-3 feet

4 = whitecaps 50-65%, waves 3-5 feet

5 = whitecaps &gt;65%, waves &gt;5 feet

6 = too rough too survey

**Sighting Cues:**

1 = Blow

2 = Splash

3 = Body Part

4 = Breach

5 = Other (needs comments)

**Cloud Cover:**

01 = clear

02 = partly cloudy

03 = continuous layer of clouds

04 = rain

05 = haze

99 = other, requires comments

**Vertical Angle** is given in rough increments of 20 degrees with 1 being directly on the trackline and 4 being anything outside of survey wide to horizon**Horizontal Angle** is given assuming the nose of the plane is 0 degrees and directly off the wing is 90 degrees – measurements are taken from 1-180 on each side of the plane.**Glare**

0 = No glare

1 = 0-25 %

2 = 25 -50 %

3 = &gt;50%

## Appendix C

Species List for Aerial Surveys		
Common Name	Scientific Name	Species Code
<b>Cetaceans</b>		
North Atlantic right whale	<i>Eubalaena glacialis</i>	Egl
Minke whale	<i>Balaenoptera acutorostrata</i>	Bac
sei whale	<i>Balaenoptera borealis</i>	Bbo
fin whale	<i>Balaenoptera physalus</i>	Bph
Brydes whale	<i>Balaenoptera edeni</i>	Bed
humpback whale	<i>Megaptera novaeangliae</i>	Mno
unidentified balaenopterid	Family <i>Balaenopteridae</i>	BALA
sperm whale	<i>Physeter macrocephalus</i>	Pma
pygmy sperm whale	<i>Kogia breviceps</i>	Kbr
dwarf sperm whale	<i>Kogia sima</i>	Ksi
unidentified Kogia	<i>Kogia</i> spp.	KOGI
Northern bottlenose whale	<i>Hyperoodon ampullatus</i>	Ham
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	Zca
Mesoplodon beaked whale	Genus <i>Mesoplodon</i>	MESO
unidentified beaked whale	Family <i>Ziphiidae</i>	ZIPH
harbor porpoise	<i>Phocoena phocoena</i>	Pph
killer whale	<i>Orcinus orca</i>	Oor
melon-headed whale	<i>Peponocephala electra</i>	Pel
pygmy killer whale	<i>Feresa attenuata</i>	Fat
false killer whale	<i>Pseudorca crassidens</i>	Pcr
Risso's dolphin	<i>Grampus griseus</i>	Ggr
long-finned pilot whale	<i>Globicephala melas</i>	Gme
short-finned pilot whale	<i>Globicephala macrorhynchus</i>	Gma
unidentified pilot whale	Genus <i>Globicephala</i>	GLOB
rough-toothed dolphin	<i>Steno bredanensis</i>	Sbr
Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>	Lac
Fraser's dolphin	<i>Lagenodelphis hosei</i>	Lho
common dolphin	<i>Delphinus delphis</i>	Dde
bottlenose dolphin	<i>Tursiops truncatus</i>	Ttr
spotted dolphin	<i>Stenella frontalis</i>	Sfr
striped dolphin	<i>Stenella coeruleoalba</i>	Sco
spinner dolphin	<i>Stenella longirostris</i>	Scl
unidentified <i>Stenella</i>	Genus <i>Stenella</i>	STEN
unidentified delphinid	Family <i>Delphinidae</i>	DELP
unidentified cetacean		CETA
<b>Pinnipeds</b>		
gray seal	<i>Halichoerus grypus</i>	Hgr
harbor seal	<i>Phoca vitulina</i>	Pvi
harp seal	<i>Phoca groenlandica</i>	Pgr
hooded seal	<i>Cystophora cristata</i>	Ccr
unidentified phocid	Family <i>Phocidae</i>	PHOC
<b>Sea Turtles</b>		
loggerhead	<i>Caretta caretta</i>	Cca
leatherback	<i>Dermochelys coriacea</i>	Dco
green	<i>Chelonia mydas</i>	Cmy
Kemp's ridley	<i>Lepidochelys kempii</i>	Lke
hawksbill	<i>Eretmochelys imbricata</i>	Eim
unidentified sea turtle		TURT
<b>Other interesting sightings</b>		
basking shark	<i>Cetorhinus maximus</i>	Cma
manta ray	<i>Manta birostris</i>	Mbi
ocean sunfish	<i>Mola mola</i>	Mmo
spotted eagle-ray	<i>Aetobatus narinari</i>	Ana
Unidentified elasmobranch		CHON
Unidentified marine vertebrate		VERT

Date: \_\_\_\_\_

- UNCW USWTR Aerial Survey -

Sighting # \_\_\_\_\_

### Sighting Data Sheet

#### **Initial Sighting on Track**

Time: \_\_\_\_\_ WP: \_\_\_\_\_ Sighting Cue: \_\_\_\_\_

Confidence: 1 2 3 4 Vertical Angle: 1 2 3 4 Horizontal Bearing in Degrees: \_\_\_\_\_

Observer: \_\_\_\_\_ Observer Side: L R

Beaufort Sea State: \_\_\_\_\_ Track Line: \_\_\_\_\_

#### **Actual Time and Position of Sighting**

Time: \_\_\_\_\_ WP #: \_\_\_\_\_

Species: \_\_\_\_\_ Numbers: (Low/ High/ Best): \_\_\_\_/\_\_\_\_/\_\_\_\_

Photographer: \_\_\_\_\_ Frame Numbers: \_\_\_\_\_ to \_\_\_\_\_ Spacer: \_\_\_\_\_

#### **Final Time and Position of Sighting**

Time: \_\_\_\_\_ WP#: \_\_\_\_\_

Behavior and Additional Comments:

Date: 07/08/2010

### USWTR Daily Plane Log Sheet

Pilot in Command: Dave Second in Command: Bob Plane: N1353L

Observers: Ryan-Left, Erin-Right

Time take off: 9:45

HOBBS Start: 1977.7

Land for lunch: 12:53

Track Lines and Direction (e.g. N to S) Flown: 1 to 6

Take off after lunch: 14:11

HOBBS Stop: 1983.8

Land: 16:39

HOBBS Total: 6.1

Track Lines and Direction (e.g. N to S) Flown: 7 to 10

Overall weather: Hazy in the morning, clear but partly cloudy in the afternoon

#### General Observations

Absolutely no marine mammals or other living creature seen in the USWTR range. BSS varied from 2-3 in the morning and from 2-4 in the afternoon. There were some showers in the afternoon on the offshore end of the lines. There were lots of military vessels and training in the range all day.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Transit effort leg: \_\_\_\_\_

Date: 08/20/2010

### USWTR Daily Plane Log Sheet

Pilot in Command: Dave Second in Command: Bob Plane: N1353L

Observers: Erin - Left, Ryan - Right

Time take off: 12:25

HOBBS Start: 2043.3

Land for lunch: 15:55

Track Lines and Direction (e.g. N to S) Flown: 1, offshore lines, 10, 8, & 9

Take off after lunch: N/A

HOBBS Stop: 2047.1

Land: N/A

HOBBS Total: 3.8

Track Lines and Direction (e.g. N to S) Flown: N/A

Overall weather: Varied, offshore lines better than inshore region, high cloud cover and some rain showers

#### General Observations

Only flew afternoon flights, morning showers and cloud cover prevented earlier flights. Conducted a total of four tracklines in the USWTR box as well as three offshore transit legs. An offshore line 1 was flown then we surved a transit line to offshore line 10 which was surved into our normal USWTR trackline 10. USWTR box was higher on the inshore portion of the box with BSS 3-4, on the back sides of rain showers sea state dropped and conditions improved to BSS 2-3. Offshore legs also had low sea states of BSS 2-3. No sightings were recorded on any line.

\_\_\_\_\_  
Transit effort leg: \_\_\_\_\_

Date: 08/21/2010

### USWTR Daily Plane Log Sheet

Pilot in Command: Dave Second in Command: Bob Plane: N1353L

Observers: Ryan-L, Erin-R

Time take off: 9:17

HOBBS Start: 2047.1

Land for lunch: 13:29

Track Lines and Direction (e.g. N to S) Flown: 7 to 2

Take off after lunch: N/A

HOBBS Stop: 2051.5

Land: N/A

HOBBS Total: 4.4

Track Lines and Direction (e.g. N to S) Flown: N/A

Overall weather: Continuous cloud cover with some rain

#### General Observations

Beaufort Sea States were poor most of the day with a high 3 to 4 and then on lines 3 and 2 the seas calmed to a BSS 2. There were some patches of rain causing the plane to truncate the trackline and run parallel to the line.  
There was one sighting that could not be resighted due to sea state. There was a sighting of Tursiops and another unknown sighting that was not resighted due to animals avoidance.

Transit effort leg: \_\_\_\_\_

Date: 09/14/2010

### USWTR Daily Plane Log Sheet

Pilot in Command: Dave Second in Command: Bob Plane: N1353L

Observers: Erin - left, Ryan - right

Time take off: 8:48

HOBBS Start: 1953.8

Land for lunch: 12:24

Track Lines and Direction (e.g. N to S) Flown: 6, 5, 7-10, 5

Take off after lunch: NA

HOBBS Stop: 1957.6

Land: NA

HOBBS Total: 3.8

Track Lines and Direction (e.g. N to S) Flown: NA

Overall weather: Poor, BSS 3-4 low swell but high white caps

#### General Observations

Forecasted 10knt winds and 2 ft seas. Winds higher and in opposition to swell causing white caps to build up degrading survey conditions. Started to fly lines 6 to 1 but military vessel conducting live fire in those areas caused flights to be diverted to northern lines 7 to 10. Picked up line 5 after 10 as only part of this line was flown earlier in the day. Forecasted conditions did not match actual causing team to only run 6 lines in poor sea state conditions.

Transit effort leg: No

Date: 09/15/2010

### USWTR Daily Plane Log Sheet

Pilot in Command: Dave Second in Command: Bob Plane: N1353L

Observers: Ryan-Left, Erin-Right

Time take off: 12:08

HOBBS Start: 1957.6

Land for lunch: N/A

Track Lines and Direction (e.g. N to S) Flown: 4 to 1, 5, 6

Take off after lunch: N/A

HOBBS Stop: 1962.0

Land: 16:15

HOBBS Total: 4.4

Track Lines and Direction (e.g. N to S) Flown: N/A

Overall weather: Hazy, no clouds

#### General Observations

BSS of a 3 on the western edge of the lines with most of the lines being a BSS 2. Three sightings one of which was an unidentified delphinid and the other two were spotted dolphins. The first sighting was of a single animal which was showing avoidance behavior so was unable to be identified.

Transit effort leg: No

Date: 10/21/2010

### USWTR Daily Plane Log Sheet

Pilot in Command: Dave Second in Command: Colin Plane: N337CH

Observers: Ryan - Right, Erin - Left

Time take off: 8:40

HOBBS Start: 922.7

Land for lunch: 12:56

Track Lines and Direction (e.g. N to S) Flown: 10, 9, 8, 3, 2, 1

Take off after lunch: 14:25

HOBBS Stop: 929.4

Land: 16:48

HOBBS Total: 6.7

Track Lines and Direction (e.g. N to S) Flown: 4, 5, 7, 6

Overall weather: AM good conditions, PM conditions deteriorated

#### General Observations

Calling for 5-10, 10-15, seas 2-3 feet, 6 sec period.  
Morning conditions BSS 2 with some 3, overall nice. Busy in the range, NAVY had area 17 reserved with 1 live fire exercises and 2 aircraft carriers conducting flight activities. All activities required no fly buffer areas that affected our flight paths. Afternoon winds switched direction and increased which drove the BSS up. Team had 3 cetacean sightings (1 of bottlenose dolphins, and 2 of Risso's dolphin).

Transit effort leg: NO



Date: 10/22/2010

### USWTR Daily Plane Log Sheet

Pilot in Command: Dave Second in Command: Collin Plane: N337CH

Observers: Right-Erin, Left-Ryan

Time take off: 8:50

HOBBS Start: 929.4

Land for lunch: 11:50

Track Lines and Direction (e.g. N to S) Flown: 1 and 2, coastal survey

Take off after lunch: \_\_\_\_\_

HOBBS Stop: 932.4

Land: \_\_\_\_\_

HOBBS Total: 3

Track Lines and Direction (e.g. N to S) Flown: \_\_\_\_\_

Overall weather: Clear skys, high winds, rough seas

#### General Observations

Beaufort Sea State was a 4, winds were 15-20 knots. No marine mammals were observed. Surveys were stopped due to high seas. A coastal survey was performed after USWTR surveys ended. The survey started at Cape Lookout and went to Cape Fear, flying 2 miles from the coastline. No large whales were observed.

Transit effort leg: \_\_\_\_\_

Date: 11/19/2010

### USWTR Daily Plane Log Sheet

Pilot in Command: Dave Second in Command: Bob Plane: N1375L

Observers: Erin - Left, Ryan - Right

Time take off: 12:11

HOBBS Start: 2076.6

Land for lunch: 15:23

Track Lines and Direction (e.g. N to S) Flown: 10-7 plus 2 coastal survey

Take off after lunch: NA

HOBBS Stop: 2079.9

Land: NA

HOBBS Total: 3.3

Track Lines and Direction (e.g. N to S) Flown: NA

Overall weather: Poor conditions due to high sea state

#### General Observations

Forcast 15-20 knts diminishing, 2-4 ft seas. Weather had predicted a High to move in over area by today causing weather conditions to improve, the High was late. Team flew a coasta survey from ILM airport up to the tip of Cape Lookout before flying lines 10-7 in the USWTR box. Survey conditions were a BSS of 3 to 4 resulting in no cetacean sightings. The team also flew a coastal survey from Cape Fear up to Wrightsville Beach. No sightings during coastal surveys either.

Transit effort leg: Coastal

Date: 11/20/2010

### USWTR Daily Plane Log Sheet

Pilot in Command: Dave Second in Command: Bob Plane: N1375L

Observers: Ryan-Left, Erin-Right

Time take off: 8:11

HOBBS Start: 2079.9

Land for lunch: 12:00

Track Lines and Direction (e.g. N to S) Flown: 1 to 6

Take off after lunch: 13:07

HOBBS Stop: 2087.1

Land: 15:57

HOBBS Total: 7.2

Track Lines and Direction (e.g. N to S) Flown: 1, 1E, 1B, 10W, 10

Overall weather: sunny, clear, BSS 1-2

#### General Observations

Great day with 13 sightings. Three sightings were beaked whales but we were only able to photo 2 of those. The USWTR box was flipped farther off shore which is where the beaked whales were observed. The other 10 sightings were of Tursiops truncatus. Seas were a BSS 1-2 all day with it picking up in the afternoon.

Transit effort leg: \_\_\_\_\_

Date: 01/14/2011

### USWTR Daily Plane Log Sheet

Pilot in Command: Dave Second in Command: Bob Plane: 1275M

Observers: Erin - Left, Ryan - Right

Time take off: 8:20

HOBBS Start: Broken

Land for lunch: 12:16

Track Lines and Direction (e.g. N to S) Flown: 10 to 5

Take off after lunch: 1:30

HOBBS Stop: Broken

Land: 3:56

HOBBS Total: 7.0

Track Lines and Direction (e.g. N to S) Flown: 4 to 1

Overall weather: Good sea conditions and vizability

#### General Observations

Forecast called for low winds and 2-3ft seas - Cold temperatures. Good day of surveys, had 8 sightings, mainly inshore of Spotted dolphins. Seas picked up a little towards the end of the day and the winter glare conditions made our sighting window smaller on one side of the plane for the last two survey lines.

Transit effort leg: \_\_\_\_\_

Date: 02/24/2011

### USWTR Daily Plane Log Sheet

Pilot in Command: Dave Second in Command: Bob Plane: N1275M

Observers: Erin-Right, Ryan-Left

Time take off: 8:45

HOBBS Start: N/A

Land for lunch: 11:59

Track Lines and Direction (e.g. N to S) Flown: 1 to 4

Take off after lunch: 13:12

HOBBS Stop: N/A

Land: 16:16

HOBBS Total: 6.7

Track Lines and Direction (e.g. N to S) Flown: 5 to 8

Overall weather: Morning clear skies, afternoon was cloudy

#### General Observations

In the morning BSS were higher inshore then offshore and in the afternoon BSS were lower inshore and higher offshore. BSS ranged from 1-3 all day. There were 11 sightings with one minke whale mom calf pair and a single minke whale. There rest were bottlenose dolphin except for one unknown animal.

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Transit effort leg: \_\_\_\_\_

Date: 03/17/2011

### USWTR Daily Plane Log Sheet

Pilot in Command: Wayne Second in Command: Ron Plane: N1314S

Observers: Erin - Left, Ryan - Right

Time take off: 9:30

HOBBS Start: 3028.1

Land for lunch: 12:15

Track Lines and Direction (e.g. N to S) Flown: 1-4 and TE from CF to ILM

Take off after lunch: 1:05

HOBBS Stop: 3035.3

Land: 5:00

HOBBS Total: 7.2

Track Lines and Direction (e.g. N to S) Flown: 5-10

Overall weather: Am poor conditions with PM improving

#### General Observations

Morning flights saw no sighting in 4 lines flown due to high sea states. Flew a transit effort flight from Cape Fear to ILM to give the seas time to calm down and to take advantage of lower sea states inshore. Afternoon survey conditions improved slightly and saw 4 sightings in 6 tracklines including a pair of Humpback whales (a species not recorded in the range before today). Overall moderate survey conditions for the day.

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\_\_\_\_\_  
Transit effort leg: Yes

Date: 03/18/2011

### USWTR Daily Plane Log Sheet

Pilot in Command: Ron Second in Command: Wayne Plane: N1314S

Observers: Ryan - Left, Erin - Right

Time take off: 8:33

HOBBS Start: 3035.3

Land for lunch: 11:20

Track Lines and Direction (e.g. N to S) Flown: 1, Transit, 10

Take off after lunch: \_\_\_\_\_

HOBBS Stop: 3038.3

Land: \_\_\_\_\_

HOBBS Total: 3

Track Lines and Direction (e.g. N to S) Flown: \_\_\_\_\_

Overall weather: Sunny, rough seas

#### General Observations

Seas were more rough than predicted. BSS was between 3-4. No sightings were observed and surveys were cut after lunch.

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Transit effort leg: \_\_\_\_\_

Date: 04/20/2011

### USWTR Daily Plane Log Sheet

Pilot in Command: Colin Second in Command: Cameron Plane: N1275M

Observers: Erin- Left, Ryan - Right

Time take off: 9:34

HOBBS Start: 129.2

Land for lunch: 1:35

Track Lines and Direction (e.g. N to S) Flown: 5-10 and Lookout to ILM

Take off after lunch: \_\_\_\_\_

HOBBS Stop: 133.4

Land: \_\_\_\_\_

HOBBS Total: 4.2

Track Lines and Direction (e.g. N to S) Flown: \_\_\_\_\_

Overall weather: Overcast, High winds lead to high seas

#### General Observations

Beaufort sea state 3-4 entire survey, no sightings. Targeted the 19th but scheduling conflict caused flights to be moved back. By this time seas were beginning to increase which lead to below average survey conditions.

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Transit effort leg: \_\_\_\_\_

## Complete Cetacean Sighting Summaries

Compiled here are all sighting summaries for cetaceans seen during the July 2010 – April 2011 Onslow Bay aerial surveys. Each of the 41 on effort sightings has its own summary and no off effort sightings were recorded during this survey period.

Saturday, August 21, 2010 Sighting # 1

### Initial sighting on Track

Time: 10:13 WP#: 7 Lat: 33.694377 Long: -76.380856  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 6 Beaufort Sea State: 3  
Observer: RJM Observer side: Left

### Actual Time and Position of Sighting

Time: 10:25 WP#: 8 Lat: 33.690604 Long: -76.385677  
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 7 / 9 / 8  
Features used in Species ID:

Representative images used for Species ID: NA  
Photographer: NA Frame numbers: NA Spacer: NA  
Calculated distance from Trackline: Estimate

### Final Time and Position of Sighting

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

### Behavior and Additional Comments

Animals were not relocated after initial observation due to high sea state. Group was closely packed and traveling at a moderate pace. Animals had robust body appearance with pronounced rostrum, uniform gray in coloration.

Saturday, August 21, 2010 Sighting # 2

### Initial sighting on Track

Time: 11:17 WP#: 19 Lat: 33.643184 Long: -76.57215  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 4 Beaufort Sea State: 2  
Observer: EWC Observer side: Right

### Actual Time and Position of Sighting

Time: 11:18 WP#: 20 Lat: 33.649193 Long: -76.570275  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 7 / 10 / 8  
Features used in Species ID: Robust, uniform gray animals with a light to white colored peduncle

Representative images used for Species ID: 6186, 6197, 6198, 6199  
Photographer: EWC Frame numbers: 6181 to 6219 Spacer: 6220  
Calculated distance from Trackline: 0.6903 km

### Final Time and Position of Sighting

Time: 11:25 WP#: 21 Lat: 33.644500 Long: -76.574284  
Calculated Distance Traveled: 0.6403 km

### Behavior and Additional Comments

Group spaced very close to one another in group of 7 to 10 close to the surface traveling slowly. Animals might have been feeding on bait ball nearby, animals congregating showing bellies to one another. Upon circling animals spread out into pairs but still traveling slowly. No white peduncle patch was observed.

Saturday, August 21, 2010 Sighting # 3

**Initial sighting on Track**

Time: 12:13 WP#: 34 Lat: 33.500171 Long: -76.65558  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 2 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 12:36 WP#: 35 Lat: 33.514175 Long: -76.647372  
Species: None Numbers (Low/High/Best): 5 / 7 / 7  
Features used in Species ID: Species ID could not be established, animal labeled as Unidentified delphinid  
Representative images used for Species ID: None  
Photographer: Erin Frame numbers: NA Spacer: NA  
Calculated distance from Trackline: Wpt 35 assumed location

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

Dark bodied animals diving slowly upon initial observation. Most likely pilot whales but ID could not be established as animals were not resighted.

Wednesday, September 15, 2010 Sighting # 1

### Initial sighting on Track

Time: 13:32 WP#: 13 Lat: 33.68278 Long: -76.888802  
Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: Body  
On/Off Effort: On Trackline: 2 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 13:34 WP#: 14 Lat: 33.68420 Long: -76.9000859  
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 1/1/1  
Features used in Species ID: Unable to establish species ID

Representative images used for Species ID:  
Photographer: EWC Frame numbers: 6221 to 6223 Spacer:  
Calculated distance from Trackline: 1.1 km

### Final Time and Position of Sighting

Time: 13:52 WP#: 15 Lat: 33.68472 Long: -76.895721  
Calculated Distance Traveled: 0.4 km

### Behavior and Additional Comments

Single animal surfaced once with a big splash then dove below the surface. Showed a uniform grey coloration. Upon resighting animal it showed similar elusive behavior around the plane making collecting images difficult.

Wednesday, September 15, 2010 Sighting # 2

### Initial sighting on Track

Time: 14:22 WP#: 19 Lat: 33.61948 Long: -76.943368  
Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: Splash  
On/Off Effort: On Trackline: 1 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 14:24 WP#: 20 Lat: 33.62346 Long: -76.938743  
Species: *Stenella frontalis* Numbers (Low/High/Best): 33 / 40 / 37  
Features used in Species ID: Alternating light and dark body coloration. Active interactions among animals in the group with lots of belly showing and tactile interactions.

Representative images used for Species ID: 6238, 6240, 6242, 6249, 6252, 6260, 6271  
Photographer: Erin Frame numbers: 6224 - 6290 Spacer: 6291  
Calculated distance from Trackline: 0.62 km

### Final Time and Position of Sighting

Time: 14:32 WP#: 21 Lat: 33.62938 Long: -76.927847  
Calculated Distance Traveled: 1.2 km

### Behavior and Additional Comments

Fairly large group in close association with one another, traveling at moderate pace just below the surface. Surfacing frequently and regularly.



Wednesday, September 15, 2010 Sighting # 3

**Initial sighting on Track**

Time: 14:57 WP#: 25 Lat: 33.95259 Long: -76.848477  
Vertical Angle: 1 Horizontal Bearing in Degrees: 60 Sighting Cue: Body  
On/Off Effort: On Trackline: 5 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 14:58 WP#: 26 Lat: 33.95439 Long: -76.849868  
Species: *Stenella frontalis* Numbers (Low/High/Best): 2 / 2 / 2  
Features used in Species ID: Alternating light and dark coloration, white rostrum tip.

Representative images used for Species ID: 6302, 6305  
Photographer: EWC Frame numbers: 6292 to 6305 Spacer: 6306  
Calculated distance from Trackline: 0.24 km

**Final Time and Position of Sighting**

Time: 15:05 WP#: 27 Lat: 33.94656 Long: -76.868110  
Calculated Distance Traveled: 1.9 km

**Behavior and Additional Comments**

Initial sighting of a single animal followed by a second with the two separated by a large distance.  
Both animals created large splashes while surfacing.

Thursday, October 21, 2010 Sighting # 1

### Initial sighting on Track

Time: 9:38 WP#: 9 Lat: 33.810982 Long: -76.142143  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 9 Beaufort Sea State: 2  
Observer: RJM Observer side: Right

### Actual Time and Position of Sighting

Time: 9:39 WP#: 10 Lat: 33.813908 Long: -76.141887  
Species: *Grampus griseus* Numbers (Low/High/Best): 8/12/10  
Features used in Species ID: Long body, large dorsal fin, grey coloration, white head with cleft on rostrum

Representative images used for Species ID: 6319, 6324, 6325, 6359  
Photographer: Ryan Frame numbers: 6308 to 6398 Spacer: 6399  
Calculated distance from Trackline: 0.3262 km

### Final Time and Position of Sighting

Time: 9:48 WP#: 10 Lat: 33.807848 Long: -76.139425  
Calculated Distance Traveled: 0.7112 km

### Behavior and Additional Comments

Some traveling in pairs but staying spread out. Slow travel, animals staying just below the surface.  
There are some juvenile animals. Some animals are picked up speed.

Thursday, October 21, 2010 Sighting # 2

### Initial sighting on Track

Time: 11:12 WP#: 31 Lat: 33.572535 Long: -76.621860  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 3 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 11:14 WP#: 32 Lat: 33.568532 Long: -76.625898  
Species: *Grampus griseus* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: Long body, large dorsal fin, grey coloration, white head with cleft on rostrum

Representative images used for Species ID: 6425, 6447  
Photographer: Ryan Frame numbers: 6400 to 6486 Spacer: N/A  
Calculated distance from Trackline: 0.5815 km

### Final Time and Position of Sighting

Time: 11:23 WP#: 33 Lat: 33.571147 Long: -76.621735  
Calculated Distance Traveled: 0.4830 km

### Behavior and Additional Comments

Animals were traveling slowly just below the surface, with some deeper dives. They are showing possible avoidance behavior.

Thursday, October 21, 2010 Sighting # 3

**Initial sighting on Track**

Time: 11:26 WP#: 35 Lat: 33.635035 Long: -76.702165  
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Splash  
On/Off Effort: On Trackline: 3 Beaufort Sea State: 2  
Observer: Ryan Observer side: Right

**Actual Time and Position of Sighting**

Time: 11:28 WP#: 36 Lat: 33.638377 Long: -76.701693  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 15/20/18  
Features used in Species ID: Grey robust animals with white peduncles

Representative images used for Species ID: 6511, 6512  
Photographer: Ryan Frame numbers: 6487 to 6517 Spacer: 6517  
Calculated distance from Trackline: 0.3742 km

**Final Time and Position of Sighting**

Time: 11:30 WP#: 37 Lat: 33.640930 Long: -76.700543  
Calculated Distance Traveled: 0.3032 km

**Behavior and Additional Comments**

Animals were in a tightly packed group doing deeper dives. They were possibly feeding in a cluster or group or exhibiting social behavior. They were not traveling in any general direction.

Saturday, November 20, 2010 Sighting # 1

### Initial sighting on Track

Time: 9:03 WP#: 9 Lat: 33.559341 Long: -76.7316  
Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: Splash  
On/Off Effort: On Trackline: 2 Beaufort Sea State: 1  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 9:05 WP#: 10 Lat: 33.561044 Long: -76.736932  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 15 / 16 / 16  
Features used in Species ID: Robust bodied animals with darker grey on dorsal surface and lighter on sides. Large dorsal fin.  
Representative images used for Species ID: 7, 11, 16, 23  
Photographer: Erin Frame numbers: 1 to 37 Spacer: 38  
Calculated distance from Trackline: 0.5291 km

### Final Time and Position of Sighting

Time: 9:10 WP#: 11 Lat: 33.570211 Long: -76.74018  
Calculated Distance Traveled: 1.063 km

### Behavior and Additional Comments

Disperse group, animals traveling in pairs or loose groups of approximately 4-5. Slow directional travel with regular surfacings. Group tightened into one larger group with only a few animals swimming separately. White caudal peduncle coloration was noted in group and at least one calf was present. Animals showing non directional travel when we left them.

Saturday, November 20, 2010 Sighting # 2

### Initial sighting on Track

Time: 9:12 WP#: 13 Lat: 33.592834 Long: -76.77504  
Vertical Angle: 1 Horizontal Bearing in Degrees: 45 Sighting Cue: Body  
On/Off Effort: On Trackline: 2 Beaufort Sea State: 1  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 9:15 WP#: 14 Lat: 33.594334 Long: -76.784286  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 10 / 12 / 12  
Features used in Species ID: Dark grey dorsal ridge with lighter grey lateral coloration. Lighter grey blaze to dorsal fin.  
Representative images used for Species ID: 55, 60, 67, 71, 91  
Photographer: Erin Frame numbers: 39 to 98 Spacer: 99  
Calculated distance from Trackline: 0.8726 km

### Final Time and Position of Sighting

Time: 9:19 WP#: 15 Lat: 33.597477 Long: -76.778585  
Calculated Distance Traveled: 0.6328 km

### Behavior and Additional Comments

Fairly tight group splashing while surfacing together. Possibly one or two calves observed. A number of animals would breach clear of the surface during the encounter. On one of our circles animals appeared to be hanging motionless just below the surface before resuming travel a few moments later.

Saturday, November 20, 2010 Sighting # 3

### Initial sighting on Track

Time: 9:49 WP#: 25 Lat: 33.614727 Long: -76.67656  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 3 Beaufort Sea State: 1  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 9:50 WP#: 26 Lat: 33.614344 Long: -76.67268  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 22 / 25 / 25  
Features used in Species ID: Robust body and rostrum, darker grey dorsal ridge with lighter grey lateral body.  
Representative images used for Species ID: 109, 119, 125, 128, 137  
Photographer: Erin Frame numbers: 100 to 147 Spacer: 148  
Calculated distance from Trackline: 0.36 km

### Final Time and Position of Sighting

Time: 9:53 WP#: 27 Lat: 33.621534 Long: -76.68275  
Calculated Distance Traveled: 1.23 km

### Behavior and Additional Comments

Animals traveling close to one another in a horizontal line at a moderate rate of travel and surfacing regularly. Group increased its amount of subsurface travel upon circling.

Saturday, November 20, 2010 Sighting # 4

### Initial sighting on Track

Time: 9:49 WP#: 31 Lat: 33.528411 Long: -76.42429  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 4 Beaufort Sea State: 1  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 10:05 WP#: 32 Lat: 33.527289 Long: -76.41977  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 45 / 55 / 50  
Features used in Species ID: Dark grey dorsal surface with lighter grey lateral coloration. Blaze from lateral coloration to region of dorsal fin  
Representative images used for Species ID: 166, 175, 198  
Photographer: Erin Frame numbers: 149 to 205 Spacer: 206  
Calculated distance from Trackline: 0.44 km

### Final Time and Position of Sighting

Time: 10:12 WP#: 33 Lat: 33.536427 Long: -76.42388  
Calculated Distance Traveled: 1.09 km

### Behavior and Additional Comments

Entire group was spread out over a large area, most animals were swimming as singles with a few groups of 4-5. All individuals showed milling behavior with little dedicated direction to travel.

Saturday, November 20, 2010 Sighting # 5

### Initial sighting on Track

Time: 10:18 WP#: 35 Lat: 33.641741 Long: -76.57079  
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body  
On/Off Effort: On Trackline: 4 Beaufort Sea State: 1  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 10:20 WP#: 36 Lat: 33.645909 Long: -76.57503  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4 / 4 / 4  
Features used in Species ID: Lateral light grey blaze up to robust dorsal fin. Darker grey coloration on dorsal ridge.  
Representative images used for Species ID: 210, 211, 216  
Photographer: Erin Frame numbers: 207 to 229 Spacer: 230  
Calculated distance from Trackline: 0.61 km

### Final Time and Position of Sighting

Time: 10:23 WP#: 37 Lat: 33.647799 Long: -76.575663  
Calculated Distance Traveled: 0.22 km

### Behavior and Additional Comments

Traveling slowly just below the surface. All animals surfacing roughly together. White peduncle coloration was observed.

Saturday, November 20, 2010 Sighting # 6

### Initial sighting on Track

Time: 10:54 WP#: 47 Lat: 33.745104 Long: -76.57954  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 5 Beaufort Sea State: 1  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 10:56 WP#: 48 Lat: 33.7473850 Long: -76.588069  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 25 / 28 / 28  
Features used in Species ID: Lateral light grey blaze up to robust dorsal fin. Darker grey coloration on dorsal ridge.  
Representative images used for Species ID: 236, 239, 253, 257, 262  
Photographer: Erin Frame numbers: 231 to 265 Spacer: 266  
Calculated distance from Trackline: 0.83 km

### Final Time and Position of Sighting

Time: 11:00 WP#: 49 Lat: 33.742372 Long: -76.58289  
Calculated Distance Traveled: 0.73 km

### Behavior and Additional Comments

Couple of tightly packed groups of 7-12 animals showing slow travel with a moderate amount of time spent traveling just below the surface. Three groups of pairs also seen. White peduncle coloration noted in animals.

Saturday, November 20, 2010 Sighting # 7

### Initial sighting on Track

Time: 13:43 WP#: 67 Lat: 33.446025 Long: -76.71448  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 1 Beaufort Sea State: 2  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 13:45 WP#: 68 Lat: 33.454015 Long: -76.70884  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 12 / 18 / 15  
Features used in Species ID: Light grey blaze up to level of dorsal fin. Robust body appearance darker grey coloration along dorsal midline.  
Representative images used for Species ID: 268, 273, 281, 284, 289  
Photographer: Erin Frame numbers: 267 to 293 Spacer: 294  
Calculated distance from Trackline: 1.03 km

### Final Time and Position of Sighting

Time: 13:50 WP#: 69 Lat: 33.438818 Long: -76.69766  
Calculated Distance Traveled: 1.98 km

### Behavior and Additional Comments

Widely spaced single animals traveling at moderate pace. Upon initial sighting only saw 3 animals this increased to 11+ while circling as a few groups of 3-4 joined. White peduncle coloration pattern was observed. Group formed into a single large group as sighting progressed.

Saturday, November 20, 2010 Sighting # 8

### Initial sighting on Track

Time: 13:54 WP#: 71 Lat: 33.369371 Long: -76.614519  
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body  
On/Off Effort: On Trackline: 1 Beaufort Sea State: 2  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 14:00 WP#: 72 Lat: 33.371993 Long: -76.61616  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8 / 10 / 9  
Features used in Species ID: Robust rostrum, dark grey dorsal midline, robust dorsal fin.  
Representative images used for Species ID: 300, 304, 308, 321  
Photographer: Erin Frame numbers: 295 to 324 Spacer: 325  
Calculated distance from Trackline: 0.33 km

### Final Time and Position of Sighting

Time: 14:01 WP#: 73 Lat: 33.362340 Long: -76.60201  
Calculated Distance Traveled: 1.7 km

### Behavior and Additional Comments

Group of approximately 8 animals transiting across our trackline. Arranged in a horizontal line swimming side by side. Animals appeared to freeze just below the surface during one of our circles. At least 2 small calves observed in the group. White peduncle coloration observed.

Saturday, November 20, 2010 Sighting # 9

### Initial sighting on Track

Time: 14:03 WP#: 76 Lat: 33.297995 Long: -76.52494  
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body  
On/Off Effort: On Trackline: 1 off Beaufort Sea State: 2  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 14:08 WP#: 77 Lat: 33.305696 Long: -76.5216  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 6 / 8 / 7  
Features used in Species ID: Dark grey dorsal surface and light grey lateral coloration. Light blaze up to level of dorsal fin.  
Representative images used for Species ID: 332, 344, 346  
Photographer: Erin Frame numbers: 326 to 352 Spacer: 353  
Calculated distance from Trackline: 0.91 km

### Final Time and Position of Sighting

Time: 14:08 WP#: 78 Lat: 33.305532 Long: -76.51888  
Calculated Distance Traveled: 0.25 km

### Behavior and Additional Comments

Two groups of animals moderately spaced from one another traveling just below the surface.

Saturday, November 20, 2010 Sighting # 10

### Initial sighting on Track

Time: 14:26 WP#: 82 Lat: 33.355409 Long: -76.02944  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: B line Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 14:29 WP#: 83 Lat: 33.354651 Long: -76.02138  
Species: None Numbers (Low/High/Best): 2 / 2 / 2  
Features used in Species ID: Dark grey tiger stripe appearance along dorsal surface. Small d fin placed far back on body, small pectoral fins, slow slopping head.  
Representative images used for Species ID: 354-357, 360-362, 366-370  
Photographer: Erin Frame numbers: 354 to 380 Spacer: 381  
Calculated distance from Trackline: 0.75 km

### Final Time and Position of Sighting

Time: 14:34 WP#: 84 Lat: 33.358452 Long: -76.024618  
Calculated Distance Traveled: 0.52 km

### Behavior and Additional Comments

Pair of large animals with light tan/grey body coloration. Animals appeared to have deeper bodies compared to other animals we have seen. Slow sloping head with a crease roughly at level of blowhole. Small pectoral fins and dorsal fin that was positioned closer to tail than head. Animals surfaced for a series of 6-7 breathes before diving from sight quickly.



Saturday, November 20, 2010 Sighting # 11

**Initial sighting on Track**

Time: 14:37 WP#: 85 Lat: 33.436558 Long: -75.92367  
Vertical Angle: 3 Horizontal Bearing in Degrees: 45 Sighting Cue: Body  
On/Off Effort: On Trackline: B line Beaufort Sea State: 2  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 14:40 WP#: 86 Lat: 33.440505 Long: -75.91474  
Species: None Numbers (Low/High/Best): 2 / 2 / 2  
Features used in Species ID: Large bodied animal, sloping head, dorsal fin placed far back on body, small pectoral fins.  
Representative images used for Species ID: NA  
Photographer: Erin Frame numbers: NA Spacer: NA  
Calculated distance from Trackline: 0.94 km

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

Large bodied animals similar to those in sighting 10. Animals dove quickly from sight before images could be collected.

Saturday, November 20, 2010 Sighting # 12

**Initial sighting on Track**

Time: 14:52 WP#: 90 Lat: 33.665092 Long: -75.83501  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 10 offshore Beaufort Sea State: 2  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 14:58 WP#: 91 Lat: 33.672114 Long: -75.83727  
Species: None Numbers (Low/High/Best): 6 / 6 / 6  
Features used in Species ID: Large bodied animal, sloping head, dorsal fin placed far back on body, small pectoral fins.  
Representative images used for Species ID: 383-386  
Photographer: Erin Frame numbers: 382 to 386 Spacer: 387  
Calculated distance from Trackline: 0.81 km

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

A group of six large bodied animals, different from the two previous sightings, with light grey coloration. Widely spaced from one another, all traveling in the same direction. Animals quickly dove from the surface only allowing for a single quick sequence of images to be collected. Small dorsal fin and pectoral fins can be seen.

Saturday, November 20, 2010 Sighting # 13

**Initial sighting on Track**

Time: 15:10 WP#: 95 Lat: 33.977613 Long: -76.22938  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 15:17 WP#: 97 Lat: 33.984226 Long: -76.224449  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 15 / 23 / 21  
Features used in Species ID: Light grey blaze up to level of dorsal fin. Robust body appearance  
darker grey coloration along dorsal midline.  
Representative images used for Species ID: 399, 403, 407  
Photographer: Erin Frame numbers: 388 to 418 Spacer: 419  
Calculated distance from Trackline: 0.86 km

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

Animals traveling in 2-3 groups of 5-7 animals, all were active at the surface. Multiple calves were observed as well as white peduncle coloration.

Friday, January 14, 2011 Sighting # 1

### Initial sighting on Track

Time: 8:54 WP#: 4 Lat: 34.161287 Long: -76.468074  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 3  
Observer: Ryan Observer side: Right

### Actual Time and Position of Sighting

Time: 8:56 WP#: 5 Lat: 34.165669 Long: -76.482446  
Species: *Stenella frontalis* Numbers (Low/High/Best): 10/24/22  
Features used in Species ID: Alternating light and dark pattern down the body, blaze before the dorsal fin, white tip on the rostrum.  
Representative images used for Species ID: 6937, 6967, 6968, 6975  
Photographer: Ryan Frame numbers: 6937-7000 Spacer: 7001  
Calculated distance from Trackline: 1.409 km

### Final Time and Position of Sighting

Time: 9:00 WP#: 6 Lat: 34.169625 Long: -76.476628  
Calculated Distance Traveled: 0.6928 km

### Behavior and Additional Comments

Traveling very fast just below the surface, staying close together

Friday, January 14, 2011 Sighting # 2

### Initial sighting on Track

Time: 9:04 WP#: 9 Lat: 34.084928 Long: -76.366187  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 3  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 9:05 WP#: 10 Lat: 34.086145 Long: -76.365575  
Species: *Stenella frontalis* Numbers (Low/High/Best): 19/28/26  
Features used in Species ID: Alternating light and dark pattern down the body, blaze before the dorsal fin, white tip on the rostrum.  
Representative images used for Species ID: 7025, 7026, 7062  
Photographer: Ryan Frame numbers: 7002-7063 Spacer: 7064  
Calculated distance from Trackline: 0.1466 km

### Final Time and Position of Sighting

Time: 9:10 WP#: 12 Lat: 34.086316 Long: -76.370189  
Calculated Distance Traveled: 0.4253 km

### Behavior and Additional Comments

Traveling at a fast pace, just below the surface. Animals are alternating between spaced out and coming together and then spreading out again. Lots of splashing and some darting in different directions.

Friday, January 14, 2011 Sighting # 3

### Initial sighting on Track

Time: 10:33 WP#: 26 Lat: 34.070788 Long: -76.739338  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 7 Beaufort Sea State: 2  
Observer: Ryan Observer side: Right

### Actual Time and Position of Sighting

Time: 10:35 WP#: 27 Lat: 34.070243 Long: -76.725518  
Species: *Stenella frontalis* Numbers (Low/High/Best): 20/30/25  
Features used in Species ID: Alternating light and dark patterns down the body, blaze just before the dorsal fin, white tip on the rostrum.  
Representative images used for Species ID: 7079, 7147  
Photographer: Ryan Frame numbers: 7065-7149 Spacer: 7150  
Calculated distance from Trackline: 1.274 km

### Final Time and Position of Sighting

Time: 9:00 WP#: 28 Lat: 34.071755 Long: -76.734126  
Calculated Distance Traveled: 0.8105 km

### Behavior and Additional Comments

Animals spaced out in groups of 2-4 and then one large group. Animals were staying close together and not traveling fast or any given direction. Some young animals in the group.

Friday, January 14, 2011 Sighting # 4

### Initial sighting on Track

Time: 10:50 WP#: 33 Lat: 34.029663 Long: -76.820548  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 6 Beaufort Sea State: 2  
Observer: Ryan Observer side: Right

### Actual Time and Position of Sighting

Time: 10:51 WP#: 34 Lat: 34.035643 Long: -76.822912  
Species: *Stenella frontalis* Numbers (Low/High/Best): 40/55/50  
Features used in Species ID: Alternating light and dark patterns down the body, blaze just before the dorsal fin, white tip on the rostrum.  
Representative images used for Species ID: 7169, 7170, 7192, 7193, 7196, 7203  
Photographer: Ryan Frame numbers: 7151-7231 Spacer: 7232  
Calculated distance from Trackline: 0.6997 km

### Final Time and Position of Sighting

Time: 10:54 WP#: 35 Lat: 34.033815 Long: -76.826533  
Calculated Distance Traveled: 0.3907 km

### Behavior and Additional Comments

One large group and several subgroups swimming just below the surface. Some doing deeper dives and clustered together, darting different directions, and some jumping.

Friday, January 14, 2011 Sighting # 5

### Initial sighting on Track

Time: 11:29 WP#: 47 Lat: 33.819754 Long: -76.678634  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 5 Beaufort Sea State: 2  
Observer: Ryan Observer side: Right

### Actual Time and Position of Sighting

Time: 11:31 WP#: 48 Lat: 33.833874 Long: -76.663780  
Species: *Stenella frontalis* Numbers (Low/High/Best): 150/190/180  
Features used in Species ID: Alternating light and dark pattern down the body, blaze just before the dorsal fin, white tip on rostrum.  
Representative images used for Species ID: 7261, 7254, 7276  
Photographer: Ryan Frame numbers: 7233-7306 Spacer: 7307  
Calculated distance from Trackline: 2.085 km

### Final Time and Position of Sighting

Time: 11:35 WP#: 49 Lat: 33.829618 Long: -76.666739  
Calculated Distance Traveled: 0.5465 km

### Behavior and Additional Comments

Animals were playfully darting, circling and jumping. They were swimming just below the surface, traveling NW. There were 3 groups each having approximately 50 animals. Some animals were chasing and swimming belly to belly. Some calves present.

Friday, January 14, 2011 Sighting # 6

### Initial sighting on Track

Time: 11:49 WP#: 54 Lat: 33.975389 Long: -76.878983  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 5 Beaufort Sea State: 3  
Observer: Ryan Observer side: Right

### Actual Time and Position of Sighting

Time: 11:51 WP#: 55 Lat: 33.980883 Long: -76.883005  
Species: *Stenella frontalis* Numbers (Low/High/Best): 20/28/25  
Features used in Species ID: Alternating light and dark pattern down the body, blaze coming up just before the dorsal fin, while tip to rostrum.  
Representative images used for Species ID: 7325, 7328  
Photographer: Ryan Frame numbers: 7308-7348 Spacer: 7349  
Calculated distance from Trackline: 0.7147 km

### Final Time and Position of Sighting

Time: 11:53 WP#: 56 Lat: 33.984980 Long: -76.875142  
Calculated Distance Traveled: 0.8562 km

### Behavior and Additional Comments

Three groups of animals each with about 6-8 individuals swimming close together at a fast pace.

Friday, January 14, 2011 Sighting # 7

**Initial sighting on Track**

Time: 13:50 WP#: 62 Lat: 33.916583 Long: -76.931541  
Vertical Angle: 3 Horizontal Bearing in Degrees: 60 Sighting Cue: 2  
On/Off Effort: On Trackline: 4 Beaufort Sea State: 3  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: 13:55 WP#: 63 Lat: 33.921761 Long: -76.936736  
Species: *Stenella frontalis* Numbers (Low/High/Best): 11/18/15  
Features used in Species ID: Alternating light and dark pattern down the body, a blaze coming up just before the dorsal fin, white tip on rostrum.  
Representative images used for Species ID: 7385, 7387, 7391, 7392  
Photographer: Ryan Frame numbers: 7350-7392 Spacer: 7393  
Calculated distance from Trackline: 0.7492 km

**Final Time and Position of Sighting**

Time: 13:57 WP#: 64 Lat: 33.930591 Long: -76.928325  
Calculated Distance Traveled: 1.252 km

**Behavior and Additional Comments**

Animals swimming in a tightly packed group just below the surface. Normal surfacing and traveling at a somewhat fast pace.

Friday, January 14, 2011 Sighting # 8

**Initial sighting on Track**

Time: 14:12 WP#: 66 Lat: 33.606519 Long: -76.523409  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 4 Beaufort Sea State: 3  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: WP#: Lat: Long:  
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID:  
Representative images used for Species ID:  
Photographer: Ryan Frame numbers: Spacer:  
Calculated distance from Trackline:

**Final Time and Position of Sighting**

Time: WP#: Lat: Long:  
Calculated Distance Traveled:

**Behavior and Additional Comments**

No resight

Thursday, February 24, 2011 Sighting # 1

### Initial sighting on Track

Time: 9:22 WP#: 9 Lat: 33.477952 Long: -76.754541  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 1 Beaufort Sea State: 2  
Observer: RJM Observer side: Left

### Actual Time and Position of Sighting

Time: 9:22 WP#: 10 Lat: 33.482840 Long: -76.753731  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 25 / 35 / 32  
Features used in Species ID: Robust body appearance lateral blaze to mid dorsal fin. Large dorsal fin.

Representative images used for Species ID: 7461, 7462, 7443, 7464  
Photographer: EWC Frame numbers: 7430 - 7474 Spacer: 7475  
Calculated distance from Trackline: 0.6 km

### Final Time and Position of Sighting

Time: 9:27 WP#: 11 Lat: 33.490571 Long: -76.761051  
Calculated Distance Traveled: 1.1 km

### Behavior and Additional Comments

Slow traveling animals with regular surfacings - part of the group staying submerged below the other animals. Animals traveling in a loose group in side by side formation.

Animal with white peduncle patch

Thursday, February 24, 2011 Sighting # 2

### Initial sighting on Track

Time: 9:40 WP#: 16 Lat: 33.495711 Long: -76.652164  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 2 Beaufort Sea State: 2  
Observer: RJM Observer side: Left

### Actual Time and Position of Sighting

Time: 9:41 WP#: 17 Lat: 33.492367 Long: -76.654561  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3 / 5 / 4  
Features used in Species ID: Robust body appearance, large dorsal fin, white coloration to peduncle

Representative images used for Species ID: 7477  
Photographer: EWC Frame numbers: 7476-7479 Spacer: 7480  
Calculated distance from Trackline: 0.4 km

### Final Time and Position of Sighting

Time: 9:46 WP#: 18 Lat: 33.493375 Long: -76.659808  
Calculated Distance Traveled: 0.5 km

### Behavior and Additional Comments

Group moving at a fairly high rate of speed, a few animals would hit the surface hard then dive down out of sight. We were only able to make a few circles before the animals moved off.

White peduncle patch present

Thursday, February 24, 2011 Sighting # 3

### Initial sighting on Track

Time: 10:21 WP#: 33 Lat: 33.571529 Long: -76.618242  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 3 Beaufort Sea State: 2  
Observer: RJM Observer side: Left

### Actual Time and Position of Sighting

Time: 10:23 WP#: 34 Lat: 33.574638 Long: -76.622563  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 14 / 20 / 18  
Features used in Species ID: Robust body appearance, wide base dorsal fin. Light blaze on side of body trailing to mid dorsal fin.  
Representative images used for Species ID: 7501, 7511, 7513, 7524  
Photographer: EWC Frame numbers: 7481-7530 Spacer: 7531  
Calculated distance from Trackline: 0.5 km

### Final Time and Position of Sighting

Time: 10:26 WP#: 35 Lat: 33.580020 Long: -76.623398  
Calculated Distance Traveled: 0.6 km

### Behavior and Additional Comments

Group hanging at the surface with little to no direction of travel, animals widely spaced with many a single individuals but some in pairs. Group showed no changes in behavior upon circling them.

Thursday, February 24, 2011 Sighting # 4

### Initial sighting on Track

Time: 10:29 WP#: 38 Lat: 33.507294 Long: -76.535076  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 3 Beaufort Sea State: 2  
Observer: EWC Observer side: Right

### Actual Time and Position of Sighting

Time: 10:31 WP#: 39 Lat: 33.511343 Long: -76.545763  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 10 / 11 / 10  
Features used in Species ID: Robust body appearance, lateral blaze to the level of mid dorsal fin.  
Representative images used for Species ID: 7532, 7533, 7558  
Photographer: EWC Frame numbers: 7532-7560 Spacer: 7561  
Calculated distance from Trackline: 1 km

### Final Time and Position of Sighting

Time: 10:35 WP#: 40 Lat: 33.511661 Long: -76.549372  
Calculated Distance Traveled: 0.3 km

### Behavior and Additional Comments

Two small groups of 5 animals, slow direction of travel at the surface. Potentially one calf in the group.



Thursday, February 24, 2011 Sighting # 5

### Initial sighting on Track

Time: 10:45 WP#: 44 Lat: 33.607698 Long: -76.528192  
Vertical Angle: 1 Horizontal Bearing in Degrees: 45 Sighting Cue: Body  
On/Off Effort: On Trackline: 4 Beaufort Sea State: 2  
Observer: ECW Observer side: Right

### Actual Time and Position of Sighting

Time: 10:46 WP#: 45 Lat: 33.614701 Long: -76.525724  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 68 / 83 / 79  
Features used in Species ID: Light lateral blaze along side up to the level of the mid dorsal.  
Large dorsal, white peduncle patch  
Representative images used for Species ID: 7562, 7563, 7583, 7595  
Photographer: EWC Frame numbers: 7562-7598 Spacer: 7599  
Calculated distance from Trackline: 0.8 km

### Final Time and Position of Sighting

Time: 10:49 WP#: 46 Lat: 33.615189 Long: -76.530863  
Calculated Distance Traveled: 0.5 km

### Behavior and Additional Comments

Large group, well dispersed and moving at a moderate rate of travel. A few subgroups of densely packed animals and others in between 1-3 animals. Regular slow surfcaings. A few calves were seen in the group, no images of calves taken.

Thursday, February 24, 2011 Sighting # 6

### Initial sighting on Track

Time: 10:52 WP#: 48 Lat: 33.680684 Long: -76.624144  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 4 Beaufort Sea State: 2  
Observer: EWC Observer side: Right

### Actual Time and Position of Sighting

Time: 10:55 WP#: 49 Lat: 33.684479 Long: -76.620831  
Species: *Balaenoptera acutorostrata* Numbers (Low/High/Best): 2 / 2 / 2  
Features used in Species ID: White pectoral blazes, small dorsal fin place far back on the animals body, tapered shape to the head. Large body size.  
Representative images used for Species ID: 7633, 7696, 7701, 7702, 7717, 7719, 7720  
Photographer: EWC Frame numbers: 7600-7733 Spacer: 7734  
Calculated distance from Trackline: 0.5 km

### Final Time and Position of Sighting

Time: 11:17 WP#: 50 Lat: 33.688427 Long: -76.604171  
Calculated Distance Traveled: 1.6 km

### Behavior and Additional Comments

Animals surfaced for a few breaths before diving to around 30-40ft below the surface - could still see the animals silhouette. Calf surfacing with mother and half way between mothers breaths. Mother surfaces 3 times during our observation period.

Thursday, February 24, 2011 Sighting # 7

### Initial sighting on Track

Time: 11:22 WP#: 52 Lat: 33.791944 Long: -76.771217  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 4 Beaufort Sea State: 2  
Observer: RJM Observer side: Left

### Actual Time and Position of Sighting

Time: 11:23 WP#: 53 Lat: 33.788800 Long: -76.776595  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 10 / 11 / 10  
Features used in Species ID: Robust body appearance

Representative images used for Species ID: 7746, 7762  
Photographer: EWC Frame numbers: 7742-7762 Spacer: 7763  
Calculated distance from Trackline: 0.6 km

### Final Time and Position of Sighting

Time: 11:25 WP#: 54 Lat: 33.789135 Long: -76.780603  
Calculated Distance Traveled: 0.4 km

### Behavior and Additional Comments

Disperse group traveling as singles at a moderate pace, animals difficult to photograph because only as singles.

Thursday, February 24, 2011 Sighting # 8

### Initial sighting on Track

Time: 11:33 WP#: 58 Lat: 33.958550 Long: -76.993051  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 4 Beaufort Sea State: 3  
Observer: RJM Observer side: Left

### Actual Time and Position of Sighting

Time: 11:34 WP#: 59 Lat: 33.953879 Long: -76.990195  
Species: *Stenella frontalis* Numbers (Low/High/Best): 25 / 32 / 29  
Features used in Species ID: Light lateral blaze trailing to the level of mid dorsal fin. Alternating light and dark pattern down the body

Representative images used for Species ID: 7746, 7762  
Photographer: EWC Frame numbers: 7742-7762 Spacer: 7763  
Calculated distance from Trackline: 0.6 km

### Final Time and Position of Sighting

Time: 11:37 WP#: 60 Lat: 33.952746 Long: -76.990692  
Calculated Distance Traveled: 0.1 km

### Behavior and Additional Comments

Dense group of animals moving at a high rate of speed just below the surface with frequent quick surfacings - at least one calf seen in group.

Thursday, February 24, 2011 Sighting # 9

### Initial sighting on Track

Time: 1:57 WP#: 74 Lat: 33.683036 Long: -76.495812  
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body  
On/Off Effort: On Trackline: 5 Beaufort Sea State: 2  
Observer: RJM Observer side: Left

### Actual Time and Position of Sighting

Time: 2:00 WP#: 75 Lat: 33.690618 Long: -76.487107  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 180 / 250 / 230  
Features used in Species ID: Robust body, light grey lateral blaze along side to level of mid dorsal fin, white peduncle patch.

Representative images used for Species ID: 7837, 7838, 7842, 7842, 7845  
Photographer: EWC Frame numbers: 7813-7859 Spacer: 7860  
Calculated distance from Trackline: 1.2 km

### Final Time and Position of Sighting

Time: 2:04 WP#: 76 Lat: 33.693116 Long: -76.493962  
Calculated Distance Traveled: 0.7 km

### Behavior and Additional Comments

Very large and disperse group - multiple groups of ~25-30 animals. Leisure rate of travel at the surface  
No response to circling.

White peduncle patch present.

Thursday, February 24, 2011 Sighting # 10

### Initial sighting on Track

Time: 2:19 WP#: 81 Lat: 33.748130 Long: -76.453492  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 6 Beaufort Sea State: 3  
Observer: EWC Observer side: Right

### Actual Time and Position of Sighting

Time: 2:19 WP#: 82 Lat: 33.748897 Long: -76.455229  
Species: *Balaenoptera acutorostrata* Numbers (Low/High/Best): 1 / 1 / 1  
Features used in Species ID: White pectoral blaze, large fusiform body, small dorsal fin placed far back on the animals body.

Representative images used for Species ID: No images collected  
Photographer: EWC Frame numbers: NA Spacer: NA  
Calculated distance from Trackline: 0.2 km

### Final Time and Position of Sighting

Time: 2:37 WP#: 83 Lat: 33.746308 Long: -76.439363  
Calculated Distance Traveled: 0.3 km

### Behavior and Additional Comments

Animal made on surfacing (initial observation) and then dove to ~30-40ft below the surface. Because of the higher sea state we were unable to follow the animal while it stay submerged and despite circling for 18min did not resight the animal.

Thursday, February 24, 2011 Sighting # 11

**Initial sighting on Track**

Time: 3:10 WP#: 92 Lat: 33.793790 Long: -76.375023  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 7 Beaufort Sea State: 3  
Observer: RJM Observer side: Left

**Actual Time and Position of Sighting**

Time: 3:20 WP#: 93 Lat: 33.800181 Long: -76.365204  
Species: Numbers (Low/High/Best): 2 / 2 / 2  
Features used in Species ID: 2 animals, presumably different species with different diagnostic characteristics.  
Representative images used for Species ID: No images collected  
Photographer: EWC Frame numbers: NA Spacer: NA  
Calculated distance from Trackline: 1.2 km

**Final Time and Position of Sighting**

Time: 3:22 WP#: 94 Lat: 33.790147 Long: -76.367524  
Calculated Distance Traveled: 1.1 km

**Behavior and Additional Comments**

Light grey colored animal with a robust body appearance and a rounded head (no rostrum)  
Approximately 10-12 ft long, appeared to have a large squat body.  
Additionally there appeared to be another animal submerged ~30ft below the surface so no features could be distinguished. 1st animal seen twice and submerged animal did not surface and no relocated.

Thursday, March 17, 2011 Sighting # 1

### Initial sighting on Track

Time: 13:46 WP#: 33 Lat: 33.711499 Long: -76.533645  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 5 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 13:47 WP#: 34 Lat: 33.710799 Long: -76.537303  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8/12/12  
Features used in Species ID: Robust grey animals with white peduncles

Representative images used for Species ID: 7873, 7882, 7898, 7899, 7901  
Photographer: Ryan Frame numbers: 7816 to 7903 Spacer: 7904  
Calculated distance from Trackline: 0.3472 km

### Final Time and Position of Sighting

Time: 13:50 WP#: 35 Lat: 33.717697 Long: -76.531166  
Calculated Distance Traveled: 0.9542 km

### Behavior and Additional Comments

Animals traveling just below the surface with regular surfacing. Animals were staying close together.  
Animals had white peduncles and one calf was present. Animals were traveling NW.

Thursday, March 17, 2011 Sighting # 2

### Initial sighting on Track

Time: 14:08 WP#: 41 Lat: 33.752791 Long: -76.459247  
Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: 3  
On/Off Effort: On Trackline: 6 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 14:10 WP#: 42 Lat: 33.748012 Long: -76.463278  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 28/35/33  
Features used in Species ID: Robust grey animals with white peduncles

Representative images used for Species ID: 7911, 7914, 7920, 7921, 7945  
Photographer: Ryan Frame numbers: 7905 to 7950 Spacer: 7951  
Calculated distance from Trackline: 0.6491 km

### Final Time and Position of Sighting

Time: 14:14 WP#: 43 Lat: 33.752949 Long: -76.466130  
Calculated Distance Traveled: 0.6090 km

### Behavior and Additional Comments

Animals broken into two groups and traveling slowly just below the surface. Some doing deeper dives.  
Animals have white peduncles. Two groups spaced farther apart but actually tightened within the group.

Thursday, March 17, 2011 Sighting # 3

### Initial sighting on Track

Time: 14:22 WP#: 46 Lat: 33.905068 Long: -76.659004  
Vertical Angle: 3 Horizontal Bearing in Degrees: 45 Sighting Cue: 3  
On/Off Effort: On Trackline: 6 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 14:23 WP#: 47 Lat: 33.906008 Long: -76.669755  
Species: *Megaptera novaeangliae* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: Large black robust animal with long white pectoral fins

Representative images used for Species ID: 8023, 8027, 8029, 8030, 8041, 8051, 8054, 8055  
Photographer: Ryan Frame numbers: 7952 to 8066 Spacer: 8067  
Calculated distance from Trackline: 0.9977 km

### Final Time and Position of Sighting

Time: 14:35 WP#: 48 Lat: 33.896470 Long: -76.674521  
Calculated Distance Traveled: 1.148 km

### Behavior and Additional Comments

Animals hanging just below the surface with regular surfacing. Animals not moving very fast or at all  
Did one deep dive at 14:26 then surfaced at 14:34. We stayed on the animals for one more minute until they did another deep dive.

Thursday, March 17, 2011 Sighting # 4

### Initial sighting on Track

Time: 14:43 WP#: 50 Lat: 34.047573 Long: -76.848943  
Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: 2  
On/Off Effort: On Trackline: 6 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 14:44 WP#: 51 Lat: 34.051842 Long: -76.857337  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 35/45/45  
Features used in Species ID: Robust uniform grey animals

Representative images used for Species ID: 8069, 8075, 8076, 8077, 8089, 8090, 8093, 8094  
Photographer: Ryan Frame numbers: 8068 to 8102 Spacer: 8103  
Calculated distance from Trackline: 0.9074 km

### Final Time and Position of Sighting

Time: 14:47 WP#: 52 Lat: 34.054682 Long: -76.853703  
Calculated Distance Traveled: 0.4602 km

### Behavior and Additional Comments

Animals scattered all over, hanging below the surface with regular surfacing. Some calves present.

## Notes on the Sighting Summary Sheet

The Sighting Summary, adapted from the Sighting Data Sheet used in the field (Fig. 3), integrates data gathered in the field with results from lab analyses to provide a full summary of each marine mammal sighting. A Sighting Summary was completed for all sightings, including sightings made while off-effort during transits between survey legs, as well as sighting cues which were never relocated.

The Sighting Summary sheet is broken into four sections; “Initial Sighting on Track”, “Time and Position of Sighting”, “Final Time and Position of Sighting”, and “Behavior and Additional Comments”. Each section and sub headings will be detailed below.

### **Initial Sighting on Track**

**Time:** The time the break track GPS way-point was taken

**WP#:** GPS way-point number of the break track

**Lat/Long:** The latitude and longitude associated with the break track way-point

**Track Line:** The track line surveyed when the sighting was made

**On/Off Effort:** Whether the sighting was made during an active survey track line (i.e. On effort) or during transit BETWEEN track lines (i.e. off effort). Sightings made during off effort transit to and from the range are NOT included in the sighting summaries.

**Sighting Cue:** Whether the initial sighting was a splash, a breach or body part.

**Vertical Angle:** Vertical “angle” between 1 and 4, the lower edge of view (“1”) to the horizon (“4”). A subjective and relative measure of how far away from the track line the initial sighting occurred.

**Horizontal Bearing in Degrees:** The horizontal degrees from front to back (0 to 180) at which the sighting occurred.

**Observer:** Three lettered initial of the observer who made the sighting

**Observer Side:** On which side of the plane in the direction of travel the sighting occurred.

### **Time and Position of Sighting**

**Time:** The time the GPS way-point was taken while relocating animals and circling above

**WP#:** GPS way-point number of the sighting

**Lat/Long:** The latitude and longitude associated with the way point obtained while circling over animals

**Beaufort Sea State:** The sea state observed during the sighting

**Species:** Scientific binomial name of the marine mammal species involved in the sighting. When species identity could not be established unequivocally, the next higher taxonomic level to which identity could be established was used. If a cetacean was identified as a dolphin but images obtained during the encounter were not sufficient to establish species ID, the designation “unidentified delphinid” or “*T. truncatus*/*S. frontalis*” was used. The next higher level used was unidentified cetacean. If a large body was observed but it could not be established whether a cetacean, fish/shark or turtle was involved in the sighting, the designation “unidentified marine vertebrate” was used.

**Criteria used to identify species:** Which species specific diagnostic features were used in classifying a sighting to species.

**Best images used for species ID:** The images obtained during the sighting that best displayed the features used to establish species.

**Numbers (Low/ High/ Best):** Low, high, and best estimate of number of animals involved in the sighting.

**Calves observed?** Whether any calves were observed during the encounter. A conservative measure was used, in that only animals roughly half the size of the associated larger animal (the presumed mother) were designated as calves.

**Calculated Distance from Track Line:** The distance between the break track way-point and the initial sighting way-point. For more information on how distance was calculated and errors inherent in this method, refer to the “Methods” section.

**Photographer:** Three lettered initials of observer seated in the right camera seat.

**Card #:** Memory card on which the photos from the particular sighting was made.

**Frame Numbers:** Starting and ending frame number

**Spacer:** Image used to separate sighting to clarify when one sighting ends and the next begins. Image typically of interior of plane or a 45 degree angle shot of the horizon.

### **Final Time and Position of Sighting**

Time: WP#: Lat: Long: Calculated Distance traveled: ➡see section above

### **Behavior and Additional Comments**

Any behavioral notes obtained during the sighting (*e.g.* group formation, relative travel speed, feeding events or presumed copulation attempts, presence of other cetaceans or sharks in or around the animal(s) in the sighting, interaction with inanimate objects such marine debris). This section also includes notes on altitude of the survey plane during the encounter as well as any indications (or lack thereof) of the animal(s) reacting evasively to the presence of the plane.

