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

Cape Hatteras, NC

**Onslow Bay, NC** 

Jacksonville, FL

### Final Report (January 2012 – December 2012)

April 22, 2013



#### **Executive Summary**

This is the fifth progress report of a monitoring program for protected marine species in waters offshore Cape Hatteras and Onslow Bay, North Carolina and Jacksonville, Florida. The results of aerial line transect surveys and vessel-based photo-ID surveys and passive acoustic monitoring are reported for the period from January 2012 through December 2012. Density estimates for marine mammals and sea turtles were generated from data collected during aerial and vessel-based surveys. In Onslow Bay, five years of monitoring has yielded a comprehensive picture of the density, distribution and abundance of marine mammals and sea turtles and has provided insights to residency patterns among delphinids in this region. Over 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, two years of monitoring surveys have provided preliminary information on the distribution and diversity of the marine mammals and sea turtles in this highly productive area.

#### Study Areas

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-a). Twenty six tracklines ranging from 73.5 to 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).

The study area in Onslow Bay encompasses the region previously 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. Aerial survey effort in Onslow Bay was reallocated to the

Cape Hatteras survey area in May 2011; therefore, vessel survey effort was the only monitoring method in Onslow Bay in 2012.

Like the other two study sites, the survey 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-c). The ten survey tracklines in JAX are longer (86 km) than those in the Cape Hatteras area 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*).



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

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

Researchers from the University of North Carolina Wilmington (UNCW) and Duke University conducted aerial surveys off Cape Hatteras between January 2012 and December 2012. The goal was to conduct two days of effort each month, covering a subset of the 26 tracklines that cover the area. This goal was achieved in January, March, May, June and December. During the months of February, August, September and November, a single survey day was achieved; during the remaining three months surveys were not conducted due to unfavorable weather conditions. Thus, a total of 134 tracklines (9186 km) were covered during the reporting period. Survey conditions were dominated by Beaufort Sea State (BSS) 3, although effort was conducted from a BSS 1-5. A total of 148 sightings of 3699 cetaceans were encountered while on effort.

Thirteen species of cetaceans were documented, including bottlenose dolphins (*Tursiops* truncatus; 48 sightings of 943 individuals), short-finned pilot whales; (Globicephala macrorhynchus; 30 sightings of 372 individuals), Cuvier's beaked whales (Ziphius cavirostris; 14 sightings of 40 individuals), mesoplodont beaked whales (Mesoplodon spp; 10 sightings of 25 individuals), common dolphins (Delphinus delphis; 7 sighting of 565 individuals), Atlantic spotted dolphins (Stenella frontalis; 7 sightings of 348 individuals), humpback whales (Megaptera novaeangliae; four sightings of 4 individuals), Risso's dolphins (Grampus griseus; four sightings of 31 individuals), sperm whales (*Physeter macrocephalus*; four sightings of 10 individuals), fin whales (Balaenoptera physalus; four sighting of 7 individuals), striped dolphins (Stenella coeruleoalba; four sightings of 775 individuals), melon-headed whales (Peponocephala electra; two sightings of 395 individuals), Clymene dolphins (Stenella clymene; two sightings of 165 individuals), and minke whales (B. acutorostrata; two sightings of four individuals). A total of 80 sea turtle sightings were recorded during this survey period, including 71 loggerhead (*Caretta caretta*) turtles and one leatherback (*Dermochelys coriacea*) turtle. In addition to cetaceans and sea turtles, other pelagic marine vertebrates (e.g. a small number of shark species, manta rays and ocean sunfish) and two whale sharks were observed. Commercial, Coast Guard, Navy and recreational vessels were also encountered in the survey area.

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

In 2012, researchers at Duke University conducted dedicated vessel-based surveys (423.9 km) in conjunction with a pilot whale behavioral response study (625.5 km) in the Cape Hatteras survey site. Approximately 1050 km were surveyed, totaling 155.6 hours of survey effort. During 16 field days, 130 sightings of eight species were recorded, including: fin whales (n = 1), common dolphins (n = 11), short-finned pilot whales (n = 52), Risso's dolphins (n = 2), sperm whales (n = 4), Atlantic spotted dolphins (n = 2), bottlenose dolphins (n = 54), Cuvier's beaked whales (n = 1) and three unidentified delphinids. Two sightings of loggerhead sea turtles and one unidentified sea turtle were also recorded during vessel surveys. Forty eight biopsy samples were collected from common dolphins (n = 5), pilot whales (n = 33), and bottlenose dolphins (n = 10). Approximately 4111 digital images were taken during the reporting period for species confirmation and 2635 were analyzed for individual recognition. Twenty seven bottlenose

dolphins were added to the catalog although there were no matches made in 2012. One hundred seventeen short-finned pilot whales, photographed during behavioral follows conducted as part of the controlled sound exposure research, were also added to the existing catalog. A number of these pilot whales were matched to photo-identification catalogs from previous tagging and biopsy work in the Cape Hatteras survey area.

#### Passive Acoustic Monitoring - Cape Hatteras

Researchers from Duke University conducted vessel-based and fixed passive acoustic monitoring in the Cape Hatteras survey site. During three days of vessel surveys, a four-element hydrophone array was towed behind the vessel, resulting in 33.8 hours of passive acoustic recordings. Whistles were detected during 23.2 hours of the recording time and clicks were detected during 19.0 hours of the recording time. Species identification for acoustic detections was not possible due to high sea states that prevented positive visual confirmation of all animals in the area, but species included: pilot whales (*Globicephala* spp.) and bottlenose dolphins. Additionally, there was a single acoustic detection of sperm whale clicks.

During a two day deployment, approximately 18 hours of passive acoustic recordings were collected by an autonomous glider. Whistles were detected during 12.9 hours and clicks were detected during 8.0 hours of the total recording time.

In 2012, two HARP deployments and one HARP recovery occurred at Cape Hatteras at one site (Site A) located along the shelf break at 950-970 m depth. Both HARPs were programmed to sample continuously at 200 kHz. The data from the first HARP deployment have been analyzed. Detections of marine mammals included: fin whale 20-Hz pulses (7.1% of recording effort), minke whale pulse trains (8.1%), *Kogia* spp. clicks (0.02%), Risso's dolphin clicks (0.4%), sperm whale clicks (10.3%), beaked whale spp. clicks (0.3%), and unidentified odontocete whistles, clicks, and burst-pulses (77.2%). Eleven beaked whale click events were recorded, and spectral characteristics of the detected clicks are similar to clicks of *Mesoplodon europaeus* (8 events) and *Ziphius cavirostris* (3 events).

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

Researchers from Duke University conducted shipboard surveys for marine mammals and sea turtles in the Onslow Bay survey site. Over 420 km were surveyed, totaling 31.5 hours of survey effort. Most survey effort was conducted in BSS 2 to 3 (70.8%) and 26.6% of effort was conducted in less than ideal sighting conditions (BSS 4). Twelve cetacean sightings were recorded during vessel surveys consisting of Risso's dolphins (n = 1), *Mesoplodon* spp. (n = 2), Atlantic spotted dolphins (n = 1), bottlenose dolphins (n = 7) and one unidentified small whale. 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. Survey effort that extended beyond the propose USWTR and in deeper water resulted in two observations of Mesoplodon spp. Two sightings of loggerhead sea turtles were recorded during vessel surveys in Year Five. Fifteen biopsy samples were collected from Risso's dolphins (n = 5), spotted dolphins (n = 2) and bottlenose dolphins (n = 8). Over 1440 digital images were taken during the reporting period for species confirmation and individual identification. Photo-identification analysis is now complete for all images taken through December 2012. Since the beginning of the monitoring program in 2007, seven bottlenose dolphins and three Atlantic spotted dolphins have been re-sighted (Figure 12). In total, approximately 5% of bottlenose dolphins (7 of 139) and 4% (3 of 78) of Atlantic spotted dolphins identified in Onslow Bay have been re-sighted, despite limited sampling effort. These re-sightings suggest some degree of residency for both bottlenose dolphins and Atlantic spotted dolphins within the study area.

#### Passive Acoustic Monitoring - Onslow Bay

In 2012, two HARP recoveries and two HARP deployments occurred in Onslow Bay at one site (Site E) located just east of the vessel survey area at 850-950 m depth. 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 two HARPs recovered during 2012 has not yet occurred; however, analysis of the HARP data from the 2010-2011 Site A deployment was completed. Detections of marine mammals included: blue whale Type A and B

calls (2.0% of recording effort); fin whale 20-Hz pulses (3.3%); minke whale pulse trains (1.7%); North Atlantic right whale up-calls, moans, and variable calls (0.02%); possible sei whales (0.4%); *Kogia* spp. clicks (0.01%); Risso's dolphin clicks (0.5%); sperm whale clicks (0.2%); and unidentified odontocete whistles, clicks, and burst-pulses (15.6%). As found in previous winter deployments at Site A, a strong pulse of longer-duration and clustered unidentified odontocete vocal events was found during the 2010-2011 deployment, starting in November and ending in January.

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

Researchers from UNCW and Duke University conducted aerial surveys off Jacksonville, Florida between January 2012 and December 2012. The goal was to survey the entire site (10 tracklines) twice per calendar month, and during the months of January, April, May, and July we achieved those goals. No surveys were conducted in February, June, August, October and December due to unfavorable weather conditions. Thus, a total of 120 tracklines (9853 km) were surveyed during the reporting period. A total of 75 sightings of 1153 cetaceans were recorded while on effort in the study area. Six species of cetaceans were observed including bottlenose dolphins (Tursiops truncactus; 35 sightings of 351 individuals), Atlantic spotted dolphins (Stenella frontalis; 28 sightings of 657 individuals), Risso's dolphins (Grampus griseus; 6 sightings of 75 individuals), rough-toothed dolphins (Steno bredanensis; two sightings of 63 individuals), short-finned pilot whales (Globicephala macrorhynchus; one sightings of two individuals), and a humpback whale (*Megaptera novaeangliae*; one sighting of a single individual). There were no sightings North Atlantic right whales (Eubalaena glacialis) during the reporting period. The number of cetacean sightings varied by month, with the highest number of encounters in January, March, July and September. A total of 319 sea turtles were recorded during the study period, including 274 loggerhead (Caretta caretta), and 17 leatherback (Dermochelys coriacea) turtles. Sea turtles were observed during each month surveyed, with highest numbers recorded in March 2012. In addition to cetaceans and sea turtles, other pelagic marine vertebrates (e.g. multiple species of sharks, manta rays, and ocean sunfish) and a single whale shark were observed. Commercial, Navy and recreational vessels were also encountered in the survey area.

#### 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. Ten vessel surveys were conducted in 2012, totaling 937.4 km, or 58.6 hours, of marine mammal and sea turtle surveys. Most survey effort was conducted in BSS 2 to 3 (82.2 %) and 14.9 % in optimal (BSS 1) sighting conditions. Forty one cetacean sightings were recorded during vessel surveys consisting of spotted dolphins (n = 14), bottlenose dolphins (n = 23), and unidentified delphinids (n = 4). 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 one group detected in deeper offshore waters (Figure 8). Forty nine sea turtles were observed and included loggerhead sea turtles (n = 41), leatherback sea turtles (n = 4) and Kemp's ridley sea turtles (n = 1). Thirty one biopsy samples were collected from Atlantic spotted dolphins (n = 19) and bottlenose dolphins (n = 12). Approximately 949 digital images were taken for species confirmation and individual identification during vessel surveys. Images of newly identified dolphins were added to existing catalogs (Table 8) and photo-identification analysis is now complete for all images taken through December 2012. Photo-identification catalogues for Tursiops truncatus and Stenella frontalis currently consist of 41 and 60 individuals, respectively. Two individual spotted dolphins have been re-sighted within the Jacksonville survey area, however, there were no matches made in 2012.

#### Passive Acoustic Monitoring – Jacksonville

In 2012, one HARP was deployed in Jacksonville at one site (Site A; 91 m) but was never recovered. Retrieval and search trips were made but yielded no results toward recovery. All recovery attempts have now been halted for this HARP. Analysis of data from four HARP deployments (05A, 05B, 06A, and 06B) was completed by members of the Scripps Whale Acoustics Lab. Detections of marine mammals during this time period (August 2010 – July 2011) at Site A included: fin whale 20-Hz pulses (0.3% of recording effort), minke whale pulse trains (0.7%), possible sei whales (0.04%), a 5-pulse sound likely produced by a mysticete (0.8%), Risso's dolphin clicks (0.6%), and unidentified odontocete whistles and clicks (58.7%).

Detections of marine mammals during this time period (August 2010 – July 2011) at Site B included: humpback whale calls (0.01% of recording effort); minke whale pulse trains (0.01%), and unidentified odontocete whistles and clicks (24.1%). Overall rates of unidentified odontocete detections were higher at Site A than B. A greater number of Risso's click detections were observed in the August 2010 – July 2011 data sets than in previous data sets.



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#### **Summary of Cape Hatteras Aerial Surveys**

This chapter describes the aerial surveys conducted in the Cape Hatteras, North Carolina, study area between January 2012 and December 2012. The aim was to conduct two days of effort each month, flying a subset of the 26 tracklines that cover the area. Survey effort occurred in nine of twelve months; unfavorable weather conditions precluded any effort during April, July, and October. Two or more survey days were achieved for five of the nine months, with a single day of effort occurring in the remaining four. A total of 134 tracklines (9186 km) were covered in the Cape Hatteras survey site during this reporting period. While survey conditions were dominated by Beaufort Sea State (BSS) 1-3, 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, McAlarney *et al.* 2012). This trend also was apparent in the present effort, as sightings dropped from 41.91 to 8.91 sightings per 1000 km as BSS increased from 1 to 5.

A total of 148 sightings of 3699 cetaceans were encountered while on effort during the 15days of aerial surveys in the study area (Table 1, Figure 1). Thirteen species of cetaceans were photo-documented, including bottlenose dolphins (Tursiops truncatus; 48 sightings of 943 individuals), short-finned pilot whales (Globicephala macrorhynchus; 30 sightings of 372 individuals), Cuvier's beaked whales (Ziphius cavirostris; 14 sightings of 40 individuals), mesoplodont beaked whales (Mesoplodon spp; ten sightings of 25 individuals), common dolphins (Delphinus delphis; seven sighting of 565 individuals), Atlantic spotted dolphins (Stenella frontalis; seven sightings of 348 individuals), humpback whales (Megaptera novaeangliae; four sightings for four individuals), Risso's dolphins (Grampus griseus; four sightings of 31 individuals), sperm whales (*Physeter macrocephalus*; four sightings of ten individuals), fin whales (Balaenoptera physalus; four sightings of seven individuals), striped dolphins (Stenella coeruleoalba; four sighting of 775 individuals), melon-headed whales (Peponocephala electra; two sightings of 395 individuals), Clymene dolphins (Stenella clymene; two sighting of 165 individuals), and minke whales (Balaenoptera acutorostrata; two sightings for four individuals). There were seven sightings (15 individuals) where species identity could not be established with 100% certainty. Five of these sightings were of animals of considerable size and are listed here as "unidentified cetaceans". One sighting of a single individual is listed

as an unidentified baleen whale as it could not be determined to species due to its depth in the water. The remaining sighting is listed as "unidentified delphinid".

Eighty sea turtle sightings were recorded during this survey period. Seventy-one were identified as loggerhead sea turtles (*Caretta caretta*), and one as a leatherback sea turtle (*Dermochelys coriacea*). No species identification could be established for the remaining eight sightings, and they are listed here as "unidentified sea turtles". (Tables 18-19, Figures 20a-c & 21).

In addition to cetaceans and sea turtles, other pelagic marine vertebrates (*e.g.* a small number of shark species, manta rays, cownose rays, whale shark and ocean sunfish) were observed (Tables 20-24, Figure 22). Commercial, military and recreational vessels were also encountered in the survey area (Tables 25-27, Figures 23-25).

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i ursiops ir uricatus	# of individuals	ო	6	198	e		277	71			34	28	943
Globicanhala maconhurchurc	Sightings		2	4			6	2	۲			7	30
	# of individuals		19	80	•		27	85	5			40	372
Zinhius nauinostris	Sightings	-					2	ო	٢		7	ო	14
Ziprius cavirosuis	# of individuals	+					3	9	2		6	14	40
Meconicadas en	Sightings	2		-			+	-			-	1	10
Mesophonon shh.	# of individuals	7		с,			2	e			3	4	25
Delphinus delphis	Sightings		£	N		4							7
	# of individuals		18	200	e C	47							565
Stenella frontalis	Sightings			- 5		<ul><li>N</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><li>K</li><l< td=""><td>t 7</td><td></td><td></td><td></td><td></td><td>e v</td><td>7</td></l<></ul>	t 7					e v	7
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and the second	# of individuals					13	8	9					31
Physeter macrocephalus	Sightings # of individuals	<del>.</del> .		<del>.</del> .		<del>,</del> ,					<del>-</del> 4		4 5
		-	6	- ,	l	4	ł						2
Balaenoptera physalus	Sightings		2	N ·									4 1
	# of individuals		3	4									-
Stenella coeruleoalba	Sightings # of individuals		2 700	1									3 775
	Sightings			~	l		ľ	L					~
Peponocephala electra	# of individuals			395									395
Stenella clymene	Sightings						2 46F						2
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I laidontified actacoon	Sightings			4									4
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	Total sightings	œ	6	29	0	28	29 0	15	2	0	7	21	148
	Total individuals	16	750	989				175	7	0	52	279	3699

Table 1. Total number of sightings and individuals for each species by month from January 2012 to December 2012 for the Hatteras survev area Species are arranged by number of sighitngs in descending order.



*Figure 1*. All cetacean sightings during aerial surveys of the Hatteras survey area from January 2012 to December 2012.

#### 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 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 JAX Aerial Survey chapter of this report.

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

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



Figure 2. Survey tracklines in the Hatteras survey area.

Trackline Effort in Hatteras Survey Area

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#### Results

One hundred thirty four tracklines totaling 9186 km were surveyed from January 2012 to December 2012. Conditions during the 15 survey days ranged from a BSS 1 to 5 with 74% of effort in sea states < 3.

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 two months of the year forced effort to be focused in unfavorable "weather windows" with higher sea state conditions. In subsequent months, periods of more suitable survey conditions were increasingly available except in April, July and October when there were no favorable weather windows. Despite the higher sea states in January, February and September, days with suitable 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. 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: 668 km (7%), BSS 2: 1716 km (19%), BSS 3: 4410 km (48%), BSS 4: 1494 km (16%), BSS 5: 898 km (10%)(Fig. 3a-c)]. Cetacean sighting rates dropped off as BSS increased, with 41.91 sightings/1000 km surveyed in BSS 1, 21.56 sightings/1000 km surveyed in BSS 2, 14.06 sightings/1000 km surveyed in BSS 3, 8.70 sightings/1000 km surveyed in BSS 4, and 8.91 sightings/1000 km surveyed in BSS 5(Fig. 4a-c).

Mean sighting distance for all cetacean sightings was 0.84 km (SD=0.51). Sighting distances across sea states varied by less than 0.25km (Fig.5a-b). Examining the number and composition of sightings made in a BSS 5 helps clarify its high average sighting distance. The six sightings for which a sighting distance could be calculated included three sightings of large baleen whales and a sighting of a group of 250 striped dolphins. The nature of these sightings increased the likelihood that they would be detected despite the higher sea state. Average sighting distances are normally calculated after removing outliers, defined as any value in excess of three standard deviations from the mean (Mean=0.9 km, SD=0.72\*3=2.16, Outlier >3.06). Two of the sighting distances were identified as outliers during this reporting period. In addition nine sightings did not have sighting distances collected and are excluded from these calculations.