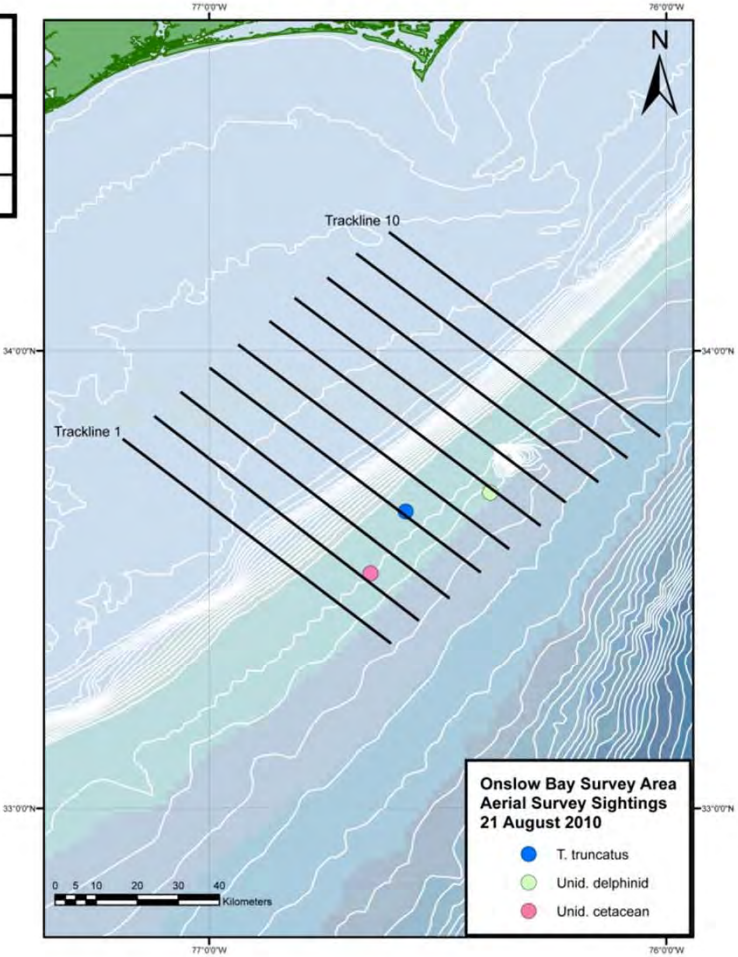
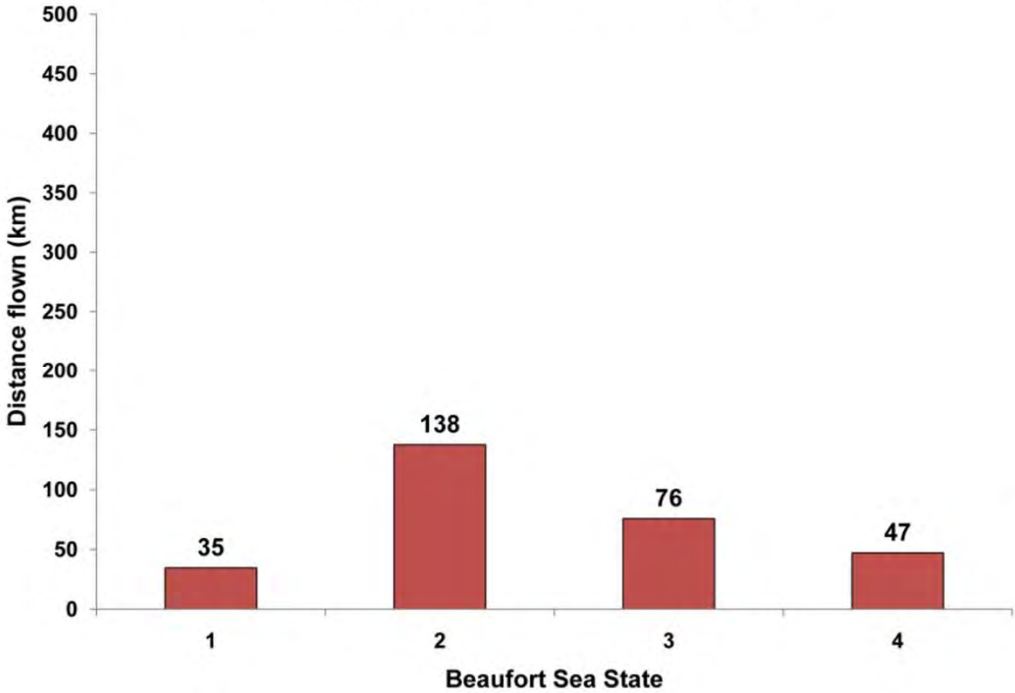


# Summary of 21 August 2010

21 August 2010

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	8	2	4
Unidentified Delphinid	1	8	3	6
Unidentified Cetacean	1	7	2	2

Survey Effort by Beaufort Sea State for 20 August 2010

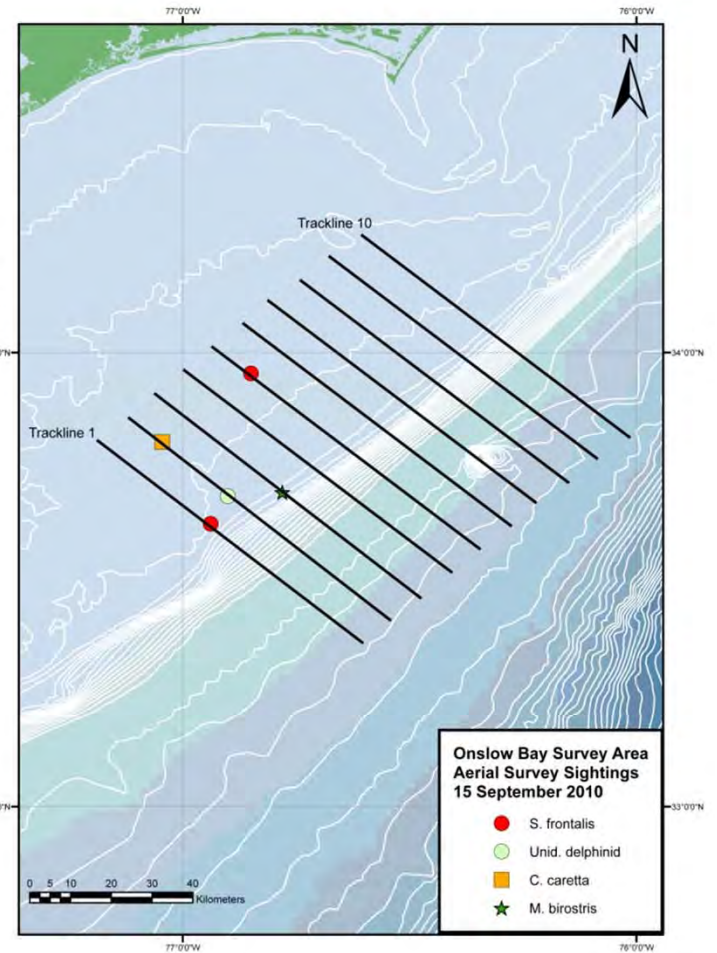
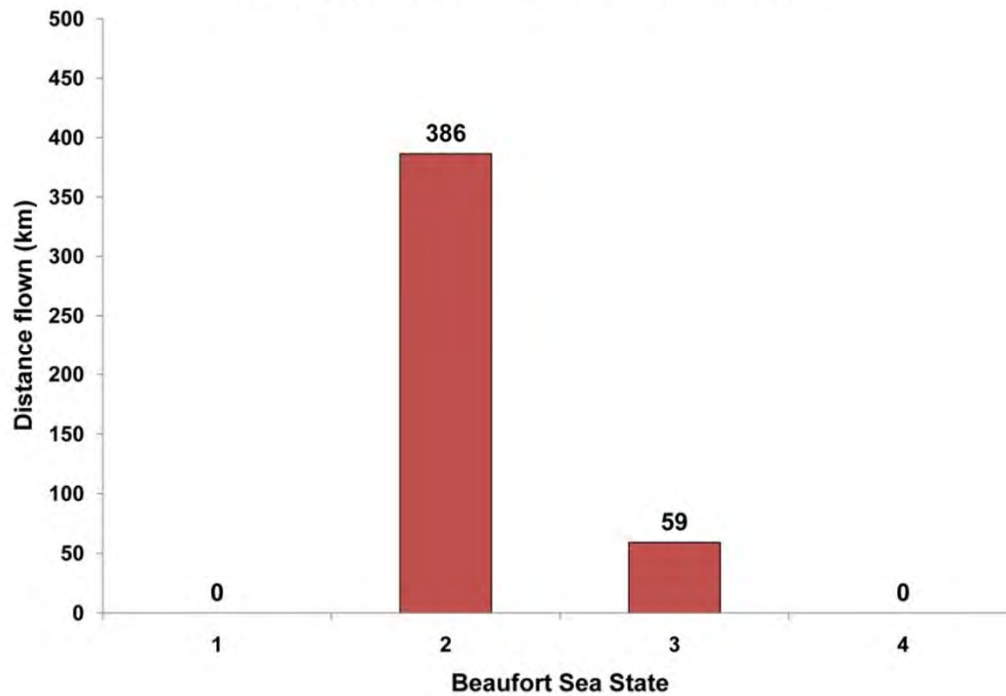


## Summary of 15 September 2010

15 September 2010

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Stenella frontalis</i>	1	37	2	1
<i>Stenella frontalis</i>	1	2	3	5
Unidentified Delphinid	1	1	2	3
<i>Caretta caretta</i>	1	1	2	2
<i>Manta birostris</i>	1	3	3	2

Survey Effort by Beaufort Sea State for 15 September 2010

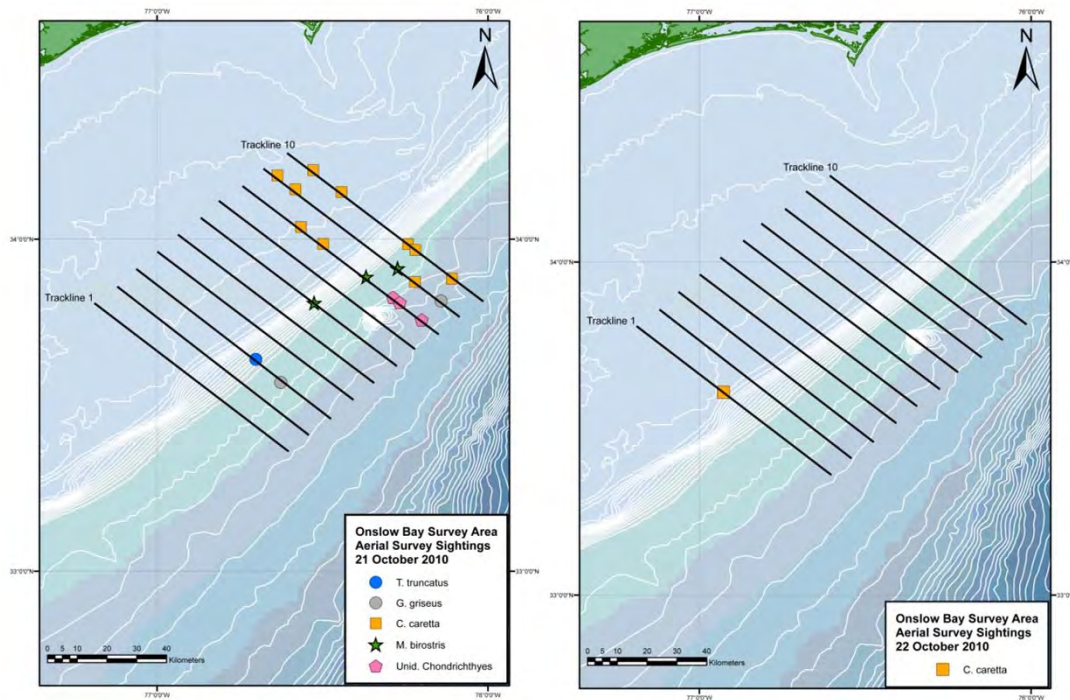


21 October 2010

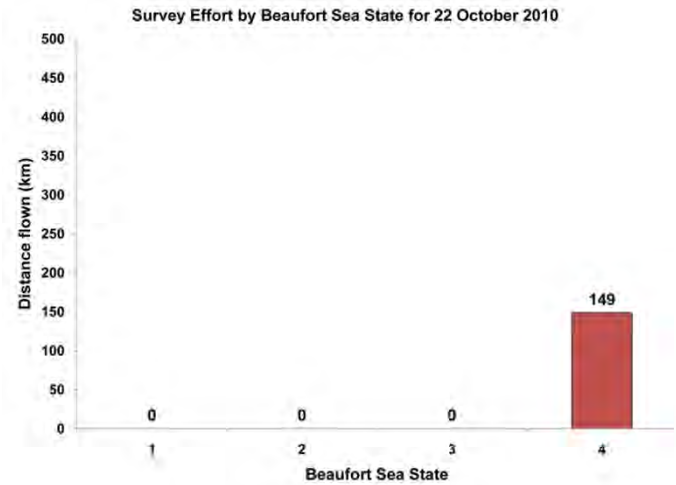
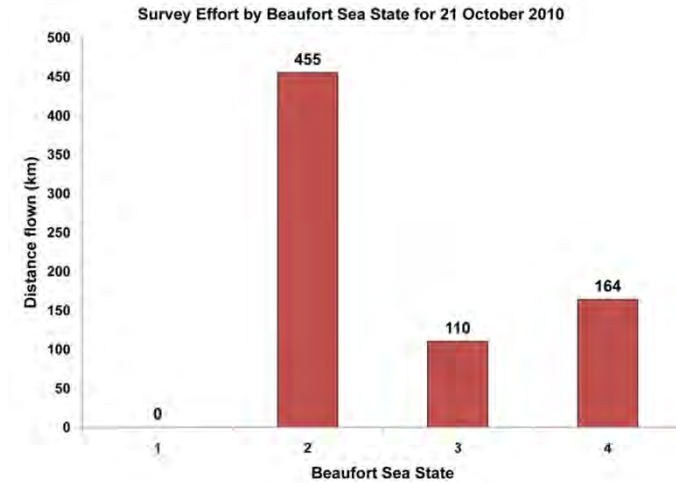
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	18	2	3
<i>Grampus griseus</i>	1	2	2	3
<i>Grampus griseus</i>	1	10	2	9
<i>Caretta caretta</i>	10	10	2	
<i>Manta birostris</i>	3	3	2 to 4	
Unidentified Chondrichthyes	3	3	2	8

22 October 2010

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Caretta caretta</i>	1	1	4	1



## Summary of October 2010



19 November 2010

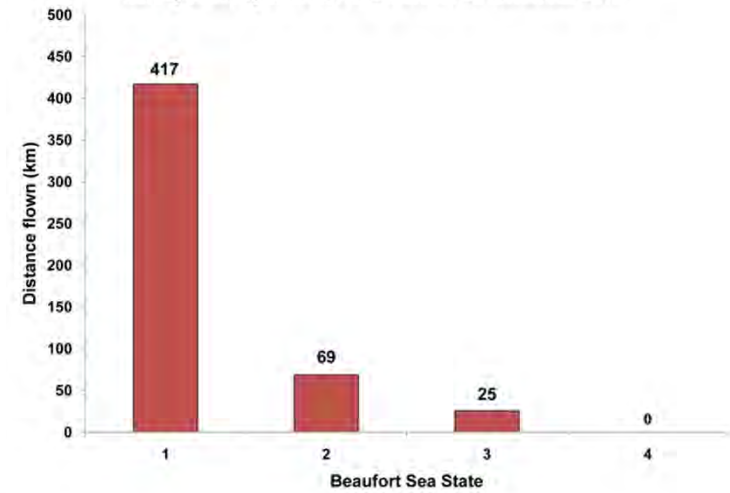
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
Unidentified sea turtle	1	1	3	9
<i>Manta birostris</i>	1	1	4	10
Unidentified Chondrichthyes	1	1	4	9

20 November 2010

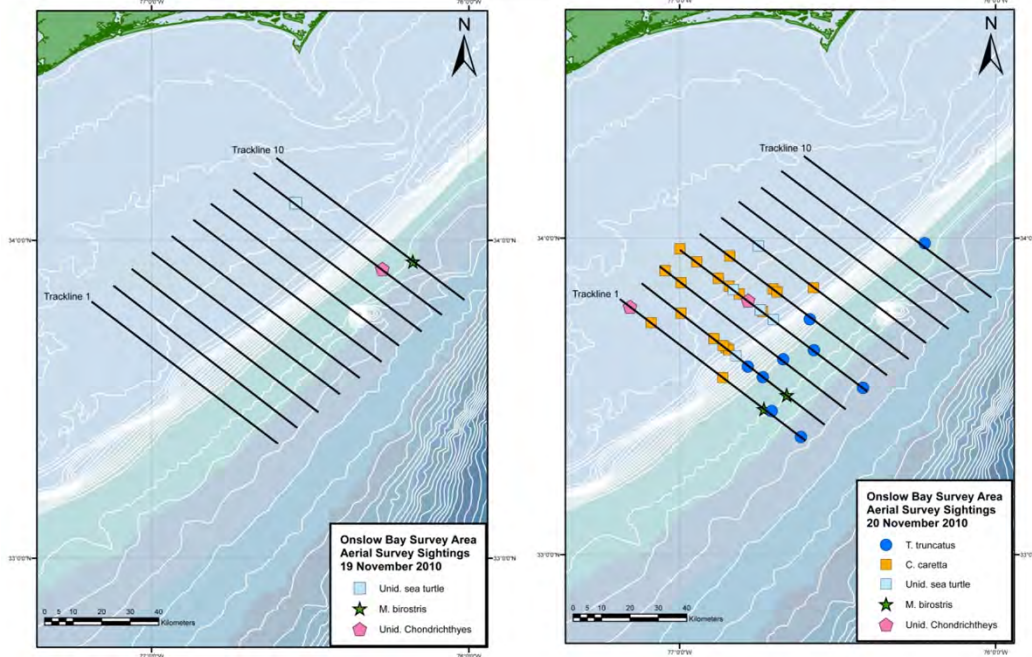
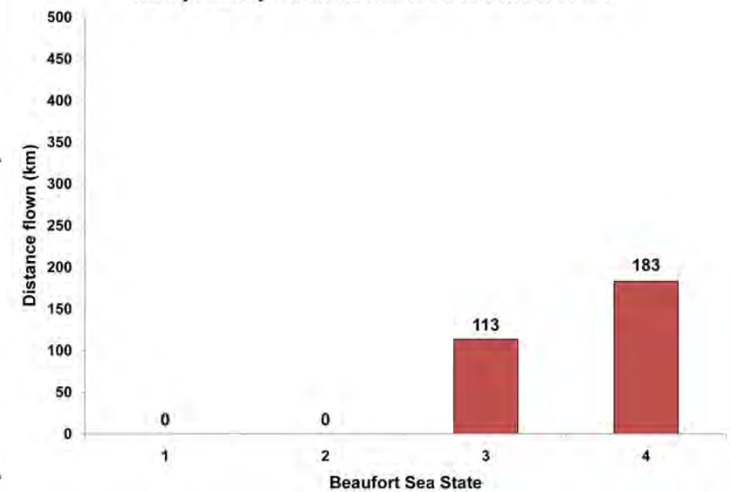
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	25	1	3
<i>Tursiops truncatus</i>	1	15	2	1
<i>Tursiops truncatus</i>	1	9	2	1
<i>Tursiops truncatus</i>	1	16	1	2
<i>Tursiops truncatus</i>	1	12	1	2
<i>Tursiops truncatus</i>	1	50	1	4
<i>Tursiops truncatus</i>	1	4	1	4
<i>Tursiops truncatus</i>	1	28	1	5
<i>Tursiops truncatus</i>	1	21	2	10
<i>Caretta caretta</i>	19	30	1 to 2	-
Unidentified sea turtle	5	5	1	-
<i>Manta birostris</i>	1	2	1 to 3	-
Unidentified Chondrichthyes	1	1	1	-

## Summary of November 2010

Survey Effort by Beaufort Sea State for 20 November 2010



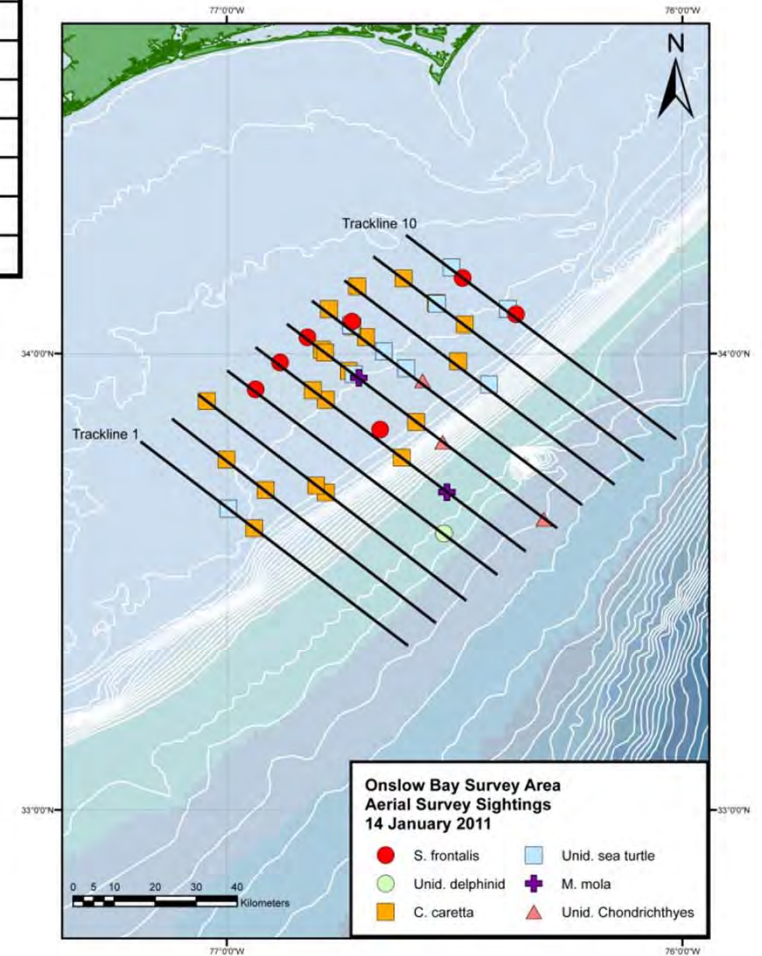
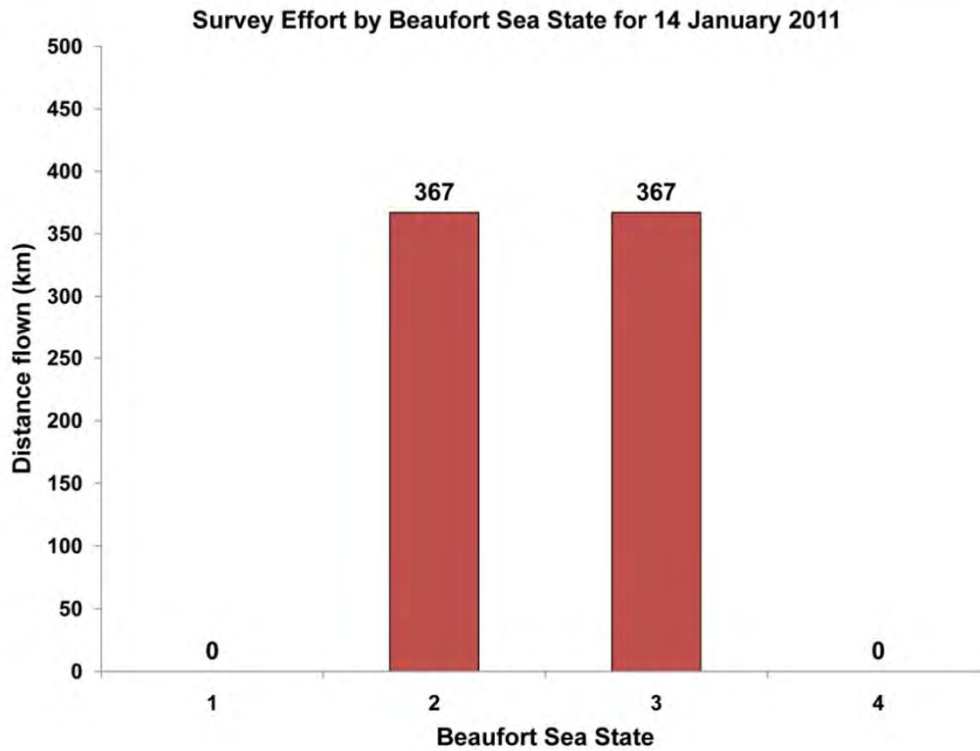
Survey Effort by Beaufort Sea State for 19 November 2010



14 January 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Stenella frontalis</i>	1	26	3	10
<i>Stenella frontalis</i>	1	15	3	4
<i>Stenella frontalis</i>	1	50	2	6
<i>Stenella frontalis</i>	1	180	2	5
Unidentified Delphinid	1	2	3	4
<i>Caretta caretta</i>	21	36	2 to 3	-
Unidentified sea turtle	9	11	2 to 3	-
<i>Manta birostris</i>	2	2	2	-
Unidentified Chondrichthyes	3	3	2	-

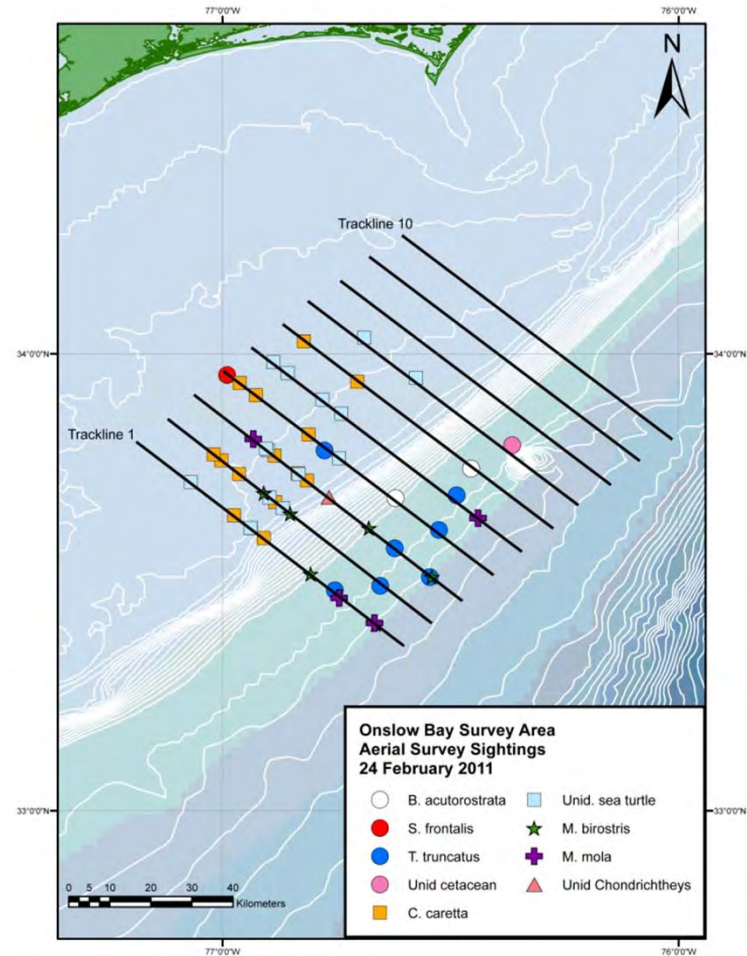
## Summary of 14 January 2011



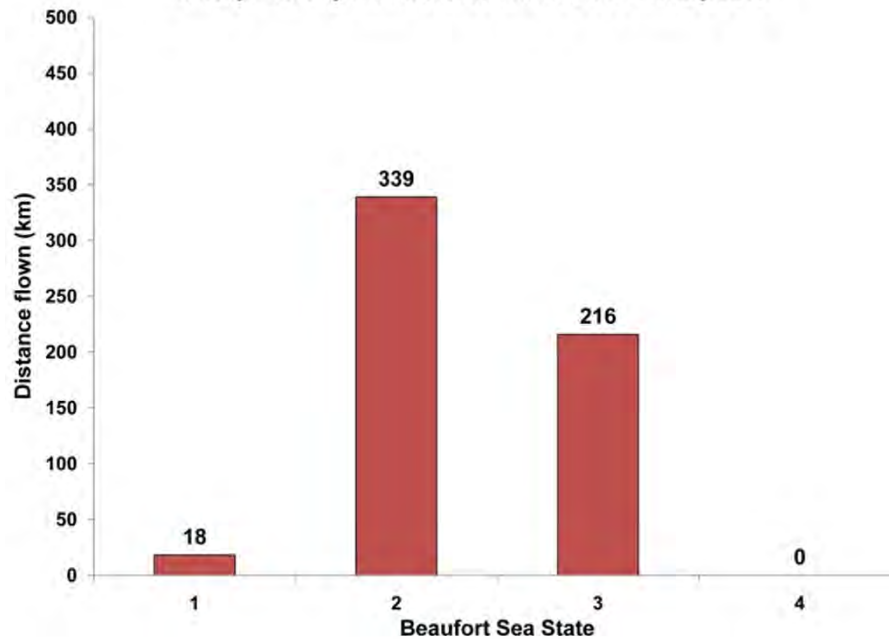
24 February 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Balaenoptera acutorostrata</i>	1	2	2	4
<i>Balaenoptera acutorostrata</i>	1	1	3	6
<i>Tursiops truncatus</i>	1	32	2	1
<i>Tursiops truncatus</i>	1	4	2	2
<i>Tursiops truncatus</i>	1	10	2	3
<i>Tursiops truncatus</i>	1	18	2	3
<i>Tursiops truncatus</i>	1	79	2	4
<i>Tursiops truncatus</i>	1	10	2	4
<i>Tursiops truncatus</i>	1	230	2	4
<i>Stenella frontalis</i>	1	29	3	4
Unidentified Cetacean	1	2	3	7
<i>Caretta caretta</i>	15	45	2 to 3	-
Unidentified sea turtle	14	25	2 to 3	-
<i>Manta birostris</i>	6	6	2	-
<i>Mola mola</i>	4	5	2 to 3	-
Unidentified Chondrichthyes	1	1	2	3

## Summary of 24 February 2011



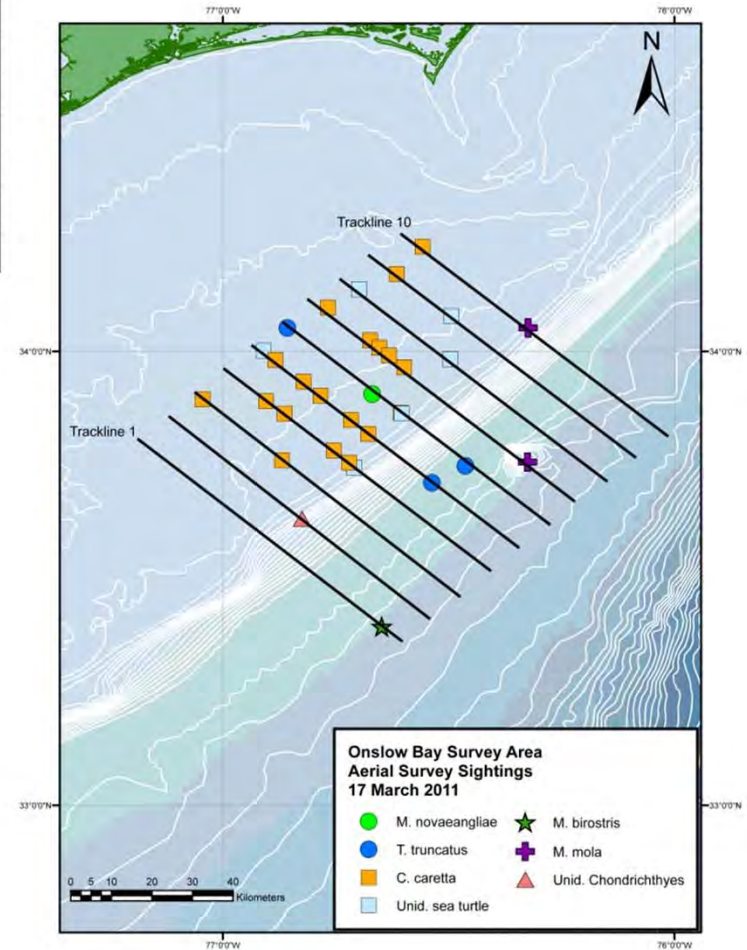
Survey Effort by Beaufort Sea State for 24 February 2011



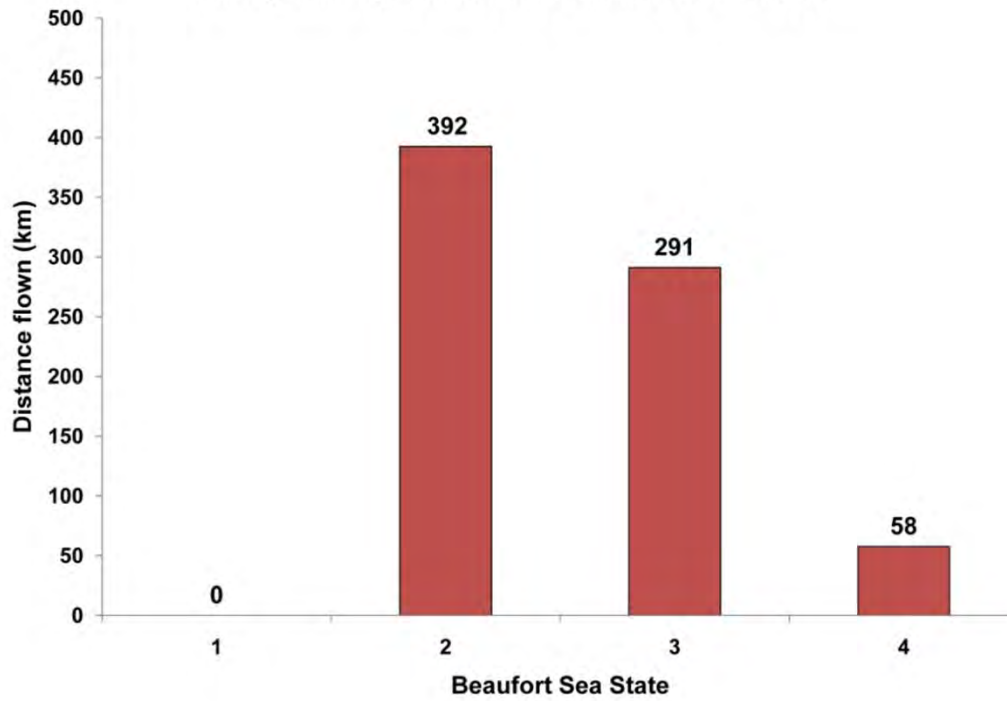
17 March 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	12	2	5
<i>Tursiops truncatus</i>	1	33	2	6
<i>Megaptera novaeangliae</i>	1	2	2	6
<i>Tursiops truncatus</i>	1	45	2	6
<i>Caretta caretta</i>	19	55	2 to 4	-
Unidentified sea turtle	6	8	2 to 3	-
<i>Manta birostris</i>	1	1	4	1
<i>Mola mola</i>	2	2	2	-
Unidentified Chondrichthyes	1	1	3	2

## Summary of 17 March 2011



Survey Effort by Beaufort Sea State for 17 March 2011

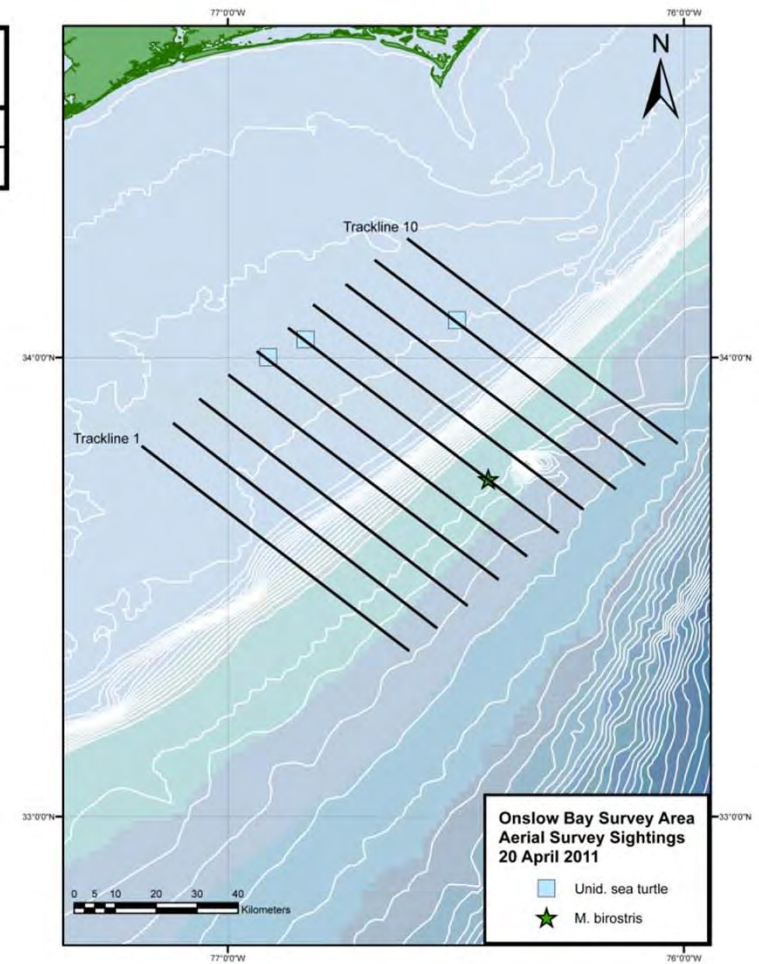
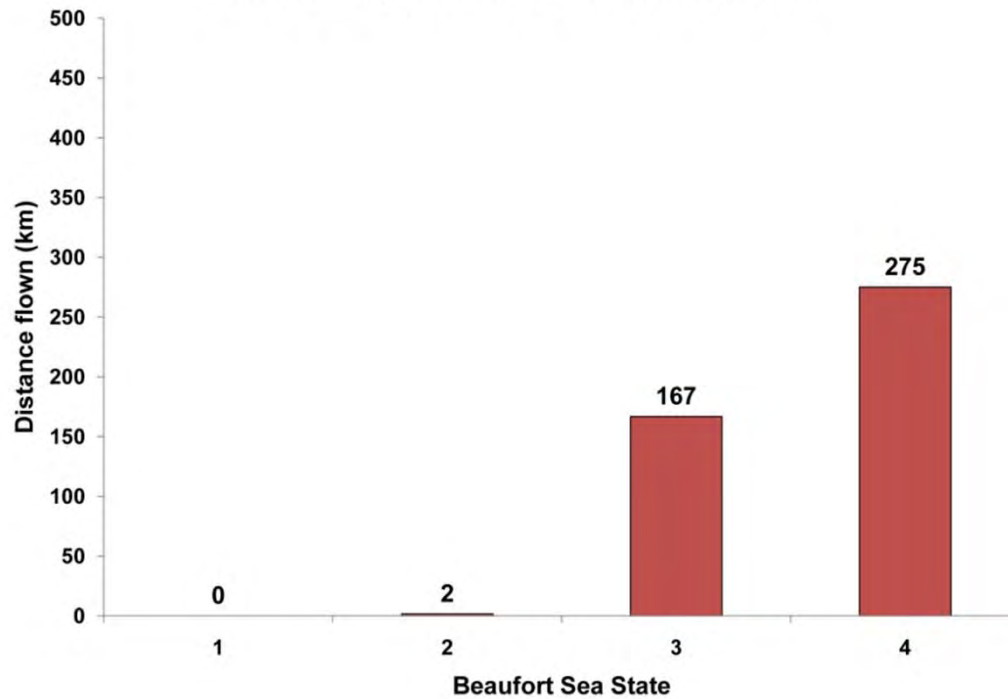


20 April 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
Unidentified sea turtle	3	3	3 to 4	-
<i>Manta birostris</i>	1	1	3	6

## Summary of 20 April 2011

Survey Effort by Beaufort Sea State for 20 April 2011





During the current reporting period additional effort was conducted in the waters offshore of the survey site in Onslow Bay. This effort was conducted to help establish potential distribution boundaries of those cetacean species that utilize deeper water habitats (Risso's dolphin, rough-toothed dolphin and short-finned pilot whales). Review of HARP acoustic recordings also suggested additional deeper water species may be present near the outer boundaries of the survey area, although they have not been observed during visual observations. Four 74 km tracklines were placed at 18.5 km increments and were laid out in a NE – SW orientation to more closely approximate the underlying bathymetry. The outer trackline extended beyond the 2000m shelf break (Fig 1 App H). Sea state conditions dictated which day these surveys could be conducted. Three lines were flown between July 2010 and April 2011 (Table 1 App H). Five cetacean sightings were collected during this effort, which included one sighting of bottlenose dolphins (*Tursiops truncatus*) and four sightings of beaked whales (*Mesoplodon* spp.). All beaked whale sightings occurred between the 1000 and 2000m isobaths (Figure 2 App H and Table 2 App H).

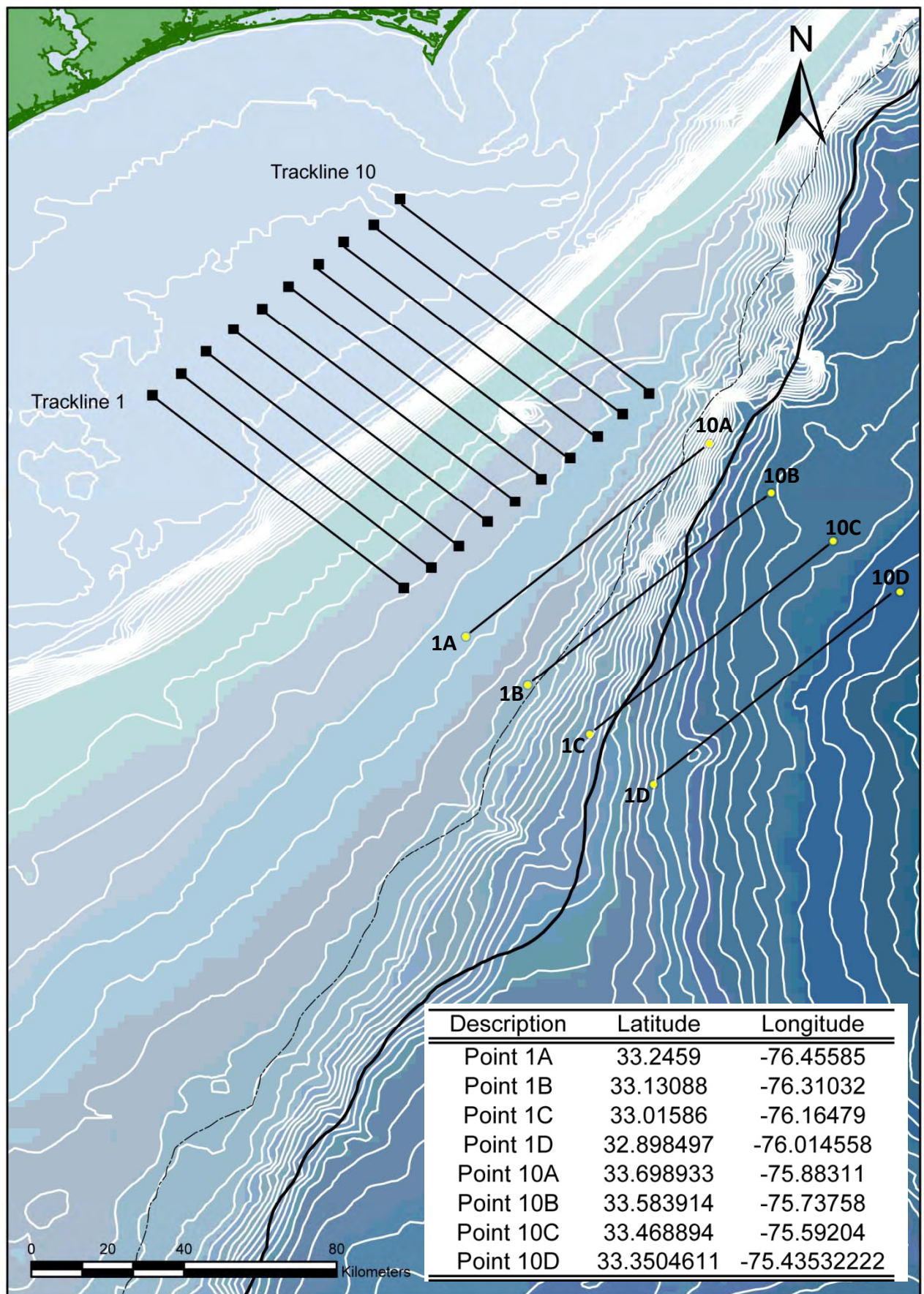


Figure 1 Appendix H. Tracklines and coordinates for Onslow Bay, offshore survey effort.

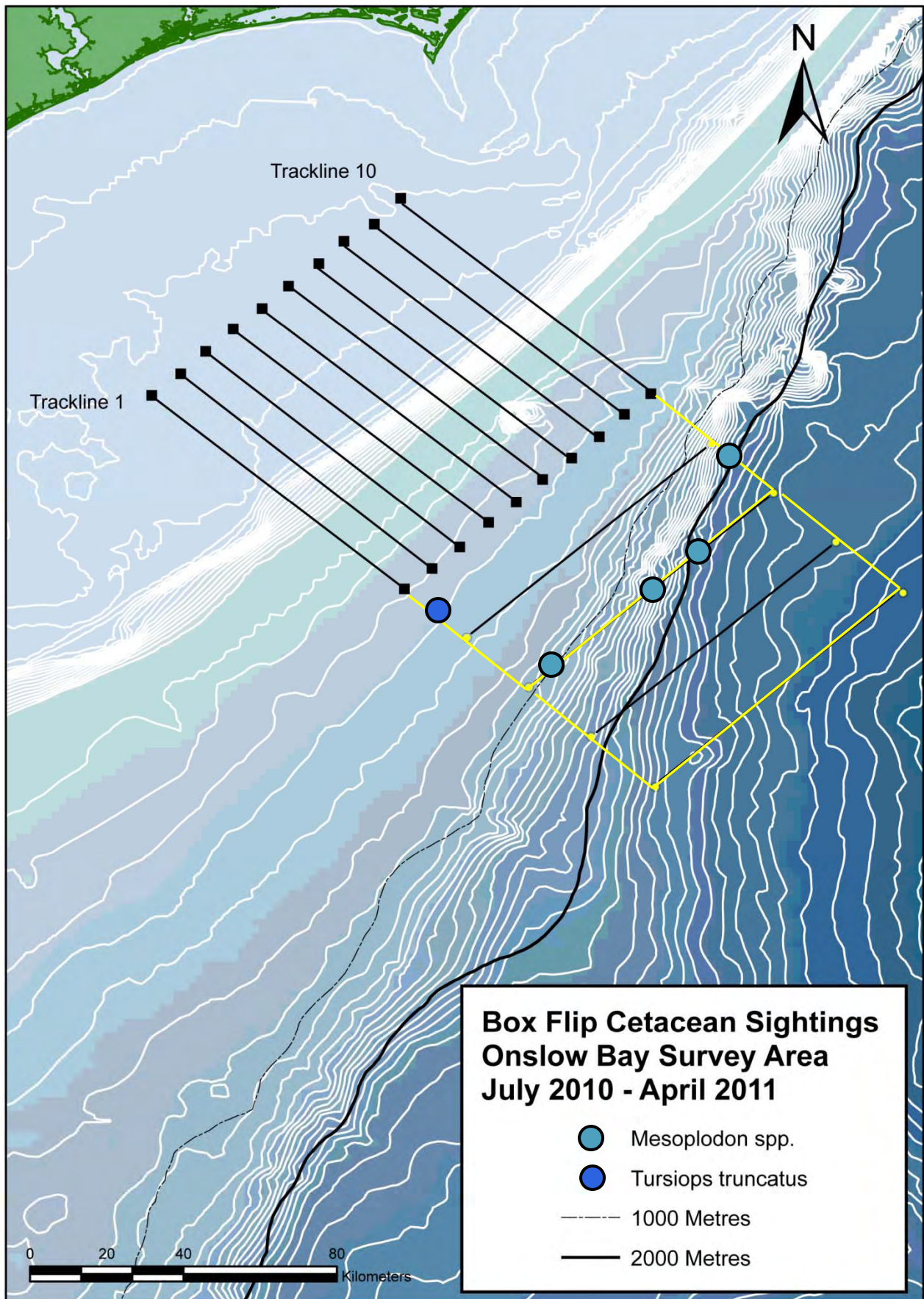


Figure 2, Appendix H. All sightings recorded in the Onslow Bay, offshore survey area.

Table 1, Appendix H. Tracklines and km flown during offshore aerial surveys in Onslow Bay, North Carolina between July 2010 and April 2011.

Date	Tracklines flown AM	Tracklines flown PM	Total km flown W/O offshore
20-Aug-2010	1D, D, 10D		223.5
20-Nov-2010		1B, B, 10B	147.4
18-Mar-2011	1B, B, 10B		153.5
			524.4

Table 2, Appendix H. All sightings recorded during offshore aerial surveys in Onslow Bay, North Carolina between July 2010 and April 2011.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Species	Best #
20-Nov-10	14:29	83	33.354651	-76.021376	N	B	2	90°	<i>Mesoplodon spp.</i>	2
20-Nov-10	14:40	86	33.440505	-75.914739	N	B	3	45°	<i>Mesoplodon spp.</i>	2
20-Nov-10	14:58	91	33.672114	-75.837265	NW	10B	3	90°	<i>Mesoplodon spp.</i>	6
20-Nov-10	14:08	77	33.305693	-76.521602	SE	1B	2	60°	<i>T. truncatus</i>	7
18-Mar-11	9:27	9	33.178846	-76.250955	N	B	1	90°	<i>Mesoplodon spp.</i>	1

Thursday, May 26, 2011 Sighting # 1

**Initial sighting on Track**

Time: 10:18 WP#: 3 Lat: 35.341992 Long: -74.589329  
Vertical Angle: 1 Horizontal Bearing in Degrees: 1 Sighting Cue: 90  
On/Off Effort: On Trackline: 34 Beaufort Sea State: 3  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Species: *Unidentified Mesoplodon* Numbers (Low/High/Best): 2 / 2 / 2  
Features used in Species ID: Long, slender body light grey to tan in coloration. Pointed rostrum larger than dolphins.  
Representative images used for Species ID: NA  
Photographer: Ryan Frame numbers: NA Spacer: NA  
Calculated distance from Trackline: NA

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

Animals swimming close together, larger than dolphins. No resight of the pair.

Thursday, May 26, 2011 Sighting # 2

**Initial sighting on Track**

Time: 10:45 WP#: 8 Lat: 35.408462 Long: -74.476301  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 35 Beaufort Sea State: 4  
Observer: Ryan Observer side: Right

**Actual Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Species: *Unidentified Cetacean* Numbers (Low/High/Best): 1 / 1 / 1  
Features used in Species ID: Looks like a smaller pilot whale, lighter in coloration behind the dorsal fin.  
Representative images used for Species ID: NA  
Photographer: Ryan Frame numbers: NA Spacer: NA  
Calculated distance from Trackline: NA

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

No resight, animals gave 3 -4 blows during only observation before diving.

Thursday, May 26, 2011 Sighting # 3

**Initial sighting on Track**

Time: 11:28 WP#: 18 Lat: 35.484293 Long: -74.793554  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 36 Beaufort Sea State: 4  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: 11:37 WP#: 19 Lat: 35.490571 Long: -74.799069  
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 4/4/4  
Features used in Species ID: N/A

Representative images used for Species ID: N/A  
Photographer: Ryan Frame numbers: N/A Spacer: N/A  
Calculated distance from Trackline: Estimate

**Final Time and Position of Sighting**

Time: N/A WP#: N/A Lat: N/A Long: N/A  
Calculated Distance Traveled: N/A

**Behavior and Additional Comments**

White peduncle, indicative of tursiops, no resight

Thursday, May 26, 2011 Sighting # 4

**Initial sighting on Track**

Time: 14:31 WP#: 27 Lat: 34.647059 Long: -74.926513  
Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: Body  
On/Off Effort: Off Trackline: 27 - 26 Beaufort Sea State: 3  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: N/A WP#: N/A Lat: N/A Long: N/A  
Species: *Unidentified Cetacean* Numbers (Low/High/Best): N/A  
Features used in Species ID: N/A

Representative images used for Species ID: N/A  
Photographer: Ryan Frame numbers: N/A Spacer: N/A  
Calculated distance from Trackline: N/A

**Final Time and Position of Sighting**

Time: N/A WP#: N/A Lat: N/A Long: N/A  
Calculated Distance Traveled: N/A

**Behavior and Additional Comments**

No resight, large splash. Big bodied animal doing a deep dive, very streamlined, light grey. Looked like a torpedo going straight down.

Friday, May 27, 2011 Sighting # 1

### Initial sighting on Track

Time: 9:34 WP#: 3 Lat: 35.82885 Long: -74.85918  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 41 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 9:41 WP#: 4 Lat: 35.82443 Long: -74.86736  
Species: *Delphinus delphis* Numbers (Low/High/Best): 250 / 300 / 300  
Features used in Species ID: Grey animals with cream/tan colored blaze down the sides

Representative images used for Species ID: 8697, 8709, 8716, 8718, 8726  
Photographer: Erin Frame numbers: 8688 - 8726 Spacer: 8727  
Calculated distance from Trackline: 0.9 km

### Final Time and Position of Sighting

Time: 9:48 WP#: 10 Lat: 35.82864 Long: -74.86492  
Calculated Distance Traveled: 0.5 km

### Behavior and Additional Comments

Large line of hundreds of dolphins traveling at slow speed most well below the surface.  
Multiple large groups of animals with one large group of 200+.  
Lots of splashing at the surface, animals with definite direction of travel.

Friday, May 27, 2011 Sighting # 2

### Initial sighting on Track

Time: 9:52 WP#: 8 Lat: 35.840419 Long: -74.832352  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 41 Beaufort Sea State: 2  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 9:54 WP#: 9 Lat: 35.847822 Long: -74.838262  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 25 / 46 / 46  
Features used in Species ID: Large, black bodied animals with square head, wide dorsal fin placed ~1/3 back body, pectoral fins ending before leading edge of dorsal fin.

Representative images used for Species ID: 8729, 8738, 8746, 8751  
Photographer: Erin Frame numbers: 8728 - 8751 Spacer: 8752  
Calculated distance from Trackline: 1 km

### Final Time and Position of Sighting

Time: 9:59 WP#: 10 Lat: 35.853825 Long: -74.843747  
Calculated Distance Traveled: 0.8 km

### Behavior and Additional Comments

Initially 2 groups of animals logging at the surface. Upon circling a third group was observed a short distance from the original 2.

Friday, May 27, 2011 Sighting # 3

**Initial sighting on Track**

Time: 10:07 WP#: 13 Lat: 35.826662 Long: -74.753913  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 41 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 10:08 WP#: 14 Lat: 35.823289 Long: -74.753615  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 11 / 15 / 13  
Features used in Species ID: Large, black bodied animal with big square head. Large dorsal fin  
~1/3 back body. Pectoral fins trailing to leading edge of dorsal fin  
Representative images used for Species ID: 8758, 8765  
Photographer: Erin Frame numbers: 8753 - 8772 Spacer: 8773  
Calculated distance from Trackline: 0.4 km

**Final Time and Position of Sighting**

Time: 10:11 WP#: 15 Lat: 35.823229 Long: -74.759432  
Calculated Distance Traveled: 0.5 km

**Behavior and Additional Comments**

Lark dark bodied animals logging / slow travel at surface. Multiple size within the group.

Friday, May 27, 2011 Sighting # 4

**Initial sighting on Track**

Time: 10:16 WP#: 18 Lat: 35.827756 Long: -74.602622  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 41 Beaufort Sea State: 2  
Observer: Ryan Observer side: Left

**Actual Time and Position of Sighting**

Time: 10:18 WP#: 19 Lat: 35.831716 Long: -74.600833  
Species: *Physeter macrocephalus* Numbers (Low/High/Best): 2 / 2 / 2  
Features used in Species ID: Large grey body, bow hole off center and at a 45 degree forward  
angle. Wrinkled bodied, large head.  
Representative images used for Species ID: 8778, 8780, 8784, 8789  
Photographer: Erin Frame numbers: 8774 - 8791 Spacer: 8792  
Calculated distance from Trackline: 0.5 km

**Final Time and Position of Sighting**

Time: 10:19 WP#: 20 Lat: 35.833738 Long: -74.600985  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Single animal observed traveling just below the surface taking multiple breaths before diving again.  
A second animal was observed while circling the first. Both sightings occurred along a line of  
sargassum patches.



Friday, May 27, 2011 Sighting # 5

**Initial sighting on Track**

Time: 10:43 WP#: 24 Lat: 35.761421 Long: -74.781425  
Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: Body  
On/Off Effort: On Trackline: 40 Beaufort Sea State: 3  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 10:45 WP#: 25 Lat: 35.761017 Long: -74.779985  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 12 / 14 / 13  
Features used in Species ID: Large, black bodied animal with big square head. Large dorsal fin  
~1/3 back body. Pectoral fins trailing to leading edge of dorsal fin  
Representative images used for Species ID: 8793, 8798, 8801, 8803  
Photographer: Erin Frame numbers: 8793 - 8806 Spacer: 8807  
Calculated distance from Trackline: 0.1 km

**Final Time and Position of Sighting**

Time: 10:48 WP#: 26 Lat: 35.761087 Long: -74.771661  
Calculated Distance Traveled: 0.75 km

**Behavior and Additional Comments**

One group of pilot whales showing slow travel while surfacing regularly.

Friday, May 27, 2011 Sighting # 6

**Initial sighting on Track**

Time: 10:50 WP#: 28 Lat: 35.762952 Long: -74.832077  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 40 Beaufort Sea State: 3  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 10:52 WP#: 29 Lat: 35.76707 Long: -74.82998  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 20 / 24 / 23  
Features used in Species ID: Large, black bodied animal with big square head. Large dorsal fin  
~1/3 back body. Pectoral fins trailing to leading edge of dorsal fin  
Representative images used for Species ID: 8810, 8812, 8816  
Photographer: Erin Frame numbers: 8808 - 8822 Spacer: 8823  
Calculated distance from Trackline: 0.5 km

**Final Time and Position of Sighting**

Time: 10:53 WP#: 30 Lat: 35.764896 Long: -74.835937  
Calculated Distance Traveled: 0.6 km

**Behavior and Additional Comments**

Single, large group of animals closely packed showing slow travel with regular surfacings.

Friday, May 27, 2011 Sighting # 7

### Initial sighting on Track

Time: 11:15 WP#: 37 Lat: 35.691801 Long: -74.741405  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 39 Beaufort Sea State: 3  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 11:21 WP#: 38 Lat: 35.688751 Long: -74.748692  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 12 / 15 / 13  
Features used in Species ID: Large, black bodied animal with big square head. Large dorsal fin  
~1/3 back body. Pectoral fins trailing to leading edge of dorsal fin  
Representative images used for Species ID: 8826, 8831, 8834, 8835, 8841  
Photographer: Erin Frame numbers: 8824 - 8843 Spacer: 8844  
Calculated distance from Trackline: 0.75 km

### Final Time and Position of Sighting

Time: 11:21 WP#: 39 Lat: 35.707327 Long: -74.74025  
Calculated Distance Traveled: 2 km

### Behavior and Additional Comments

Initial sighting of 2 animals, upon circling more animals were encountered that joined the initial pair.

Friday, May 27, 2011 Sighting # 8

### Initial sighting on Track

Time: 11:24 WP#: 41 Lat: 35.702547 Long: -74.720478  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 40 Beaufort Sea State: 3  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 11:25 WP#: 42 Lat: 35.70088 Long: -74.72344  
Species: *Physeter macrocephalus* Numbers (Low/High/Best): 1 / 1 / 1  
Features used in Species ID: Large grey body blow hole off center and angled forward 45 degrees  
Some wrinkles seen on the body, low dorsal ridge and "knuckles" on dorsal peduncle  
Representative images used for Species ID: No images collected  
Photographer: Erin Frame numbers: NA Spacer: NA  
Calculated distance from Trackline: 0.3 km

### Final Time and Position of Sighting

Time: 11:25 WP#: 43 Lat: 35.703143 Long: -74.723494  
Calculated Distance Traveled: 0.25 km

### Behavior and Additional Comments

Animal was observed as it dove from the surface.

Friday, May 27, 2011 Sighting # 9

**Initial sighting on Track**

Time: 11:31 WP#: 46 Lat: 35.68981 Long: -74.52118  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 39 Beaufort Sea State: 4  
Observer: Ryan Observer side: Left

**Actual Time and Position of Sighting**

Time: 11:40 WP#: 47 Lat: 35.69827 Long: -74.53404  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 9 / 10 / 10  
Features used in Species ID: Large, black bodied animal with big square head. Large dorsal fin  
~1/3 back body. Pectoral fins trailing to leading edge of dorsal fin  
Representative images used for Species ID: 8845, 8847  
Photographer: Erin Frame numbers: 8845 - 8853 Spacer: 8854  
Calculated distance from Trackline: 1.5 km\*

**Final Time and Position of Sighting**

Time: 11:41 WP#: 48 Lat: 35.70351 Long: -74.52034  
Calculated Distance Traveled: 1.3 km\*

**Behavior and Additional Comments**

Observed animals at surface logging.

Friday, May 27, 2011 Sighting # 10

**Initial sighting on Track**

Time: 11:31 WP#: 46 Lat: 35.68981 Long: -74.52118  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: Off Trackline: 39 Beaufort Sea State: 4  
Observer: Ryan Observer side: Right

**Actual Time and Position of Sighting**

Time: 11:40 WP#: 47 Lat: 35.69827 Long: -74.53404  
Species: *Steno bredanensis* Numbers (Low/High/Best): 4 / 4 / 4  
Features used in Species ID: Dark grey animals with large pectoral fins, large triangular dorsal  
fin. White lower jaw, low sloping melon.  
Representative images used for Species ID: 8849, 8850  
Photographer: Erin Frame numbers: 8845 - 8853 Spacer: 8854  
Calculated distance from Trackline: NA

**Final Time and Position of Sighting**

Time: 11:41 WP#: 48 Lat: 35.70351 Long: -74.52034  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

While circling for sighting #9 observed a tight group of 4 animals traveling at a moderate rate of speed below the surface. We made a single circle on animals to collect photos after which the group was not observed again. Location of animals is identical to those in sighting #9 - no distance from trackline or distance traveled was calculated as sighting occurred within the range of sighting #9.

Friday, May 27, 2011 Sighting # 11

### Initial sighting on Track

Time: 11:58 WP#: 53 Lat: 35.62272 Long: -74.68595  
Vertical Angle: 1 Horizontal Bearing in Degrees: 45 Sighting Cue: Body  
On/Off Effort: On Trackline: 38 Beaufort Sea State: 3  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 12:07 WP#: 54 Lat: 35.63006 Long: -74.68479  
Species: *Stenella frontalis* Numbers (Low/High/Best): 40 / 50 / 50  
Features used in Species ID: Light lateral blaze trailing to midpoint of dorsal fin, white tip to rostrum, light appearance of spots on larger animals.  
Representative images used for Species ID: 8857, 8859, 8861-64, 8881 and 8886  
Photographer: Erin Frame numbers: 8855 - 8889 Spacer: 8890  
Calculated distance from Trackline: 0.8 km

### Final Time and Position of Sighting

Time: 12:07 WP#: 55 Lat: 35.63107 Long: -74.71327  
Calculated Distance Traveled: 2.5 km\*

### Behavior and Additional Comments

Single large group of animals moderately spaced apart surfacing regularly.

Friday, May 27, 2011 Sighting # 12

### Initial sighting on Track

Time: 11:58 WP#: 53 Lat: 53.62272 Long: -74.68595  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: Off Trackline: 38 Beaufort Sea State: 3  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 12:07 WP#: 54 Lat: 35.63006 Long: -74.68479  
Species: *Unidentified Mesoplodon* Numbers (Low/High/Best): 1 / 1 / 1  
Features used in Species ID: Tiny dorsal fin placed far back on the body, tiny pectoral fins, small pointed rostrum sloping smoothly into rostrum. Darker coloration around eye.  
Representative images used for Species ID: 8867-69, 8871 and 8874  
Photographer: Erin Frame numbers: 8855 - 8889 Spacer: 8890  
Calculated distance from Trackline: NA

### Final Time and Position of Sighting

Time: 12:07 WP#: 55 Lat: 35.63107 Long: -74.71327  
Calculated Distance Traveled: NA

### Behavior and Additional Comments

While circling for sighting #11 observed a large single animal traveling below the surface. Animal surfaced and was photographed before diving out of sight. Animals location is the same as that given for sighting #11 as it occurred in the same area and no additional waypoints were recorded for this animal.

Friday, May 27, 2011 Sighting # 13

**Initial sighting on Track**

Time: 14:12 WP#: 62 Lat: 35.55036 Long: -74.60432  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 37 Beaufort Sea State: 4  
Observer: Ryan Observer side: Left

**Actual Time and Position of Sighting**

Time: 14:20 WP#: 63 Lat: 35.56299 Long: -74.60435  
Species: *Lagenodelphis hosei* Numbers (Low/High/Best): 60 / 75 / 75  
Features used in Species ID: Small rostrum, robust body with small triangular dorsal fin placed far back on the body. Some animals with dark bilge line from eye down sides with lighter boarder  
Representative images used for Species ID: 8893-8895, 8898, 8899  
Photographer: Erin Frame numbers: 8891 - 8934 Spacer: 8935  
Calculated distance from Trackline: 1.4 km

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

Observed a large group of animals splashing at the surface showing some directional movement as well as milling behavior. Group appeared to slow down and fan out during our encounter.

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Tuesday, June 14, 2011 Sighting # 1

**Initial sighting on Track**

Time: 10:11 WP#: 4 Lat: 34.778379 Long: -75.308153  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: splash  
On/Off Effort: On Trackline: 25 Beaufort Sea State: 4  
Observer: Ryan Observer side: Right

**Actual Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Species: *Unidentified Cetacean* Numbers (Low/High/Best): 1 / 1 / 1  
Features used in Species ID:

Representative images used for Species ID: NA  
Photographer: Ryan Frame numbers: NA Spacer: NA  
Calculated distance from Trackline: NA

**Final Time and Position of Sighting**

Time: 10:18 WP#: 5 Lat: 34.782421 Long: -75.319607  
Calculated Distance Traveled: 1.1 km

**Behavior and Additional Comments**

Large, black bodied animal. No resight.

Tuesday, June 14, 2011 Sighting # 2

**Initial sighting on Track**

Time: 11:35 WP#: 22 Lat: 34.930132 Long: -75.117213  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 28 Beaufort Sea State: 3  
Observer: Ryan Observer side: Right

**Actual Time and Position of Sighting**

Time: 11:36 WP#: 23 Lat: 34.928116 Long: -75.116029  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 15 / 20 / 18  
Features used in Species ID: Dark grey animals, some with white peduncles but more uniform.

Representative images used for Species ID: 8966, 8973, 8995, 8996, 9001  
Photographer: Ryan Frame numbers: 8936 - 9018 Spacer: 9018  
Calculated distance from Trackline: 0.24 km

**Final Time and Position of Sighting**

Time: 11:45 WP#: 24 Lat: 34.922955 Long: -75.124287  
Calculated Distance Traveled: 0.9 km

**Behavior and Additional Comments**

One calf, two groups of two traveling in pairs close together, regular surfacing. Other animals spread out, not traveling in a specific direction. Showing avoidance.

Tuesday, June 14, 2011 Sighting # 3

**Initial sighting on Track**

Time: 11:48 WP#: 25 Lat: 34.985284 Long: -75.185588  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 28 Beaufort Sea State: 3  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: WP#: Lat: Long:  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: Uniform grey animals with white peduncles

Representative images used for Species ID: No photos  
Photographer: Frame numbers: Spacer:  
Calculated distance from Trackline:

**Final Time and Position of Sighting**

Time: WP#: Lat: Long:  
Calculated Distance Traveled:

**Behavior and Additional Comments**

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Tuesday, June 14, 2011 Sighting # 4

**Initial sighting on Track**

Time: 14:53 WP#: 44 Lat: 35.153779 Long: -75.020784  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 31 Beaufort Sea State: 3  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: WP#: Lat: Long:  
Species: *Ziphius cavirostris* Numbers (Low/High/Best): 4/4/4  
Features used in Species ID: Large animal with brown body and white colored head

Representative images used for Species ID:  
Photographer: Frame numbers: Spacer:  
Calculated distance from Trackline:

**Final Time and Position of Sighting**

Time: 15:12 WP#: 46 Lat: 35.148997 Long: -75.012569  
Calculated Distance Traveled:

**Behavior and Additional Comments**

Large brown bodied animal with white colored head. Rounded dorsal fin set far back on body.  
All swimming together about 1-2 body lengths apart. Definitely Ziphius. They dove and were not  
resighted for photos. There was another species sighted during the search for the beaked whales which  
is designated as sighting 5

Tuesday, June 14, 2011 Sighting # 5

### Initial sighting on Track

Time: 14:53 WP#: 44 Lat: 35.153779 Long: -75.020784  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 31 Beaufort Sea State: 3  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 15:03 WP#: 45 Lat: 35.154789 Long: -75.023044  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 7/7/7  
Features used in Species ID: Uniform grey animals with a slightly white peduncle

Representative images used for Species ID: 9041, 9042, 9044  
Photographer: Ryan Frame numbers: 9019 - 9053 Spacer: 9053  
Calculated distance from Trackline: 0.2342 km

### Final Time and Position of Sighting

Time: 15:12 WP#: 46 Lat: 35.148997 Long: -75.012569  
Calculated Distance Traveled: 1.150 km

### Behavior and Additional Comments

Milling at the surface or subsurface. This sighting popped up in the search for sighting 4, the beaked whales.

Tuesday, June 14, 2011 Sighting # 6

### Initial sighting on Track

Time: 15:15 WP#: 48 Lat: 35.105851 Long: -74.961873  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: 2  
On/Off Effort: On Trackline: 31 Beaufort Sea State: 3  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 15:19 WP#: 49 Lat: 35.116018 Long: -74.960536  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 9/11/10  
Features used in Species ID: Large, dark body, blunt head, small pecks

Representative images used for Species ID: 9077, 9076, 9075, 9063, 9059, 9054  
Photographer: Ryan Frame numbers: 9054 - 9081 Spacer: 9081  
Calculated distance from Trackline: 1.137 km

### Final Time and Position of Sighting

Time: 15:26 WP#: 50 Lat: 35.123212 Long: -74.945967  
Calculated Distance Traveled: 1.548 km

### Behavior and Additional Comments

Darting through the water, staying subsurface. Possible avoidance behavior.



Wednesday, June 15, 2011 Sighting # 1

**Initial sighting on Track**

Time: 10:43 WP#: 13 Lat: 35.476630 Long: -74.5149  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 36 Beaufort Sea State: 4  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 10:43 WP#: 14 Lat: 35.47301 Long: -74.51978  
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 1 / 1 / 1  
Features used in Species ID: Light grey to white animal with blunt head ~size of a pilot whale

Representative images used for Species ID: None  
Photographer: Erin Frame numbers: NA Spacer: NA  
Calculated distance from Trackline:

**Final Time and Position of Sighting**

Time: 10:56 WP#: 15 Lat: 35.464768 Long: -74.51472  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

Animal never surfaced during our observations. Displayed highly variable direction of travel.  
Dove from view during our initial observation and was not resighted during our search of the area for ~13 minutes.

Saturday, July 30, 2011 Sighting # 1

### Initial sighting on Track

Time: 10:07 WP#: 4 Lat: 35.832214 Long: -74.856326  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 40 Beaufort Sea State: 2  
Observer: Ryan Observer side: Right

### Actual Time and Position of Sighting

Time: 10:09 WP#: 5 Lat: 35.827493 Long: -74.853076  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 80/100/90  
Features used in Species ID: Large black bodied animals with a blunt head and small pectoral fins

Representative images used for Species ID: 9702, 9703, 9704, 9725  
Photographer: Ryan Frame numbers: 9696 - 9743 Spacer: 9744  
Calculated distance from Trackline: 0.6012 km

### Final Time and Position of Sighting

Time: 10:15 WP#: 6 Lat: 35.819436 Long: -74.874566  
Calculated Distance Traveled: 2.135 km

### Behavior and Additional Comments

Animals milling on surface, widely spaced, groups of 8-15. There were tursiops in the mix as well. They were tightly spaces and splashing with a group size of 10/12/11.

Saturday, July 30, 2011 Sighting # 2

### Initial sighting on Track

Time: 10:17 WP#: 8 Lat: 35.830465 Long: -74.819771  
Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: 3  
On/Off Effort: On Trackline: 40 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 10:19 WP#: 9 Lat: 35.839234 Long: -74.818899  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 20/30/25  
Features used in Species ID: Large black bodied animals with blunt heads and small pectoral fins

Representative images used for Species ID: 9753, 9754  
Photographer: Ryan Frame numbers: 9745 - 9758 Spacer: 9759  
Calculated distance from Trackline: 0.9782 km

### Final Time and Position of Sighting

Time: 10:29 WP#: 10 Lat: 35.821433 Long: -74.839890  
Calculated Distance Traveled: 2.738 km

### Behavior and Additional Comments

Widely spaced, scattered, milling around on surface or just subsurface. Making deeper dives and resurfacing.

Saturday, July 30, 2011 Sighting # 3

**Initial sighting on Track**

Time: 10:32 WP#: 12 Lat: 35.831852 Long: -74.757788  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 40 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: 10:34 WP#: 13 Lat: 35.842294 Long: -74.763221  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 20/30/25  
Features used in Species ID: Robust grey bodied animals

Representative images used for Species ID: 9772, 9773, 9775  
Photographer: Ryan Frame numbers: 9760 - 9809 Spacer: 9810  
Calculated distance from Trackline: 1.260 km

**Final Time and Position of Sighting**

Time: 10:39 WP#: 14 Lat: 35.835807 Long: -74.762225  
Calculated Distance Traveled: 0.7269 km

**Behavior and Additional Comments**

Widely spaced, multiple subgroups, splashing, breaching, belly rubbing

Saturday, July 30, 2011 Sighting # 4

**Initial sighting on Track**

Time: 10:46 WP#: 17 Lat: 35.830749 Long: -74.523249  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 40 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: 10:48 WP#: 18 Lat: 35.837776 Long: -74.534692  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8/10/8  
Features used in Species ID: Robust grey animals, white blaze trailing to post dorsal fin

Representative images used for Species ID: 9812-9814, 9817, 9826, 9834, 9814, 9847  
Photographer: Ryan Frame numbers: 9811 - 9861 Spacer: 9862  
Calculated distance from Trackline: 1.294 km

**Final Time and Position of Sighting**

Time: 10:53 WP#: 19 Lat: 35.840409 Long: -74.536985  
Calculated Distance Traveled: 0.3584 km

**Behavior and Additional Comments**

Animals traveling in tight group

Saturday, July 30, 2011 Sighting # 5

**Initial sighting on Track**

Time: 10:55 WP#: 21 Lat: 35.831379 Long: -74.482425  
Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: 3  
On/Off Effort: On Trackline: 40 Beaufort Sea State: 2  
Observer: Ryan Observer side: Right

**Actual Time and Position of Sighting**

Time: 10:56 WP#: 22 Lat: 35.829427 Long: -74.482279  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 10/15/12  
Features used in Species ID: Robust grey bodied animals with a lighter blaze trailing to just post dorsal fin  
Representative images used for Species ID: 9880, 9881, 9885, 9886  
Photographer: Ryan Frame numbers: 9863 - 9895 Spacer: 9896  
Calculated distance from Trackline: 0.2175 km

**Final Time and Position of Sighting**

Time: 10:59 WP#: 23 Lat: 35.824477 Long: -74.490404  
Calculated Distance Traveled: 0.9163 km

**Behavior and Additional Comments**

Belly rubbing, tightly packed, splashing and swimming in circles

Saturday, July 30, 2011 Sighting # 6

**Initial sighting on Track**

Time: 11:07 WP#: 28 Lat: 35.762600 Long: -74.374819  
Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: 2  
On/Off Effort: On Trackline: 39 Beaufort Sea State: 3  
Observer: Ryan Observer side: Right

**Actual Time and Position of Sighting**

Time: 11:08 WP#: 29 Lat: 35.769256 Long: -74.376584  
Species: *Physeter macrocephalus* Numbers (Low/High/Best): 1/1/1  
Features used in Species ID: Large grey bodied animals with large forward blow and blunt head  
Representative images used for Species ID: 9897, 9904, 9929, 9936  
Photographer: Ryan Frame numbers: 9897 - 9945 Spacer: 9946  
Calculated distance from Trackline: 0.7571 km

**Final Time and Position of Sighting**

Time: 11:09 WP#: 30 Lat: 35.762356 Long: -74.385283  
Calculated Distance Traveled: 1.098 km

**Behavior and Additional Comments**

Logging at the surface

Saturday, July 30, 2011 Sighting # 7

### Initial sighting on Track

Time: 11:10 WP#: 18 Lat: 35.763268 Long: -74.413674  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 39 Beaufort Sea State: 3  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 11:11 WP#: 32 Lat: 35.764706 Long: -74.414867  
Species: *Physeter macrocephalus* Numbers (Low/High/Best): 3/3/3  
Features used in Species ID: Large grey bodied animal will large forward blow and blunt head

Representative images used for Species ID: 9947, 9951, 9959  
Photographer: Ryan Frame numbers: 9947 - 9974 Spacer: 9975  
Calculated distance from Trackline: 0.1928 km

### Final Time and Position of Sighting

Time: 11:16 WP#: 33 Lat: 35.760384 Long: -74.412399  
Calculated Distance Traveled: 0.5297 km

### Behavior and Additional Comments

Logging at the surface

Saturday, July 30, 2011 Sighting # 8

### Initial sighting on Track

Time: 11:18 WP#: 36 Lat: 35.761286 Long: -74.500437  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 39 Beaufort Sea State: 2  
Observer: Ryan Observer side: Right

### Actual Time and Position of Sighting

Time: 11:19 WP#: 37 Lat: 35.766473 Long: -74.508376  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 28/35/30  
Features used in Species ID: Robust grey animals with lighter color blaze from rostrum to post dorsal fin

Representative images used for Species ID: 0003, 0004, 0016, 0017, 9998  
Photographer: Ryan Frame numbers: 0001 - 9998 Spacer: 9999  
Calculated distance from Trackline: 0.9197 km

### Final Time and Position of Sighting

Time: 11:21 WP#: 38 Lat: 35.761723 Long: -74.508473  
Calculated Distance Traveled: 0.5282 km

### Behavior and Additional Comments

Widely spaced, lots of splashing. A couple of groups of 10 or so. Belly to belly swimming, swimming subsurface.

Saturday, July 30, 2011 Sighting # 9

**Initial sighting on Track**

Time: 11:27 WP#: 40 Lat: 35.764230 Long: -74.702959  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 39 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: 11:29 WP#: 41 Lat: 35.753212 Long: -74.701881  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 3/5/4  
Features used in Species ID: Large black animals with small pectoral fins and blunt head

Representative images used for Species ID: 0038, 0039, 0044, 0045  
Photographer: Ryan Frame numbers: 0033 - 0048 Spacer: 0049  
Calculated distance from Trackline: 1.229 km

**Final Time and Position of Sighting**

Time: 11:37 WP#: 42 Lat: 35.754312 Long: -74.710280  
Calculated Distance Traveled: 0.7677 km

**Behavior and Additional Comments**

Moving at a fast pace, widely spaced.

Saturday, July 30, 2011 Sighting # 10

**Initial sighting on Track**

Time: 11:39 WP#: 44 Lat: 35.765238 Long: -74.794349  
Vertical Angle: 1 Horizontal Bearing in Degrees: 45 Sighting Cue: 3  
On/Off Effort: On Trackline: 39 Beaufort Sea State: 2  
Observer: Ryan Observer side: Right

**Actual Time and Position of Sighting**

Time: 11:41 WP#: 45 Lat: 35.758390 Long: -74.789591  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 5/7/6  
Features used in Species ID: Large black animal with small pectoral fins and a blunt head

Representative images used for Species ID: 0050, 0051, 0072, 0073  
Photographer: Ryan Frame numbers: 0050 - 0086 Spacer: 0087  
Calculated distance from Trackline: 0.8741 km

**Final Time and Position of Sighting**

Time: 11:48 WP#: 46 Lat: 35.760698 Long: -74.800063  
Calculated Distance Traveled: 0.9791 km

**Behavior and Additional Comments**

Widely spaced, doing deeper dives then swimming subsurface.

Saturday, July 30, 2011 Sighting # 11

**Initial sighting on Track**

Time: 13:56 WP#: 57 Lat: 35.690898 Long: -74.535851  
Vertical Angle: 3 Horizontal Bearing in Degrees: 60 Sighting Cue: 2  
On/Off Effort: On Trackline: 38 Beaufort Sea State: 3  
Observer: Ryan Observer side: Right

**Actual Time and Position of Sighting**

Time: 13:56 WP#: 58 Lat: 35.681309 Long: -74.533918  
Species: *Physeter macrocephalus* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: Large grey animals with large forward blow and blunt head

Representative images used for Species ID: 0102, 0106, 0110  
Photographer: Ryan Frame numbers: 0088 - 0114 Spacer: 0115  
Calculated distance from Trackline: 1.080 km

**Final Time and Position of Sighting**

Time: 13:59 WP#: 59 Lat: 35.692302 Long: -74.534939  
Calculated Distance Traveled: 1.226 km

**Behavior and Additional Comments**

Logging at the surface

Saturday, July 30, 2011 Sighting # 12

**Initial sighting on Track**

Time: 14:21 WP#: 66 Lat: 35.621053 Long: -74.782324  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 37 Beaufort Sea State: 3  
Observer: Ryan Observer side: Right

**Actual Time and Position of Sighting**

Time: 14:23 WP#: 67 Lat: 35.619175 Long: -74.785925  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 40/45/43  
Features used in Species ID: Large black animals with small pectoral fins and a blunt head

Representative images used for Species ID: 0126, 0133, 0137-0139  
Photographer: Ryan Frame numbers: 0116 - 0144 Spacer: 0145  
Calculated distance from Trackline: 0.3867 km

**Final Time and Position of Sighting**

Time: 14:26 WP#: 68 Lat: 35.627991 Long: -74.784884  
Calculated Distance Traveled: 0.9848 km

**Behavior and Additional Comments**

2 groups logging at the surface

Saturday, July 30, 2011 Sighting # 13

**Initial sighting on Track**

Time: 15:01 WP#: 75 Lat: 35.551567 Long: -74.405722  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 36 Beaufort Sea State: 3  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: 15:02 WP#: 76 Lat: 35.560734 Long: -74.398325  
Species: *Physeter macrocephalus* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: Large grey animals with large forward blow and blunt head

Representative images used for Species ID: 0148, 0159, 0184, 0187  
Photographer: Ryan Frame numbers: 0146 - 0193 Spacer: 0194  
Calculated distance from Trackline: 1.219 km

**Final Time and Position of Sighting**

Time: 15:05 WP#: 77 Lat: 35.563116 Long: -74.405971  
Calculated Distance Traveled: 0.7406 km

**Behavior and Additional Comments**

Logging at the surface close together



Sunday, July 31, 2011 Sighting # 1

### Initial sighting on Track

Time: 10:13 WP#: 14 Lat: 35.143615 Long: -74.875296  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 32 Beaufort Sea State: 3  
Observer: RJM Observer side: Left

### Actual Time and Position of Sighting

Time: 10:16 WP#: 15 Lat: 35.146405 Long: -74.870301  
Species: *Physeter macrocephalus* Numbers (Low/High/Best): 3 / 3 / 3  
Features used in Species ID: Large square head, Blowhole off center with 45 degree forward blow wrinkles along caudal are of body, "knuckles" on dorsal peduncle, no dorsal fin.  
Representative images used for Species ID: 4036, 4062, 4072  
Photographer: EWC Frame numbers: 4032 - 4074 Spacer: 4075  
Calculated distance from Trackline: 0.5 km

### Final Time and Position of Sighting

Time: 10:25 WP#: 18 Lat: 35.157699 Long: -74.880452  
Calculated Distance Traveled: 1.6 km

### Behavior and Additional Comments

Initial observation was of a single animal hanging just below the surface. Upon circling a total of 3 animals were observed logging at the surface. All animals approximately the same size.

Sunday, July 31, 2011 Sighting # 1

### Initial sighting on Track

Time: 10:13 WP#: 14 Lat: 35.143615 Long: -74.875298  
Vertical Angle: - Horizontal Bearing in Degrees: - Sighting Cue: splash  
On/Off Effort: Off Trackline: 32 Beaufort Sea State: 3  
Observer: RJM Observer side: Left

### Actual Time and Position of Sighting

Time: 10:20 WP#: 16 Lat: 35.147153 Long: -74.870689  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 8 / 12 / 10  
Features used in Species ID: Large square heads, dark black bodies with large dorsal fin placed approximately 1/3 back animals body.  
Representative images used for Species ID: NA  
Photographer: NA Frame numbers: NA Spacer: NA  
Calculated distance from Trackline: NA

### Final Time and Position of Sighting

Time: 10:25 WP#: 18 Lat: 35.157699 Long: -74.880452  
Calculated Distance Traveled: NA

### Behavior and Additional Comments

Group of pilot whales observed in the same area as sperm whales. Observation was made while circling on sperm whales, as such it will be listed as an off effort sighting and is only included to show distribution of animals.

Sunday, July 31, 2011 Sighting # 2

**Initial sighting on Track**

Time: 10:45 WP#: 23 Lat: 34.878139 Long: -74.627305  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Blow  
On/Off Effort: Off Trackline: between 32-31 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 10:45 WP#: 24 Lat: 34.867745 Long: -74.645303  
Species: *Physeter macrocephalus* Numbers (Low/High/Best): 2 / 2 / 2  
Features used in Species ID: Large square head, grey body with wrinkles along caudal area of animal. blow hole at 45 degrees forward and off center to left. "Knuckles" on dorsal caudal region.  
Representative images used for Species ID: 4078, 4079, 4082, 4078  
Photographer: Erin Frame numbers: 4076-4099 Spacer: 4100  
Calculated distance from Trackline: 2 km

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

Pair of animals traveling side by side both almost stationary in the water taking frequent breaths.

Sunday, July 31, 2011 Sighting # 3

**Initial sighting on Track**

Time: 11:00 WP#: 26 Lat: 35.13326 Long: -74.99565  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 31 Beaufort Sea State: 3  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 11:01 WP#: 27 Lat: 35.14314 Long: -74.982232  
Species: *Physeter macrocephalus* Numbers (Low/High/Best): 1 / 1 / 1  
Features used in Species ID: Blowhole forward at 45 degrees and off center, "knuckles" from mid back down tail stock. grey wrinkled body.  
Representative images used for Species ID: 4121  
Photographer: Erin Frame numbers: 4101-4128 Spacer: 4129  
Calculated distance from Trackline: 1.6 km

**Final Time and Position of Sighting**

Time: 11:03 WP#: 28 Lat: 35.137896 Long: -74.987758  
Calculated Distance Traveled: 0.8 km

**Behavior and Additional Comments**

Logging at the surface.

Sunday, July 31, 2011 Sighting # 4

**Initial sighting on Track**

Time: 14:56 WP#: 55 Lat: 34.827275 Long: -75.235589  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 3 Beaufort Sea State: 26  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 14:57 WP#: 56 Lat: 34.825875 Long: -74.238322  
Species: *Unidentified Mesoplodon* Numbers (Low/High/Best): 3 / 3 / 3  
Features used in Species ID: Tiny dorsal fin placed far back on the animals body, tapering head into rostrum, tiny pectoral fins.  
Representative images used for Species ID: 4166 - 4168  
Photographer: Erin Frame numbers: 4166-4168 Spacer: 4169  
Calculated distance from Trackline: 0.3 km

**Final Time and Position of Sighting**

Time: 15:11 WP#: 57 Lat: 34.834264 Long: -75.244736  
Calculated Distance Traveled: 1.1 km

**Behavior and Additional Comments**

Animals light in color and easy to see beneath the surface. A pair of animals was observed first which was joined by a third. Animals moving very fast beneath the surface and changed directions quickly and sporadically. Surfaced briefly making pictures of animals heads difficult to obtain.

Tuesday, October 25, 2011 Sighting # 1

**Initial sighting on Track**

Time: 11:27 WP#: 3 Lat: 35.478465 Long: -74.779912  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 36 Beaufort Sea State: 5  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: WP#: Lat: Long:  
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID:

Representative images used for Species ID:  
Photographer: Ryan Frame numbers: Spacer:  
Calculated distance from Trackline:

**Final Time and Position of Sighting**

Time: WP#: Lat: Long:  
Calculated Distance Traveled:

**Behavior and Additional Comments**

Swimming as a pair. No resight. No photos

Tuesday, October 25, 2011 Sighting # 2

**Initial sighting on Track**

Time: 11:38 WP#: 5 Lat: 35.476317 Long: -74.667290  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 36 Beaufort Sea State: 5  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: 11:40 WP#: 6 Lat: 35.468725 Long: -74.668304  
Species: *Ziphius cavirostris* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID:

Representative images used for Species ID:  
Photographer: Ryan Frame numbers: Spacer:  
Calculated distance from Trackline: 0.8492 km

**Final Time and Position of Sighting**

Time: WP#: Lat: Long:  
Calculated Distance Traveled:

**Behavior and Additional Comments**

Swimming like a mom/calf pair, darting around. Possibly beaked whales, dark spot behind melon with lighter body. No photos

Tuesday, October 25, 2011 Sighting # 3

**Initial sighting on Track**

Time: 12:32 WP#: 12 Lat: 35.620374 Long: -74.773549  
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: 2  
On/Off Effort: On Trackline: 38 Beaufort Sea State: 5  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: 12:33 WP#: 13 Lat: 35.623382 Long: -74.785817  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 12/15/13  
Features used in Species ID: Large, dark bodied animals with blunt heads

Representative images used for Species ID: 5698, 5706, 5711  
Photographer: Ryan Frame numbers: 5698 - 5719 Spacer: 5720  
Calculated distance from Trackline: 1.158 km

**Final Time and Position of Sighting**

Time: 13:39 WP#: 14 Lat: 35.622434 Long: -74.783915  
Calculated Distance Traveled: 0.2017 km

**Behavior and Additional Comments**

Logging at the surface, multiple sub-groups. One large tight group.

Wednesday, October 26, 2011 Sighting # 11

### Initial sighting on Track

Time: 10:13 WP#: 6 Lat: 36.0424 Long: -74.458536  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 44 Beaufort Sea State: 4  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 10:14 WP#: 7 Lat: 36.03329 Long: -74.456628  
Species: *Stenella coeruleoalba* Numbers (Low/High/Best): 125 / 170 / 150  
Features used in Species ID: Dark central line on rostrum with lighter white on either side.  
Darkened stripe from jaw line through eye down to insertion of pectoral fins.  
Representative images used for Species ID: 5724, 5738, 5742, 5758, 5759, 5781, 5795  
Photographer: Erin Frame numbers: 5721 to 5836 Spacer: 5836  
Calculated distance from Trackline: 1.0 km

### Final Time and Position of Sighting

Time: 10:27 WP#: 8 Lat: 36.02695 Long: -74.46127  
Calculated Distance Traveled: 0.8 km

### Behavior and Additional Comments

Two species separated into smaller, species specific groups within the larger group. Two species were identified through photo examination once back in the lab.

Wednesday, October 26, 2011 Sighting # 2

### Initial sighting on Track

Time: 10:13 WP#: 6 Lat: 36.0424 Long: -74.458536  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 44 Beaufort Sea State: 4  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 10:14 WP#: 7 Lat: 36.03329 Long: -74.456628  
Species: *Stenella longirostris* Numbers (Low/High/Best): 125 / 170 / 150  
Features used in Species ID: Long narrow rostrum, dorsal fins of some animals canted forward\*  
Representative images used for Species ID: 5737, 5788\*, 5805, 5806  
Photographer: Erin Frame numbers: 5721 - 5836 Spacer: 5836  
Calculated distance from Trackline: 1.0 km

### Final Time and Position of Sighting

Time: 10:27 WP#: 8 Lat: 36.02695 Long: -74.46127  
Calculated Distance Traveled: 0.8 km

### Behavior and Additional Comments

Two species separated into smaller, species specific groups within the larger group. Two species were identified through photo examination once back in the lab.

Wednesday, October 26, 2011 Sighting # 3

### Initial sighting on Track

Time: 10:29 WP#: 10 Lat: 36.04262 Long: -74.506917  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 44 Beaufort Sea State: 4  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 10:35 WP#: 11 Lat: 36.05366 Long: -74.497680  
Species: *Unidentified Kogia* Numbers (Low/High/Best): 1 / 1 / 1  
Features used in Species ID: *Kogia* sp. Small d-fin far back on animals body, head comes to a tapered rounded point with no rostrum, blowhole off center on the head  
Representative images used for Species ID: 5842, 5843, 5849-51, 5859-61, 5864-66  
Photographer: Erin Frame numbers: 5837 to 5870 Spacer: 5870  
Calculated distance from Trackline: 1.5 km

### Final Time and Position of Sighting

Time: 10:38 WP#: 12 Lat: 36.05101 Long: -74.464421  
Calculated Distance Traveled: 3.0 km

### Behavior and Additional Comments

Animal surfacing with an arched back ducking head below surface before diving. Stayed within veiw when it dove (~10ft underwater). tapered "shark-like" profile to head. Small pectoral fins.

Wednesday, October 26, 2011 Sighting # 4

### Initial sighting on Track

Time: 12:07 WP#: 22 Lat: 35.8277 Long: -74.42841  
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body  
On/Off Effort: On Trackline: 41 Beaufort Sea State: 5  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 12:14 WP#: 23 Lat: 35.83453 Long: -74.419  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 3 / 4 / 3  
Features used in Species ID: Dark body with large square head, large dorsal fin placed 1/3 back on the animals body  
Representative images used for Species ID: 5871 to 5874  
Photographer: Erin Frame numbers: 5871 to 5874 Spacer: 5874  
Calculated distance from Trackline: 1.1 km

### Final Time and Position of Sighting

Time: 12:24 WP#: 24 Lat: 35.83216 Long: -74.427113  
Calculated Distance Traveled: 0.8 km

### Behavior and Additional Comments

More animals appearing during our circling.

Wednesday, October 26, 2011 Sighting # 5

### Initial sighting on Track

Time: 12:31 WP#: 28 Lat: 35.75848 Long: -74.372751  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 40 Beaufort Sea State: 5  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 12:35 WP#: 29 Lat: 35.76767 Long: -74.360549  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 4 / 5 / 5  
Features used in Species ID: large square head, dark bodied, large dorsal fin placed 1/3 back on the animals body.

Representative images used for Species ID: 5875 to 5891  
Photographer: Erin Frame numbers: 5875 to 5891 Spacer: 5891  
Calculated distance from Trackline: 1.5 km

### Final Time and Position of Sighting

Time: 12:39 WP#: 30 Lat: 35.7709 Long: -74.335  
Calculated Distance Traveled: 2.3 km

### Behavior and Additional Comments

Four larger animals plus one smaller.

Wednesday, October 26, 2011 Sighting # 6

### Initial sighting on Track

Time: 14:33 WP#: 37 Lat: 35.20441 Long: -74.994379  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 32 Beaufort Sea State: 5  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 14:35 WP#: 38 Lat: 35.20945 Long: -74.983697  
Species: *Balaenoptera physalis* Numbers (Low/High/Best): 1 / 1 / 1  
Features used in Species ID: Long bodied animal with white coloration along the right mandible

Representative images used for Species ID: 5897, 5898, 5900, 5902, 5903  
Photographer: Erin Frame numbers: 5892 to 5904 Spacer: 5904  
Calculated distance from Trackline: 1.1 km

### Final Time and Position of Sighting

Time: 14:44 WP#: 39 Lat: 35.22604 Long: -74.971381  
Calculated Distance Traveled: 2.2 km

### Behavior and Additional Comments

Long bodied animal with white coloration along the right mandible. Animal maintained body position just below the surface.



Wednesday, October 26, 2011 Sighting # 7

**Initial sighting on Track**

Time: 16:07 WP#: 50 Lat: 35.408013 Long: -74.901949  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Body  
On/Off Effort: On Trackline: 49 Beaufort Sea State: 5  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 16:09 WP#: 51 Lat: 35.420941 Long: -74.881285  
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 1 / 1 / 1  
Features used in Species ID: Small bodied animal deep below surface.

Representative images used for Species ID: 5905  
Photographer: Erin Frame numbers: 5905 Spacer: 5906  
Calculated distance from Trackline: 2.3 km

**Final Time and Position of Sighting**

Time: 16:15 WP#: 52 Lat: 35.43085 Long: -74.879787  
Calculated Distance Traveled: 1.1 km

**Behavior and Additional Comments**

Difficult to photograph, animal spent lots of time deep below the surface.

Sunday, November 13, 2011 Sighting # 1

### Initial sighting on Track

Time: 9:17 WP#: 3 Lat: 35.554101 Long: -74.820925  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 37 Beaufort Sea State: 2  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 9:25 WP#: 4 Lat: 35.551333 Long: -74.834995  
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 3 / 3 / 3  
Features used in Species ID: Animals not reencountered

Representative images used for Species ID: NA  
Photographer: NA Frame numbers: NA Spacer: NA  
Calculated distance from Trackline: 1.3 km

### Final Time and Position of Sighting

Time: 9:29 WP#: 5 Lat: 35.545212 Long: -74.830687  
Calculated Distance Traveled: 0.8 km

### Behavior and Additional Comments

Initial sighting of three delphinids swimming towards the line. Difficult to relocate even with low sea states. No photos collected.

Sunday, November 13, 2011 Sighting # 2

### Initial sighting on Track

Time: 9:38 WP#: 7 Lat: 35.552292 Long: -74.485738  
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Body  
On/Off Effort: On Trackline: 37 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 9:42 WP#: 8 Lat: 35.545902 Long: -74.476016  
Species: *Stenella frontalis* Numbers (Low/High/Best): 8 / 13 / 13  
Features used in Species ID: Alternating light and dark pattern along the length of the animal.

White tip to rostrum.  
Representative images used for Species ID: 5917, 5918, 5925, 5927  
Photographer: Erin Frame numbers: 5911 - 5935 Spacer: 5936  
Calculated distance from Trackline: 1.1 km

### Final Time and Position of Sighting

Time: 9:57 WP#: 10 Lat: 35.548380 Long: -74.461638  
Calculated Distance Traveled: 1.3 km

### Behavior and Additional Comments

Animals running below the surface - avoidance behavior. Second group of about eight animals seen while returning to trackline.

Sunday, November 13, 2011 Sighting # 3

**Initial sighting on Track**

Time: 10:00 WP#: 12 Lat: 35.549678 Long: -74.367727  
Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: Splash  
On/Off Effort: On Trackline: 37 Beaufort Sea State: 2  
Observer: Ryan Observer side: Left

**Actual Time and Position of Sighting**

Time: 10:05 WP#: 13 Lat: 35.562103 Long: -74.373883  
Species: *Stenella frontalis* Numbers (Low/High/Best): 20 / 23 / 21  
Features used in Species ID: White tip to rostrum, faint spotting pattern on some animals

Representative images used for Species ID: 5939, 5940, 5956, 5959  
Photographer: Erin Frame numbers: 5937 - 5967 Spacer: 5968  
Calculated distance from Trackline: 1.5 km

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

Dense groups but spread out.

Sunday, November 13, 2011 Sighting # 4

**Initial sighting on Track**

Time: 10:18 WP#: 20 Lat: 35.482878 Long: -74.701317  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 36 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 10:25 WP#: 21 Lat: 35.504660 Long: -74.699905  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 10 / 30 / 30  
Features used in Species ID: Robust body appearance, uniform grey body coloration.

Representative images used for Species ID: 5971, 5974, 5985, 5996, 6000  
Photographer: Erin Frame numbers: 5969 - 6002 Spacer: 6003  
Calculated distance from Trackline: 2.4 km

**Final Time and Position of Sighting**

Time: 10:25 WP#: 22 Lat: 35.504537 Long: -74.695135  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

Three groups of animals.

Sunday, November 13, 2011 Sighting # 5

### Initial sighting on Track

Time: 10:43 WP#: 26 Lat: 35.410232 Long: -75.071594  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 35 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 10:44 WP#: 27 Lat: 35.402847 Long: -75.072340  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 15 / 20 / 20  
Features used in Species ID: Robust body appearance, white peduncle

Representative images used for Species ID: 6008, 6011, 6018, 6025  
Photographer: Erin Frame numbers: 6004 - 6027 Spacer: 6028  
Calculated distance from Trackline: 2.7 km

### Final Time and Position of Sighting

Time: 10:48 WP#: 28 Lat: 35.399598 Long: -75.081818  
Calculated Distance Traveled: 3.5 km

### Behavior and Additional Comments

Animals moving fast and in multiple directions, big arching surfacings, scattered group.

Sunday, November 13, 2011 Sighting # 6

### Initial sighting on Track

Time: 10:52 WP#: 30 Lat: 35.409467 Long: -74.916612  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Splash  
On/Off Effort: On Trackline: 35 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 10:53 WP#: 31 Lat: 35.404918 Long: -74.930050  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 38 / 42 / 40  
Features used in Species ID: Robust body appearance, lighter grey coloration high on animals sides

Representative images used for Species ID: 6034, 6039, 6040, 6046  
Photographer: Erin Frame numbers: 6029 - 6053 Spacer: 6054  
Calculated distance from Trackline: 1.3 km

### Final Time and Position of Sighting

Time: 10:55 WP#: 32 Lat: 35.411736 Long: -74.924551  
Calculated Distance Traveled: 0.9 km

### Behavior and Additional Comments

Scattered group of dolphins moderate rate of travel hanging below surface.  
Multiple groups surrounding initial sighting.

Sunday, November 13, 2011 Sighting # 7

**Initial sighting on Track**

Time: 10:58 WP#: 35 Lat: 35.408925 Long: -74.816425  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Wake  
On/Off Effort: On Trackline: 35 Beaufort Sea State: 2  
Observer: Ryan Observer side: Left

**Actual Time and Position of Sighting**

Time: 10:59 WP#: 36 Lat: 35.424983 Long: -74.824943  
Species: *Physeter macrocephalus* Numbers (Low/High/Best): 1 / 1 / 1  
Features used in Species ID: large body size, blunt square head, blow forward at 45 degrees

Representative images used for Species ID: 6056, 6067, 6072  
Photographer: Erin Frame numbers: 6055 - 6075 Spacer: 6076  
Calculated distance from Trackline: 1.9 km

**Final Time and Position of Sighting**

Time: 11:01 WP#: 37 Lat: 35.422714 Long: -74.825082  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Saw animals wake and then blow at initial sighting. Single animal at surface taking a series of breaths.

Sunday, November 13, 2011 Sighting # 8

**Initial sighting on Track**

Time: 11:03 WP#: 38 Lat: 35.425236 Long: -74.797940  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: Off Trackline: 35 Beaufort Sea State: 2  
Observer: Ryan Observer side: Left

**Actual Time and Position of Sighting**

Time: 11:03 WP#: 39 Lat: 35.424565 Long: -74.794380  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 15 / 20 / 15  
Features used in Species ID: Robust body appearance, white peduncle

Representative images used for Species ID: 6086, 6090  
Photographer: Erin Frame numbers: 6077 - 6095 Spacer: 6096  
Calculated distance from Trackline: 0.3 km

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

Opportunistic sighting while heading back to trackline.

Sunday, November 13, 2011 Sighting # 9

**Initial sighting on Track**

Time: 11:13 WP#: 42 Lat: 35.415418 Long: -74.511513  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 35 Beaufort Sea State: 2  
Observer: Ryan Observer side: Left

**Actual Time and Position of Sighting**

Time: 11:14 WP#: 43 Lat: 35.420423 Long: -74.509397  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 10 / 13 / 12  
Features used in Species ID: Robust body appearance, short rostrum, uniform grey coloration

Representative images used for Species ID: 6107, 6115, 6122  
Photographer: Erin Frame numbers: 6097 - 6133 Spacer: 6134  
Calculated distance from Trackline: 0.6 km

**Final Time and Position of Sighting**

Time: 11:15 WP#: 44 Lat: 35.421509 Long: -74.502041  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

Lots of splashing at the surface, group maintained stationary position throughout sighting.

Sunday, November 13, 2011 Sighting # 10

**Initial sighting on Track**

Time: 11:33 WP#: 51 Lat: 35.341709 Long: -74.716800  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 34 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 11:33 WP#: 52 Lat: 35.349782 Long: -74.721951  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 3 / 3 / 3  
Features used in Species ID: Black body, blunt head, short pectoral fins.

Representative images used for Species ID: 6136, 6139, 6145, 6147  
Photographer: Erin Frame numbers: 6135 - 6149 Spacer: 6150  
Calculated distance from Trackline: 1.0 km

**Final Time and Position of Sighting**

Time: 11:35 WP#: 53 Lat: 35.347382 Long: -74.721988  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

Spread out group.

Sunday, November 13, 2011 Sighting # 11

**Initial sighting on Track**

Time: 11:37 WP#: 54 Lat: 35.347230 Long: -74.758430  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: Off Trackline: 34 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 11:38 WP#: 55 Lat: 35.351769 Long: -74.756597  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 10 / 15 / 12  
Features used in Species ID: Robust body appearance

Representative images used for Species ID: 6152, 6154, 6167  
Photographer: Erin Frame numbers: 6151 - 6167 Spacer: 6168  
Calculated distance from Trackline: 0.5 km

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

Very spread out group.

Sunday, November 13, 2011 Sighting # 12

**Initial sighting on Track**

Time: 11:42 WP#: 57 Lat: 35.342631 Long: -74.854017  
Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: Splash  
On/Off Effort: On Trackline: 34 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 11:43 WP#: 58 Lat: 35.349374 Long: -74.864955  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 30 / 35 / 30  
Features used in Species ID: Robust body appearance, white peduncle patch, short rostrum.

Representative images used for Species ID: 6176, 6177, 6184, 6190  
Photographer: Erin Frame numbers: 6169 - 6191 Spacer: 6192  
Calculated distance from Trackline: 1.2 km

**Final Time and Position of Sighting**

Time: 11:45 WP#: 59 Lat: 35.354141 Long: -74.863779  
Calculated Distance Traveled: 0.5 km

**Behavior and Additional Comments**

Group spread out into smaller groups.

Sunday, November 13, 2011 Sighting # 13

**Initial sighting on Track**

Time: 13:47 WP#: 66 Lat: 35.245516 Long: -74.885482  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 33 Beaufort Sea State: 3  
Observer: Ryan Observer side: Left

**Actual Time and Position of Sighting**

Time: 13:48 WP#: 67 Lat: 35.247398 Long: -74.884306  
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 12 / 15 / 15  
Features used in Species ID: no photos

Representative images used for Species ID: N/A  
Photographer: Erin Frame numbers: N/A Spacer: N/A  
Calculated distance from Trackline: 0.2349 km

**Final Time and Position of Sighting**

Time: 13:53 WP#: 68 Lat: 35.253920 Long: -74.896304  
Calculated Distance Traveled: 1.306 km

**Behavior and Additional Comments**

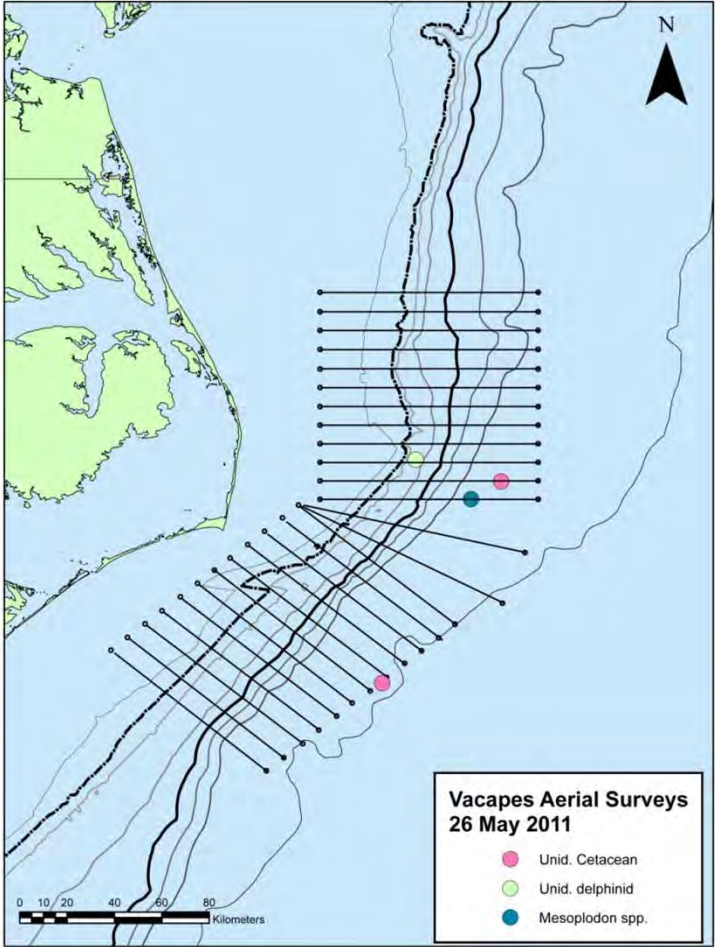
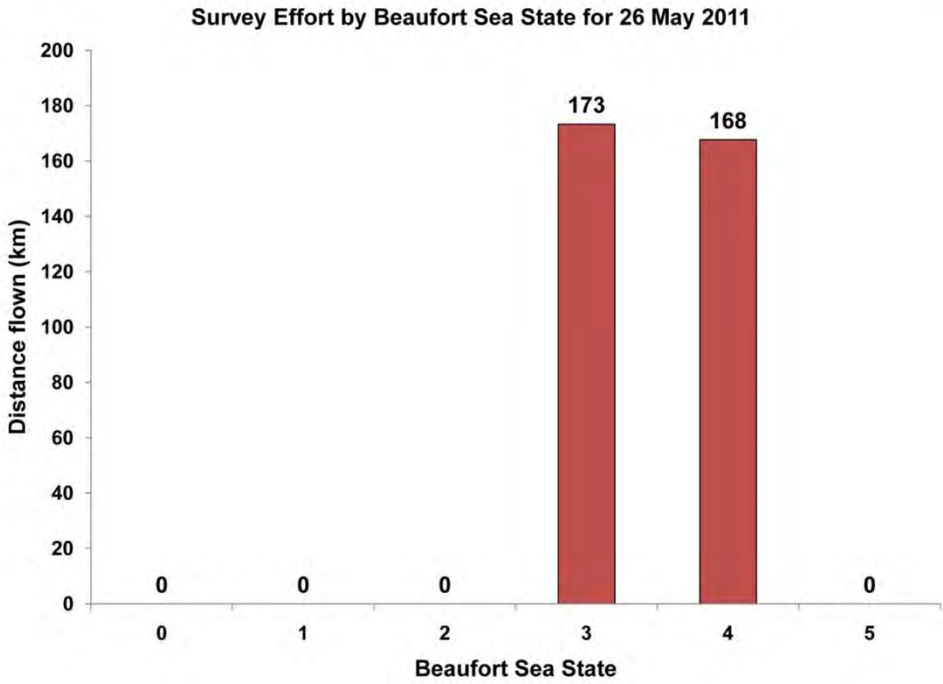
Tightly packed group just below the surface - no resight.



# Summary of 26 May 2011

26 May 2011

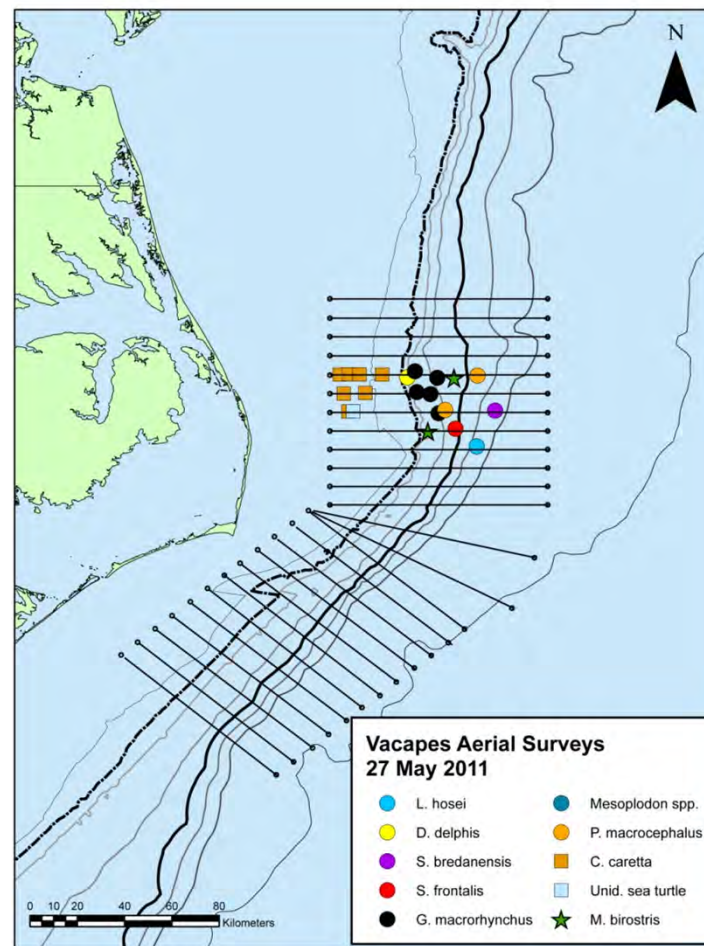
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
Mesoplodon	1	2	3	34
Unidentified Cetacean	1	1	4	35
Unidentified Cetacean	1	1	-	-
Unidentified delphinid	1	4	4	36



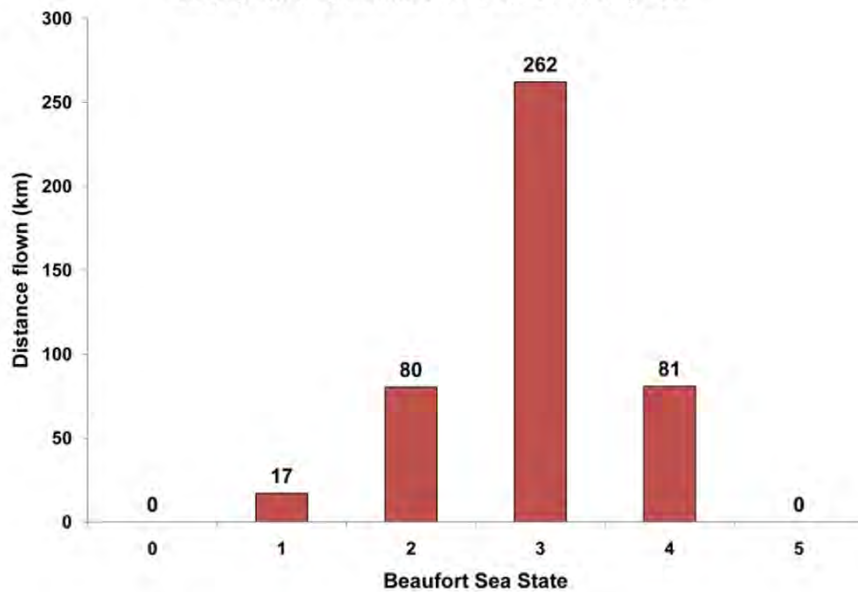
27 May 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Stenella frontalis</i>	1	2	3	34
<i>Steno bredanensis</i>	1	4	4	39
<i>Lagenodelphis hosei</i>	1	75	4	37
<i>Delphinus delphis</i>	1	300	2	41
<i>Globicephala macrorhynchus</i>	1	46	2	41
<i>Globicephala macrorhynchus</i>	1	13	2	41
<i>Globicephala macrorhynchus</i>	1	13	3	40
<i>Globicephala macrorhynchus</i>	1	23	3	40
<i>Globicephala macrorhynchus</i>	1	13	3	39
<i>Globicephala macrorhynchus</i>	1	10	4	39
<i>Physeter macrocephalus</i>	1	2	2	41
<i>Physeter macrocephalus</i>	1	1	3	39
Mesoplodon	1	1	3	38
<i>Caretta caretta</i>	7	15	1 to 2	-
Unidentified sea turtle	1	1	2	39
<i>Manta birostris</i>	2	2	2 to 3	-

## Summary of 27 May 2011



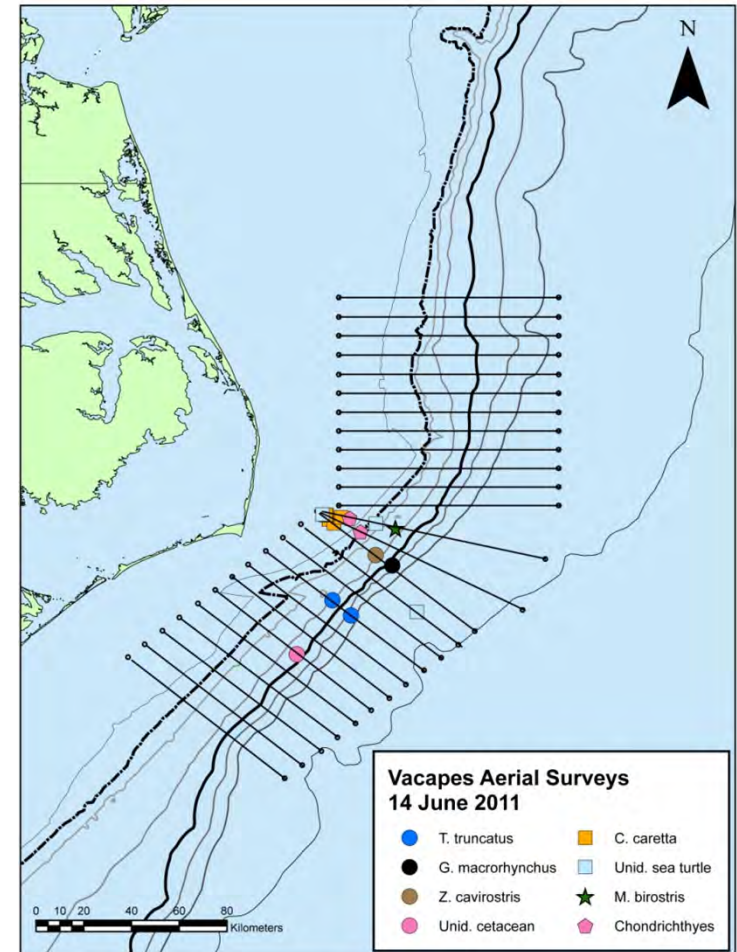
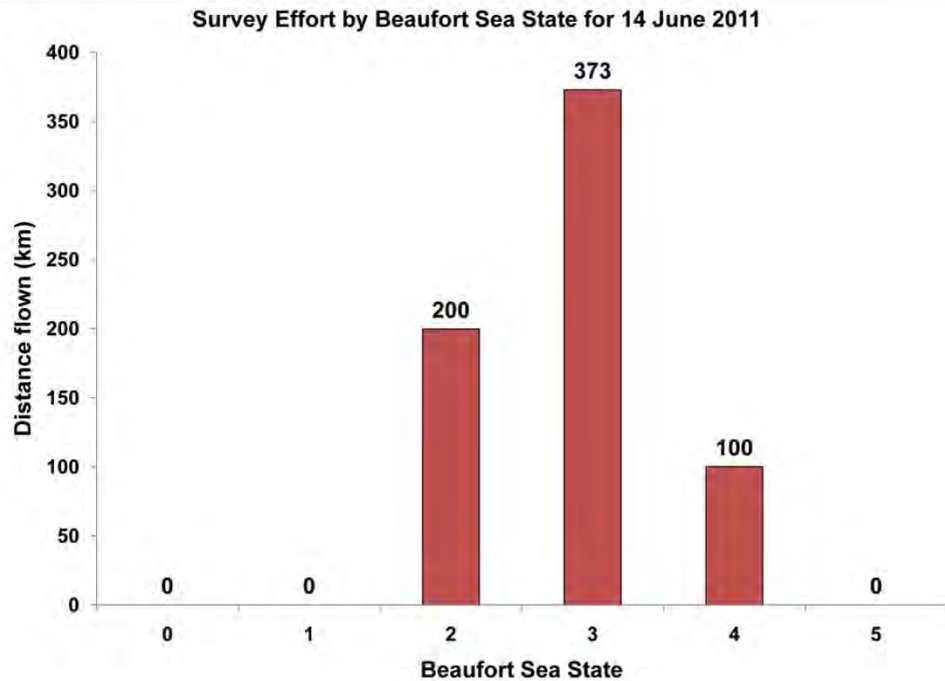
Survey Effort by Beaufort Sea State for 27 May 2011



14 June 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	18	3	28
<i>Tursiops truncatus</i>	1	2	3	28
<i>Tursiops truncatus</i>	1	7	3	31
<i>Globicephala macrorhynchus</i>	1	10	3	31
<i>Ziphius cavirostris</i>	1	4	3	31
Unidentified Cetacean	1	1	4	25
<i>Caretta caretta</i>	5	6	2	-
Unidentified sea turtle	3	3	2	-
<i>Manta birostris</i>	1	1	2	33
Chondrichthyes	2	2	2	-

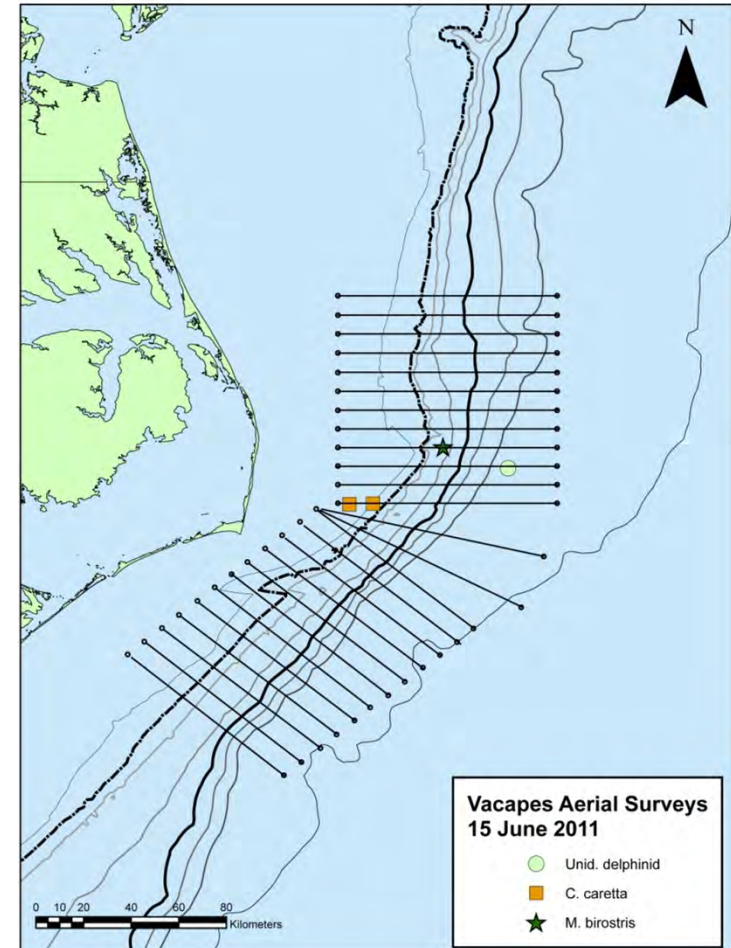
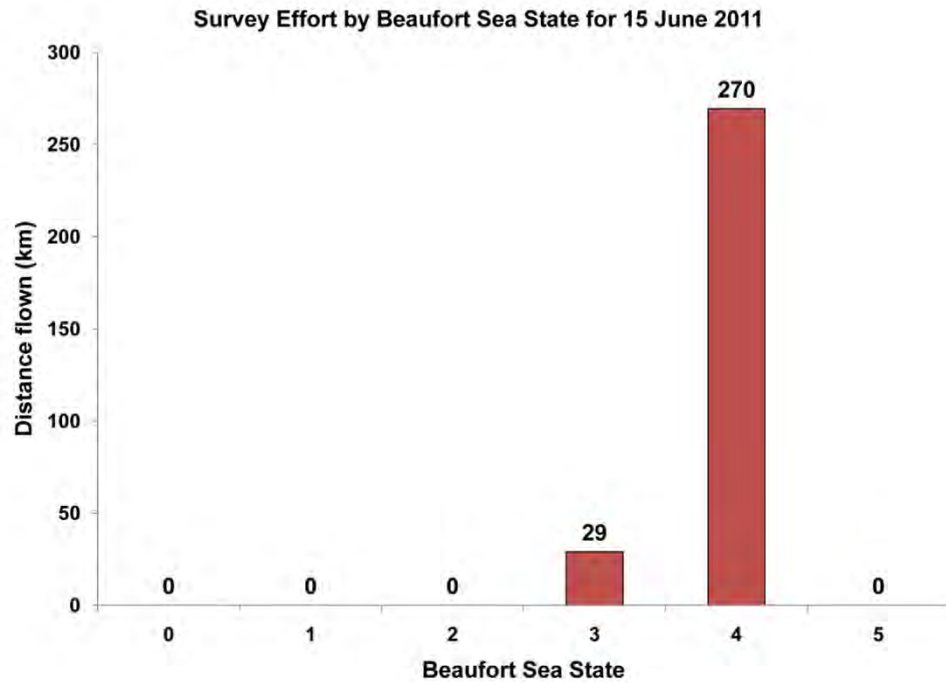
## Summary of 14 June 2011



## Summary of 15 June 2011

15 June 2011

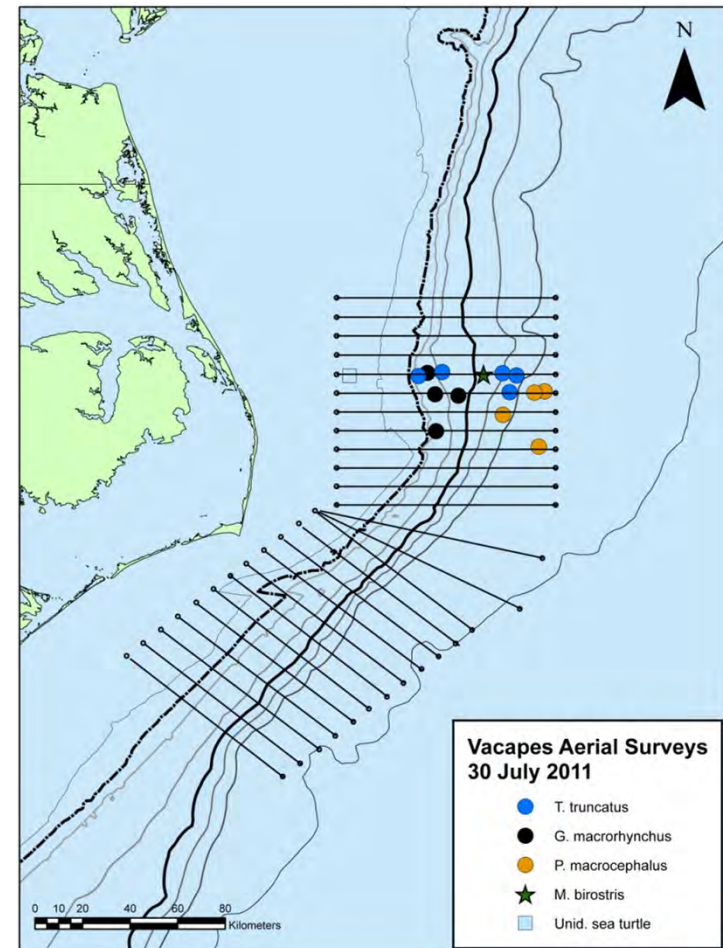
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
Unidentified delphinid	1	1	4	36
<i>Caretta caretta</i>	2	2	4	34
<i>Manta birostris</i>	1	1	4	37



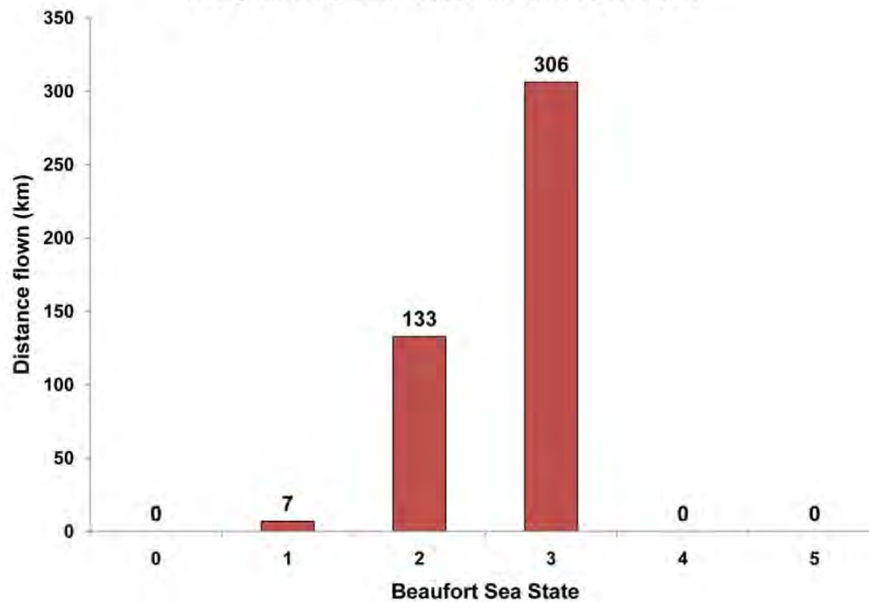
30 July 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	11	2	40
<i>Tursiops truncatus</i>	1	25	2	40
<i>Tursiops truncatus</i>	1	8	2	40
<i>Tursiops truncatus</i>	1	12	2	40
<i>Tursiops truncatus</i>	1	30	2	39
<i>Globicephala macrorhynchus</i>	1	90	2	40
<i>Globicephala macrorhynchus</i>	1	25	2	40
<i>Globicephala macrorhynchus</i>	1	4	2	39
<i>Globicephala macrorhynchus</i>	1	6	2	39
<i>Globicephala macrorhynchus</i>	1	43	3	37
<i>Physeter macrocephalus</i>	1	1	3	39
<i>Physeter macrocephalus</i>	1	3	3	39
<i>Physeter macrocephalus</i>	1	2	3	38
<i>Physeter macrocephalus</i>	1	2	3	36
Unidentified sea turtle	1	1	2	40
<i>Manta birostris</i>	1	1	2	40

## Summary of 30 July 2011



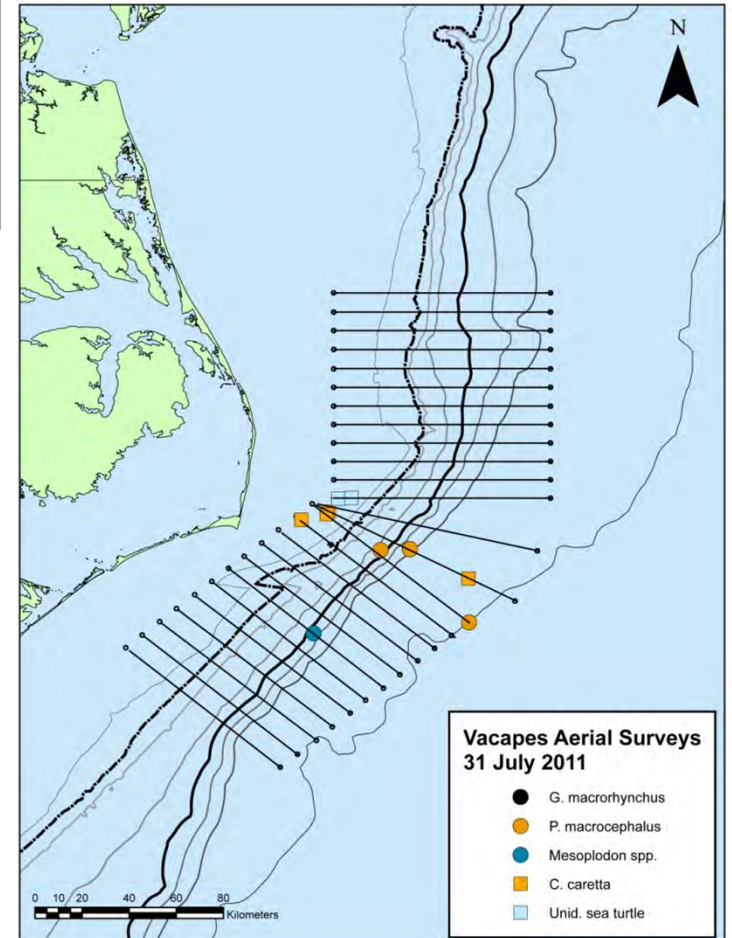
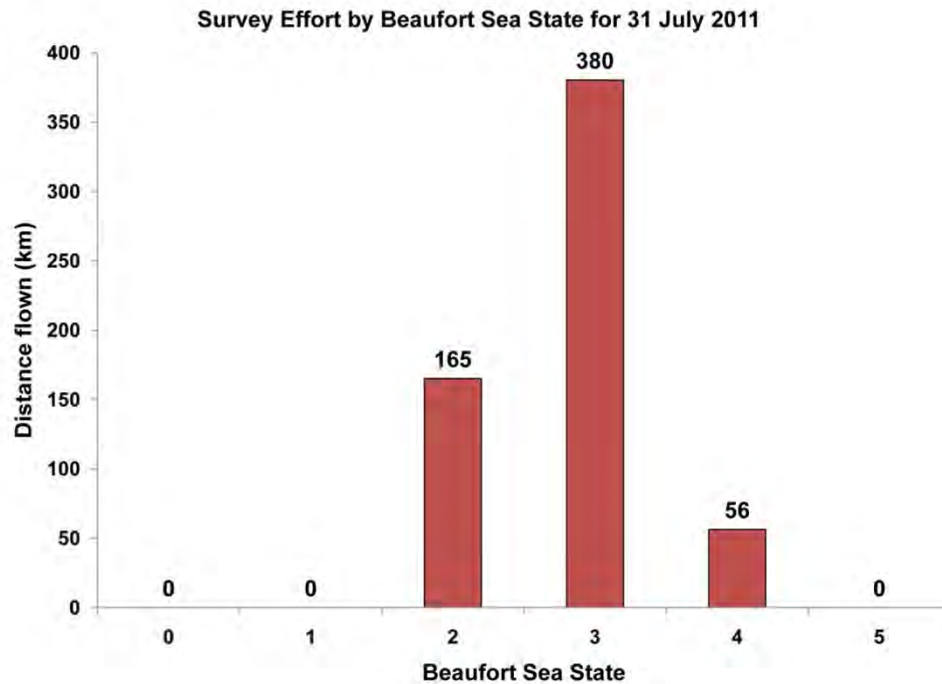
Survey Effort by Beaufort Sea State for 30 July 2011



31 July 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Globicephala macrorhynchus</i>	1	8	3	32
<i>Physeter macrocephalus</i>	1	3	3	32
<i>Physeter macrocephalus</i>	1	2	3	31
<i>Physeter macrocephalus</i>	1	1	3	31
Mesoplodon	1	3	3	26
<i>Caretta caretta</i>	4	4	2 to 3	-
Unidentified sea turtle	2	2	2	34

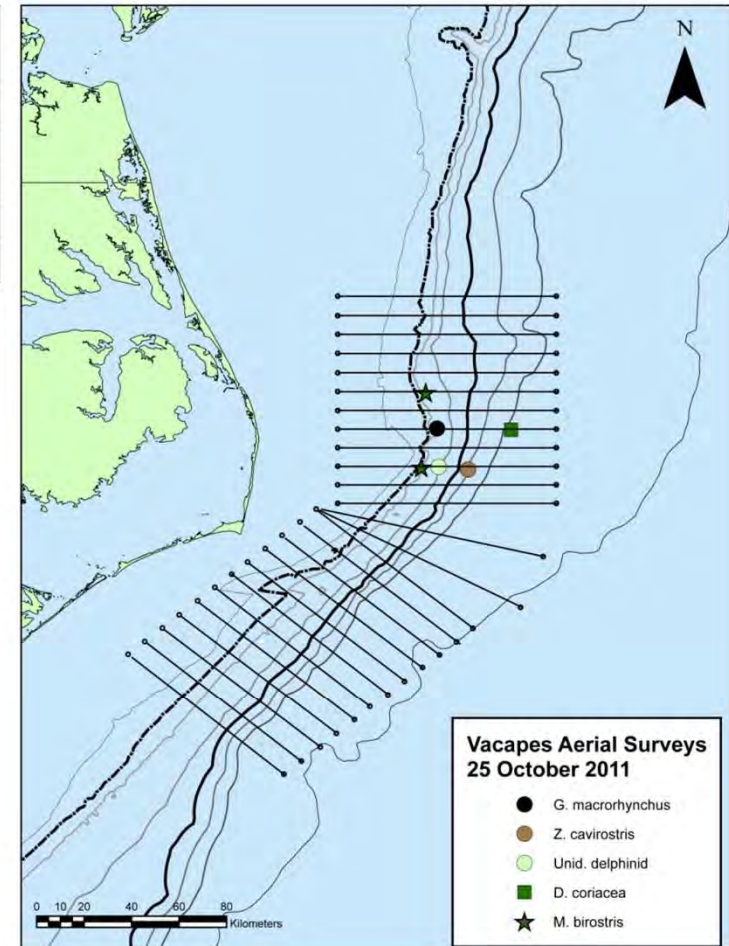
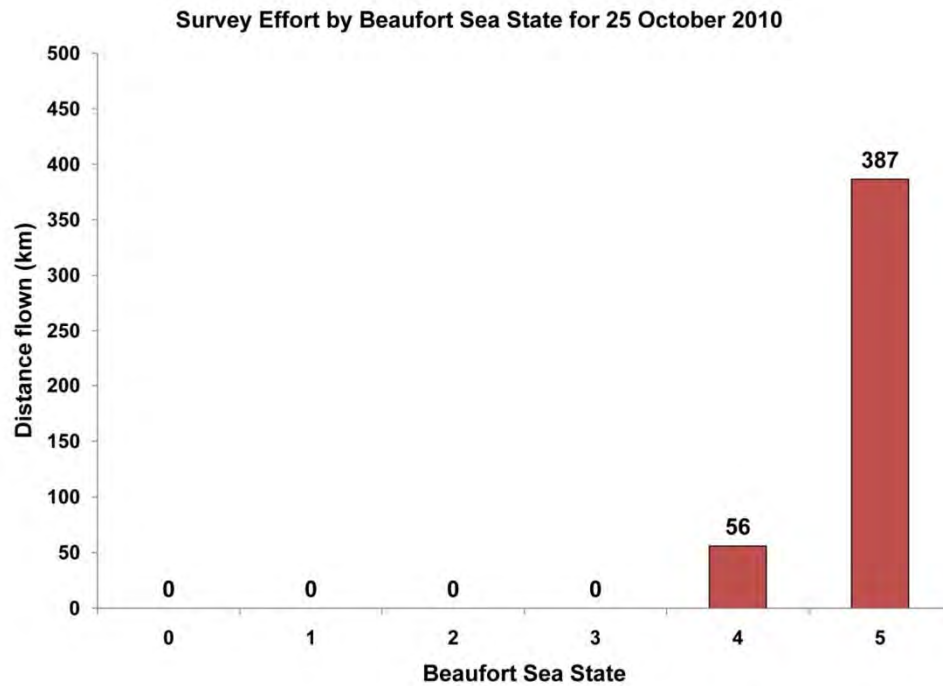
## Summary of 31 July 2011



## Summary of 25 October 2011

25 October 2011

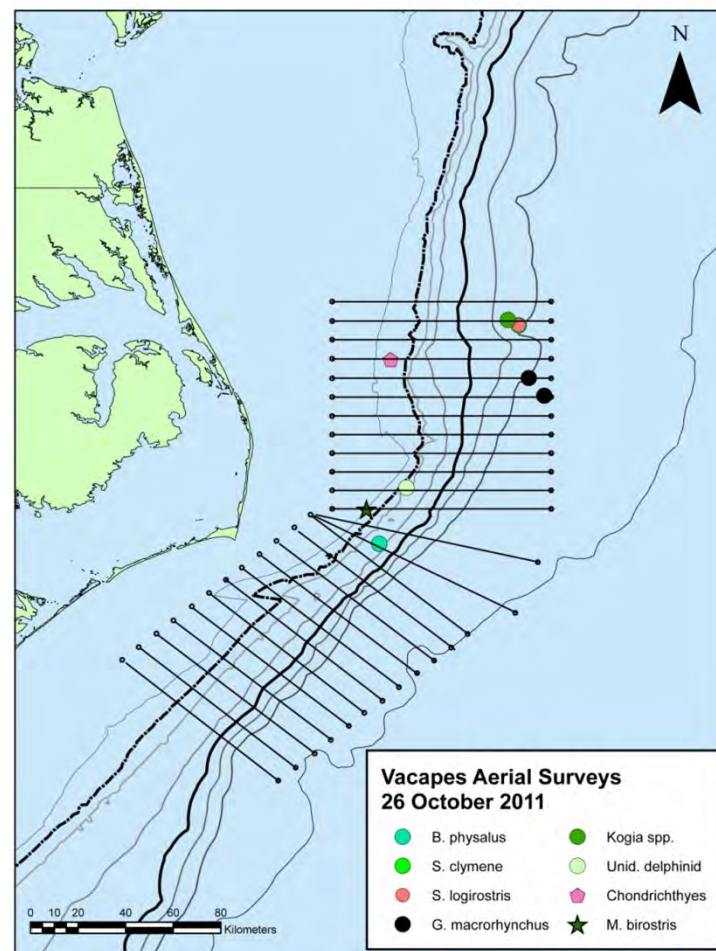
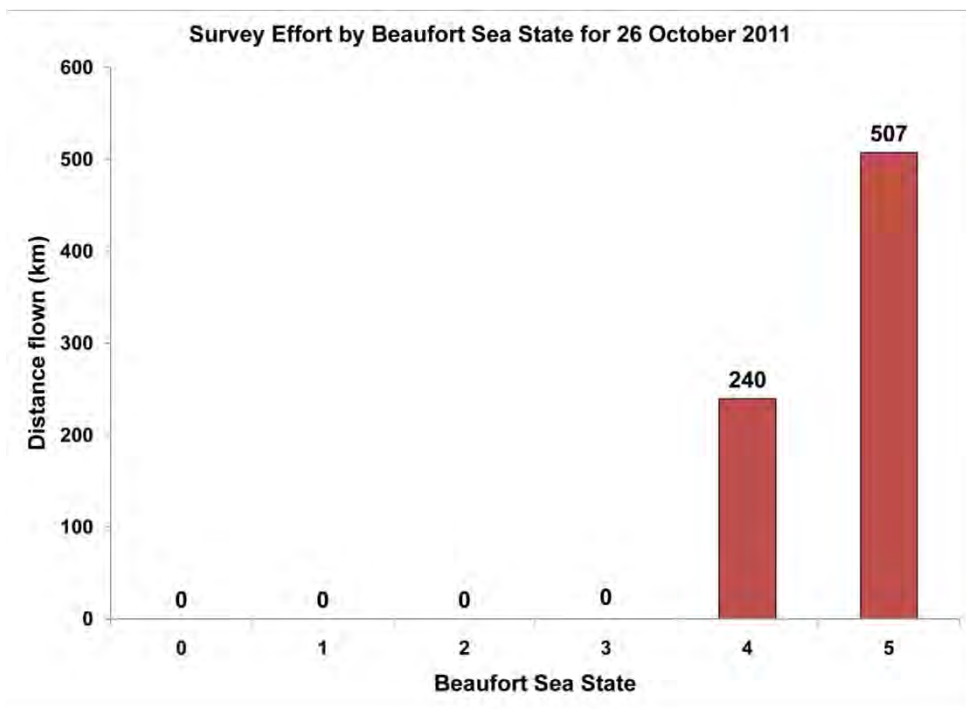
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Globicephala macrorhynchus</i>	1	13	5	38
<i>Ziphius cavirostris</i>	1	1	5	36
Unidentified delphinid	1	2	5	36
<i>Dermochelys coriacea</i>	1	1	5	38
<i>Manta birostris</i>	2	2	4 to 5	-



26 October 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Stenella clymene</i>	1	70	4	44
<i>Stenella logirostris</i>	1	70	4	44
Kogia spp	1	1	4	44
<i>Globicephala macrorhynchus</i>	1	3	5	41
<i>Globicephala macrorhynchus</i>	1	4	5	40
<i>Balaenoptera physalus</i>	1	1	5	32
Unidentified delphinid	1	9	5	35
<i>Manta birostris</i>	1	1	5	34
Chondrichthyes	1	1	4	42

## Summary of 26 October 2011

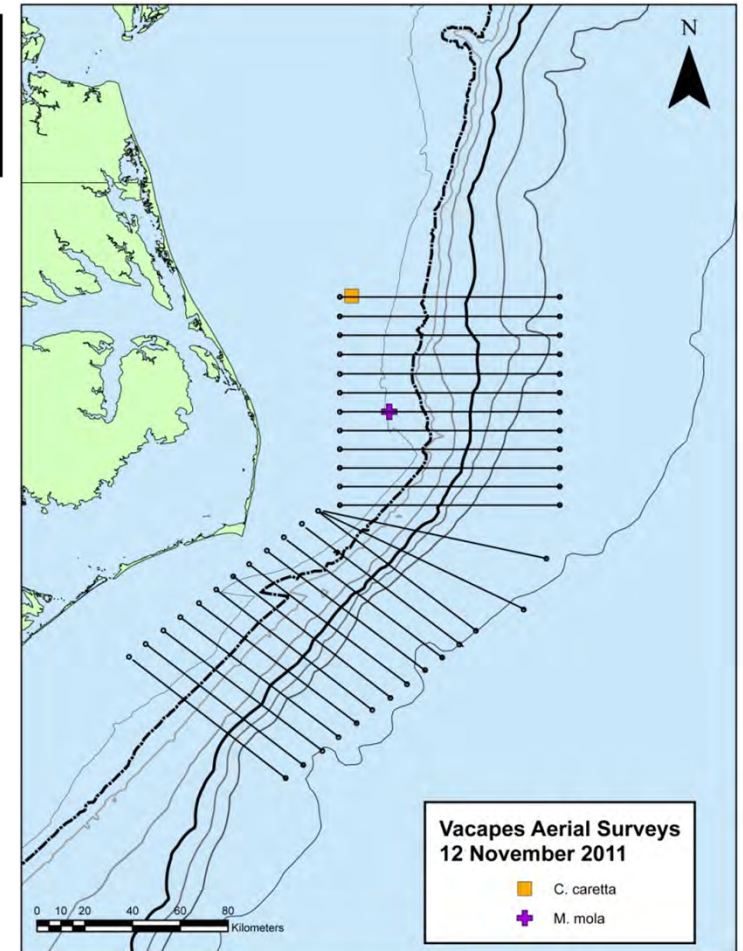
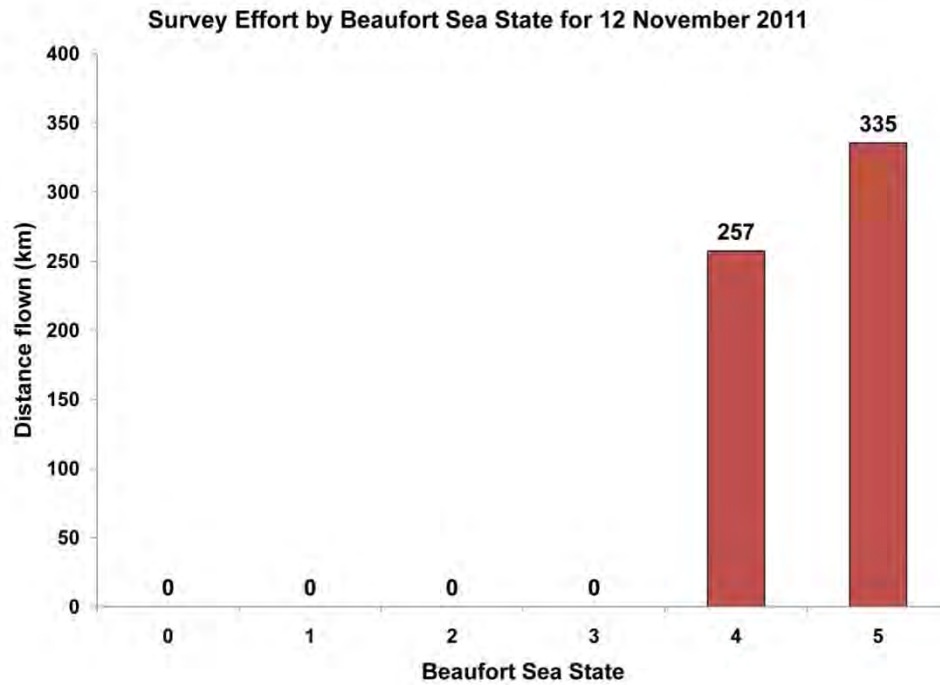




## Summary of 12 November 2011

12 November 2011

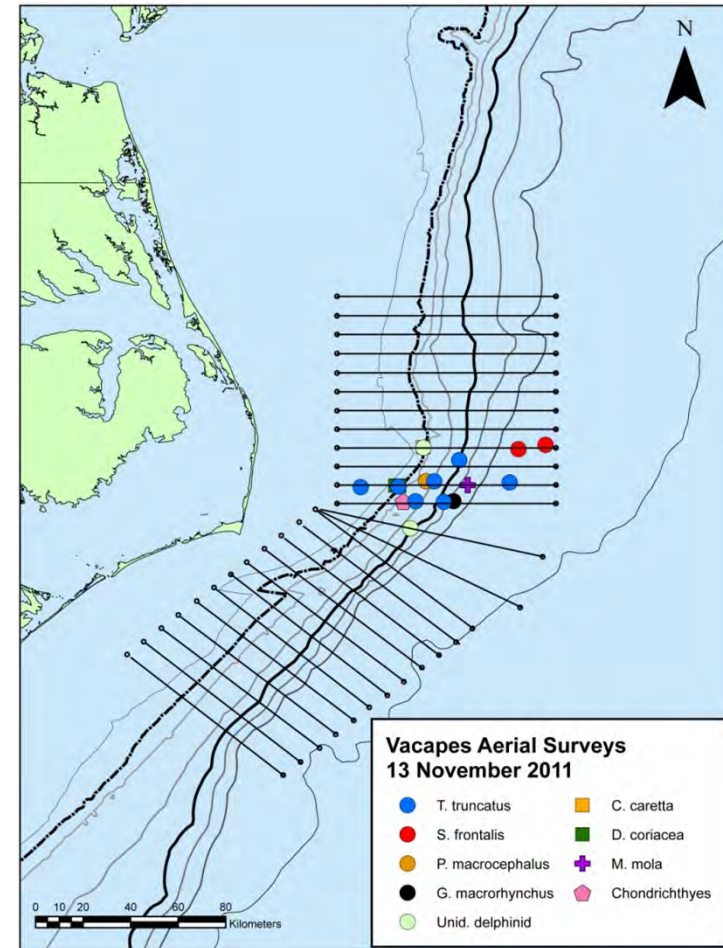
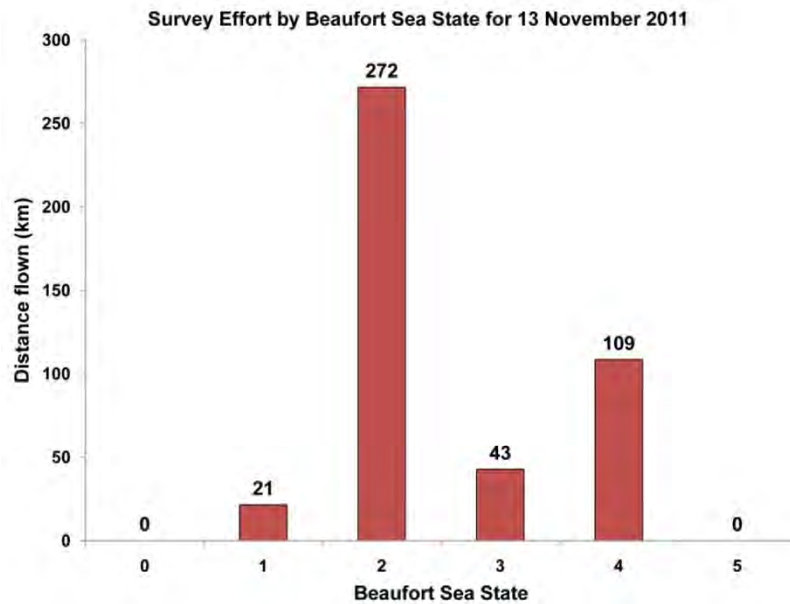
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Caretta caretta</i>	1	1	4	45
<i>Mola mola</i>	1	1	4	39



13 November 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	30	2	36
<i>Tursiops truncatus</i>	1	20	2	35
<i>Tursiops truncatus</i>	1	40	2	35
<i>Tursiops truncatus</i>	1	12	2	34
<i>Tursiops truncatus</i>	1	30	2	34
<i>Tursiops truncatus</i>	1	15	2	35
<i>Tursiops truncatus</i>	1	12	2	35
<i>Stenella frontalis</i>	1	13	2	37
<i>Stenella frontalis</i>	1	21	2	37
<i>Globicephala macrorhynchus</i>	1	3	2	34
<i>Physeter macrocephalus</i>	1	1	2	35
Unidentified delphinid	1	3	2	35
Unidentified delphinid	1	13	13	37
<i>Caretta caretta</i>	1	1	2	37
<i>Dermochelys coriacea</i>	2	2	2	35
<i>Mola mola</i>	1	1	2	35
Chondrichthyes	1	2	1	34

## Summary of 13 November 2011



Wednesday, July 28, 2010 Sighting # 1

**Initial Sighting on Track**

Time: 12:49 WP#: 12 Lat: 30.569710 Long: -80.552614  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 10 Beaufort Sea State: 0  
Observer: RCH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 12:52 WP#: 13 Lat: 30.576911 Long: -80.551686  
Species: *Stenella frontalis* Numbers (Low/High/Best): 25/35/31  
Features used in Species ID: Alternating light and dark "banding" dorsally, long,  
white-tipped rostrum, obvious spotting pattern  
Representative images used for Species ID: 1743, 1744, 1746-1749, 1753  
Photographer: PBN Frame Numbers: 1741-1753 Spacer: 1754  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 12:53 WP#: 14 Lat: 30.568629 Long: -80.559956  
Calculated Distance Traveled: 1.2 km

**Behavior and Additional Comments**

Two large groups, leisurely travel  

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Wednesday, July 28, 2010 Sighting # 2

**Initial Sighting on Track**

Time: 12:58 WP#: 20 Lat: 30.566608 Long: -80.406468  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 10 Beaufort Sea State: 0  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 12:58 WP#: 21 Lat: 30.559232 Long: -80.409551  
Species: *Stenella frontalis* Numbers (Low/High/Best): 8/10/9  
Features used in Species ID: Spotted pattern, light and dark alternating "banding" dorsally,  
long and white-tipped rostrum  
Representative images used for Species ID: 1769, 1782, 1784, 1790  
Photographer: PBN Frame Numbers: 1755-1800 Spacer: 1801  
Calculated Distance from Track Line: 0.9 km

**Final Time and Position of Sighting**

Time: 13:01 WP#: 22 Lat: 30.562598 Long: -80.410155  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

Active surface travel  

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Wednesday, July 28, 2010 Sighting # 3

**Initial Sighting on Track**

Time: 13:02 WP#: 24 Lat: 30.566528 Long: -80.363193  
Vertical Angle: 3 Horizontal Bearing in Degrees: 120 Sighting Cue: Body  
On/Off Effort: On Track Line: 10 Beaufort Sea State: 0  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 13:03 WP#: 25 Lat: 30.561963 Long: -80.362140  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4/4/4  
Features used in Species ID: Short, stubby rostrum, wide flukes, well defined crease at base of melon, overall gray coloration  
Representative images used for Species ID: 1816 - 1820  
Photographer: PBN Frame Numbers: 1802-1824 Spacer: 1825  
Calculated Distance from Track Line: 0.5 km

**Final Time and Position of Sighting**

Time: 13:05 WP#: 26 Lat: 30.562966 Long: -80.363824  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Elusive, two adults and two juveniles/calves

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Wednesday, July 28, 2010 Sighting # 4

**Initial Sighting on Track**

Time: 13:41 WP#: 36 Lat: 30.500034 Long: -80.319854  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 1  
Observer: RCH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 13:41 WP#: 37 Lat: 30.495012 Long: -80.321756  
Species: *Steno bredanensis* Numbers (Low/High/Best): 23/28/26  
Features used in Species ID: Elongated beak, absence of melon, "suspender" shaped cape, white lower jaw  
Representative images used for Species ID: 1841, 1842, 1847, 1852, 1857, 1859, 1864  
Photographer: PBN Frame Numbers: 1826-1906 Spacer: 1907  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 13:45 WP#: 38 Lat: 30.494119 Long: -80.319644  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Mixed group of *S. bredanensis* (n=23-28) and *T. truncatus* (4/5/4) - see images 1864 through 1872. Part of *S. bredanensis* group in tight formation with pectoral fins overlapping

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Wednesday, July 28, 2010 Sighting # 5

**Initial Sighting on Track**

Time: 13:50 WP#: 41 Lat: 30.499735 Long: -80.496615  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 1  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 13:54 WP#: 42 Lat: 30.503798 Long: -80.489435  
Species: Unidentified Delphinid Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: n/a

Representative images used for Species ID: n/a

Photographer: PBN Frame Numbers: 1908-1932 Spacer: 1933  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 13:56 WP#: 43 Lat: 30.498507 Long: -80.490609  
Calculated Distance Traveled: 0.6 km

**Behavior and Additional Comments**

Deep diving

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Wednesday, July 28, 2010 Sighting # 6

**Initial Sighting on Track**

Time: 14:30 WP#: 61 Lat: 30.432832 Long: -79.904533  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 1  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 14:30 WP#: 62 Lat: 30.428555 Long: -79.904506  
Species: Globicephala macrorhynchus Numbers (Low/High/Best): 40/60/50  
Features used in Species ID: Large black delphinids, bulbous foreheads, broad based dorsal fins

Representative images used for Species ID: 1934, 1936, 1939, 1941

Photographer: PBN Frame Numbers: 1934-2002 Spacer: 2003  
Calculated Distance from Track Line: 0.5 km

**Final Time and Position of Sighting**

Time: 14:35 WP#: 63 Lat: 30.434440 Long: -79.902242  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

Group spread out over one km, a few calves observed

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Wednesday, July 28, 2010 Sighting # 7

**Initial Sighting on Track**

Time: 15:05 WP#: 72 Lat: 30.365482 Long: -80.667379  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 1  
Observer: RCH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 15:09 WP#: 73 Lat: 30.362017 Long: -80.658427  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3/7/7  
Features used in Species ID: Sturdy looking animals with relatively large flukes, overall gray coloration, stubby rostrum  
Representative images used for Species ID: 2024-2026  
Photographer: PBN Frame Numbers: 2003-2027 Spacer: 2028  
Calculated Distance from Track Line: 0.9 km

**Final Time and Position of Sighting**

Time: 15:12 WP#: 74 Lat: 30.355987 Long: -80.658448  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

Surface travel, active and fast  
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Thursday, July 29, 2010 Sighting # 1

**Initial Sighting on Track**

Time: 11:01 WP#: 12 Lat: 30.036093 Long: -80.609298  
Vertical Angle: 2 Horizontal Bearing in Degrees: 140 Sighting Cue: Splash  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 2  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 11:02 WP#: 13 Lat: 30.037309 Long: -80.606967  
Species: Unidentified Delphinid Numbers (Low/High/Best): 1/1/1  
Features used in Species ID: n/a

Representative images used for Species ID: n/a  
Photographer: No images Frame Numbers: n/a Spacer: n/a  
Calculated Distance from Track Line: 0.3 km

**Final Time and Position of Sighting**

Time: none WP#: n/a Lat: n/a Long: n/a  
Calculated Distance Traveled: n/a

**Behavior and Additional Comments**

Short surface intervals, hard to relocate  

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Thursday, July 29, 2010 Sighting # 2

**Initial Sighting on Track**

Time: 11:43 WP#: 26 Lat: 30.140674 Long: -79.784082  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: Off Track Line: NA Beaufort Sea State: 2  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 11:45 WP#: 27 Lat: 30.136391 Long: -79.783961  
Species: Tursiops truncatus Numbers (Low/High/Best): 8/13/11  
Features used in Species ID: Light colored caudal peduncle, wide flukes, short and stubby rostrum, gray with darker gray cape with cape line close to blow hole  
Representative images used for Species ID: 2034-2036, 2040  
Photographer: RCH Frame Numbers: 2029-2092 Spacer: 2093  
Calculated Distance from Track Line: 0.5 km

**Final Time and Position of Sighting**

Time: 11:55 WP#: 28 Lat: 30.133304 Long: -79.779049  
Calculated Distance Traveled: 0.6 km

**Behavior and Additional Comments**

Spread out group, fast travel  

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Thursday, July 29, 2010 Sighting # 3

**Initial Sighting on Track**

Time: 12:03 WP#: 30 Lat: 30.166684 Long: -80.039347  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 2  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 12:04 WP#: 31 Lat: 30.163065 Long: -80.034489  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 15/20/17  
Features used in Species ID: Light colored caudal peduncle, short and stubby rostrum,  
robust gray dolphins with darker gray cape  
Representative images used for Species ID: 2114, 2125,  
Photographer: RCH Frame Numbers: 2094 to 2141 Spacer: 2142  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: none WP#: n/a Lat: n/a Long: n/a  
Calculated Distance Traveled: n/a

**Behavior and Additional Comments**

Fast surface travel, including leaping in unison. Group split up in smaller sub-groups.

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Thursday, July 29, 2010 Sighting # 4

**Initial Sighting on Track**

Time: 13:03 WP#: 39 Lat: 30.232282 Long: -79.943071  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 5 Beaufort Sea State: 2  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 13:04 WP#: 40 Lat: 30.232059 Long: -79.946156  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 6/8/7  
Features used in Species ID: Robust gray animals, with lighter colored caudal peduncle,  
relatively wide flukes  
Representative images used for Species ID: 2143, 2144, 2158  
Photographer: RCH Frame Numbers: 2143 to 2172 Spacer: 2173  
Calculated Distance from Track Line: 0.3 km

**Final Time and Position of Sighting**

Time: 13:13 WP#: 41 Lat: 30.222435 Long: -79.945056  
Calculated Distance Traveled: 1.0 km

**Behavior and Additional Comments**

Fast travel, barely showing body - difficult to photograph.

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Tuesday, August 3, 2010 Sighting # 1

**Initial Sighting on Track**

Time: 13:49 WP#: 26 Lat: 30.099407 Long: -80.665150  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 3 Beaufort Sea State: 1  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 13:50 WP#: 27 Lat: 30.103074 Long: -80.669104  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8/10/9  
Features used in Species ID: Sturdy gray dolphins, with darker gray dorsal cape, short, stubby rostrum, well-defined crease at base of melon  
Representative images used for Species ID: 2179, 2189, 2190, 2221, 2191  
Photographer: HJF Frame Numbers: 2174-2233 Spacer: 2234  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 13:54 WP#: 28 Lat: 30.101804 Long: -80.668211  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Some leaping observed by two dolphins, rolling, showing bellies.