	Tracklines	Tracklines	Total km	
Date	Flown AM	Flown PM	Flown	Hobbs Hours
30-Jan-2012	20 to 25	26 to 29	733.76	7.8
31-Jan-2012	39 to 36	35 to 32	599.96	7.5
1-Feb-2012	45 to 42	41, 40, 31, 30	584.52	7.2
14-Mar-2012	20 to 25	26 to 31	868.40	7.6
15-Mar-2012	32, 33, 27, 38	45, 44, 43, 39	570.35	7.4
3-May-2012	28 to 31	32 to 35	622.25	6.9
4-May-2012	45 to 42	41 to 38	544.60	7.4
8-Jun-2012	20 to 23	24 to 27	584.85	7.0
9-Jun-2012	32 to 35	45 to 42	591.40	7.1
10-Jun-2012	31 to 28, 41, 40	39 to 36	731.10	7.4
30-Aug-2012	20 to 25	38 to 41	704.45	7.9
21-Sep-2012	20 to 24, 27	31 to 28	739.10	9.4*
30-Nov-2012	30 to 34	31 to 28	321.45	4.7
1-Dec-2012	36 to 39	45 to 42	584.10	5.5
2-Dec-2012	36 to 39	45 to 42	405.50	6.7
		Total	9185.79	107.5

*Table 3.* Tracklines, km flown and Hobbs hours during aerial surveys of the Hatteras survey area from January 2012 to December 2012. Trackline numbers are listed in the order in which they were flown. Asterisk denotes hours included in transit from Hatteras, NC to Jacksonville, FL.



*Figure 3a*. Total distance surveyed per Beaufort Sea State from January 2012 to December 2012 during aerial surveys in the Hatteras survey area.



*Figure 3b.* Effort by Beaufort Sea State for each day from January 2012 to December 2012 during aerial surveys in the Hatteras survey area.





AvgBSS = [(Distance @ BSS 1\*1)+.../Total distance flown that day].



*Figure 4a*. Number of cetacean sightings per Beaufort Sea State from January 2012 to December 2012 during aerial surveys in the Hatteras survey area.



*Figure 4b.* Cetacean sightings per 1000 km flown by Beaufort Sea State from January 2012 to December 2012 during aerial surveys in the Hatteras survey area.



*Figure 4c.* Cetacean sightings per 1000 km surveyed and the average Beaufort Sea State per month from January 2012 to December 2012 during aerial surveys in the Hatteras survey area.



*Figure 5a.* Sighting distances from trackline by Beaufort Sea State for 137 of 148 cetacean sightings from January 2012 to December 2012 during aerial surveys in the Hatteras survey area. Omitted sightings: 9 without sighting distances and 2 outliers.



*Figure 5b.* Sighting distances from trackline by Beaufort Sea State for cetacean sightings from January 2012 to December 2012 during aerial surveys in the Hatteras survey area. Error bars denote standard deviation for each category.

#### Marine Mammal Sightings

A total of 148 sightings of 3699 individual cetaceans representing thirteen species were observed while on effort during the reporting period. Three endangered species – humpback (*Megaptera noaeangliae*), 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). Eight cetacean species had additional sightings that were recorded while off effort. These sightings are included in the below tables and maps for each species but are excluded from any calculations. A sighting was considered off effort if it occurred while transiting to or from the survey area or between tracklines. Any cetaceans the survey team encountered while investigating a separate sighting queue were also labeled off effort. Total number of individuals is based upon the best estimate of group size. Information on individual sighting summaries are in Appendix B and C. Daily sightings are summarized in Appendix D.

#### Bottlenose dolphin (Tursiops truncatus) (Table 4, Figure 6)

This species was the most commonly observed cetacean species based both on number of sightings (48) and number of individuals (943). This species was observed during eight of the nine survey months of this reporting period. Group size ranged between two to 50 individuals (mean=20). Three additional off effort sightings inside the range were recorded, with group sizes between six and eight individuals. The majority of sightings occurred greater 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 4*. Bottlenose dolphin (*Tursiops truncatus*) sightings in the Hatteras survey area from January 2012 to December 2012. Asterisk denotes off effort sightings.

	t olgi	ung	5.						_	
Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	
30-Jan-12	11:45	25	34.887330	-75.433136	NW	25	1	90°	3	
31-Jan-12	12:21	86	35.487627		W	36	1	90°	6	*
1-Feb-12	12:12	36	35.768284		W	40	1	90°	9	
14-Mar-12	12:08	34	34.823642			25	3	90°	14	
15-Mar-12		35	35.550984		E	37	1	90°	28	
15-Mar-12		39	35.558571		E	37	3	90°	8	
15-Mar-12		49	35.628645		w	38	1	90°	35	
15-Mar-12		53		-74.735229	W	38	1	90°	40	
15-Mar-12		64		-74.845911	E	45	1	100°	8	
15-Mar-12		69	36.136306		E	45	2	90°	4	
15-Mar-12	14:33	73		-74.614163	E	45	1	90°	26	
15-Mar-12	15:42	94	35.989608		E	43	3	90	20	
15-Mar-12	15:42	97	35.989808		E	43	2	100°	15	
3-May-12	16:11	43	35.406789		W	37	1	90°	4	
	10:25	21	36.126969		E	45	1	90°	4	*
4-May-12 4-May-12						45		90°	39	*
	10:32	26	36.116379		E		2	90°	8	*
4-May-12	10:42	30	36.125553			45				~
4-May-12	11:53	61	35.973742		E	43	2	90°	13	
4-May-12	12:14	68		-74.635989	W	42	1	60°	23	
4-May-12	14:00	85	35.843667		W	41	3	110°		
4-May-12	14:06	89		-74.586393	W	41	2	45°	40	
4-May-12	14:23	94	35.758378		E	40	1	90°	34	
4-May-12	14:28	100	35.767991	-74.577045	E	40	2	90°	50	
4-May-12	15:22	126	35.685520	-74.688836	W	39	2	90°	30	
4-May-12	15:45	137	35.621951	-74.681484	E	38	2	90°	48	
4-May-12	15:53	141	35.625957	-74.760278	E	38	2	90°	8	
4-May-12	16:03	145	35.620312	-74.795580	E	38	2	90°	2	
8-Jun-12	11:49	21	34.723967	-75.511635		23	2	90°	25	
8-Jun-12	14:39	35	34.769632	-75.416677	SE	24	1	90°	15	
9-Jun-12	10:24	18	35.343964		E	34	2	1 <b>1</b> 0°	11	
9-Jun-12	10:39	22	35.335487		E	34	2	90°	34	
9-Jun-12	11:20	34		-74.851604	W	35	2	90°	2	
				-74.720814				1 <b>1</b> 0°		
9-Jun-12				-74.654650		43	3	90°		
9-Jun-12				-74.512985		43	2	90°	22	
10-Jun-12				-74.987720		41	1	90°	8	
				-74.380440		41	3	11°	40	
				-74.553820		39	1	90°	35	
10-Jun-12				-74.574964		37	2	90°	35	
30-Aug-12				-74.876626		38	2	45°	33	
30-Aug-12				-74.659026		38	2	90°	11	
30-Aug-12				-74.507810	E	38	2	90°	9	
30-Aug-12				-74.643173		41	1	90°	18	
30-Nov-12				-75.008259		30	1	90°	13	
30-Nov-12				-75.008217		32	1	90°	4	
30-Nov-12				-74.878582		34	1	90°	17	
1-Dec-12				-74.461530		38	3	90°	2	
2-Dec-12		9		-75.661606			1	90°	6	
2-Dec-12				-75.746810			3	90°	6	
2-Dec-12				-75.562758			2	90°	4	
2-Dec-12	13:28	66	34.777744	-75.423560	SE	24	2	60°	10	



*Figure 6.* Bottlenose dolphin (*Tursiops truncatus*) sightings by group size. Red outline denotes off effort sightings.

#### Short-finned pilot whale (Globicephala macrorhynchus) (Table 5, Figure 7)

This species was observed 30 times for a total of 327 individuals and was seen in seven of the nine months in which surveys were conducted. Group sizes ranged from one to 45 individuals (mean=11).

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 (Figure 7). 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. 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.* 2011). 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.* 2011).

*Table 5.* Short-finned pilot whale (*Globicephala macrorhynchus*) sightings in the Hatteras survey area from January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
1-Feb-12	11:41	29	35.834085		Е	41	1	100°	15
1-Feb-12	12:10	35	35.764195		W	40	1	90°	4
14-Mar-12	11:59	30	34.753415		NW	25	1	90°	21
14-Mar-12	14:32	46	34.829440	-75.255250	SE	26	1	90°	16
15-Mar-12	10:38	24	35.201177	-74.673247	NW	33	2	100°	25
15-Mar-12	16:01	104	35.980901		E	43	1	90°	18
4-May-12	14:36	103	35.761736	-74.656952	E	40	2	90°	5
4-May-12	14:49	108	35.748995	-74.799130	E	40	3	110°	11
9-Jun-12	<b>9</b> :15	5	35.205705	-74.956640	Е	32	1	90°	9
9-Jun-12	13:45	47	36.128285	-74.414388	E	45	2	90°	8
9-Jun-12	14:08	55	36.058991	-74.471143	W	44	2	100°	2
9-Jun-12	14:20	59	36.048126	-74.642296	W	44	1	90°	31
9-Jun-12	15:43	82	35.922541	-74.638361	Е	42	2	90°	2
9-Jun-12	15:54	86	35.914315	-74.814962	Е	42	1	100°	11
10-Jun-12	11:08	94	35.823113	-74.674842	Е	41	2	90°	7
10-Jun-12	11:53	107	35.767227	-74.830361	W	40	1	90°	12
10-Jun-12	13:54	118	35.689751	-74.809128	E	39	2	90°	45
30-Aug-12	13:53	33	35.627248	-74.800441	Е	38	1	90°	18
30-Aug-12	14:38	53	35.691674	-74.800817	W	39	2	90°	41
30-Aug-12	15:00	63	35.755539	-74.809280	Е	40	2	60°	4
30-Aug-12	15:08	67	35.761492	-74.659694	Е	40	2	90°	15
30-Aug-12	15:44	92	35.834234	-74.833176	W	41	2	60°	7
21-Sep-12	10:48	12	34.669830	-75.566572	SE	22	1	90°	5
1-Dec-12	11:05	31	35.541047	-74.357903	Е	38	2	90°	1
1-Dec-12	13:10	44	36.121488	-74.505460	Е	45	3	90°	3
1-Dec-12	13:20	48	36.121955	-74.363954	Е	45	2	90°	5
1-Dec-12	14:16	60	35.970768	-74.670173	Е	43	2	90°	5
1-Dec-12	14:25	64	35.973986	-74.328506	Е	43	2	90°	13
1-Dec-12	14:36	68	35.903755	-74.436792	W	42	2	90°	3
2-Dec-12	10:44	44	34.600899	-75.457848	SE	22	2	90°	10



Figure 7. Short-finned pilot whale (Globicephala macrorhynchus) sightings by group size.

#### Cuvier's beaked whale (Ziphius cavirostris) (Table 6, Figure 8)

Fourteen sightings of 40 individuals occurred while on effort in the Cape Hatteras survey area, and this species was observed in seven of the nine months in which surveys were conducted. One additional off effort sighting of five animals was recorded inside the range in November. The sighting occurred while we had broken track to investigate a past sighting. Group sized ranged from single animals up to eight individuals (mean=3) All animals were recorded just beyond the 200 m isobath. See below for NMFS stock assessment information for this species.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
31-Jan-12	10:42	66	35.692390	-74.624678	E	39	1	100°	1
4-May-12	11:43	54	35.977379	-74.634714	E	43	2	90°	2
4-May-12	13:57	81	35.821674	-74.724824	Е	41	2	60°	3
9-Jun-12	11:04	29	35.412325	-74.494889	W	35	1	100°	2
10-Jun-12	14:56	134	35.614247	-74.760269	W	38	2	100°	1
30-Aug-12	14:27	49	35.692400	-74.694600	W	39	1	90°	1
30-Aug-12	15:27	79	35.828540	-74.398137	W	41	1	90°	4
30-Aug-12	15:39	88	35.841997	-74.688174	W	41	2	90°	1
21-Sep-12	15:29	43	34.897389	-75.069119	NW	28	2	90°	2
30-Nov-12	13:23	16	35.111504	-74.976190	NW	31	3	90°	5
30-Nov-12	14:51	31	35.200557	-74.685430	NW	33	1	100°	5
30-Nov-12	15:29	44	35.332009	-74.785398	SE	34	2	90°	4
1-Dec-12	10:09	13	35.483571	-74.646833	W	37	1	90°	1
2-Dec-12	9:37	12	34.449417	-75.524725	SE	20	1	100°	8
2-Dec-12	11:05	50	34.643750	-75.394300	NW	23	1	60°	5

*Table 6.* Cuvier's beaked whale (*Ziphius cavirostris*) sightings in the Hatteras survey area from January 2012 to December 2012. Asterisk denotes off effort sighting.

#### Beaked whale (Mesoplodon spp.) (Table 7, Figure 9)

Animals were identified as belonging to the genus *Mesoplodon* and distinguished apart from *Z. cavirostris* on ten sightings for a total of 25 individuals (mean=3). Sightings occurred offshore of the 100 m isobath. The difficulty in differentiating the various species of beaked whales (*Mesoplodon* spp. and *Ziphius* sp.) has led 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 7. Mesoplodon* spp. sightings in the Hatteras survey area from January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
31-Jan-12	11:46	81	35.560197	-74.700421	Е	37	2	90°	4
31-Jan-12	12:21	86	35.487627	-74.803840	W	36	1	90°	3
15-Mar-12	9:42	5	35.143693	-74.887270	SE	32	2	90°	3
4-May-12	11:00	37	36.038311	-74.582717	W	44	1	90°	1
4-May-12	15:15	122	35.692604	-74.734785	W	39	2	90°	1
4-May-12	15:26	130	35.682618	-74.603401	W	39	2	90°	1
8-Jun-12	16:01	57	34.747765	-75.130554	SE	26	3	90°	2
30-Aug-12	10:14	6	34.549125	-75.543718	NW	21	1	90°	3
30-Nov-12	13:23	16	35.111504	-74.976190	NW	31	3	90°	3
2-Dec-12	9:43	16	34.408173	-75.489960	SE	20	2	90°	4



Figure 9. Mesoplodon spp. sightings by group size.
#### Atlantic spotted dolphin (Stenella frontalis) (Table 8, Figure 10)

Eight sightings of 367 individuals were observed while on effort in the Cape Hatteras survey area. Group size ranged between 25 and 85 (mean=46). A single group of 19 individuals was observed while off effort over the continental shelf inside the range. 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 that occurs further offshore and around islands (Perrin *et al.* 1987, 1994). Spotted dolphins occurred from inside 50m to offshore of the 2000m isobath suggesting that both ecotypes occurred within the survey area. The abundance estimate for *S. frontalis* in the western north Atlantic is 26798 (CV=0.66); the status of the stock(s) is/are unknown (Waring *et al.* 2012).

*Table 8.* Atlantic spotted dolphin (*Stenella frontalis*) sightings in the Hatteras survey area from January 2012 to December 2012. Asterisk denotes off effort sighting.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	
15-Mar-12	9:53	9	35.101080	-74.777675	SE	32	2	90°	26	
3-May-12	15:22	33	35.324588	-75.206974			1	90°	19	;
4-May-12	9:52	6	36.112706	-74.990582	E	45	2	90°	48	
4-May-12	11:52	58	35.979662	-74.557988	E	43	2	90°	58	
10-Jun-12	14:32	130	35.622873	-74.662187	W	38	2	45°	25	
1-Dec-12	10:36	21	35.559816	-74.792280	E	38	4	90°	26	
2-Dec-12	10:12	27	34.723346	-75.782118	NW	21	3	90°	85	
2-Dec-12	13:11	61	34.884608	-75.560403	SE	24	2	45°	80	

\*



*Figure 10.* Atlantic spotted dolphin (Stenella frontalis) sightings by group size. Dark red outline denotes off effort sighting.

# Common dolphin (Delphinus delphis) (Table 9, Figure 11)

Eight sightings of 675 individuals of common dolphins (mean group size =84) were observed beyond the 200 m isobath. Mixed species groups of common dolphin and striped dolphin (*Stenella coeruleoalba*) were observed twice during the current reporting period, including one sighting that occurred while off effort. The current best estimate of common dolphins in the western Atlantic Ocean combines two geographic estimates. Estimates from the Bay of Fundy to Maryland [90547 individuals (CV=0.24)] and from Maryland to central Florida [30196 (CV=0.54)] form a combined estimate of 120743 (CV=0.23) (Waring *et al.* 2010). The status of the common dolphins stock in the Northwest Atlantic is unknown.

*Table* 9. Common dolphin (*Delphinus delphis*) sightings in the Hatteras survey area from January 2012 to December 2012. Asterisk denotes off effort sighting.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
1-Feb-12	12:12	36	35.768284	-74.819007	W	40	1	90°	18
15-Mar-12	14:47	78	36.126091	-74.417143	Е	45	2	60°	75
15-Mar-12	16:01	105	35.981214	-74.345163	Е	43	1	90°	110
15-Mar-12	16:41	113	35.693636	-74.757051	W	39	1	60°	125
4-May-12	10:11	12	36.113022	-74.660513	Ш	45	1	90°	37
4-May-12	10:14	15	36.118288	-74.558515	Е	45	1	45°	40
4-May-12	11:05	40	36.041401	-74.684002	W	44	1	45°	45
4-May-12	11:39	51	35.988005	-74.735377	Е	43	3	110°	225

\*



*Figure 11*. Common dolphin (*Delphinus delphis*) sightings by group size. Bicolor circles denote mixed groups with *Stenella coeruleoalba*. Red outline denotes off effort sighting.

#### Humpback whale (Megaptera novaeangliae) (Table 10, Figure 12)

All sightings of humpback whales were of single animals and occurred over the continental slope. In addition to the four on effort sightings made inside the range, an inshore sighting was made while off effort transiting from the range. A floating carcass of a humpback was encountered within the range while on effort; photographs were collected and local stranding networks were notified. No recovery effort was attempted due to the its advanced state of decomposition, although the carcass was entered into the National Database. Currently, humpback whales in the western North Atlantic are treated as a single stock despite genetic evidence identifying smaller sub-stocks (Waring *et al.* 2012). 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.* 2012). This species is listed as endangered under the Endangered Species Act.

Table 10. Humpback whale (Megaptera novaeangliae) sightings in
the Hatteras survey area from January 2012 to December 2012.
Asterisk denotes off effort sighting. Triangle denotes carcass.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	
30-Jan-12	12:03	30	35.048412	-75.558142	NW	25	4	90°	1	
14-Mar-12	17:29	86	35.676900	-75.446891			1	90°	1	1
15-Mar-12	12:36	56	35.616915	-75.052653	W	38	3	60°	1	4
4-May-12	16:11	151	35.629127	-75.069973	E	38	3	90°	1	
2-Dec-12	9:03	4	34.745702	-75.932835	SE	20	2	90°	1	
2-Dec-12	14:12	79	35.019581	-75.633433	NW	25	2	90°	1	

\*

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*Figure 12.* Humpback whale (*Megaptera novaeangliae*) sightings. Red outline denotes off effort sighting. Bold outline denoted floating carcass.

<u>Risso's dolphin</u> (*Grampus griseus*) (Table 11, Figure 13)

This species was encountered four times while on effort for a total of 31 individuals (Figure 8). Group size for this species ranged from 4 to 13 individuals (mean=8). One additional off effort sighting was made on the offshore end of trackline 45. Risso's dolphins were recorded in three of the nine months surveyed, and were only observed in deeper, offshore waters >200m. Risso's dolphins have been found 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.* 2011). 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.* 2011). The status of this species in the western Atlantic is unknown (Waring *et al.* 2011).

*Table 11*. Risso's dolphin (*Grampus griseus*) sightings in the Hatteras survey area from January 2012 to December 2012. Asterisk denotes off effort sighting.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
3-May-12	11:20	16	35.104194	-75.087699	SE	32	2	90°	13
8-Jun-12	15:37	49	34.811290	-75.211198	SE	26	1	90°	8
9-Jun-12	13:46	48	36.131861	-74.410493	Е	45	2	90°	7
30-Aug-12	14:01	38	35.630284	-74.665757	Е	38	2	90°	6
30-Aug-12	15:13	73	35.758820	-74.525161	Е	40	2	90°	4

×



*Figure 13.* Risso's dolphin (*Grampus griseus*) sightings by group size. Red outline denotes off effort sighting.