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Tuesday, August 3, 2010 Sighting # 2

**Initial Sighting on Track**

Time: 13:56 WP#: 30 Lat: 30.099779 Long: -80.604907  
Vertical Angle: 2 Horizontal Bearing in Degrees: 110 Sighting Cue: Body  
On/Off Effort: On Track Line: 3 Beaufort Sea State: 1  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 13:58 WP#: 31 Lat: 30.102898 Long: -80.611146  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 7/9/8  
Features used in Species ID: Robust gray dolphins, broad flukes, well defined crease at base of melon, short and stubby rostrum  
Representative images used for Species ID: 2242-2244  
Photographer: HJF Frame Numbers: 2235-2283 Spacer: 2284  
Calculated Distance from Track Line: 0.7 km

**Final Time and Position of Sighting**

Time: 14:00 WP#: 32 Lat: 30.108929 Long: -80.612981  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

Fairly active group with leaps observed.

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Tuesday, August 3, 2010 Sighting # 3

**Initial Sighting on Track**

Time: 14:18 WP#: 42 Lat: 30.100066 Long: -80.025498  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Body  
On/Off Effort: On Track Line: 3 Beaufort Sea State: 0  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 14:19 WP#: 43 Lat: 30.100609 Long: -80.031909  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4/5/4  
Features used in Species ID: Broad flukes, gray dolphins, well-defined crease at base of melon

Representative images used for Species ID: 2303, 2308  
Photographer: HJF Frame Numbers: 2285-2319 Spacer: 2320  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 14:22 WP#: 44 Lat: 30.102851 Long: -80.031990  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Leisurely travel  

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Tuesday, August 3, 2010 Sighting # 4

**Initial Sighting on Track**

Time: 14:41 WP#: 48 Lat: 30.166306 Long: -80.117655  
Vertical Angle: 2 Horizontal Bearing in Degrees: 140 Sighting Cue: Splash  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 1  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 14:43 WP#: 49 Lat: 30.161981 Long: -80.109361  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 12/15/14  
Features used in Species ID: Broad flukes, gray dolphins with darker gray dorsal cape, light colored caudal peduncle

Representative images used for Species ID: 2352  
Photographer: HJF Frame Numbers: 2321-2362 Spacer: 2363  
Calculated Distance from Track Line: 0.9 km

**Final Time and Position of Sighting**

Time: 14:45 WP#: 50 Lat: 30.162545 Long: -80.111521  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Initial splashing, then subsurface, slow travel. Juvenile present.  

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Tuesday, August 3, 2010 Sighting # 5

**Initial Sighting on Track**

Time: 14:56 WP#: 55 Lat: 30.166536 Long: -80.508454  
Vertical Angle: 3 Horizontal Bearing in Degrees: 45 Sighting Cue: Body  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 1  
Observer: HJF Observer Side: Right

**Actual Time and Position of Sighting**

Time: 14:57 WP#: 56 Lat: 30.174048 Long: -80.522888  
Species: *Stenella frontalis* Numbers (Low/High/Best): 6/7/6  
Features used in Species ID: Alternating light and dark "banding" dorsally, white-tipped beak, spotted pattern observed  
Representative images used for Species ID: 2368, 2378, 2382, 2387, 2396  
Photographer: HJF Frame Numbers: 2364 to 2399 Spacer: 2400  
Calculated Distance from Track Line: 1.6 km

**Final Time and Position of Sighting**

Time: 14:58 WP#: 57 Lat: 30.173667 Long: -80.518857  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

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Tuesday, August 3, 2010 Sighting # 6

**Initial Sighting on Track**

Time: 15:14 WP#: 57 Lat: 30.232668 Long: -80.441607  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Track Line: 5 Beaufort Sea State: 0  
Observer: HJF Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:15 WP#: 69 Lat: 30.227607 Long: -80.443721  
Species: *Stenella frontalis* Numbers (Low/High/Best): 5/6/5  
Features used in Species ID: Long rostrum with white tip, alternating dark and light dorsal "banding"  
Representative images used for Species ID: 2413, 2421  
Photographer: HJF Frame Numbers: 2401 to 2429 Spacer: 2430  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 15:18 WP#: 70 Lat: 30.229359 Long: -80.444142  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

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Tuesday, August 3, 2010 Sighting # 7

**Initial Sighting on Track**

Time: 15:46 WP#: 79 Lat: 30.300425 Long: -80.063086  
Vertical Angle: 3 Horizontal Bearing in Degrees: 135 Sighting Cue: Body  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 2  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 15:46 WP#: 80 Lat: 30.293612 Long: -80.058466  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 20/25/23  
Features used in Species ID: Large black cetaceans with square bulbous melons

Representative images used for Species ID: 2436, 2446, 2453, 2455, 2458  
Photographer: HJF Frame Numbers: 2431 to 2467 Spacer: 2468  
Calculated Distance from Track Line: 0.9 km

**Final Time and Position of Sighting**

Time: 15:48 WP#: 81 Lat: 30.293886 Long: -80.060340  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Lined up in a long line, juveniles observed.

Wednesday, August 4, 2010 Sighting # 1

**Initial Sighting on Track**

Time: 9:29 WP#: 4 Lat: 30.566632 Long: -80.443982  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 10 Beaufort Sea State: 2  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 9:31 WP#: 5 Lat: 30.569290 Long: -80.443675  
Species: *Stenella frontalis* Numbers (Low/High/Best): 8/12/10  
Features used in Species ID: long, white-tipped rostrum and visible spotting pattern

Representative images used for Species ID: 2476, 2483, 2493, 2502  
Photographer: RCH Frame Numbers: 2469 - 2506 Spacer: 2507  
Calculated Distance from Track Line: 0.3 km

**Final Time and Position of Sighting**

Time: 9:34 WP#: 6 Lat: 30.570171 Long: -80.445006  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Several groups of 3-4 individuals spaced widely apart.

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Wednesday, August 4, 2010 Sighting # 2

**Initial Sighting on Track**

Time: 10:06 WP#: 13 Lat: 30.499765 Long: -80.024208  
Vertical Angle: 2 Horizontal Bearing in Degrees: 75 Sighting Cue: Body  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 3  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 10:07 WP#: 14 Lat: 30.503344 Long: -80.022060  
Species: *Grampus griseus* Numbers (Low/High/Best): 13/15/14  
Features used in Species ID: cleft in melon, scarring pattern on animals, tall dorsal fin

Representative images used for Species ID: 2515, 2520, 2547, 2527  
Photographer: RCH Frame Numbers: 2508 - 2547 Spacer: 2548  
Calculated Distance from Track Line: 0.5 km

**Final Time and Position of Sighting**

Time: 10:09 WP#: 15 Lat: 30.506114 Long: -80.022831  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

Large group with individuals fairly close together in duos and trios. No mother/calf pairs observed.

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Wednesday, August 4, 2010 Sighting # 3

**Initial Sighting on Track**

Time: 10:17 WP#: 18 Lat: 30.499877 Long: -80.268265  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 2  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 10:21 WP#: 19 Lat: 30.508844 Long: -80.265349  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3/3/3  
Features used in Species ID: slate gray coloration, broad flukes, robust body, defined crease between melon and snout  
Representative images used for Species ID: 2553, 2554, 2562, 2563  
Photographer: RCH Frame Numbers: 2549 - 2565 Spacer: 2566  
Calculated Distance from Track Line: 1.0 km

**Final Time and Position of Sighting**

Time: 10:22 WP#: 20 Lat: 30.505130 Long: -80.261766  
Calculated Distance Traveled: 0.5 km

**Behavior and Additional Comments**

Trio close together, but very little time spent at the surface. Final 2.42 assumed based on final observed location.

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Wednesday, August 4, 2010 Sighting # 4

**Initial Sighting on Track**

Time: 10:28 WP#: 22 Lat: 30.498333 Long: -80.461189  
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Body  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 2  
Observer: HJF Observer Side: Left

**Actual Time and Position of Sighting**

Time: 10:30 WP#: 23 Lat: 30.492811 Long: -80.456700  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: slate gray coloration, broad flukes, robust body  
Representative images used for Species ID: 2569, 2570, 2585, 2584  
Photographer: RCH Frame Numbers: 2567 - 2587 Spacer: 2588  
Calculated Distance from Track Line: 0.75 km

**Final Time and Position of Sighting**

Time: 10:33 WP#: 24 Lat: 30.497790 Long: -80.452187  
Calculated Distance Traveled: 0.70 km

**Behavior and Additional Comments**

Quick moving; individuals were covering lots of ground. Fairly elusive with little time spent at the surface. Traveled from south of the trackline to north of the trackline.

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Wednesday, August 4, 2010 Sighting # 5

**Initial Sighting on Track**

Time: 10:52 WP#: 30 Lat: 30.433109 Long: -80.422447  
Vertical Angle: 2 Horizontal Bearing in Degrees: 120 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 1  
Observer: HJF Observer Side: Left

**Actual Time and Position of Sighting**

Time: 10:53 WP#: 31 Lat: 30.428820 Long: -80.410074  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: robust bodies with broad flukes, slate gray coloration

Representative images used for Species ID: 2599, 2600, 2603, 2604  
Photographer: RCH Frame Numbers: 2589 - 2606 Spacer: 2607  
Calculated Distance from Track Line: 1.3 km

**Final Time and Position of Sighting**

Time: 10:55 WP#: 32 Lat: 30.426969 Long: -80.406694  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

Very quick travel observed. Individuals were mostly subsurface with quick breaths while swimming.

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Wednesday, August 4, 2010 Sighting # 6

**Initial Sighting on Track**

Time: 10:57 WP#: 38 Lat: 30.433162 Long: -80.385133  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 1  
Observer: HJF Observer Side: Left

**Actual Time and Position of Sighting**

Time: 11:00 WP#: 34 Lat: 30.435945 Long: -80.390245  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 2/3/3  
Features used in Species ID: large, robust bodies with slate gray coloration, defined crease between melon and rostrum, broad flukes

Representative images used for Species ID: 2615, 2621, 2622, 2623  
Photographer: RCH Frame Numbers: 2608 - 2626 Spacer: 2627  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 11:01 WP#: 35 Lat: 30.435452 Long: -80.386525  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

At least one mother/juvenile pair observed. Animals were elusive and difficult to photograph with lots of subsurface travel.

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Wednesday, August 4, 2010 Sighting # 7

**Initial Sighting on Track**

Time: 11:04 WP#: 37 Lat: 30.433262 Long: -80.298047  
Vertical Angle: 1 Horizontal Bearing in Degrees: 145 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 1  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 11:11 WP#: 38 Lat: 30.431232 Long: -80.311753  
Species: Unidentified Delphinid Numbers (Low/High/Best): 1/1/1  
Features used in Species ID: N/A

Representative images used for Species ID: N/A  
Photographer: N/A Frame Numbers: N/A Spacer: N/A  
Calculated Distance from Track Line: N/A

**Final Time and Position of Sighting**

Time: N/A WP#: N/A Lat: N/A Long: N/A  
Calculated Distance Traveled: N/A

**Behavior and Additional Comments**

Animal was elusive and never relocated for photo documentation.  
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Wednesday, August 4, 2010 Sighting # 8

**Initial Sighting on Track**

Time: 11:43 WP#: 46 Lat: 30.366118 Long: -80.206106  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 7 Beaufort Sea State: 3  
Observer: HJF Observer Side: Left

**Actual Time and Position of Sighting**

Time: 11:46 WP#: 47 Lat: 30.365388 Long: -80.204530  
Species: Tursiops truncatus Numbers (Low/High/Best): 11/14/12  
Features used in Species ID: stout bodies, uniform gray coloration with dark gray cape, broad flukes

Representative images used for Species ID: 2642, 2660, 2634, 2665  
Photographer: RCH Frame Numbers: 2628 - 2678 Spacer: 2679  
Calculated Distance from Track Line: 0.2 km

**Final Time and Position of Sighting**

Time: 11:47 WP#: 48 Lat: 30.361074 Long: -80.203204  
Calculated Distance Traveled: 0.5 km

**Behavior and Additional Comments**

Two groups packed fairly tight with lots of surface activity and feeding observed.  
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Wednesday, August 4, 2010 Sighting # 9

**Initial Sighting on Track**

Time: 12:10 WP#: 59 Lat: 30.302369 Long: -80.562138  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 1  
Observer: HJF Observer Side: Left

**Actual Time and Position of Sighting**

Time: 12:16 WP#: 60 Lat: 30.302515 Long: -80.573540  
Species: *Stenella frontalis* Numbers (Low/High/Best): 2/3/3  
Features used in Species ID: spotted pattern, long white-tipped rostrum, alternating light and dark banding  
Representative images used for Species ID: 2680, 2681, 2694  
Photographer: RCH Frame Numbers: 2680 - 2696 Spacer: 2696  
Calculated Distance from Track Line: 1.1 km

**Final Time and Position of Sighting**

Time: 12:18 WP#: 61 Lat: 30.306569 Long: -80.567389  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

Individuals were widely spread out.  
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Wednesday, August 4, 2010 Sighting # 10

**Initial Sighting on Track**

Time: 13:09 WP#: 78 Lat: 30.232690 Long: -80.622519  
Vertical Angle: 1 Horizontal Bearing in Degrees: 110 Sighting Cue: Body  
On/Off Effort: On Track Line: 5 Beaufort Sea State: 1  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 13:10 WP#: 79 Lat: 30.235185 Long: -80.625116  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4/6/5  
Features used in Species ID: slate gray coloration with dark gray cape, defined melon, and broad flukes  
Representative images used for Species ID: 2698, 2703, 2715  
Photographer: RCH Frame Numbers: 2698 - 2715 Spacer: 2716  
Calculated Distance from Track Line: 0.3 km

**Final Time and Position of Sighting**

Time: 13:17 WP#: 81 Lat: 30.240662 Long: -80.621428  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

At least one mom/calf pair and a single individual observed diving frequently and fairly deep.  
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Wednesday, August 4, 2010 Sighting # 11

**Initial Sighting on Track**

Time: 13:19 WP#: 77 Lat: 30.232586 Long: -80.656360  
Vertical Angle: 1 Horizontal Bearing in Degrees: 95 Sighting Cue: Body  
On/Off Effort: On Track Line: 5 Beaufort Sea State: 1  
Observer: HJF Observer Side: Left

**Actual Time and Position of Sighting**

Time: 13:20 WP#: 83 Lat: 30.230547 Long: -80.650354  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4/6/5  
Features used in Species ID: robust bodies with gray coloration, defined melon and broad flukes  
Representative images used for Species ID: 2717, 2721, 2730, 2731  
Photographer: RCH Frame Numbers: 2717 - 2732 Spacer: 2733  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 13:21 WP#: 84 Lat: 30.226300 Long: -80.655421  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

One to two mom/calf pairs observed. Animals were spaced widely apart with very little time spent at the surface of the water.

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Wednesday, August 4, 2010 Sighting # 12

**Initial Sighting on Track**

Time: 15:02 WP#: 93 Lat: 30.165946 Long: -80.545882  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 1  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:03 WP#: 94 Lat: 30.157833 Long: -80.547499  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 6/8/7  
Features used in Species ID: slate gray coloration on robust, large bodies with broad flukes, dark gray cape  
Representative images used for Species ID: 2759, 2763, 2764, 2765  
Photographer: RCH Frame Numbers: 2734 - 2765 Spacer: 2766  
Calculated Distance from Track Line: 0.9 km

**Final Time and Position of Sighting**

Time: 15:06 WP#: 95 Lat: 30.156846 Long: -80.546041  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

One to two mom/calf pairs observed.

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Wednesday, August 4, 2010 Sighting # 13

**Initial Sighting on Track**

Time: 16:23 WP#: 111 Lat: 30.031227 Long: -79.922885  
Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 2  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 16:25 WP#: 112 Lat: 30.029908 Long: -79.927285  
Species: *Grampus griseus* Numbers (Low/High/Best): 12/16/14  
Features used in Species ID: scarring visible on bodies, cleft in melon, tall, large dorsal fin

Representative images used for Species ID: 2779, 2780, 2786, 2787  
Photographer: RCH Frame Numbers: 2767 - 2788 Spacer: 2789  
Calculated Distance from Track Line: 0.5 km

**Final Time and Position of Sighting**

Time: 16:26 WP#: 113 Lat: 30.026840 Long: -79.930050  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

Lots of duos and trios observed diving with very little time spent at the water's surface.

Wednesday, August 4, 2010 Sighting # 14

**Initial Sighting on Track**

Time: 16:32 WP#: 116 Lat: 29.992618 Long: -79.759833  
Vertical Angle: 2 Horizontal Bearing in Degrees: 135 Sighting Cue: Body  
On/Off Effort: Off Track Line: between 1&2 Beaufort Sea State: 2  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 16:34 WP#: 117 Lat: 30.003451 Long: -79.761480  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 13/15/14  
Features used in Species ID: large black animals with square, bulbous, large-based melons

Representative images used for Species ID: 2791, 2792, 2800, 2801  
Photographer: RCH Frame Numbers: 2788 - 2806 Spacer: 2807  
Calculated Distance from Track Line: 1.2 km-off

**Final Time and Position of Sighting**

Time: 16:35 WP#: 118 Lat: 30.001405 Long: -79.760326  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

A close group of duos and trios.

Thursday, August 5, 2010 Sighting # 1

**Initial Sighting on Track**

Time: 10:01 WP#: 8 Lat: 30.433442 Long: -80.012274  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 2  
Observer: HJF Observer Side: Right

**Actual Time and Position of Sighting**

Time: 10:03 WP#: 9 Lat: 30.438946 Long: -80.008208  
Species: *Grampus griseus* Numbers (Low/High/Best): 38/44/41  
Features used in Species ID: Overall white coloration, visible scarring, rounded head with cleft

Representative images used for Species ID: 2815, 2819, 2826  
Photographer: HJF Frame Numbers: 2808-2835 Spacer: 2836  
Calculated Distance from Track Line: 0.7 km

**Final Time and Position of Sighting**

Time: 10:04 WP#: 10 Lat: 30.436028 Long: -80.011669  
Calculated Distance Traveled: 0.5 km

**Behavior and Additional Comments**

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Wednesday, September 8, 2010 Sighting # 1

**Initial Sighting on Track**

Time: 12:53 WP#: 3 Lat: 29.966991 Long: -80.580044  
Vertical Angle: 1 Horizontal Bearing in Degrees: 110 Sighting Cue: Body  
On/Off Effort: On Track Line: 1 Beaufort Sea State: 1  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 12:54 WP#: 4 Lat: 29.965209 Long: -80.584939  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3/4/3  
Features used in Species ID: Broad flukes, distinctly darker gray cape, robust bodies  
crease at bottom of melon clearly visible  
Representative images used for Species ID: 2842, 2843, 2848, 2849, 2856  
Photographer: REH Frame Numbers: 2841-2861 Spacer: 2861  
Calculated Distance from Track Line: 0.5 km

**Final Time and Position of Sighting**

Time: 13:06 WP#: 5 Lat: 29.965133 Long: -80.585026  
Calculated Distance Traveled: 0.01 km

**Behavior and Additional Comments**

Skittish - possible avoidance behavior - count as a "take". One calf observed in group. Multiple  
birds feeding on a concentration of fish in the area.

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Wednesday, September 8, 2010 Sighting # 2

**Initial Sighting on Track**

Time: 13:21 WP#: 9 Lat: 29.967653 Long: -80.076484  
Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: Splash  
On/Off Effort: On Track Line: 1 Beaufort Sea State: 1  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 13:21 WP#: 10 Lat: 29.958024 Long: -80.078054  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 15/25/20  
Features used in Species ID: Large black cetaceans with elongated bodies, and square  
bulbous foreheads  
Representative images used for Species ID: 2862, 2864-2867  
Photographer: REH Frame Numbers: 2862-2867 Spacer: 2869  
Calculated Distance from Track Line: 1.0 km

**Final Time and Position of Sighting**

Time: 13:40 WP#: 11 Lat: 29.946080 Long: -80.095558  
Calculated Distance Traveled: 2.1 km

**Behavior and Additional Comments**

Note: Final time and position is estimated (2.41) since the animals were not relocated for an  
actual final time/location. Animals in three, roughly equally sized groups. One group very tightly  
packed. SW overall direction of travel. Lost animals, searched for ca: 10 min, then took 2.41.

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Wednesday, September 8, 2010 Sighting # 3

**Initial Sighting on Track**

Time: 14:41 WP#: 24 Lat: 30.101830 Long: -80.036194  
Vertical Angle: 2 Horizontal Bearing in Degrees: 75 Sighting Cue: Body  
On/Off Effort: On Track Line: 3 Beaufort Sea State: 1  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 14:45 WP#: 25 Lat: 30.101518 Long: -80.033725  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): Gm: 20/40/30  
Features used in Species ID: Globicephala: black large cetaceans, with broad base dorsal fins, and large, square heads, Tursiops; gray robust dolphins, well-defined crease at base of melon  
Representative images used for Species ID: Glo. :2940-2942, 2955, 2959; Ttr: 2876-2877, 2880  
Photographer: REH Frame Numbers: 2870-3027 Spacer: 3028  
Calculated Distance from Track Line: 0.2 km

**Final Time and Position of Sighting**

Time: 15:28 WP#: 27 Lat: 30.144226 Long: -80.007934  
Calculated Distance Traveled: 5.3 km

**Behavior and Additional Comments**

Mixed group of Globicephala and Tursiops, or at least in close proximity. Active animals, fast travel. Several Gma calves. Tursiops and pilot whales in same image: 2876-2879. Group sizes: Globicephala: 20/40/30, Tursiops: 3/10/6. Hard to follow, lost animals several times.

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Wednesday, September 8, 2010 Sighting # 4

**Initial Sighting on Track**

Time: 15:38 WP#: 30 Lat: 30.151249 Long: -79.776363  
Vertical Angle: 2 Horizontal Bearing in Degrees: 105 Sighting Cue: Body  
On/Off Effort: Off Track Line: B/T TL 3 & 4 Beaufort Sea State: 1  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:39 WP#: 31 Lat: 30.152859 Long: -79.769391  
Species: *Grampus griseus* Numbers (Low/High/Best): 13/25/19  
Features used in Species ID: Large dolphins with blunt head with cleft in melon, many animals scarred, coloration ranging from dark gray to a very light, almost white gray, relatively tall dorsal  
Representative images used for Species ID: 3037, 3054, 3063-3065  
Photographer: REH Frame Numbers: 3029-3067 Spacer: 3068  
Calculated Distance from Track Line: off effort

**Final Time and Position of Sighting**

Time: 15:41 WP#: 32 Lat: 30.152791 Long: -79.772249  
Calculated Distance Traveled: off effort

**Behavior and Additional Comments**

Off-effort sighting during transit between off-shore ends of track lines 3 and 4. Medium paced travel, mainly sub-surface.

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Wednesday, September 8, 2010 Sighting # 5

**Initial Sighting on Track**

Time: 15:51 WP#: 34 Lat: 30.164957 Long: -80.102705  
Vertical Angle: 1 Horizontal Bearing in Degrees: 75 Sighting Cue: Body  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 1  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:53 WP#: 35 Lat: 30.166545 Long: -80.104081  
Species: Grampus griseus Numbers (Low/High/Best): 30/45/37  
Features used in Species ID: Large dolphins, gray dorsally with lighter colored "suspenders",  
bulbous heads with cleft in melon, variable coloration, some scarring apparent  
Representative images used for Species ID: 3072-3078  
Photographer: REH Frame Numbers: 3069-3080 Spacer: 3081  
Calculated Distance from Track Line: 0.2 km

**Final Time and Position of Sighting**

Time: 15:55 WP#: 36 Lat: 30.167249 Long: -80.103061  
Calculated Distance Traveled: 0.1 km

**Behavior and Additional Comments**

Fast travel, "rooster-tailing".  
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Thursday, September 9, 2010 Sighting # 1

**Initial Sighting on Track**

Time: 8:48 WP#: 7 Lat: 30.568120 Long: -80.479944  
Vertical Angle: 1 Horizontal Bearing in Degrees: 110 Sighting Cue: Splash  
On/Off Effort: On Track Line: 10 Beaufort Sea State: 1  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 8:49 WP#: 8 Lat: 30.559272 Long: -80.481691  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 6/7/6  
Features used in Species ID: Broad flukes, short stubby rostrum, gray animals with darker gray cape  
Representative images used for Species ID: 3092, 3094, 3109, 3119  
Photographer: RCH Frame Numbers: 3082 to 3136 Spacer: 3137  
Calculated Distance from Track Line: 1.0 km

**Final Time and Position of Sighting**

Time: 8:58 WP#: 9 Lat: 30.559037 Long: -80.472018  
Calculated Distance Traveled: 0.9 km

**Behavior and Additional Comments**

Animals were porpoising and active at the surface and started making deeper dives after a few minutes of circling- possible avoidance. Calves were present.

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Thursday, September 9, 2010 Sighting # 2

**Initial Sighting on Track**

Time: 9:01 WP#: 12 Lat: 30.568486 Long: -80.388614  
Vertical Angle: 2 Horizontal Bearing in Degrees: 75 Sighting Cue: Body  
On/Off Effort: On Track Line: 10 Beaufort Sea State: 1  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 9:02 WP#: 13 Lat: 30.561181 Long: -80.384668  
Species: *Stenella frontalis* Numbers (Low/High/Best): 11/11/11  
Features used in Species ID: Alternating light and dark "banding" dorsally, long white-tipped rostrum, slender caudal peduncle  
Representative images used for Species ID: 3144, 3146, 3147, 3157, 3159  
Photographer: RCH Frame Numbers: 3138 to 3185 Spacer: 3186  
Calculated Distance from Track Line: 0.9 km

**Final Time and Position of Sighting**

Time: 9:08 WP#: 14 Lat: 30.569044 Long: -80.385824  
Calculated Distance Traveled: 0.9 km

**Behavior and Additional Comments**

2 sub-groups of 2 and 9 animals. Porpoising and active at the surface, one group was tightly grouped. Some jumping observed. Calves were present.

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Thursday, September 9, 2010 Sighting # 3

**Initial Sighting on Track**

Time: 9:11 WP#: 17 Lat: 30.568664 Long: -80.306548  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 10 Beaufort Sea State: 1  
Observer: REH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 9:12 WP#: 18 Lat: 30.570181 Long: -80.307318  
Species: *Stenella frontalis* Numbers (Low/High/Best): 18/20/20  
Features used in Species ID: Alternating light and dark "banding", spotted pattern, white-tipped beak  
Representative images used for Species ID: 3209, 3215, 3216  
Photographer: RCH Frame Numbers: 3187 to 3232 Spacer: 3233  
Calculated Distance from Track Line: 0.2 km

**Final Time and Position of Sighting**

Time: 9:23 WP#: 19 Lat: 30.571372 Long: -80.308883  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Animals spread out, multiple direction of travel. Energetic porpoising. In sub-groups of 2 to 4.

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Thursday, September 9, 2010 Sighting # 4

**Initial Sighting on Track**

Time: 11:16 WP#: 34 Lat: 30.497842 Long: -80.634766  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 1  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 11:17 WP#: 35 Lat: 30.502875 Long: -80.628567  
Species: *Stenella frontalis* Numbers (Low/High/Best): 4/5/5  
Features used in Species ID: Spotted pattern, long and white-tipped rostrum  
Representative images used for Species ID: 3234, 3247, 3248, 3249  
Photographer: RCH Frame Numbers: 3234 to 3256 Spacer: 3257  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 11:22 WP#: 36 Lat: 30.502546 Long: -80.625706  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

Foraging, spread out and energetic, multi-directional travel. Other animals present: birds & fish.

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Thursday, September 9, 2010 Sighting # 5

**Initial Sighting on Track**

Time: 11:25 WP#: 38 Lat: 30.497642 Long: -80.690207  
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 1  
Observer: REH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 11:28 WP#: 39 Lat: 30.500845 Long: -80.681718  
Species: *Stenella frontalis* Numbers (Low/High/Best): 19/19/19  
Features used in Species ID: Long, white-tipped rostrum, spotted pattern, alternating light and dark "banding" dorsally  
Representative images used for Species ID: 3301, 3305, 3306, 3307, 3311, 3312, 3314  
Photographer: RCH Frame Numbers: 32598 - 3315 Spacer: 3316  
Calculated Distance from Track Line: 0.9 km

**Final Time and Position of Sighting**

Time: 11:36 WP#: 40 Lat: 30.488969 Long: -80.683587  
Calculated Distance Traveled: 1.3 km

**Behavior and Additional Comments**

Circled on 2 mother/calf pairs before locating another group of 15 animals.  
2-3 Dco were also present.

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Thursday, September 9, 2010 Sighting # 6

**Initial Sighting on Track**

Time: 11:43 WP#: 45 Lat: 30.434568 Long: -80.555706  
Vertical Angle: 2 Horizontal Bearing in Degrees: 85 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 1  
Observer: REH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 11:45 WP#: 46 Lat: 30.438106 Long: -80.552150  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3/6/6  
Features used in Species ID: Robust, gray animals with broad flukes and short, stubby rostrums  
Representative images used for Species ID: 3331, 3332, 3333, 3336  
Photographer: RCH Frame Numbers: 3317 - 3341 Spacer: 3342  
Calculated Distance from Track Line: 0.5 km

**Final Time and Position of Sighting**

Time: 11:52 WP#: 47 Lat: 30.435896 Long: -80.543466  
Calculated Distance Traveled: 0.9 km

**Behavior and Additional Comments**

Animals were possibly foraging. Birds were present and plunge-diving. Two Dco also present.

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Thursday, September 9, 2010 Sighting # 7

**Initial Sighting on Track**

Time: 12:33 WP#: 58 Lat: 30.364541 Long: -80.317237  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 7 Beaufort Sea State: 1  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 12:36 WP#: 59 Lat: 30.369277 Long: -80.314187  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 15/25/20  
Features used in Species ID: Broad flukes, gray body with darker gray cape, crease at base of melon, short and stubby rostrum  
Representative images used for Species ID: 3353, 3380, 3390, 3472  
Photographer: RCH Frame Numbers: 3343 - 3485 Spacer: 3485  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 12:56 WP#: 60 Lat: 30.361255 Long: -80.328629  
Calculated Distance Traveled: 1.6 km

**Behavior and Additional Comments**

Multiple sub-groups, very active, lots of splashing. Some possible avoidance.  
Cca also present.

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Thursday, September 9, 2010 Sighting # 8

**Initial Sighting on Track**

Time: 13:06 WP#: 63 Lat: 30.363942 Long: -80.661456  
Vertical Angle: 2 Horizontal Bearing in Degrees: 120 Sighting Cue: Body  
On/Off Effort: On Track Line: 7 Beaufort Sea State: 1  
Observer: REH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 13:10 WP#: 64 Lat: 30.355374 Long: -80.663553  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 5/8/6  
Features used in Species ID: Gray body with darker gray cape, broad flukes, short and stubby rostrum  
Representative images used for Species ID: 3522, 3523, 3524, 3525  
Photographer: RCH Frame Numbers: 3486 - 3527 Spacer: 3528  
Calculated Distance from Track Line: 1.0 km

**Final Time and Position of Sighting**

Time: 13:18 WP#: 65 Lat: 30.362913 Long: -80.657331  
Calculated Distance Traveled: 1.0 km

**Behavior and Additional Comments**

Animals were elusive, possibly foraging. Fish and turtles (2Cca, 1Dco) were present.

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Thursday, September 9, 2010 Sighting # 9

**Initial Sighting on Track**

Time: 14:59 WP#: 74 Lat: 30.301295 Long: -80.636374  
Vertical Angle: 3 Horizontal Bearing in Degrees: 110 Sighting Cue: Splash  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 1  
Observer: REH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 15:01 WP#: 75 Lat: 30.307905 Long: -80.637999  
Species: *Stenella frontalis* Numbers (Low/High/Best): 17/30/27  
Features used in Species ID: Alternating light and dark "banding", white-tipped rostrum, spots

Representative images used for Species ID: 3539-3544, 3601, 3602  
Photographer: RCH Frame Numbers: 3529 - 3641 Spacer: 3641  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 15:07 WP#: 77 Lat: 30.312839 Long: -80.634428  
Calculated Distance Traveled: 0.6 km

**Behavior and Additional Comments**

2 sub-groups, some animals in one group were extremely active- changing direction, lots of splashing and thrashing, circling.  
Birds and 1 Dco were also present.

Thursday, September 9, 2010 Sighting # 10

**Initial Sighting on Track**

Time: 15:09 WP#: 79 Lat: 30.301579 Long: -80.564921  
Vertical Angle: 2 Horizontal Bearing in Degrees: 130 Sighting Cue: Other\*  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 1  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:11 WP#: 80 Lat: 30.285440 Long: -80.572777  
Species: *Stenella frontalis* Numbers (Low/High/Best): 20/22/22  
Features used in Species ID: Alternating light and dark "banding" dorsally, slender, white-tipped rostrums

Representative images used for Species ID: 3668, 3672, 3674, 3675, 3676  
Photographer: RCH Frame Numbers: 3642 - 3683 Spacer: 3684  
Calculated Distance from Track Line: 1.9 km

**Final Time and Position of Sighting**

Time: 15:15 WP#: 81 Lat: 30.285433 Long: -80.580083  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

Animals were moving very quickly, one direction of travel. Calves were present.  
Cca, Dco and birds were also present.  
\*Other cue is for birds.

Thursday, September 9, 2010 Sighting # 11

**Initial Sighting on Track**

Time: 15:22 WP#: 85 Lat: 30.301929 Long: -80.333509  
Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: Splash  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 0  
Observer: REH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 15:24 WP#: 86 Lat: 30.302525 Long: -80.331754  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4/9/8  
Features used in Species ID: Robust, gray animals with broad flukes and short, stubby rostrums  
Representative images used for Species ID: 3700-3702  
Photographer: RCH Frame Numbers: 3685-3707 Spacer: 3707  
Calculated Distance from Track Line: 0.2 km

**Final Time and Position of Sighting**

Time: 15:36 WP#: 87 Lat: 30.302542 Long: -80.338405  
Calculated Distance Traveled: 0.6 km

**Behavior and Additional Comments**

Small sub-groups spread out.  
Cca present.

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Thursday, September 9, 2010 Sighting # 12

**Initial Sighting on Track**

Time: 15:39 WP#: 90 Lat: 30.302095 Long: -80.226422  
Vertical Angle: 2 Horizontal Bearing in Degrees: 120 Sighting Cue: Splash  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 1  
Observer: REH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 15:41 WP#: 91 Lat: 30.306444 Long: -80.233738  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8/9/9  
Features used in Species ID: Overall gray color, short rostrums, broad flukes, obvious crease at base of melon  
Representative images used for Species ID: 3716, 3721, 3722  
Photographer: RCH Frame Numbers: 3708 - 3724 Spacer: 3725  
Calculated Distance from Track Line: 0.9 km

**Final Time and Position of Sighting**

Time: 15:47 WP#: 93 Lat: 30.305116 Long: -80.233048  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

One group, slow single direction of travel. Calves were present.

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Thursday, September 9, 2010 Sighting # 13

**Initial Sighting on Track**

Time: 15:53 WP#: 95 Lat: 30.301531 Long: -80.000819  
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Body  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 1  
Observer: REH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 15:55 WP#: 96 Lat: 30.306173 Long: -80.002039  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 21/21/21  
Features used in Species ID: Large black animals, with bulbous melons and broad-based dorsal fins  
Representative images used for Species ID: 3732, 3733, 3739, 3746  
Photographer: RCH Frame Numbers: 3726 - 3767 Spacer: 3768  
Calculated Distance from Track Line: 0.5 km

**Final Time and Position of Sighting**

Time: 15:59 WP#: 97 Lat: 30.308835 Long: -79.995754  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

Calves present. Two sub-groups of animals.  
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Thursday, September 9, 2010 Sighting # 14

**Initial Sighting on Track**

Time: NA WP#: NA Lat: NA Long: NA  
Vertical Angle: \_\_\_\_\_ Horizontal Bearing in Degrees: \_\_\_\_\_ Sighting Cue: Body  
On/Off Effort: Off Track Line: btw 6 & 5 Beaufort Sea State: 1  
Observer: REH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 16:08 WP#: 100 Lat: 30.259573 Long: -79.765893  
Species: *Grampus griseus* Numbers (Low/High/Best): 23/30/27  
Features used in Species ID: Robust dolphins with square foreheads, lighter colored "suspenders" on flanks when viewed from above, variable whitish, grey to almost black color  
Representative images used for Species ID: 3769, 3780, 3783, 3787  
Photographer: RCH Frame Numbers: 3769-3790 Spacer: 3791  
Calculated Distance from Track Line: \_\_\_\_\_

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: \_\_\_\_\_ Long: \_\_\_\_\_  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

Off-effort, hence, only one way point taken for the encounter. Calves present.  
\_\_\_\_\_  
\_\_\_\_\_

Thursday, September 9, 2010 Sighting # 15

**Initial Sighting on Track**

Time: NA WP#: NA Lat: \_\_\_\_\_ Long: \_\_\_\_\_  
Vertical Angle: \_\_\_\_\_ Horizontal Bearing in Degrees: \_\_\_\_\_ Sighting Cue: Body  
On/Off Effort: Off Track Line: btw 4 & 3 Beaufort Sea State: 1  
Observer: REH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 17:14 WP#: 114 Lat: 30.110498 Long: -79.790738  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8/10/10  
Features used in Species ID: Crease at base of melon, short rostrum, gray with darker gray cape, broad flukes  
Representative images used for Species ID: 3792, 3793, 3797, 3801, 3802  
Photographer: RCH Frame Numbers: 3792-3805 Spacer: 3806  
Calculated Distance from Track Line: \_\_\_\_\_

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: \_\_\_\_\_ Long: \_\_\_\_\_  
Calculated Distance Traveled: \_\_\_\_\_

**Behavior and Additional Comments**

Very energetic, lots of splashing and porpoising. Calves were present. Dark animals with light peduncle patch. Off effort, only one way point taken.

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Thursday, September 9, 2010 Sighting # 16

**Initial Sighting on Track**

Time: 17:26 WP#: 116 Lat: 30.098959 Long: -80.076030  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 3 Beaufort Sea State: 1  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 17:27 WP#: 117 Lat: 30.104426 Long: -80.076755  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 18/30/25  
Features used in Species ID: Gray with darker gray cape, broad flukes, short and stubby rostrum  
Representative images used for Species ID: 3825 - 3827, 3843 - 3846  
Photographer: RCH Frame Numbers: 3807-3846 Spacer: 3847  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 17:31 WP#: 118 Lat: 30.115523 Long: -80.076053  
Calculated Distance Traveled: 1.2 km

**Behavior and Additional Comments**

Multiple sub-groups and singletons and pairs. Calves present.

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Monday, October 18, 2010 Sighting # 1

**Initial Sighting on Track**

Time: 12:30 WP#: 5 Lat: 29.964595 Long: -80.539575  
Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: 3  
On/Off Effort: On Track Line: 1 Beaufort Sea State: 1  
Observer: HJF Observer Side: Right

**Actual Time and Position of Sighting**

Time: 12:32 WP#: 6 Lat: 29.955300 Long: -80.533353  
Species: *Stenella frontalis* Numbers (Low/High/Best): 14/15/14  
Features used in Species ID: Spotted body, long and white tipped beak,

Representative images used for Species ID: 4145, 4155, 4156, 4161, 4165  
Photographer: HJF Frame Numbers: 4141-4169 Spacer: 4169  
Calculated Distance from Track Line: 1.2 km

**Final Time and Position of Sighting**

Time: 12:33 WP#: 7 Lat: 29.958640 Long: -80.536879  
Calculated Distance Traveled: 0.5 km

**Behavior and Additional Comments**

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\_\_\_\_\_  
\_\_\_\_\_

Monday, October 18, 2010 Sighting # 2

**Initial Sighting on Track**

Time: 13:01 WP#: 18 Lat: 30.032547 Long: -79.956286  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 1  
Observer: HJF Observer Side: Right

**Actual Time and Position of Sighting**

Time: 13:02 WP#: 19 Lat: 30.038068 Long: -79.950917  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8/8/8  
Features used in Species ID: Robust dolphins with elongated bodies, relatively short snouts, gray body color with darker gray dorsal cape  
Representative images used for Species ID: 4170, 4183, 4184, 4190, 4192  
Photographer: HJF Frame Numbers: 4170 to 4193 Spacer: 4194  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 13:05 WP#: 20 Lat: 30.035505 Long: -79.953804  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

Throwing around a lot of white water, some leaping at the end of the encounter  
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\_\_\_\_\_



Monday, October 18, 2010 Sighting # 3

**Initial Sighting on Track**

Time: 13:27 WP#: 24 Lat: 30.030517 Long: -80.516704  
Vertical Angle: 3 Horizontal Bearing in Degrees: 120 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 1  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 13:28 WP#: 25 Lat: 30.025375 Long: -80.512558  
Species: *Steno bredanensis* Numbers (Low/High/Best): 40/50/45  
Features used in Species ID: Absence of a distinct melon, white lower jaw, "hour glass" shaped dorsal cape,  
Representative images used for Species ID: 4204, 4209, 4217, 4236, 4239  
Photographer: HJF Frame Numbers: 4195-4241 Spacer: 40/50/45  
Calculated Distance from Track Line: 0.7 km

**Final Time and Position of Sighting**

Time: 13:30 WP#: 26 Lat: 30.018592 Long: -80.507421  
Calculated Distance Traveled: 0.9 km

**Behavior and Additional Comments**

Many sub-groups, spread out, lots of splashing  
\_\_\_\_\_  
\_\_\_\_\_

Monday, October 18, 2010 Sighting # 4

**Initial Sighting on Track**

Time: 13:44 WP#: 33 Lat: 30.093749 Long: -80.680797  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Track Line: 3 Beaufort Sea State: 1  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 13:45 WP#: 34 Lat: 30.101437 Long: -80.691499  
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: \_\_\_\_\_  
Representative images used for Species ID: 4818 - 4822  
Photographer: HJF Frame Numbers: 4816 - 4822 Spacer: 4824  
Calculated Distance from Track Line: 1.3 km

**Final Time and Position of Sighting**

Time: n/a WP#: n/a Lat: n/a Long: n/a  
Calculated Distance Traveled: n/a

**Behavior and Additional Comments**

Final position not taken. Animals uncooperative and difficult to work.  
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\_\_\_\_\_

Monday, October 18, 2010 Sighting # 5

**Initial Sighting on Track**

Time: 14:13 WP#: 42 Lat: 30.100658 Long: -80.010955  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Track Line: 3 Beaufort Sea State: 1  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 14:14 WP#: 43 Lat: 30.105502 Long: -80.013435  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 7/9/8  
Features used in Species ID: Short and stubby rostrums, robust and gray dolphins, large flukes  
Representative images used for Species ID: 4833, 4836, 4837, 4839, 4840  
Photographer: HJF Frame Numbers: 4825-4846 Spacer: 4847  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 14:16 WP#: 44 Lat: 30.104476 Long: -80.010561  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

Medium-paced travel  
\_\_\_\_\_  
\_\_\_\_\_

Monday, October 18, 2010 Sighting # 6

**Initial Sighting on Track**

Time: 14:17 WP#: 46 Lat: 30.099569 Long: -79.995947  
Vertical Angle: 1 Horizontal Bearing in Degrees: 110 Sighting Cue: Body  
On/Off Effort: On Track Line: 3 Beaufort Sea State: 1  
Observer: HJF Observer Side: Right

**Actual Time and Position of Sighting**

Time: 14:20 WP#: 47 Lat: 30.095035 Long: -80.001863  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 6/10/8  
Features used in Species ID: Overall gray coloration with darker gray dorsal capes, broad flukes, short rostrums  
Representative images used for Species ID: 4862, 4864, 4872, 4877, 4885  
Photographer: HJF Frame Numbers: 4848-4885 Spacer: 4886  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 14:23 WP#: 48 Lat: 30.102304 Long: -80.005149  
Calculated Distance Traveled: 0.9 km

**Behavior and Additional Comments**

Smaller sub-groups - spread out  
\_\_\_\_\_  
\_\_\_\_\_

Monday, October 18, 2010 Sighting # 7

**Initial Sighting on Track**

Time: 14:36 WP#: 53 Lat: 30.167474 Long: -79.893239  
Vertical Angle: 2 Horizontal Bearing in Degrees: 70 Sighting Cue: Body  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 1  
Observer: HJF Observer Side: Right

**Actual Time and Position of Sighting**

Time: 14:36 WP#: 54 Lat: 30.173050 Long: -79.894166  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 9/13/11  
Features used in Species ID: Large black cetaceans with bulbous foreheads, broad-based dorsal fins  
Representative images used for Species ID: 4894, 4895, 4898, 4899  
Photographer: HJF Frame Numbers: 4887-4899 Spacer: 4900  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 14:39 WP#: 55 Lat: 30.170570 Long: -79.895986  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

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Monday, October 18, 2010 Sighting # 8

**Initial Sighting on Track**

Time: 14:44 WP#: 57 Lat: 30.171362 Long: -80.072027  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 1  
Observer: HJF Observer Side: Right

**Actual Time and Position of Sighting**

Time: 14:46 WP#: 58 Lat: 30.170842 Long: -80.066972  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4/4/4  
Features used in Species ID: Gray dolphins with darker gray cape, broad flukes, short and stubby rostrums  
Representative images used for Species ID: 4907 to 4910  
Photographer: HJF Frame Numbers: 4901-4913 Spacer: 4914  
Calculated Distance from Track Line: 0.5 km

**Final Time and Position of Sighting**

Time: n/a WP#: n/a Lat: n/a Long: n/a  
Calculated Distance Traveled: n/a

**Behavior and Additional Comments**

Final position not obtained. Two mother/calf pairs observed.

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Monday, October 18, 2010 Sighting # 9

**Initial Sighting on Track**

Time: 15:02 WP#: 64 Lat: 30.162535 Long: -80.474755

Vertical Angle: 2 Horizontal Bearing in Degrees: 120 Sighting Cue: 3

On/Off Effort: On Track Line: 4 Beaufort Sea State: 1

Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 15:03 WP#: 65 Lat: 30.161994 Long: -80.466740

Species: *Stenella frontalis* Numbers (Low/High/Best): 33/40/35

Features used in Species ID: Alternating dark and light dorsal "banding", spots, white-tipped beak

Representative images used for Species ID: 4927, 4930, 4931, 4938

Photographer: HJF Frame Numbers: 4915-4941 Spacer: 4942

Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 15:07 WP#: 66 Lat: 30.164913 Long: -80.465188

Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

Fairly tight group, looks like they are feeding on something.

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Tuesday, October 19, 2010 Sighting # 1

**Initial Sighting on Track**

Time: 10:53 WP#: 26 Lat: 30.569164 Long: -79.886665  
Vertical Angle: 3 Horizontal Bearing in Degrees: 20 Sighting Cue: Body  
On/Off Effort: On Track Line: 10 Beaufort Sea State: 3  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 10:55 WP#: 27 Lat: 30.571964 Long: -79.888432  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 13/15/13  
Features used in Species ID: Stubby rostrum, broad-based dorsal fin, relatively broad flukes, gray body coloration with darker gray dorsal cape, light colored caudal peduncle  
Representative images used for Species ID: 4283, 4285, 4301, 4302  
Photographer: PBN Frame Numbers: 4242 to 4305 Spacer: 4306  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 11:02 WP#: 28 Lat: 30.566922 Long: -79.885394  
Calculated Distance Traveled: 0.6 km

**Behavior and Additional Comments**

Surface travel, presence of calves could not be determined, no avoidance behavior observed.

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Tuesday, October 19, 2010 Sighting # 2

**Initial Sighting on Track**

Time: 15:19 WP#: 52 Lat: 30.568162 Long: -80.531332  
Vertical Angle: 1 Horizontal Bearing in Degrees: 30 Sighting Cue: Body  
On/Off Effort: On Track Line: 10 Beaufort Sea State: 1  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:20 WP#: 53 Lat: 30.569500 Long: -80.516943  
Species: *Stenella frontalis* Numbers (Low/High/Best): 16/20/18  
Features used in Species ID: Spots observed, white-tipped beak, thin caudal peduncle  
Representative images used for Species ID: 4335, 4355, 4359  
Photographer: PBN Frame Numbers: 4307 to 4368 Spacer: 4369  
Calculated Distance from Track Line: 1.4 km

**Final Time and Position of Sighting**

Time: 15:23 WP#: 54 Lat: 30.565515 Long: -80.519015  
Calculated Distance Traveled: 0.5 km

**Behavior and Additional Comments**

Surface travel, calves present, school of fish, no avoidance observed

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Tuesday, October 19, 2010 Sighting # 3

**Initial Sighting on Track**

Time: 15:25 WP#: 56 Lat: 30.568870 Long: -80.575276  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 10 Beaufort Sea State: 1  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:26 WP#: 57 Lat: 30.568212 Long: -80.571374  
Species: Stenella frontalis Numbers (Low/High/Best): 22/27/27  
Features used in Species ID: Alternating light and dark "banding" dorsally, white-tipped rostrum spotted  
Representative images used for Species ID: 4388, 4410, 4437  
Photographer: PBN Frame Numbers: 4370 to 4443 Spacer: 4444  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 15:28 WP#: 58 Lat: 30.566500 Long: -80.575266  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

Another school of fish nearby  
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\_\_\_\_\_  
\_\_\_\_\_

Thursday, November 18, 2010 Sighting # 1

**Initial Sighting on Track**

Time: 11:22 WP#: 26 Lat: 30.233410 Long: -80.386648  
Vertical Angle: 2 Horizontal Bearing in Degrees: 75 Sighting Cue: Body  
On/Off Effort: On Track Line: 5 Beaufort Sea State: 3  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 11:22 WP#: 27 Lat: 30.234708 Long: -80.380993  
Species: Stenella frontalis Numbers (Low/High/Best): 53/60/58  
Features used in Species ID: long, white-tipped rostrum, spotting pattern, alternating light  
and dark banding on body  
Representative images used for Species ID: IMG\_4453, IMG\_4477, IMG\_4478  
Photographer: RCH Frame Numbers: IMG\_4445 - IMG\_4484 Spacer: IMG\_4485  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 11:29 WP#: 28 Lat: 30.228446 Long: -80.385852  
Calculated Distance Traveled: 0.8 km

**Behavior and Additional Comments**

One very large cohesive group traveling together.

Tuesday, December 21, 2010 Sighting # 1

**Initial Sighting on Track**

Time: 10:46 WP#: 14 Lat: 30.500638 Long: -80.347050  
Vertical Angle: 2 Horizontal Bearing in Degrees: 120 Sighting Cue: Body  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 3  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 10:48 WP#: 15 Lat: 30.508612 Long: -80.348717  
Species: *Stenella frontalis* Numbers (Low/High/Best): 6/10/8  
Features used in Species ID: Alternating light and dark banding pattern along dorsal surface, visible spotting on some individuals, White tipped rostrum  
Representative images used for Species ID: 4516, 4519, 4524, 4527  
Photographer: PBN Frame Numbers: 4501-4547 Spacer: 4548  
Calculated Distance from Track Line: 0.9 km

**Final Time and Position of Sighting**

Time: 10:56 WP#: 16 Lat: 30.513782 Long: -80.343218  
Calculated Distance Traveled: 0.8 km

**Behavior and Additional Comments**

Milling near surface with occasional deep dives, somewhat elusive

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Tuesday, December 21, 2010 Sighting # 2

**Initial Sighting on Track**

Time: 11:05 WP#: 22 Lat: 30.501468 Long: -80.597303  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 2  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 11:05 WP#: 23 Lat: 30.510515 Long: -80.597130  
Species: *Stenella frontalis* Numbers (Low/High/Best): 3/3/3  
Features used in Species ID: Slender white tipped rostrum, visible spotting on some animals, Narrow caudal peduncle  
Representative images used for Species ID: 4552, 4553, 4575, 4576, 4598  
Photographer: PBN Frame Numbers: 4549-4602 Spacer: 4603  
Calculated Distance from Track Line: 1.0 km

**Final Time and Position of Sighting**

Time: 11:11 WP#: 24 Lat: 30.500386 Long: -80.594421  
Calculated Distance Traveled: 1.2 km

**Behavior and Additional Comments**

Surface travel

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Tuesday, December 21, 2010 Sighting # 3

**Initial Sighting on Track**

Time: 11:27 WP#: 30 Lat: 30.432705 Long: -80.347965  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 1  
Observer: RCH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 11:28 WP#: 31 Lat: 30.435426 Long: -80.344608  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 10/14/12  
Features used in Species ID: Robust body, overall gray coloration, broad based dorsal, visible crease between melon and rostrum  
Representative images used for Species ID: 4604,4622,4631,4637,4638  
Photographer: PBN Frame Numbers: 4604-4640 Spacer: 4641  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 11:31 WP#: 32 Lat: 30.431187 Long: -80.351859  
Calculated Distance Traveled: 0.8 km

**Behavior and Additional Comments**

Loose grouping with slow surface travel

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Tuesday, December 21, 2010 Sighting # 4

**Initial Sighting on Track**

Time: 11:32 WP#: 35 Lat: 30.431797 Long: -80.273660  
Vertical Angle: 2 Horizontal Bearing in Degrees: 110 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 1  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 11:33 WP#: 36 Lat: 30.436438 Long: -80.276994  
Species: *Stenella frontalis* Numbers (Low/High/Best): 5/8/7  
Features used in Species ID: Visible spotting on some individuals, narrow rostrum with white tip, narrow caudal peduncle  
Representative images used for Species ID: 4642,4643,4656,4658  
Photographer: PBN Frame Numbers: 4642-4688 Spacer: 4698  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 11:39 WP#: 37 Lat: 30.431760 Long: -80.283566  
Calculated Distance Traveled: 0.8 km

**Behavior and Additional Comments**

Very spread out, mother/calf pair

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Tuesday, December 21, 2010 Sighting # 5

**Initial Sighting on Track**

Time: 12:16 WP#: 44 Lat: 30.365662 Long: -80.584299  
Vertical Angle: 2 Horizontal Bearing in Degrees: 120 Sighting Cue: Body  
On/Off Effort: On Track Line: 7 Beaufort Sea State: 1  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 12:17 WP#: 45 Lat: 30.368144 Long: -80.578741  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: Robust body, overall gray coloration, thick caudal peduncle with white dorsal surface  
Representative images used for Species ID: 4690,4691,4692,2493,4696  
Photographer: PBN Frame Numbers: 4690-4703 Spacer: 4704  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 12:23 WP#: 46 Lat: 30.368898 Long: -80.579836  
Calculated Distance Traveled: 0.1 km

**Behavior and Additional Comments**

Somewhat elusive

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Tuesday, December 21, 2010 Sighting # 6

**Initial Sighting on Track**

Time: 13:12 WP#: 56 Lat: 30.233282 Long: -80.471853  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 5 Beaufort Sea State: 3  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 13:13 WP#: 57 Lat: 30.241160 Long: -80.471661  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3/3/3  
Features used in Species ID: Thick rostrum with visible crease at melon, broad based dorsal fin, overall gray coloration  
Representative images used for Species ID: 4707,4708,4711,1715,4730  
Photographer: PBN Frame Numbers: 4705-4730 Spacer: 4731  
Calculated Distance from Track Line: 0.9 km

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

Elusive surface travel with some deep diving, possible avoidance behavior observer

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Tuesday, December 21, 2010 Sighting # 7

**Initial Sighting on Track**

Time: 15:43 WP#: 67 Lat: 30.100680 Long: -80.355397  
Vertical Angle: 1 Horizontal Bearing in Degrees: 120 Sighting Cue: Body  
On/Off Effort: On Track Line: 3 Beaufort Sea State: 3  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:49 WP#: 68 Lat: 30.098785 Long: -80.357685  
Species: Unidentified Delphinid Numbers (Low/High/Best): 1/1/1  
Features used in Species ID: Animals were not observed long enough to make a positive identification  
Representative images used for Species ID: NA  
Photographer: PBN Frame Numbers: NA Spacer: NA  
Calculated Distance from Track Line: 0.3 km

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

Not resighted, actual time and position are assumed

Wednesday, December 29, 2010 Sighting # 1

**Initial Sighting on Track**

Time: 12:49 WP#: 9 Lat: 29.963468 Long: -79.981404  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 1 Beaufort Sea State: 3  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 12:53 WP#: 10 Lat: 29.958804 Long: -79.974424  
Species: Unidentified Delphinid Numbers (Low/High/Best): 2/4/2  
Features used in Species ID: Animals not observed long enough for positive identification

Representative images used for Species ID: NA  
Photographer: RCH Frame Numbers: NA Spacer: NA  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

Fast travel south, re-sighted once then never seen again.

Wednesday, December 29, 2010 Sighting # 2

**Initial Sighting on Track**

Time: 13:03 WP#: 12 Lat: 29.966228 Long: -79.830743  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Body  
On/Off Effort: On Track Line: 1 Beaufort Sea State: 3  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 13:06 WP#: 13 Lat: 29.968734 Long: -79.834176  
Species: Tursiops truncatus Numbers (Low/High/Best): 6/8/7  
Features used in Species ID: Robust body, overall gray coloration, thick caudal peduncle, broad based dorsal fin

Representative images used for Species ID: 5176,5181,5182,5192,5194  
Photographer: RCH Frame Numbers: 5167-5198 Spacer: 5199  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 13:11 WP#: 14 Lat: 29.966952 Long: -79.831066  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

Medium paced travel, looks like Tursiops from the plane (white caudal peduncle, sturdy looking)

Wednesday, December 29, 2010 Sighting # 3

**Initial Sighting on Track**

Time: 13:28 WP#: 18 Lat: 30.031145 Long: -80.259184  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State:         
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 13:30 WP#: 19 Lat: 30.034135 Long: -80.260091  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 15/20/17  
Features used in Species ID: Broad based dorsal fin, short robust rostrum, overall gray coloration, robust body  
Representative images used for Species ID: 5203,5204,5216,5219,5220  
Photographer: RCH Frame Numbers: 5200-5229 Spacer: 5230  
Calculated Distance from Track Line: 0.3 km

**Final Time and Position of Sighting**

Time: 13:32 WP#: 20 Lat: 30.033146 Long: -80.261151  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Two groups spaced about 100 m apart.

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Wednesday, December 29, 2010 Sighting # 4

**Initial Sighting on Track**

Time: 13:42 WP#: 23 Lat: 30.030343 Long: -80.553343  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 2  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 13:43 WP#: 24 Lat: 30.032205 Long: -80.553900  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 10/15/12  
Features used in Species ID: Short robust rostrum, overall gray coloration, heavy flippers  
Representative images used for Species ID: 5231,5236,5244,5245,5257  
Photographer: RCH Frame Numbers: 5231-5268 Spacer: 5269  
Calculated Distance from Track Line: 0.2 km

**Final Time and Position of Sighting**

Time: 13:49 WP#: 25 Lat: 30.036658 Long: -80.550997  
Calculated Distance Traveled: 0.6 km

**Behavior and Additional Comments**

Milling, dolphins look like Tursiops.

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Thursday, December 30, 2010 Sighting # 1

**Initial Sighting on Track**

Time: 8:53 WP#: 4 Lat: 30.566342 Long: -80.519935  
Vertical Angle: 2 Horizontal Bearing in Degrees: 120 Sighting Cue: Body  
On/Off Effort: On Track Line: 10 Beaufort Sea State: 1  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 8:55 WP#: 5 Lat: 30.562893 Long: -80.519634  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4/4/4  
Features used in Species ID: Short and stubby rostrum, gray with darker gray cape, robust and elongated body  
Representative images used for Species ID: 5271-5273  
Photographer: PBN Frame Numbers: 5270-5286 Spacer: 5287  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 9:01 WP#: 6 Lat: 30.564537 Long: -80.518119  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Moderate rate of travel at surface. Initial sighting of one animal, upon circling resighted four animals.

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Thursday, December 30, 2010 Sighting # 2

**Initial Sighting on Track**

Time: 9:08 WP#: 12 Lat: 30.566594 Long: -80.286674  
Vertical Angle: 2 Horizontal Bearing in Degrees: 130 Sighting Cue: Body  
On/Off Effort: On Track Line: 10 Beaufort Sea State: 2  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 9:09 WP#: 13 Lat: 30.562619 Long: -80.291194  
Species: *Stenella frontalis* Numbers (Low/High/Best): 5/5/5  
Features used in Species ID: Alternating light and dark "banding" dorsally, elongated and white-tipped rostrum  
Representative images used for Species ID: 5293, 5309-5312, 5330, 5331  
Photographer: PBN Frame Numbers: 5288-5366 Spacer: 5367  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 9:20 WP#: 14 Lat: 30.570682 Long: -80.282093  
Calculated Distance Traveled: 1.3 km

**Behavior and Additional Comments**

Widely spaced group traveling fast causing large splashes when surfacing. Traveling as singles and pairs. Showing possible avoidance behavior.

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Thursday, December 30, 2010 Sighting # 3

**Initial Sighting on Track**

Time: 9:37 WP#: 23 Lat: 30.498851 Long: -79.809588  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 2  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 9:38 WP#: 24 Lat: 30.502363 Long: -79.807404  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8/9/9  
Features used in Species ID: Long, robust bodies, light colored peduncle, overall gray coloration with darker gray cape, short beak  
Representative images used for Species ID: 5381, 5407-5412  
Photographer: PBN Frame Numbers: 5368-5447 Spacer: 5448  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 9:41 WP#: 25 Lat: 30.508627 Long: -79.809509  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

Group was hanging at the surface - tight grouping which split into two smaller groups. Easy rate of travel.

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Thursday, December 30, 2010 Sighting # 4

**Initial Sighting on Track**

Time: 10:02 WP#: 31 Lat: 30.500338 Long: -80.324565  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 1  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 10:04 WP#: 32 Lat: 30.498796 Long: -80.321313  
Species: *Stenella frontalis* Numbers (Low/High/Best): 35/50/40  
Features used in Species ID: Alternating light and dark pattern, spots, lighter shoulder blaze, white-tipped rostrum  
Representative images used for Species ID: 5473, 5476, 5480, 5482, 5485-5487  
Photographer: PBN Frame Numbers: 5449 to 5531 Spacer: 5532  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 10:07 WP#: 33 Lat: 30.505045 Long: -80.315992  
Calculated Distance Traveled: 0.9 km

**Behavior and Additional Comments**

Loose grouping of animals, milling and splashing at the surface. Single group spread over a large area, including lots of juveniles.

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Thursday, December 30, 2010 Sighting # 5

**Initial Sighting on Track**

Time: 10:10 WP#: 35 Lat: 30.499865 Long: -80.368864  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 1  
Observer: RJM Observer Side: Left

**Actual Time and Position of Sighting**

Time: 10:11 WP#: 36 Lat: 30.494795 Long: -80.369824  
Species: *Stenella frontalis* Numbers (Low/High/Best): 20/30/25  
Features used in Species ID: white-tipped beak, light shoulder blaze, spotted pattern

Representative images used for Species ID: 5557, 5559, 5560, 5566, 5589, 5592  
Photographer: PBN Frame Numbers: 5583 - 5624 Spacer: 5625  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 10:14 WP#: 37 Lat: 30.497729 Long: -80.369207  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

Large group exhibiting lots of activity at the water's surface.

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Thursday, December 30, 2010 Sighting # 6

**Initial Sighting on Track**

Time: 10:17 WP#: 39 Lat: 30.500058 Long: -80.462316  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 1  
Observer: PBN Observer Side: 1

**Actual Time and Position of Sighting**

Time: 10:18 WP#: 40 Lat: 30.498913 Long: -80.451449  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: short rostrum, narrow dark gray cape, robust, elongated body

Representative images used for Species ID: 5630, 5643 - 5645, 5657, 5672, 5700, 5702  
Photographer: PBN Frame Numbers: 5626 - 5714 Spacer: 5715  
Calculated Distance from Track Line: 1.0 km

**Final Time and Position of Sighting**

Time: 10:23 WP#: 41 Lat: 30.500564 Long: -80.456915  
Calculated Distance Traveled: 0.6 km

**Behavior and Additional Comments**

Pair was exhibiting fairly fast travel with short surfacings.

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Thursday, December 30, 2010 Sighting # 7

**Initial Sighting on Track**

Time: 10:30 WP#: 43 Lat: 30.499351 Long: -80.669547  
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Body  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 1  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 10:31 WP#: 44 Lat: 30.504672 Long: -80.668439  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: Broad flukes, robust, elongate body, short, stubby rostrum, light colored peduncle  
Representative images used for Species ID: 5723, 5724, 5747  
Photographer: PBN Frame Numbers: 5716 - 5750 Spacer: 5751  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 10:34 WP#: 45 Lat: 30.502561 Long: -80.667757  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Slow travel close to the water's surface

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Thursday, December 30, 2010 Sighting # 8

**Initial Sighting on Track**

Time: 10:56 WP#: 60 Lat: 30.433084 Long: -80.224719  
Vertical Angle: 2 Horizontal Bearing in Degrees: 130 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 1  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 10:56 WP#: 61 Lat: 30.426356 Long: -80.227854  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 1/1/1  
Features used in Species ID: broad flukes, short, stubby rostrum  
Representative images used for Species ID: 5791, 5792, 5799, 5800, 5801  
Photographer: PBN Frame Numbers: 5752 - 5806 Spacer: 5807  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 11:00 WP#: 62 Lat: 30.428318 Long: -80.226192  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

Slow travel with short surfacings

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Thursday, December 30, 2010 Sighting # 9

**Initial Sighting on Track**

Time: 11:00 WP#: 64 Lat: 30.427061 Long: -80.209683  
Vertical Angle: 2 Horizontal Bearing in Degrees: 120 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 1  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 11:01 WP#: 65 Lat: 30.426861 Long: -80.217773  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 13/13/13  
Features used in Species ID: short and stubby rostrum, gray body coloration with dark gray cape, pronounced melon  
Representative images used for Species ID: 5811, 5815 - 5817, 5840  
Photographer: PBN Frame Numbers: 5808 - 5848 Spacer: 5849  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 11:03 WP#: 66 Lat: 30.428800 Long: -80.223245  
Calculated Distance Traveled: 0.6 km

**Behavior and Additional Comments**

Animals active at the surface, splashing and milling. Some individuals were swimming inverted, showing their bellies.

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Thursday, December 30, 2010 Sighting # 10

**Initial Sighting on Track**

Time: 11:13 WP#: 68 Lat: 30.432284 Long: -79.853695  
Vertical Angle: 2 Horizontal Bearing in Degrees: 120 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 1  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 11:14 WP#: 69 Lat: 30.434864 Long: -79.856500  
Species: *Balaenoptera acutorostrata* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: small dark gray/black baleen whale, pointy rostrum, white bands on flippers  
Representative images used for Species ID: 5880 - 5889  
Photographer: PBN Frame Numbers: 5850 - 5898 Spacer: 5899  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 11:23 WP#: 70 Lat: 30.427019 Long: -79.857527  
Calculated Distance Traveled: 0.9 km

**Behavior and Additional Comments**

Animals exhibiting regular surfacings - traveling slowly just below the surface. Final location is an estimation of the last known location as animals disappeared from view.

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Thursday, December 30, 2010 Sighting # 11

**Initial Sighting on Track**

Time: 11:29 WP#: 74 Lat: 30.366132 Long: -79.855762  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 7 Beaufort Sea State: 1  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 11:29 WP#: 75 Lat: 30.372719 Long: -79.850767  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 15/15/15  
Features used in Species ID: gray with dark gray cape, short, stubby rostrum and relatively broad flukes  
Representative images used for Species ID: 5915, 5912, 5920, 5927, 5930  
Photographer: PBN Frame Numbers: 5890 - 5942 Spacer: 5943  
Calculated Distance from Track Line: 0.9 km

**Final Time and Position of Sighting**

Time: 11:32 WP#: 76 Lat: 30.373322 Long: -79.853707  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

Loose group of animals, with many traveling in pairs. Exhibiting slow travel just below the surface. Some juveniles present.

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Thursday, December 30, 2010 Sighting # 12

**Initial Sighting on Track**

Time: 11:45 WP#: 81 Lat: 30.366445 Long: -80.287253  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 7 Beaufort Sea State: 1  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 11:46 WP#: 82 Lat: 30.372465 Long: -80.280112  
Species: *Stenella frontalis* Numbers (Low/High/Best): 6/6/6  
Features used in Species ID: Spots, alternating bands of light and dark on dorsal side of body, white tipped rostrum  
Representative images used for Species ID: 5944, 5955 - 5957, 5959, 5975  
Photographer: PBN Frame Numbers: 5944 - 6001 Spacer: 6002  
Calculated Distance from Track Line: 1.0 km

**Final Time and Position of Sighting**

Time: 11:47 WP#: 83 Lat: 30.372391 Long: -80.281947  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Animals milling at the surface - moving at a slow rate of travel.

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Thursday, December 30, 2010 Sighting # 13

**Initial Sighting on Track**

Time: 11:49 WP#: 85 Lat: 30.365490 Long: -80.314671  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: 603 Track Line: 7 Beaufort Sea State: 1  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 11:50 WP#: 86 Lat: 30.365033 Long: -80.310898  
Species: *Stenella frontalis* Numbers (Low/High/Best): 2/3/3  
Features used in Species ID: spots, long, white-tipped rostrum, dorsal banding pattern  
of light and dark  
Representative images used for Species ID: 6004, 6005, 6013, 6015  
Photographer: PBN Frame Numbers: 6003 - 6032 Spacer: 6033  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 11:52 WP#: 87 Lat: 30.368983 Long: -80.311009  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

Animals were widely spaced over a large area. Individuals would race up to the surface and  
then dive from sight

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Thursday, December 30, 2010 Sighting # 14

**Initial Sighting on Track**

Time: 14:07 WP#: 104 Lat: 30.299627 Long: -80.469222  
Vertical Angle: 3 Horizontal Bearing in Degrees: 110 Sighting Cue: Body  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 2  
Observer: RJM Observer Side: Left

**Actual Time and Position of Sighting**

Time: 14:09 WP#: 105 Lat: 30.310022 Long: -80.479380  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 35/50/43  
Features used in Species ID: gray with darker gray cape, light colored peduncle, robust,  
elongated body, short, stubby rostrum  
Representative images used for Species ID: 6060, 6077, 6090, 6094 - 6098  
Photographer: PBN Frame Numbers: 6034 - 6099 Spacer: 6100  
Calculated Distance from Track Line: 1.5 km

**Final Time and Position of Sighting**

Time: 14:12 WP#: 106 Lat: 30.300260 Long: -80.478851  
Calculated Distance Traveled: 1.1 km

**Behavior and Additional Comments**

Very disperse group with 3-4 subgroups, which are more condensed. Often travelling in a line  
of approximately 5-6 animals. Slow rate of travel exhibited with lots of splashing at the surface

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Thursday, December 30, 2010 Sighting # 15

**Initial Sighting on Track**

Time: 14:14 WP#: 108 Lat: 30.300778 Long: -80.416525  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 2  
Observer: RJM Observer Side: Left

**Actual Time and Position of Sighting**

Time: 14:16 WP#: 109 Lat: 30.304107 Long: -80.425841  
Species: *Stenella frontalis* Numbers (Low/High/Best): 10/11/10  
Features used in Species ID: Alternating light and dark banding, light saddle blaze, white tipped rostrum  
Representative images used for Species ID: 6107, 6109, 6111, 6113, 6123  
Photographer: PBN Frame Numbers: 6101 - 6140 Spacer: 6141  
Calculated Distance from Track Line: 1.0 km

**Final Time and Position of Sighting**

Time: 14:17 WP#: 110 Lat: 30.309582 Long: -80.416446  
Calculated Distance Traveled: 1.1 km

**Behavior and Additional Comments**

Animals were originally travelling together in a single line, but eventually split into a group of six and a group of 4

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Thursday, December 30, 2010 Sighting # 16

**Initial Sighting on Track**

Time: 14:19 WP#: 112 Lat: 30.299917 Long: -80.351955  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 2  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 14:19 WP#: 113 Lat: 30.297977 Long: -80.353320  
Species: *Stenella frontalis* Numbers (Low/High/Best): 20/22/21  
Features used in Species ID: spotted pattern with light and dark banding, white tipped rostrum  
Representative images used for Species ID: 6148, 6151, 6153, 6155, 6173, 6188  
Photographer: PBN Frame Numbers: 6142 - 6190 Spacer: 6191  
Calculated Distance from Track Line: 0.3 km

**Final Time and Position of Sighting**

Time: 14:22 WP#: 114 Lat: 30.300182 Long: -80.346876  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

Very dense pack of animals milling at water's surface. Animals were surfacing together. Possible avoidance behavior observed.

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Thursday, December 30, 2010 Sighting # 17

**Initial Sighting on Track**

Time: \_\_\_\_\_ WP#: n/a Lat: \_\_\_\_\_ Long: \_\_\_\_\_  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: OFF Track Line: OFF Beaufort Sea State: 2  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 14:27 WP#: 118 Lat: 30.272449 Long: -80.284592  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 5/6/6  
Features used in Species ID: Short, stubby rostrum, relatively broad flukes, gray with darker gray cape, distinct crease at base of melon  
Representative images used for Species ID: 6201, 6205, 6206, 6210, 6218  
Photographer: PBN Frame Numbers: 6192 - 6248 Spacer: 6249  
Calculated Distance from Track Line: n/a

**Final Time and Position of Sighting**

Time: 14:28 WP#: 119 Lat: 30.270557 Long: -80.292085  
Calculated Distance Traveled: 0.8 km

**Behavior and Additional Comments**

Off effort sighting made while investigating another cue, so no initial sighting point was taken

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Thursday, December 30, 2010 Sighting # 18

**Initial Sighting on Track**

Time: 14:42 WP#: 123 Lat: 30.299429 Long: -79.914961  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 2  
Observer: RJM Observer Side: Left

**Actual Time and Position of Sighting**

Time: 14:43 WP#: 124 Lat: 30.302666 Long: -79.920360  
Species: *Megaptera novaeangliae* Numbers (Low/High/Best): 1/1/1  
Features used in Species ID: long, white flippers, broad, scalloped flukes, long body (approx. 10-12 m)  
Representative images used for Species ID: 6252, 6256, 62600, 6261  
Photographer: PBN Frame Numbers: 6250 - 6270 Spacer: 6271  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 14:55 WP#: 125 Lat: 30.316501 Long: -79.921440  
Calculated Distance Traveled: 1.5 km

**Behavior and Additional Comments**

Initially observed motionless at the surface. The animals then descended slightly and remained approx. 10 m below the surface, motionless, for the remainder of the sighting.

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Thursday, December 30, 2010 Sighting # 19

**Initial Sighting on Track**

Time: 15:01 WP#: 127 Lat: 30.301027 Long: -79.847014  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 2  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:04 WP#: 128 Lat: 30.298252 Long: -79.854173  
Species: *Balaenoptera acutorostrata* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: black/dark gray sleek whale with white flipper stripes

Representative images used for Species ID: 6279 - 6285

Photographer: PBN Frame Numbers: 6272 - 6285 Spacer: 6286

Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 15:07 WP#: 129 Lat: 30.301978 Long: -79.852978  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

Animals exhibited very little forward motion with few surfacings. Animals appear to have a lighter and a darker region to the body.

Thursday, December 30, 2010 Sighting # 20

**Initial Sighting on Track**

Time: 10:30 WP#: 136 Lat: 30.233521 Long: -80.462840  
Vertical Angle: 3 Horizontal Bearing in Degrees: 120 Sighting Cue: Body  
On/Off Effort: On Track Line: 5 Beaufort Sea State: 2  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 10:36 WP#: 137 Lat: 30.233559 Long: -80.469845  
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 4/5/5  
Features used in Species ID: n/a

Representative images used for Species ID: n/a

Photographer: n/a Frame Numbers: n/a Spacer: n/a

Calculated Distance from Track Line: n/a

**Final Time and Position of Sighting**

Time: n/a WP#: n/a Lat: n/a Long: n/a  
Calculated Distance Traveled: n/a

**Behavior and Additional Comments**

Initial sighting of 4-5 animals tightly grouped were never relocated for photo identification. Position is an estimation of location.

Saturday, January 15, 2011 Sighting # 1

**Initial Sighting on Track**

Time: 12:24 WP#: 8 Lat: 30.499066 Long: -80.247405  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: Off Track Line: 9 Beaufort Sea State: 3  
Observer: WRS (pilot) Observer Side: Right

**Actual Time and Position of Sighting**

Time: 12:27 WP#: 9 Lat: 30.499651 Long: -80.242933  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 9/12/11  
Features used in Species ID: Short beak, light colored peduncle, relatively broad flukes

Representative images used for Species ID: 4756-4759  
Photographer: RCH Frame Numbers: 4740 - 4765 Spacer: 4766  
Calculated Distance from Track Line: N/A

**Final Time and Position of Sighting**

Time: 12:33 WP#: 10 Lat: 30.493735 Long: -80.231193  
Calculated Distance Traveled: N/A

**Behavior and Additional Comments**

Spotted by pilot therefore considered an off-effort sighting. Individuals in a couple of smaller groups.