#### Minke whale (Balaenoptera acutorostrata) (Table 12, Figure 14)

Minke whale sightings all occurred in offshore waters > 2000m. On effort sightings included a pair of adult whales in January and a mom/calf pair in March. Additional off effort sightings of minke whales including an adult pair and another mom/calf pair recorded in March as well as a single individual in November. 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 12.* Minke whale (*Balaenoptera acutorostrata*) sightings in the Hatteras survey area from January 2012 to December 2012. Asterisk denotes off effort sightings.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
31-Jan-12	14:28	97	35.418673	-74.516484	E	35	2	90°	2
14-Mar-12	16:41	76	34.933077	-74.838806	Е	30	3	90°	2
15-Mar-12	10:10	14	35.032775	-74.405086			1	90°	2
15-Mar-12	10:37	23	35.198969	-74.674666	NW	33	2	90°	2
30-Nov-12	14:34	28	35.154434	-74.441113	NW	33	2	90°	1

\* \*

\*



*Figure 14*. Minke whale (*Balaenoptera acutorostrata*) sightings. Red outline denotes off effort sightings.

# Striped dolphin (Stenella coeruleoalba) (Table 13, Figure 15)

This species was observed three times, for a total of 775 individuals and was only seen in two of the nine months surveyed during this reporting period. Group size ranged between 75 and 450 (mean=258). All sightings were in depths greater than 200 m. Mixed species groups of striped dolphins and common dolphins (*D. delphis*) were observed twice during the current reporting period, including one sighting that occurred while off effort. The current best population estimate in the western North Atlantic is 94462 (CV=0.04) (Waring *et al.* 2007).

*Table 13.* Striped dolphin (*Stenella coeruleoalba*) sightings in the Hatteras survey area from January 2012 to December 2012. Asterisk denotes off effort sighting.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
1-Feb-12	9:37	6	36.118833	-74.602939	Е	45	3	90°	450
1-Feb-12	12:31	40	35.772974	-74.846489	W	40	1	90°	250
15-Mar-12	14:47	78	36.126091	-74.417143	Е	45	2	60°	75
15-Mar-12	16:01	105	35.981214	-74.345163	Е	43	1	90°	110

∗



*Figure 15.* Striped dolphin (*Stenella coeruleoalba*) sightings by group size. Bicolor circles denote mixed groups with *Delphinus delphis.* Red outline denotes off effort sighting

#### Sperm whale (Physeter macrocephalus) (Table 14, Figure 16)

This species was observed four times, for a total of ten individuals, and was seen in four of the nine months surveyed during this reporting period. Group size ranged between one and six. All sightings were recorded beyond the continental shelf, in depths greater than 1000 m. During the November  $30^{th}$  sighting a juvenile sperm whale was observed in close association with two adults. Three more adults were encountered near the original group. 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 14*. Sperm whale (*Physeter macrocephalus*) sightings in the Hatteras survey area from January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
31-Jan-12	15:35	105	35.227815	-74.785030	Е	33	2	60°	1
14-Mar-12	16:27	72	34.959386	-74.896202	Е	30	3	90°	1
4-May-12	10:21	19	36.129849	-74.468156	Е	45	3	90°	2
30-Nov-12	14:34	28	35.154434	-74.441113	NW	33	2	90°	6



*Figure 16.* Sperm whale (*Physeter macrocephalus*) sightings by group size. Dark blue outline denotes group with juvenile present.

#### Fin Whale (Balaenoptera physalus) (Table 15, Figure 17)

Four fin whales for a total of seven individuals were observed 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 15.* Fin whale (*Balaenoptera physalus*) sightings in the Hatteras survey area from January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
1-Feb-12	10:32	17	35.972639	-74.790403	Е	43	2	100°	1
1-Feb-12	14:50	50	35.031185	-74.841419	SE	31	2	90°	2
15-Mar-12	10:24	19	35.151913	-74.430711	NW	33	2	60°	1
15-Mar-12	14:59	84	36.051086	-74.393703	W	44	1	60°	3



Figure 17. Fin whale (Balaenoptera physalus) sightings by group size

# Melon-headed whale (Peponocephala electra) (Table 16, Figure 18)

Two groups totaling 395 individuals were encountered in March in waters greater than 200m. Currently this species' numbers in the western north Atlantic are unknown due to the paucity of sightings (Waring *et al.* 2007). Vessel surveys in 1999 and 2002 recorded two groups (20 and 80 individuals respectively) off of Cape Hatteras in waters exceeding 2500m.

*Table 16.* Melon-headed whale (*Peponocephala electra*) sightings in the Hatteras survey area from January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
14-Mar-12	17:02	82	35.159333	-75.040836	W	31	1	90°	185
15-Mar-12	10:49	28	35.239920	-74.805528	NW	33	3	90°	210



Figure 18. Melon-headed whale (Peponocephala electra) sightings by group size.

#### Clymene dolphin (Stenella clymene) (Table 17, Figure 19)

Two sightings totaling 165 individuals were observed beyond the 1000 m isobath. 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 17*. Clymene dolphin (*Stenella clymene*) sightings in the Hatteras survey area from January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
8-Jun-12	15:47	53	34.802065	-75.194170	SE	26	2	90°	65
10-Jun-12	15:34	149	35.556768	-74.461219	Ε	37	1	90°	100



Figure 19. Clymene dolphin (Stenella clymene) sightings by group size.

Sea Turtles (Tables 18-19, Figures 20a-c and 21)

Eighty 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 3 (Figures 20a-b). Sea turtles were recorded in every month surveyed except November; the highest sighting rates occurred in March, May and December (Figure 20c). Loggerhead sea turtles (*Caretta caretta*) represented the majority of sea turtle sightings (89%). The only other sea turtle species that was identified in the Cape Hatteras survey site was the leatherback sea turtles (*Dermochelys coriacea*) (1%). For the remaining 10% of sightings, species identification could not be made with 100% certainty and they are, therefore, listed as "unidentified sea turtles".



*Figure 20a.* Total number of sea turtle sightings by Beaufort Sea State in the Hatteras survey area from January 2012 to December 2012.



*Figure 20b.* Sea turtle sightings per 1000 km flown by Beaufort Sea State in the Hatteras survey area from January 2012 to December 2012.



*Figure 20c.* Sea turtle sightings per 1000 km surveyed and the average Beaufort Sea State per month in the Hatteras survey area from January 2012 to December 2012.

#### Loggerhead sea turtles (Caretta caretta)(Table 18, Figure 21)

Sightings of loggerhead sea turtles occurred in eight of the nine months surveyed, for a total of 71 animals. The vast 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).

								77	
		r Point	atitude	ongitude-1	Heading	Track Number	Angle out	Degree Forward	t#
Date	Lime	Way	atit	ů.	lea	rac	Ignv	)eg	Best
30-Jan-12	14:19	<u>&gt;</u> 38	34.982313	-75.442413	SE	26	2	90°	1
14-Mar-12	11:15	18	34.807049		NW	23	2	110°	1
14-Mar-12	15:10	46	35.049280	-75.412273	NW	27	1	90°	2
14-Mar-12	16:04	57	35.112704	-75.231516	W	29	1	90°	1
14-Mar-12	16:09	59	35.219367	-75.373094	W	29	1	90°	1
15-Mar-12	12:28	40	35.624351	-74.968183	W	38	1	90°	1
15-Mar-12	12:29	41	35.622425	-75.008358	W	38	2	90°	2
15-Mar-12	15:25	68	36.047686	-75.105060	W	44	2	90°	2
3-May-12	10:22	3	35.109130		SE	28	1	90°	1
3-May-12	11:02	11	35.099645	-75.210582	NW	29	1	90°	1
3-May-12	11:12	14	35.245574	-75.271762	SE	30	1	90°	1
3-May-12	15:31	31	35.337961	-74.971990	E	34	2	90°	1
4-May-12 4-May-12	9:48 9:50	3	36.119271 36.124978		E	45 45	1	90° 90°	1
4-May-12	9:50	4	36.123250		E	45	2	90°	1
4-May-12	11:16	44	36.041886		Ŵ	44	2	90°	1
4-May-12	11:19	45	36.042330		w	44	1	90°	1
4-May-12	11:20	29	36.042565	-75.143855	W	44	1	90°	3
4-May-12	11:24	32	35.973601	-75.095511	E	43	2	100°	3
4-May-12	11:25	48	35.973402	-75.049213	Е	43	2	90°	2
4-May-12	11:25	33	35.973452	-75.052896	Е	43	2	90°	3
4-May-12	11:27	49	35.975784		Е	43	2	60°	4
4-May-12	12:23	70	35.904163		W	42	2	90°	1
4-May-12	12:25	49	35.906719		W	42	1	90°	3
4-May-12	12:26	50	35.904858		W	42	2	90°	4
4-May-12	13:46	76	35.833303	-75.104231	E	41	1	90°	1
4-May-12	15:00	113	35.755940	-75.119142	E	40	3	90°	1
4-May-12	15:06	116	35.685444	-75.027899	W	39 38	1	90°	1
4-May-12 4-May-12	16:05 16:09	100 102	35.619490 35.616549	-74.893894 -75.030994	W	38	2	90° 90°	3
8-Jun-12	15:23	44	35.057983	-75.535721	SE	26	2	90°	2
9-Jun-12	9:28	5	35.133293	-74.825820	E	32	1	90°	1
9-Jun-12	14:47	40	36.048442		w	44	3	90°	1
9-Jun-12	14:55	70	35.980155	-75.004276	W	43	1	90°	1
10-Jun-12	10:48	87	35.836235		E	41	2	90°	1
10-Jun-12	15:13	140	35.552683		Е	37	1	90°	1
10-Jun-12	15:20	143	35.552466	-74.791101	Е	37	1	90°	1
30-Aug-12				-74.822054	Е	38	1	90°	1
30-Aug-12				-75.107414	E	40	3	60°	1
30-Aug-12				-74.962089	E	40	2	90°	1
30-Aug-12				-74.948371	E	40	1	90°	1
21-Sep-12				-75.371733		20	1	90°	1
1-Dec-12	11:25	29		-74.886333		39	2	90°	1
1-Dec-12	14:52	53		-75.034245 -75.707214		42	1	90°	1
2-Dec-12	10:32 11:18	37 55				22 23	1	90° 90°	1
2-Dec-12 2-Dec-12	13:09			-75.669282 -75.608462		23	2	90°	1
2-Dec-12 2-Dec-12	13:57	42 54		-75.399059		_	2	90°	1
2-Dec-12 2-Dec-12	14:01	77		-75.495757			2	90°	1
2-Dec-12	14:01			-75.506121			2	90°	1
2 000-12	1.1.01	~~	51.5001.00	10.000121		20	-		

*Table 18.* Loggerhead sea turtle (*Caretta caretta*) sightings in the Hatteras survey area from January 2012 to December 2012.

# Leatherback Sea Turtle (Dermochelys coriacea) (Table 19, Figure 21)

One leatherback sea turtle was observed in January around the 100 m isobath. 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 19.* Leatherback sea turtle (*Dermochelys coriacea*) sightings in the Hatteras survey area from January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
31-Jan-12	15:14	92	35.340399	-74.981557	W	34	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. Eight sightings of individual animals in the Cape Hatteras survey site are listed as unidentified.



Figure 21. Loggerhead (Caretta caretta), and leatherback (Dermochelys coriacea) sightings.

#### Other Marine Vertebrate Sightings (Tables 20-24, Figure 22)

#### Chondrichthyan fishes

Forty six unidentified shark sightings were recorded during the reporting period. Most sharks were seen in the area near the 100 m isobath in six of the nine months surveyed. One sighting of a whale shark was observed in May off of the 2000 m isobath. Fifty-five manta rays (*Manta birostris*) were observed during the study period, and occurred in eight of the nine months surveyed. Two sightings of 215 individuals of cownose rays were observed in June inside the 100 m isobaths.

# Other fishes

Six sightings of eight individuals of ocean sunfish (*Mola mola*) were recorded with the majority off of the 200 m isobath. All sightings occurred in either March or May.

B   I	- attor ao		0.10		uary 2012					
31-Jan-12 11:14 70 35.620908 -74.916730 W 38 1 90° 1   1-Feb-12 12:29 30 35.764894 -74.829801 W 40 1 90° 1   14-Mar-12 11:32 22 34.785942 -75.442206 SE 24 3 90° 1   14-Mar-12 15:05 43 34.946376 -75.07604039 E 30° 1 90° 1   14-Mar-12 16:19 70 35.105205 -75.084039 E 37 2 90° 1   15-Mar-12 11:19 21 35.533090 -74.853567 E 37 2 90° 1   4-May-12 10:01 8 36.119958 -74.743049 E 45 1 90° 1   4-May-12 10:01 8 36.119958 -74.464442 E 45 1 90° 1   4-May-12 10:13 43 36.042704 -74.863163 W 44 3 90° 1   4-May-12	Date	Time	Way Point	Latitude	Heading	Track Number	Angle out	Degree Forward	Best #	
1-Feb-12   12:29   30   35.764894   -74.829801   W   40   1   90°   1     14-Mar-12   11:32   22   34.785942   -75.442206   SE   24   3   90°   1     14-Mar-12   15:05   43   34.946376   -75.276026   NW   27   2   90°   1     14-Mar-12   16:19   70   35.105206   -75.063589   W   31   1   90°   1     14-Mar-12   17:19   21   35.533090   -74.853567   E   37   2   90°   1     3-May-12   10:01   8   36.119958   -74.73049   E   45   1   90°   1     4-May-12   10:01   8   36.12051   -74.853567   W   44   1   90°   1     4-May-12   10:01   8   36.12051   -74.857720   W   42   1   90°   1     4-May-12   13:48   57   35.832107 <td< td=""><td>31-Jan-12</td><td>11:14</td><td>70</td><td>35.620908</td><td>-74.916730</td><td>W</td><td>38</td><td>1</td><td>90°</td><td>1</td></td<>	31-Jan-12	11:14	70	35.620908	-74.916730	W	38	1	90°	1
14-Mar-12 11:32 22 34.785942 -75.442206 SE 24 3 90° 1   14-Mar-12 15:05 43 34.946376 -75.276026 NW 27 2 90° 1   14-Mar-12 16:19 70 35.105205 -75.084039 E 30 3 90° 1   14-Mar-12 17:12 72 35.175606 -75.053589 W 31 1 90° 1   3-May-12 15:34 37 35.337540 -74.864631 E 34 1 90° 1   4-May-12 10:01 8 36.119958 -74.464442 E 45 1 90° 1   4-May-12 10:00 2 36.042704 -74.883163 W 44 3 90° 1   4-May-12 13:45 77 35.832066 -75.04194 E 41 2 90° 1   4-May-12 13:45 59 35.832117 -74.76506 E 41 1 90° 2   4-May-12	1-Feb-12	12:29	30	35.764894	-74.829801	W	40	1	90°	1
14-Mar-12 16:19 70 35.105205 -75.084039 E 30 3 90° 1   14-Mar-12 17:12 72 35.175606 -75.053589 W 31 1 90° 1   3-May-12 15:34 37 35.337540 -74.864631 E 34 1 90° 1   4-May-12 10:01 8 36.119958 -74.743049 E 45 1 90° 1   4-May-12 10:00 13 36.120651 -74.464442 E 45 1 90° 1   4-May-12 11:13 43 36.042704 -74.85257 W 44 3 90° 2   4-May-12 13:48 77 35.831250 -75.026414 E 41 2 90° 1   4-May-12 13:48 77 35.832666 -75.041994 E 41 1 90° 2   4-May-12 14:42 77 35.764304 -74.713703 W 40 2 90° 3   4-May-12 14	14-Mar-12	<b>1</b> 1:32	22	34.785942	-75.442206	SE	24	3	90°	1
14-Mar-12 17:12 72 35.175606 -75.053589 W 31 1 90° 1   15-Mar-12 11:19 21 35.533090 -74.853567 E 37 2 90° 1   3-May-12 15:34 37 35.337540 -74.864631 E 44 1 90° 1   4-May-12 10:01 8 36.119958 -74.743049 E 45 1 90° 1   4-May-12 10:00 13 36.120651 -74.464442 E 45 1 90° 1   4-May-12 11:13 43 36.042704 -74.853163 W 44 3 90° 2   4-May-12 13:48 77 35.832266 -75.041994 E 41 2 90° 1   4-May-12 13:48 77 35.764304 -74.713703 W 40 2 90° 2   4-May-12 14:42 77 35.764304 -74.713703 W 40 2 90° 3   4-May-12 1	14-Mar-12	15:05	43	34.946376	-75.276026	NW	27	2	90°	1
15-Mar-1211:192135.553090 $-74.853567$ E37290°13-May-1215:343735.337540 $-74.864631$ E34190°14-May-1210:01836.119958 $-74.743049$ E45190°14-May-1210:201336.120651 $-74.464442$ E45190°14-May-1210:502236.042394 $-74.452557$ W44190°14-May-1211:134336.042704 $-74.457720$ W42190°14-May-1213:487735.831250 $-75.026414$ E41290°14-May-1213:485735.832666 $-75.041994$ E41290°14-May-1213:485735.832616 $-74.612451$ E41190°24-May-1214:427735.764304 $-74.713703$ W40290°34-May-1214:4310635.760568 $-74.773431$ E40190°14-May-1215:1011835.687021 $-74.867441$ W39360°34-May-1216:0714835.616983 $-74.773431$ E40190°14-May-1216:0714835.231566 $-74.816012$ W33290°19-Jun-1214:35<	14-Mar-12	16:19	70	35.105205	-75.084039	Е	30	3	90°	1
3-May-12 15:34 37 35.337540 -74.864631 E 34 1 90° 1   4-May-12 10:01 8 36.119958 -74.743049 E 45 1 90° 1   4-May-12 10:20 13 36.120651 -74.464442 E 45 1 90° 1   4-May-12 10:50 22 36.042394 -74.452557 W 44 1 90° 1   4-May-12 11:13 43 36.042704 -74.452557 W 44 3 90° 1   4-May-12 13:48 77 35.831250 -75.026414 E 41 2 90° 1   4-May-12 13:48 57 35.832616 -75.041994 E 41 1 90° 2   4-May-12 14:42 77 35.764304 -74.713703 W 40 2 90° 3   4-May-12 14:43 106 35.67021 -74.867441 W 39 3 60° 3   4-May-12 15:	14-Mar-12	17:12	72	35.175606	-75.053589	W	31	1	90°	1
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4-May-1210:2013 $36.120651$ $-74.464442$ E $45$ 1 $90^{\circ}$ 14-May-1210:5022 $36.042394$ $-74.452557$ W $44$ 1 $90^{\circ}$ 14-May-1211:1343 $36.042704$ $-74.883163$ W $44$ 3 $90^{\circ}$ 24-May-1212:0745 $35.904124$ $-74.457720$ W $42$ 1 $90^{\circ}$ 14-May-1213:4877 $35.831250$ $-75.026414$ E $41$ 2 $90^{\circ}$ 14-May-1213:4857 $35.832666$ $-75.041994$ E $41$ 2 $90^{\circ}$ 14-May-1213:5559 $35.832117$ $-74.750506$ E $41$ 1 $90^{\circ}$ 24-May-1214:4277 $35.764304$ $-74.713703$ W $40$ 2 $90^{\circ}$ 34-May-1214:43106 $35.760568$ $-74.773431$ E $40$ 1 $90^{\circ}$ 34-May-1215:10118 $35.616983$ $-74.773431$ E $40$ 1 $90^{\circ}$ 34-May-1216:07148 $35.616983$ $-74.788789$ W $39$ 1 $90^{\circ}$ 18-Jun-1214:3532 $34.823625$ $-75.490919$ SE241 $90^{\circ}$ 19-Jun-1214:3532 $34.792949$ $-75.452283$ SE241 $90^{\circ}$ 19-Jun-1214:3633 $34.792949$	3-May-12	15:34		35.337540	-74.864631	Е		1	90°	1
4-May-12 10:50 22 36.042394 -74.452557 W 44 1 90° 1   4-May-12 11:13 43 36.042704 -74.883163 W 44 3 90° 2   4-May-12 12:07 45 35.904124 -74.457720 W 42 1 90° 1   4-May-12 13:48 77 35.831250 -75.026414 E 41 2 90° 1   4-May-12 13:48 57 35.832666 -75.041994 E 41 1 90° 2   4-May-12 14:05 64 35.833689 -74.612451 E 41 1 90° 2   4-May-12 14:42 77 35.764304 -74.713703 W 40 2 90° 3   4-May-12 15:10 118 35.667021 -74.867441 W 39 1 90° 1   4-May-12 16:07 148 35.616983 -74.976901 E 38 2 90° 1   4-May-12	4-May-12	<b>10</b> :01	8	36.119958	-74.743049	Е	45	1	90°	1
4-May-1211:1343 $36.042704$ $-74.883163$ W44390°24-May-1212:0745 $35.904124$ $-74.457720$ W42190°14-May-1213:4877 $35.831250$ $-75.026414$ E41290°14-May-1213:4857 $35.832666$ $-75.041994$ E41290°14-May-1213:5559 $35.832117$ $-74.750506$ E41190°24-May-1214:0564 $35.833689$ $-74.612451$ E41190°24-May-1214:4277 $35.764304$ $-74.713703$ W40290°34-May-1215:10118 $35.687021$ $-74.867441$ W39360°34-May-1215:12120 $35.691093$ $-74.976901$ E38290°14-May-1216:07148 $35.616983$ $-74.976901$ E38290°18-Jun-1214:3532 $34.823625$ $-75.490919$ SE24190°19-Jun-1214:3533 $34.792949$ $-75.452283$ SE24190°19-Jun-1214:3633 $36.123902$ $-74.772485$ E45290°19-Jun-1213:3345 $36.123902$ $-74.76592$ W44390°1 <tr< td=""><td>4-May-12</td><td>10:20</td><td>13</td><td>36.120651</td><td>-74.464442</td><td>Е</td><td>45</td><td>1</td><td>90°</td><td>1</td></tr<>	4-May-12	10:20	13	36.120651	-74.464442	Е	45	1	90°	1
4-May-12 12:07 45 35.904124 -74.457720 W 42 1 90° 1   4-May-12 13:48 77 35.831250 -75.026414 E 41 2 90° 1   4-May-12 13:48 57 35.832666 -75.041994 E 41 2 90° 1   4-May-12 13:55 59 35.832117 -74.750506 E 41 1 90° 2   4-May-12 14:20 64 35.833689 -74.612451 E 41 1 90° 2   4-May-12 14:42 77 35.764304 -74.713703 W 40 2 90° 3   4-May-12 15:10 118 35.687021 -74.867441 W 39 3 60° 3   4-May-12 15:10 118 35.616983 -74.976901 E 38 2 90° 1   4-May-12 16:07 148 35.616983 -74.976901 E 38 2 90° 1   8-Jun-12 <td< td=""><td>4-May-12</td><td>10:50</td><td>22</td><td>36.042394</td><td>-74.452557</td><td>W</td><td>44</td><td>1</td><td>90°</td><td>1</td></td<>	4-May-12	10:50	22	36.042394	-74.452557	W	44	1	90°	1
4-May-12 12:07 45 35.904124 -74.457720 W 42 1 90° 1   4-May-12 13:48 77 35.831250 -75.026414 E 41 2 90° 1   4-May-12 13:48 57 35.832666 -75.041994 E 41 2 90° 1   4-May-12 13:55 59 35.832117 -74.750506 E 41 1 90° 2   4-May-12 14:20 64 35.833689 -74.612451 E 41 1 90° 2   4-May-12 14:42 77 35.764304 -74.713703 W 40 2 90° 3   4-May-12 15:10 118 35.687021 -74.867441 W 39 3 60° 3   4-May-12 15:10 118 35.616983 -74.976901 E 38 2 90° 1   4-May-12 16:07 148 35.616983 -74.976901 E 38 2 90° 1   8-Jun-12 <td< td=""><td>4-May-12</td><td>11:13</td><td>43</td><td>36.042704</td><td>-74.883163</td><td>W</td><td>44</td><td>3</td><td>90°</td><td>2</td></td<>	4-May-12	11:13	43	36.042704	-74.883163	W	44	3	90°	2
4-May-1213:485735.832666 $\cdot 75.041994$ E41290°14-May-1213:555935.832117 $\cdot 74.750506$ E41190°24-May-1214:056435.833689 $\cdot 74.612451$ E41190°24-May-1214:427735.764304 $\cdot 74.713703$ W40290°34-May-1214:4310635.760568 $\cdot 74.773431$ E40190°14-May-1215:1011835.687021 $\cdot 74.867441$ W39360°34-May-1215:1011835.616983 $\cdot 74.773437$ E40°190°14-May-1216:0714835.616983 $\cdot 74.976901$ E38290°28-Jun-1214:353234.823625 $\cdot 75.490919$ SE24190°19-Jun-1214:363334.792949 $\cdot 75.452283$ SE24190°19-Jun-1214:363334.792949 $\cdot 74.772485$ E45290°19-Jun-1213:334536.123902 $\cdot 74.735805$ E45390°19-Jun-1213:334536.049928 $\cdot 74.775592$ W44390°19-Jun-1214:253636.049928 $\cdot 74.775592$ W44390°110-Jun		12:07	45	35.904124	-74.457720	W	42	1	90°	
4-May-12 13:48 57 35.832666 -75.041994 E 41 2 90° 1   4-May-12 13:55 59 35.832117 -74.750506 E 41 1 90° 2   4-May-12 14:05 64 35.833689 -74.612451 E 41 1 90° 2   4-May-12 14:42 77 35.764304 -74.713703 W 40 2 90° 3   4-May-12 14:43 106 35.760568 -74.773431 E 40 1 90° 1   4-May-12 15:10 118 35.687021 -74.867441 W 39 3 60° 3   4-May-12 15:12 120 35.691093 -74.976901 E 38 2 90° 2   8-Jun-12 14:35 32 34.823625 -75.490919 SE 24 1 90° 1   9-Jun-12 14:36 33 34.792949 -75.452283 SE 24 1 90° 1   9-Jun-12 <			77	35.831250	-75.026414	Е	41	2	90°	1
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4-May-12 14:43 106 35.760568 -74.773431 E 40 1 90° 1   4-May-12 15:10 118 35.687021 -74.867441 W 39 3 60° 3   4-May-12 15:12 120 35.691093 -74.788789 W 39 1 90° 3   4-May-12 16:07 148 35.616983 -74.976901 E 38 2 90° 2   8-Jun-12 14:35 32 34.823625 -75.490919 SE 24 1 90° 1   9-Jun-12 14:36 33 34.792949 -75.452283 SE 24 1 90° 1   9-Jun-12 13:32 44 36.122763 -74.772485 E 45 2 90° 1   9-Jun-12 13:33 45 36.123902 -74.75503 W 44 3 90° 1   9-Jun-12 14:25 36 36.049692 -74.652639 W 44 3 90° 1   9-Jun-12 <	4-May-12	14:05	64		-74.612451	Е	41	1	90°	
4-May-1214:43106 $35.760568$ $-74.773431$ E401 $90^{\circ}$ 14-May-1215:10118 $35.687021$ $-74.867441$ W $39$ 3 $60^{\circ}$ 34-May-1215:12120 $35.691093$ $-74.788789$ W $39$ 1 $90^{\circ}$ 34-May-1216:07148 $35.616983$ $-74.976901$ E $38$ 2 $90^{\circ}$ 28-Jun-1214:3532 $34.823625$ $-75.490919$ SE241 $90^{\circ}$ 18-Jun-1214:3633 $34.792949$ $-75.452283$ SE241 $90^{\circ}$ 19-Jun-1210:008 $35.231566$ $-74.816012$ W $33$ 2 $90^{\circ}$ 19-Jun-1213:3244 $36.122763$ $-74.772485$ E $45$ 2 $90^{\circ}$ 19-Jun-1213:3345 $36.123902$ $-74.735805$ E $45$ 3 $90^{\circ}$ 19-Jun-1214:2536 $36.049692$ $-74.652639$ W443 $90^{\circ}$ 19-Jun-1214:3839 $36.049928$ $-74.776592$ W443 $90^{\circ}$ 110-Jun-1214:5745 $35.980784$ $-74.910667$ E $43$ 2 $90^{\circ}$ 110-Jun-1214:5745 $35.980784$ $-74.956731$ W $38$ 2 $90^{\circ}$ 110-Jun-1214:5745 $35.629778$ </td <td></td> <td>14:42</td> <td>77</td> <td>35.764304</td> <td>-74.713703</td> <td>W</td> <td>40</td> <td>2</td> <td></td> <td>3</td>		14:42	77	35.764304	-74.713703	W	40	2		3
4-May-12 15:10 118 35.687021 -74.867441 W 39 3 60° 3   4-May-12 15:12 120 35.691093 -74.788789 W 39 1 90° 3   4-May-12 16:07 148 35.616983 -74.976901 E 38 2 90° 2   8-Jun-12 14:35 32 34.823625 -75.490919 SE 24 1 90° 1   8-Jun-12 14:36 33 34.792949 -75.452283 SE 24 1 90° 1   9-Jun-12 10:00 8 35.231566 -74.816012 W 33 2 90° 1   9-Jun-12 13:33 45 36.123902 -74.735805 E 45 3 90° 1   9-Jun-12 14:25 36 36.049692 -74.652639 W 44 3 90° 1   9-Jun-12 14:57 45 35.980784 -74.910667 E 43 2 90° 1   10-Jun-12 <			106		-74.773431	Е	40	1		1
4-May-1215:1212035.691093-74.788789W39190°34-May-1216:0714835.616983-74.976901E38290°28-Jun-1214:353234.823625-75.490919SE24190°18-Jun-1214:363334.792949-75.452283SE24190°19-Jun-1210:00835.231566-74.816012W33290°19-Jun-1213:324436.122763-74.772485E45290°29-Jun-1213:334536.123902-74.735805E45390°19-Jun-1214:253636.049692-74.652639W44390°19-Jun-1214:383936.049928-74.776592W44390°110-Jun-1214:574535.980784-74.910667E43290°110-Jun-1214:0512135.688317-74.661957E39290°110-Jun-1214:2810135.620978-74.875931W38290°130-Aug-1214:354135.692317-74.832266E40290°130-Aug-1214:586035.762882-74.875931E40190°130-Aug-1214:596135.			118			W	39	3		3
4-May-1216:0714835.616983-74.976901E38290°28-Jun-1214:353234.823625-75.490919SE24190°18-Jun-1214:363334.792949-75.452283SE24190°19-Jun-1210:00835.231566-74.816012W33290°19-Jun-1213:324436.122763-74.772485E45290°29-Jun-1213:334536.123902-74.735805E45390°19-Jun-1214:253636.049692-74.652639W44390°39-Jun-1214:383936.049928-74.776592W44390°110-Jun-1214:574535.980784-74.910667E43290°110-Jun-1214:0512135.620978-74.558731W38290°110-Jun-1214:2810135.620978-74.802453W39290°130-Aug-1214:354135.692317-74.802453W39290°130-Aug-1214:586035.762882-74.875931E40190°130-Aug-1214:596135.762885-74.595660E40290°130-Aug-1214:596135.	4-May-12	15:12	120	35.691093	-74.788789	W	39	1	90°	3
8-Jun-12 14:35 32 34.823625 -75.490919 SE 24 1 90° 1   8-Jun-12 14:36 33 34.792949 -75.452283 SE 24 1 90° 1   9-Jun-12 10:00 8 35.231566 -74.816012 W 33 2 90° 1   9-Jun-12 13:32 44 36.122763 -74.772485 E 45 2 90° 1   9-Jun-12 13:33 45 36.123902 -74.735805 E 45 3 90° 1   9-Jun-12 14:25 36 36.049692 -74.652639 W 44 3 90° 1   9-Jun-12 14:25 36 36.049928 -74.776592 W 44 3 90° 1   10-Jun-12 14:57 45 35.980784 -74.910667 E 43 2 90° 1   10-Jun-12 14:57 45 35.692317 -74.661957 E 39 2 90° 1   10-Jun-12 <t< td=""><td>4-May-12</td><td>16:07</td><td>148</td><td>35.616983</td><td>-74.976901</td><td>Е</td><td>38</td><td>2</td><td>90°</td><td>2</td></t<>	4-May-12	16:07	148	35.616983	-74.976901	Е	38	2	90°	2
9-Jun-12 10:00 8 35.231566 -74.816012 W 33 2 90° 1   9-Jun-12 13:32 44 36.122763 -74.772485 E 45 2 90° 2   9-Jun-12 13:33 45 36.123902 -74.735805 E 45 3 90° 1   9-Jun-12 14:25 36 36.049692 -74.652639 W 44 3 90° 3   9-Jun-12 14:38 39 36.049928 -74.776592 W 44 3 90° 3   9-Jun-12 14:57 45 35.980784 -74.910667 E 43 2 90° 1   10-Jun-12 9:28 73 35.147629 -75.143407 NW 30 1 90° 1   10-Jun-12 14:05 121 35.688317 -74.661957 E 39 2 90° 1   10-Jun-12 14:28 101 35.620978 -74.858731 W 38 2 90° 1   30-Aug-12 <	8-Jun-12	14:35	32	34.823625	-75.490919	SE	24	1		1
9-Jun-1210:00835.231566-74.816012W33290°19-Jun-1213:324436.122763-74.772485E45290°29-Jun-1213:334536.123902-74.735805E45390°19-Jun-1214:253636.049692-74.652639W44390°39-Jun-1214:383936.049928-74.776592W44390°39-Jun-1214:574535.980784-74.910667E43290°110-Jun-129:287335.147629-75.143407NW30190°110-Jun-1214:0512135.688317-74.661957E39290°110-Jun-1214:2810135.620978-74.858731W38290°130-Aug-1214:354135.692317-74.802453W39290°130-Aug-1214:586035.762882-74.875931E40190°130-Aug-1214:596135.762885-74.875931E40290°130-Aug-1214:596135.762885-74.875931E40290°130-Aug-1214:596135.762885-74.595660E40290°121-Sep-1211:232134.7	8-Jun-12	14:36	33	34.792949	-75.452283	SE	24	1	90°	1
9-Jun-12 13:32 44 36.122763 -74.772485 E 45 2 90° 2   9-Jun-12 13:33 45 36.123902 -74.735805 E 45 3 90° 1   9-Jun-12 14:25 36 36.049692 -74.652639 W 44 3 90° 1   9-Jun-12 14:38 39 36.049928 -74.776592 W 44 3 90° 1   9-Jun-12 14:57 45 35.980784 -74.910667 E 43 2 90° 1   10-Jun-12 9:28 73 35.147629 -75.143407 NW 30 1 90° 1   10-Jun-12 9:28 73 35.620978 -74.651957 E 39 2 90° 1   10-Jun-12 14:05 121 35.620978 -74.558731 W 38 2 90° 1   30-Aug-12 14:35 41 35.692317 -74.802453 W 39 2 90° 1   30-Aug-12 <	9-Jun-12		8		-74.816012	W	33	2		1
9-Jun-12 14:25 36 36.049692 -74.652639 W 44 3 90° 1   9-Jun-12 14:38 39 36.049928 -74.776592 W 44 3 90° 3   9-Jun-12 14:57 45 35.980784 -74.910667 E 43 2 90° 1   10-Jun-12 9:28 73 35.147629 -75.143407 NW 30 1 90° 1   10-Jun-12 9:28 73 35.688317 -74.661957 E 39 2 90° 1   10-Jun-12 14:28 101 35.620978 -74.558731 W 38 2 90° 1   30-Aug-12 14:35 41 35.620978 -74.802453 W 38 2 90° 1   30-Aug-12 14:35 41 35.620978 -74.875931 E 40 1 90° 1   30-Aug-12 14:58 60 35.762282 -74.875931 E 40 1 90° 1   30-Aug-12	9-Jun-12		44	36.122763	-74.772485	Е	45	2		2
9-Jun-12 14:38 39 36.049928 -74.776592 W 44 3 90° 3   9-Jun-12 14:57 45 35.980784 -74.910667 E 43 2 90° 1   10-Jun-12 9:28 73 35.147629 -75.143407 NW 30 1 90° 1   10-Jun-12 9:28 73 35.688317 -74.661957 E 39 2 90° 1   10-Jun-12 14:05 121 35.688317 -74.661957 E 39 2 90° 1   10-Jun-12 14:28 101 35.620978 -74.558731 W 38 2 90° 1   30-Aug-12 14:35 41 35.692317 -74.802453 W 39 2 90° 1   30-Aug-12 14:58 60 35.762882 -74.875931 E 40 1 90° 1   30-Aug-12 14:59 61 35.762885 -74.875931 E 40 2 90° 2   30-Aug-12	9-Jun-12	13:33	45	36.123902	-74.735805	Е	45	3	90°	1
9-Jun-12 14:57 45 35.980784 -74.910667 E 43 2 90° 1   10-Jun-12 9:28 73 35.147629 -75.143407 NW 30 1 90° 1   10-Jun-12 14:05 121 35.688317 -74.661957 E 39 2 90° 1   10-Jun-12 14:28 101 35.620978 -74.558731 W 38 2 90° 1   30-Aug-12 14:35 41 35.692317 -74.802453 W 39 2 90° 1   30-Aug-12 14:58 60 35.762882 -74.875931 E 40 1 90° 1   30-Aug-12 14:59 61 35.762882 -74.875931 E 40 2 90° 2   30-Aug-12 14:59 61 35.762885 -74.875931 E 40 2 90° 2   30-Aug-12 15:11 70 35.762885 -74.595660 E 40 2 90° 1   21-Sep-12	9-Jun-12	14:25	36	36.049692	-74.652639	W	44	3	90°	1
10-Jun-129:287335.147629-75.143407NW30190°110-Jun-1214:0512135.688317-74.661957E39290°110-Jun-1214:2810135.620978-74.558731W38290°130-Aug-1214:354135.692317-74.802453W39290°130-Aug-1214:586035.762882-74.875931E40190°130-Aug-1214:596135.762885-74.833266E40290°230-Aug-1215:117035.762885-74.595660E40290°121-Sep-1211:232134.767440-75.559998NW23190°121-Sep-1214:463435.145568-75.140791NW30290°2	9-Jun-12	14:38	39	36.049928	-74.776592	W	44	3	90°	3
10-Jun-1214:0512135.688317-74.661957E39290°110-Jun-1214:2810135.620978-74.558731W38290°130-Aug-1214:354135.692317-74.802453W39290°130-Aug-1214:586035.762882-74.875931E40190°130-Aug-1214:596135.762882-74.875931E40290°230-Aug-1214:596135.762885-74.595660E40290°230-Aug-1215:117035.762885-74.595660E40290°121-Sep-1211:232134.767440-75.559998NW23190°121-Sep-1214:463435.145568-75.140791NW30290°2	9-Jun-12	14:57	45	35.980784	-74.910667	Е	43	2	90°	1
10-Jun-1214:2810135.620978-74.558731W38290°130-Aug-1214:354135.692317-74.802453W39290°130-Aug-1214:586035.762882-74.875931E40190°130-Aug-1214:596135.763274-74.833266E40290°230-Aug-1215:117035.762885-74.595660E40290°121-Sep-1211:232134.767440-75.559998NW23190°121-Sep-1214:463435.145568-75.140791NW30290°2	10-Jun-12	9:28	73	35.147629	-75.143407	NW	30	1	90°	1
30-Aug-12 14:35 41 35.692317 -74.802453 W 39 2 90° 1   30-Aug-12 14:58 60 35.762882 -74.875931 E 40 1 90° 1   30-Aug-12 14:59 61 35.763274 -74.833266 E 40 2 90° 2   30-Aug-12 15:11 70 35.762885 -74.595660 E 40 2 90° 1   30-Aug-12 15:11 70 35.762885 -74.595660 E 40 2 90° 1   21-Sep-12 11:23 21 34.767440 -75.559998 NW 23 1 90° 1   21-Sep-12 14:46 34 35.145568 -75.140791 NW 30 2 90° 2	10-Jun-12	14:05	121	35.688317	-74.661957	Е	39	2	90°	1
30-Aug-1214:586035.762882-74.875931E40190°130-Aug-1214:596135.763274-74.833266E40290°230-Aug-1215:117035.762885-74.595660E40290°121-Sep-1211:232134.767440-75.559998NW23190°121-Sep-1214:463435.145568-75.140791NW30290°2	10-Jun-12	14:28	101	35.620978	-74.558731	W	38	2	90°	1
30-Aug-1214:586035.762882-74.875931E40190°130-Aug-1214:596135.763274-74.833266E40290°230-Aug-1215:117035.762885-74.595660E40290°121-Sep-1211:232134.767440-75.559998NW23190°121-Sep-1214:463435.145568-75.140791NW30290°2	30-Aug-12	14:35	41	35.692317	-74.802453	W	39	2	90°	1
30-Aug-12 14:59 61 35.763274 -74.833266 E 40 2 90° 2   30-Aug-12 15:11 70 35.762885 -74.595660 E 40 2 90° 1   21-Sep-12 11:23 21 34.767440 -75.559998 NW 23 1 90° 1   21-Sep-12 14:46 34 35.145568 -75.140791 NW 30 2 90° 2	~		60	35.762882	-74.875931	Е			90°	
30-Aug-12   15:11   70   35.762885   -74.595660   E   40   2   90°   1     21-Sep-12   11:23   21   34.767440   -75.559998   NW   23   1   90°   1     21-Sep-12   14:46   34   35.145568   -75.140791   NW   30   2   90°   2			61	35.763274	-74.833266	Е	40	2	90°	2
21-Sep-12 11:23 21 34.767440 -75.559998 NW 23 1 90° 1   21-Sep-12 14:46 34 35.145568 -75.140791 NW 30 2 90° 2			70			Е	40		90°	
21-Sep-12 14:46 34 35.145568 -75.140791 NW 30 2 90° 2			21	34.767440	-75.559998	NW	23	1	90°	1
	21-Sep-12	14:46	34	35.145568	-75.140791	NW	30	2	90°	2
	2-Dec-12	10:20	20	34.786988	-75.849913	NW	21	1	90°	1

*Table 20.* Manta ray (*Manta birostris*) sightings in the Hatteras survey area from January 2012 to December 2012.