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Sunday, January 16, 2011 Sighting # 1

**Initial Sighting on Track**

Time: 9:17 WP#: 10 Lat: 29.966904 Long: -80.341261  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 1 Beaufort Sea State: 3  
Observer: RCH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 9:20 WP#: 11 Lat: 29.973825 Long: -80.340072  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 10/20/20  
Features used in Species ID: Overall gray coloration, robust body, short heavy rostrum with visible crease at melon  
Representative images used for Species ID: 4722,4779,4785,4786,4790,4804  
Photographer: PBN Frame Numbers: 4767-4818 Spacer: 4819  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 9:24 WP#: 12 Lat: 29.974696 Long: -80.340174  
Calculated Distance Traveled: 0.1 km

**Behavior and Additional Comments**

Two groups of ten animals, Fast travel at the surface

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Sunday, January 16, 2011 Sighting # 2

**Initial Sighting on Track**

Time: 10:01 WP#: 21 Lat: 30.030741 Long: -80.440041  
Vertical Angle: 2 Horizontal Bearing in Degrees: 120 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 3  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 10:02 WP#: 22 Lat: 30.030912 Long: -80.433461  
Species: *Stenella frontalis* Numbers (Low/High/Best): 6/12/10  
Features used in Species ID: Spotting pattern visible, white tipped rostrum, dark and light banding pattern on dorsal surface  
Representative images used for Species ID: 4823,4824,4833,4840,4842,4844,4847  
Photographer: PBN Frame Numbers: 4820-4871 Spacer: 4872  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 10:06 WP#: 23 Lat: 30.027907 Long: -80.432039  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

2 small groups with singletons

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Monday, January 31, 2011 Sighting # 1

**Initial Sighting on Track**

Time: 9:54 WP#: 8 Lat: 30.567629 Long: -80.348759  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: 3  
On/Off Effort: On Track Line: 10 Beaufort Sea State: 4  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 9:57 WP#: 9 Lat: 30.560639 Long: -80.351907  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: wide fluke, white peduncle, overall gray color, darker gray cape

Representative images used for Species ID: 5077, 5082, 5088  
Photographer: PBN Frame Numbers: 5076 - 5089 Spacer: 5090  
Calculated Distance from Track Line: 0.9 km

**Final Time and Position of Sighting**

Time: 10:02 WP#: 10 Lat: 30.555938 Long: -80.352357  
Calculated Distance Traveled: 0.5 km

**Behavior and Additional Comments**

Final position is an assumed location as they were not relocated after initial position and photographs.

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Monday, January 31, 2011 Sighting # 2

**Initial Sighting on Track**

Time: 10:14 WP#: 17 Lat: 30.567266 Long: -79.908492  
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: 3  
On/Off Effort: On Track Line: 10 Beaufort Sea State: 2  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 10:16 WP#: 18 Lat: 30.568143 Long: -79.910576  
Species: *Grampus griseus* Numbers (Low/High/Best): 8/8/8  
Features used in Species ID: defined medial cleft on bulbous forehead, "suspender-like" coloration pattern, extensive scarring

Representative images used for Species ID: 5095, 5101, 5105, 5110  
Photographer: PBN Frame Numbers: 5091 - 5112 Spacer: 5113  
Calculated Distance from Track Line: 0.2 km

**Final Time and Position of Sighting**

Time: 10:17 WP#: 19 Lat: 30.568772 Long: -79.913813  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

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Monday, January 31, 2011 Sighting # 3

**Initial Sighting on Track**

Time: 10:36 WP#: 23 Lat: 30.498895 Long: -80.256737  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 2  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 10:38 WP#: 24 Lat: 30.498119 Long: -80.251884  
Species: *Stenella frontalis* Numbers (Low/High/Best): 40/60/50  
Features used in Species ID: light and dark banding pattern, visible spotting pattern, white tipped rostrum  
Representative images used for Species ID: 5129, 5137, 5144, 5152  
Photographer: PBN Frame Numbers: 5114 - 5161 Spacer: 5162  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 10:41 WP#: 25 Lat: 30.491346 Long: -80.251859  
Calculated Distance Traveled: 0.8 km

**Behavior and Additional Comments**

large spread out group in a very loose aggregations. Lots of surface activity exhibited.

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Monday, January 31, 2011 Sighting # 4

**Initial Sighting on Track**

Time: 10:43 WP#: 27 Lat: 30.499218 Long: -80.301879  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 2  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 10:44 WP#: 28 Lat: 30.499485 Long: -80.305212  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 1/1/1  
Features used in Species ID: overall gray color, broad flukes, short, stubby rostrum  
Representative images used for Species ID: 5163, 5164, 5165  
Photographer: PBN Frame Numbers: 5163 - 5170 Spacer: 5171  
Calculated Distance from Track Line: 0.3 km

**Final Time and Position of Sighting**

Time: 10:44 WP#: 29 Lat: 30.502070 Long: -80.305611  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

Single animal observed with frequent diving behavior.

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Monday, January 31, 2011 Sighting # 5

**Initial Sighting on Track**

Time: 11:10 WP#: 38 Lat: 30.434257 Long: -80.252044  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 3  
Observer: HJF Observer Side: Left

**Actual Time and Position of Sighting**

Time: 11:12 WP#: 39 Lat: 30.431978 Long: -80.248953  
Species: *Stenella frontalis* Numbers (Low/High/Best): 30/50/40  
Features used in Species ID: light and dark banding pattern, long, white-tipped rostrum,  
visible spotting pattern  
Representative images used for Species ID: 5180, 5192, 5200, 5201, 5214  
Photographer: PBN Frame Numbers: 5172 - 5220 Spacer: 5221  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 11:13 WP#: 40 Lat: 30.431989 Long: -80.256418  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

Very large group with several distinct subgroups. (Possible that this is the same group of  
Sighting 3, as the Longitudes are very similar). If so, the group had moved south between  
sightings.

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Monday, January 31, 2011 Sighting # 6

**Initial Sighting on Track**

Time: 11:56 WP#: 57 Lat: 30.364492 Long: -80.664567  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 7 Beaufort Sea State: 3  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 12:00 WP#: 58 Lat: 30.361811 Long: -80.661452  
Species: *Stenella frontalis* Numbers (Low/High/Best): 5/7/6  
Features used in Species ID: spotting pattern, long, white-tipped beak, alternating light and  
dark banding pattern  
Representative images used for Species ID: 5228, 5241, 5245  
Photographer: PBN Frame Numbers: 5226 - 5254 Spacer: 5255  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 12:02 WP#: 59 Lat: 30.357343 Long: -80.661355  
Calculated Distance Traveled: 0.5 km

**Behavior and Additional Comments**

Group was difficult to relocate as the animals spent very little time at the water's surface.

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Monday, January 31, 2011 Sighting # 7

**Initial Sighting on Track**

Time: 12:58 WP#: 81 Lat: 30.234082 Long: -80.585714  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 5 Beaufort Sea State: 2  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 13:00 WP#: 82 Lat: 30.234102 Long: -80.573657  
Species: *Stenella frontalis* Numbers (Low/High/Best): 20/30/25  
Features used in Species ID: light and dark banding pattern, spotting pattern, long rostrum

Representative images used for Species ID: 5274, 5276, 5286, 5288

Photographer: PBN Frame Numbers: 5256 - 5288 Spacer: 5289

Calculated Distance from Track Line: 0.7 km

**Final Time and Position of Sighting**

Time: 13:01 WP#: 83 Lat: 30.234955 Long: -80.573104  
Calculated Distance Traveled: 0.1 km

**Behavior and Additional Comments**

Two distinct subgroups of approximately eight and seventeen individuals.

Monday, January 31, 2011 Sighting # 8

**Initial Sighting on Track**

Time: 15:04 WP#: 103 Lat: 30.166902 Long: -80.064561  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 2  
Observer: HJF Observer Side: Left

**Actual Time and Position of Sighting**

Time: 15:06 WP#: 104 Lat: 30.171833 Long: -80.068726  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 1/1/1  
Features used in Species ID: short, stubby rostrum, over gray coloration, broad flukes

Representative images used for Species ID: 5292, 5299, 5300

Photographer: PBN Frame Numbers: 5290 - 5302 Spacer: 5303

Calculated Distance from Track Line: 0.7 km

**Final Time and Position of Sighting**

Time: 15:07 WP#: 105 Lat: 30.170388 Long: -80.074079  
Calculated Distance Traveled: 0.5 km

**Behavior and Additional Comments**

Single individual who was very active at the surface.

Monday, January 31, 2011 Sighting # 9

**Initial Sighting on Track**

Time: 15:38 WP#: 120 Lat: 30.099737 Long: -80.390697  
Vertical Angle: 3 Horizontal Bearing in Degrees: 120 Sighting Cue: Body  
On/Off Effort: On Track Line: 3 Beaufort Sea State: 2  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:40 WP#: 121 Lat: 30.106392 Long: -80.384853  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3/4/4  
Features used in Species ID: short, stubby rostrum, slate gray, defined crease between rostrum and melon  
Representative images used for Species ID: 5317, 5321, 5324  
Photographer: PBN Frame Numbers: 5306 - 5325 Spacer: 5326  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 15:41 WP#: 122 Lat: 30.105763 Long: -80.383823  
Calculated Distance Traveled: 0.1 km

**Behavior and Additional Comments**

group was active at the surface and grouped very tightly together. Mom/calf pairs observed.

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Monday, January 31, 2011 Sighting # 10

**Initial Sighting on Track**

Time: 15:44 WP#: 124 Lat: 30.099349 Long: -80.490222  
Vertical Angle: 1 Horizontal Bearing in Degrees: 110 Sighting Cue: Body  
On/Off Effort: On Track Line: 3 Beaufort Sea State: 2  
Observer: HJF Observer Side: Left

**Actual Time and Position of Sighting**

Time: 15:47 WP#: 125 Lat: 30.094753 Long: -80.489454  
Species: *Stenella frontalis* Numbers (Low/High/Best): 14/20/18  
Features used in Species ID: spotting pattern, alternating light and dark bands, long, white tipped rostrum  
Representative images used for Species ID: 5344, 5345  
Photographer: PBN Frame Numbers: 5327 - 5364 Spacer: 5365  
Calculated Distance from Track Line: 0.5 km

**Final Time and Position of Sighting**

Time: 15:48 WP#: 126 Lat: 30.097811 Long: -80.484765  
Calculated Distance Traveled: 0.6 km

**Behavior and Additional Comments**

A tightly packed group traveling together.

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Monday, January 31, 2011 Sighting # 11

**Initial Sighting on Track**

Time: 15:52 WP#: 128 Lat: 30.099168 Long: -80.644438  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 3 Beaufort Sea State: 2  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:56 WP#: 129 Lat: 30.105711 Long: -80.638341  
Species: *Stenella frontalis* Numbers (Low/High/Best): 24/28/26  
Features used in Species ID: white tipped beak, spotting, light and dark banding, long rostrum

Representative images used for Species ID: 5368, 5387

Photographer: PBN Frame Numbers: 5366 - 5398 Spacer: 5399  
Calculated Distance from Track Line: 1.0 km

**Final Time and Position of Sighting**

Time: n/a WP#: n/a Lat: n/a Long: n/a  
Calculated Distance Traveled: n/a

**Behavior and Additional Comments**

Large group evenly spread out over several hundred meters. Mom calf pairs were observed.

Monday, January 31, 2011 Sighting # 12

**Initial Sighting on Track**

Time: 16:03 WP#: 134 Lat: 30.031981 Long: -80.644486  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 3  
Observer: HJF Observer Side: Left

**Actual Time and Position of Sighting**

Time: 16:04 WP#: 135 Lat: 30.030698 Long: -80.643081  
Species: *Stenella frontalis* Numbers (Low/High/Best): 2/3/3  
Features used in Species ID: visible spotting pattern, long, white-tipped rostrum

Representative images used for Species ID: 5403, 5404, 5405

Photographer: PBN Frame Numbers: 5400 - 5416 Spacer: 5417  
Calculated Distance from Track Line: 0.2 km

**Final Time and Position of Sighting**

Time: 16:08 WP#: 136 Lat: 30.034568 Long: -80.637422  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

Three individuals spread out over a large distance. Though animals were not traveling together lots of surface activity and diving were observed.

Monday, January 31, 2011 Sighting # 13

**Initial Sighting on Track**

Time: 16:09 WP#: 138 Lat: 30.031754 Long: -80.599744  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 3  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 16:11 WP#: 139 Lat: 30.027308 Long: -80.600764  
Species: *Stenella frontalis* Numbers (Low/High/Best): 30/45/35  
Features used in Species ID: spotting pattern, light and dark banding pattern, white tipped rostrum  
Representative images used for Species ID: 5427, 5432, 5452, 5454  
Photographer: PBN Frame Numbers: 5418 - 5459 Spacer: 5460  
Calculated Distance from Track Line: 0.5 km

**Final Time and Position of Sighting**

Time: 16:11 WP#: 140 Lat: 30.032571 Long: -80.600004  
Calculated Distance Traveled: 0.6 km

**Behavior and Additional Comments**

Two distinct subgroups, one with at least 10 individuals and the second with at least 20.

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Monday, January 31, 2011 Sighting # 14

**Initial Sighting on Track**

Time: 16:25 WP#: 150 Lat: 30.032479 Long: -80.097111  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 2  
Observer: HJF Observer Side: Left

**Actual Time and Position of Sighting**

Time: 16:26 WP#: 151 Lat: 30.039486 Long: -80.103293  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 12/15/14  
Features used in Species ID: defined crease between melon and rostrum, short, stubby rostrum, slate gray coloration  
Representative images used for Species ID: 5471, 5472  
Photographer: PBN Frame Numbers: 5461 - 5495 Spacer: 5496  
Calculated Distance from Track Line: 1.0 km

**Final Time and Position of Sighting**

Time: 16:28 WP#: 152 Lat: 30.043882 Long: -80.105365  
Calculated Distance Traveled: 0.5 km

**Behavior and Additional Comments**

At least two small subgroups observed exhibiting fast travel with lots of aerial activity.  
The groups spread out over the course of the sighting.

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Monday, January 31, 2011 Sighting # 15

**Initial Sighting on Track**

Time: 16:31 WP#: 154 Lat: 30.032641 Long: -80.007759  
Vertical Angle: 2 Horizontal Bearing in Degrees: 70 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 2  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 16:32 WP#: 155 Lat: 30.026680 Long: -80.011872  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 5/5/5  
Features used in Species ID: overall gray coloring, short rostrum with a defined crease between the melon  
Representative images used for Species ID: 5523, 5524, 5527  
Photographer: PBN Frame Numbers: 5497 - 5528 Spacer: 5529  
Calculated Distance from Track Line: 0.7 km

**Final Time and Position of Sighting**

Time: 16:33 WP#: 156 Lat: 30.027539 Long: -80.010996  
Calculated Distance Traveled: 0.1 km

**Behavior and Additional Comments**

Sighting consisted of several widely-spaced singletons each several hundred meters apart.

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Monday, January 31, 2011 Sighting # 16

**Initial Sighting on Track**

Time: 17:09 WP#: 165 Lat: 29.964650 Long: -80.625364  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 1 Beaufort Sea State: 2  
Observer: PBN Observer Side: Right

**Actual Time and Position of Sighting**

Time: 17:12 WP#: 166 Lat: 29.963541 Long: -80.621873  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 6/8/5  
Features used in Species ID: short, stubby rostrum, grey coloration with darker grey cape  
Representative images used for Species ID: 5562  
Photographer: PBN Frame Numbers: 5546 - 5567 Spacer: 5568  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 17:14 WP#: 167 Lat: 29.961777 Long: -80.618514  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

Individuals exhibited a lot of underwater travel, but displayed lots of activity while at the surface.

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Tuesday, February 22, 2011 Sighting # 1

**Initial Sighting on Track**

Time: 14:35 WP#: 23 Lat: 30.031106 Long: -80.473133  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 2  
Observer: HJF Observer Side: Left

**Actual Time and Position of Sighting**

Time: 14:40 WP#: 24 Lat: 30.021563 Long: -80.461713  
Species: *Stenella frontalis* Numbers (Low/High/Best): 20/30/25  
Features used in Species ID: alternating light and dark banding, spotted pattern, white-tipped rostrum  
Representative images used for Species ID: 5605, 5606  
Photographer: REH Frame Numbers: 5598 - 5613 Spacer: 5612  
Calculated Distance from Track Line: 1.5 km

**Final Time and Position of Sighting**

Time: 14:42 WP#: 25 Lat: 30.022458 Long: -80.462601  
Calculated Distance Traveled: 0.1 km

**Behavior and Additional Comments**

Two distinct subgroups, each with approximately 10 individuals. One group was very tightly bunched, while the second was widely dispersed.

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Tuesday, February 22, 2011 Sighting # 2

**Initial Sighting on Track**

Time: 14:45 WP#: 27 Lat: 30.032759 Long: -80.502807  
Vertical Angle: 2 Horizontal Bearing in Degrees: 140 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 2  
Observer: HJF Observer Side: Left

**Actual Time and Position of Sighting**

Time: 14:51 WP#: 28 Lat: 30.025984 Long: -80.499021  
Species: *Stenella frontalis* Numbers (Low/High/Best): 3/10/6  
Features used in Species ID: visible spotting pattern, long, white-tipped rostrum, alternating light and dark banding  
Representative images used for Species ID: 5636 - 5639  
Photographer: REH Frame Numbers: 5613 - 5639 Spacer: 5640  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 14:55 WP#: 29 Lat: 30.031445 Long: -80.476643  
Calculated Distance Traveled: 2.2 km

**Behavior and Additional Comments**

Final point is assumed, as the animals were not relocated for a final position. Upon original sighting, animals were porpoising with lots of surface activity. As there were several individuals separated by very large distances, group size may be underestimated.

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Tuesday, February 22, 2011 Sighting # 3

**Initial Sighting on Track**

Time: 14:59 WP#: 32 Lat: 30.030825 Long: -80.584125  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 2  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:06 WP#: 33 Lat: 30.031494 Long: -80.568841  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 2/5/3  
Features used in Species ID: slate gray coloration, broad flukes, and large dorsal fin

Representative images used for Species ID: 5648 - 5650  
Photographer: REH Frame Numbers: 5641 - 5663 Spacer: 5664  
Calculated Distance from Track Line: 1.5 km

**Final Time and Position of Sighting**

Time: 15:11 WP#: 34 Lat: 30.040187 Long: -80.570312  
Calculated Distance Traveled: 1.0 km

**Behavior and Additional Comments**

Animals were widely dispersed and incredibly difficult to relocate and photograph.

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Saturday, February 26, 2011 Sighting # 1

**Initial Sighting on Track**

Time: 14:19 WP#: 16 Lat: 30.231844 Long: -80.577608  
Vertical Angle: 1 Horizontal Bearing in Degrees: 95 Sighting Cue: Body  
On/Off Effort: On Track Line: 5 Beaufort Sea State: 1  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 14:21 WP#: 17 Lat: 30.235706 Long: -80.573331  
Species: *Stenella frontalis* Numbers (Low/High/Best): 4/4/4  
Features used in Species ID: Long and white tipped beak, alternating light and dark "banding" pattern dorsally  
Representative images used for Species ID: 5665, 5666  
Photographer: REH Frame Numbers: 5658 - 5683 Spacer: 5684  
Calculated Distance from Track Line: 0.6 km

**Final Time and Position of Sighting**

Time: 14:25 WP#: 18 Lat: 30.236897 Long: -80.574824  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

A pair and two singles. Initially slow travel which changed to fast travel after a few minutes of observation.

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Saturday, February 26, 2011 Sighting # 2

**Initial Sighting on Track**

Time: 14:27 WP#: 22 Lat: 30.235609 Long: -80.631573  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Body  
On/Off Effort: On Track Line: 5 Beaufort Sea State: 1  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 14:29 WP#: 23 Lat: 30.239116 Long: -80.631891  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 6/7/6  
Features used in Species ID: Blunt rostrum, broad flukes, white caudal peduncle, robust dolphins  
Representative images used for Species ID: 5693, 5695, 5699, 5700  
Photographer: REH Frame Numbers: 5685 - 5702 Spacer: 5703  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 14:33 WP#: 24 Lat: 30.238482 Long: -80.632379  
Calculated Distance Traveled: < 0.1 km

**Behavior and Additional Comments**

Spread out group. One mother/calf pair and four to five singles.

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Saturday, February 26, 2011 Sighting # 3

**Initial Sighting on Track**

Time: 14:39 WP#: 29 Lat: 30.300499 Long: -80.651036  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Body  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 1  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 14:41 WP#: 30 Lat: 30.304738 Long: -80.648357  
Species: *Stenella frontalis* Numbers (Low/High/Best): 5/6/5  
Features used in Species ID: White tipped beak, alternating light and dark dorsal "banding" pattern  
Representative images used for Species ID: 5736, 5737, 5738  
Photographer: REH Frame Numbers: 5704 - 5739 Spacer: 5740  
Calculated Distance from Track Line: 0.5 km

**Final Time and Position of Sighting**

Time: 14:49 WP#: 31 Lat: 30.308544 Long: -80.648437  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

Two pairs and one to two singles. Long dive times, slow travel at surface.

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Saturday, February 26, 2011 Sighting # 4

**Initial Sighting on Track**

Time: 15:00 WP#: 38 Lat: 30.301506 Long: -80.305989  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 1  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 15:05 WP#: 39 Lat: 30.311289 Long: -80.305520  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: Short and stubby rostrum, defined crease at base of melon, overall gray coloration, relatively broad flukes  
Representative images used for Species ID: 5749, 5750, 5751  
Photographer: REH Frame Numbers: 5741 - 5752 Spacer: 5753  
Calculated Distance from Track Line: 1.1 km

**Final Time and Position of Sighting**

Time: 15:10 WP#: 40 Lat: 30.308270 Long: -80.306901  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

One mom/calf pair. Overall "skittish" behavior and long dive times - potential avoidance? Count as a take.

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Saturday, February 26, 2011 Sighting # 5

**Initial Sighting on Track**

Time: 15:16 WP#: 45 Lat: 30.301337 Long: -80.064286  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 2  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 15:17 WP#: 46 Lat: 30.301623 Long: -80.067897  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8/10/9  
Features used in Species ID: Broad flukes, white caudal peduncle, gray with darker gray cape, blunt rostrum  
Representative images used for Species ID: 5756, 5767, 5770  
Photographer: REH Frame Numbers: 5754 - 5772 Spacer: 5773  
Calculated Distance from Track Line: 0.3 km

**Final Time and Position of Sighting**

Time: 15:23 WP#: 47 Lat: 30.306190 Long: -80.066595  
Calculated Distance Traveled: 0.5 km

**Behavior and Additional Comments**

Fairly tight group, slow travel.

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Saturday, February 26, 2011 Sighting # 6

**Initial Sighting on Track**

Time: 15:53 WP#: 56 Lat: 30.365664 Long: -80.446416  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Body  
On/Off Effort: On Track Line: 7 Beaufort Sea State: 2  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 15:55 WP#: 57 Lat: 30.358155 Long: -80.447163  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 6/8/7  
Features used in Species ID: Gray color with darker gray dorsal cape, short and stubby rostrum, broad flukes  
Representative images used for Species ID: 5755, 5780, 5781  
Photographer: REH Frame Numbers: 5755 - 5784 Spacer: 5785  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 15:57 WP#: 58 Lat: 30.364953 Long: -80.440254  
Calculated Distance Traveled: 1.0 km

**Behavior and Additional Comments**

Tight group and a single approximately 200-300 apart from the group.

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Saturday, February 26, 2011 Sighting # 7

**Initial Sighting on Track**

Time: 16:14 WP#: 47 Lat: 30.434747 Long: -80.457390  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 1  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 16:16 WP#: 67 Lat: 30.430237 Long: -80.458247  
Species: *Stenella frontalis* Numbers (Low/High/Best): 30/40/35  
Features used in Species ID: Alternating light and dark "banding pattern dorsally, white-tipped beak, white flank blaze terminating mid dorsal fin  
Representative images used for Species ID: 5786, 5795, 5806  
Photographer: REH Frame Numbers: 5786 to 5814 Spacer: 5815  
Calculated Distance from Track Line: 0.5 km

**Final Time and Position of Sighting**

Time: 16:19 WP#: 68 Lat: 30.428967 Long: -80.456137  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Fast travel, medium group cohesiveness  

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Sunday, February 27, 2011 Sighting # 1

**Initial Sighting on Track**

Time: 13:28 WP#: 6 Lat: 29.966365 Long: -80.532676  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 1 Beaufort Sea State: 1  
Observer: RCH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 13:30 WP#: 7 Lat: 29.967210 Long: -80.530466  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 1/3/3  
Features used in Species ID: Defined crease between rostrum and melon, overall gray coloration, short rostrum, broad flukes  
Representative images used for Species ID: 5823, 5829, 5830  
Photographer: HJF Frame Numbers: 5816-5835 Spacer: 5836  
Calculated Distance from Track Line: 0.2 km

**Final Time and Position of Sighting**

Time: 13:34 WP#: 8 Lat: 29.969049 Long: -80.532804  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

Deep diving and elusive

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Sunday, February 27, 2011 Sighting # 2

**Initial Sighting on Track**

Time: 14:17 WP#: 25 Lat: 30.031088 Long: -80.479784  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 1  
Observer: HJF Observer Side: Right

**Actual Time and Position of Sighting**

Time: 14:18 WP#: 26 Lat: 30.0332130 Long: -80.4768150  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 5/7/6  
Features used in Species ID: Short robust, broad flukes, overall gray coloration, robust body  
Representative images used for Species ID: 5860, 5862, 5863, 5865  
Photographer: HJF Frame Numbers: 5837-5871 Spacer: 5872  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 14:25 WP#: 27 Lat: 30.024912 Long: -80.475251  
Calculated Distance Traveled: 0.9 km

**Behavior and Additional Comments**

Milling at surface in belly up postures, calves present, avoidance behavior observed

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Sunday, February 27, 2011 Sighting # 3

**Initial Sighting on Track**

Time: 14:26 WP#: 29 Lat: 30.031331 Long: -80.523357  
Vertical Angle: 1 Horizontal Bearing in Degrees: 110 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 1  
Observer: RCH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 14:27 WP#: 30 Lat: 30.037012 Long: -80.525749  
Species: *Stenella frontalis* Numbers (Low/High/Best): 6/8/7  
Features used in Species ID: Alternating dark and light bands on dorsal surface, long rostrum with white tip, visible spotting on some animals  
Representative images used for Species ID: 5876,5877  
Photographer: HJF Frame Numbers: 5873-5883 Spacer: 5884  
Calculated Distance from Track Line: 0.7 km

**Final Time and Position of Sighting**

Time: 14:28 WP#: 31 Lat: 30.031150 Long: -80.522346  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

Many animals swimming in belly up posture  

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Sunday, February 27, 2011 Sighting # 4

**Initial Sighting on Track**

Time: 14:29 WP#: 29 Lat: 30.032524 Long: -80.546033  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: Off Track Line: 2 Beaufort Sea State: 1  
Observer: WRS Observer Side: Co-pilot

**Actual Time and Position of Sighting**

Time: 14:29 WP#: 30 Lat: 30.041570 Long: -80.547525  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 16/19/17  
Features used in Species ID: Short rostrum, light blaze along flank  
Representative images used for Species ID: 5889,5890,5893,5901-5904  
Photographer: HJF Frame Numbers: 5885-5929 Spacer: 5930  
Calculated Distance from Track Line: 1.0 km

**Final Time and Position of Sighting**

Time: 14:33 WP#: 35 Lat: 30.040575 Long: -80.549701  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Two groups, some deep diving observed  

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Sunday, February 27, 2011 Sighting # 5

**Initial Sighting on Track**

Time: 14:47 WP#: 43 Lat: 30.101128 Long: -80.502530  
Vertical Angle: 1 Horizontal Bearing in Degrees: 45 Sighting Cue: Body  
On/Off Effort: On Track Line: 3 Beaufort Sea State: 1  
Observer: HJF Observer Side: Right

**Actual Time and Position of Sighting**

Time: 14:47 WP#: 44 Lat: 30.096030 Long: -80.497417  
Species: *Stenella frontalis* Numbers (Low/High/Best): 16/16/16  
Features used in Species ID: Visible spotting, slender animals, long rostrum, visible dark and light banding on dorsal surface  
Representative images used for Species ID: 5931-5965  
Photographer: HJF Frame Numbers: 5938.5944,5953 Spacer: 5966  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 14:49 WP#: 45 Lat: 30.099997 Long: -80.501111  
Calculated Distance Traveled: 0.6 km

**Behavior and Additional Comments**

One tight group travelling at the surface  
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Sunday, February 27, 2011 Sighting # 6

**Initial Sighting on Track**

Time: 15:21 WP#: 54 Lat: 30.165374 Long: -79.98073  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 1  
Observer: RCH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 15:23 WP#: 55 Lat: 30.167562 Long: -79.97213  
Species: *Balaenoptera acutorostrata* Numbers (Low/High/Best): 1/1/1  
Features used in Species ID: White flippers visible sub-surface  
Representative images used for Species ID: 6064,6076,6077  
Photographer: HJF Frame Numbers: 6038-6088 Spacer: 6089  
Calculated Distance from Track Line: 0.9 km

**Final Time and Position of Sighting**

Time: 15:25 WP#: 56 Lat: 30.167162 Long: -79.97310  
Calculated Distance Traveled: 0.1 km

**Behavior and Additional Comments**

No visible travel, animal remained only a few meters subsurface during the sighting  
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Sunday, February 27, 2011 Sighting # 7

**Initial Sighting on Track**

Time: 15:30 WP#: 58 Lat: 30.165590 Long: -80.039653  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 2  
Observer: HJF Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:31 WP#: 59 Lat: 30.174200 Long: -80.040481  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 15/17/16  
Features used in Species ID: Short rostrum, overall gray coloration, robust body

Representative images used for Species ID: 6106,6107,6117,6121,6123  
Photographer: HJF Frame Numbers: 6090-6124 Spacer: 6125  
Calculated Distance from Track Line: 1.0 km

**Final Time and Position of Sighting**

Time: 15:32 WP#: 60 Lat: 30.172477 Long: -80.042297  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

Animals were paired off and travelling in a single group  
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Sunday, February 27, 2011 Sighting # 8

**Initial Sighting on Track**

Time: 15:36 WP#: 62 Lat: 30.165791 Long: -80.169523  
Vertical Angle: 3 Horizontal Bearing in Degrees: 120 Sighting Cue: Body  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 1  
Observer: HJF Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:40 WP#: 63 Lat: 30.162715 Long: -80.157747  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 1/1/1  
Features used in Species ID: Short rostrum, gray cape, white peduncle

Representative images used for Species ID: 6133,6134,6151  
Photographer: HJF Frame Numbers: 6126-6158 Spacer: 6159  
Calculated Distance from Track Line: 1.2 km

**Final Time and Position of Sighting**

Time: 15:41 WP#: 64 Lat: 30.161570 Long: -80.160220  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

Fast surface travel  
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Sunday, February 27, 2011 Sighting # 9

**Initial Sighting on Track**

Time: 15:45 WP#: 67 Lat: 30.165767 Long: -80.293803  
Vertical Angle: 3 Horizontal Bearing in Degrees: 140 Sighting Cue: Breach  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 2  
Observer: HJF Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:49 WP#: 68 Lat: 30.177897 Long: -80.287122  
Species: *Stenella frontalis* Numbers (Low/High/Best): 22/30/35  
Features used in Species ID: Visible spotting, visible light and dark banding on dorsal surface, long rostrum with white tip  
Representative images used for Species ID: 6170,6179,6192,6204  
Photographer: HJF Frame Numbers: 6160-6231 Spacer: 6232  
Calculated Distance from Track Line: 1.5 km

**Final Time and Position of Sighting**

Time: 15:49 WP#: 69 Lat: 30.176912 Long: -80.280504  
Calculated Distance Traveled: 0.6 km

**Behavior and Additional Comments**

Aerobic, fast surface travel, one large group with several outliers

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Sunday, February 27, 2011 Sighting # 10

**Initial Sighting on Track**

Time: 15:50 WP#: 70 Lat: 30.171884 Long: -80.308536  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 1  
Observer: HJF Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:52 WP#: 71 Lat: 30.172691 Long: -80.299677  
Species: *Stenella frontalis* Numbers (Low/High/Best): 15/19/17  
Features used in Species ID: Visible spotting on some individuals, light and dark banding on dorsal surface  
Representative images used for Species ID: 6355,6257,6259  
Photographer: HJF Frame Numbers: 6233-6270 Spacer: 6271  
Calculated Distance from Track Line: 0.9 km

**Final Time and Position of Sighting**

Time: 15:53 WP#: 72 Lat: 30.166950 Long: -80.309104  
Calculated Distance Traveled: 1.1 km

**Behavior and Additional Comments**

Large tight group

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Sunday, February 27, 2011 Sighting # 11

**Initial Sighting on Track**

Time: 16:02 WP#: 74 Lat: 30.173830 Long: -80.545001  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 2  
Observer: WRS Observer Side: Right

**Actual Time and Position of Sighting**

Time: 16:02 WP#: 75 Lat: 30.171754 Long: -80.541038  
Species: *Stenella frontalis* Numbers (Low/High/Best): 20/25/22  
Features used in Species ID: Visible light and dark banding on dorsal surface, Spotting  
visible on some individuals  
Representative images used for Species ID: 6336,6341,6348,6377,6381  
Photographer: HJF Frame Numbers: 6321-6348 Spacer: 6349  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 16:06 WP#: 76 Lat: 30.160288 Long: -80.535859  
Calculated Distance Traveled: 1.4 km

**Behavior and Additional Comments**

Two large groups  

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Sunday, February 27, 2011 Sighting # 12

**Initial Sighting on Track**

Time: 16:34 WP#: 83 Lat: 30.434122 Long: -80.470670  
Vertical Angle: 2 Horizontal Bearing in Degrees: 70 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 1  
Observer: RCH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 16:35 WP#: 84 Lat: 30.440695 Long: -80.475763  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3/3/3  
Features used in Species ID: Broad flukes, overall gray coloration, light cape visible on flanks  
Representative images used for Species ID: 6392,6395,6398  
Photographer: HJF Frame Numbers: 6387-6401 Spacer: 6402  
Calculated Distance from Track Line: 0.9 km

**Final Time and Position of Sighting**

Time: 16:38 WP#: 85 Lat: 30.434330 Long: -80.476361  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

Subsurface travel w/some deep diving elusive  

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Sunday, February 27, 2011 Sighting # 13

**Initial Sighting on Track**

Time: 16:43 WP#: 88 Lat: 30.433209 Long: -80.439190  
Vertical Angle: 3 Horizontal Bearing in Degrees: 60 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 2  
Observer: RCH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 16:47 WP#: 89 Lat: 30.433840 Long: -80.438006  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4/4/4  
Features used in Species ID: Overall gray coloration, short stubby rostrum

Representative images used for Species ID: 6470,6471,6472  
Photographer: HJF Frame Numbers: 6455-6480 Spacer: 6481  
Calculated Distance from Track Line: 0.1 km

**Final Time and Position of Sighting**

Time: 16:49 WP#: 90 Lat: 30.432460 Long: -80.441733  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

Fast subsurface travel with some deep dives

Friday, April 8, 2011 Sighting # 1

**Initial Sighting on Track**

Time: 10:01 WP#: 5 Lat: 29.965159 Long: -80.591978  
Vertical Angle: 2 Horizontal Bearing in Degrees: 110 Sighting Cue: 2  
On/Off Effort: On Track Line: 1 Beaufort Sea State: 1  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 10:01 WP#: 6 Lat: 29.958717 Long: -80.588615  
Species: *Stenella frontalis* Numbers (Low/High/Best): 24/28/26  
Features used in Species ID: white-tipped rostrum, some animals heavily spotted, cape with blaze  
Representative images used for Species ID: 6959,6865,6871  
Photographer: REH Frame Numbers: 6848-6874 Spacer: 6875  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 10:08 WP#: 7 Lat: 29.961777 Long: -80.591294  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

One group of 8 plus several singletons, one group of 15

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Friday, April 8, 2011 Sighting # 2

**Initial Sighting on Track**

Time: 10:34 WP#: 13 Lat: 30.012310 Long: -79.787997  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: 3  
On/Off Effort: Off Track Line: N/A Beaufort Sea State: 3  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 10:36 WP#: 14 Lat: 30.007336 Long: -79.783349  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 17/17/17  
Features used in Species ID: very dark gray bodies with light peduncle, short rostrum with well-defined crease at melon, robust bodies  
Representative images used for Species ID: 6877,6878,6879,6880,6881,6890  
Photographer: REH Frame Numbers: 6876-6891 Spacer: 6892  
Calculated Distance from Track Line: 0.7 km

**Final Time and Position of Sighting**

Time: 10:39 WP#: 15 Lat: 30.009518 Long: -79.781824  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

Two groups, one of 13 one of 4

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Friday, April 8, 2011 Sighting # 3

**Initial Sighting on Track**

Time: 11:02 WP#: 19 Lat: 30.032011 Long: -80.484790  
Vertical Angle: 1 Horizontal Bearing in Degrees: 95 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 1  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 11:03 WP#: 20 Lat: 30.032401 Long: -80.481369  
Species: Unidentified Delphinid Numbers (Low/High/Best): N/A  
Features used in Species ID: No identification was possible animals were not required

Representative images used for Species ID: N/A  
Photographer: N/A Frame Numbers: N/A Spacer: N/A  
Calculated Distance from Track Line: N/A

**Final Time and Position of Sighting**

Time: N/A WP#: N/A Lat: N/A Long: N/A  
Calculated Distance Traveled: N/A

**Behavior and Additional Comments**

Animals not required  
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Friday, April 8, 2011 Sighting # 4

**Initial Sighting on Track**

Time: 11:15 WP#: 23 Lat: 30.031650 Long: -80.619260  
Vertical Angle: 3 Horizontal Bearing in Degrees: 75 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 1  
Observer: RCH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 11:15 WP#: 24 Lat: 30.021469 Long: -80.618234  
Species: Stenella frontalis Numbers (Low/High/Best): 28/34/30  
Features used in Species ID: white-tipped rostrum, alternating light/dark banding pattern from overhead, some animals heavily spotted, cape with blaze  
Representative images used for Species ID: \_\_\_\_\_  
Photographer: REH Frame Numbers: 6893-6920 Spacer: 6921  
Calculated Distance from Track Line: 1.1 km

**Final Time and Position of Sighting**

Time: 11:18 WP#: 25 Lat: 30.019361 Long: -80.618064  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Originally sighted as two smaller groups, one group of 30+  
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Friday, April 8, 2011 Sighting # 5

**Initial Sighting on Track**

Time: 11:21 WP#: 28 Lat: 30.030219 Long: -80.688079  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 1  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: N/A WP#: N/A Lat: N/A Long: N/A  
Species: Unidentified Delphinid Numbers (Low/High/Best): N/A  
Features used in Species ID: Animals were never acquired

Representative images used for Species ID: N/A  
Photographer: N/A Frame Numbers: N/A Spacer: N/A  
Calculated Distance from Track Line: N/A

**Final Time and Position of Sighting**

Time: N/A WP#: N/A Lat: N/A Long: N/A  
Calculated Distance Traveled: N/A

**Behavior and Additional Comments**

Animals were never reaquired

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Friday, April 8, 2011 Sighting # 6

**Initial Sighting on Track**

Time: 11:49 WP#: 40 Lat: 30.100240 Long: -80.098145  
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Body  
On/Off Effort: On Track Line: 3 Beaufort Sea State: 1  
Observer: RCH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 11:49 WP#: 41 Lat: 30.102726 Long: -80.094447  
Species: Tursiops truncatus Numbers (Low/High/Best): 3/3/3  
Features used in Species ID: blunt, robust rostrum, very dark gray bodies with light peduncle, broad flukes

Representative images used for Species ID: 6923,6927,6928,6929  
Photographer: REH Frame Numbers: 6922-6929 Spacer: 6930  
Calculated Distance from Track Line: 0.5 km

**Final Time and Position of Sighting**

Time: 11:55 WP#: 42 Lat: 30.101933 Long: -80.104750  
Calculated Distance Traveled: 1.0 km

**Behavior and Additional Comments**

Calf present

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Friday, April 8, 2011 Sighting # 7

**Initial Sighting on Track**

Time: 12:17 WP#: 48 Lat: 30.166690 Long: -80.133657  
Vertical Angle: 2 Horizontal Bearing in Degrees: 75 Sighting Cue: 3  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 2  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 12:18 WP#: 49 Lat: 30.167368 Long: -80.130928  
Species: *Grampus griseus* Numbers (Low/High/Best): 7/8/8  
Features used in Species ID: large, robust animals with blunt, creased melons, highly varied  
in coloration from light gray to dark with some animals heavily scarred  
Representative images used for Species ID: 6937,6940,6941  
Photographer: REH Frame Numbers: 6931-6943 Spacer: 6944  
Calculated Distance from Track Line: 0.3 km

**Final Time and Position of Sighting**

Time: 12:21 WP#: 50 Lat: 30.173440 Long: -80.130949  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

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Friday, April 8, 2011 Sighting # 8

**Initial Sighting on Track**

Time: 12:33 WP#: 52 Lat: 30.166622 Long: -80.467169  
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: 3  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 1  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 12:34 WP#: 53 Lat: 30.167375 Long: -80.470162  
Species: *Stenella frontalis* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: alternating light/dark banding pattern from above, white-tipped  
rostrum, spotted bodies  
Representative images used for Species ID: \_\_\_\_\_  
Photographer: REH Frame Numbers: 6945-6954 Spacer: 6955  
Calculated Distance from Track Line: 0.3 km

**Final Time and Position of Sighting**

Time: 12:42 WP#: 54 Lat: 30.170494 Long: -80.465785  
Calculated Distance Traveled: 0.5 km

**Behavior and Additional Comments**

Foraging near school of large fish  
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Friday, April 8, 2011 Sighting # 9

**Initial Sighting on Track**

Time: 12:50 WP#: 60 Lat: 30.166588 Long: -80.664305  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 1  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 12:52 WP#: 61 Lat: 30.169687 Long: -80.657295  
Species: *Stenella frontalis* Numbers (Low/High/Best): 8/8/8  
Features used in Species ID: slender, white-tipped rostrum, adults heavily spotted,  
darker cape with light blaze  
Representative images used for Species ID: 6956,6957  
Photographer: REH Frame Numbers: 6956-6957 Spacer: 6958  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 12:53 WP#: 62 Lat: 30.162753 Long: -80.659180  
Calculated Distance Traveled: 0.8 km

**Behavior and Additional Comments**

Four mom/calf pairs  
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Friday, April 8, 2011 Sighting # 10

**Initial Sighting on Track**

Time: 14:42 WP#: 70 Lat: 30.232168 Long: -80.676982  
Vertical Angle: 3 Horizontal Bearing in Degrees: 110 Sighting Cue: Body  
On/Off Effort: On Track Line: 5 Beaufort Sea State: 1  
Observer: RCH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 14:43 WP#: 71 Lat: 30.236528 Long: -80.682972  
Species: *Stenella frontalis* Numbers (Low/High/Best): 8/8/8  
Features used in Species ID: slender, white-tipped rostrum, some animals heavily spotted  
Representative images used for Species ID: 6963, 6965  
Photographer: REH Frame Numbers: 6961-6966 Spacer: 6967  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 14:52 WP#: 72 Lat: 30.227069 Long: -80.676503  
Calculated Distance Traveled: 1.2 km

**Behavior and Additional Comments**

Erratic behavior, surface travel with school of fish, calves present  
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Friday, April 8, 2011 Sighting # 11

**Initial Sighting on Track**

Time: 15:43 WP#: 90 Lat: 30.300378 Long: -80.538102  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 1  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:45 WP#: 91 Lat: 30.311985 Long: -80.528641  
Species: *Stenella frontalis* Numbers (Low/High/Best): 4/4/4  
Features used in Species ID: heavily spotted animals, white-tipped rostrum, light/dark  
banding pattern from overhead  
Representative images used for Species ID: 6971, 6972, 6973  
Photographer: REH Frame Numbers: 6968-6974 Spacer: 6975  
Calculated Distance from Track Line: 1.6 km

**Final Time and Position of Sighting**

Time: 15:50 WP#: 92 Lat: 30.311301 Long: -80.528464  
Calculated Distance Traveled: 0.1 km

**Behavior and Additional Comments**

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Friday, April 8, 2011 Sighting # 12

**Initial Sighting on Track**

Time: 16:02 WP#: 99 Lat: 30.365316 Long: -80.596923  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 7 Beaufort Sea State: 1  
Observer: RCH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 16:02 WP#: 100 Lat: 30.366095 Long: -80.599045  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3/3/3  
Features used in Species ID: gray with darker gray cape, broad flukes, short, robust rostrum  
Representative images used for Species ID: 6978, 6980, 6981, 6982  
Photographer: REH Frame Numbers: 6976-6982 Spacer: 6983  
Calculated Distance from Track Line: 0.2 km

**Final Time and Position of Sighting**

Time: 16:09 WP#: 101 Lat: 30.361849 Long: -80.595986  
Calculated Distance Traveled: 0.6 km

**Behavior and Additional Comments**

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Friday, April 8, 2011 Sighting # 13

**Initial Sighting on Track**

Time: 16:19 WP#: 107 Lat: 30.365316 Long: -80.596923  
Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: Body  
On/Off Effort: On Track Line: 7 Beaufort Sea State: 1  
Observer: RCH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 16:21 WP#: 108 Lat: 30.366095 Long: -80.599045  
Species: *Stenella frontalis* Numbers (Low/High/Best): 70/80/75  
Features used in Species ID: dark cape with blaze, heavily spotted animals, slender, rostrum with white tip  
Representative images used for Species ID: 6987, 6995, 6996, 6997  
Photographer: REH Frame Numbers: 6984-7000 Spacer: 7001  
Calculated Distance from Track Line: 1.2 km

**Final Time and Position of Sighting**

Time: 16:24 WP#: 109 Lat: 30.361849 Long: -80.595986  
Calculated Distance Traveled: 0.7 km

**Behavior and Additional Comments**

Two large groups  
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Friday, April 8, 2011 Sighting # 14

**Initial Sighting on Track**

Time: 16:37 WP#: 113 Lat: 30.364915 Long: -79.854536  
Vertical Angle: 2 Horizontal Bearing in Degrees: 120 Sighting Cue: Body  
On/Off Effort: On Track Line: 7 Beaufort Sea State: 1  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 16:38 WP#: 114 Lat: 30.359322 Long: -79.859038  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 6/8/7  
Features used in Species ID: very dark gray body with light peduncle, short, robust rostrum and well-defined crease at melon  
Representative images used for Species ID: 7020, 7021, 7023, 7024, 7025  
Photographer: REH Frame Numbers: 7002-7026 Spacer: 7027  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 16:42 WP#: 115 Lat: 30.359508 Long: -79.858105  
Calculated Distance Traveled: 0.1 km

**Behavior and Additional Comments**

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Friday, April 8, 2011 Sighting # 15

**Initial Sighting on Track**

Time: 16:55 WP#: 119 Lat: 30.433732 Long: -80.057528  
Vertical Angle: 2 Horizontal Bearing in Degrees: 75 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 1  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 16:57 WP#: 120 Lat: 30.434931 Long: -80.053184  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4/4/4  
Features used in Species ID: gray with darker cape, broad flukes, short, robust rostrum

Representative images used for Species ID: 7028, 7030, 7031

Photographer: REH Frame Numbers: 7028-7035 Spacer: 7036  
Calculated Distance from Track Line: 0.4 km

**Final Time and Position of Sighting**

Time: 17:03 WP#: 121 Lat: 30.431357 Long: -80.072377  
Calculated Distance Traveled: 1.9 km

**Behavior and Additional Comments**

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Friday, April 8, 2011 Sighting # 16

**Initial Sighting on Track**

Time: 17:11 WP#: 124 Lat: 30.433879 Long: -80.271079  
Vertical Angle: 1 Horizontal Bearing in Degrees: 130 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 1  
Observer: RCH Observer Side: Left

**Actual Time and Position of Sighting**

Time: 17:12 WP#: 125 Lat: 30.427251 Long: -80.267361  
Species: *Stenella frontalis* Numbers (Low/High/Best): 40/40/40  
Features used in Species ID: white-tipped, slender rostrum, heavily spotted, dark cape with lighter blaze

Representative images used for Species ID: 7037-7039, 7041, 7042

Photographer: REH Frame Numbers: 7037-7045 Spacer: 7046  
Calculated Distance from Track Line: 0.8 km

**Final Time and Position of Sighting**

Time: 17:14 WP#: 126 Lat: 30.429265 Long: -80.269206  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

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Friday, April 8, 2011 Sighting # 17

**Initial Sighting on Track**

Time: 17:27 WP#: 130 Lat: 30.433070 Long: -80.687565  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 1  
Observer: REH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 17:28 WP#: 131 Lat: 30.434722 Long: -80.684533  
Species: Stenella frontalis Numbers (Low/High/Best): 25/25/25  
Features used in Species ID: heavily spotted, white-tipped, slender rostrum, dark cape with lighter blaze  
Representative images used for Species ID: 7054, 7056, 7057, 7059, 7066, 7102  
Photographer: REH Frame Numbers: 7047-7105 Spacer: 7106  
Calculated Distance from Track Line: 0.3 km

**Final Time and Position of Sighting**

Time: 17:32 WP#: 132 Lat: 30.438025 Long: -80.687130  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

Some acrobatics. very active, rough playing

Saturday, April 9, 2011 Sighting # 1

**Initial Sighting on Track**

Time: 10:00 WP#: 10 Lat: 30.499756 Long: -80.417988  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 2  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 10:03 WP#: 11 Lat: 30.494210 Long: -80.415287  
Species: *Stenella frontalis* Numbers (Low/High/Best): 35/45/40  
Features used in Species ID: Alternating light and dark dorsal "banding", long, white-tipped beak  
Representative images used for Species ID: 7110, 7114, 7115, 7116  
Photographer: RCH Frame Numbers: 7107-7166 Spacer: 7167  
Calculated Distance from Track Line: 0.7 km

**Final Time and Position of Sighting**

Time: 10:10 WP#: 12 Lat: 30.502313 Long: -80.414408  
Calculated Distance Traveled: 0.9 km

**Behavior and Additional Comments**

Active and somewhat spread out group, some leaping observed  
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Saturday, April 9, 2011 Sighting # 2

**Initial Sighting on Track**

Time: 10:18 WP#: 16 Lat: 30.499271 Long: -80.640493  
Vertical Angle: 1 Horizontal Bearing in Degrees: 70 Sighting Cue: Body  
On/Off Effort: On Track Line: 9 Beaufort Sea State: 2  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 10:20 WP#: 17 Lat: 30.487590 Long: -80.647595  
Species: *Stenella frontalis* Numbers (Low/High/Best): 4/5/5  
Features used in Species ID: Light flank blaze terminating at mid-dorsal fin, long and white tipped rostrum  
Representative images used for Species ID: 7168, 7169, 7184, 7185  
Photographer: RCH Frame Numbers: 7168-7187 Spacer: 7188  
Calculated Distance from Track Line: 1.5 km

**Final Time and Position of Sighting**

Time: 10:22 WP#: 18 Lat: 30.490311 Long: -80.637886  
Calculated Distance Traveled: 1.0 km

**Behavior and Additional Comments**

Some tactile interaction observed, belly to belly swimming  
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Saturday, April 9, 2011 Sighting # 3

**Initial Sighting on Track**

Time: 10:30 WP#: 22 Lat: 30.432873 Long: -80.622239  
Vertical Angle: 2 Horizontal Bearing in Degrees: 80 Sighting Cue: Body  
On/Off Effort: On Track Line: 8 Beaufort Sea State: 2  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 10:30 WP#: 23 Lat: 30.439739 Long: -80.629138  
Species: *Stenella frontalis* Numbers (Low/High/Best): 9/12/11  
Features used in Species ID: Long, white-tipped beak, light flank blaze ending mid-dorsal

Representative images used for Species ID: 7192, 7200, 7201, 7202  
Photographer: RCH Frame Numbers: 7189-7204 Spacer: 7205  
Calculated Distance from Track Line: 1.0 km

**Final Time and Position of Sighting**

Time: 10:34 WP#: 24 Lat: 30.440867 Long: -80.629433  
Calculated Distance Traveled: 0.1 km

**Behavior and Additional Comments**

Potentially feeding, 7-8 animals in group and two stragglers.

Saturday, April 9, 2011 Sighting # 4

**Initial Sighting on Track**

Time: 12:20 WP#: 48 Lat: 30.232844 Long: -80.576501  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Track Line: 6 Beaufort Sea State: 2  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 12:22 WP#: 49 Lat: 30.226524 Long: -80.578210  
Species: *Stenella frontalis* Numbers (Low/High/Best): 9/10/9  
Features used in Species ID: Obvious spotting, light flank blaze terminating mid-dorsal, long whit-tipped beak

Representative images used for Species ID: 7216, 7223, 7224, 7234  
Photographer: RCH Frame Numbers: 7206-7234 Spacer: 7235  
Calculated Distance from Track Line: 0.7 km

**Final Time and Position of Sighting**

Time: 12:23 WP#: 50 Lat: 30.227246 Long: -80.578234  
Calculated Distance Traveled: <0.1 km

**Behavior and Additional Comments**

Fairly tight group, slow surface travel

Saturday, April 9, 2011 Sighting # 5

**Initial Sighting on Track**

Time: 14:23 WP#: 63 Lat: 30.166006 Long: -79.913501  
Vertical Angle: 1 Horizontal Bearing in Degrees: 70 Sighting Cue: Body  
On/Off Effort: On Track Line: 4 Beaufort Sea State: 2  
Observer: PBN Observer Side: Left

**Actual Time and Position of Sighting**

Time: 14:28 WP#: 64 Lat: 30.162229 Long: -79.922369  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3/4/3  
Features used in Species ID: Robust, gray dolphins with darker gray capes, blunt rostrum

Representative images used for Species ID: 7255, 7261, 7262  
Photographer: RCH Frame Numbers: 7254-7263 Spacer: 7264  
Calculated Distance from Track Line: 1.0 km

**Final Time and Position of Sighting**

Time: 14:29 WP#: 65 Lat: 30.163080 Long: -79.921031  
Calculated Distance Traveled: 0.2 km

**Behavior and Additional Comments**

Fairly fast travel  
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Saturday, April 9, 2011 Sighting # 6

**Initial Sighting on Track**

Time: 14:57 WP#: 70 Lat: 30.100496 Long: -80.504729  
Vertical Angle: 2 Horizontal Bearing in Degrees: 120 Sighting Cue: Body  
On/Off Effort: On Track Line: 3 Beaufort Sea State: 2  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 14:58 WP#: 71 Lat: 30.102658 Long: -80.502276  
Species: *Stenella frontalis* Numbers (Low/High/Best): 25/30/27  
Features used in Species ID: Alternating light and dark dorsal 'banding', spotted pattern, long and white-tipped beak

Representative images used for Species ID: 7269, 7238, 7295, 7298, 7301  
Photographer: RCH Frame Numbers: 7265-7307 Spacer: 7308  
Calculated Distance from Track Line: 0.3 km

**Final Time and Position of Sighting**

Time: 15:01 WP#: 72 Lat: 30.104892 Long: -80.504589  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

Fast surface travel, leaping  
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Saturday, April 9, 2011 Sighting # 7

**Initial Sighting on Track**

Time: 15:15 WP#: 79 Lat: 30.031534 Long: -80.530440  
Vertical Angle: 3 Horizontal Bearing in Degrees: 70 Sighting Cue: Splash  
On/Off Effort: On Track Line: 2 Beaufort Sea State: 1  
Observer: RCH Observer Side: Right

**Actual Time and Position of Sighting**

Time: 15:16 WP#: 80 Lat: 30.029456 Long: -80.529475  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: Broad flukes, robust and gray dolphins with darker gray cape, short and stubby rostrum  
Representative images used for Species ID: 7327, 7328, 7329  
Photographer: RCH Frame Numbers: 7309-7331 Spacer: 7332  
Calculated Distance from Track Line: 0.2 km

**Final Time and Position of Sighting**

Time: 15 WP#: 81 Lat: 30.027944 Long: -80.526122  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

Fats travel and aerial behavior. One dolphin appeared to have something in its mouth.  
Probable avoidance behavior observed.

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Thursday, May 19, 2011 Sighting # 1

**Initial sighting on Track**

Time: 12:43 WP#: 3 Lat: 29.965041 Long: -80.666394  
Vertical Angle: 1 Horizontal Bearing in Degrees: 110 Sighting Cue: 2  
On/Off Effort: on Trackline: 1 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: 12:49 WP#: 4 Lat: 29.964261 Long: -80.666475  
Species: *Stenella frontalis* Numbers (Low/High/Best): 45/55/50  
Features used in Species ID: White blaze extending to mid dorsal fin, alternating light and dark pattern,  
Representative images used for Species ID: 8108  
Photographer: Heather Frame numbers: 8104 - 8110 Spacer: 8111  
Calculated distance from Trackline: 0.087 km

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

**Behavior and Additional Comments**

Animals were doing deep dives and traveling at a fast pace in 2 groups. Not resighted for a final location

Thursday, May 19, 2011 Sighting # 2

**Initial sighting on Track**

Time: 13:18 WP#: 9 Lat: 29.970826 Long: -80.000716  
Vertical Angle: 90 Horizontal Bearing in Degrees: 3 Sighting Cue: 3  
On/Off Effort: On Trackline: 1 Beaufort Sea State: 4  
Observer: Erin Observer side: L

**Actual Time and Position of Sighting**

Time: 13:23 WP#: 10 Lat: 29.974699 Long: -80.003449  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4/4/4  
Features used in Species ID: Solid grey body  
Representative images used for Species ID: 8112 and 8113  
Photographer: Heather Frame numbers: 8112 - 8125 Spacer: 8126  
Calculated distance from Trackline: 0.5047 km

**Final Time and Position of Sighting**

Time: 13:25 WP#: 11 Lat: 29.973924 Long: -80.013388  
Calculated Distance Traveled: 0.9612 km

**Behavior and Additional Comments**

Animals doing deep dives, regular surfacing, traveling fast

Friday, May 20, 2011 Sighting # 1

**Initial sighting on Track**

Time: 8:04 WP#: 3 Lat: 30.566761 Long: -80.664637  
Vertical Angle: 2 Horizontal Bearing in Degrees: 120 Sighting Cue: 3  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 1  
Observer: Heather Observer side: Right

**Actual Time and Position of Sighting**

Time: 8:09 WP#: 5 Lat: 30.569307 Long: -80.694923  
Species: *Stenella frontalis* Numbers (Low/High/Best): 7/7/7  
Features used in Species ID: Alternating light and dark pattern down the body, white tip on rostrum, spots  
Representative images used for Species ID: 8149, 8145  
Photographer: Erin Frame numbers: 8127 - 8150 Spacer: 8151  
Calculated distance from Trackline: 2.913 km

**Final Time and Position of Sighting**

Time: 8:13 WP#: 6 Lat: 30.566331 Long: -80.698882  
Calculated Distance Traveled: 0.5032 km

**Behavior and Additional Comments**


Friday, May 20, 2011 Sighting # 2

**Initial sighting on Track**

Time: 8:14 WP#: 8 Lat: 30.565893 Long: -80.648876  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 1  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 8:17 WP#: 9 Lat: 30.564627 Long: -80.653456  
Species: *Stenella frontalis* Numbers (Low/High/Best): 21/21/21  
Features used in Species ID: Alternating light and dark pattern down the body, white tip on rostrum, spots  
Representative images used for Species ID: 8156, 8158  
Photographer: Erin Frame numbers: 8152 - 8190 Spacer: 8191  
Calculated distance from Trackline: 0.4606 km

**Final Time and Position of Sighting**

Time: 8:18 WP#: 10 Lat: 30.560714 Long: -80.646437  
Calculated Distance Traveled: 0.8006 km

**Behavior and Additional Comments**

At least 2 distinct subgroups, closely bunched. Leatherback sea turtle in vicinity.

Friday, May 20, 2011 Sighting # 3

**Initial sighting on Track**

Time: 8:56 WP#: 23 Lat: 30.503000 Long: -80.210909  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: 3  
On/Off Effort: On Trackline: 9 Beaufort Sea State: 2  
Observer: Heather Observer side: Left

**Actual Time and Position of Sighting**

Time: 9:00 WP#: 24 Lat: 30.499995 Long: -80.212291  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4/4/4  
Features used in Species ID: Robust, uniform grey animals

Representative images used for Species ID: 8199, 8200  
Photographer: Erin Frame numbers: 8192 - 8206 Spacer: 8207  
Calculated distance from Trackline: 0.3594 km

**Final Time and Position of Sighting**

Time: 9:05 WP#: 25 Lat: 30.496983 Long: -80.213890  
Calculated Distance Traveled: 0.3683 km

**Behavior and Additional Comments**

Tight group remained mostly at surface until we started circling then they were subsurface.

Friday, May 20, 2011 Sighting # 4

**Initial sighting on Track**

Time: 9:24 WP#: 33 Lat: 30.429793 Long: -80.553007  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: 3  
On/Off Effort: On Trackline: 8 Beaufort Sea State: 2  
Observer: Heather Observer side: Left

**Actual Time and Position of Sighting**

Time: 9:28 WP#: 34 Lat: 30.434336 Long: -80.554982  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4/4/4  
Features used in Species ID: Robust, uniform grey

Representative images used for Species ID: 8211, 8215  
Photographer: Erin Frame numbers: 8208 - 8216 Spacer: 8217  
Calculated distance from Trackline: 0.5395 km

**Final Time and Position of Sighting**

Time: 9:31 WP#: 35 Lat: 30.437043 Long: -80.553172  
Calculated Distance Traveled: 0.3474 km

**Behavior and Additional Comments**

Lots of surface activity, spread out.

Friday, May 20, 2011 Sighting # 5

**Initial sighting on Track**

Time: 9:46 WP#: 40 Lat: 30.434515 Long: -80.100540  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: 3  
On/Off Effort: On Trackline: 8 Beaufort Sea State: 2  
Observer: Heather Observer side: Left

**Actual Time and Position of Sighting**

Time: 9:49 WP#: 41 Lat: 30.439923 Long: -80.099134  
Species: *Grampus griseus* Numbers (Low/High/Best): 5/8/5  
Features used in Species ID: Grey animals with with white scaring and blunt head, cleft in center of head  
Representative images used for Species ID: 8239, 8218, 8223  
Photographer: Erin Frame numbers: 8218 - 8242 Spacer: 8243  
Calculated distance from Trackline: 0.6163 km

**Final Time and Position of Sighting**

Time: 9:52 WP#: 42 Lat: 30.443251 Long: -80.106579  
Calculated Distance Traveled: 0.8040 km

**Behavior and Additional Comments**

Close group stayed just subsurface most of the time

Friday, May 20, 2011 Sighting # 6

**Initial sighting on Track**

Time: 9:58 WP#: 45 Lat: 30.434578 Long: -79.880805  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 8 Beaufort Sea State: 3  
Observer: Heather Observer side: Left

**Actual Time and Position of Sighting**

Time: 10:03 WP#: 48 Lat: 30.444134 Long: -79.822932  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 10/30/20  
Features used in Species ID: Robust, grey animals  
Representative images used for Species ID: 8253, 8254  
Photographer: Erin Frame numbers: 8245 - 8266 Spacer: 8267  
Calculated distance from Trackline: 5.649 km

**Final Time and Position of Sighting**

Time: 10:04 WP#: 49 Lat: 30.440195 Long: -79.817589  
Calculated Distance Traveled: 0.6739 km

**Behavior and Additional Comments**

Several distinct groups

Friday, May 20, 2011 Sighting # 7

**Initial sighting on Track**

Time: 10:13 WP#: 53 Lat: 30.360578 Long: -80.002146  
Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: 3  
On/Off Effort: On Trackline: 7 Beaufort Sea State: 3  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 10:16 WP#: 54 Lat: 30.365678 Long: -79.997541  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 5/5/5  
Features used in Species ID: Large, black, robust animals with blunt head

Representative images used for Species ID: 8284, 8290  
Photographer: Erin Frame numbers: 8268, 8290 Spacer: 8291  
Calculated distance from Trackline: 0.7189 km

**Final Time and Position of Sighting**

Time: 10:18 WP#: 55 Lat: 30.370200 Long: -80.002867  
Calculated Distance Traveled: 0.7169 km

**Behavior and Additional Comments**

Mom/calf pair or observed. All swimming in same direction

Friday, May 20, 2011 Sighting # 8

**Initial sighting on Track**

Time: 9:58 WP#: 62 Lat: 30.368587 Long: -80.448406  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 7 Beaufort Sea State: 2  
Observer: Heather Observer side: Left

**Actual Time and Position of Sighting**

Time: 10:34 WP#: 63 Lat: 30.364594 Long: -80.446151  
Species: *Stenella frontalis* Numbers (Low/High/Best): 30/30/30  
Features used in Species ID: Alternating light and dark pattern down body, white tip on rostrum

Representative images used for Species ID: 8292  
Photographer: Erin Frame numbers: 8292 - 8311 Spacer: 8312  
Calculated distance from Trackline: 0.4939 km

**Final Time and Position of Sighting**

Time: 10:35 WP#: 64 Lat: 30.352737 Long: -80.450114  
Calculated Distance Traveled: 1.372 km

**Behavior and Additional Comments**

Calves present



Friday, May 20, 2011 Sighting # 9

### Initial sighting on Track

Time: 10:48 WP#: 71 Lat: 30.302851 Long: -80.554180  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 6 Beaufort Sea State: 2  
Observer: Heather Observer side: Left

### Actual Time and Position of Sighting

Time: 10:49 WP#: 72 Lat: 30.309490 Long: -80.560544  
Species: *Stenella frontalis* Numbers (Low/High/Best): 7/7/7  
Features used in Species ID: Alternating light and dark pattern down body, white tip on rostrum

Representative images used for Species ID: 8325, 8327  
Photographer: Erin Frame numbers: 8313 - 8335 Spacer: 8336  
Calculated distance from Trackline: 0.9582 km

### Final Time and Position of Sighting

Time: 10:51 WP#: 73 Lat: 30.306625 Long: -80.560403  
Calculated Distance Traveled: 0.3189 km

### Behavior and Additional Comments

Traveling close together, moderate rate of travel

Friday, May 20, 2011 Sighting # 10

### Initial sighting on Track

Time: 10:55 WP#: 77 Lat: 30.299830 Long: -80.427073  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 6 Beaufort Sea State: 2  
Observer: Heather Observer side: Left

### Actual Time and Position of Sighting

Time: 10:56 WP#: 78 Lat: 30.302858 Long: -80.429018  
Species: *Stenella frontalis* Numbers (Low/High/Best): 25/35/30  
Features used in Species ID: Alternating light and dark pattern down body, white tip on rostrum

Representative images used for Species ID: 8349, 8350  
Photographer: Erin Frame numbers: 8337 - 8364 Spacer: 8365  
Calculated distance from Trackline: 0.3850 km

### Final Time and Position of Sighting

Time: 10:59 WP#: 79 Lat: 30.294230 Long: -80.430994  
Calculated Distance Traveled: 0.9780 km

### Behavior and Additional Comments

2 large groups with 7-10 and 12-15 individuals, each group closely lumped or on top of each other.

Friday, May 20, 2011 Sighting # 11

**Initial sighting on Track**

Time: 11:34 WP#: 88 Lat: 30.228551 Long: -80.437420  
Vertical Angle: 4 Horizontal Bearing in Degrees: 110 Sighting Cue: 4  
On/Off Effort: On Trackline: 5 Beaufort Sea State: 1  
Observer: Heather Observer side: Left

**Actual Time and Position of Sighting**

Time: 11:36 WP#: 89 Lat: 30.224460 Long: -80.424656  
Species: *Stenella frontalis* Numbers (Low/High/Best): 25/40/32  
Features used in Species ID: Alternating light and dark pattern down body, white tip on rostrum

Representative images used for Species ID: 8377, 8381  
Photographer: Erin Frame numbers: 8366 - 8394 Spacer: 8395  
Calculated distance from Trackline: 1.308 km

**Final Time and Position of Sighting**

Time: 11:37 WP#: 90 Lat: 30.222363 Long: -80.425224  
Calculated Distance Traveled: 0.2395 km

**Behavior and Additional Comments**

2 distinct subgroups one of approximately 20 individuals and the other 8. Separated by a good distance.

Friday, May 20, 2011 Sighting # 12

**Initial sighting on Track**

Time: 13:21 WP#: 105 Lat: 30.159044 Long: -80.430797  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 4 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 13:22 WP#: 106 Lat: 30.153661 Long: -80.434027  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 20/20/20  
Features used in Species ID: Robust, grey animals

Representative images used for Species ID: 8414, 8425, 8437, 8444  
Photographer: Erin Frame numbers: 8409 - 8445 Spacer: 8446  
Calculated distance from Trackline: 0.6743 km

**Final Time and Position of Sighting**

Time: 13:25 WP#: 107 Lat: 30.157059 Long: -80.437600  
Calculated Distance Traveled: 0.5107 km

**Behavior and Additional Comments**

Animals were both North and South of trackline, several distinct groups, lots of surface activity.

Friday, May 20, 2011 Sighting # 13

**Initial sighting on Track**

Time: 14:41 WP#: 123 Lat: 29.966714 Long: -80.093090  
Vertical Angle: 2 Horizontal Bearing in Degrees: 110 Sighting Cue: 3  
On/Off Effort: On Trackline: 1 Beaufort Sea State: 3  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 14:43 WP#: 124 Lat: 29.973099 Long: -80.091205  
Species: *Grampus griseus* Numbers (Low/High/Best): 4/4/4  
Features used in Species ID: Large grey animals with white scaring. Blunt head with cleft

Representative images used for Species ID: 8451, 8461, 8463, 8468, 8470  
Photographer: Erin Frame numbers: 8447 - 8473 Spacer: 8473  
Calculated distance from Trackline: 0.7328 km

**Final Time and Position of Sighting**

Time: 14:48 WP#: 126 Lat: 29.977286 Long: -80.083709  
Calculated Distance Traveled: 0.8591 km

**Behavior and Additional Comments**

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Tuesday, June 21, 2011 Sighting # 1

**Initial sighting on Track**

Time: 14:52 WP#: 20 Lat: 29.963176 Long: -80.257278  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 1 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 14:53 WP#: 21 Lat: 29.962702 Long: -80.256426  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3 / 3 / 3  
Features used in Species ID: Uniform grey coloration, robust body, large dorsal fin

Representative images used for Species ID: 9098  
Photographer: Erin Frame numbers: 9096 - 9100 Spacer: NA  
Calculated distance from Trackline: 0.1 km

**Final Time and Position of Sighting**

Time: 15:04 WP#: 22 Lat: 29.964821 Long: -80.250774  
Calculated Distance Traveled: 0.6 km

**Behavior and Additional Comments**

Animals were difficult to resight. Only visible at the surface due to diffuse glare caused by smoke layer.

Wednesday, July 20, 2011 Sighting # 1

### Initial sighting on Track

Time: 9:00 WP#: 10 Lat: 30.500174 Long: -80.435124  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 3  
Observer: Heather Observer side: Right

### Actual Time and Position of Sighting

Time: 9:02 WP#: 11 Lat: 30.505652 Long: -80.426843  
Species: *Stenella frontalis* Numbers (Low/High/Best): 8/15/13  
Features used in Species ID: White blaze to mid dorsal fin, spots, alternating light and dark coloration  
Representative images used for Species ID: 9098, 9112, 9127  
Photographer: Heather Frame numbers: 9096 - 9132 Spacer: 9133  
Calculated distance from Trackline: 1.00 km

### Final Time and Position of Sighting

Time: 9:10 WP#: 12 Lat: 30.498694 Long: -80.429734  
Calculated Distance Traveled: 0.8218 km

### Behavior and Additional Comments

Animals traveling at a relatively fast speed just below the surface with regular surfacing and spread out.

Wednesday, July 20, 2011 Sighting # 2

### Initial sighting on Track

Time: 9:56 WP#: 23 Lat: 30.366409 Long: -80.105135  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 7 Beaufort Sea State: 3  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 9:57 WP#: 24 Lat: 30.366602 Long: -80.105149  
Species: *Grampus griseus* Numbers (Low/High/Best): 16/26/23  
Features used in Species ID: Blunt heads with cleft in middle, white to grey bodies  
Representative images used for Species ID: 9161, 9166, 9174, 9197, 9200, 9201  
Photographer: Heather Frame numbers: 9134 - 9217 Spacer: 9218  
Calculated distance from Trackline: 0.02150 km

### Final Time and Position of Sighting

Time: 10:08 WP#: 25 Lat: 30.361352 Long: -80.107426  
Calculated Distance Traveled: 0.6233 km

### Behavior and Additional Comments

Mixed species sighting, Ggr and Ttr \*\*\*\*

Animals traveling very fast in 1 direction just below the surface. Animals divided into multiple groups, widely spaced, possibly 6 subgroups. All near a current line, some circling and breaching.

Wednesday, July 20, 2011 Sighting # 3

### Initial sighting on Track

Time: 10:10 WP#: 27 Lat: 30.366453 Long: -80.166821  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 7 Beaufort Sea State: 3  
Observer: Heather Observer side: Right

### Actual Time and Position of Sighting

Time: 10:10 WP#: 28 Lat: 30.371936 Long: -80.164104  
Species: *Grampus griseus* Numbers (Low/High/Best): 25/30/28  
Features used in Species ID: Blunt heads with cleft in the middle, white to grey bodies

Representative images used for Species ID: 9291, 9336, 9350  
Photographer: Heather Frame numbers: 9219 - 9367 Spacer: 9368  
Calculated distance from Trackline: 0.6631 km

### Final Time and Position of Sighting

Time: 10:20 WP#: 29 Lat: 30.397805 Long: -80.191307  
Calculated Distance Traveled: 3.884 km

### Behavior and Additional Comments

Traveling very fast with the majority in a tightly packed group with a few stragglers.

Wednesday, July 20, 2011 Sighting # 4

### Initial sighting on Track

Time: 10:25 WP#: 32 Lat: 30.366501 Long: -80.321520  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 7 Beaufort Sea State: 3  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 10:27 WP#: 33 Lat: 30.367646 Long: -80.322849  
Species: *Stenella frontalis* Numbers (Low/High/Best): 9/15/13  
Features used in Species ID: Alternating light and dark pattern down body with spotting

Representative images used for Species ID: 9377, 9378  
Photographer: Heather Frame numbers: 9369 - 9390 Spacer: 9391  
Calculated distance from Trackline: 0.1802 km

### Final Time and Position of Sighting

Time: 10:37 WP#: 34 Lat: 30.364527 Long: -80.335880  
Calculated Distance Traveled: 1.297 km

### Behavior and Additional Comments

Traveling very fast sub surface and staying about 3 body lengths apart.

Wednesday, July 20, 2011 Sighting # 5

**Initial sighting on Track**

Time: 11:32 WP#: 47 Lat: 30.233583 Long: -80.353259  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 5 Beaufort Sea State: 2  
Observer: Heather Observer side: R

**Actual Time and Position of Sighting**

Time: n/a WP#: n/a Lat: n/a Long: n/a  
Species: None Numbers (Low/High/Best): n/a  
Features used in Species ID: n/a

Representative images used for Species ID: n/a  
Photographer: n/a Frame numbers: n/a Spacer: n/a  
Calculated distance from Trackline: n/a

**Final Time and Position of Sighting**

Time: 11:44 WP#: 48 Lat: 30.239769 Long: -80.365223  
Calculated Distance Traveled:

**Behavior and Additional Comments**

No resight.

Wednesday, July 20, 2011 Sighting # 6

**Initial sighting on Track**

Time: 13:53 WP#: 61 Lat: 30.100442 Long: -79.847551  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 3 Beaufort Sea State: 3  
Observer: Heather Observer side: R

**Actual Time and Position of Sighting**

Time: 13:54 WP#: 62 Lat: 30.100653 Long: -79.847793  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8/12/11  
Features used in Species ID: Dark bodied animals with white peduncles

Representative images used for Species ID: 9398, 9399, 9401, 9403  
Photographer: Heather Frame numbers: 9392 - 9424 Spacer: 9425  
Calculated distance from Trackline: 0.03305 km

**Final Time and Position of Sighting**

Time: 13:56 WP#: 63 Lat: 30.111557 Long: -79.846815  
Calculated Distance Traveled: 1.216 km

**Behavior and Additional Comments**

Milling around subsurface, some doing deeper dives

Wednesday, July 20, 2011 Sighting # 7

**Initial sighting on Track**

Time: 14:14 WP#: 66 Lat: 30.100087 Long: -80.438727  
Vertical Angle: 3 Horizontal Bearing in Degrees: 120 Sighting Cue: 3  
On/Off Effort: On Trackline: 3 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: 14:16 WP#: 67 Lat: 30.092634 Long: -80.431332  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3/3/3  
Features used in Species ID: Dark bodied animals with white peduncles

Representative images used for Species ID: 9427, 9450  
Photographer: Heather Frame numbers: 9426 - 9454 Spacer: 9454  
Calculated distance from Trackline: 1.092 km

**Final Time and Position of Sighting**

Time: 14:19 WP#: 68 Lat: 30.101285 Long: -80.426980  
Calculated Distance Traveled: 1.049 km

**Behavior and Additional Comments**

Slow travel just below the surface with regular surfacing.