*Table 21*. Ocean sunfish (*Mola mola*) sightings in the Hatteras survey area January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forwarc	Best #
14-Mar-12	15:04	42	34.925919	-75.248879	NW	27	2	90°	1
15-Mar-12	14:54	59	36.047749	-74.380803	W	44	1	90°	2
15-Mar-12	15:14	64	36.048208	-74.697467	W	44	1	90°	1
15-Mar-12	15:52	100	35.981580	-74.701363	Е	43	1	90°	1
15-Mar-12	15:54	76	35.980228	-74.582010	Е	43	1	90°	2
4-May-12	12:27	51	35.904258	-75.151214	W	42	1	90°	1

*Table 22.* Cownose ray (*Rhinoptera bonasus*) sightings in the Hatteras survey area from January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
9-Jun-12	14:48	41	36.048232	-75.153199	W	44	3	90°	115
9-Jun-12	14:53	69	35.984086	-75.087424	Е	43	2	90°	100

*Table 23.* Whale shark (*Rhincodon typus*) sightings in the Hatteras survey area from January 2012 to December 2012.

Jate	ime	Vay Point	atitude	.ongitude-1	leading	rack Number	Angle out	Jegree Forward	sest #
Da	Tin	Wa	Lai	Loi	He	Tr	An	De	Be
4-May-12	10:37	18	36.120074	-74.339752	Ε	45	2	90°	1

*Table 24.* Shark sightings in the Hatteras survey area from January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best#
30-Jan-12	15:46	45	35.148924		NW	29	2	90°	1
31-Jan-12	10:34	64	35.691530		Е	39	2	100°	2
31-Jan-12	11:31	76	35.551524	-74.874927	Е	37	2	100°	1
31-Jan-12	14:16	86	35.411350	-74.943757	E	35	2	60°	1
31-Jan-12	15:16	93	35.340280	-75.059272	W	34	2	90°	1
31-Jan-12	16:25	104	35.286952	-75.172793	NW	32	3	90°	1
1-Feb-12	11:17	18	35.906640	-74.995842	W	42	1	90°	1
14-Mar-12	14:23	43	34.981119	-75.439423	SE	26	1	90°	1
14-Mar-12	15:05	44	34.955862	-75.288557	NW	27	1	90°	2
14-Mar-12	15:09	45	35.025510	-75.380647	NW	27	1	90°	2
14-Mar-12	15:22	58	35.048186	-75.270932	Е	28	2	90°	2
14-Mar-12	16:05	58	35.135787	-75.262088	W	29	1	90°	1
14-Mar-12	16:16	68	35.176076	-75.177059	Е	30	2	90°	2
15-Mar-12	10:59	18	35.280617	-75.062533	NW	33	1	90°	1
15-Mar-12	11:18	33	35.553680	-74.866761	Е	37	1	90°	1
4-May-12	9:56	6	36.119915	-74.923200	Е	45	2	90°	1
4-May-12	10:00	9	36.122167	-74.781411	Е	45	2	90°	5
4-May-12	10:00	7	36.122169	-74.781580	E	45	1	90°	6
4-May-12	10:01	10	36.119299	-74.729222	Е	45	3	90°	1
4-May-12	11:11	27	36.041520	-74.802816	W	44	1	90°	1
4-May-12	13:49	78	35.829576	-75.001251	E	41	2	90°	2
4-May-12	13:53	79	35.833918	-74.861117	E	41	2	60°	1
10-Jun-12	13:52	115	35.690740	-74.869919	E	39	2	90°	1
10-Jun-12		142	35.552192	-74.801730	Е	37	1	90°	1
1-Dec-12	9:36	3	35.411902	-74.883982	Е	36	2	90°	1
1-Dec-12	10:34	19	35.555019	-74.846013	Е	38	2	90°	1
1-Dec-12	12:59	41	36.123967			45	2	90°	2
1-Dec-12	14:22	62	35.972902	-74.419563	E	43	2	90°	1
2-Dec-12	10:09	25	34.682658			21	1	90°	1
2-Dec-12	11:14	36	34.757154		NW		2	90°	1



*Figure 22.* Manta ray (*Manta birostris*), ocean sunfish (*Mola mola*), cownose ray (*Rhinoptera bonasus*), whale shark (*Rhincodon typus*), and shark sightings.

# Vessel Sightings Commercial (Table 25, Figure 23)

A total of 60 commercial vessels (*e.g.* tankers, car carriers, and container vessels) were observed in the survey site.

Forwar rack Number ongitude-Comments Point ingle out eading atitude legree # me Nay Date Best 16 34.896912 -75.590712 SE 30-Jan-12 11:09 24 1 45 1 Container vessel 30-Jan-12 11:34 22 34.691896 -75.196889 NW 25 3 45 1 Container vessel 30-Jan-12 11:43 21 34.862233 -75.410071 NW 25 3 40 1 Container vessel 30-Jan-12 14:23 30 34.893406 -75.328068 SE 26 2 45° 1 Tanker 30-Jan-12 15:40 44 35.031108 -75.122166 NW 29 3 90° 2 Container vessel 30-Jan-12 15:48 49 35.184777 -75.325902 NW 29 90' 1 1 Tug 31-Jan-12 10:29 63 35.693048 -75.035848 Е 39 2 30 Car carrier 1 43 3 1-Feb-12 10:46 13 35.979539 -74.739665 Е 90° Tanker 1 1-Feb-12 10:47 14 35.979351 -74.689621 Е 43 1 45° 1 Tanker w 1-Feb-12 11:08 23 35.906896 -74.682852 42 1 30° 1 Container vessel w 42 1-Feb-12 11:17 25 35.906643 -75.0232752 2 60° Tug and barge 1-Feb-12 11:34 23 35.833323 -74.729371 Е 41 3 90 1 Container vessel 1-Feb-12 12:45 44 35.762631 -74.923563 W 40 2 30 1 Container vessel 1-Feb-12 12:46 33 35.762651 -74.981484 W 40 1 45 1 Car carrier 14-Mar-12 14:20 42 35.045205 -75.523156 SE 26 3 60° 2 Tug and barge 26 14-Mar-12 14:29 44 34.857168 SE 2 -75.27846360° 1 Container vessel 15-Mar-12 9:32 3 35.289946 -75.180282 SE 32 2 90 Container vessel 1 15-Mar-12 10:58 17 35.270621 -75.014607 NW 33 3 60 Container vessel 1 15-Mar-12 11:53 32 35.620644 -74.350832 w 38 3 60 Tanker 1 15-Mar-12 15:59 102 35.979793 -74.371471 F 43 1 90° 2 Tug and barge 15-Mar-12 16:51 87 35.689424 -74.862145 W 39 2 60° 1 Container vessel 3-May-12 10:27 35.014994 -75.228570 28 5 SE 1 45° 1 Container vessel 3-May-12 15:09 26 35.250450 -74.912350 NW 33 3 60 1 Tanker 3-May-12 15:27 36 35.336925 -75.128346 Container vessel Е 34 2 100 1 4-May-12 11:19 28 36.042895 -75.113351 Tanker and tug W 44 1 45° 1 4-May-12 11:41 36 35.973870 -74.696169 Е 43 3 45° 1 Tanker 4-May-12 12:27 71 35.904202 -75.150537 W 42 2 30° 2 Tug and barge 4-May-12 14:10 67 35.828144 -74.545013 Е 41 1 90 Container vessel 1 4-May-12 15:29 133 35.690593 -74.470812 W 39 3 30 1 Container vessel 8-Jun-12 14:46 30 34.694494 -75.322497 E 24 2 45° 1 Car carrier 8-Jun-12 15:03 40 34.695322 -75.195951 NW 25 2 45° 1 Car carrier w 8-Jun-12 | 15:09 | 33 | 34.814920 | -75.353369 25 2 60° 1 Car carrier 8-Jun-12 16:14 62 34.733246 -74.989814 NW 27 45 1 1 Container vessel 35.410179 -74.794335 9-Jun-12 11:18 32 W 35 4 60 1 Container vessel 9-Jun-12 13:30 27 36.123033 -74.893359 E 45 3 45 1 Tanker 10-Jun-12 9:02 56 35.019710 -74.846358 SE 31 3 45 Conatiner vessel 1 10-Jun-12 9:03 57 34.983962 -74.803345 SE 31 2 90° 2 Tug and barge 10-Jun-12 10:04 69 34.800954 -74.948292 NW 28 3 60 1 Container vessel 10-Jun-12 10:05 82 34.814870 -74.964147 NW 28 3 45 1 Container vessel 10-Jun-12 16:02 154 35.481175 -74.918291 W 36 3 45 Container vessel 1 30-Aug-12 11:32 18 34.719377 -75.363571 SE 24 1 30 Container vessel 1 30-Aug-12 11:52 21 34.741667 -75.256762 NW 25 1 90° 1 Container vessel E 2 2 30-Aug-12 13:55 35 35.619740 -74.759061 38 45 Container vessel 21-Sep-12 15:09 37 34.932721 -74.992911SE 29 4 45 Container vessel 1 30-Nov-12 13:39 14 35.234386 -75.126575 NW 31 4 45 1 Container vessel 1-Dec-12 10:20 13 35.480752 -75.058295 W 37 3 45 Tanker 1 1-Dec-12 10:45 20 35.551713 -74.627836 Е 38 3 60° 1 Tanker 1-Dec-12 13:00 42 36.123631 -74.735814 F 45 4 60° 1 Commercial fishing vessel W 44 2 1-Dec-12 13:43 55 36.041036 -74.907234 30° 1 Tanker 2-Dec-12 9:47 19 34.357454 -75.418300 SE 20 3 90' 1 Container vessel 2-Dec-12 9:59 22 34.533673 -75.511064 NW 21 3 90 1 Container vessel 2-Dec-12 13:31 69 34.734712 -75.378113 SE 24 2

45 1

45° 1

2-Dec-12 13:35 71 34.655392 -75.266447 SE 24 2

Container vessel

Car carrier

Table 25. Commercial vessel sightings in the Hatteras survey area from January 2012 to December 2012.

Forward Number ongitude-Comments Point out eading .atitude legree # rack alge Vay Best 16 34.896912 -75.590712 30-Jan-12 11:09 SE 24 45 Container vessel 1 1 30-Jan-12 11:34 22 34.691896 -75.196889 NW 25 3 45 1 Container vessel 30-Jan-12 11:43 21 34.862233 -75.410071 NW 25 3 40 1 Container vessel 30-Jan-12 14:23 30 34.893406 -75.328068 SE 26 2 45° 1 Tanker 2 30-Jan-12 15:40 44 35.031108 -75.122166 NW 29 3 90° Container vessel 30-Jan-12 15:48 49 35.184777 -75.325902 NW 29 90 Tug 1 1 31-Jan-12 10:29 63 35.693048 -75.035848 Е 39 2 Car carrier 30 1 1-Feb-12 10:46 13 35.979539 -74.739665 E 43 3 90 1 Tanker E 1-Feb-12 10:47 14 35.979351 -74.689621 43 1 45° 1 Tanker 1-Feb-12 11:08 23 35.906896 -74.682852 W 42 1 30° 1 Container vessel 1-Feb-12 11:17 25 35.906643 -75.023275 w 2 2 42 60° Tug and barge 1-Feb-12 11:34 23 35.833323 -74.729371Е 41 3 90 1 Container vessel 2 1-Feb-12 12:45 44 35.762631 -74.923563 W 40 30 1 Container vessel 1-Feb-12 12:46 33 35.762651 -74.981484 W 40 1 45 1 Car carrier 14-Mar-12 14:20 42 35.045205 -75.523156 SE 26 3 60° 2 Tug and barge 26 2 14-Mar-12 14:29 44 34.857168 -75.278463SE 60% 1 Container vessel 15-Mar-12 9:32 3 35.289946 -75.180282 SE 32 90 Container vessel 2 1 15-Mar-12 10:58 17 35.270621 -75.014607 NW 3 Container vessel 33 60' 1 15-Mar-12 11:53 32 35.620644 -74.350832 w 38 3 60 1 Tanker 15-Mar-12 15:59 102 35.979793 -74.371471 Е 43 1 90° 2 Tug and barge 15-Mar-12 16:51 87 35.689424 -74.862145 w 39 2 60° 1 Container vessel 3-May-12 10:27 35.014994 -75.228570 28 5 SE 1 45 1 Container vessel 3-May-12 15:09 26 35.250450 -74.912350NW 33 3 60 1 Tanker 3-May-12 15:27 36 35.336925 -75.128346 Е 34 2 100 1 Container vessel 4-May-12 11:19 28 Tanker and tug 36.042895 -75.113351 W 44 1 45 1 4-May-12 11:41 36 35.973870 -74.696169 E 43 3 45° 1 Tanker 4-May-12 12:27 71 35.904202 W 42 2 2 -75.150537 30 Tug and barge 4-May-12 14:10 67 35.828144 -74.545013 Е 41 1 90° Container vessel 1 4-May-12 15:29 133 35.690593 -74.470812 W 39 3 30 1 Container vessel 8-Jun-12 14:46 30 34.694494 -75.322497 E 24 2 45° 1 Car carrier 8-Jun-12 15:03 40 34.695322 -75.195951 NW 2 25 45° 1 Car carrier 8-Jun-12 | 15:09 | 33 | 34.814920 | -75.353369 w 25 2 60° 1 Car carrier 8-Jun-12 16:14 62 34.733246 -74.989814 NW 27 45 1 1 Container vessel 35.410179 -74.794335 9-Jun-12 11:18 32 W 35 4 60 1 Container vessel 9-Jun-12 13:30 27 36.123033 -74.893359 F 45 3 45 1 Tanker 10-Jun-12 9:02 56 35.019710 -74.846358 SE 31 3 45 Conatiner vessel 1 10-Jun-12 9:03 57 34.983962 -74.803345 SE 31 2 90° 2 Tug and barge 10-Jun-12 10:04 69 34.800954 -74.948292 NW 28 3 60 1 Container vessel 10-Jun-12 10:05 82 34.814870 -74.964147 NW 28 3 45 Container vessel 1 10-Jun-12 16:02 154 35.481175 -74.918291w 36 3 45 Container vessel 1 30-Aug-12 11:32 18 34.719377 -75.363571 SE 24 1 30 Container vessel 1 30-Aug-12 11:52 21 34.741667 -75.256762 NW 25 1 90° 1 Container vessel 30-Aug-12 13:55 35 35.619740 -74.759061 E 38 2 2 45 Container vessel 21-Sep-12 15:09 37 34.932721 -74.992911 SE 29 4 45 1 Container vessel 30-Nov-12 13:39 14 -75.126575 NW 35.234386 31 4 45 1 Container vessel 1-Dec-12 10:20 13 35.480752 -75.058295 W 3 37 45 1 Tanker 1-Dec-12 10:45 20 35.551713 -74.627836 Е 38 3 60° 1 Tanker Commercial fishing vessel 1-Dec-12 13:00 42 36.123631 -74.735814 E 45 4 60° 1 W 44 2 1-Dec-12 13:43 55 36.041036 -74.907234 30° 1 Tanker 2-Dec-12 9:47 19 34.357454 -75.418300 SE 20 3 90' 1 Container vessel 2-Dec-12 9:59 22 34.533673 -75.511064 NW 21 3 90 1 Container vessel 2-Dec-12 13:31 69 34.734712 -75.378113 SE 24 2

45 1

45° 1

2-Dec-12 13:35 71 34.655392 -75.266447 SE 24 2

Container vessel

Car carrier

Table 25. Commercial vessel sightings in the Hatteras survey area from January 2012 to December 2012.



Figure 23. Large commercial shipping vessel sightings.

Military / Coast Guard Vessels (Table 26, Figure 24)

A total of four military vessels were observed in the survey site.

*Table 26.* Military vessel sightings in the Hatteras survey area from January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	Comments
30-Jan-12	14:17	37	35.028867	-75.502693	SE	26	1	60°	1	Coast Guard vessel
1-Feb-12	15:51	45	35.221525	-75.239292	W	30	2	45°	1	Coast Guard vessel
30-Jan-12	10:09	8	34.679623	-75.706340	NW	21	2	60°	1	Military beach lander
14-Mar-12	11:31	21	34.814030	-75.479488	SE	24	2	60°	1	Millitary transport vessel


Figure 24. Military vessel sightings.

#### Other Vessels (Table 27, Figure 25)

A total of 281 other vessels were recorded in the survey site. Recreational sport fishing vessels constituted the majority of these sightings (n=271). This category also included sailing vessels and yachts.