Wednesday, July 20, 2011 Sighting # 8

**Initial sighting on Track**

Time: 15:23 WP#: 82 Lat: 29.965712 Long: -80.654761  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 1 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: 15:25 WP#: 83 Lat: 29.954577 Long: -80.651344  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 7/10/8  
Features used in Species ID: Grey bodied animals with white peduncles

Representative images used for Species ID: 9460, 9475  
Photographer: Heather Frame numbers: 9456 - 9478 Spacer: 9479  
Calculated distance from Trackline: 1.281 km

**Final Time and Position of Sighting**

Time: 15:27 WP#: 84 Lat: 29.963750 Long: -80.654459  
Calculated Distance Traveled: 1.063 km

**Behavior and Additional Comments**

Traveling subsurface. Showing avoidance behavior.



Thursday, July 21, 2011 Sighting # 1

**Initial sighting on Track**

Time: 9:57 WP#: 14 Lat: 30.167064 Long: -80.126644  
Vertical Angle: 2 Horizontal Bearing in Degrees: 110 Sighting Cue: 3  
On/Off Effort: On Trackline: 4 Beaufort Sea State: 3  
Observer: HJF Observer side: L

**Actual Time and Position of Sighting**

Time: 10:00 WP#: 15 Lat: 30.160364 Long: -80.130149  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 12 / 16 / 14  
Features used in Species ID: Uniform grey coloration with slight lateral blaze, robust body appearance, white dorsal surface to peduncle.  
Representative images used for Species ID: 11, 12, 20, 21  
Photographer: EWC Frame numbers: 2 - 38 Spacer: 39  
Calculated distance from Trackline: 0.8 km

**Final Time and Position of Sighting**

Time: 10:02 WP#: 16 Lat: 30.158152 Long: -80.128843  
Calculated Distance Traveled: 0.3 km

**Behavior and Additional Comments**

Traveling together mostly as a group with a few outliers - one mom / calf pair observed

Thursday, July 21, 2011 Sighting # 2

**Initial sighting on Track**

Time: 10:42 WP#: 20 Lat: 30.231813 Long: -79.982862  
Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: 3  
On/Off Effort: On Trackline: 5 Beaufort Sea State: 3  
Observer: EWC Observer side: Right

**Actual Time and Position of Sighting**

Time: 10:45 WP#: 21 Lat: 30.229362 Long: -79.981972  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4 / 8 / 6  
Features used in Species ID: Robust body appearance, uniform grey coloration  
Representative images used for Species ID: 62, 66, 67  
Photographer: EWC Frame numbers: 40-72 Spacer: 73  
Calculated distance from Trackline: 0.3 km

**Final Time and Position of Sighting**

Time: 10:51 WP#: 22 Lat: 30.237843 Long: -79.986097  
Calculated Distance Traveled: 1 km

**Behavior and Additional Comments**

A couple of small groups spread apart, two calves observed.

Thursday, July 21, 2011 Sighting # 3

### Initial sighting on Track

Time: 13:02 WP#: 31 Lat: 30.365277 Long: -80.251457  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 7 Beaufort Sea State: 3  
Observer: EWC Observer side: Right

### Actual Time and Position of Sighting

Time: 13:03 WP#: 32 Lat: 30.350203 Long: -80.247303  
Species: *Stenella frontalis* Numbers (Low/High/Best): 30 / 40 / 35  
Features used in Species ID: White tip to rostrum, area of white along animals midline, body with visible spotting especially inside white area on midline.  
Representative images used for Species ID: 76, 86, 88, 100, 106, 107 & 116  
Photographer: EWC Frame numbers: 74-130 Spacer: 131  
Calculated distance from Trackline: 1.7 km

### Final Time and Position of Sighting

Time: 13:07 WP#: 33 Lat: 30.354932 Long: -80.252459  
Calculated Distance Traveled: 0.7 km

### Behavior and Additional Comments

Fast travel with lots of aerial activity, closely packed animals, direction of travel changed during sighting

Thursday, July 21, 2011 Sighting # 4

### Initial sighting on Track

Time: 13:10 WP#: 35 Lat: 30.365455 Long: -80.125084  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 7 Beaufort Sea State: 3  
Observer: EWC Observer side: Right

### Actual Time and Position of Sighting

Time: 13:13 WP#: 36 Lat: 30.361196 Long: -80.134629  
Species: *Grampus griseus* Numbers (Low/High/Best): 18 / 22 / 20  
Features used in Species ID: Large head coming to a rounded point, large falcate dorsal fin, visible scarring on body.  
Representative images used for Species ID: 140, 141, 147  
Photographer: EWC Frame numbers: 132-158 Spacer: 159  
Calculated distance from Trackline: 1 km

### Final Time and Position of Sighting

Time: 13:13 WP#: 37 Lat: 30.363711 Long: -80.131814  
Calculated Distance Traveled: 0.4 km

### Behavior and Additional Comments

Densely packed group traveling together with a few outlying animals.

Thursday, July 21, 2011 Sighting # 5

**Initial sighting on Track**

Time: 13:45 WP#: 42 Lat: 30.433942 Long: -80.508678  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 8 Beaufort Sea State: 3  
Observer: EWC Observer side: Right

**Actual Time and Position of Sighting**

Time: 13:46 WP#: 43 Lat: 30.438755 Long: -80.505104  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3 / 3 / 3  
Features used in Species ID: Uniform grey coloration

Representative images used for Species ID: 174, 175  
Photographer: EWC Frame numbers: 160-178 Spacer: 179  
Calculated distance from Trackline:

**Final Time and Position of Sighting**

Time: 13:54 WP#: 44 Lat: 30.443925 Long: -80.509085  
Calculated Distance Traveled:

**Behavior and Additional Comments**

Traveling close together - behavior and numbers made it difficult to relocate.

Thursday, July 21, 2011 Sighting # 6

**Initial sighting on Track**

Time: 14:48 WP#: 53 Lat: 30.567495 Long: -80.471574  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 3  
Observer: EWC Observer side: Right

**Actual Time and Position of Sighting**

Time: 14:51 WP#: 54 Lat: 30.571109 Long: -80.463937  
Species: *Stenella frontalis* Numbers (Low/High/Best): 20 / 50 / 35  
Features used in Species ID: Light lateral blaze ending at dorsal fin, spotting pattern present, white tip to rostrum.

Representative images used for Species ID: 197-201  
Photographer: EWC Frame numbers: 180-216 Spacer: 217  
Calculated distance from Trackline: 0.8 km

**Final Time and Position of Sighting**

Time: 14:54 WP#: 55 Lat: 30.581021 Long: -80.462456  
Calculated Distance Traveled: 1.1 km

**Behavior and Additional Comments**

Very disperse group made up of pairs or trios with one group of five. Lots of aerial activity.

Thursday, July 21, 2011 Sighting # 7

**Initial sighting on Track**

Time: 14:59 WP#: 57 Lat: 30.565379 Long: -80.601155  
Vertical Angle: 3 Horizontal Bearing in Degrees: 120 Sighting Cue: 3  
On/Off Effort: On Trackline: 3 Beaufort Sea State: 10  
Observer: HJF Observer side: Left

**Actual Time and Position of Sighting**

Time: 15:09 WP#: 58 Lat: 30.571359 Long: -80.584509  
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 4 / 8 / 6  
Features used in Species ID:

Representative images used for Species ID: None taken

Photographer: NA Frame numbers: NA Spacer: NA

Calculated distance from Trackline: 1.7 km

**Final Time and Position of Sighting**

Time: NA WP#: NA Lat: NA Long: NA

Calculated Distance Traveled: NA

**Behavior and Additional Comments**

Animals were difficult to relocate.

Wednesday, August 17, 2011 Sighting # 1

### Initial sighting on Track

Time: 8:51 WP#: 3 Lat: 30.571701 Long: -80.661282  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 1  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 8:54 WP#: 4 Lat: 30.567801 Long: -80.653477  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 13 / 15 / 15  
Features used in Species ID: Robust body appearance, uniform grey color except slight lighter blaze to d fin.

Representative images used for Species ID: 4221, 4223, 4232  
Photographer: Erin Frame numbers: 4188 - 4239 Spacer: 4240  
Calculated distance from Trackline: 0.9 km

### Final Time and Position of Sighting

Time: 9:00 WP#: 5 Lat: 30.570849 Long: -80.665136  
Calculated Distance Traveled: 1.1 km

### Behavior and Additional Comments

Three subgroups with 3 to 5 animals per group and some singles along the perimeter.  
Animals displayed quick shallow surfacings that caused a moderate amount of splashing.  
Leisure pace to travel. Two mom / calf pairs.

Wednesday, August 17, 2011 Sighting # 2

### Initial sighting on Track

Time: 9:02 WP#: 8 Lat: 30.565282 Long: -80.600495  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 1  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 9:04 WP#: 9 Lat: 30.566900 Long: -80.599104  
Species: *Stenella frontalis* Numbers (Low/High/Best): 15 / 18 / 17  
Features used in Species ID: Light dark pattern repeating down body of animal, white tip to rostrum, appearance os spots to varying degrees among animals.

Representative images used for Species ID: 4253, 4265, 4267, 4269  
Photographer: Erin Frame numbers: 4241 - 4270 Spacer: 4271  
Calculated distance from Trackline: 0.2 km

### Final Time and Position of Sighting

Time: 9:06 WP#: 10 Lat: 30.564581 Long: -80.604737  
Calculated Distance Traveled: 0.6 km

### Behavior and Additional Comments

One large, densely packed group traveling slowly at the surface, group began more directional travel upon circling.  
One younger animal in group

Wednesday, August 17, 2011 Sighting # 3

### Initial sighting on Track

Time: 9:10 WP#: 12 Lat: 30.570419 Long: -80.472776  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 1  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 9:11 WP#: 13 Lat: 30.574196 Long: -80.472735  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 14 / 16 / 15  
Features used in Species ID: Uniform grey coloration, broad dorsal fin

Representative images used for Species ID: 4287, 4303, 4305  
Photographer: Erin Frame numbers: 4272 - 4316 Spacer: 4317  
Calculated distance from Trackline: 0.4 km

### Final Time and Position of Sighting

Time: 9:13 WP#: 14 Lat: 30.575091 Long: -80.482831  
Calculated Distance Traveled: 1.0 km

### Behavior and Additional Comments

Long line of animals single file and well spaced apart. Lots of splashing at the surface caused by rapid surfacings.

Wednesday, August 17, 2011 Sighting # 4

### Initial sighting on Track

Time: 9:37 WP#: 21 Lat: 30.500905 Long: -79.851271  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 9 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 9:44 WP#: 22 Lat: 30.503179 Long: -79.850363  
Species: *Grampus griseus* Numbers (Low/High/Best): 4 / 4 / 4  
Features used in Species ID: Blunt head, varying coloration of light and dark due to scarring  
tall thin dorsal fin.

Representative images used for Species ID: 4334, 4342  
Photographer: Erin Frame numbers: 4318 - 4345 Spacer: 4346  
Calculated distance from Trackline: 0.3 km

### Final Time and Position of Sighting

Time: 9:47 WP#: 23 Lat: 30.508147 Long: -79.857124  
Calculated Distance Traveled: 0.8 km

### Behavior and Additional Comments

Pairs of animals reluctant to surface but still at a slow rate of travel.

Wednesday, August 17, 2011 Sighting # 5

### Initial sighting on Track

Time: 9:59 WP#: 27 Lat: 30.499438 Long: -80.275065  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 9 Beaufort Sea State: 1  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 10:01 WP#: 28 Lat: 30.491920 Long: -80.271451  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 2 / 2 / 2  
Features used in Species ID: Uniform grey coloration with slight blaze to behind dorsal fin  
robust body appearance.  
Representative images used for Species ID: 4351, 4352, 4385  
Photographer: Erin Frame numbers: 4347 - 4367 Spacer: 4368  
Calculated distance from Trackline: 0.9 km

### Final Time and Position of Sighting

Time: 10:04 WP#: 29 Lat: 30.492711 Long: -80.277138  
Calculated Distance Traveled: 0.6 km

### Behavior and Additional Comments

Pair of animals widely spaced and splashing at the surface. A few times animals breached then formed into a closer grouping. Animals surfaced then dove deep out of sight on multiple occasions.

Wednesday, August 17, 2011 Sighting # 6

### Initial sighting on Track

Time: 10:15 WP#: 35 Lat: 30.499811 Long: -80.687819  
Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: Splash  
On/Off Effort: On Trackline: 9 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 10:21 WP#: 36 Lat: 30.499007 Long: -80.685826  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 1 / 1 / 1  
Features used in Species ID:  
Representative images used for Species ID: No Images  
Photographer: Erin Frame numbers: 4369 - 4382 Spacer: 4383  
Calculated distance from Trackline: 0.2 km

### Final Time and Position of Sighting

Time: 10:23 WP#: 37 Lat: 30.505734 Long: -80.688824  
Calculated Distance Traveled: 0.8 km

### Behavior and Additional Comments

Animal was only seen once. Waypoint 36 and 37 are assumed locations.

Wednesday, August 17, 2011 Sighting # 7

### Initial sighting on Track

Time: 11:17 WP#: 50 Lat: 30.368434 Long: -80.443388  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 7 Beaufort Sea State: 2  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 11:23 WP#: 51 Lat: 30.357457 Long: -80.446147  
Species: *Stenella frontalis* Numbers (Low/High/Best): 15 / 18 / 16  
Features used in Species ID: Alternating light and dark coloration down the animals body  
varying degree of spotting between animals, lighter blaze to middle of dorsal fin.  
Representative images used for Species ID: 4415, 4416, 4420, 4423  
Photographer: Erin Frame numbers: 4384 - 4426 Spacer: 4427  
Calculated distance from Trackline: 1.2 km

### Final Time and Position of Sighting

Time: 11:24 WP#: 52 Lat: 30.363671 Long: -80.449793  
Calculated Distance Traveled: 0.8 km

### Behavior and Additional Comments

Group all hanging at the surface motionless "logging", began slow travel after circling and formed into a tighter group. An second group of 4 animals was seen near the original group.

Wednesday, August 17, 2011 Sighting # 8

### Initial sighting on Track

Time: 13:55 WP#: 69 Lat: 30.166726 Long: -80.673712  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 4 Beaufort Sea State: 2  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 13:59 WP#: 70 Lat: 30.171744 Long: -80.678577  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4 / 4 / 4  
Features used in Species ID: Uniform grey coloration, robust body appearance, blunt rostrum.  
Representative images used for Species ID: 4447, 4448, 4459, 4465  
Photographer: Erin Frame numbers: 4428 - 4467 Spacer: 4468  
Calculated distance from Trackline: 0.7 km

### Final Time and Position of Sighting

Time: 14:01 WP#: 71 Lat: 30.175129 Long: -80.672558  
Calculated Distance Traveled: 0.7 km

### Behavior and Additional Comments

Animals swimming belly to belly near the surface with lots of big splashes and the occasional breach.



Wednesday, August 17, 2011 Sighting # 9

### Initial sighting on Track

Time: 14:05 WP#: 73 Lat: 30.168796 Long: -80.536116  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 4 Beaufort Sea State: 2  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 14:07 WP#: 74 Lat: 30.168431 Long: -80.535960  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 9 / 9 / 9  
Features used in Species ID: Uniform grey coloration, robust rostrum and body.

Representative images used for Species ID: 4481, 4490, 4496  
Photographer: Erin Frame numbers: 4469 - 4498 Spacer: 4499  
Calculated distance from Trackline: 0.1 km

### Final Time and Position of Sighting

Time: 14:13 WP#: 75 Lat: 30.172361 Long: -80.528183  
Calculated Distance Traveled: 0.9 km

### Behavior and Additional Comments

Initially three animal observed logging / interacting at the surface, upon circling only a single animal was observed. Individuals were very active at the surface - chin slapping. A second group was seen ~6 animal that were swimming very close to one another.

Wednesday, August 17, 2011 Sighting # 10

### Initial sighting on Track

Time: 14:28 WP#: 77 Lat: 30.165081 Long: -80.024973  
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Splash  
On/Off Effort: On Trackline: 4 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 14:32 WP#: 78 Lat: 30.161176 Long: -80.024868  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 5 / 7 / 6  
Features used in Species ID: Uniform grey coloration, robust rostrum and body.

Representative images used for Species ID: 4503, 4510  
Photographer: Erin Frame numbers: 4500 - 4512 Spacer: 4513  
Calculated distance from Trackline: 0.4 km

### Final Time and Position of Sighting

Time: 14:34 WP#: 49 Lat: 30.156045 Long: -80.016716  
Calculated Distance Traveled: 1.0 km

### Behavior and Additional Comments

Group of animals were widely spaced traveling at a moderate pace - mainly single animals with a few traveling as pairs.

Wednesday, August 17, 2011 Sighting # 11

### Initial sighting on Track

Time: 15:14 WP#: 86 Lat: 30.031953 Long: -80.683372  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 2 Beaufort Sea State: 2  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: NA WP#: NA Lat: NA Long: NA  
Species: None Numbers (Low/High/Best): 1 / 1 / 1  
Features used in Species ID: See comments below

Representative images used for Species ID: NA  
Photographer: Erin Frame numbers: NA Spacer: NA  
Calculated distance from Trackline: NA

### Final Time and Position of Sighting

Time: NA WP#: NA Lat: NA Long: NA  
Calculated Distance Traveled: NA

### Behavior and Additional Comments

Large animal around 20 - 25ft, uniform light grey in color. Body very long from pectoral fins to caudal fin. Animal was observed at the surface taking a few rapid breaths before diving. Was not resighted once it dove from the surface.

Wednesday, August 17, 2011 Sighting # 12

### Initial sighting on Track

Time: 15:33 WP#: 91 Lat: 30.031421 Long: -80.480616  
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body  
On/Off Effort: On Trackline: 2 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 15:34 WP#: 92 Lat: 30.025702 Long: -80.486462  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 2 / 4 / 4  
Features used in Species ID:

Representative images used for Species ID: 4522  
Photographer: Erin Frame numbers: 4514 - 4525 Spacer: 4526  
Calculated distance from Trackline: 0.8 km

### Final Time and Position of Sighting

Time: 15:44 WP#: 93 Lat: 30.023251 Long: -80.474775  
Calculated Distance Traveled: 1.1 km

### Behavior and Additional Comments

Mom and calf plus two outlier.

Wednesday, August 17, 2011 Sighting # 13

### Initial sighting on Track

Time: 15:57 WP#: 99 Lat: 30.035888 Long: -80.033268  
Vertical Angle: 1 Horizontal Bearing in Degrees: 45 Sighting Cue: Splash  
On/Off Effort: On Trackline: 2 Beaufort Sea State: 3  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 15:58 WP#: 100 Lat: 30.029594 Long: -80.027030  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3 / 4 / 4  
Features used in Species ID: Uniform grey coloration, robust body appearance.

Representative images used for Species ID: 4538, 4539  
Photographer: Erin Frame numbers: 4527 - 4540 Spacer: 4541  
Calculated distance from Trackline: 0.9 km

### Final Time and Position of Sighting

Time: 16:02 WP#: 101 Lat: 30.031170 Long: -80.035958  
Calculated Distance Traveled: 0.9 km

### Behavior and Additional Comments

Robust appearance to animals, traveling just below the surface.

Wednesday, August 17, 2011 Sighting # 14

### Initial sighting on Track

Time: 16:18 WP#: 105 Lat: 29.965994 Long: -80.008382  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 1 Beaufort Sea State: 3  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 16:19 WP#: 106 Lat: 29.967220 Long: -80.009970  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 10 / 10 / 10  
Features used in Species ID: Uniform grey coloration, light blaze to behind dorsal fin, robust body appearance.

Representative images used for Species ID: 4542, 4543  
Photographer: Erin Frame numbers: 4542 - 4556 Spacer: 4557  
Calculated distance from Trackline: 0.2 km

### Final Time and Position of Sighting

Time: 16:22 WP#: 107 Lat: 29.971577 Long: -80.006337  
Calculated Distance Traveled: 0.6 km

### Behavior and Additional Comments

Disperse group traveling at a moderate pace, a few young / smaller animals and at least one mom/calf.

Thursday, August 18, 2011 Sighting # 1

### Initial sighting on Track

Time: 9:32 WP#: 11 Lat: 30.032333 Long: -79.937861  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 2 Beaufort Sea State: 1  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 9:33 WP#: 12 Lat: 30.028955 Long: -79.930610  
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 11/15/13  
Features used in Species ID: Large, dark bodied animals with small pectoral fins and a blunt head

Representative images used for Species ID: 4559, 4563, 4586, 4589  
Photographer: Ryan Frame numbers: 4558 - 4593 Spacer: 4594  
Calculated distance from Trackline: 0.7927 km

### Final Time and Position of Sighting

Time: 9:38 WP#: 13 Lat: 30.035747 Long: -79.931309  
Calculated Distance Traveled: 0.7582 km

### Behavior and Additional Comments

Logging just below the surface then slow travel with regular surfacing. Several calves in group.

Thursday, August 18, 2011 Sighting # 2

### Initial sighting on Track

Time: 9:43 WP#: 16 Lat: 30.029983 Long: -80.070750  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 2 Beaufort Sea State: 2  
Observer: Ryan Observer side: Right

### Actual Time and Position of Sighting

Time: 9:44 WP#: 17 Lat: 30.029663 Long: -80.070879  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 22/28/24  
Features used in Species ID: Robust, uniform grey animals with white blaze to dorsal fin

Representative images used for Species ID: 4601, 4610, 4611, 4622  
Photographer: Ryan Frame numbers: 4595 - 4636 Spacer: 4636  
Calculated distance from Trackline: 0.03769 km

### Final Time and Position of Sighting

Time: 9:47 WP#: 18 Lat: 30.032259 Long: -80.064010  
Calculated Distance Traveled: 0.7215 km

### Behavior and Additional Comments

Lots of breaching, splashing. One big group of approx. 12 and several small groups of 3-4. Fast moving with a white peduncle present.

Thursday, August 18, 2011 Sighting # 3

**Initial sighting on Track**

Time: 10:00 WP#: 23 Lat: 30.030482 Long: -80.483837  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 2 Beaufort Sea State: 2  
Observer: Ryan Observer side: Right

**Actual Time and Position of Sighting**

Time: 10:01 WP#: 24 Lat: 30.033624 Long: -80.477832  
Species: *Stenella frontalis* Numbers (Low/High/Best): 15/18/17  
Features used in Species ID: Alternating light and dark pattern down body, spots down body

Representative images used for Species ID: 4685, 4650, 4654, 4671, 4672, 4674, 4681  
Photographer: Ryan Frame numbers: 4637 - 4704 Spacer: 4705  
Calculated distance from Trackline: 0.6755 km

**Final Time and Position of Sighting**

Time: 10:06 WP#: 25 Lat: 30.037816 Long: -80.482801  
Calculated Distance Traveled: 0.6679 km

**Behavior and Additional Comments**

Traveling fast just under the surface, darting different directions, belly to belly swimming. Some traveling close together.

Thursday, August 18, 2011 Sighting # 4

**Initial sighting on Track**

Time: 10:28 WP#: 34 Lat: 30.101288 Long: -80.240282  
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: 2  
On/Off Effort: On Trackline: 3 Beaufort Sea State: 3  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: WP#: Lat: Long:  
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID:

Representative images used for Species ID:  
Photographer: Frame numbers: Spacer:  
Calculated distance from Trackline:

**Final Time and Position of Sighting**

Time: WP#: Lat: Long:  
Calculated Distance Traveled:

**Behavior and Additional Comments**

No resight

Thursday, August 18, 2011 Sighting # 5

**Initial sighting on Track**

Time: 10:40 WP#: 37 Lat: 30.104061 Long: -80.029883  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: 3  
On/Off Effort: On Trackline: 3 Beaufort Sea State: 3  
Observer: Erin Observer side: L

**Actual Time and Position of Sighting**

Time: 10:42 WP#: 38 Lat: 30.110885 Long: -80.022385  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8/10/10  
Features used in Species ID: Large robust, uniform grey animals

Representative images used for Species ID: 4707, 4708, 4712  
Photographer: Ryan Frame numbers: 4706 - 4717 Spacer: 4718  
Calculated distance from Trackline: 1.047 km

**Final Time and Position of Sighting**

Time: 10:46 WP#: 39 Lat: 30.112861 Long: -80.019678  
Calculated Distance Traveled: 0.3407 km

**Behavior and Additional Comments**

Moving very fast, lots of splashing from darting on surface water.

Thursday, August 18, 2011 Sighting # 6

**Initial sighting on Track**

Time: 12:12 WP#: 59 Lat: 30.299903 Long: -80.526268  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 6 Beaufort Sea State: 2  
Observer: Ryan Observer side: Right

**Actual Time and Position of Sighting**

Time: 12:18 WP#: 60 Lat: 30.302488 Long: -80.525608  
Species: *Stenella frontalis* Numbers (Low/High/Best): 10/15/12  
Features used in Species ID: Alternating light and dark pattern down body with white tip on

rostrum  
Representative images used for Species ID: 4725, 4748, 4752  
Photographer: Ryan Frame numbers: 4719 - 4774 Spacer: 4775  
Calculated distance from Trackline: 0.2943 km

**Final Time and Position of Sighting**

Time: 12:23 WP#: 61 Lat: 30.307683 Long: -80.527641  
Calculated Distance Traveled: 0.6097 km

**Behavior and Additional Comments**

Staying in a close group just below the surface. Some swimming belly up.

Thursday, August 18, 2011 Sighting # 7

### Initial sighting on Track

Time: 14:10 WP#: 69 Lat: 30.367712 Long: -80.202135  
Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: 3  
On/Off Effort: On Trackline: 7 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 14:12 WP#: 70 Lat: 30.391684 Long: -80.202370  
Species: *Stenella frontalis* Numbers (Low/High/Best): 25/30/28  
Features used in Species ID: Alternating light and dark pattern down body with spotting

Representative images used for Species ID: 4777, 4787, 4792, 4805, 4806  
Photographer: Ryan Frame numbers: 4776 - 4824 Spacer: 4825  
Calculated distance from Trackline: 2.6666 km

### Final Time and Position of Sighting

Time: 14:15 WP#: 71 Lat: 30.390068 Long: -80.202746  
Calculated Distance Traveled: 0.1833 km

### Behavior and Additional Comments

2 groups with some breaching and making big splashes. Each group tight together, milling just below the surface.

Thursday, August 18, 2011 Sighting # 8

### Initial sighting on Track

Time: 14:40 WP#: 78 Lat: 30.433684 Long: -80.333107  
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: 3  
On/Off Effort: On Trackline: 8 Beaufort Sea State: 3  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 14:40 WP#: 79 Lat: 30.436006 Long: -80.331779  
Species: *Stenella frontalis* Numbers (Low/High/Best): 9/12/10  
Features used in Species ID: White tip on rostrum with spots down the body

Representative images used for Species ID: 4844, 4845  
Photographer: Ryan Frame numbers: 4826 - 4877 Spacer: 4878  
Calculated distance from Trackline: 0.2879 km

### Final Time and Position of Sighting

Time: 14:44 WP#: 80 Lat: 30.433243 Long: -80.325195  
Calculated Distance Traveled: 0.7020 km

### Behavior and Additional Comments

Animals were in a tight group until we flew over them and then they showed avoidance. Darting different directions.

Possible avoidance

Thursday, August 18, 2011 Sighting # 9

**Initial sighting on Track**

Time: 15:04 WP#: 88 Lat: 30.501254 Long: -80.489315  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 9 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: 15:08 WP#: 89 Lat: 30.500294 Long: -80.498198  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3/3/3  
Features used in Species ID: Robust, uniform grey animals

Representative images used for Species ID: 4900, 4888, 4896  
Photographer: Ryan Frame numbers: 4897 - 4907 Spacer: 4908  
Calculated distance from Trackline: 0.8577 km

**Final Time and Position of Sighting**

Time: 15:09 WP#: 90 Lat: 30.504671 Long: -80.492133  
Calculated Distance Traveled: 0.7580 km

**Behavior and Additional Comments**

Was logging at the surface until we started circling then they started moving fast and doing deep dives  
Possible avoidance

Thursday, August 18, 2011 Sighting # 10

**Initial sighting on Track**

Time: 15:15 WP#: 93 Lat: 30.500179 Long: -80.304384  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 9 Beaufort Sea State: 2  
Observer: Ryan Observer side: Right

**Actual Time and Position of Sighting**

Time: 15:16 WP#: 94 Lat: 30.497217 Long: -80.309981  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 15/18/16  
Features used in Species ID: Robust, uniform grey animals

Representative images used for Species ID: 4909, 4921, 4928, 4932, 4937  
Photographer: Ryan Frame numbers: 4909 - 4939 Spacer: 4940  
Calculated distance from Trackline: 0.6293 km

**Final Time and Position of Sighting**

Time: 15:18 WP#: 95 Lat: 30.497949 Long: -80.302887  
Calculated Distance Traveled: 0.6845 km

**Behavior and Additional Comments**

Fast darting in different directions. 2 groups, some swimming belly to belly.



Thursday, August 18, 2011 Sighting # 11

**Initial sighting on Track**

Time: 15:53 WP#: 105 Lat: 30.566016 Long: -80.502711  
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: 2  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: 15:54 WP#: 106 Lat: 30.562645 Long: -80.494513  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8/8/8  
Features used in Species ID: Robust, uniform grey animal

Representative images used for Species ID: 4963, 4956, 4960  
Photographer: Ryan Frame numbers: 4941 - 4971 Spacer: 4972  
Calculated distance from Trackline: 0.8698 km

**Final Time and Position of Sighting**

Time: 15:58 WP#: 107 Lat: 30.556583 Long: -80.495974  
Calculated Distance Traveled: 0.6884 km

**Behavior and Additional Comments**

Swimming spread out, breaching, splashing, traveling fast

Thursday, August 18, 2011 Sighting # 12

**Initial sighting on Track**

Time: 16:00 WP#: 109 Lat: 30.564456 Long: -80.542065  
Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: 3  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

**Actual Time and Position of Sighting**

Time: 16:02 WP#: 110 Lat: 30.557425 Long: -80.547583  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 16/20/18  
Features used in Species ID: Robust, uniform grey animals

Representative images used for Species ID: 4979, 4988  
Photographer: Ryan Frame numbers: 4973 - 5003 Spacer: 5004  
Calculated distance from Trackline: 0.9436 km

**Final Time and Position of Sighting**

Time: 16:06 WP#: 111 Lat: 30.562219 Long: -80.532825  
Calculated Distance Traveled: 1.510 km

**Behavior and Additional Comments**

Several groups, individuals in each group are tight but groups are spaced out. All swimming in one direction, most staying subsurface with some doing deeper dives.

Thursday, August 18, 2011 Sighting # 13

**Initial sighting on Track**

Time: 16:09 WP#: 114 Lat: 30.566778 Long: -80.595993  
Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: 3  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 2  
Observer: Ryan Observer side: Right

**Actual Time and Position of Sighting**

Time: 16:09 WP#: 115 Lat: 30.567225 Long: -80.592630  
Species: *Stenella frontalis* Numbers (Low/High/Best): 8/8/8  
Features used in Species ID: Alternating light and dark pattern down body

Representative images used for Species ID: 5021, 5035, 5042, 4043  
Photographer: Ryan Frame numbers: 5005 - 5049 Spacer: 5050  
Calculated distance from Trackline: 0.3258 km

**Final Time and Position of Sighting**

Time: 16:12 WP#: 116 Lat: 30.572476 Long: -80.595599  
Calculated Distance Traveled: 0.6494 km

**Behavior and Additional Comments**

Animals in a tight group darting in different directions, breaching, splashing, belly to belly swimming

Thursday, September 29, 2011 Sighting # 1

### Initial sighting on Track

Time: 11:28 WP#: 30 Lat: 30.298181 Long: -80.623132  
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: 2  
On/Off Effort: On Trackline: 6 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 11:28 WP#: 31 Lat: 30.303628 Long: -80.631996  
Species: *Stenella frontalis* Numbers (Low/High/Best): 15/19/16  
Features used in Species ID: Alternating light and dark pattern down body with white tip on rostrum  
Representative images used for Species ID: 5054, 5057  
Photographer: Ryan Frame numbers: 5051 - 5067 Spacer: 5068  
Calculated distance from Trackline: 1.045 km

### Final Time and Position of Sighting

Time: 11:41 WP#: 32 Lat: 30.303041 Long: -80.641945  
Calculated Distance Traveled: 0.9574 km

### Behavior and Additional Comments

Chasing down a school of fish, darting in different directions, moving quick just below the surface.  
2 subgroups, one with about 7 individuals the other with about 9. Doing deeper dives. Possible avoidance.

Thursday, September 29, 2011 Sighting # 2

### Initial sighting on Track

Time: 13:35 WP#: 43 Lat: 30.365835 Long: -79.975745  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 7 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 13:38 WP#: 44 Lat: 30.366795 Long: -79.972312  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 1/1/1  
Features used in Species ID: White peduncle  
Representative images used for Species ID: 5075, 5076  
Photographer: Ryan Frame numbers: 5069 - 5079 Spacer: 5080  
Calculated distance from Trackline:

### Final Time and Position of Sighting

Time: 13:44 WP#: 45 Lat: 30.364137 Long: -79.985106  
Calculated Distance Traveled:

### Behavior and Additional Comments

Presence of a white peduncle, traveling just below the surface.

Thursday, September 29, 2011 Sighting # 3

### Initial sighting on Track

Time: 14:07 WP#: 51 Lat: 30.433704 Long: -80.365225  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 7 Beaufort Sea State: 2  
Observer: Ryan Observer side: Right

### Actual Time and Position of Sighting

Time: 14:08 WP#: 52 Lat: 30.433527 Long: -80.356491  
Species: *Stenella frontalis* Numbers (Low/High/Best): 1/1/1  
Features used in Species ID: Alternating light and dark pattern down body, white tip on rostrum

Representative images used for Species ID: 5085, 5087, 5088  
Photographer: Ryan Frame numbers: 5081 - 5091 Spacer: 5092  
Calculated distance from Trackline: 0.8376 km

### Final Time and Position of Sighting

Time: 14:12 WP#: 53 Lat: 30.435878 Long: -80.357179  
Calculated Distance Traveled: 0.2696 km

### Behavior and Additional Comments

Traveling just below the surface then doing deeper dives. Jumping.

Thursday, September 29, 2011 Sighting # 4

### Initial sighting on Track

Time: 14:18 WP#: 55 Lat: 30.432618 Long: -80.559966  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 8 Beaufort Sea State: 2  
Observer: Ryan Observer side: Right

### Actual Time and Position of Sighting

Time: 14:20 WP#: 56 Lat: 30.433188 Long: -80.549888  
Species: *Stenella frontalis* Numbers (Low/High/Best): 4/8/7  
Features used in Species ID: Alternating light and dark pattern down body with white tip on rostrum

Representative images used for Species ID: 5094  
Photographer: Ryan Frame numbers: 5093 - 5102 Spacer: 5103  
Calculated distance from Trackline: 0.9683 km

### Final Time and Position of Sighting

Time: 14:20 WP#: 57 Lat: 30.432181 Long: -80.553303  
Calculated Distance Traveled: 0.3460 km

### Behavior and Additional Comments

Moving quick just below the surface

Thursday, September 29, 2011 Sighting # 5

### Initial sighting on Track

Time: 14:34 WP#: 63 Lat: 30.501071 Long: -80.433772  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: 3  
On/Off Effort: On Trackline: 9 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 14:35 WP#: 64 Lat: 30.506057 Long: -80.431239  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 7/7/7  
Features used in Species ID: Robust, uniform grey bodied animal

Representative images used for Species ID: 5121, 5127-5129  
Photographer: Ryan Frame numbers: 5104 - 5129 Spacer: 5130  
Calculated distance from Trackline: 0.6052 km

### Final Time and Position of Sighting

Time: 14:37 WP#: 65 Lat: 30.500464 Long: -80.424406  
Calculated Distance Traveled: 0.9030 km

### Behavior and Additional Comments

Lots of splashing, stayed in a tight group.

Thursday, September 29, 2011 Sighting # 6

### Initial sighting on Track

Time: 13:02 WP#: 73 Lat: 30.566017 Long: -80.050175  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: 2  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 3  
Observer: Ryan Observer side: Right

### Actual Time and Position of Sighting

Time: 15:04 WP#: 74 Lat: 30.572807 Long: -80.038414  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 12/17/15  
Features used in Species ID: Robust, uniform grey animal

Representative images used for Species ID: 5134-5135, 5149  
Photographer: Ryan Frame numbers: 5131 - 5155 Spacer: 5156  
Calculated distance from Trackline: 1.356 km

### Final Time and Position of Sighting

Time: 15:05 WP#: 75 Lat: 30.574808 Long: -80.043137  
Calculated Distance Traveled: 0.5039 km

### Behavior and Additional Comments

Calves present, white peduncles traveling just below the surface.

Thursday, September 29, 2011 Sighting # 7

### Initial sighting on Track

Time: 15:07 WP#: 77 Lat: 30.565399 Long: -80.101097  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: 2  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 3  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 15:08 WP#: 78 Lat: 30.560653 Long: -80.093260  
Species: *Grampus griseus* Numbers (Low/High/Best): 40/48/45  
Features used in Species ID: Blunt head, lots of white scarring down body, robust

Representative images used for Species ID: 5157, 5178, 5179  
Photographer: Ryan Frame numbers: 5157 - 5192 Spacer: 5193  
Calculated distance from Trackline: 0.9174 km

### Final Time and Position of Sighting

Time: 15:12 WP#: 79 Lat: 30.559231 Long: -80.085699  
Calculated Distance Traveled: 0.7410 km

### Behavior and Additional Comments

Calves present, moving slowly just below the surface, spaced out.

Thursday, September 29, 2011 Sighting # 8

### Initial sighting on Track

Time: 15:18 WP#: 82 Lat: 30.565556 Long: -80.302031  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: 3  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 15:20 WP#: 83 Lat: 30.563689 Long: -80.303858  
Species: *Stenella frontalis* Numbers (Low/High/Best): 2/2/2  
Features used in Species ID: Alternating light and dark pattern down body with white tip on

rostrum  
Representative images used for Species ID: 5194, 5203  
Photographer: Ryan Frame numbers: 5194 - 5204 Spacer: 5205  
Calculated distance from Trackline: 0.2715 km

### Final Time and Position of Sighting

Time: 15:21 WP#: 84 Lat: 30.550730 Long: -80.297536  
Calculated Distance Traveled: 1.563 km

### Behavior and Additional Comments

Mom calf pair

Thursday, September 29, 2011 Sighting # 9

### Initial sighting on Track

Time: 15:24 WP#: 86 Lat: 30.566198 Long: -80.401362  
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: 3  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 2  
Observer: Erin Observer side: Left

### Actual Time and Position of Sighting

Time: 15:24 WP#: 87 Lat: 30.569054 Long: -80.391592  
Species: *Stenella frontalis* Numbers (Low/High/Best): 30/40/35  
Features used in Species ID: Alternating light and dark pattern down body with white tip on rostrum  
Representative images used for Species ID: 5206, 5211, 5215, 5220  
Photographer: Ryan Frame numbers: 5206 - 5222 Spacer: 5223  
Calculated distance from Trackline: 0.9878 km

### Final Time and Position of Sighting

Time: 15:27 WP#: 88 Lat: 30.565255 Long: -80.388245  
Calculated Distance Traveled: 0.5302 km

### Behavior and Additional Comments

Lots of splashing, jumping and darting in different directions.

Thursday, September 29, 2011 Sighting # 10

### Initial sighting on Track

Time: 15:33 WP#: 90 Lat: 30.565173 Long: -80.605801  
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: 3  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 2  
Observer: Ryan Observer side: Right

### Actual Time and Position of Sighting

Time: 15:34 WP#: 91 Lat: 30.566402 Long: -80.602615  
Species: *Stenella frontalis* Numbers (Low/High/Best): 12/18/15  
Features used in Species ID: Alternating light and dark pattern down body with white tip on rostrum  
Representative images used for Species ID: 5230, 5254  
Photographer: Ryan Frame numbers: 5224 - 5257 Spacer: 5258  
Calculated distance from Trackline: 0.3343 km

### Final Time and Position of Sighting

Time: 15:37 WP#: 92 Lat: 30.566318 Long: -80.597448  
Calculated Distance Traveled: 0.4948 km

### Behavior and Additional Comments

Slowly moving in different directions just below the surface

Friday, September 30, 2011 Sighting # 1

### Initial sighting on Track

Time: 12:39 WP#: 5 Lat: 30.567764 Long: -79.908548  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 3  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 12:40 WP#: 6 Lat: 30.572877 Long: -79.915296  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 12 / 20 / 16  
Features used in Species ID: Robust body appearance, uniform grey coloration with lighter blaze to dorsal fin.

Representative images used for Species ID: 5265, 5271, 5279  
Photographer: Erin Frame numbers: 5259 - 5285 Spacer: 5286  
Calculated distance from Trackline: 0.8 km

### Final Time and Position of Sighting

Time: 12:45 WP#: 7 Lat: 30.571015 Long: -79.912275  
Calculated Distance Traveled: 0.35 km

### Behavior and Additional Comments

A couple loose groups observed splashing at the surface - animals dispersed upon circling.

Friday, September 30, 2011 Sighting # 2

### Initial sighting on Track

Time: 13:09 WP#: 12 Lat: 30.499459 Long: -80.472107  
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Splash  
On/Off Effort: On Trackline: 9 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 13:10 WP#: 13 Lat: 30.497738 Long: -80.463178  
Species: *Stenella frontalis* Numbers (Low/High/Best): 4 / 4 / 4  
Features used in Species ID: White tip to rostrum, alternating light and dark coloration to body

Representative images used for Species ID: 5292 & 5294  
Photographer: Erin Frame numbers: 5287 - 5319 Spacer: 5320  
Calculated distance from Trackline: 0.8 km

### Final Time and Position of Sighting

Time: 13:17 WP#: 14 Lat: 30.490438 Long: -80.455809  
Calculated Distance Traveled: 1.1 km

### Behavior and Additional Comments

Traveling in loose association with one another, splashing while surfacing. Traveling at a moderate pace



Friday, September 30, 2011 Sighting # 3

### Initial sighting on Track

Time: 13:19 WP#: 16 Lat: 30.499429 Long: -80.521748  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 9 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 13:20 WP#: 17 Lat: 30.499540 Long: -80.523346  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8 / 12 / 10  
Features used in Species ID: Robust body and uniform grey coloration.

Representative images used for Species ID: 5334, 5342, 5348, 5349  
Photographer: Erin Frame numbers: 5321 - 5354 Spacer: 5355  
Calculated distance from Trackline: 0.1 km

### Final Time and Position of Sighting

Time: 13:27 WP#: 18 Lat: 30.496537 Long: -80.514799  
Calculated Distance Traveled: 0.9 km

### Behavior and Additional Comments

Hanging out just below the surface not traveling at all, animals of uniform grey coloration.  
Animals produced large forceful breaths easily seen from the air during repeated surfacings.

Friday, September 30, 2011 Sighting # 4

### Initial sighting on Track

Time: 13:28 WP#: 20 Lat: 30.498449 Long: -80.565668  
Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: Splash  
On/Off Effort: On Trackline: 9 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 13:30 WP#: 21 Lat: 30.506798 Long: -80.562044  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8 / 9 / 8  
Features used in Species ID: Uniform grey coloration, robust body appearance.

Representative images used for Species ID: 5370 & 5381  
Photographer: Erin Frame numbers: 5356 - 5383 Spacer: 5384  
Calculated distance from Trackline: 1.0 km

### Final Time and Position of Sighting

Time: 13:33 WP#: 22 Lat: 30.501832 Long: -80.568178  
Calculated Distance Traveled: 0.8 km

### Behavior and Additional Comments

Some goofing off below the surface followed by animals breaching. Lots of zig zags and cut backs seen of animals under the water. Group was spread out.

Friday, September 30, 2011 Sighting # 5

**Initial sighting on Track**

Time: 13:45 WP#: 29 Lat: 30.435943 Long: -80.522660  
Vertical Angle: 1 Horizontal Bearing in Degrees: 45 Sighting Cue: Body  
On/Off Effort: On Trackline: 8 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 13:46 WP#: 30 Lat: 30.434095 Long: -80.526551  
Species: *Stenella frontalis* Numbers (Low/High/Best): 16 / 18 / 18  
Features used in Species ID: Spotting pattern clearly present, alternating light and dark body coloration.

Representative images used for Species ID: 5391, 5398, 5415, 5422  
Photographer: Erin Frame numbers: 5385 - 5424 Spacer: 5425  
Calculated distance from Trackline: 0.4 km

**Final Time and Position of Sighting**

Time: 13:46 WP#: 31 Lat: 30.433953 Long: -80.515676  
Calculated Distance Traveled: 1.0 km

**Behavior and Additional Comments**

Dense group all animals almost touching one another, group almost stationary.

Friday, September 30, 2011 Sighting # 6

**Initial sighting on Track**

Time: 13:51 WP#: 35 Lat: 30.434502 Long: -80.386265  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 8 Beaufort Sea State: 2  
Observer: Ryan Observer side: Left

**Actual Time and Position of Sighting**

Time: 13:51 WP#: 36 Lat: 30.443182 Long: -80.393243  
Species: *Stenella frontalis* Numbers (Low/High/Best): 9 / 10 / 10  
Features used in Species ID: Light and dark alternating body coloration, spotting clearly present.

Representative images used for Species ID: 5452 & 5457  
Photographer: Erin Frame numbers: 5426 - 5466 Spacer: 5467  
Calculated distance from Trackline: 1.1 km

**Final Time and Position of Sighting**

Time: 13:58 WP#: 37 Lat: 30.446738 Long: -80.384987  
Calculated Distance Traveled: 0.9 km

**Behavior and Additional Comments**

Disperse group splashing at the surface, a few smaller animals present.

Friday, September 30, 2011 Sighting # 7

**Initial sighting on Track**

Time: 14:47 WP#: 45 Lat: 30.302126 Long: -80.5094  
Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: Body  
On/Off Effort: On Trackline: 6 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

**Actual Time and Position of Sighting**

Time: 14:51 WP#: 46 Lat: 30.291755 Long: -80.503113  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 1 / 1 / 1  
Features used in Species ID: Uniform grey coloration, robust body appearance.

Representative images used for Species ID: 5472 - 5473  
Photographer: Erin Frame numbers: 5468 - 5475 Spacer: 5475  
Calculated distance from Trackline: 1.3 km

**Final Time and Position of Sighting**

Time: 14:51 WP#: 47 Lat: 30.300221 Long: -80.503929  
Calculated Distance Traveled: 0.95 km

**Behavior and Additional Comments**

Single animal difficult to track

Monday, October 17, 2011 Sighting # 1

### Initial sighting on Track

Time: 9:47 WP#: 5 Lat: 29.966633 Long: -80.140147  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 1 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 9:48 WP#: 6 Lat: 29.958840 Long: -80.143059  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 14 / 16 / 15  
Features used in Species ID: Robust body appearance, uniform grey coloration.

Representative images used for Species ID: 5482, 5483, 5484, 5498  
Photographer: Erin Frame numbers: 5476 - 5505 Spacer: 5506  
Calculated distance from Trackline: 0.9 km

### Final Time and Position of Sighting

Time: 9:56 WP#: 7 Lat: 29.954609 Long: -80.137264  
Calculated Distance Traveled: 0.7 km

### Behavior and Additional Comments

Traveling close together and being elusive, splashing at the surface. Possibly two small groups  
Pair and a group of ~ 12.

Monday, October 17, 2011 Sighting # 2

### Initial sighting on Track

Time: 10:44 WP#: 20 Lat: 30.100819 Long: -80.452592  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 3 Beaufort Sea State: 1  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 10:45 WP#: 21 Lat: 30.097670 Long: -80.452633  
Species: *Stenella frontalis* Numbers (Low/High/Best): 47 / 55 / 50  
Features used in Species ID: Light dark alteration of color along animals body, white tip to rostrum.

Representative images used for Species ID: 5530, 5532 - 5535  
Photographer: Erin Frame numbers: 5507 - 5535 Spacer: 5536  
Calculated distance from Trackline: 0.35 km

### Final Time and Position of Sighting

Time: 10:50 WP#: 22 Lat: 30.109271 Long: -80.455586  
Calculated Distance Traveled: 1.3 km

### Behavior and Additional Comments

Tight grouping of animal. First group of about 40 animals were joined by a group of ~ 7 that stayed submerged.

Monday, October 17, 2011 Sighting # 3

**Initial sighting on Track**

Time: 10:54 WP#: 25 Lat: 30.100546 Long: -80.338066  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Blow  
On/Off Effort: On Trackline: 3 Beaufort Sea State: 2  
Observer: Ryan Observer side: Left

**Actual Time and Position of Sighting**

Time: 11:00 WP#: 26 Lat: 30.106111 Long: -80.3422728  
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 1 / 1 / 1  
Features used in Species ID:

Representative images used for Species ID: None  
Photographer: Erin Frame numbers: None Spacer: None  
Calculated distance from Trackline: 0.7 km

**Final Time and Position of Sighting**

Time: WP#: Lat: Long:  
Calculated Distance Traveled:

**Behavior and Additional Comments**

Single animal of uniform color, no resight - marked assumed location.

Monday, October 17, 2011 Sighting # 4

**Initial sighting on Track**

Time: 11:37 WP#: 33 Lat: 30.165011 Long: -80.495318  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 4 Beaufort Sea State: 1  
Observer: Ryan Observer side: Left

**Actual Time and Position of Sighting**

Time: 11:43 WP#: 34 Lat: 30.160961 Long: -80.504487  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 6 / 7 / 6  
Features used in Species ID: Uniform grey coloration, robust body appearance.

Representative images used for Species ID: 5546, 5553, 5554  
Photographer: Erin Frame numbers: 5537 - 5557 Spacer: 5558  
Calculated distance from Trackline: 0.9 km

**Final Time and Position of Sighting**

Time: 11:43 WP#: 35 Lat: 30.157301 Long: -80.504285  
Calculated Distance Traveled: 0.4 km

**Behavior and Additional Comments**

Multiple single animals sighted, one group of three closely packed. Single animals well separated from the others.

Monday, October 17, 2011 Sighting # 5

### Initial sighting on Track

Time: 14:34 WP#: 57 Lat: 30.365853 Long: -80.166733  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 7 Beaufort Sea State: 1  
Observer: Ryan Observer side: Left

### Actual Time and Position of Sighting

Time: 14:35 WP#: 58 Lat: 30.365875 Long: -80.164744  
Species: *Grampus griseus* Numbers (Low/High/Best): 10 / 12 / 11  
Features used in Species ID: Large dorsal fin, varied coloration due to scaring, head tapers to a point but no rostrum.  
Representative images used for Species ID: 5562, 5569, 5571, 5576  
Photographer: Erin Frame numbers: 5559 - 5577 Spacer: 5578  
Calculated distance from Trackline: 0.2 km

### Final Time and Position of Sighting

Time: 14:38 WP#: 59 Lat: 30.370193 Long: -80.171961  
Calculated Distance Traveled: 0.8 km

### Behavior and Additional Comments

Dense group varied in color, blunt heads, animals traveling within a bodies length of won another.

Monday, October 17, 2011 Sighting # 6

### Initial sighting on Track

Time: 14:14 WP#: 61 Lat: 30.365491 Long: -80.123015  
Vertical Angle: 1 Horizontal Bearing in Degrees: 60 Sighting Cue: Body  
On/Off Effort: On Trackline: 7 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 14:41 WP#: 62 Lat: 30.362687 Long: -80.118399  
Species: *Grampus griseus* Numbers (Low/High/Best): 8 / 11 / 10  
Features used in Species ID: Tall dorsal fin, varied coloration due to scaring, crease in center of melon.  
Representative images used for Species ID: 5581, 5594, 5595  
Photographer: Erin Frame numbers: 5579 - 5597 Spacer: 5598  
Calculated distance from Trackline: 0.5 km

### Final Time and Position of Sighting

Time: 14:44 WP#: 63 Lat: 30.370457 Long: -80.123845  
Calculated Distance Traveled: 1.0 km

### Behavior and Additional Comments

Traveling just below the surface during sighting.

Monday, October 17, 2011 Sighting # 7

### Initial sighting on Track

Time: 15:02 WP#: 67 Lat: 30.433247 Long: -80.02866  
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 8 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 15:11 WP#: 68 Lat: 30.434682 Long: -80.024715  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3 / 3 / 3  
Features used in Species ID: Robust body, white peduncle coloration.

Representative images used for Species ID: 5601  
Photographer: Erin Frame numbers: 5599 - 5604 Spacer: 5605  
Calculated distance from Trackline: 0.4 km

### Final Time and Position of Sighting

Time: 15:12 WP#: 69 Lat: 30.432772 Long: -80.041574  
Calculated Distance Traveled: 1.6 km

### Behavior and Additional Comments

Originally only two animals seen spaced well away from one another, upon circling a third animal was observed in area of the initial pair. Animals difficult to photograph as they surfaced infrequently and traveled a long distance between each sighting.

Monday, October 17, 2011 Sighting # 8

### Initial sighting on Track

Time: 15:49 WP#: 78 Lat: 30.499664 Long: -80.015106  
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash  
On/Off Effort: On Trackline: 9 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 15:52 WP#: 79 Lat: 30.497693 Long: -80.014938  
Species: *Grampus griseus* Numbers (Low/High/Best): 10 / 10 / 10  
Features used in Species ID: Varied coloration, tapered head with no rostrum and crease in melon tall dorsal fin.

Representative images used for Species ID: 5613, 5617, 5619  
Photographer: Erin Frame numbers: 5606 - 5623 Spacer: 5624  
Calculated distance from Trackline: 0.2 km

### Final Time and Position of Sighting

Time: 15:53 WP#: 80 Lat: 30.498644 Long: -79.997907  
Calculated Distance Traveled: 1.6 km

### Behavior and Additional Comments

Evenly spaced and traveling within a bodies length of one another.

Monday, October 17, 2011 Sighting # 9

### Initial sighting on Track

Time: 16:04 WP#: 83 Lat: 30.567532 Long: -79.856279  
Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: Splash  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 16:09 WP#: 84 Lat: 30.579420 Long: -79.850618  
Species: *Tursiops truncatus* Numbers (Low/High/Best): 35 / 40 / 38  
Features used in Species ID: Robust body appearance, uniform grey coloration.

Representative images used for Species ID: 5633, 5634, 5645, 5646  
Photographer: Erin Frame numbers: 5625 - 5648 Spacer: 5649  
Calculated distance from Trackline: 1.4 km

### Final Time and Position of Sighting

Time: 16:10 WP#: 85 Lat: 30.565665 Long: -79.858706  
Calculated Distance Traveled: 1.7 km

### Behavior and Additional Comments

Group spread over ~half a mile in groups of 3's or 5's and a single group of 10. All animals in the group showed quick surfacings and directional travel that did not change while we observed them.

Monday, October 17, 2011 Sighting # 10

### Initial sighting on Track

Time: 16:19 WP#: 86 Lat: 30.566490 Long: -80.228430  
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body  
On/Off Effort: On Trackline: 10 Beaufort Sea State: 2  
Observer: Erin Observer side: Right

### Actual Time and Position of Sighting

Time: 16:20 WP#: 87 Lat: 30.566635 Long: -80.227814  
Species: *Steno bredanensis* Numbers (Low/High/Best): 40 / 45 / 43  
Features used in Species ID: Triangular dorsal fin, wide pectoral fins, low slope to melon, lower jaw colored white.

Representative images used for Species ID: 5659, 5663, 5668, 5669, 5670, 5679, 5685  
Photographer: Erin Frame numbers: 5650 - 5696 Spacer: 5697  
Calculated distance from Trackline: 0.1 km

### Final Time and Position of Sighting

Time: 16:25 WP#: 88 Lat: 30.575714 Long: -80.229018  
Calculated Distance Traveled: 1.0 km

### Behavior and Additional Comments

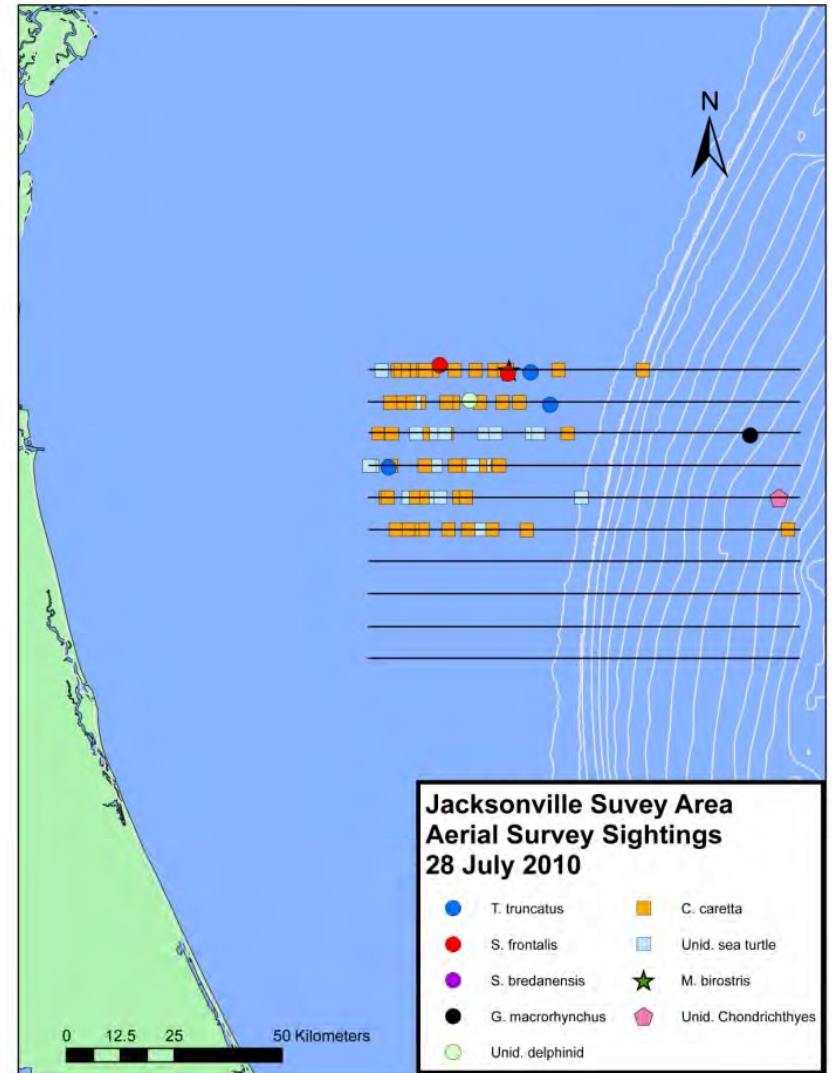
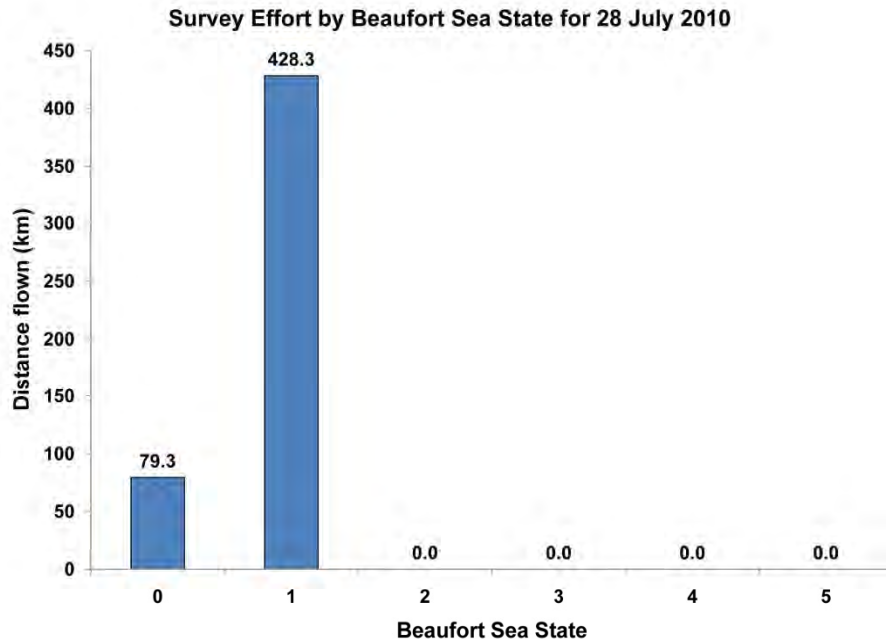
Large group of animals broken down into smaller groups that were all almost touching one another. Entire group just hanging at the surface with little to no directional travel. Central group of 10 - 12 animals.



## Summary of 28 July 2010

28 July 2010

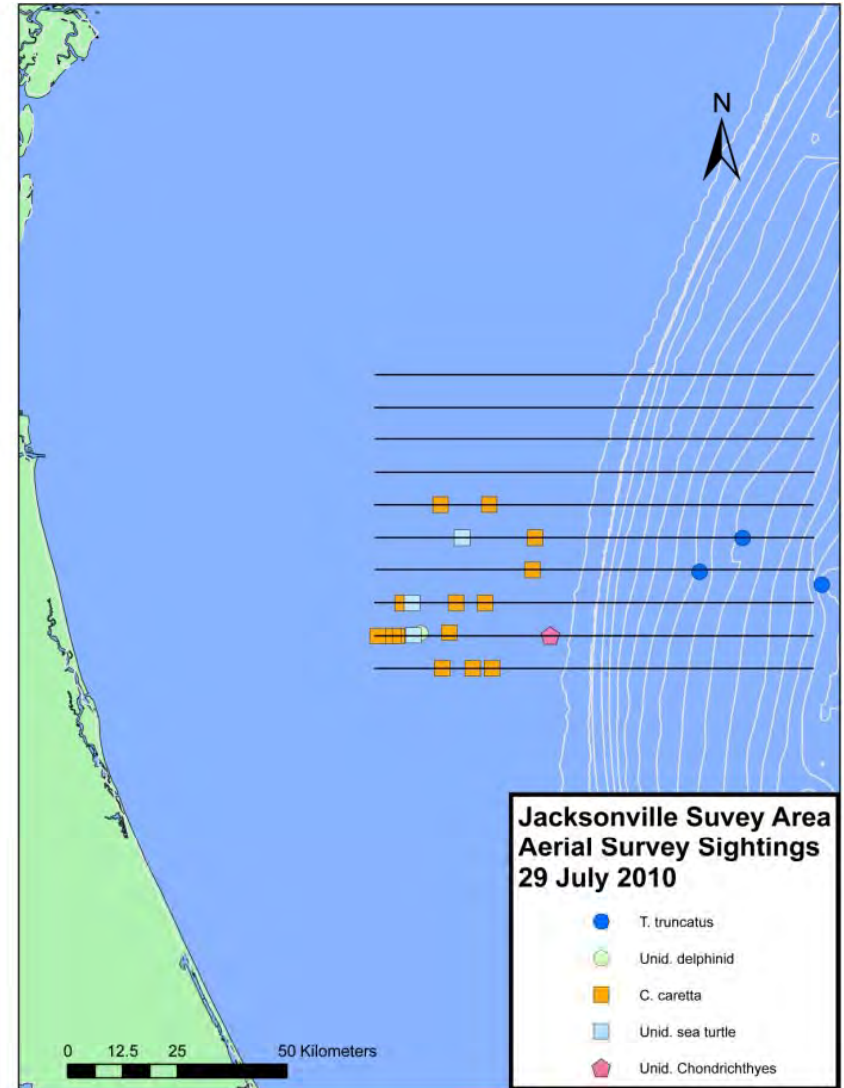
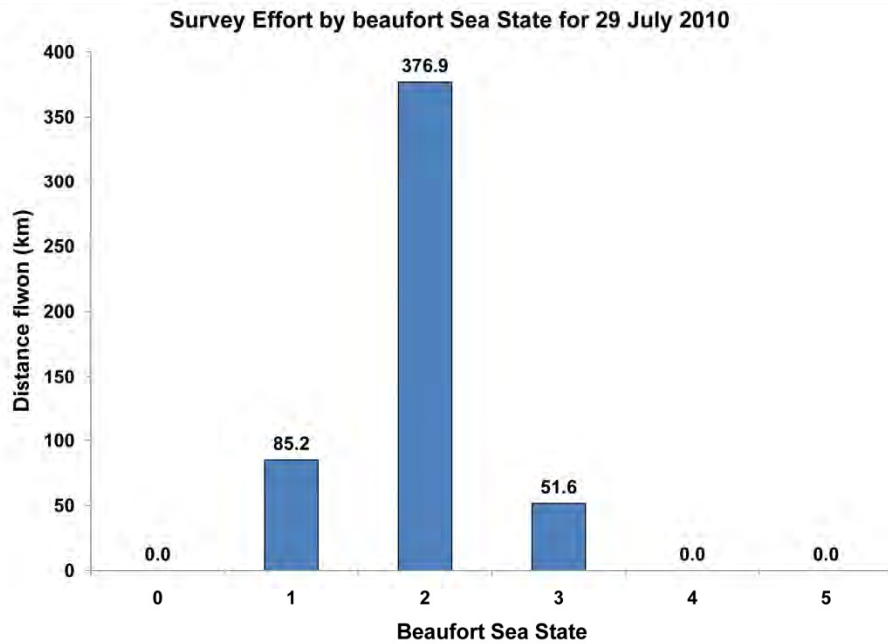
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	4	0	10
<i>Tursiops truncatus</i>	1	4	1	9
<i>Tursiops truncatus</i>	1	7	1	7
<i>Stenella frontalis</i>	1	31	0	10
<i>Stenella frontalis</i>	1	9	0	10
<i>Steno bredanensis</i>	1	23	1	9
<i>Globicephala macrorhynchus</i>	1	1	50	8
Unidentified delphinid	1	2	1	9
<i>Caretta caretta</i>	76	76	0 to 1	-
Unidentified sea turtle	28	28	0 to 1	-
<i>Manta birostris</i>	1	1	1	10
Unidentified Chondrichthyes	1	1	1	6



## Summary of 29 July 2010

29 July 2010

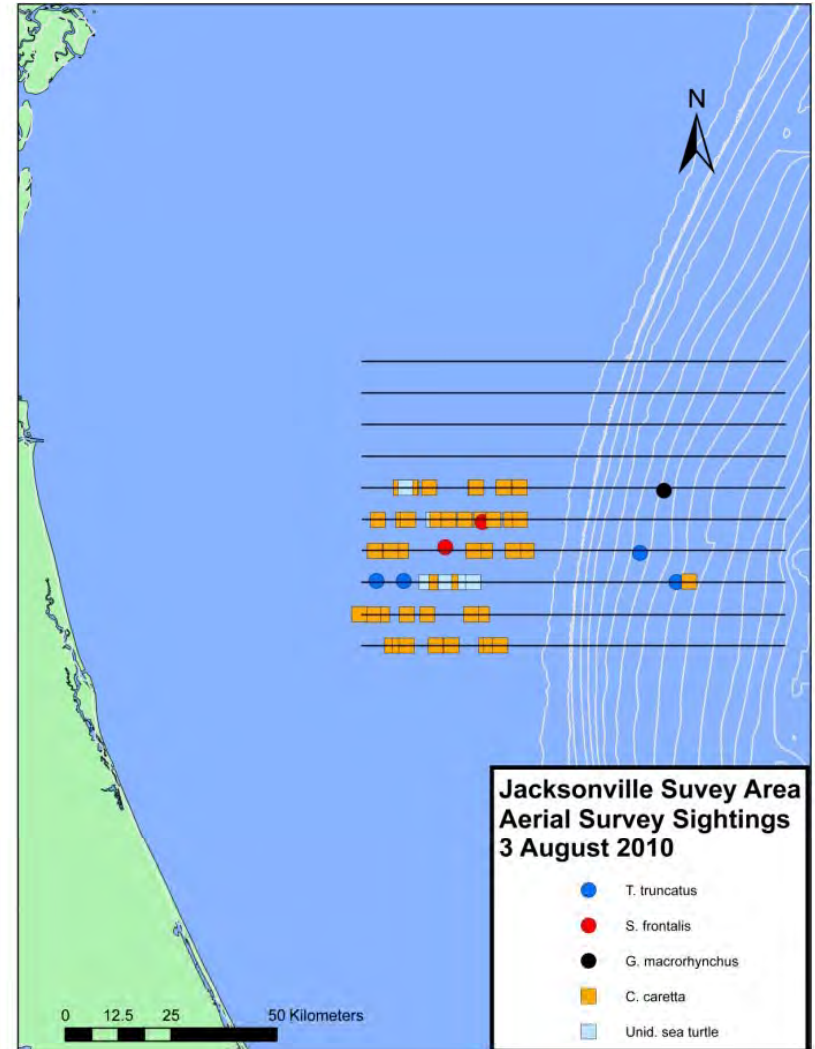
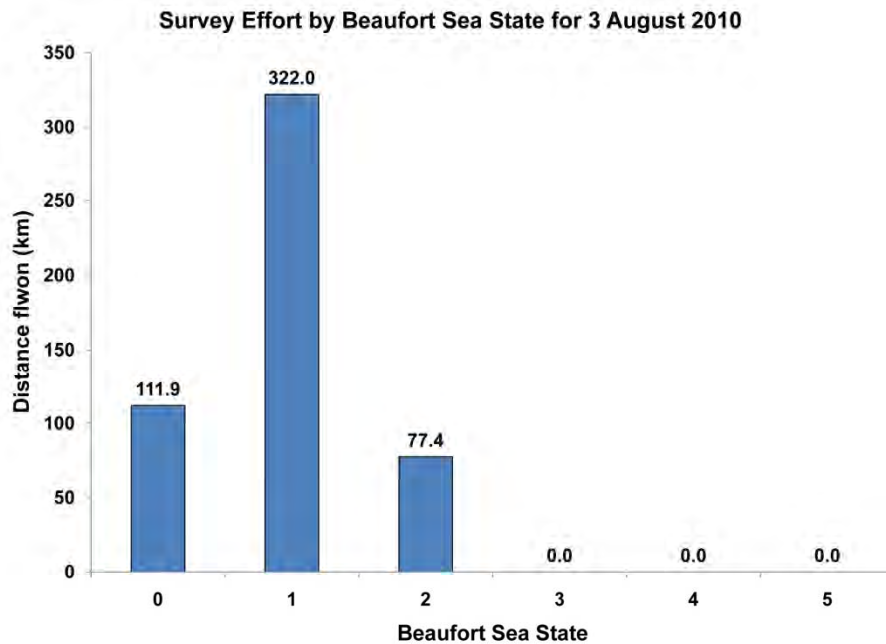
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	11	2	-
<i>Tursiops truncatus</i>	1	17	2	4
<i>Tursiops truncatus</i>	1	7	2	5
Unidentified delphinid	1	1	2	2
<i>Caretta caretta</i>	15	15	1 to 2	-
Unidentified sea turtle	3	3	1 to 2	-
Unidentified Chondrichthyes	1	1	2	2



## Summary of 3 August 2010

3 August 2010

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	9	1	3
<i>Tursiops truncatus</i>	1	8	1	3
<i>Tursiops truncatus</i>	1	4	0	3
<i>Tursiops truncatus</i>	1	14	1	4
<i>Stenella frontalis</i>	1	6	0	4
<i>Stenella frontalis</i>	1	5	0	5
<i>Globicephala macrorhynchus</i>	1	23	2	6
<i>Caretta caretta</i>	59	59	0 to 1	-
Unidentified sea turtle	6	6	1	-

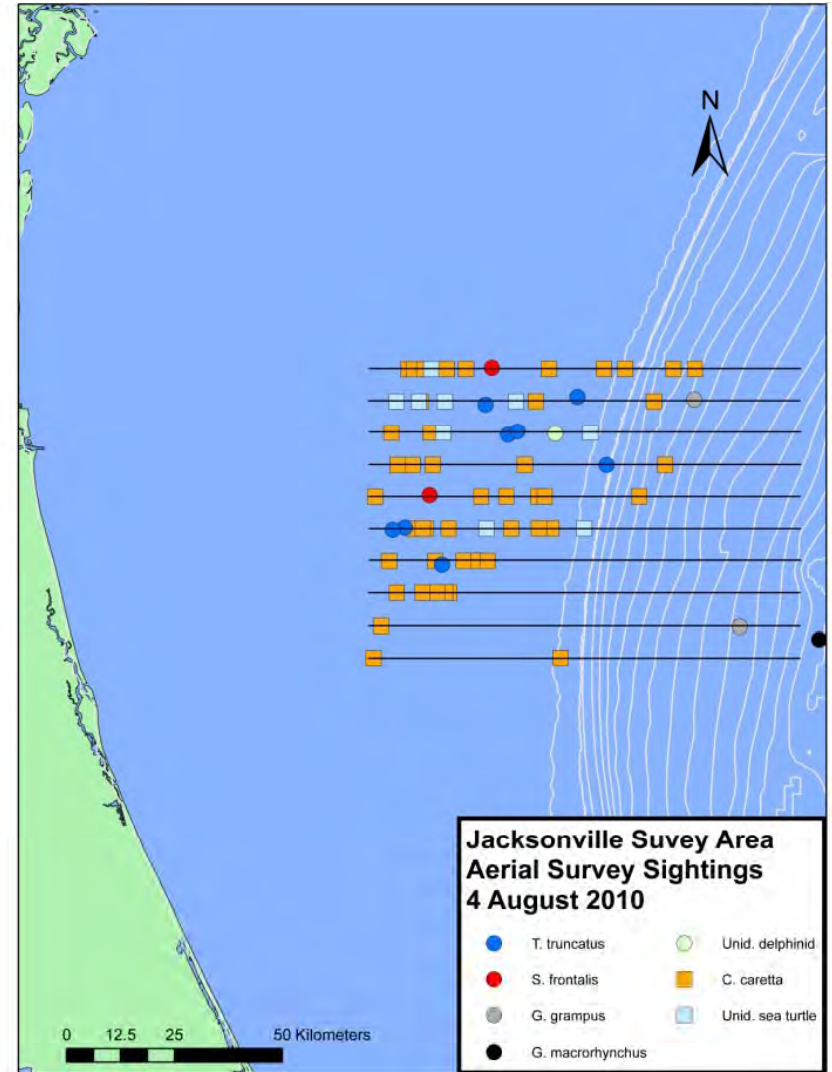
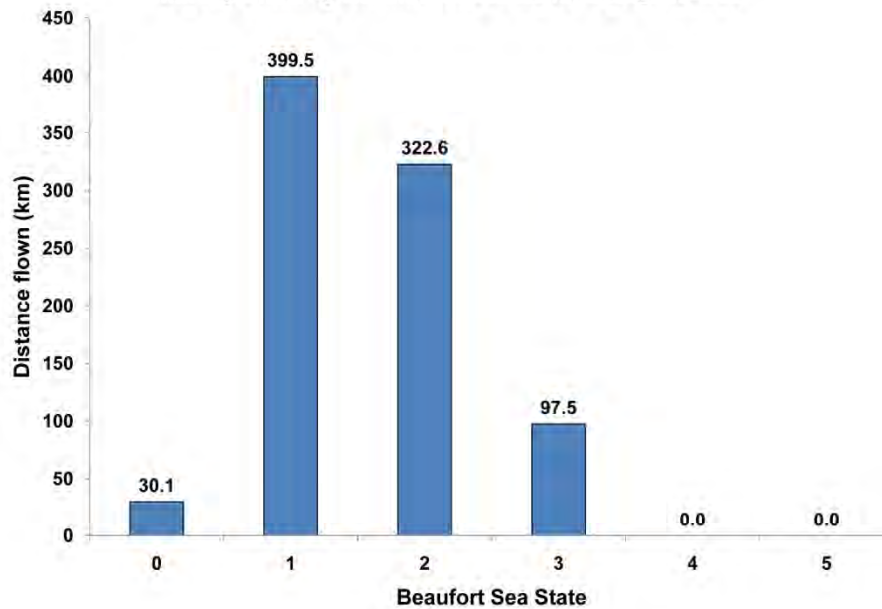


## Summary of 4 August 2010

4 August 2010

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	3	2	9
<i>Tursiops truncatus</i>	1	2	2	9
<i>Tursiops truncatus</i>	1	2	1	8
<i>Tursiops truncatus</i>	1	3	1	8
<i>Tursiops truncatus</i>	1	12	3	7
<i>Tursiops truncatus</i>	1	5	1	5
<i>Tursiops truncatus</i>	1	5	1	5
<i>Tursiops truncatus</i>	1	7	1	4
<i>Stenella frontalis</i>	1	10	2	10
<i>Stenella frontalis</i>	1	3	1	6
<i>Globicephala macrorhynchus</i>	1	14	2	2
<i>Grampus griseus</i>	1	14	3	9
<i>Grampus griseus</i>	1	14	2	2
Unidentified delphinid	1	1	1	8
<i>Caretta caretta</i>	47	55	0 to 2	-
Unidentified sea turtle	9	11	1	-

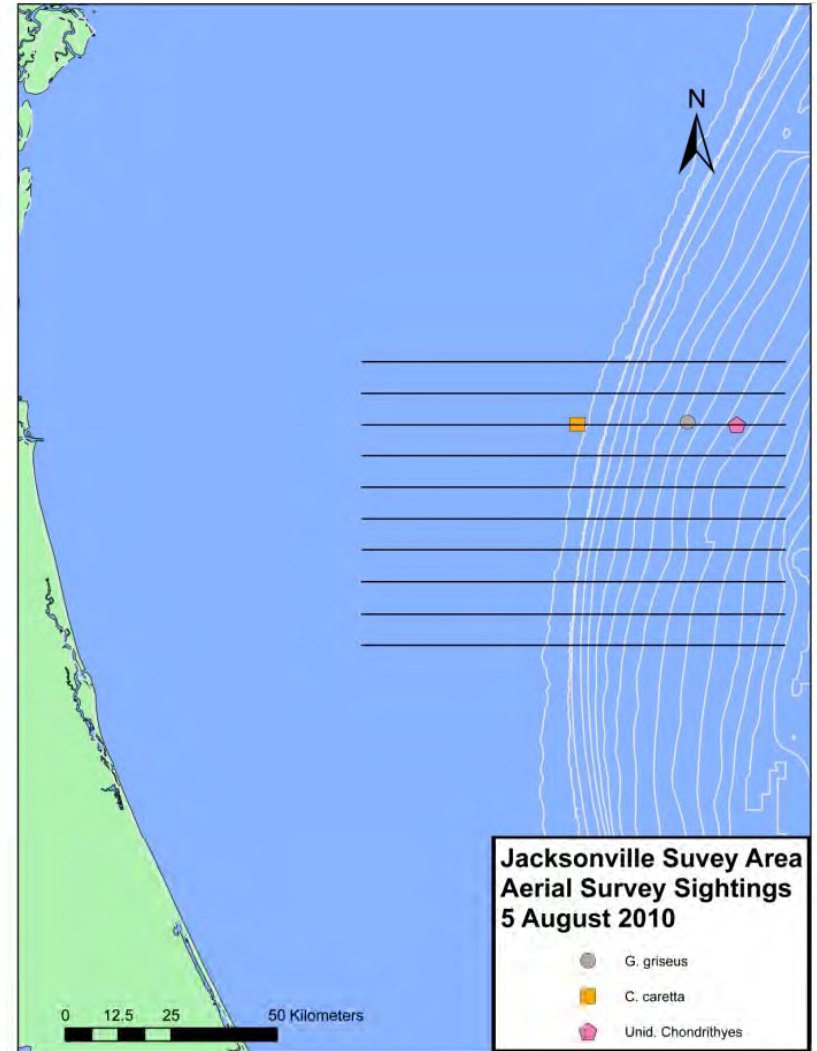
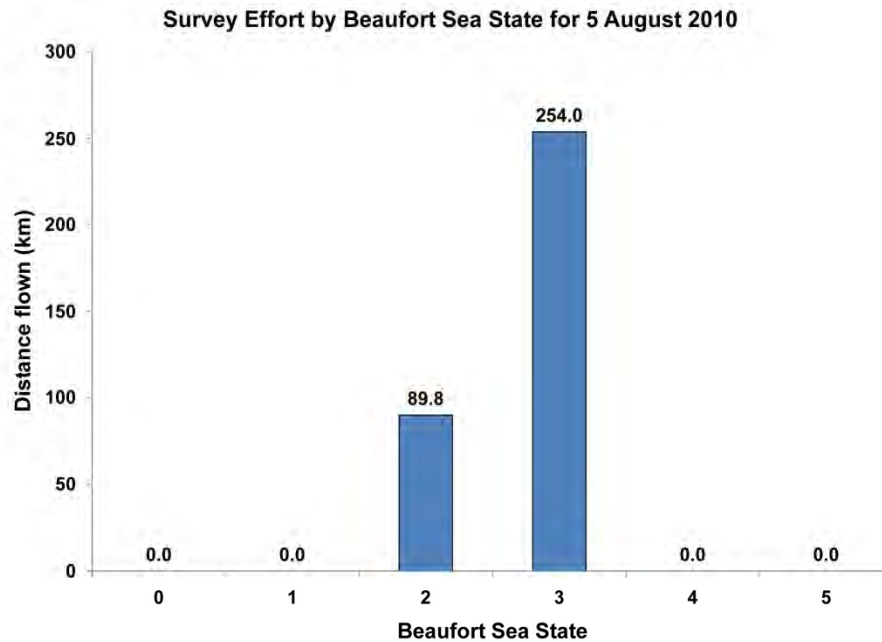
Survey Effort by Beaufort Sea State for 4 August 2010



## Summary of 5 August 2010

5 August 2010

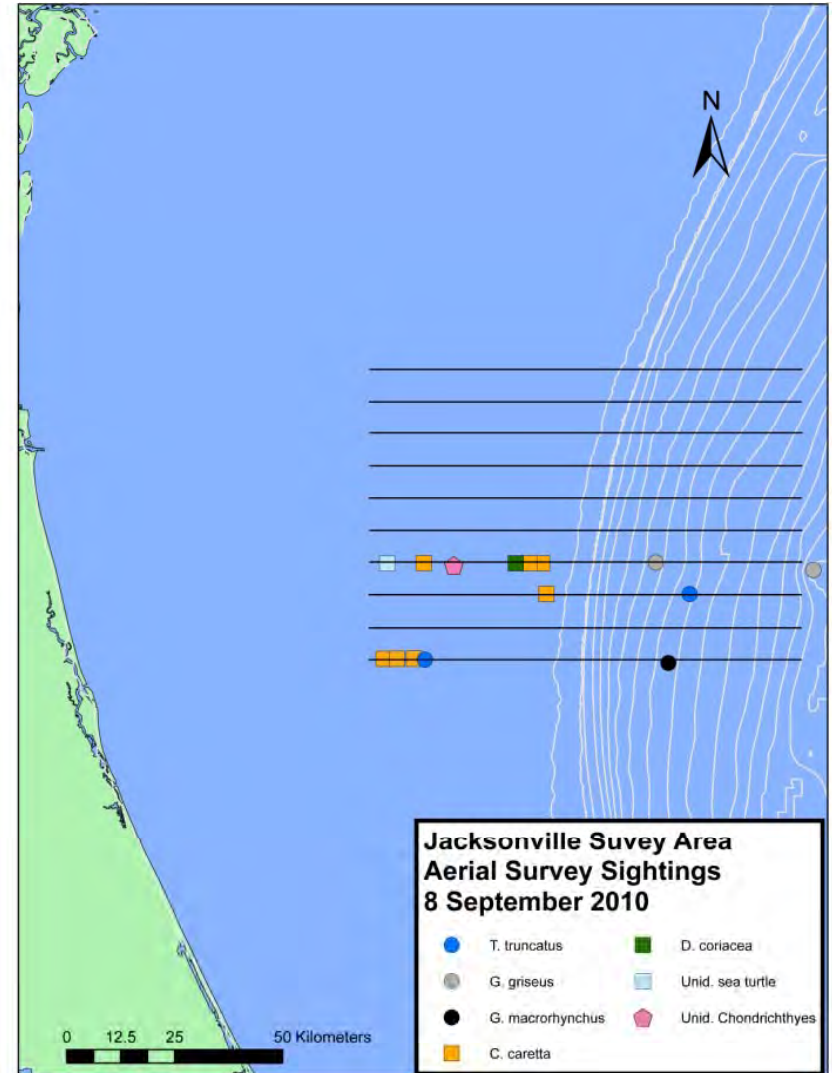
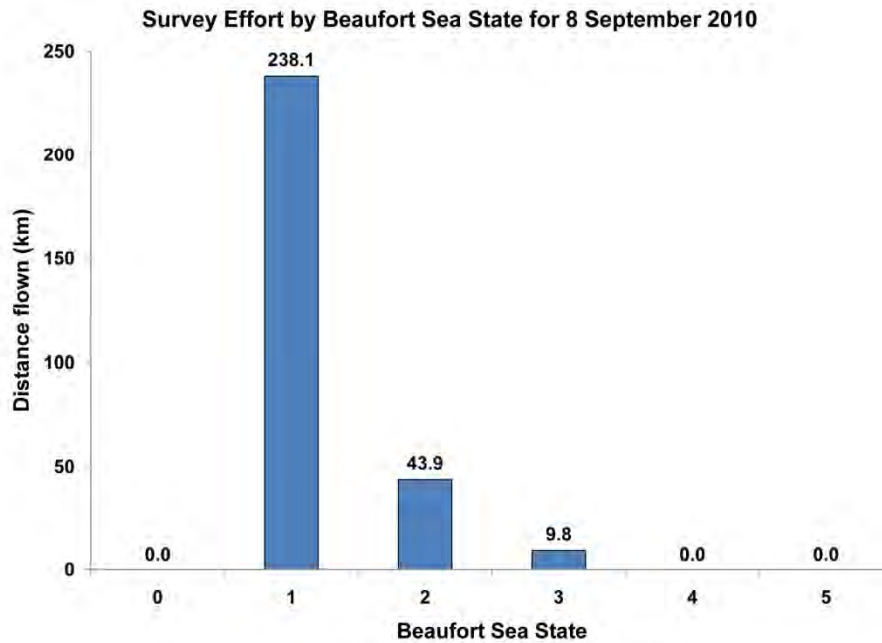
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Grampus griseus</i>	1	44	2	8
<i>Caretta caretta</i>	1	1	3	8
Chondrichthyes	1	1	2	8



## Summary of 8 September 2010

8 September 2010

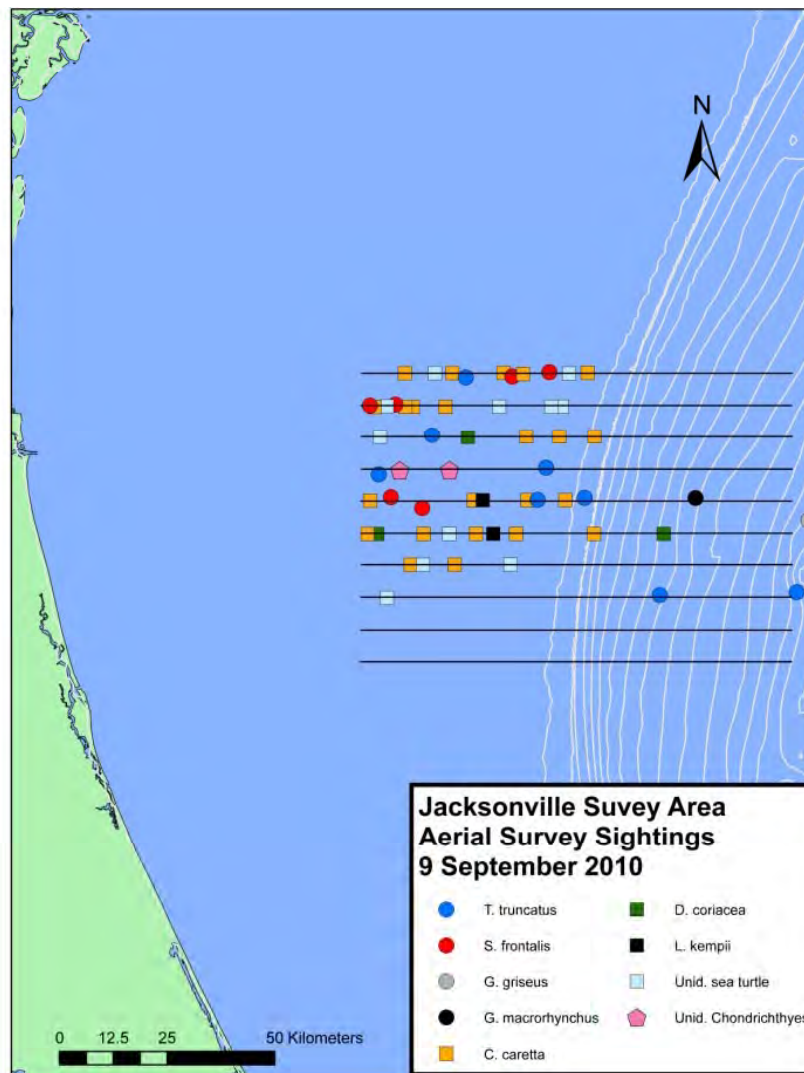
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	3	1	1
<i>Tursiops truncatus</i>	1	6	1	3
<i>Grampus griseus</i>	1	19	1	-
<i>Grampus griseus</i>	1	37	1	4
<i>Globicephala macrorhynchus</i>	1	20	1	1
<i>Globicephala macrorhynchus</i>	1	30	1	3
<i>Dermochelys coriacea</i>	1	1	1	4
<i>Caretta caretta</i>	7	8	1 to 2	-
Unidentified sea turtle	1	1	1	4
Chondrichthyes	1	1	1	4



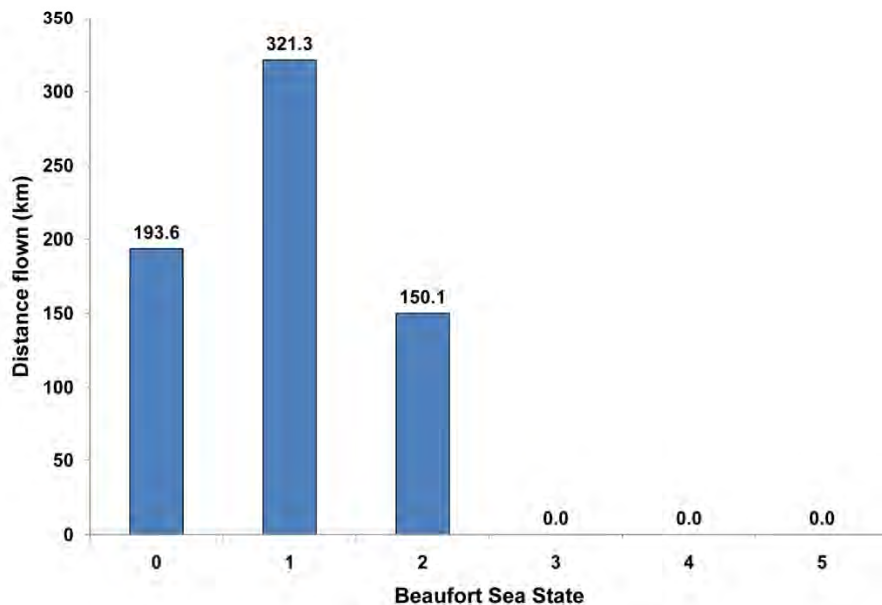
9 September 2010

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	6	1	10
<i>Tursiops truncatus</i>	1	6	1	8
<i>Tursiops truncatus</i>	1	20	1	7
<i>Tursiops truncatus</i>	1	6	1	7
<i>Tursiops truncatus</i>	1	8	0	6
<i>Tursiops truncatus</i>	1	9	1	6
<i>Tursiops truncatus</i>	1	10	1	-
<i>Tursiops truncatus</i>	1	25	1	3
<i>Stenella frontalis</i>	1	11	1	10
<i>Stenella frontalis</i>	1	20	1	10
<i>Stenella frontalis</i>	1	5	1	9
<i>Stenella frontalis</i>	1	19	1	9
<i>Stenella frontalis</i>	1	27	1	6
<i>Stenella frontalis</i>	1	22	1	6
<i>Grampus griseus</i>	1	27	1	-
<i>Globicephala macrorhynchus</i>	1	21	1	6
<i>Dermochelys coriacea</i>	3	3	0 to 1	-
<i>Lepidochelys kempii</i>	2	2	1	-
<i>Caretta caretta</i>	24	29	0 to 1	-
Unidentified sea turtle	11	14	0 to 2	-
Chondrichthyes	2	2	1	7

## Summary of 9 September 2010



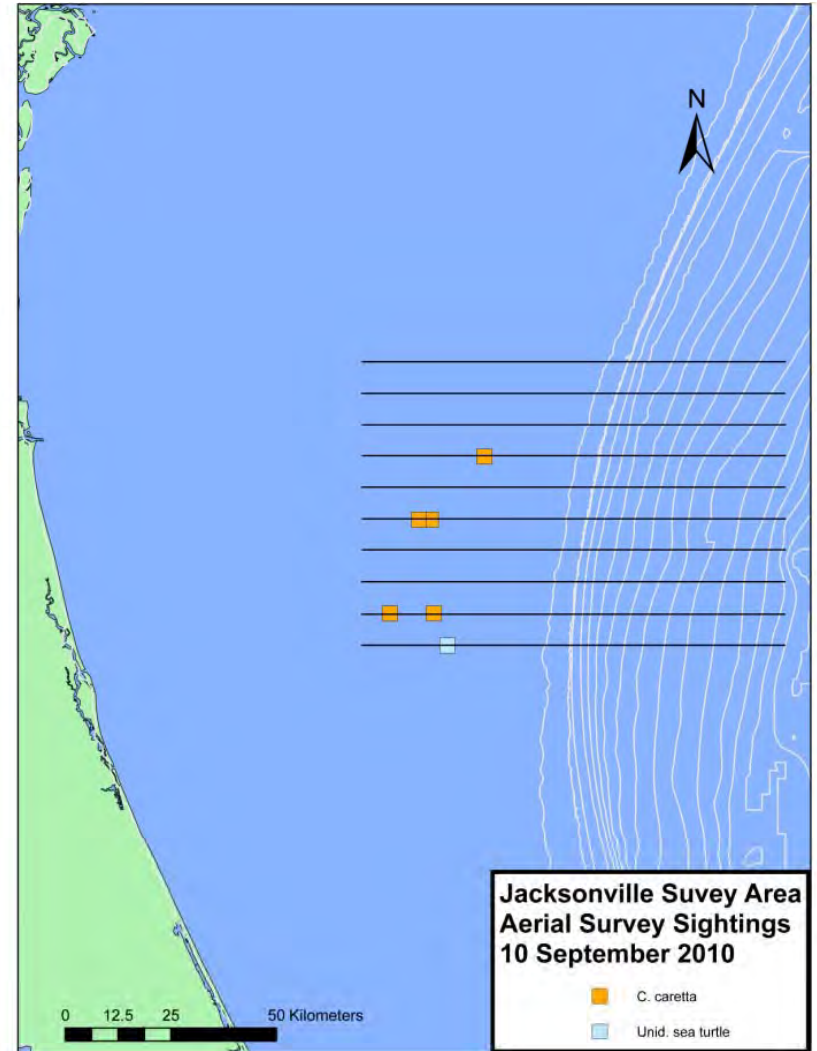
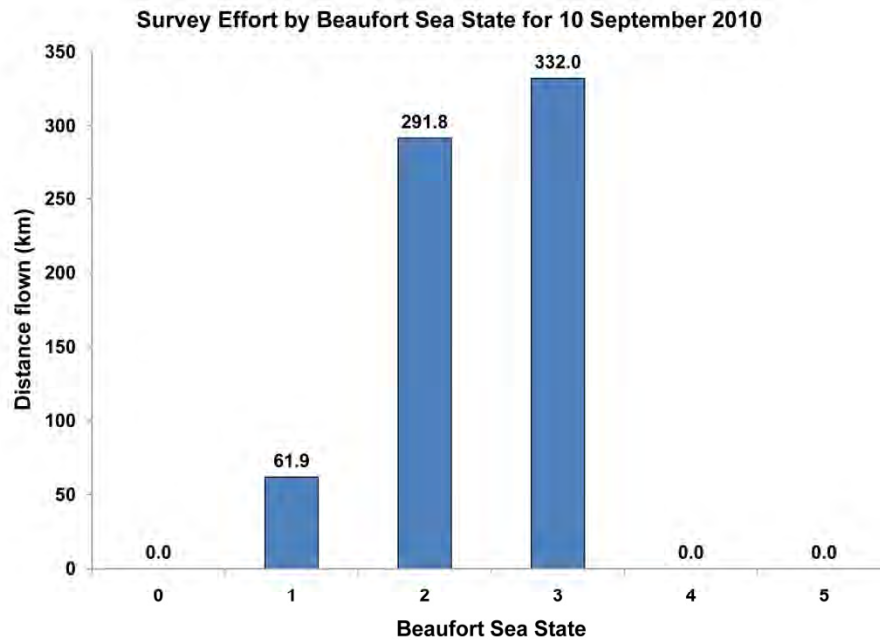
Survey Effort by Beaufort Sea State for 9 September 2010



## Summary of 10 September 2010

10 September 2010

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Caretta caretta</i>	5	6	1 to 3	-
Unidentified sea turtle	1	1	1	1



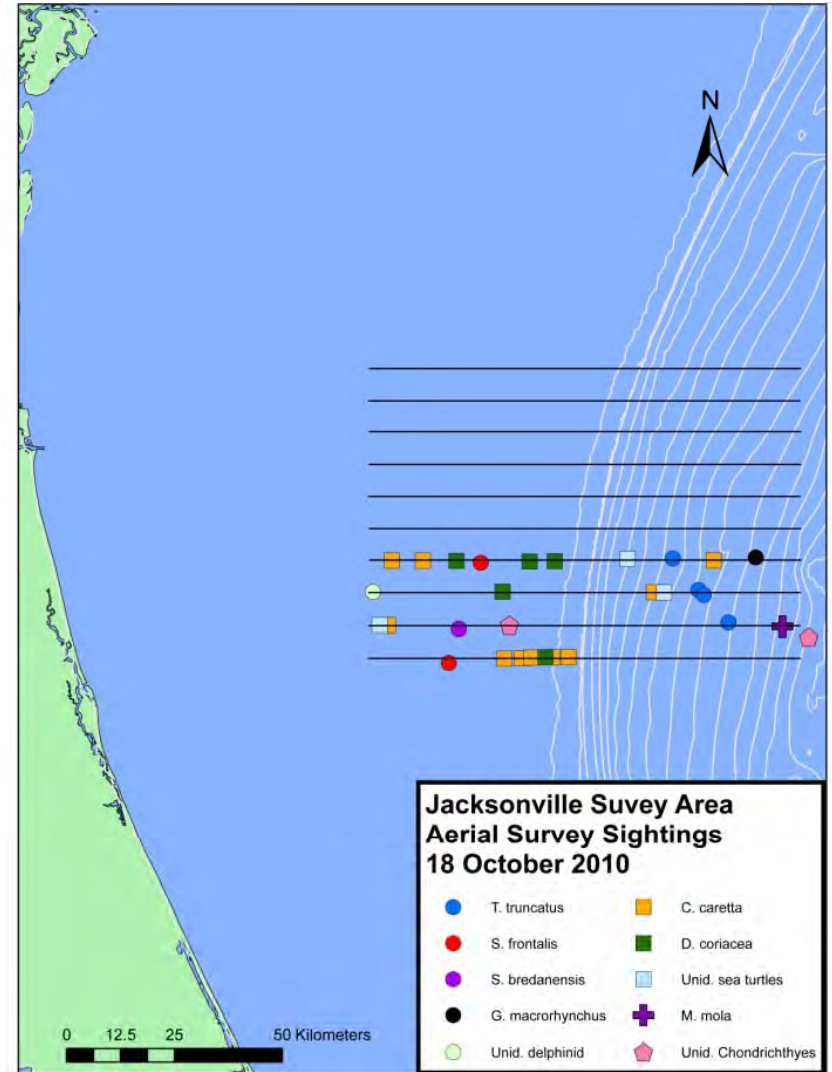
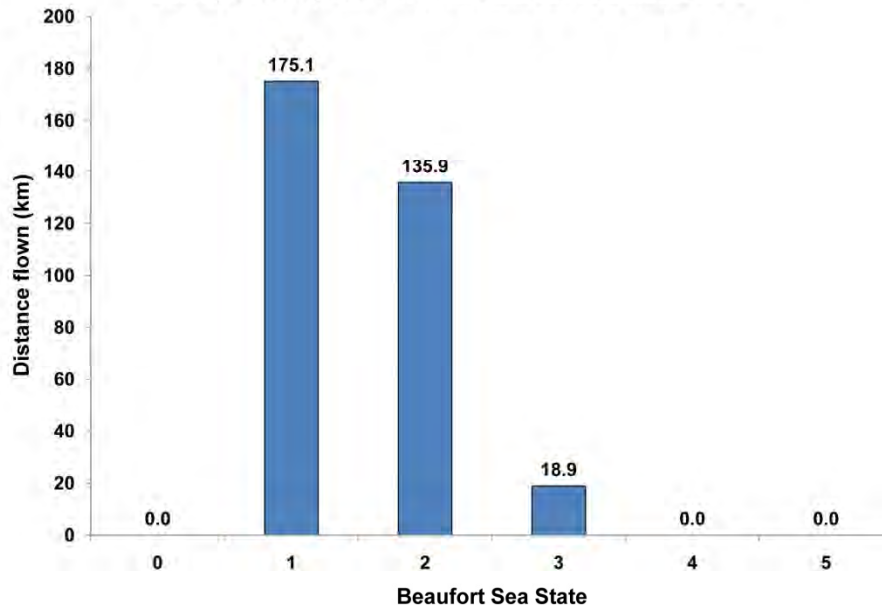


## Summary of 18 October 2010

18 October 2010

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	8	2	2
<i>Tursiops truncatus</i>	1	8	1	3
<i>Tursiops truncatus</i>	1	8	1	3
<i>Tursiops truncatus</i>	1	4	2	4
<i>Steno bredanensis</i>	1	45	1	2
<i>Stenella frontalis</i>	1	14	2	1
<i>Stenella frontalis</i>	1	35	1	4
<i>Globicephala macrorhynchus</i>	1	11	3	4
Unidentified delphinid	1	2	1	3
<i>Dermochelys coriacea</i>	5	5	1 to 2	-
<i>Caretta caretta</i>	10	10	1 to 3	-
Unidentified sea turtle	3	3	1	-
<i>Mola mola</i>	1	1	3	2
Chondrichthyes	2	2	2	-

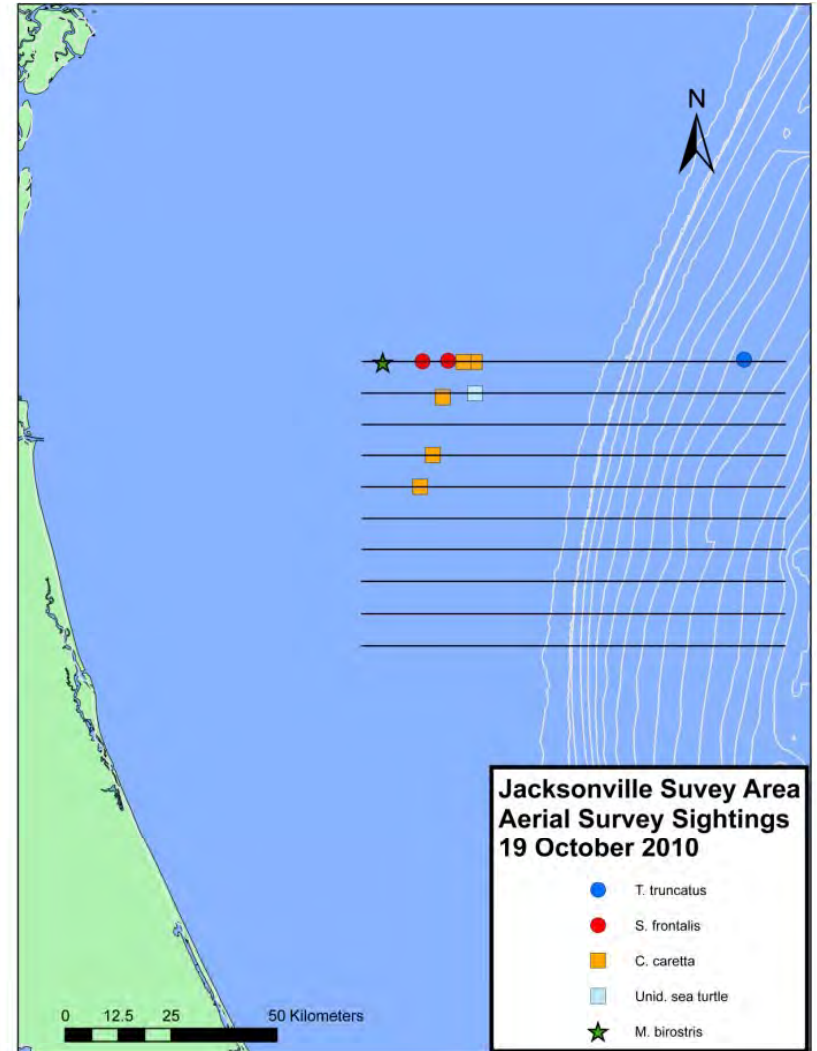
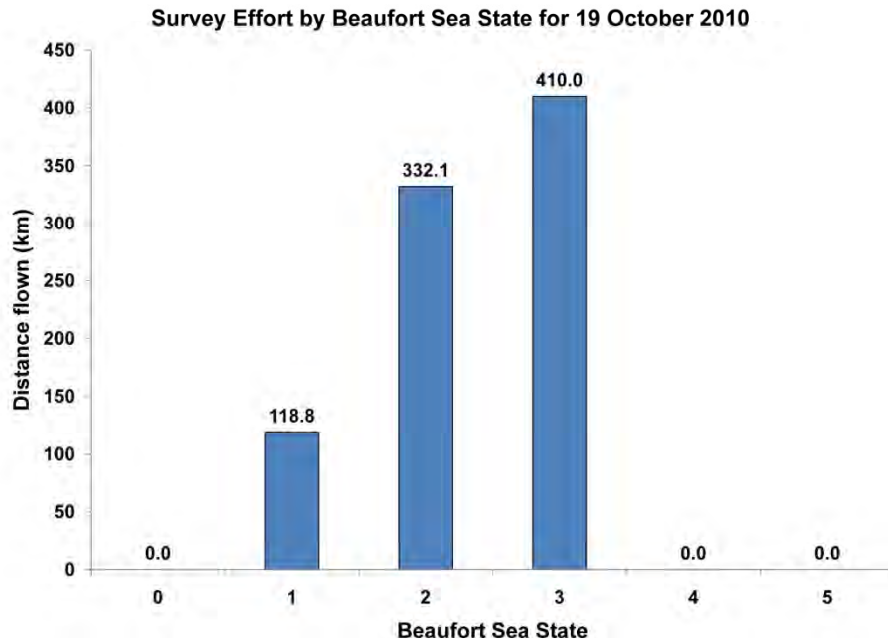
Survey Effort by Beaufort Sea State for 18 October 2010



# Summary of 19 October 2010

19 October 2010

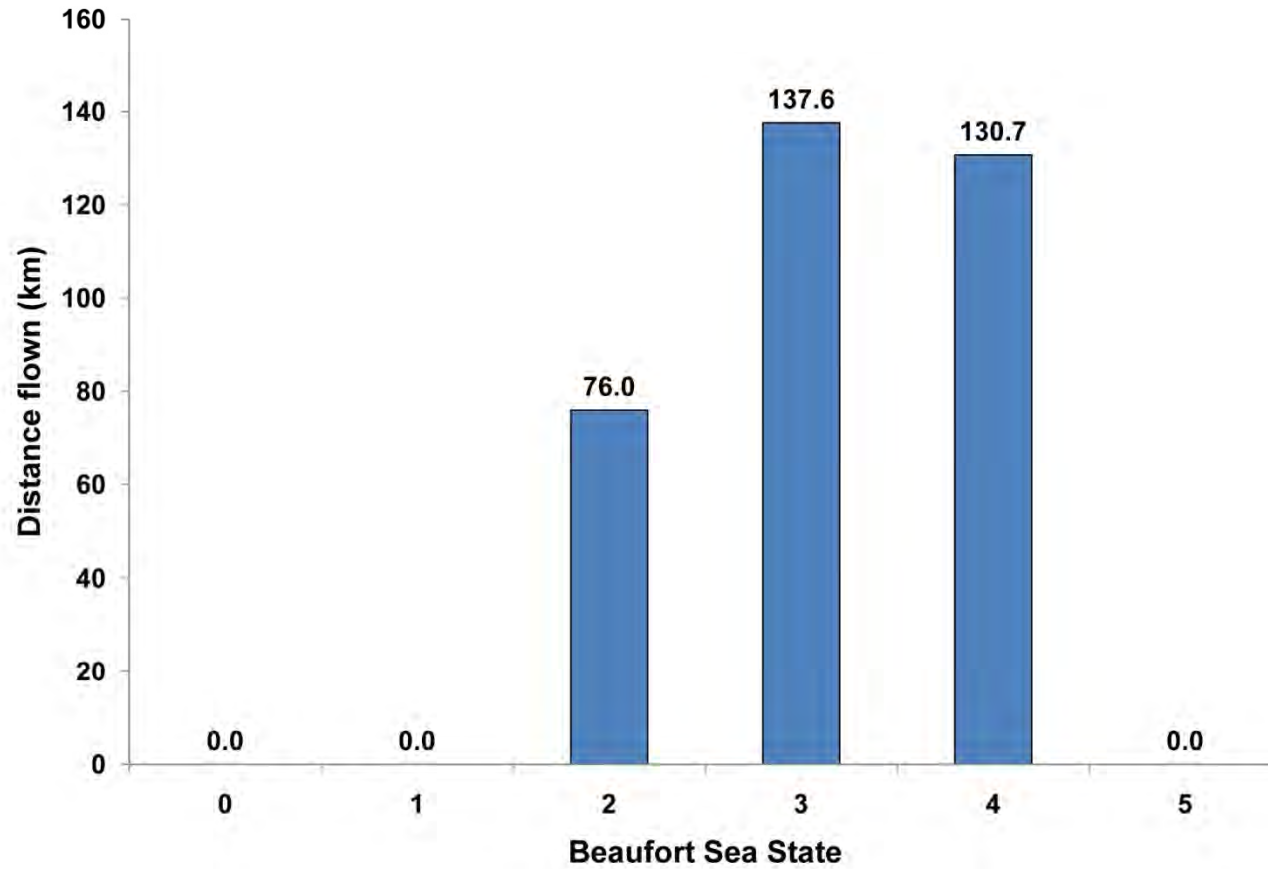
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	13	3	10
<i>Stenella frontalis</i>	1	18	1	10
<i>Stenella frontalis</i>	1	27	1	10
<i>Caretta caretta</i>	5	5	1 to 3	-
Unidentified sea turtle	1	1	1	9
<i>Manta birostris</i>	1	1	1	10



# Summary of 20 October 2010

No sightings recorded

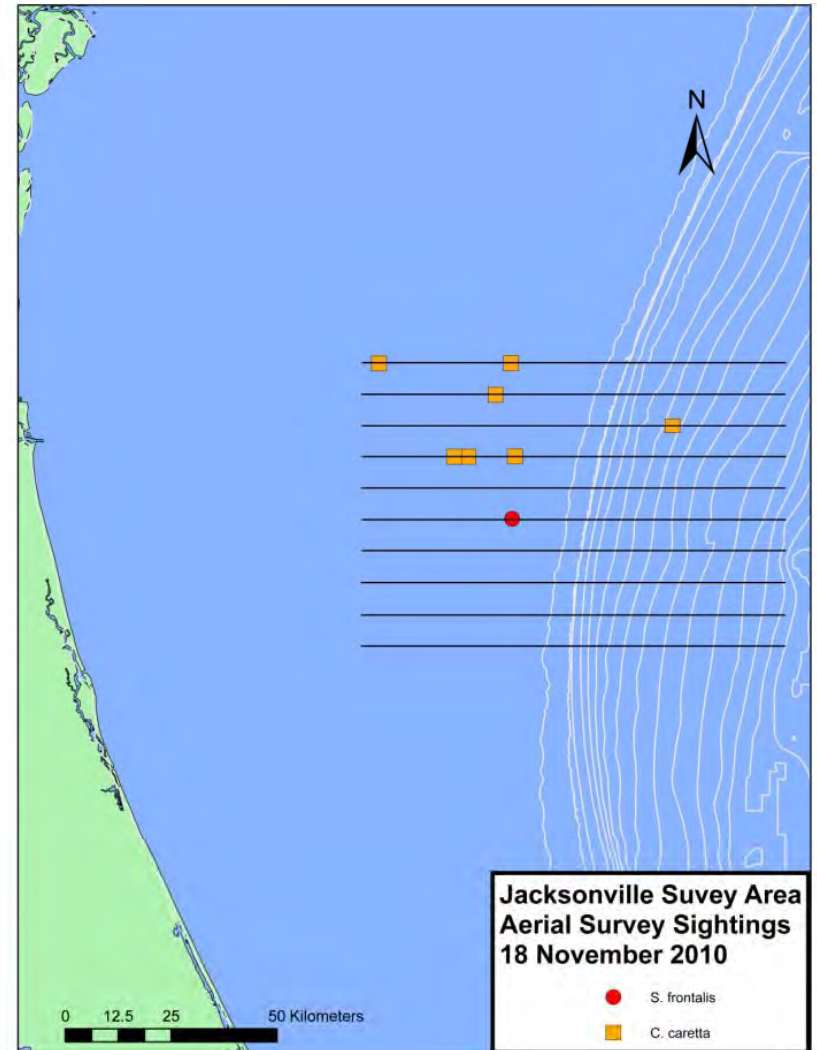
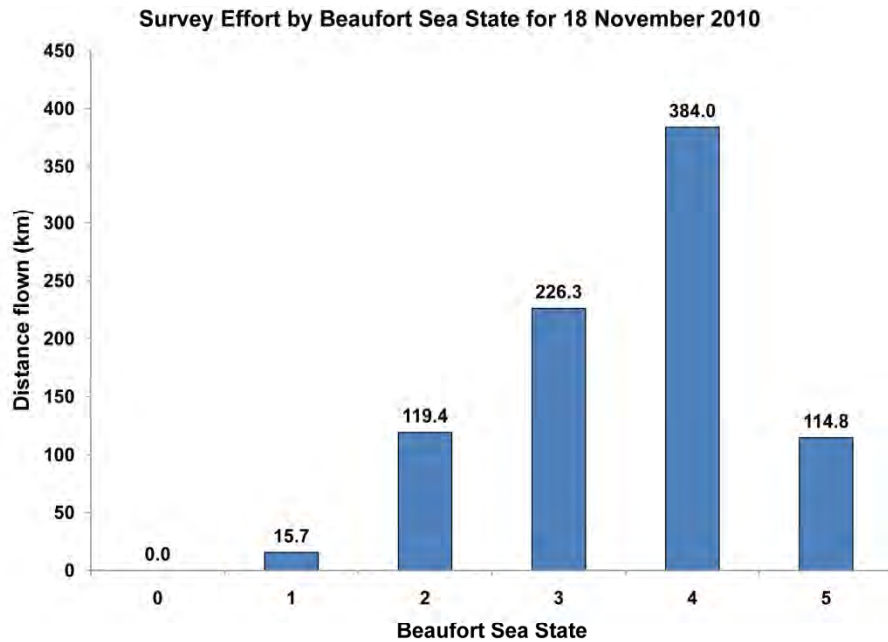
Survey Effort by Beaufort Sea State for 20 October 2010



## Summary of 18 November 2010

18 November 2010

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Stenella frontalis</i>	1	58	3	5
<i>Caretta caretta</i>	7	7	1 to 4	-

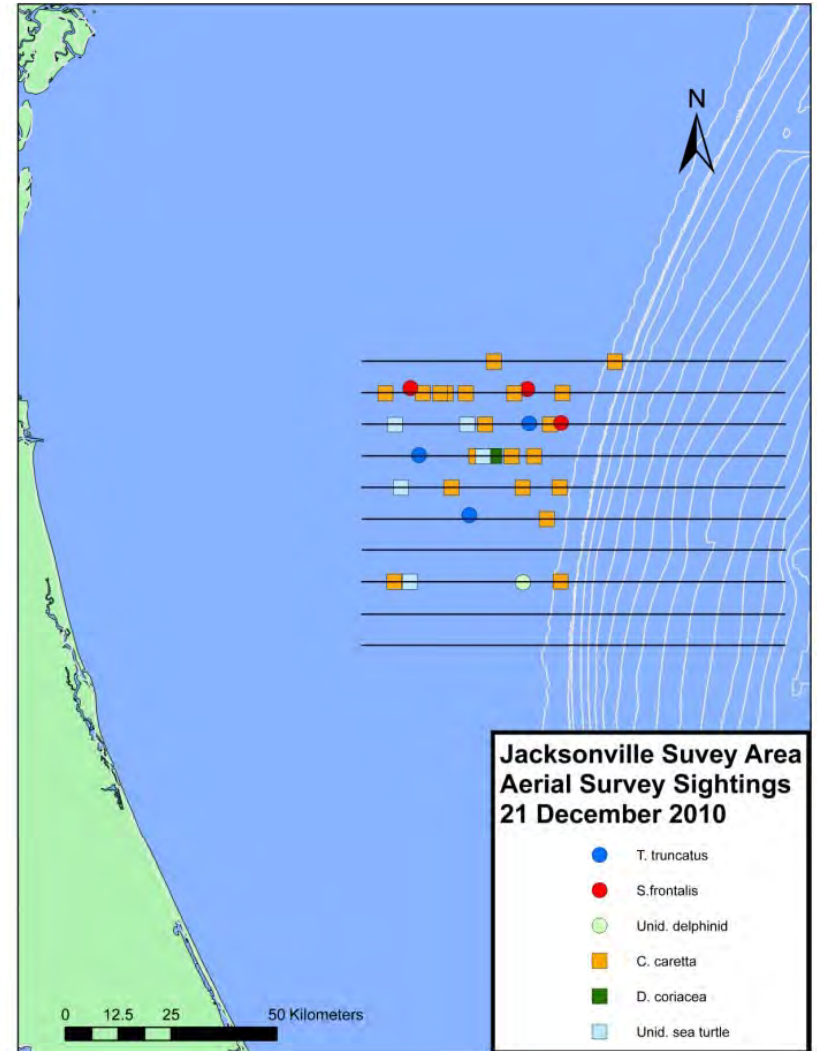
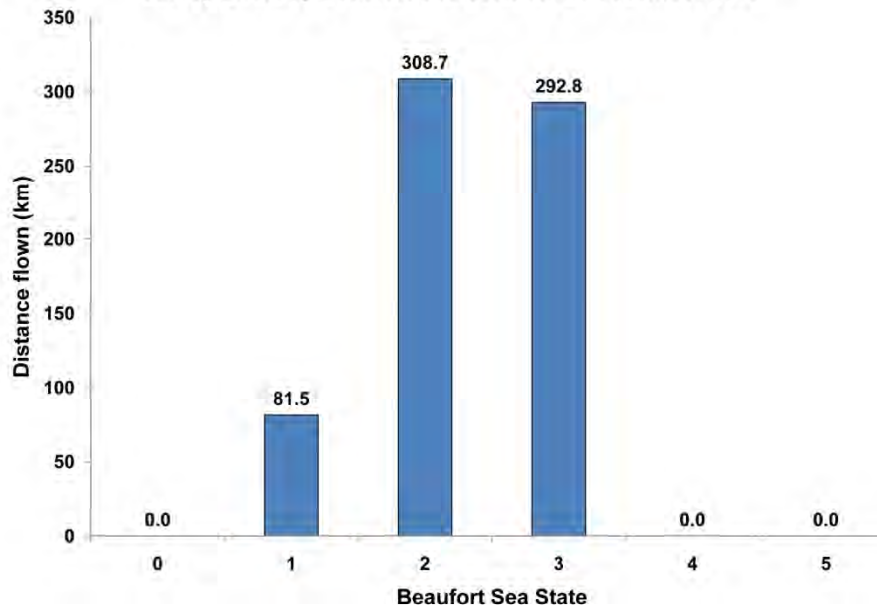


## Summary of 21 December 2010

21 December 2010

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	12	1	8
<i>Tursiops truncatus</i>	1	2	1	7
<i>Tursiops truncatus</i>	1	3	3	5
<i>Stenella frontalis</i>	1	8	3	9
<i>Stenella frontalis</i>	1	3	2	9
<i>Stenella frontalis</i>	1	7	1	8
Unidentified delphinid	1	1	3	3
<i>Dermochelys coriacea</i>	1	1	1	7
<i>Caretta caretta</i>	20	20	1 to 3	-
Unidentified sea turtle	5	6	1 to 2	-

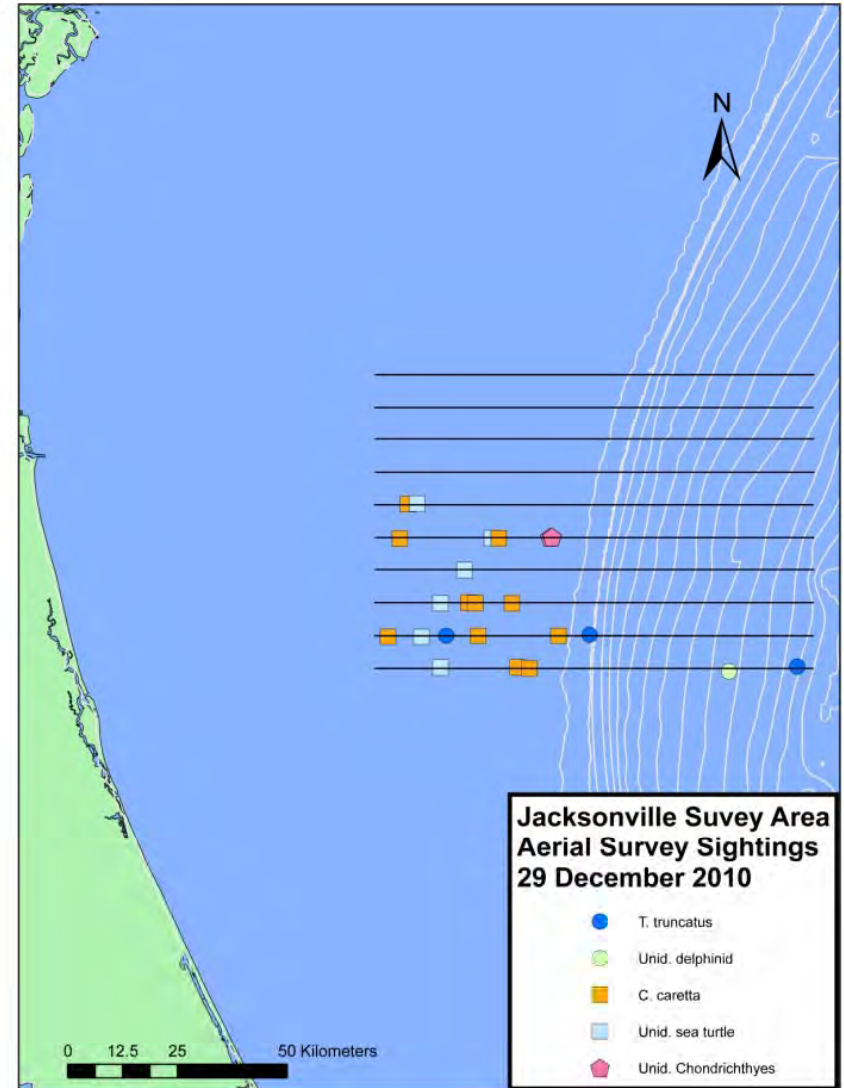
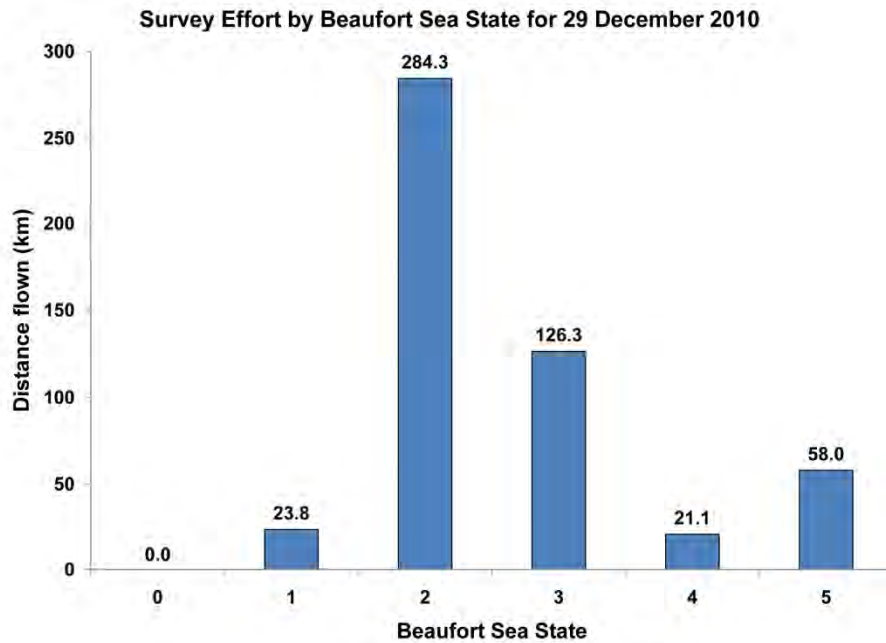
Survey Effort by Beaufort Sea State for 21 December 2010



## Summary of 29 December 2010

29 December 2010

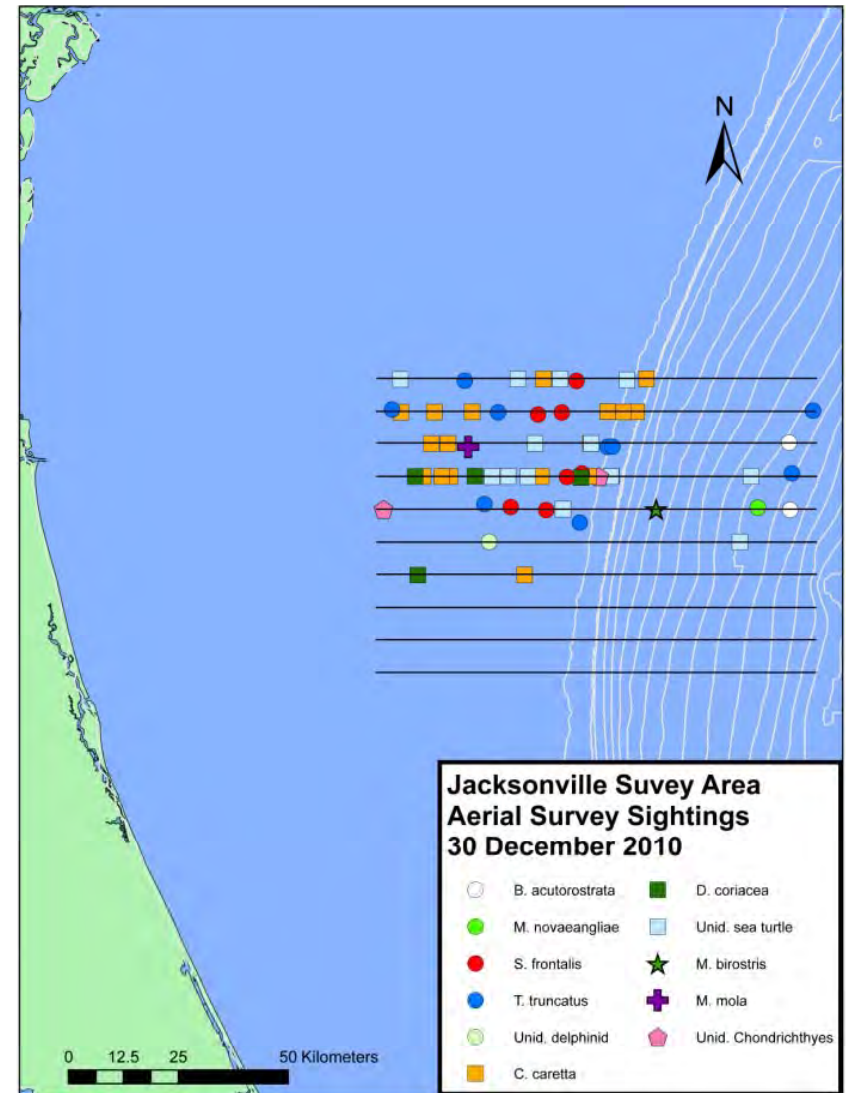
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	7	3	1
<i>Tursiops truncatus</i>	1	17	3	2
<i>Tursiops truncatus</i>	1	12	2	2
Unidentified delphinid	1	2	3	1
<i>Caretta caretta</i>	11	11	2, 5	-
Unidentified sea turtle	6	6	2, 5	-
Chondrichthyes	2	2	2	5



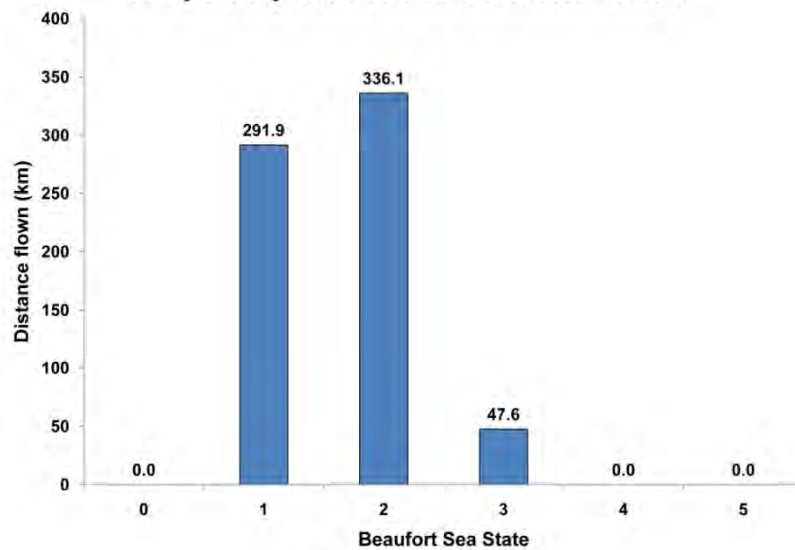
30 Decmeber 2010

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Balaenoptera acutorostrata</i>	1	2	1	8
<i>Balaenoptera acutorostrata</i>	1	2	2	6
<i>Megaptera novaeangliae</i>	1	1	2	6
<i>Tursiops truncatus</i>	1	4	1	10
<i>Tursiops truncatus</i>	1	9	2	9
<i>Tursiops truncatus</i>	1	2	1	9
<i>Tursiops truncatus</i>	1	2	1	9
<i>Tursiops truncatus</i>	1	1	1	8
<i>Tursiops truncatus</i>	1	13	1	8
<i>Tursiops truncatus</i>	1	15	1	7
<i>Tursiops truncatus</i>	1	43	2	6
<i>Tursiops truncatus</i>	1	6	2	6
<i>Stenella frontalis</i>	1	5	2	10
<i>Stenella frontalis</i>	1	40	1	9
<i>Stenella frontalis</i>	1	25	1	9
<i>Stenella frontalis</i>	1	6	1	7
<i>Stenella frontalis</i>	1	3	1	7
<i>Stenella frontalis</i>	1	10	2	6
<i>Stenella frontalis</i>	1	21	2	6
Unidentified delphinid	1	5	2	6
<i>Dermochelys coriacea</i>	4	4	1 to 2	-
<i>Caretta caretta</i>	18	20	1 to 2	-
Unidentified sea turtle	13	20	1 to 2	-
<i>Mola mola</i>	1	1	1	8
<i>Manta birostris</i>	1	1	2	6
Chondrichthyes	2	45	1 to 2	-

## Summary of 30 December 2010



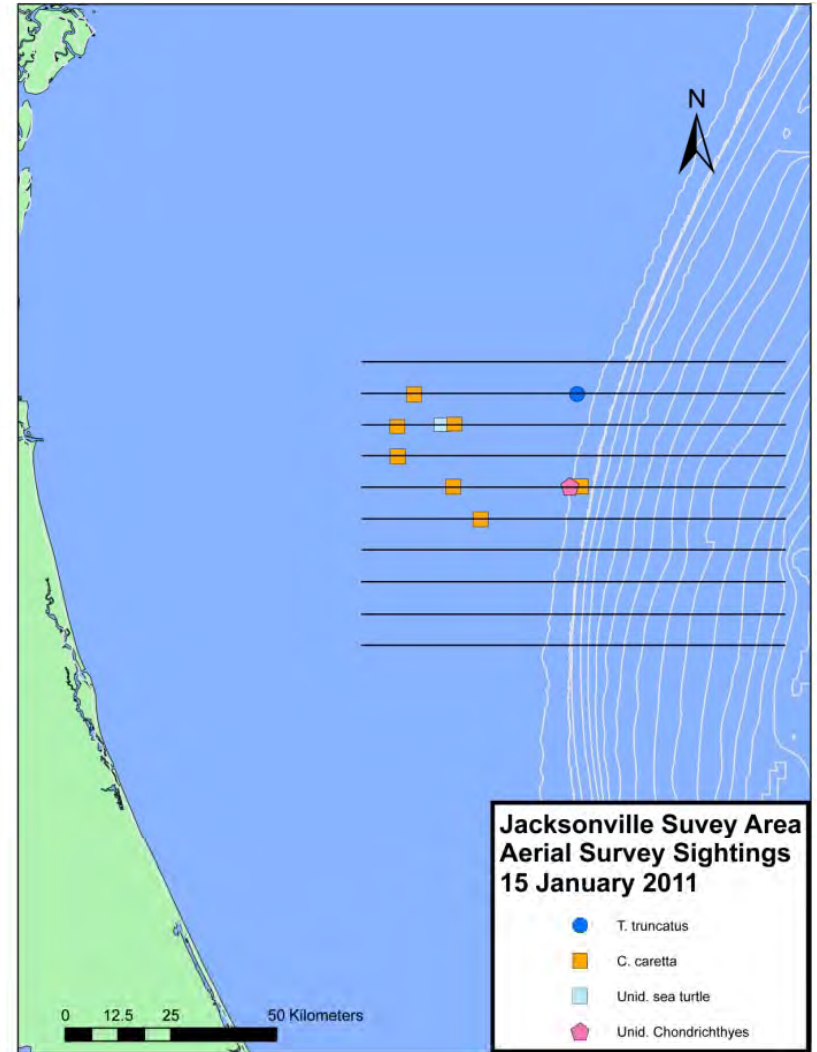
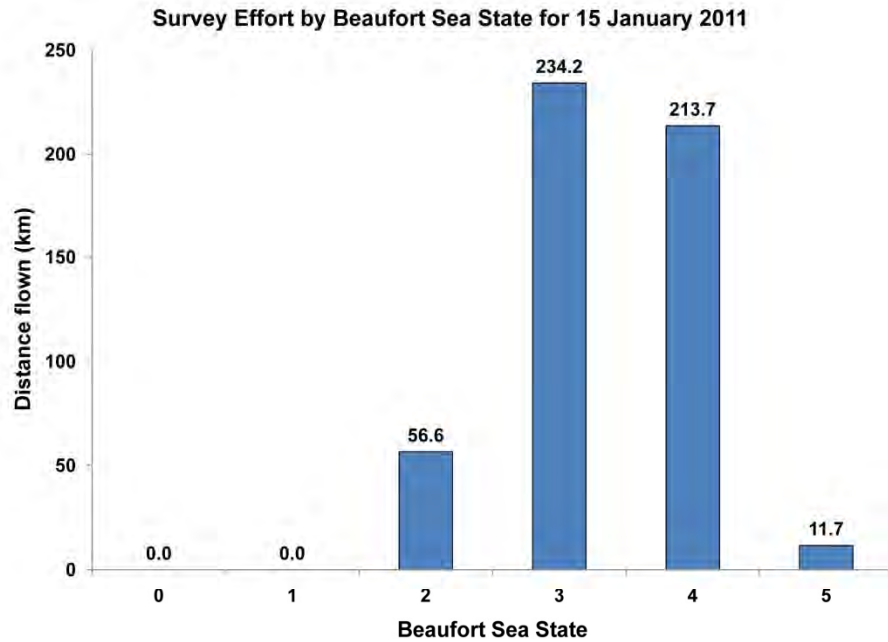
Survey Effort by Beaufort Sea State for 30 December 2010



## Summary of 15 January 2011

15 January 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	11	3	9
<i>Caretta caretta</i>	7	7	2 to 3	-
Unidentified sea turtle	1	1	3	8
Chondrichthyes	1	1	3	6

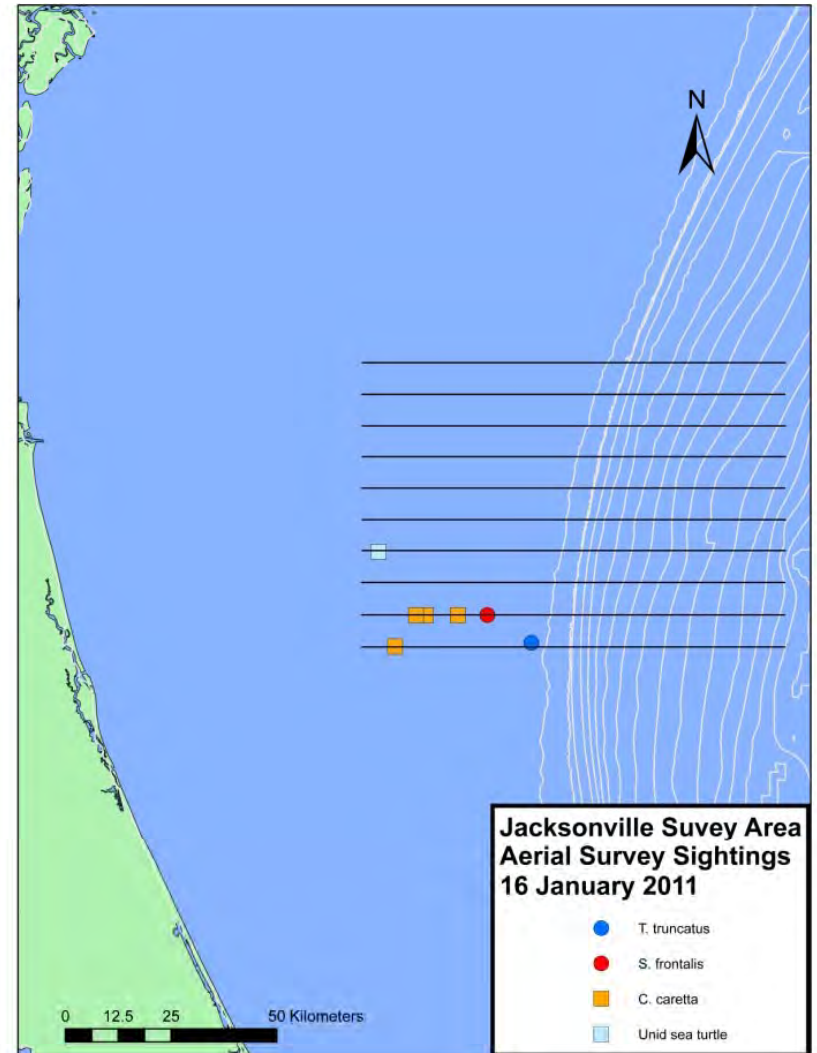
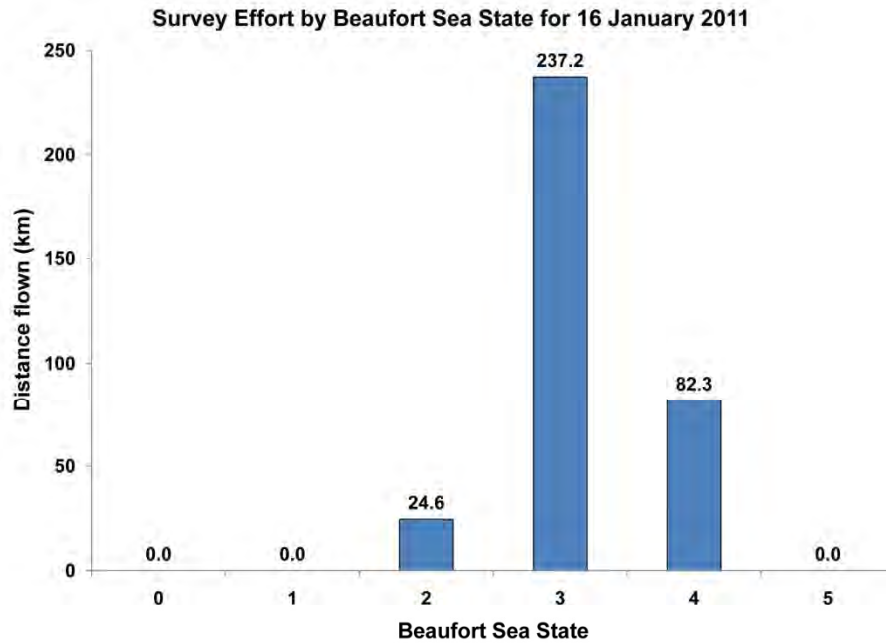




## Summary of 16 January 2011

16 January 2011

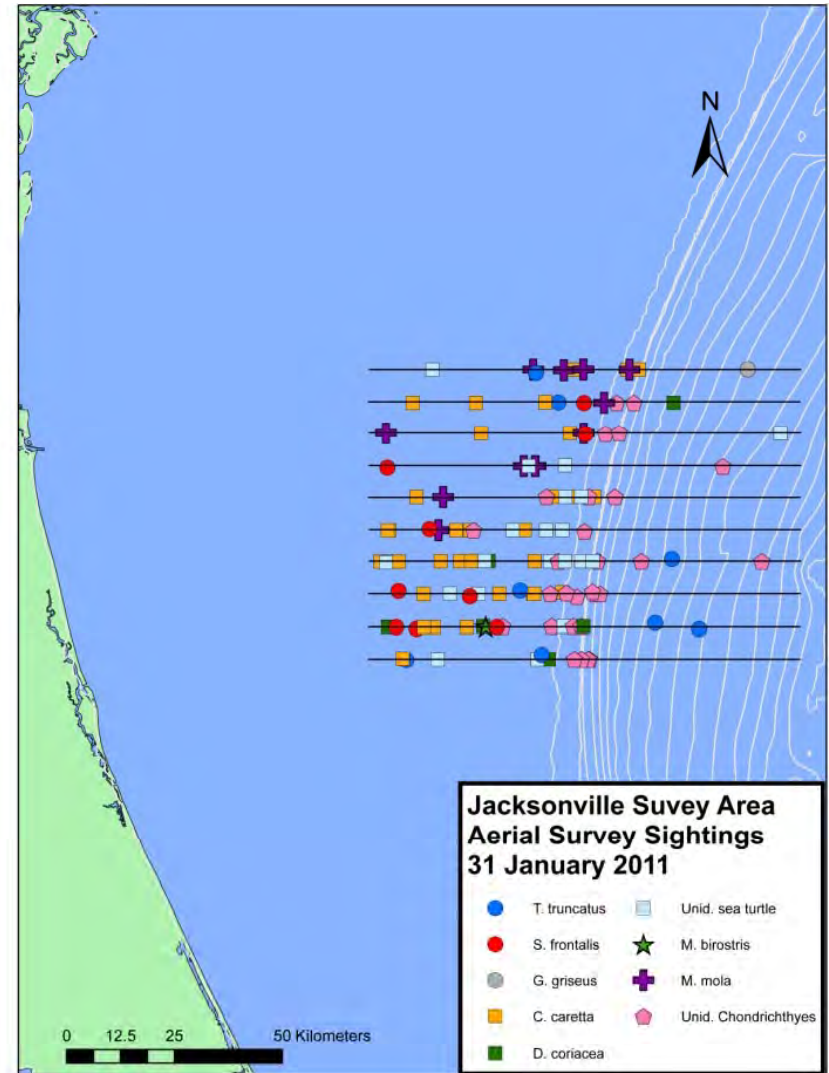
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	20	3	1
<i>Stenella frontalis</i>	1	10	3	2
<i>Caretta caretta</i>	4	5	2 to 3	-
Unidentified sea turtle	1	1	3	4



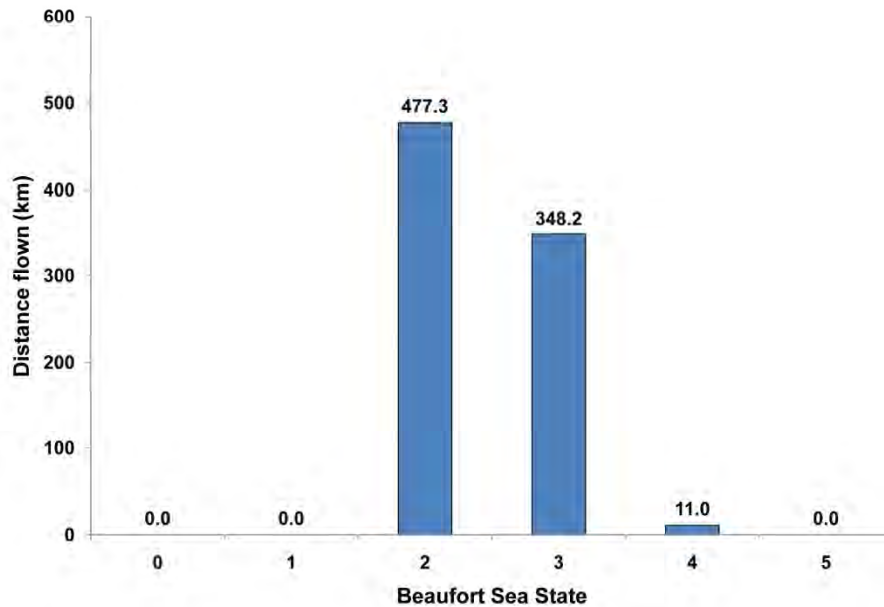
31 January 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	2	4	10
<i>Tursiops truncatus</i>	1	1	2	9
<i>Tursiops truncatus</i>	1	1	2	4
<i>Tursiops truncatus</i>	1	4	2	3
<i>Tursiops truncatus</i>	1	14	2	2
<i>Tursiops truncatus</i>	1	5	2	2
<i>Tursiops truncatus</i>	1	5	2	1
<i>Stenella frontalis</i>	1	50	2	9
<i>Stenella frontalis</i>	1	40	3	8
<i>Stenella frontalis</i>	1	6	3	7
<i>Stenella frontalis</i>	1	25	2	5
<i>Stenella frontalis</i>	1	18	2	3
<i>Stenella frontalis</i>	1	26	2	3
<i>Stenella frontalis</i>	1	3	3	2
<i>Stenella frontalis</i>	1	35	3	2
<i>Grampus griseus</i>	1	8	2	10
<i>Dermodochelys coriacea</i>	6	6	2 to 3	-
<i>Caretta caretta</i>	30	39	2 to 3	-
Unidentified sea turtle	19	24	2 to 3	-
<i>Manta birostris</i>	1	1	2	2
<i>Mola mola</i>	12	12	2 to 4	-
Chondrichthyes	29	72	1 to 2	-

## Summary of 31 January 2011



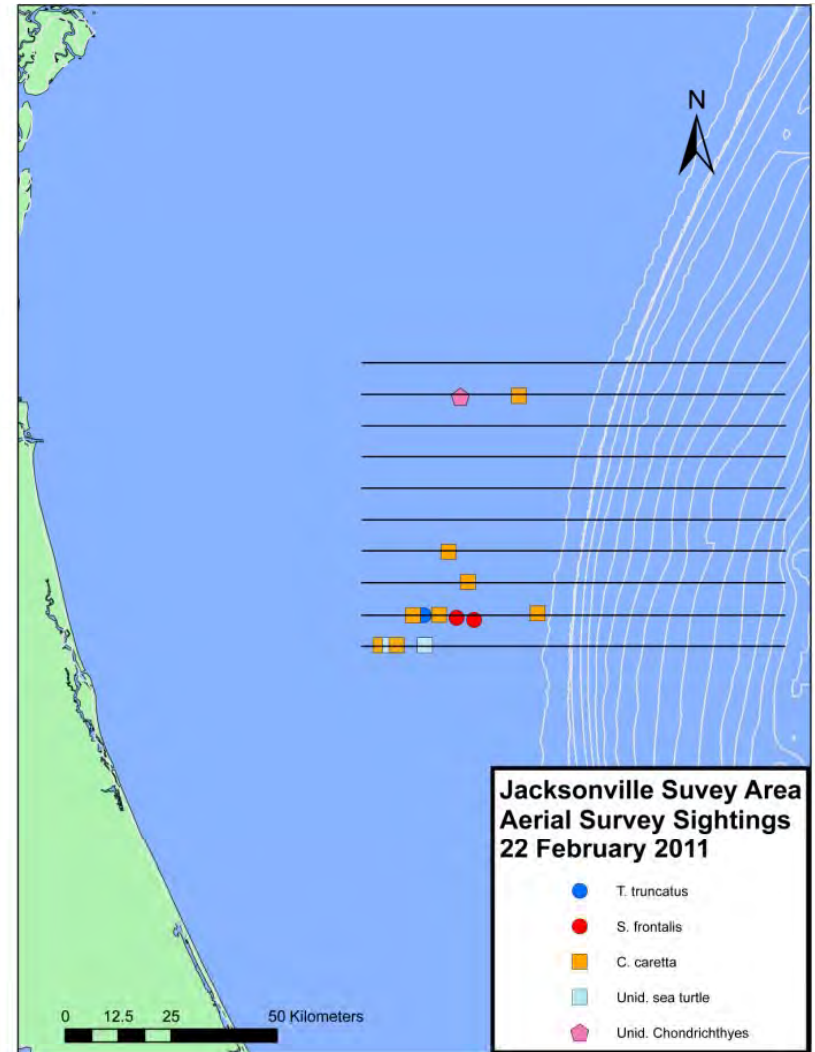
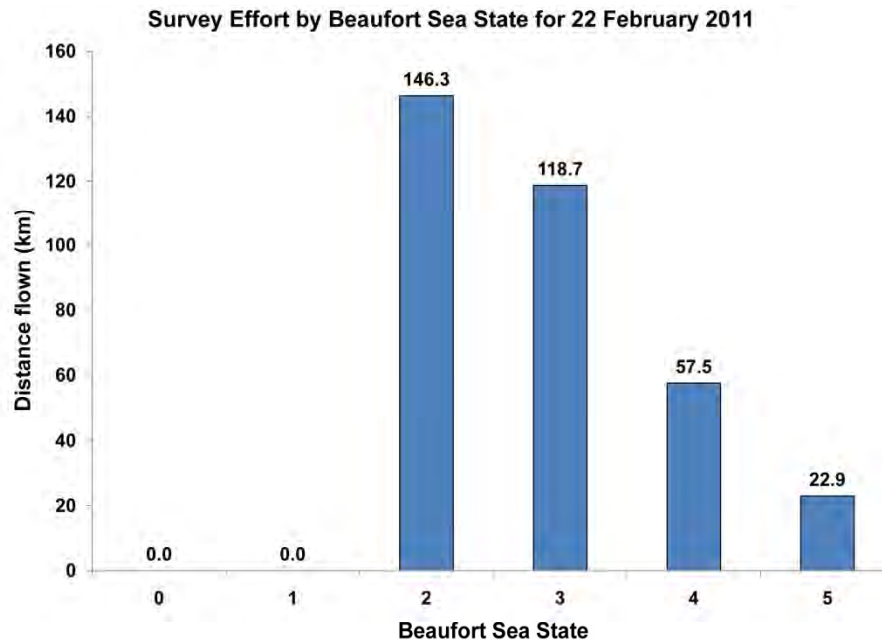
Survey Effort by Beaufort Sea State for 31 January 2011