Forward rack Number ongitude-1 Comments Point Angle out leading -atitude ee # Time Way F Date Degr Best 8-Jun-12 15:24 45 35.032304 -75.503401 SE 26 1 90° 3 Recreational fishing vessel 8-Jun-12 15:26 39 34.988092 -75.451113 E 2 30° 26 1 Recreational fishing vessel 8-Jun-12 15:27 46 34.985015 -75.447188 SE 26 3 90° 6 Recreational fishing vessel 8-Jun-12 15:29 40 34.941025 -75.391095 26 2 2 Recreational fishing vessel Е 45° 8-Jun-12 16:33 50 35.098466 -75.477129 27 1 1 Recreational fishing vessel w 30° 9-Jun-12 10:04 10 35.260048 -74.948032 33 3 Recreational fishing vessel W 60° 4 9-Jun-12 10:18 11 35.345272 -75.073930 Е 34 60° 2 Recreational fishing vessel 2 9-Jun-12 10:19 15 35.346542 -75.055295 34 2 3 E 60° Recreational fishing vessel 9-Jun-12 10:23 16 35.342292 -74.903414 E 34 Recreational fishing vessel 3 90° 4 9-Jun-12 11:19 20 35.410094 -74.830789 W 35 3 90° 3 Recreational fishing vessel 9-Jun-12 11:32 37 35.410936 -74.871878 W 35 2 45° 1 Recreational fishing vessel 9-Jun-12 11:34 38 35.411222 -74.961826 35 3 Recreational fishing vessel W 60° 8 9-Jun-12 11:38 39 35.409276 -75.103941 W 35 2 Recreational fishing vessel 90° 1 9-Jun-12 14:53 68 35.980689 -75.117116 E 43 Recreational fishing vessel 3 45° 1 9-Jun-12 14:56 44 35.979251 -74.970416 E 43 2 45° 2 Sailboat 10-Jun-12 8:53 67 35.240180 -75.138839 SE 31 4 90° 1 Cruise ship 10-Jun-12 8:54 55 35.214765 -75.103405 SE 31 3 60° 1 Recreational fishing vessel 10-Jun-12 9:33 75 35.230848 -75.250537 NW 30 2 45° 1 Sailboat 10-Jun-12 9:42 65 35.123409 -75.245520 SE 29 1 90° 1 Cruise ship 10-Jun-12 10:08 83 34.870979 -75.035384 NW 28 3 45° 1 Yacht 10-Jun-12 10:17 84 35.034434 -75.256891 NW 28 3 90° 4 Recreational fishing vessel 10-Jun-12 11:03 92 35.832235 -74.864542 E 41 3 1 90° Recreational fishing vessel 10-Jun-12 11:16 79 35.833647 -74.556188 Е 41 3 1 60° Sailboat 10-Jun-12 11:46 86 35.763284 -74.810072 W 40 2 2 Recreational fishing vessel 45° 10-Jun-12 13:46 114 35.689344 -75.088353 39 3 1 Е 90° Recreational fishing vessel 10-Jun-12 13:52 116 35.690215 -74.850860 Е 39 3 90° Recreational fishing vessel 5 10-Jun-12 13:53 93 35.689772 -74.829467 39 2 60° Recreational fishing vessel Е 4 10-Jun-12 14:57 136 35.620560 -74.800373 W 38 2 90° 18 Recreational fishing vessel 10-Jun-12 14:57 106 35.620419 -74.785175 W 38 2 60° 7 Recreational fishing vessel 10-Jun-12 15:16 110 35.550979 -74.935453 E 37 2 60° 1 Recreational fishing vessel 30-Aug-12 10:40 9 34.694742 -75.590618 SE 22 2 45° 1 Recreational fishing vessel 30-Aug-12 11:09 13 34.748301 -75.537421 NW 23 2 60° 1 Recreational fishing vessel 30-Aug-12 11:24 15 34.881109 -75.571853 SE 24 Recreational fishing vessel 3 45° 1 30-Aug-12 11:25 17 34.856171 -75.539614 SE 24 2 60° 1 Recreational fishing vessel 30-Aug-12 11:25 16 34.857919 -75.541903 SE 24 2 1 45° Recreational fishing vessel 30-Aug-12 11:57 22 34.854124 -75.407074 NW 25 3 60° 2 Recreational fishing vessel 30-Aug-12 12:01 19 34.932459 -75.509730 NW 25 2 45° 1 Recreational fishing vessel 30-Aug-12 14:33 39 35.693245 -74.725961 2 W 39 1 90° Recreational fishing vessel 30-Aug-12 14:34 40 35.692232 -74.784270 W 39 3 60° 11 Recreational fishing vessel 30-Aug-12 14:58 48 35.762835 -74.873136 Е 40 2 90° 3 Recreational fishing vessel 21-Sep-12 10:43 11 34.700613 -75.598413 SE 22 3 60° 1 Recreational fishing vessel 21-Sep-12 11:23 20 34.754097 -75.541599 NW 23 3 60° 1 Recreational fishing vessel 21-Sep-12 11:23 17 34.764480 -75.555693 NW 23 2 60° 8 Recreational fishing vessel 21-Sep-12 11:39 24 34.873596 -75.560496 SE 24 3 90° 7 Recreational fishing vessel 21-Sep-12 11:39 20 34.861771 -75.545230 SE 24 3 Recreational fishing vessel 60° 5 21-Sep-12 12:22 30 35.040337 -75.394249 NW 27 3 90° Recreational fishing vessel 3 1-Dec-12 10:14 15 35.480903 -74.802020 W 37 4 60° 1 Recreational fishing vessel 2 1 1-Dec-12 10:34 16 35.555387 -74.856740 E 38 90° Recreational fishing vessel 1-Dec-12 11:22 28 35.618697 -74.783661 W 39 1 60° 1 Recreational fishing vessel 2-Dec-12 14:01 57 34.941405 -75.515823 NW 25 3 30° 14 Recreational fishing vessel

*Table 27 (Continued).* Other vessel sightings in the Hatteras survey area from January 2012 to December 2012.



Figure 25. Other vessel sightings.

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Pilot in Command: Dave Second in Command: Stan	Plane: <u>N1353L</u>
Observers: Ryan - Left, Erin - Right	HODDO G 1921 2
Time take off: 8:38 Land for lunch: 13:03	HOBBS Start: <u>1831.3</u>
Track Lines and Direction (e.g. N to S) Flown: 20 - 25	
Track Lines and Direction (e.g. N to S) Flown. 20 20	
Take off after lunch: 13:49	HOBBS Stop: <u>1839.1</u>
Land: 16:52	HOBBS Total: 7.8
Track Lines and Direction (e.g. N to S) Flown: <u>26 - 29</u> Overall weather: <u>Winds 20 knots</u> , BSS 4-5	
General Observations	
The sea state made it difficult to find and resight animals. There was	one humpback sighting on the
eastern portion of line 25.	
	Transit effort leg:No
	ITalisit effort leg.
USWTR Daily Plane Log Shee	Date: <u>1/31/2012</u>
Pilot in Command: Dave Second in Command: Stan	
Pilot in Command: <u>Dave</u> Second in Command: <u>Stan</u> Observers: <u>Erin - Left, Ryan - Right</u>	et Plane: <u>N1353L</u>
Pilot in Command: <u>Dave</u> Second in Command: <u>Stan</u> Observers: <u>Erin - Left, Ryan - Right</u> Time take off:	et
Pilot in Command: <u>Dave</u> Second in Command: <u>Stan</u> Observers: <u>Erin - Left, Ryan - Right</u> Time take off: Land for lunch: <u>13:06</u>	et Plane: <u>N1353L</u>
Pilot in Command: <u>Dave</u> Second in Command: <u>Stan</u> Observers: <u>Erin - Left, Ryan - Right</u> Time take off:	et Plane: <u>N1353L</u>
Pilot in Command: <u>Dave</u> Second in Command: <u>Stan</u> Observers: <u>Erin - Left, Ryan - Right</u> Time take off: Land for lunch: <u>13:06</u> Track Lines and Direction (e.g. N to S) Flown: <u>39 - 36</u>	et Plane: <u>N1353L</u> HOBBS Start: <u>1839.1</u>
Pilot in Command: <u>Dave</u> Second in Command: <u>Stan</u> Observers: <u>Erin - Left, Ryan - Right</u> Time take off: Land for lunch: <u>13:06</u>	et Plane: <u>N1353L</u>
Pilot in Command: <u>Dave</u> Second in Command: <u>Stan</u> Observers: <u>Erin - Left, Ryan - Right</u> Time take off: Land for lunch: <u>13:06</u> Track Lines and Direction (e.g. N to S) Flown: <u>39 - 36</u> Take off after lunch: <u>13:53</u> Land: <u>16:48</u> Track Lines and Direction (e.g. N to S) Flown: <u>35 - 32</u>	et Plane: <u>N1353L</u> HOBBS Start: <u>1839.1</u> HOBBS Stop: <u>1846.6</u>
Pilot in Command: Dave Second in Command: Stan Observers: Erin - Left, Ryan - Right Time take off: Land for lunch: 13:06 Track Lines and Direction (e.g. N to S) Flown: 39 - 36 Take off after lunch: 13:53 Land: 16:48 Track Lines and Direction (e.g. N to S) Flown: 35 - 32 Overall weather: Moderate seas	et Plane: <u>N1353L</u> HOBBS Start: <u>1839.1</u> HOBBS Stop: <u>1846.6</u>
Pilot in Command: <u>Dave</u> Second in Command: <u>Stan</u> Observers: <u>Erin - Left, Ryan - Right</u> Time take off: Land for lunch: <u>13:06</u> Track Lines and Direction (e.g. N to S) Flown: <u>39 - 36</u> Take off after lunch: <u>13:53</u> Land: <u>16:48</u> Track Lines and Direction (e.g. N to S) Flown: <u>35 - 32</u>	et Plane: <u>N1353L</u> HOBBS Start: <u>1839.1</u> HOBBS Stop: <u>1846.6</u> HOBBS Total: <u>7.5</u>
Pilot in Command: Dave Second in Command: Stan Observers: Erin - Left, Ryan - Right Time take off: Land for lunch: 13:06 Track Lines and Direction (e.g. N to S) Flown: 39 - 36 Take off after lunch: 13:53 Land: 16:48 Track Lines and Direction (e.g. N to S) Flown: 35 - 32 Overall weather: Moderate seas General Observations	et Plane: <u>N1353L</u> HOBBS Start: <u>1839.1</u> HOBBS Stop: <u>1846.6</u> HOBBS Total: <u>7.5</u>
Pilot in Command: Dave Second in Command: Stan Observers: Erin - Left, Ryan - Right Time take off:	et Plane: <u>N1353L</u> HOBBS Start: <u>1839.1</u> HOBBS Stop: <u>1846.6</u> HOBBS Total: <u>7.5</u>
Pilot in Command: Dave Second in Command: Stan Observers: Erin - Left, Ryan - Right Time take off:	et Plane: <u>N1353L</u> HOBBS Start: <u>1839.1</u> HOBBS Stop: <u>1846.6</u> HOBBS Total: <u>7.5</u>
Pilot in Command: Dave Second in Command: Stan Observers: Erin - Left, Ryan - Right Time take off:	et Plane: <u>N1353L</u> HOBBS Start: <u>1839.1</u> HOBBS Stop: <u>1846.6</u> HOBBS Total: <u>7.5</u>
Pilot in Command: Dave Second in Command: Stan Observers: Erin - Left, Ryan - Right Time take off:	et Plane: <u>N1353L</u> HOBBS Start: <u>1839.1</u> HOBBS Stop: <u>1846.6</u> HOBBS Total: <u>7.5</u>

Pilot in Command: Dave	Second in Command: Stan	Plane: N1353L
Observers: Ryan - Left, Erin - Rig Time take off: 9:12	gnt	HOBBS Start: 1846.6
Land for lunch: 13:05	_	
Track Lines and Direction (e.g. 1	N to S) Flown: <u>45 - 40</u>	
Take off after lunch: 14:11		HOBBS Stop: <u>1853.8</u>
Land: 17:11		HOBBS Total: 7.2
Track Lines and Direction (e.g. 1	N to S) Flown: <u>31 &amp; 30</u>	
Overall weather: BSS 4-5, winds	General Observations	
Multiple species were observed	including striped dolphins, common	dolphins, pilot whales and a fin
	unidentified animals, this was due to	
in a high BSS.		
		Transit offert lageNO
		Transit effort leg:No
Pilot in Command: Cameron	<b>USWTR Daily Plane Log She</b> Second in Command: Bob	
Pilot in Command: <u>Cameron</u> Observers: <u>Heather - Left, Ryan</u>	Second in Command: Bob	Plane: <u>N1353L</u>
Observers: Heather - Left, Ryan Time take off: 9:30	Second in Command: Bob	eet
Observers: Heather - Left, Ryan Time take off: 9:30 Land for lunch: 12:50	_ Second in Command: <u>Bob</u> - Right	Plane: <u>N1353L</u>
Observers: Heather - Left, Ryan Time take off: 9:30 Land for lunch: 12:50 Track Lines and Direction (e.g. 1 Take off after lunch: 13:53 Land: 17:41 Track Lines and Direction (e.g. 1	Second in Command: <u>Bob</u> - Right - N to S) Flown: <u>20 to 25</u> N to S) Flown: <u>26 to 31</u>	Plane: <u>N1353L</u>
Observers: Heather - Left, Ryan Time take off: 9:30 Land for lunch: 12:50 Track Lines and Direction (e.g. 1 Take off after lunch: 13:53 Land: 17:41	Second in Command: <u>Bob</u> - Right N to S) Flown: <u>20 to 25</u> N to S) Flown: <u>26 to 31</u> /, BSS 2-4	eet         Plane: N1353L         HOBBS Start: 1879.9         HOBBS Stop: 1887.5
Observers: Heather - Left, Ryan Time take off: 9:30 Land for lunch: 12:50 Track Lines and Direction (e.g. 1 Take off after lunch: 13:53 Land: 17:41 Track Lines and Direction (e.g. 1 Overall weather: Sunny but hazy	Second in Command: <u>Bob</u> - Right N to S) Flown: <u>20 to 25</u> N to S) Flown: <u>26 to 31</u> /, BSS 2-4 General Observations	Plane: N1353L         HOBBS Start: 1879.9         HOBBS Stop: 1887.5         HOBBS Total: 7.6
Observers: Heather - Left, Ryan Time take off: 9:30 Land for lunch: 12:50 Track Lines and Direction (e.g. 1 Take off after lunch: 13:53 Land: 17:41 Track Lines and Direction (e.g. 1 Overall weather: Sunny but hazy 12 lines surveyed, relatively low	Second in Command: <u>Bob</u> - Right - N to S) Flown: <u>20 to 25</u> N to S) Flown: <u>26 to 31</u> /, BSS 2-4 <b>General Observations</b> sighting numbers for ideal conditions	eet Plane: N1353L HOBBS Start: 1879.9 HOBBS Stop: 1887.5 HOBBS Total: 7.6 s. Couple of groups of dolphin,
Observers: Heather - Left, Ryan Time take off: 9:30 Land for lunch: 12:50 Track Lines and Direction (e.g. 1 Take off after lunch: 13:53 Land: 17:41 Track Lines and Direction (e.g. 1 Overall weather: Sunny but hazy 12 lines surveyed, relatively low	Second in Command: <u>Bob</u> - Right N to S) Flown: <u>20 to 25</u> N to S) Flown: <u>26 to 31</u> /, BSS 2-4 General Observations	eet Plane: N1353L HOBBS Start: 1879.9 HOBBS Stop: 1887.5 HOBBS Total: 7.6 s. Couple of groups of dolphin,
Observers: Heather - Left, Ryan Time take off: 9:30 Land for lunch: 12:50 Track Lines and Direction (e.g. 1 Take off after lunch: 13:53 Land: 17:41 Track Lines and Direction (e.g. 1 Overall weather: Sunny but hazy 12 lines surveyed, relatively low	Second in Command: <u>Bob</u> - Right - N to S) Flown: <u>20 to 25</u> N to S) Flown: <u>26 to 31</u> /, BSS 2-4 General Observations sighting numbers for ideal conditions	eet Plane: N1353L HOBBS Start: 1879.9 HOBBS Stop: 1887.5 HOBBS Total: 7.6 s. Couple of groups of dolphin,
Observers: Heather - Left, Ryan Time take off: 9:30 Land for lunch: 12:50 Track Lines and Direction (e.g. 1 Take off after lunch: 13:53 Land: 17:41 Track Lines and Direction (e.g. 1 Overall weather: Sunny but hazy 12 lines surveyed, relatively low	Second in Command: <u>Bob</u> - Right - N to S) Flown: <u>20 to 25</u> N to S) Flown: <u>26 to 31</u> /, BSS 2-4 General Observations sighting numbers for ideal conditions	eet Plane: N1353L HOBBS Start: 1879.9 HOBBS Stop: 1887.5 HOBBS Total: 7.6 s. Couple of groups of dolphin,
Observers: Heather - Left, Ryan Time take off: 9:30 Land for lunch: 12:50 Track Lines and Direction (e.g. 1 Take off after lunch: 13:53 Land: 17:41 Track Lines and Direction (e.g. 1 Overall weather: Sunny but hazy 12 lines surveyed, relatively low	Second in Command: <u>Bob</u> - Right - N to S) Flown: <u>20 to 25</u> N to S) Flown: <u>26 to 31</u> /, BSS 2-4 General Observations sighting numbers for ideal conditions	eet Plane: N1353L HOBBS Start: 1879.9 HOBBS Stop: 1887.5 HOBBS Total: 7.6 s. Couple of groups of dolphin, ck whale while transiting to shore.
Observers: Heather - Left, Ryan Time take off: 9:30 Land for lunch: 12:50 Track Lines and Direction (e.g. 1 Take off after lunch: 13:53 Land: 17:41 Track Lines and Direction (e.g. 1 Overall weather: Sunny but hazy 12 lines surveyed, relatively low	Second in Command: <u>Bob</u> - Right - N to S) Flown: <u>20 to 25</u> N to S) Flown: <u>26 to 31</u> /, BSS 2-4 General Observations sighting numbers for ideal conditions	eet Plane: N1353L HOBBS Start: 1879.9 HOBBS Stop: 1887.5 HOBBS Total: 7.6 s. Couple of groups of dolphin,

	Cameron Plane: N1353L
Observers: Heather - Left, Ryan - Right Time take off: 9:12	HOBBS Start: <u>1887.5</u>
Land for lunch: <u>12:53</u> Track Lines and Direction (e.g. N to S) Flown: <u>23, 33, 37</u> ,	, 38
Take off after lunch: <u>13:55</u> Land: <u>17:21</u>	HOBBS Stop: <u>1896.1</u> HOBBS Total: 8.6
Track Lines and Direction (e.g. N to S) Flown: <u>45, 44, 43</u> , Overall weather:	
General Observ	vations
Forecast of good weather. Total of 21 sighitngs, beaked w	vhales, minke, fin, pilot, spotted dolphins,
bottlenose dolphins, common dolphins, stripped dolphins &	& unidentified delphinds.
Dead humpback on trackline 38 inshore.	
March 16 transit to Beaufort along coastline, 1.2 of the 8.6	hours were transit effort.
	Transit effort leg: 1.2 hrs
	8
	D E/2/2012
<b>USWTR Daily Plan</b> e	
Pilot in Command: Stan Second in Command:	e Log Sheet
Pilot in Command: Stan Second in Command: Observers: Erin - Left, Ryan - Right Time take off: 9:19	e Log Sheet
Pilot in Command: Stan Second in Command: Observers: Erin - Left, Ryan - Right Time take off: 9:19 Land for lunch: 12:30	Bob Plane: N337CH
Pilot in Command: <u>Stan</u> Observers: <u>Erin - Left, Ryan - Right</u> Time take off: <u>9:19</u> Land for lunch: <u>12:30</u> Track Lines and Direction (e.g. N to S) Flown: <u>28 to 31</u>	e Log Sheet Bob Plane: N337CH HOBBS Start: 3506.5
Pilot in Command: <u>Stan</u> Observers: <u>Erin - Left, Ryan - Right</u> Time take off: <u>9:19</u> Land for lunch: <u>12:30</u> Track Lines and Direction (e.g. N to S) Flown: <u>28 to 31</u> Take off after lunch: <u>13:43</u> Land: <u>16:55</u>	Bob Plane: N337CH
Pilot in Command: <u>Stan</u> Second in Command: Observers: <u>Erin - Left, Ryan - Right</u> Time take off: <u>9:19</u> Land for lunch: <u>12:30</u> Track Lines and Direction (e.g. N to S) Flown: <u>28 to 31</u> Take off after lunch: <u>13:43</u> Land: <u>16:55</u> Track Lines and Direction (e.g. N to S) Flown: <u>32 to 35</u>	e Log Sheet         Bob       Plane: N337CH         HOBBS Start: 3506.5         HOBBS Stop: 3513.4         HOBBS Total: 6.9
Pilot in Command: Stan Second in Command: Observers: Erin - Left, Ryan - Right Time take off: 9:19 Land for lunch: 12:30 Track Lines and Direction (e.g. N to S) Flown: 28 to 31 Take off after lunch: 13:43 Land: 16:55 Track Lines and Direction (e.g. N to S) Flown: 32 to 35 Overall weather: Cloudy with low lying clouds in the northe	Bob       Plane: N337CH         HOBBS Start: 3506.5         HOBBS Stop: 3513.4         HOBBS Total: 6.9         ern part of the survey area.
Pilot in Command: Stan Second in Command: Observers: Erin - Left, Ryan - Right Time take off: 9:19 Land for lunch: 12:30 Track Lines and Direction (e.g. N to S) Flown: 28 to 31 Take off after lunch: 13:43 Land: 16:55 Track Lines and Direction (e.g. N to S) Flown: 32 to 35 Overall weather: Cloudy with low lying clouds in the norther General Observ	Bob       Plane: N337CH         HOBBS Start: 3506.5         HOBBS Stop: 3513.4         HOBBS Total: 6.9         ern part of the survey area.
Pilot in Command: <u>Stan</u> Second in Command: Observers: <u>Erin - Left, Ryan - Right</u> Time take off: <u>9:19</u> Land for lunch: <u>12:30</u> Track Lines and Direction (e.g. N to S) Flown: <u>28 to 31</u> Take off after lunch: <u>13:43</u> Land: <u>16:55</u> Track Lines and Direction (e.g. N to S) Flown: <u>32 to 35</u> Overall weather: <u>Cloudy with low lying clouds in the northe</u> <b>General Observ</b> Forecast 10-15 knots dropping to 10 knots, Seas 3-4ft.	Bob       Plane: N337CH         HOBBS Start: 3506.5         HOBBS Stop: 3513.4         HOBBS Total: 6.9         ern part of the survey area.         vations
Pilot in Command: Stan Second in Command: Observers: Erin - Left, Ryan - Right Time take off: 9:19 Land for lunch: 12:30 Track Lines and Direction (e.g. N to S) Flown: 28 to 31 Take off after lunch: 13:43 Land: 16:55 Track Lines and Direction (e.g. N to S) Flown: 32 to 35 Overall weather: Cloudy with low lying clouds in the northe General Observe Forecast 10-15 knots dropping to 10 knots, Seas 3-4ft. Duke boats: NOAA CRVX and Exocetus are out for pilot w	Bob       Plane: N337CH         HOBBS Start: 3506.5         HOBBS Stop: 3513.4         HOBBS Total: 6.9         ern part of the survey area.         vations
Pilot in Command: <u>Stan</u> Second in Command: Observers: <u>Erin - Left, Ryan - Right</u> Time take off: <u>9:19</u> Land for lunch: <u>12:30</u> Track Lines and Direction (e.g. N to S) Flown: <u>28 to 31</u> Take off after lunch: <u>13:43</u> Land: <u>16:55</u> Track Lines and Direction (e.g. N to S) Flown: <u>32 to 35</u> Overall weather: <u>Cloudy with low lying clouds in the northe</u> <b>General Observ</b> Forecast 10-15 knots dropping to 10 knots, Seas 3-4ft.	Bob       Plane: N337CH         HOBBS Start: 3506.5         HOBBS Stop: 3513.4         HOBBS Total: 6.9         ern part of the survey area.         vhale project.
Pilot in Command: Stan Second in Command: Observers: Erin - Left, Ryan - Right Time take off: 9:19 Land for lunch: 12:30 Track Lines and Direction (e.g. N to S) Flown: 28 to 31 Take off after lunch: 13:43 Land: 16:55 Track Lines and Direction (e.g. N to S) Flown: 32 to 35 Overall weather: Cloudy with low lying clouds in the northe General Observ Forecast 10-15 knots dropping to 10 knots, Seas 3-4ft. Duke boats: NOAA CRVX and Exocetus are out for pilot w AM: 4 lines BSS 2-3, 1 sighting of Grampus	Bob       Plane: N337CH         HOBBS Start: 3506.5         HOBBS Stop: 3513.4         HOBBS Total: 6.9         ern part of the survey area.         vhale project.
Pilot in Command: <u>Stan</u> Second in Command: Observers: <u>Erin - Left, Ryan - Right</u> Time take off: <u>9:19</u> Land for lunch: <u>12:30</u> Track Lines and Direction (e.g. N to S) Flown: <u>28 to 31</u> Take off after lunch: <u>13:43</u> Land: <u>16:55</u> Track Lines and Direction (e.g. N to S) Flown: <u>32 to 35</u> Overall weather: <u>Cloudy with low lying clouds in the northe</u> <b>General Observ</b> Forecast 10-15 knots dropping to 10 knots, Seas 3-4ft. Duke boats: NOAA CRVX and Exocetus are out for pilot w AM: 4 lines BSS 2-3, 1 sighting of Grampus PM: 4 lines - northern lines obscured by low clouds, 2 sighting	Bob       Plane: N337CH         HOBBS Start: 3506.5         HOBBS Stop: 3513.4         HOBBS Total: 6.9         ern part of the survey area.         vhale project.