## Summary of 22 February 2011

22 February 2011

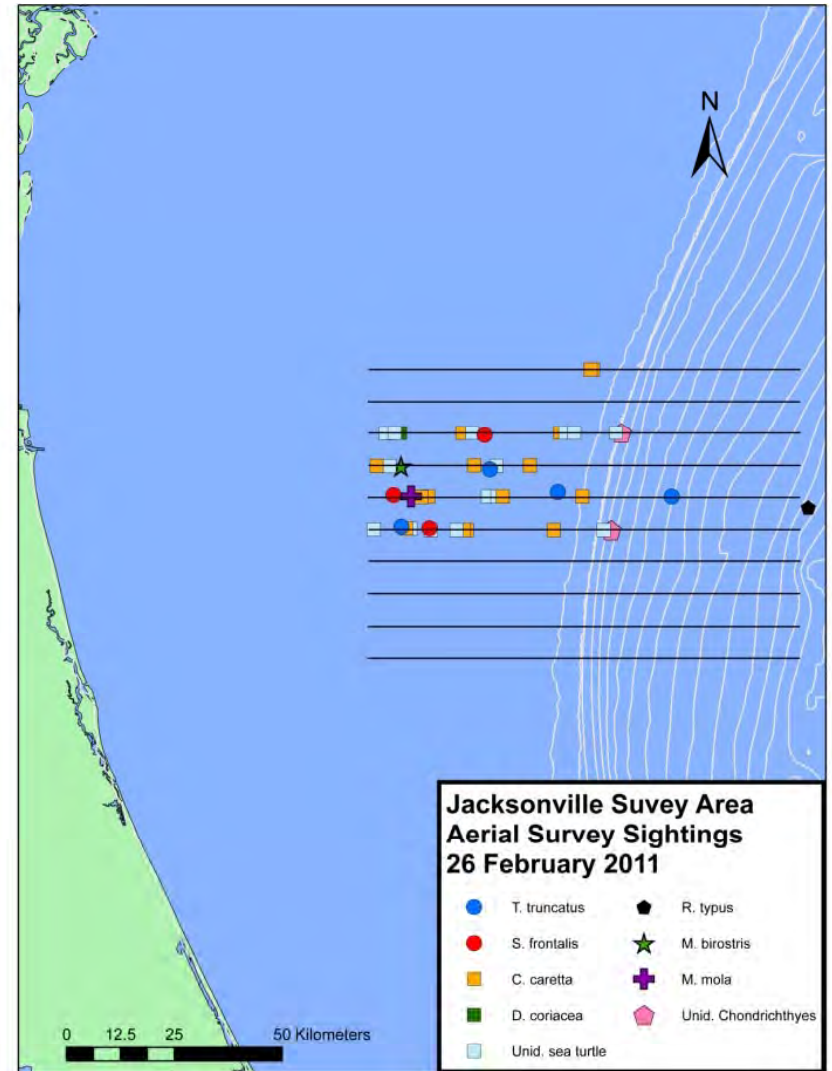
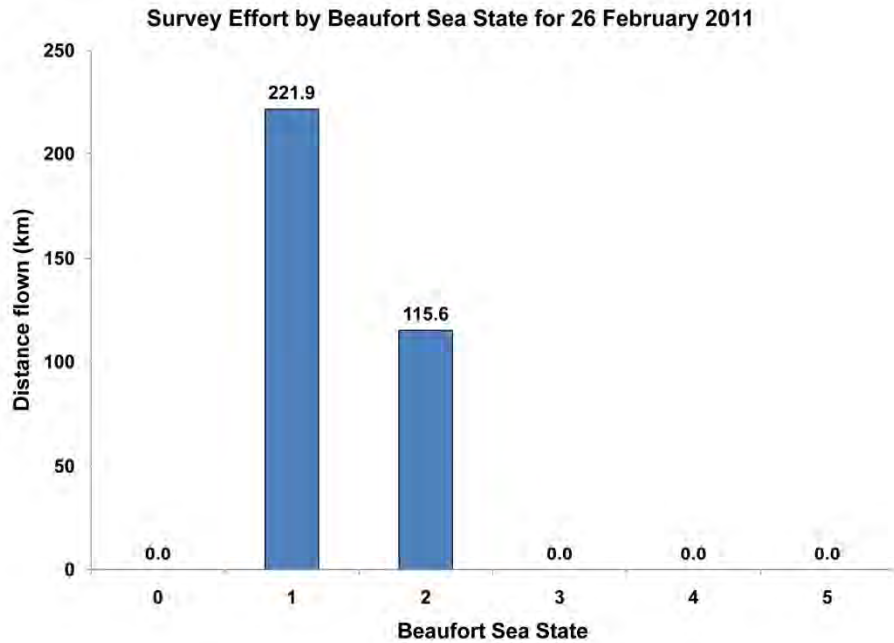
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	3	2	2
<i>Stenella frontalis</i>	1	25	2	2
<i>Stenella frontalis</i>	1	6	2	2
<i>Caretta caretta</i>	9	12	2 to 5	-
Unidentified sea turtle	2	2	2	1
Chondrichthyes	1	1	4	9



## Summary of 26 February 2011

26 February 2011

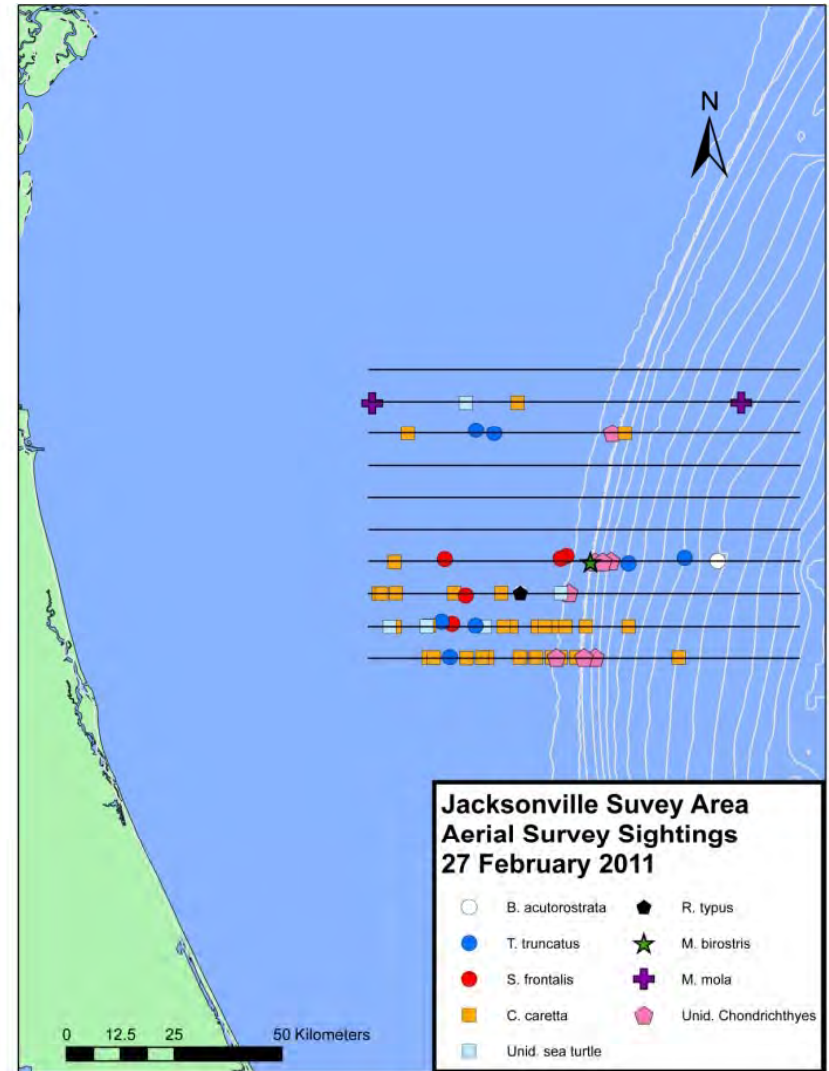
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	6	1	5
<i>Tursiops truncatus</i>	1	2	1	6
<i>Tursiops truncatus</i>	1	9	2	6
<i>Tursiops truncatus</i>	1	7	2	7
<i>Stenella frontalis</i>	1	4	1	5
<i>Stenella frontalis</i>	1	5	1	6
<i>Stenella frontalis</i>	1	35	1	8
<i>Dermochelys coriacea</i>	1	1	1	8
<i>Caretta caretta</i>	16	16	1 to 2	-
Unidentified sea turtle	15	17	1 to 2	-
<i>Manta birostris</i>	1	1	1	7
<i>Mola mola</i>	1	1	1	6
<i>Rhinocodon typus</i>	1	1	-	-
Chondrichthyes	2	2	1	-



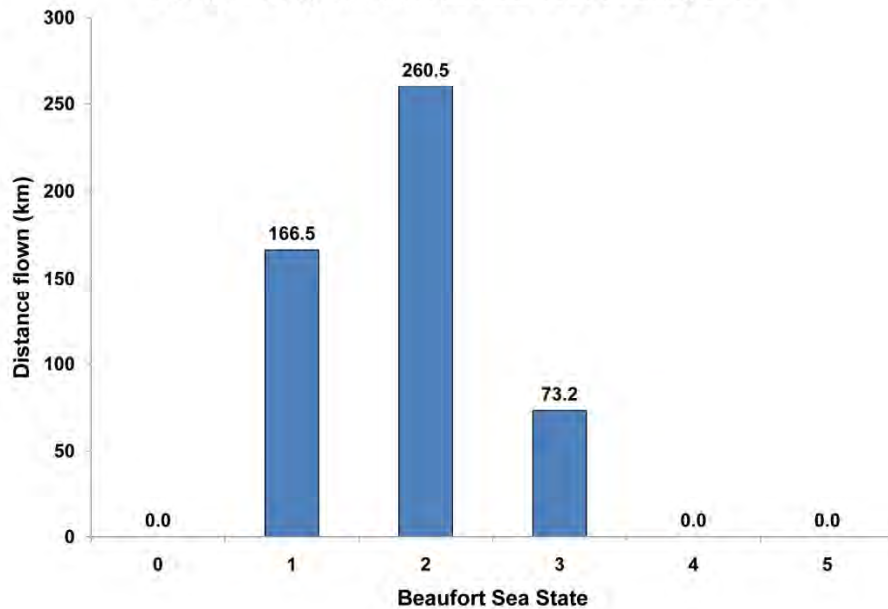
27 February 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Balaenoptera acutorostrata</i>	1	1	2	4
<i>Tursiops truncatus</i>	1	3	1	1
<i>Tursiops truncatus</i>	1	6	1	2
<i>Tursiops truncatus</i>	1	17	1	2
<i>Tursiops truncatus</i>	1	16	2	4
<i>Tursiops truncatus</i>	1	1	2	4
<i>Tursiops truncatus</i>	1	3	2	8
<i>Tursiops truncatus</i>	1	4	2	8
<i>Stenella frontalis</i>	1	7	1	2
<i>Stenella frontalis</i>	1	16	1	3
<i>Stenella frontalis</i>	1	25	2	4
<i>Stenella frontalis</i>	1	17	2	4
<i>Stenella frontalis</i>	1	22	2	4
<i>Caretta caretta</i>	32	76	1 to 3	-
Unidentified sea turtle	5	7	2 to 3	-
<i>Manta birostris</i>	1	3	1	4
<i>Mola mola</i>	2	2	2	9
<i>Rhincodon typus</i>	1	1	1	3
Chondrichthyes	9	17	1 to 2	-

## Summary of 27 February 2011



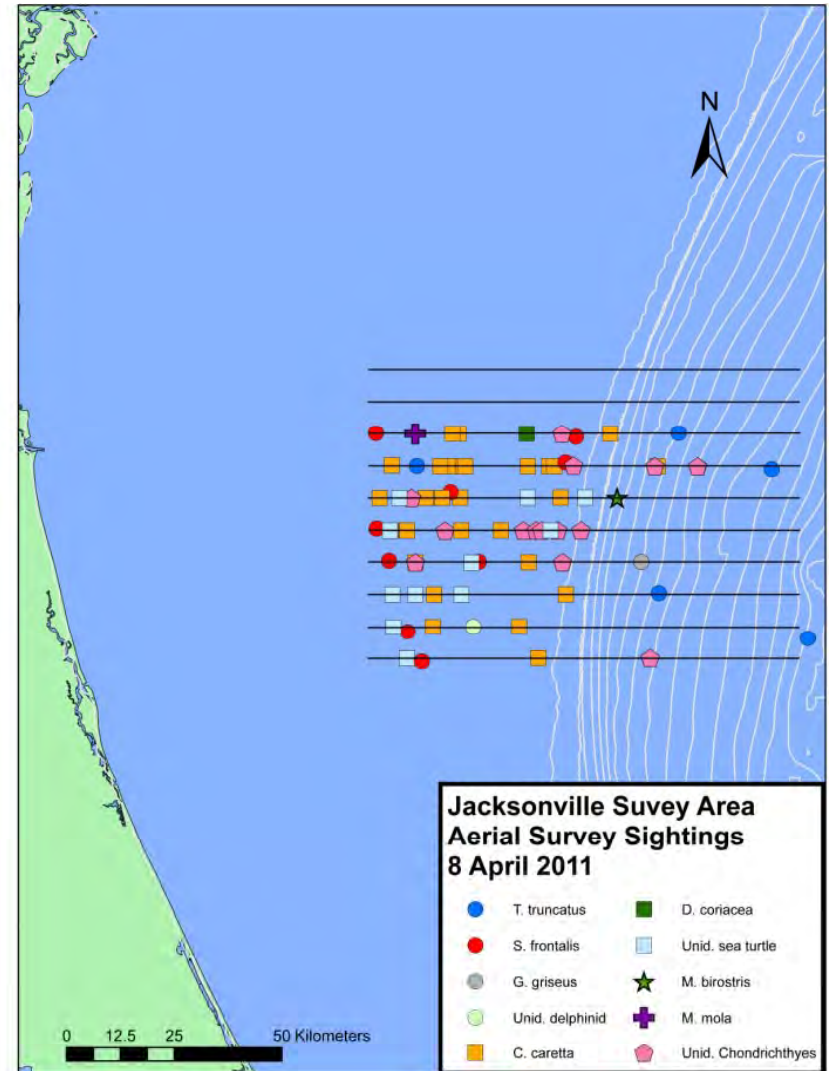
Survey Effort by Beaufort Sea State for 27 February 2011



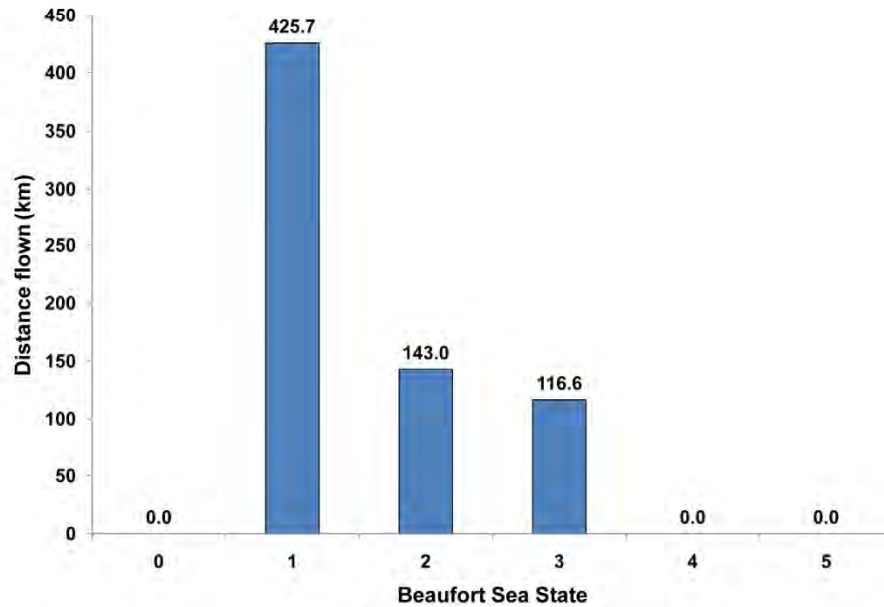
8 April 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	17	3	2
<i>Tursiops truncatus</i>	1	4	1	3
<i>Tursiops truncatus</i>	1	3	1	7
<i>Tursiops truncatus</i>	1	7	1	7
<i>Tursiops truncatus</i>	1	4	1	8
<i>Stenella frontalis</i>	1	26	1	1
<i>Stenella frontalis</i>	1	30	1	2
<i>Stenella frontalis</i>	1	2	1	4
<i>Stenella frontalis</i>	1	8	1	4
<i>Stenella frontalis</i>	1	8	1	5
<i>Stenella frontalis</i>	1	4	1	6
<i>Stenella frontalis</i>	1	75	1	7
<i>Stenella frontalis</i>	1	40	1	8
<i>Stenella frontalis</i>	1	25	1	8
<i>Grampus griseus</i>	1	8	2	4
Unidentified delphinid	1	-	1	2
<i>Dermochelys coriacea</i>	1	1	8	1
<i>Caretta caretta</i>	28	30	1 to 2	-
Unidentified sea turtle	11	13	1	-
<i>Manta birostris</i>	1	1	1	6
<i>Mola mola</i>	1	1	1	8
Chondrichthyes	15	116	1 to 3	-

## Summary of 8 April 2011



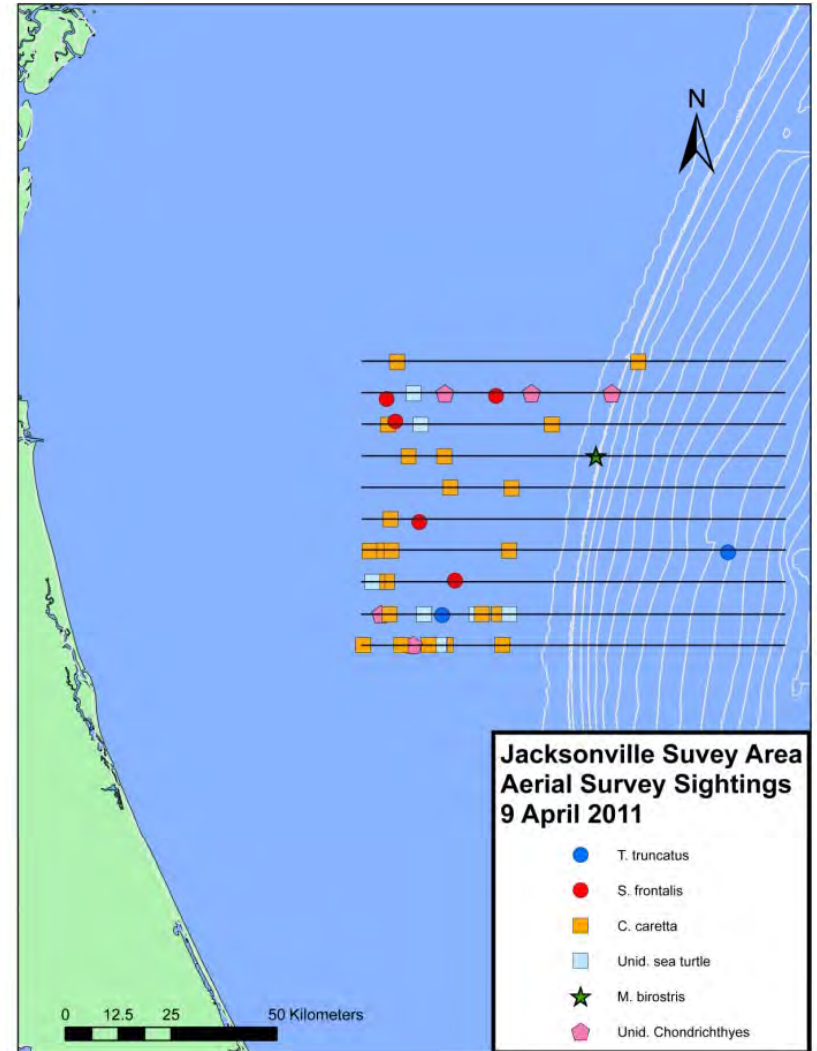
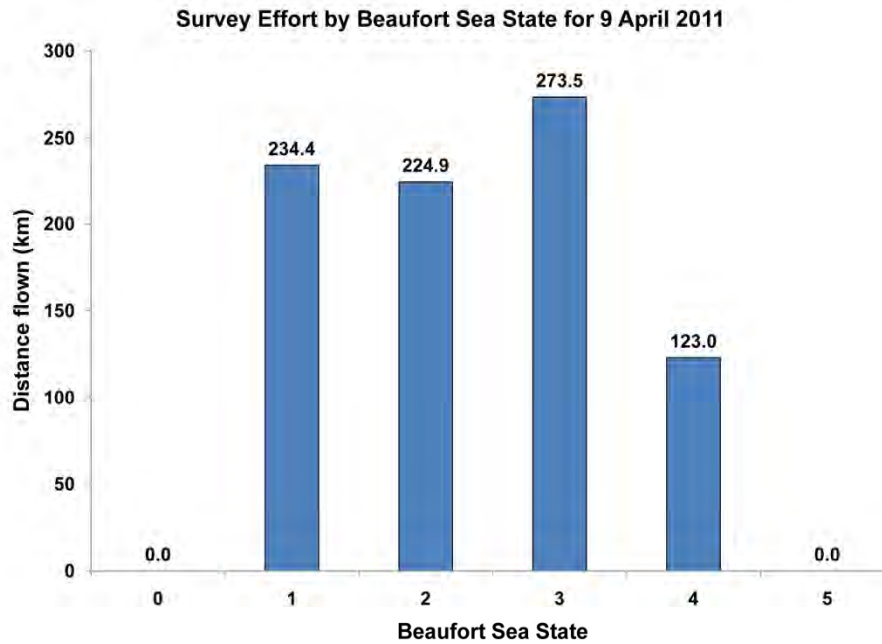
Survey Effort by Beaufort Sea State for 8 April 2011



## Summary of 9 April 2011

9 April 2011

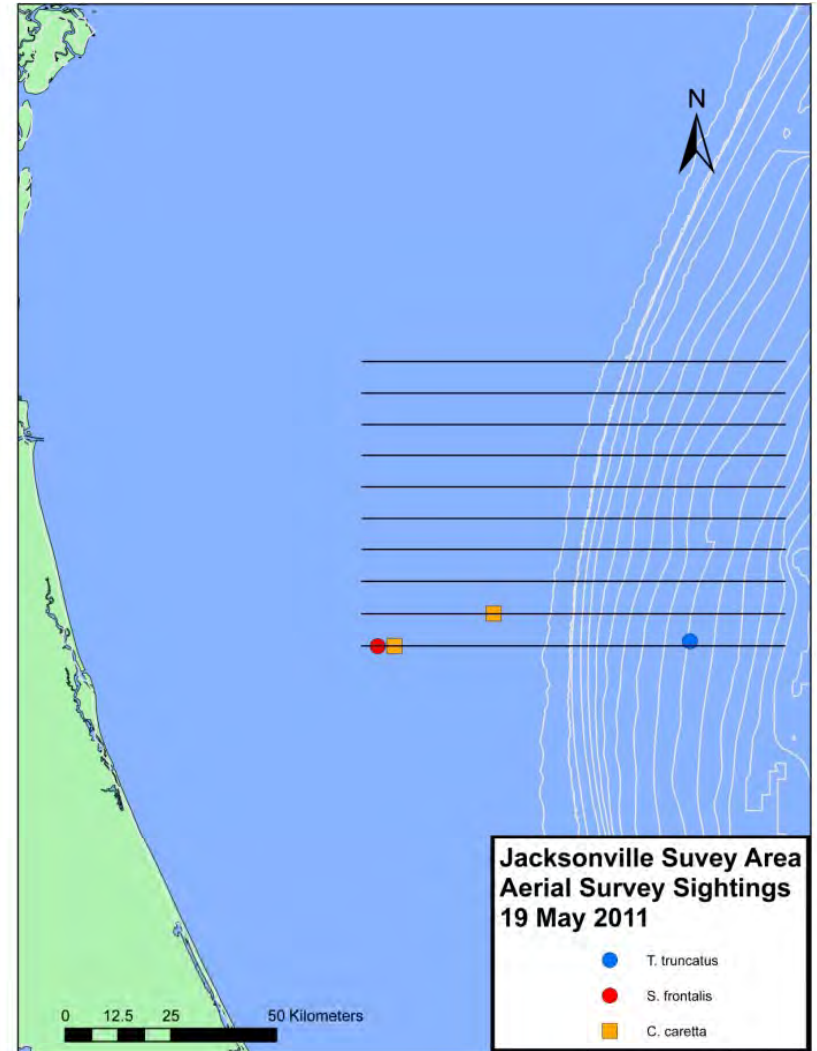
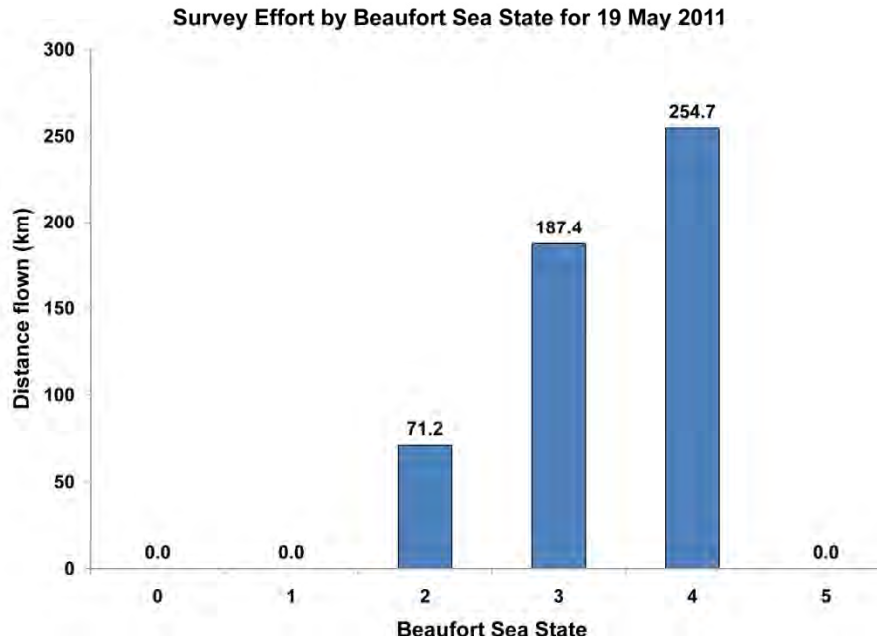
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	2	3	4
<i>Tursiops truncatus</i>	1	3	1	2
<i>Stenella frontalis</i>	1	40	2	9
<i>Stenella frontalis</i>	1	5	2	9
<i>Stenella frontalis</i>	1	11	2	8
<i>Stenella frontalis</i>	1	9	2	5
<i>Stenella frontalis</i>	1	27	2	3
<i>Caretta caretta</i>	23	23	1 to 3	-
Unidentified sea turtle	8	13	1 to 2	-
<i>Manta birostris</i>	1	1	3	7
Chondrichthyes	5	5	1 to 2	-



## Summary of 19 May 2011

19 May 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	4	4	1
<i>Stenella frontalis</i>	1	50	2	1
<i>Caretta caretta</i>	2	2	2 to 3	-

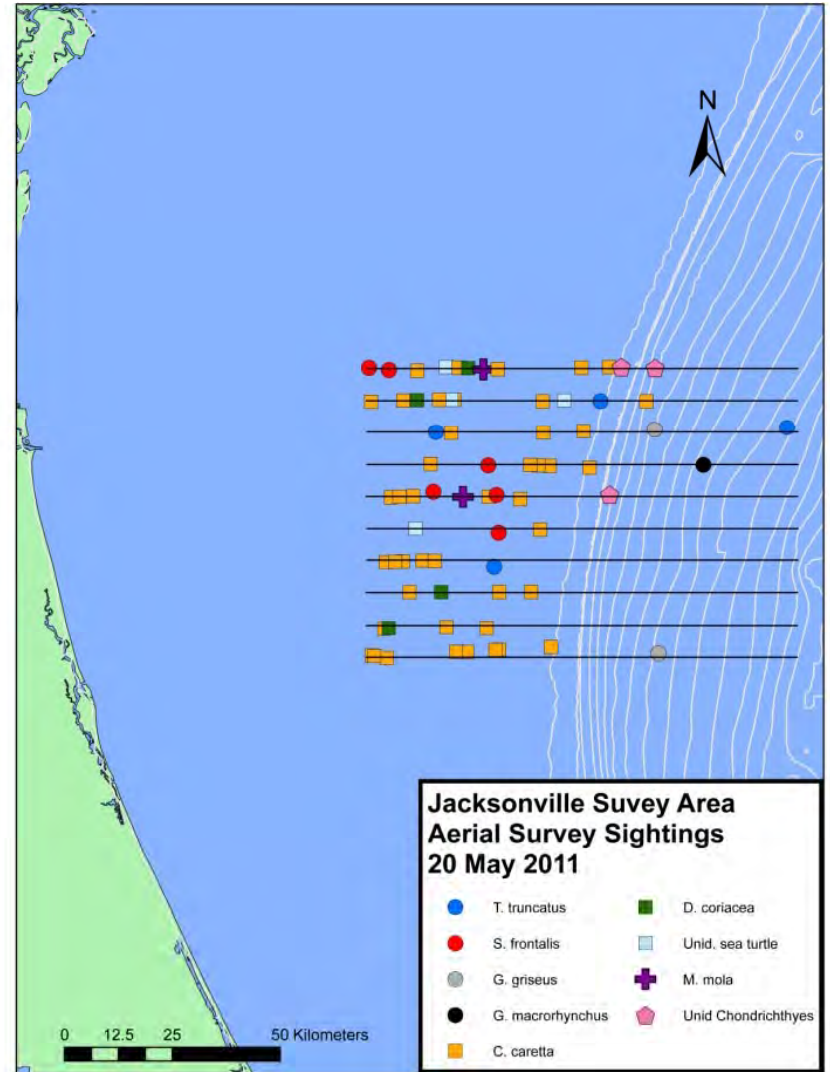




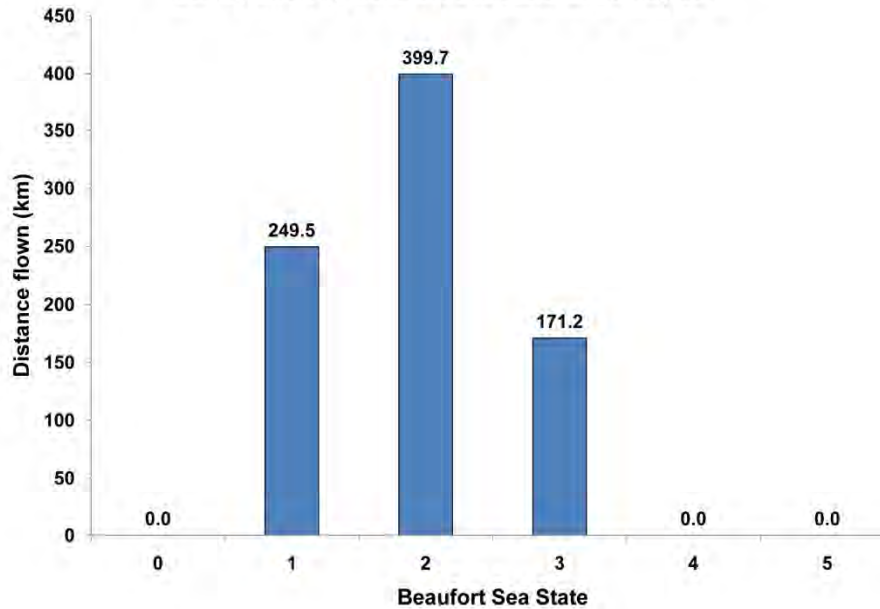
20 May 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	4	2	9
<i>Tursiops truncatus</i>	1	4	2	8
<i>Tursiops truncatus</i>	1	20	3	8
<i>Tursiops truncatus</i>	1	20	2	4
<i>Stenella frontalis</i>	1	7	1	10
<i>Stenella frontalis</i>	1	21	1	10
<i>Stenella frontalis</i>	1	30	2	7
<i>Stenella frontalis</i>	1	7	2	6
<i>Stenella frontalis</i>	1	30	2	6
<i>Stenella frontalis</i>	1	32	1	5
<i>Grampus griseus</i>	1	5	2	8
<i>Grampus griseus</i>	1	4	3	1
<i>Globicephala macrorhynchus</i>	1	5	3	7
<i>Caretta caretta</i>	46	89	1 to 2	-
<i>Dermodochelys coriacea</i>	4	4	1 to 2	-
Unidentified sea turtle	4	4	1 to 2	-
<i>Mola mola</i>	2	2	1 to 2	-
Chondrichthyes	3	3	1 to 2	-

## Summary of 20 May 2011



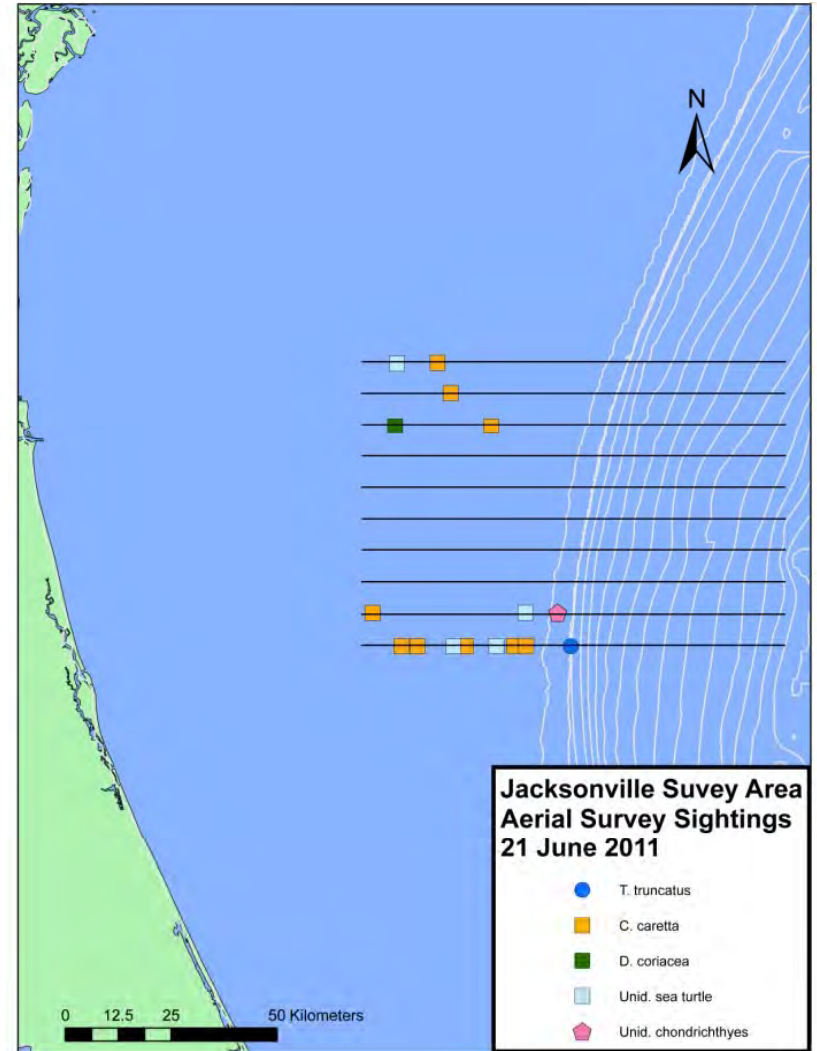
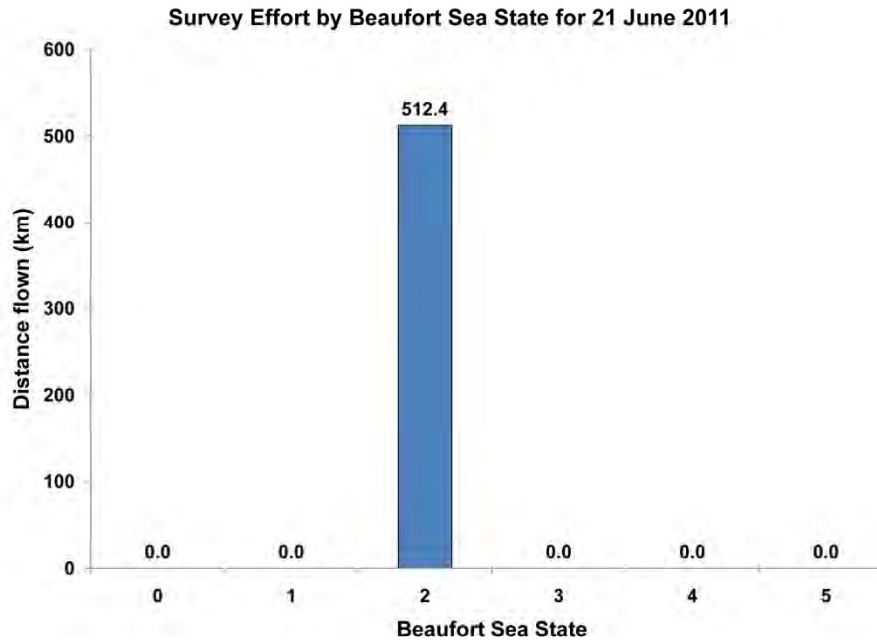
Survey Effort by Beaufort Sea State for 20 May 2011



## Summary of 21 June 2011

21 June 2011

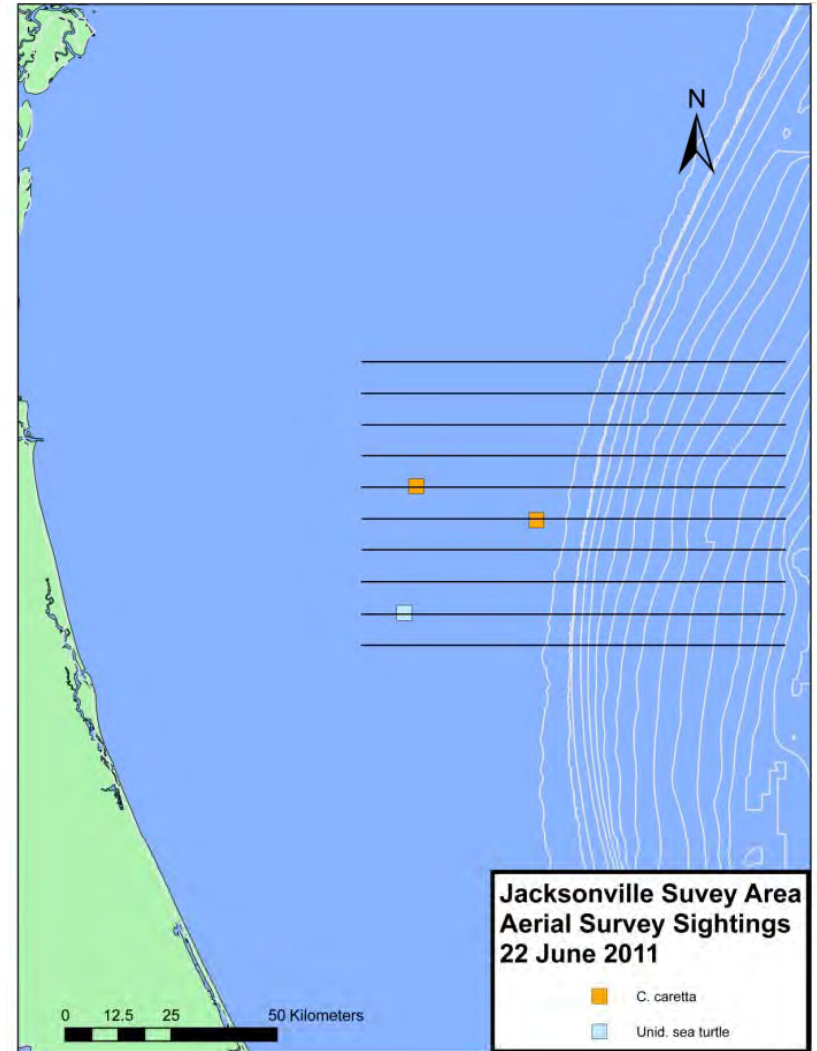
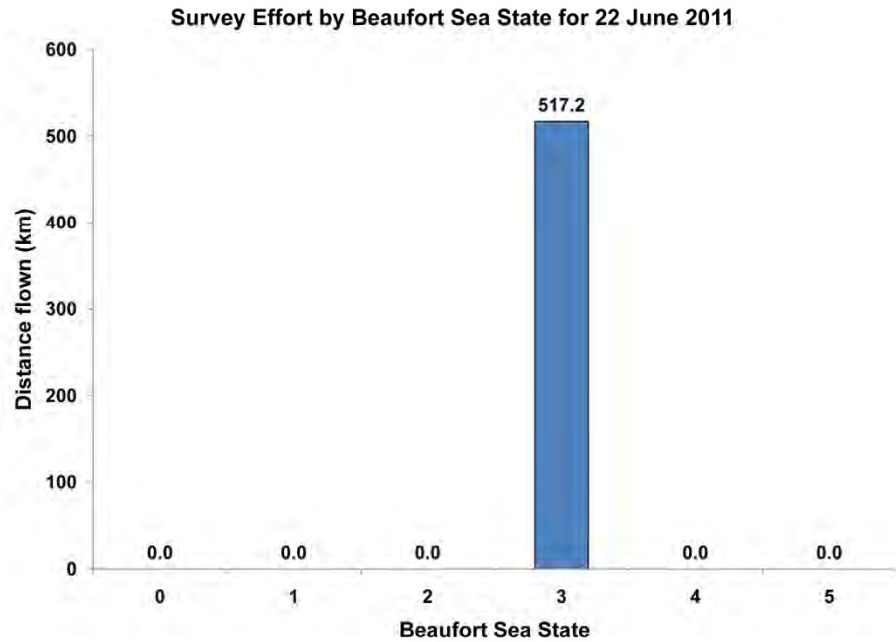
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	3	2	1
<i>Caretta caretta</i>	9	10	2	-
<i>Dermochelys coriacea</i>	1	1	2	8
Unidentified sea turtle	4	4	2	-
Chondrichthyes	1	1	2	2



## Summary of 22 June 2011

22 June 2011

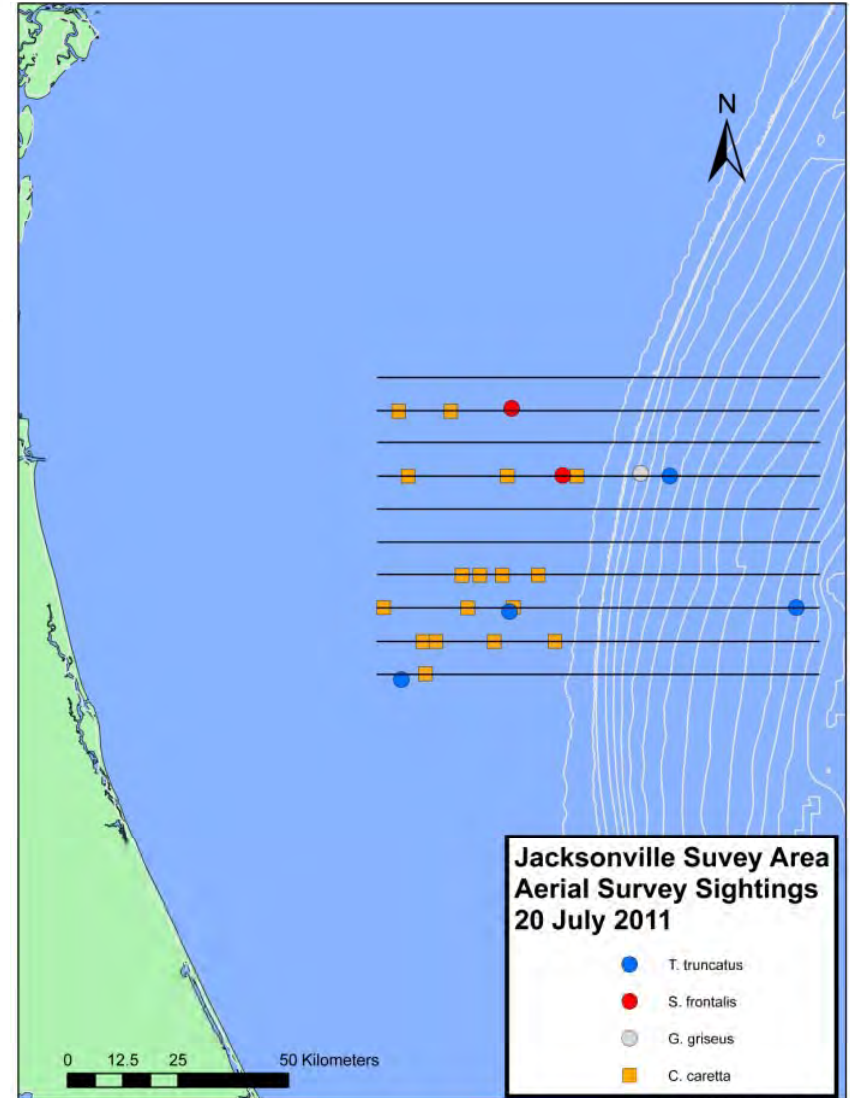
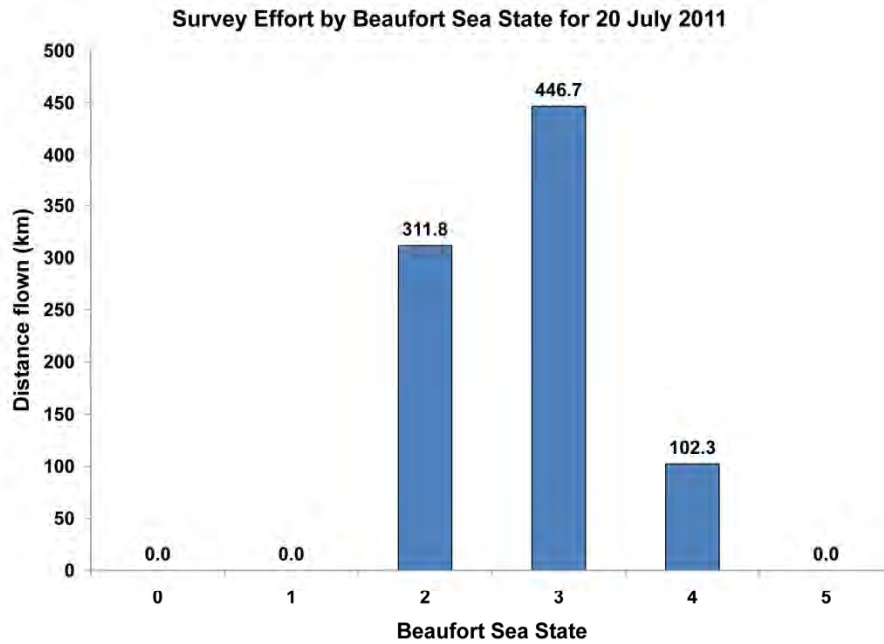
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Caretta caretta</i>	2	2	3	-
Unidentified sea turtle	1	1	3	2



# Summary of 20 July 2011

20 July 2011

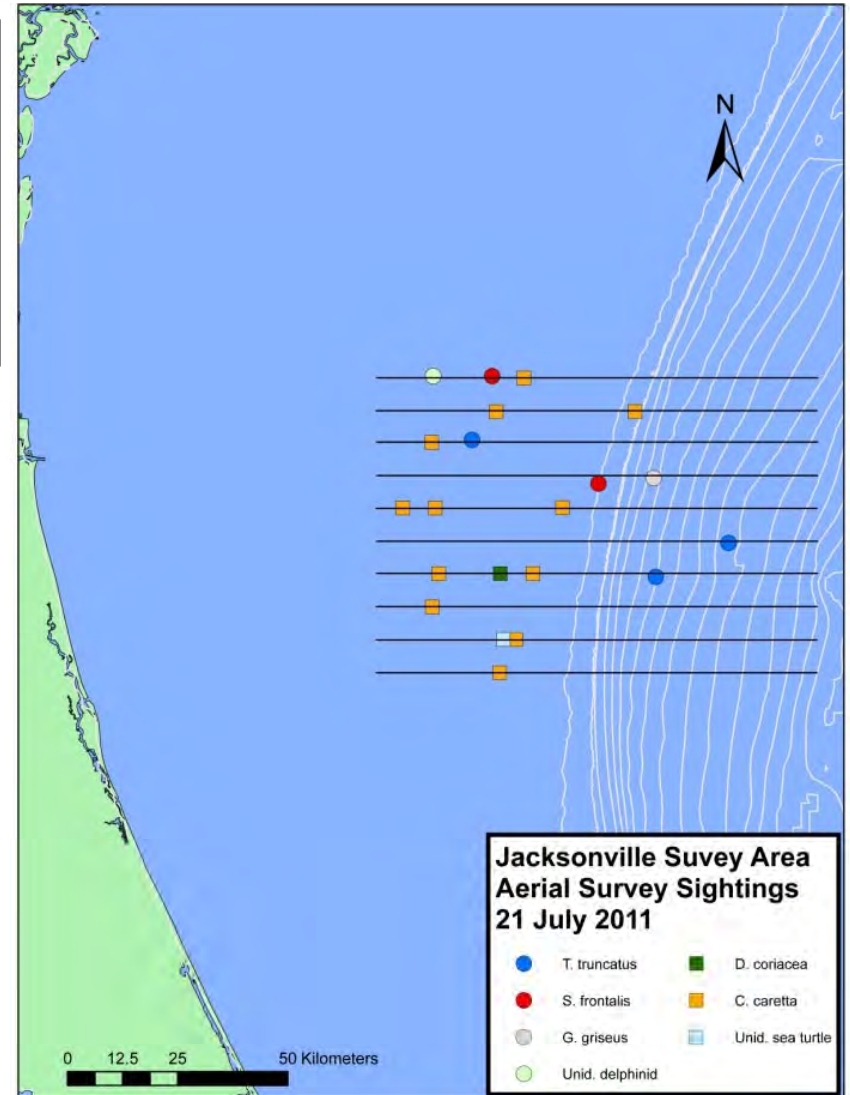
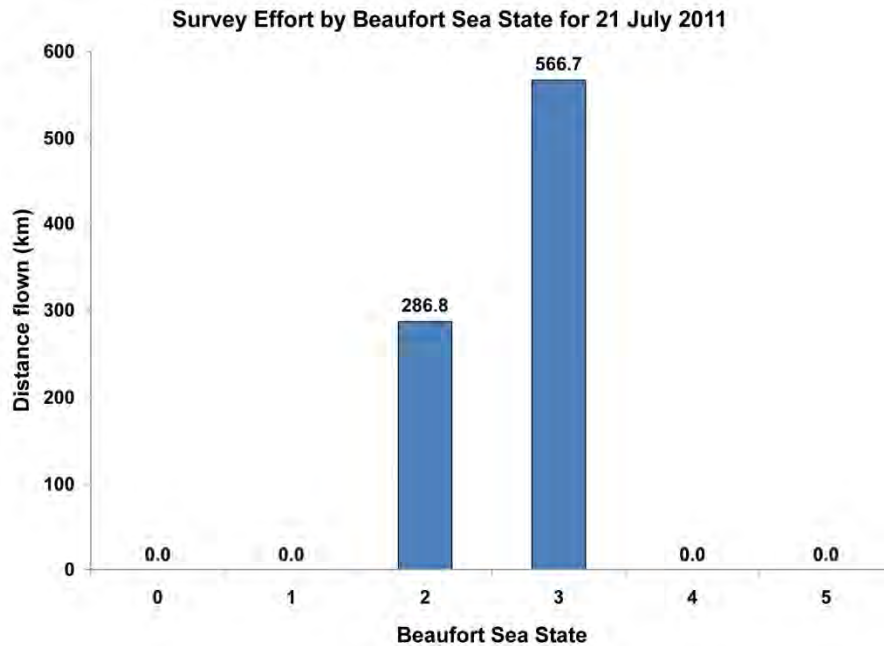
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	23	3	7
<i>Tursiops truncatus</i>	1	11	3	3
<i>Tursiops truncatus</i>	1	3	2	3
<i>Tursiops truncatus</i>	1	8	2	1
<i>Stenella frontalis</i>	1	13	3	9
<i>Stenella frontalis</i>	1	13	3	7
<i>Grampus griseus</i>	1	23	3	7
<i>Grampus griseus</i>	1	28	3	7
<i>Caretta caretta</i>	17	36	2 to 3	-



# Summary of 21 July 2011

21 July 2011

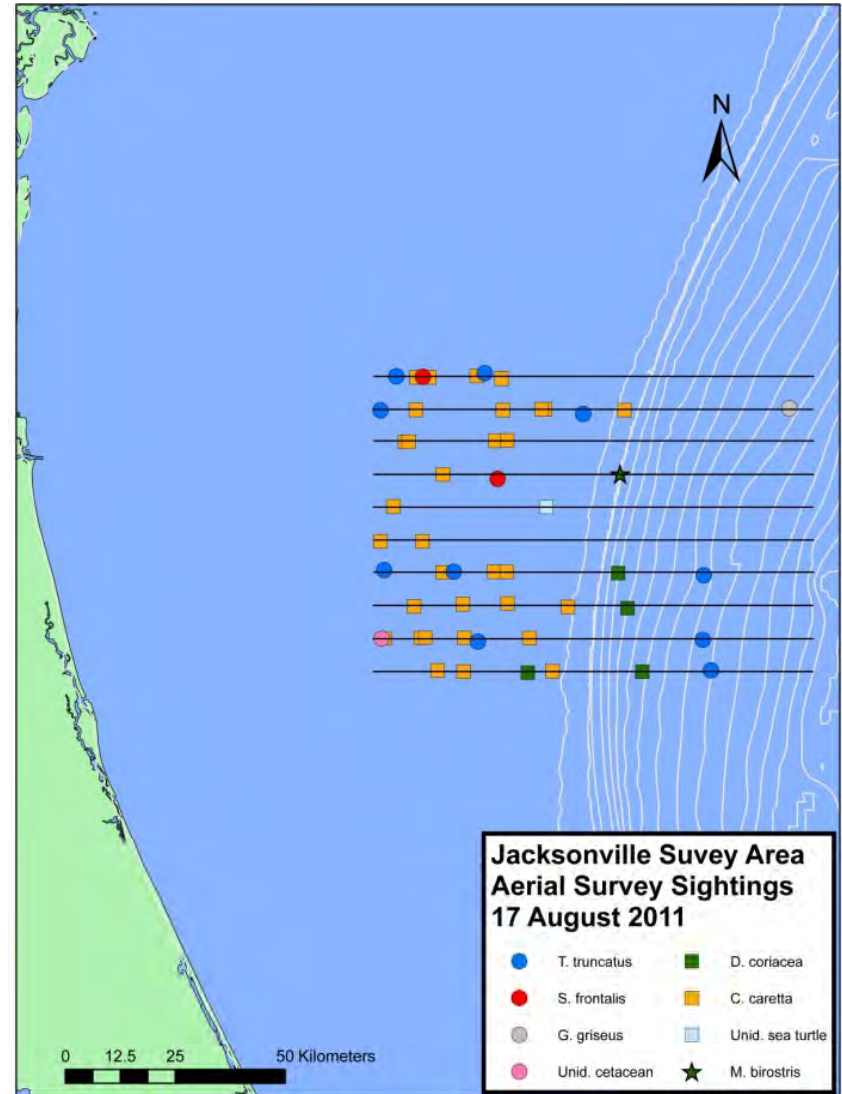
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	14	3	4
<i>Tursiops truncatus</i>	1	6	3	5
<i>Tursiops truncatus</i>	1	3	3	8
<i>Stenella frontalis</i>	1	35	3	7
<i>Stenella frontalis</i>	1	35	3	10
<i>Grampus griseus</i>	1	20	3	7
Unidentified delphinid	1	6	3	10
<i>Caretta caretta</i>	12	21	2 to 3	-
<i>Dermochelys coriacea</i>	1	1	2	4
Unidentified sea turtle	1	3	2	2



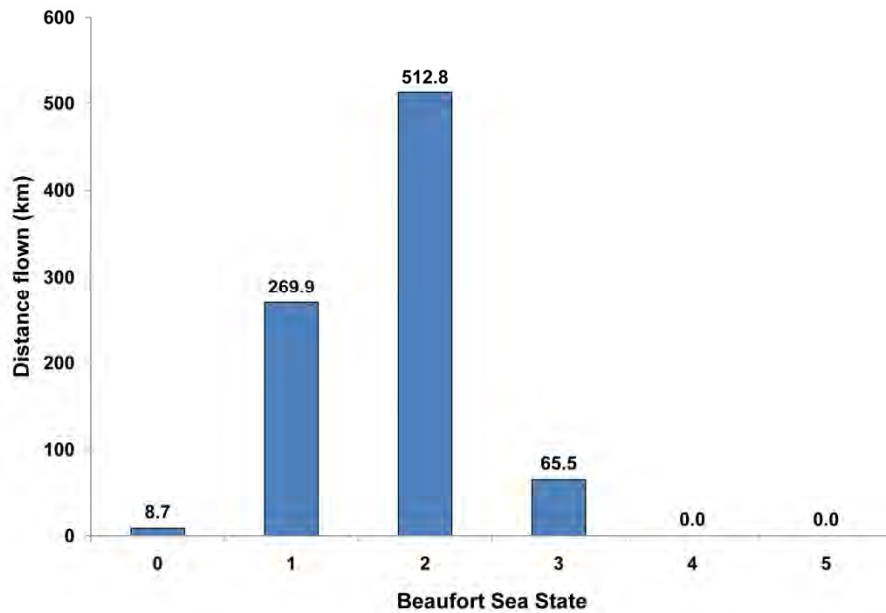
17 August 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	15	1	10
<i>Tursiops truncatus</i>	1	15	1	10
<i>Tursiops truncatus</i>	1	2	1	9
<i>Tursiops truncatus</i>	1	1	2	9
<i>Tursiops truncatus</i>	1	4	2	4
<i>Tursiops truncatus</i>	1	9	2	4
<i>Tursiops truncatus</i>	1	6	2	4
<i>Tursiops truncatus</i>	1	3	2	2
<i>Tursiops truncatus</i>	1	4	3	2
<i>Tursiops truncatus</i>	1	10	3	1
<i>Stenella frontalis</i>	1	17	1	10
<i>Stenella frontalis</i>	1	16	2	7
<i>Grampus griseus</i>	1	4	2	9
Unidentified cetacean	1	1	2	2
<i>Caretta caretta</i>	32	55	1 to 2	-
<i>Dermochelys coriacea</i>	4	4	2 to 3	-
Unidentified sea turtle	1	1	2	6
<i>Manta birostris</i>	1	1	2	7

## Summary of 17 August 2011



Survey Effort by Beaufort Sea State for 17 August 2011

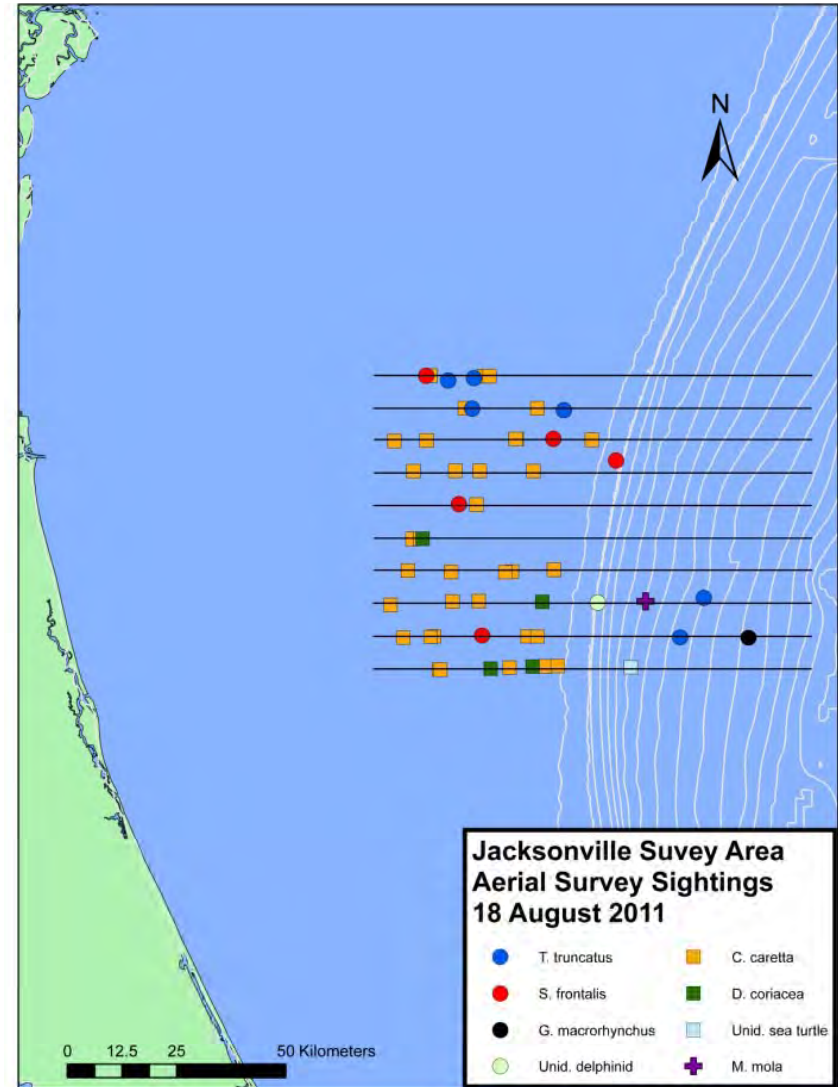
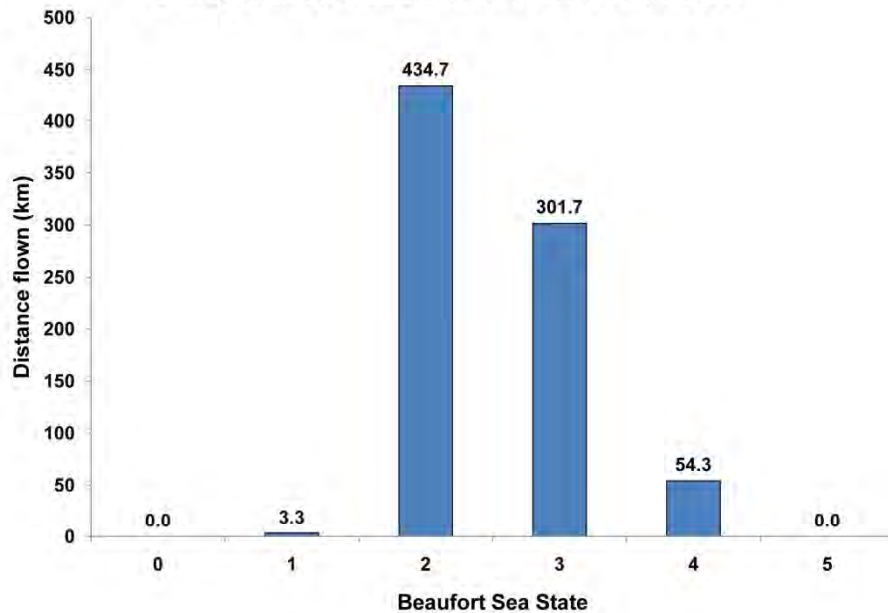


18 August 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	24	2	2
<i>Tursiops truncatus</i>	1	10	3	3
<i>Tursiops truncatus</i>	1	3	2	9
<i>Tursiops truncatus</i>	1	16	2	9
<i>Tursiops truncatus</i>	1	8	2	10
<i>Tursiops truncatus</i>	1	18	2	10
<i>Stenella frontalis</i>	1	17	2	2
<i>Stenella frontalis</i>	1	12	2	6
<i>Stenella frontalis</i>	1	28	2	7
<i>Stenella frontalis</i>	1	10	3	8
<i>Stenella frontalis</i>	1	8	2	10
<i>Globicephala macrorhynchus</i>	1	13	1	2
Unidentified delphinid	1	2	3	3
<i>Caretta caretta</i>	35	65	2 to 3	-
<i>Dermochelys coriacea</i>	4	4	2	-
Unidentified sea turtle	1	1	2	1
<i>Mola mola</i>	1	1	3	3

## Summary of 18 August 2011

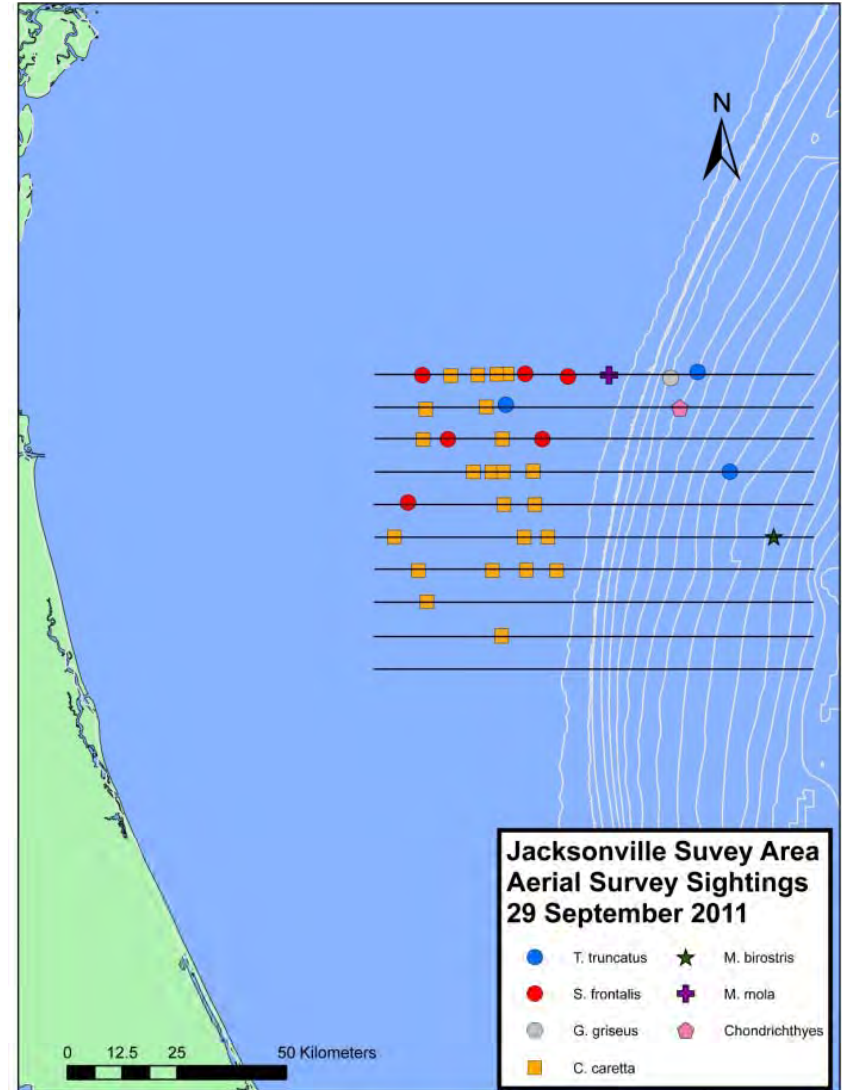
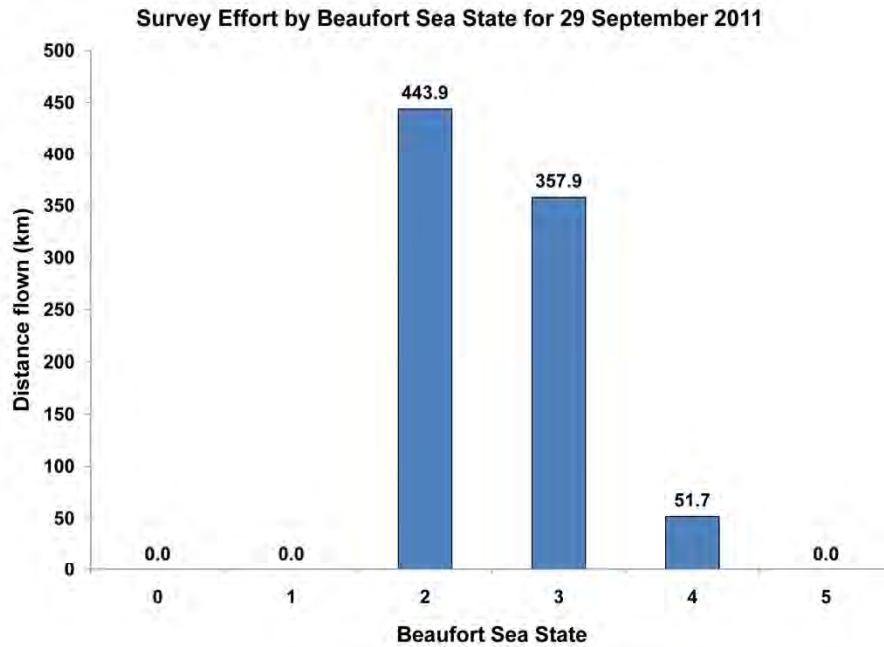
Survey Effort by Beaufort Sea State for 18 August 2011



# Summary of 29 September 2011

29 September 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	1	2	7
<i>Tursiops truncatus</i>	1	7	2	9
<i>Tursiops truncatus</i>	1	15	3	10
<i>Stenella frontalis</i>	1	16	2	6
<i>Stenella frontalis</i>	1	1	2	8
<i>Stenella frontalis</i>	1	7	2	8
<i>Stenella frontalis</i>	1	1	2	10
<i>Stenella frontalis</i>	1	35	2	10
<i>Stenella frontalis</i>	1	15	2	10
<i>Grampus griseus</i>	1	45	3	10
<i>Caretta caretta</i>	23	40	2 to 3	-
<i>Manta birostris</i>	1	1	3	5
<i>Mola mola</i>	1	1	2	10
Chondrichthyes		1	2	9

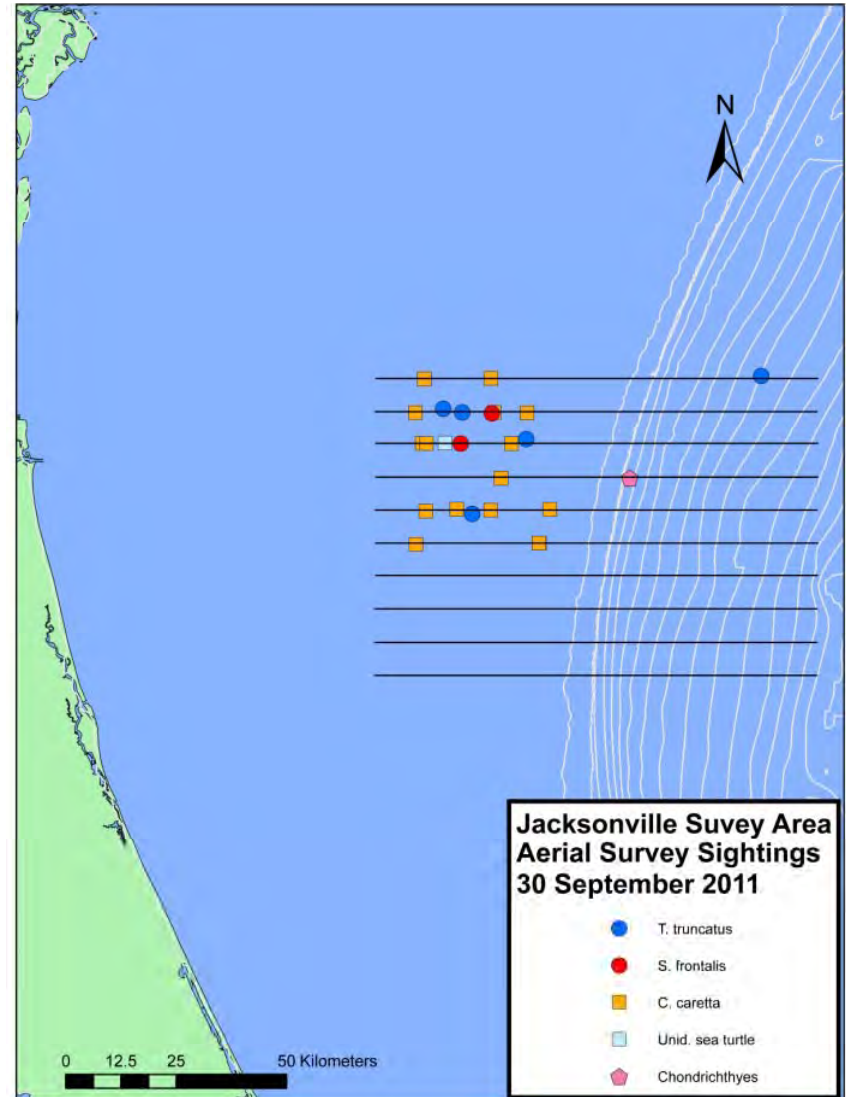
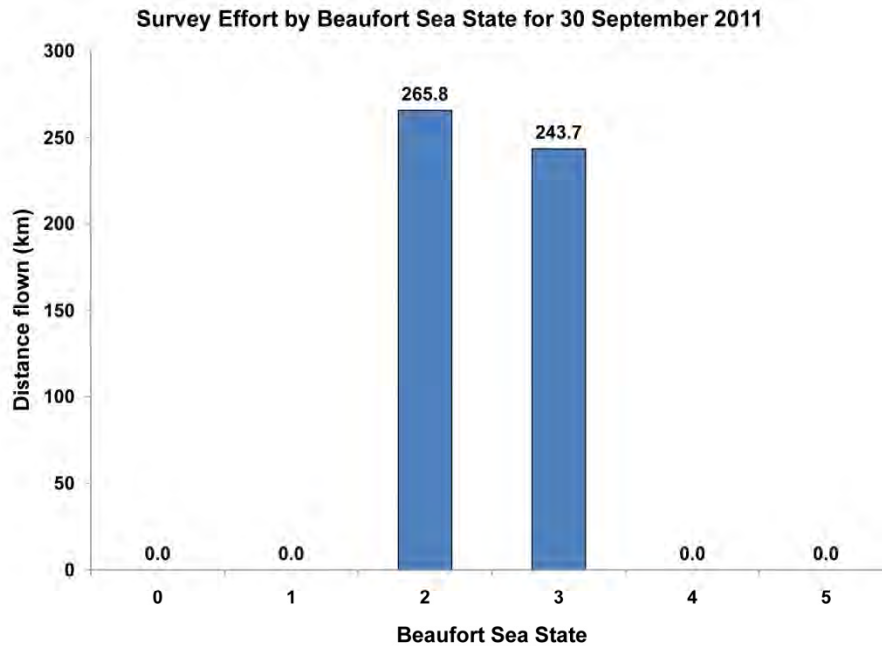




# Summary of 30 September 2011

30 September 2011

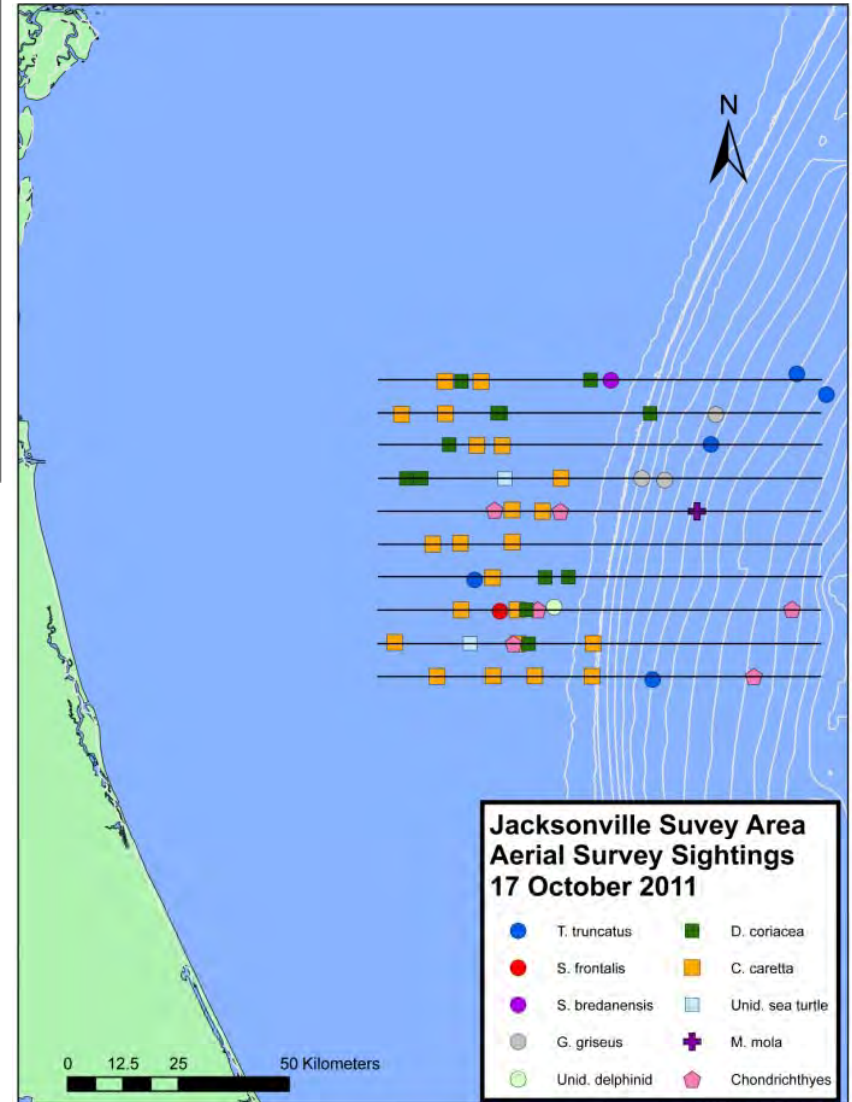
Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	16	3	10
<i>Tursiops truncatus</i>	1	10	2	9
<i>Tursiops truncatus</i>	1	8	2	9
<i>Tursiops truncatus</i>	1	10	2	8
<i>Tursiops truncatus</i>	1	1	2	6
<i>Stenella frontalis</i>	1	4	2	9
<i>Stenella frontalis</i>	1	18	2	8
<i>Caretta caretta</i>	16	26	2 to 3	-
Unidentified sea turtle	1	1	2	8
Chondrichthyes	1	1	3	7



# Summary of 17 October 2011

17 October 2011

Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line number
<i>Tursiops truncatus</i>	1	15	2	1
<i>Tursiops truncatus</i>	1	4	1	4
<i>Tursiops truncatus</i>	1	3	2	8
<i>Tursiops truncatus</i>	1	4	2	-
<i>Tursiops truncatus</i>	1	40	2	10
<i>Stenella frontalis</i>	1	50	1	2
<i>Steno bredanensis</i>	1	43	2	10
<i>Grampus griseus</i>	1	11	1	7
<i>Grampus griseus</i>	1	10	1	7
<i>Grampus griseus</i>	1	10	2	9
Unidentified delphinid	1	1	2	3
<i>Caretta caretta</i>	22	30	1 to 2	-
<i>Dermochelys coriacea</i>	12	12	1 to 2	-
Unidentified sea turtle	2	3	2	-
Chondrichthyes	6	6	1 to 2	-



Survey Effort by Beaufort Sea State for 17 October 2011