Date: <u>5/4/2012</u>

Pilot in Command: Bob Second in Command: Stan	Plane: <u>N337Ch</u>
Observers: Ryan - Left, Erin - Right	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Time take off: $9:33$	HOBBS Start: <u>3513.4</u>
Land for lunch: $12:39$	
Track Lines and Direction (e.g. N to S) Flown: <u>45 - 42</u>	
Take off after lunch: 13:32	HOBBS Stop: <u>3520.8</u>
Land: 17:31	HOBBS Total: 7.4
Track Lines and Direction (e.g. N to S) Flown: 41 - 38 Overall weather: Hazy / foggy, BSS 1, light winds	
General Observations	
Great weather, calm seas. 13 sightings in the AM: Dde, Zca, Ttr, Sfr, F	
The afternoon seas picked up to BSS 4, we had a total of 27 sightings.	
	Transit effort leg:No
	-
USWTR Daily Plane Log Sheet	Date: <u>6/8/2012</u>
	t
Pilot in Command: Rockey Second in Command: John E.	
	t
Pilot in Command: <u>Rockey</u> Second in Command: <u>John E.</u> Observers: <u>Erin - Left, Ryan - Right</u>	Plane: N1353L
Pilot in Command: <u>Rockey</u> Second in Command: <u>John E.</u> Observers: <u>Erin - Left, Ryan - Right</u> Time take off: <u>9:12</u>	Plane: N1353L
Pilot in Command: <u>Rockey</u> Second in Command: <u>John E.</u> Observers: <u>Erin - Left, Ryan - Right</u> Time take off: <u>9:12</u> Land for lunch: <u>12:42</u> Track Lines and Direction (e.g. N to S) Flown: <u>20 - 23</u>	Plane: <u>N1353L</u> HOBBS Start: <u>1912.4</u>
Pilot in Command: Rockey Second in Command: John E. Observers: Erin - Left, Ryan - Right Time take off: 9:12 Land for lunch: 12:42	Plane: N1353L
Pilot in Command: Rockey Second in Command: John E. Observers: Erin - Left, Ryan - Right Time take off: 9:12 Land for lunch: 12:42 Track Lines and Direction (e.g. N to S) Flown: 20 - 23 Take off after lunch: 13:55 Land: 17:00 Track Lines and Direction (e.g. N to S) Flown: 24 - 27	Plane: <u>N1353L</u> HOBBS Start: <u>1912.4</u> HOBBS Stop: <u>1919.4</u>
Pilot in Command: Rockey Second in Command: John E. Observers: Erin - Left, Ryan - Right Time take off: 9:12 Land for lunch: 12:42 Track Lines and Direction (e.g. N to S) Flown: 20 - 23 Take off after lunch: 13:55 Land: 17:00 Track Lines and Direction (e.g. N to S) Flown: 24 - 27 Overall weather: Dropping as the day went on	Plane: <u>N1353L</u> HOBBS Start: <u>1912.4</u> HOBBS Stop: <u>1919.4</u>
Pilot in Command: Rockey Second in Command: John E. Observers: Erin - Left, Ryan - Right Time take off: 9:12 Land for lunch: 12:42 Track Lines and Direction (e.g. N to S) Flown: 20 - 23 Take off after lunch: 13:55 Land: 17:00 Track Lines and Direction (e.g. N to S) Flown: 24 - 27	Plane: <u>N1353L</u> HOBBS Start: <u>1912.4</u> HOBBS Stop: <u>1919.4</u>
Pilot in Command: Rockey Second in Command: John E. Observers: Erin - Left, Ryan - Right Time take off: 9:12 Land for lunch: 12:42 Track Lines and Direction (e.g. N to S) Flown: 20 - 23 Take off after lunch: 13:55 Land: 17:00 Track Lines and Direction (e.g. N to S) Flown: 24 - 27 Overall weather: Dropping as the day went on General Observations	Plane: <u>N1353L</u> HOBBS Start: <u>1912.4</u> HOBBS Stop: <u>1919.4</u> HOBBS Total: <u>7.0</u>
Pilot in Command: Rockey Second in Command: John E. Observers: Erin - Left, Ryan - Right Time take off: 9:12 Land for lunch: 12:42 Track Lines and Direction (e.g. N to S) Flown: 20 - 23 Take off after lunch: 13:55 Land: 17:00 Track Lines and Direction (e.g. N to S) Flown: 24 - 27 Overall weather: Dropping as the day went on General Observations 3 to 5 ft seas forecasted	Plane: <u>N1353L</u> HOBBS Start: <u>1912.4</u> HOBBS Stop: <u>1919.4</u> HOBBS Total: <u>7.0</u>
Pilot in Command: Rockey Second in Command: John E. Observers: Erin - Left, Ryan - Right Time take off: 9:12 Land for lunch: 12:42 Track Lines and Direction (e.g. N to S) Flown: 20 - 23 Take off after lunch: 13:55 Land: 17:00 Track Lines and Direction (e.g. N to S) Flown: 24 - 27 Overall weather: Dropping as the day went on General Observations 3 to 5 ft seas forecasted AM: 2 lines with higher sea states - calming by noon - 2 sighitngs in 4 li	Plane: <u>N1353L</u> HOBBS Start: <u>1912.4</u> HOBBS Stop: <u>1919.4</u> HOBBS Total: <u>7.0</u>
Pilot in Command: Rockey Second in Command: John E. Observers: Erin - Left, Ryan - Right Time take off: 9:12 Land for lunch: 12:42 Track Lines and Direction (e.g. N to S) Flown: 20 - 23 Take off after lunch: 13:55 Land: 17:00 Track Lines and Direction (e.g. N to S) Flown: 24 - 27 Overall weather: Dropping as the day went on General Observations 3 to 5 ft seas forecasted AM: 2 lines with higher sea states - calming by noon - 2 sighitngs in 4 li	Plane: <u>N1353L</u> HOBBS Start: <u>1912.4</u> HOBBS Stop: <u>1919.4</u> HOBBS Total: <u>7.0</u>

Date: <u>6/9/2012</u>

Pilot in Command: John E. Second in Command: Rockey	Plane: <u>N1353L</u>
Observers: Ryan - Left, Erin - Right	1010 1
Time take off: $\frac{8:41}{12:04}$	HOBBS Start: <u>1919.4</u>
Land for lunch: <u>12:04</u>	
Track Lines and Direction (e.g. N to S) Flown: <u>32 - 35</u>	
Take off after lunch: 13:09	HOBBS Stop: <u>1926.5</u>
Land: 16:25	HOBBS Total: 7.1
Track Lines and Direction (e.g. N to S) Flown: <u>45 - 42</u> Overall weather: Clear skies, BSS 3 most of the day	
General Observations	
Seas were not as calm as predicted. 14 sightings with 4 species: Ttr,	Ggr, Gma and mesoplodon spp.
	Trongit offert lage NO
	Transit effort leg:No
	D. ( 6/10/2012
USWTR Daily Plane Log Shee	
Pilot in Command: John E. Second in Command: Rockey	
Pilot in Command: John E. Second in Command: Rockey Observers: Erin - Left, Ryan - Right	Plane: <u>N1353L</u>
Pilot in Command: John E. Second in Command: Rockey Observers: Erin - Left, Ryan - Right Time take off: 8:32	t
Pilot in Command: John E. Second in Command: Rockey Observers: Erin - Left, Ryan - Right Time take off: 8:32 Land for lunch: 12:29	Plane: <u>N1353L</u>
Pilot in Command: John E. Second in Command: Rockey Observers: Erin - Left, Ryan - Right Time take off: 8:32 Land for lunch: 12:29 Track Lines and Direction (e.g. N to S) Flown: 31-28, 41 & 40	et Plane: <u>N1353L</u> HOBBS Start: <u>1926.4</u>
Pilot in Command: John E. Second in Command: Rockey Observers: Erin - Left, Ryan - Right Time take off: 8:32 Land for lunch: 12:29 Track Lines and Direction (e.g. N to S) Flown: 31-28, 41 & 40 Take off after lunch: 13:30	et Plane: N1353L HOBBS Start: 1926.4 HOBBS Stop: 1933.8
Pilot in Command: John E. Second in Command: Rockey Observers: Erin - Left, Ryan - Right Time take off: 8:32 Land for lunch: 12:29 Track Lines and Direction (e.g. N to S) Flown: 31-28, 41 & 40 Take off after lunch: 13:30 Land: 16:28 Track Lines and Direction (e.g. N to S) Flown: 39 - 36	et Plane: <u>N1353L</u> HOBBS Start: <u>1926.4</u>
Pilot in Command: John E. Second in Command: Rockey Observers: Erin - Left, Ryan - Right Time take off: 8:32 Land for lunch: 12:29 Track Lines and Direction (e.g. N to S) Flown: 31-28, 41 & 40 Take off after lunch: 13:30 Land: 16:28 Track Lines and Direction (e.g. N to S) Flown: 39 - 36 Overall weather: BSS 3 dominated day - 10 sightings	et Plane: N1353L HOBBS Start: 1926.4 HOBBS Stop: 1933.8
Pilot in Command: John E. Second in Command: Rockey Observers: Erin - Left, Ryan - Right Time take off: 8:32 Land for lunch: 12:29 Track Lines and Direction (e.g. N to S) Flown: 31-28, 41 & 40 Take off after lunch: 13:30 Land: 16:28 Track Lines and Direction (e.g. N to S) Flown: 39 - 36 Overall weather: BSS 3 dominated day - 10 sightings General Observations	et Plane: N1353L HOBBS Start: 1926.4 HOBBS Stop: 1933.8 HOBBS Total: 7.4
Pilot in Command: John E. Second in Command: Rockey Observers: Erin - Left, Ryan - Right Time take off: 8:32 Land for lunch: 12:29 Track Lines and Direction (e.g. N to S) Flown: 31-28, 41 & 40 Take off after lunch: 13:30 Land: 16:28 Track Lines and Direction (e.g. N to S) Flown: 39 - 36 Overall weather: BSS 3 dominated day - 10 sightings General Observations Completed 10 tracklines with 10 cetacean sightings recorded. Seas ar	et Plane: N1353L HOBBS Start: 1926.4 HOBBS Stop: 1933.8 HOBBS Total: 7.4 veraged a BSS 3 with increasing
Pilot in Command: John E. Second in Command: Rockey Observers: Erin - Left, Ryan - Right Time take off: 8:32 Land for lunch: 12:29 Track Lines and Direction (e.g. N to S) Flown: 31-28, 41 & 40 Take off after lunch: 13:30 Land: 16:28 Track Lines and Direction (e.g. N to S) Flown: 39 - 36 Overall weather: BSS 3 dominated day - 10 sightings General Observations Completed 10 tracklines with 10 cetacean sightings recorded. Seas ar	et Plane: N1353L HOBBS Start: 1926.4 HOBBS Stop: 1933.8 HOBBS Total: 7.4 veraged a BSS 3 with increasing
Pilot in Command: John E. Second in Command: Rockey Observers: Erin - Left, Ryan - Right Time take off: 8:32 Land for lunch: 12:29 Track Lines and Direction (e.g. N to S) Flown: 31-28, 41 & 40 Take off after lunch: 13:30 Land: 16:28 Track Lines and Direction (e.g. N to S) Flown: 39 - 36 Overall weather: BSS 3 dominated day - 10 sightings	et Plane: N1353L HOBBS Start: 1926.4 HOBBS Stop: 1933.8 HOBBS Total: 7.4 veraged a BSS 3 with increasing
Pilot in Command: John E. Second in Command: Rockey Observers: Erin - Left, Ryan - Right Time take off: 8:32 Land for lunch: 12:29 Track Lines and Direction (e.g. N to S) Flown: 31-28, 41 & 40 Take off after lunch: 13:30 Land: 16:28 Track Lines and Direction (e.g. N to S) Flown: 39 - 36 Overall weather: BSS 3 dominated day - 10 sightings General Observations Completed 10 tracklines with 10 cetacean sightings recorded. Seas ar	et Plane: N1353L HOBBS Start: 1926.4 HOBBS Stop: 1933.8 HOBBS Total: 7.4 veraged a BSS 3 with increasing

Observers: Ryan - Left, Erin - Righ	Second in Command: Bob	Plane: <u>N1353L</u>
	11	
Time take off: $\frac{8:46}{12:27}$		HOBBS Start: <u>2677.5</u>
Land for lunch: <u>12:27</u>	(a. S.) Elarum, 20 - 25	
Track Lines and Direction (e.g. N	to S) Flown: $20-23$	
Take off after lunch: 13:23		HOBBS Stop: 2685.4
Land: <u>16:04</u>		HOBBS Total: 7.9
Track Lines and Direction (e.g. N Overall weather: Mostly BSS 3 an	to S) Flown: $\frac{38 - 41}{4}$ d cloudy in the Am, BSS 2-3 and s	sunny in the PM
	<b>General Observations</b>	
	ale in the morning. The wind was s	
	n which included beaked whales, (	Gma, Ggr, and Ttr. The seas
and winds were much calmer in th	e afternoon.	
We took off from ILM and flew sur	vey lines til lunch when we landed	in Manteo. After lunch we flew more
lines then landed back in Maneteo	to drop Ryan off, then flew back	to ILM to drop of Erin and gear.
		Transit effort leg:No
	USWTR Daily Plane Log Sho	Date: <u>9/21/2012</u>
Pilot in Command: Dave	Second in Command: Josh	
Observers: Ryan - Right, Erin - Lei	Second in Command: Josh	Plane: <u>N1375</u>
Observers: Ryan - Right, Erin - Le Time take off: 8:58	Second in Command: Josh	eet
Observers: Ryan - Right, Erin - Lei	Second in Command: <u>Josh</u>	Plane: <u>N1375</u>
Observers: <u>Ryan - Right, Erin - Lei</u> Time take off: <u>8:58</u> Land for lunch: <u>12:52</u> Track Lines and Direction (e.g. N Take off after lunch: <u>13:47</u>	Second in Command: <u>Josh</u>	eet Plane: N13751 HOBBS Start: 2700.5 HOBBS Stop: 2709.9
Observers: <u>Ryan - Right, Erin - Lei</u> Time take off: <u>8:58</u> Land for lunch: <u>12:52</u> Track Lines and Direction (e.g. N Take off after lunch: <u>13:47</u> Land: <u>19:30</u>	Second in Command: <u>Josh</u> ft to S) Flown: <u>20-24, 27</u>	eet Plane: N13751 HOBBS Start: 2700.5
Observers: <u>Ryan - Right, Erin - Lei</u> Time take off: <u>8:58</u> Land for lunch: <u>12:52</u> Track Lines and Direction (e.g. N Take off after lunch: <u>13:47</u> Land: <u>19:30</u> Track Lines and Direction (e.g. N	Second in Command: Josh ft to S) Flown: 20-24, 27 to S) Flown: 31-28	eet Plane: N13751 HOBBS Start: 2700.5 HOBBS Stop: 2709.9
Observers: <u>Ryan - Right, Erin - Lei</u> Time take off: <u>8:58</u> Land for lunch: <u>12:52</u> Track Lines and Direction (e.g. N Take off after lunch: <u>13:47</u> Land: <u>19:30</u>	Second in Command: <u>Josh</u> ft to S) Flown: <u>20-24, 27</u> to S) Flown: <u>31-28</u> nd 10-15 knots	eet Plane: N13751 HOBBS Start: 2700.5 HOBBS Stop: 2709.9
Observers: Ryan - Right, Erin - Lei Time take off: 8:58 Land for lunch: 12:52 Track Lines and Direction (e.g. N Take off after lunch: 13:47 Land: 19:30 Track Lines and Direction (e.g. N Overall weather: Predicted 3-5ft a	Second in Command: Josh ft to S) Flown: 20-24, 27 to S) Flown: 31-28 nd 10-15 knots General Observations	eet         Plane: N1375I         HOBBS Start: 2700.5         HOBBS Stop: 2709.9         HOBBS Total: 9.4*
Observers: Ryan - Right, Erin - Lei Time take off: 8:58 Land for lunch: 12:52 Track Lines and Direction (e.g. N Take off after lunch: 13:47 Land: 19:30 Track Lines and Direction (e.g. N Overall weather: Predicted 3-5ft a Seas higher than expected, single	Second in Command: Josh ft to S) Flown: 20-24, 27 to S) Flown: 31-28 nd 10-15 knots General Observations	eet Plane: N13751 HOBBS Start: 2700.5 HOBBS Stop: 2709.9
Observers: Ryan - Right, Erin - Lei Time take off: 8:58 Land for lunch: 12:52 Track Lines and Direction (e.g. N Take off after lunch: 13:47 Land: 19:30 Track Lines and Direction (e.g. N Overall weather: Predicted 3-5ft a	Second in Command: Josh ft to S) Flown: 20-24, 27 to S) Flown: 31-28 nd 10-15 knots General Observations	eet         Plane: N1375I         HOBBS Start: 2700.5         HOBBS Stop: 2709.9         HOBBS Total: 9.4*
Observers: Ryan - Right, Erin - Lei Time take off: 8:58 Land for lunch: 12:52 Track Lines and Direction (e.g. N Take off after lunch: 13:47 Land: 19:30 Track Lines and Direction (e.g. N Overall weather: Predicted 3-5ft a Seas higher than expected, single	Second in Command: Josh ft to S) Flown: 20-24, 27 to S) Flown: 31-28 nd 10-15 knots General Observations	eet         Plane: N1375I         HOBBS Start: 2700.5         HOBBS Stop: 2709.9         HOBBS Total: 9.4*
Observers: Ryan - Right, Erin - Lei Time take off: 8:58 Land for lunch: 12:52 Track Lines and Direction (e.g. N Take off after lunch: 13:47 Land: 19:30 Track Lines and Direction (e.g. N Overall weather: Predicted 3-5ft a Seas higher than expected, single	Second in Command: Josh ft to S) Flown: 20-24, 27 to S) Flown: 31-28 nd 10-15 knots General Observations	eet         Plane: N1375I         HOBBS Start: 2700.5         HOBBS Stop: 2709.9         HOBBS Total: 9.4*
Observers: Ryan - Right, Erin - Lei Time take off: 8:58 Land for lunch: 12:52 Track Lines and Direction (e.g. N Take off after lunch: 13:47 Land: 19:30 Track Lines and Direction (e.g. N Overall weather: Predicted 3-5ft a Seas higher than expected, single	Second in Command: Josh ft to S) Flown: 20-24, 27 to S) Flown: 31-28 nd 10-15 knots General Observations	eet         Plane: N1375I         HOBBS Start: 2700.5         HOBBS Stop: 2709.9         HOBBS Total: 9.4*
Observers: Ryan - Right, Erin - Lei Time take off: 8:58 Land for lunch: 12:52 Track Lines and Direction (e.g. N Take off after lunch: 13:47 Land: 19:30 Track Lines and Direction (e.g. N Overall weather: Predicted 3-5ft a Seas higher than expected, single	Second in Command: Josh ft to S) Flown: 20-24, 27 to S) Flown: 31-28 nd 10-15 knots General Observations	eet Plane: N1375I HOBBS Start: 2700.5 HOBBS Stop: 2709.9 HOBBS Total: 9.4* afternoon flights. Transited down to
Observers: Ryan - Right, Erin - Lei Time take off: 8:58 Land for lunch: 12:52 Track Lines and Direction (e.g. N Take off after lunch: 13:47 Land: 19:30 Track Lines and Direction (e.g. N Overall weather: Predicted 3-5ft a Seas higher than expected, single	Second in Command: Josh ft to S) Flown: 20-24, 27 to S) Flown: 31-28 nd 10-15 knots General Observations	eet         Plane: N1375I         HOBBS Start: 2700.5         HOBBS Stop: 2709.9         HOBBS Total: 9.4*

Pilot in Command: Mike Second in Command: Bob	Plane: <u>N1275M</u>
Observers: Erin - Left, Ryan - Right	110000 g
Time take off: $\frac{11:34}{11:24}$	HOBBS Start: 730.2
Land for lunch: 11:34	
Track Lines and Direction (e.g. N to S) Flown: <u>30 - 34</u>	
Take off after lunch: NA	HOBBS Stop: 734.9
Land: NA	HOBBS Total: 4.7
Track Lines and Direction (e.g. N to S) Flown: <u>31 - 28</u> Overall weather: <u>BSS 2-4</u>	
General Observations	
Partly cloudy in the morning and then sunny, Nine sightings in total for	or the day
	Transit effort leg:No
	Date: 12/1/2012
USWTR Daily Plane Log She	Date: <u>12/1/2012</u>
USWTR Daily Plane Log She	
	et
Pilot in Command: Bob Second in Command: Mike	
Pilot in Command: Bob Second in Command: Mike Observers: Ryan - Left, Erin - Right	et Plane: <u>N1275M</u>
Pilot in Command: Bob Second in Command: Mike Observers: Ryan - Left, Erin - Right Time take off: 9:11	et
Pilot in Command: Bob Second in Command: Mike Observers: Ryan - Left, Erin - Right Time take off: 9:11 Land for lunch: 11:47	et Plane: <u>N1275M</u>
Pilot in Command: Bob Second in Command: Mike Observers: Ryan - Left, Erin - Right Time take off: 9:11	et Plane: <u>N1275M</u>
Pilot in Command: Bob Second in Command: Mike Observers: Ryan - Left, Erin - Right Time take off: 9:11 Land for lunch: 11:47 Track Lines and Direction (e.g. N to S) Flown: 36 - 39 Take off after lunch: 12:37	et Plane: <u>N1275M</u> HOBBS Start: <u>734.9</u>
Pilot in Command: Bob Second in Command: Mike Observers: Ryan - Left, Erin - Right Time take off: 9:11 Land for lunch: 11:47 Track Lines and Direction (e.g. N to S) Flown: 36 - 39 Take off after lunch: 12:37	et Plane: <u>N1275M</u>
Pilot in Command: Bob Second in Command: Mike Observers: Ryan - Left, Erin - Right Time take off: 9:11 Land for lunch: 11:47 Track Lines and Direction (e.g. N to S) Flown: 36 - 39 Take off after lunch: 12:37 Land: 15:09 Track Lines and Direction (e.g. N to S) Flown: 45 - 42	et         Plane: N1275M         HOBBS Start: 734.9         HOBBS Stop: 740.4
Pilot in Command: Bob Second in Command: Mike Observers: Ryan - Left, Erin - Right Time take off: 9:11 Land for lunch: 11:47 Track Lines and Direction (e.g. N to S) Flown: 36 - 39 Take off after lunch: 12:37 Land: 15:09 Track Lines and Direction (e.g. N to S) Flown: 45 - 42	et         Plane: N1275M         HOBBS Start: 734.9         HOBBS Stop: 740.4
Pilot in Command: Bob       Second in Command: Mike         Observers: Ryan - Left, Erin - Right       Time take off: 9:11         Time take off: 9:11       Image: Second in Command: Mike         Land for lunch: 11:47       Track Lines and Direction (e.g. N to S) Flown: 36 - 39         Take off after lunch: 12:37       Image: Land: 15:09         Track Lines and Direction (e.g. N to S) Flown: 45 - 42       Overall weather: Clear skies, light winds but rough seas	et         Plane: N1275M         HOBBS Start: 734.9         HOBBS Stop: 740.4
Pilot in Command: Bob Second in Command: Mike Observers: Ryan - Left, Erin - Right Time take off: 9:11 Land for lunch: 11:47 Track Lines and Direction (e.g. N to S) Flown: 36 - 39 Take off after lunch: 12:37 Land: 15:09 Track Lines and Direction (e.g. N to S) Flown: 45 - 42	et Plane: <u>N1275M</u> HOBBS Start: <u>734.9</u> HOBBS Stop: <u>740.4</u> HOBBS Total: <u>5.5</u>
Pilot in Command: Bob       Second in Command: Mike         Observers: Ryan - Left, Erin - Right       Time take off: 9:11         Time take off: 9:11       11:47         Land for lunch: 11:47       Track Lines and Direction (e.g. N to S) Flown: 36 - 39         Take off after lunch: 12:37       13:09         Track Lines and Direction (e.g. N to S) Flown: 45 - 42         Overall weather: Clear skies, light winds but rough seas         General Observations	et Plane: <u>N1275M</u> HOBBS Start: <u>734.9</u> HOBBS Stop: <u>740.4</u> HOBBS Total: <u>5.5</u>
Pilot in Command: Bob       Second in Command: Mike         Observers: Ryan - Left, Erin - Right       Time take off: 9:11         Time take off: 9:11       11:47         Land for lunch: 11:47       Track Lines and Direction (e.g. N to S) Flown: 36 - 39         Take off after lunch: 12:37       13:09         Track Lines and Direction (e.g. N to S) Flown: 45 - 42         Overall weather: Clear skies, light winds but rough seas         General Observations	et Plane: <u>N1275M</u> HOBBS Start: <u>734.9</u> HOBBS Stop: <u>740.4</u> HOBBS Total: <u>5.5</u>
Pilot in Command: Bob       Second in Command: Mike         Observers: Ryan - Left, Erin - Right       Time take off: 9:11         Time take off: 9:11       11:47         Land for lunch: 11:47       Track Lines and Direction (e.g. N to S) Flown: 36 - 39         Take off after lunch: 12:37       13:09         Track Lines and Direction (e.g. N to S) Flown: 45 - 42         Overall weather: Clear skies, light winds but rough seas         General Observations	et Plane: <u>N1275M</u> HOBBS Start: <u>734.9</u> HOBBS Stop: <u>740.4</u> HOBBS Total: <u>5.5</u>
Pilot in Command: Bob       Second in Command: Mike         Observers: Ryan - Left, Erin - Right       Time take off: 9:11         Time take off: 9:11       11:47         Land for lunch: 11:47       Track Lines and Direction (e.g. N to S) Flown: 36 - 39         Take off after lunch: 12:37       13:09         Track Lines and Direction (e.g. N to S) Flown: 45 - 42         Overall weather: Clear skies, light winds but rough seas         General Observations	et Plane: <u>N1275M</u> HOBBS Start: <u>734.9</u> HOBBS Stop: <u>740.4</u> HOBBS Total: <u>5.5</u>
Pilot in Command: Bob       Second in Command: Mike         Observers: Ryan - Left, Erin - Right       Time take off: 9:11         Time take off: 9:11       11:47         Land for lunch: 11:47       Track Lines and Direction (e.g. N to S) Flown: 36 - 39         Take off after lunch: 12:37       13:09         Track Lines and Direction (e.g. N to S) Flown: 45 - 42         Overall weather: Clear skies, light winds but rough seas         General Observations	et Plane: <u>N1275M</u> HOBBS Start: <u>734.9</u> HOBBS Stop: <u>740.4</u> HOBBS Total: <u>5.5</u>
Pilot in Command: Bob       Second in Command: Mike         Observers: Ryan - Left, Erin - Right       Time take off: 9:11         Time take off: 9:11       11:47         Land for lunch: 11:47       Track Lines and Direction (e.g. N to S) Flown: 36 - 39         Take off after lunch: 12:37       13:09         Track Lines and Direction (e.g. N to S) Flown: 45 - 42         Overall weather: Clear skies, light winds but rough seas         General Observations	et Plane: <u>N1275M</u> HOBBS Start: <u>734.9</u> HOBBS Stop: <u>740.4</u> HOBBS Total: <u>5.5</u>

Pilot in Command: Bob	Second in Command: Mike	Plane: N1275M
Observers: Erin - Left, Ryan - Rig	ht	
Time take off: 8:16	_	HOBBS Start: 741.8
Land for lunch: 11:41	_	
Track Lines and Direction (e.g. N	I to S) Flown: <u>20 - 23</u>	
Take off after lunch: 12:46		HOBBS Stop: <u>748.5</u>
Land: 15:38		HOBBS Total: 6.7
Track Lines and Direction (e.g. N	I to S) Flown: 24 & 25	
Overall weather: Good sea states	s between 1 - 3	
	<b>General Observations</b>	
12 sightings - 2 near shore hump	backs	
Few tracklines in the afternoon be	ecause of humpback sighting and fa	ading light conditions. Large group
of Zca.		
		Transit effort leg:No

	nday, Ja	nuary 30, 2012 ${ m Sig}$	hting # 1	
Initial sighting (	on Trac	k		
Time: <u>9:37</u>		<u>3</u> Lat:	34.44632	Long: -75.525185
Vertical Angle:	2	Horizontal Bearin		100 Sighting Cue: Body
On/Off Effort:		Trackline:		Beaufort Sea State: <u>5</u>
Observer: E	rin	Observer sid	de: Right	1
Actual Time and	d Positi	on of Sighting		
Time: 9:41	WP#:	4 Lat:	34.45636	Long: -75.556625
Species:Unidentifi	ed Delphii	nid	Numbers (L	ow/High/Best): 1/1/1
Features used in	Species	ID: See comments b	elow	• <i>i</i>
		sed for Species ID:		N/A
Photographer:		Frame numbers:		Spacer: N/A
Calculated distar	nce from	Trackline:	N/A	
Final Time and	Positio	n of Sighting		
Time: N/A	WP#:	N/A Lat:	N/A	Long: N/A
Calculated Dista	nce Trav	veled:	N/A	
Behavior and A	ddition	al Comments		
			w the surface An	imal slightly larger than a dolphin.
Single light colored	unnuru	avening very lase selo		
Мо	nday, Ja	nuary 30, 2012 ${ m Sig}$	hting # 2	
Mo Initial sighting (		nuary 30, 2012 Sigi <b>k</b>	hting # 2	
	on Trac	U	hting # 2	Long: -75.437848
Initial sighting of Time: 11:44	on Trac WP#:	<b>k</b> <u>24</u> Lat:	34.8827	Long: -75.437848 90 Sighting Cue: Body
Initial sighting of Time: 11:44	on Trac WP#: 1	k	34.8827 g in Degrees:	
Initial sighting of Time: <u>11:44</u> Vertical Angle:	<b>On Trac</b> WP#: 1 On	k 24 Lat: Horizontal Bearin	34.8827 g in Degrees:	90 Sighting Cue: Body
Initial sighting of Time: <u>11:44</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>E</u>	on Trac WP#: 1 On rin	k 24 Lat: Horizontal Bearin Trackline: Observer sig	34.8827 g in Degrees:	90 Sighting Cue: Body
Initial sighting of Time: <u>11:44</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>E</u> Actual Time and	M Trac WP#: <u>1</u> On rin d Positi	k 24 Lat: Horizontal Bearin Trackline: Observer sid	34.8827 g in Degrees: 25 de:Right	90       Sighting Cue:       Body         Beaufort Sea State:       4
Initial sighting of Time: <u>11:44</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>E</u> Actual Time and Time: <u>11;45</u>	WP#: On rin WP#: On rin d Positio WP#:	k 24 Lat: Horizontal Bearin Trackline: Observer sig	34.8827 g in Degrees: 25 de: 34.88733	90     Sighting Cue:     Body       Beaufort Sea State:     4       Long:     -75.433136
Initial sighting of         Time:       11:44         Vertical Angle:          On/Off Effort:          Observer:          Actual Time and          Time:          Species:       Tursiops to	on Trac WP#: <u>1</u> On rin d Positio WP#:	k          24       Lat:         Horizontal Bearin         Trackline:         Observer side         on of Sighting         25	34.8827 g in Degrees: 25 de: Right 34.88733 Numbers (Lo	90       Sighting Cue:       Body         Beaufort Sea State:       4         Long:       -75.433136         ow/High/Best):       2 / 3 / 3
Initial sighting of Time: <u>11:44</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time and Time: <u>11:45</u> Species: <i>Tursiops tr</i> Features used in	on Trac WP#: <u>1</u> On rin d Positio WP#:	k          24       Lat:         Horizontal Bearin         Trackline:         Observer side         on of Sighting         25	34.8827 g in Degrees: 25 de: Right 34.88733 Numbers (Lo	90     Sighting Cue:     Body       Beaufort Sea State:     4       Long:     -75.433136
Initial sighting of Time: <u>11:44</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>E</u> Actual Time and Time: <u>11:45</u> Species: <i>Tursiops tr</i> Features used in up to dorsal fin	Description of the second seco	k          24       Lat:         Horizontal Bearin         Trackline:         Observer side         on of Sighting         25       Lat:         ID:         Robust body app	34.8827 g in Degrees: de: 34.88733 Numbers (Lupearance, uniform	90       Sighting Cue:       Body         Beaufort Sea State:       4
Initial sighting of Time: <u>11:44</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time and Time: <u>11:45</u> Species: <i>Tursiops tr</i> Features used in up to dorsal fin Representative in	on Trac WP#: <u>1</u> On rin d Positie WP#: Species mages us	k          24       Lat:         Horizontal Bearin         Trackline:         Observer side         on of Sighting         25         Lat:         ID:         Robust body appended         seed for Species ID:	34.8827 g in Degrees: 25 de: de:Right 34.88733 Numbers (Lo pearance, uniform 67	90       Sighting Cue:       Body         Beaufort Sea State:       4
Initial sighting of Time: <u>11:44</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time and Time: <u>11:45</u> Species: <i>Tursiops tr</i> Features used in <u>up to dorsal fin</u> Representative in Photographer: <u></u>	on Trac WP#: <u>1</u> On rin d Positie WP#: cuncatus Species mages us Erin	k          24       Lat:         Horizontal Bearin         Trackline:         Observer side         on of Sighting         25       Lat:         ID:       Robust body app         sed for Species ID:         Frame numbers:	34.8827 g in Degrees:	90       Sighting Cue:       Body         Beaufort Sea State:       4
Initial sighting of Time: <u>11:44</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time and Time: <u>11:45</u> Species: <i>Tursiops tr</i> Features used in <u>up to dorsal fin</u> Representative in Photographer: <u>Calculated distar</u>	on Trac WP#: <u>1</u> On rin d Position WP#: Species mages us Erin ace from	k          24       Lat:         Horizontal Bearin         Trackline:         Observer side         on of Sighting         25       Lat:         ID:       Robust body app         sed for Species ID:         Frame numbers:         Trackline:	34.8827 g in Degrees: 25 de: de:Right 34.88733 Numbers (Lo pearance, uniform 67	90       Sighting Cue:       Body         Beaufort Sea State:       4
Initial sighting of Time: <u>11:44</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time and Time: <u>11:45</u> Species: <i>Tursiops ti</i> Features used in <u>up to dorsal fin</u> Representative in Photographer: <u>Calculated distar</u> Final Time and	on Trac WP#: <u>1</u> On rin d Positie WP#: Species mages us Erin nce from Position	k          24       Lat:         Horizontal Bearin         Trackline:         Observer side         on of Sighting         25       Lat:         ID:       Robust body app         sed for Species ID:         Frame numbers:         Trackline:         n of Sighting	34.8827 g in Degrees: 25 de: Right 34.88733 Numbers (La bearance, uniform 67 6727 - 6768 6727 - 6768 6727 - 6768	90       Sighting Cue:       Body         Beaufort Sea State:       4
Initial sighting of Time: <u>11:44</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time and Time: <u>11:45</u> Species: <i>Tursiops tr</i> Features used in <u>up to dorsal fin</u> Representative in Photographer: <u>0</u> Calculated distar Final Time and Time: <u>11:50</u>	on Trac WP#: <u>1</u> On rin d Position WP#: Species mages us <u>Erin</u> nce from <b>Position</b> WP#:	k          24       Lat:         Horizontal Bearin         Trackline:         Observer side         on of Sighting         25       Lat:         ID:       Robust body app         sed for Species ID:         Frame numbers:         Trackline:         and Sighting         26	34.8827 g in Degrees: 25 de: Right 34.88733 Numbers (La bearance, uniform 67 6727 - 6768 0.67 km 34.88121	90       Sighting Cue:       Body         Beaufort Sea State:       4
Initial sighting of Time: 11:44 Vertical Angle: 0n/Off Effort: 0 Observer: E Actual Time and Time: 11:45 Species: Tursiops th Features used in up to dorsal fin Representative in Photographer: 0 Calculated distar Final Time and Time: 11:50 Calculated Dista	on Trac WP#: <u>1</u> On rin d Position WP#: mages us <u>Erin</u> nee from <b>Position</b> WP#: nce Trav	k          24       Lat:         Horizontal Bearin         Trackline:         Observer side         on of Sighting         25       Lat:         ID:       Robust body app         sed for Species ID:         Frame numbers:         Trackline:         a         26       Lat:         26       Lat:         26       Lat:         26       Lat:         26       Lat:         26       Lat:	34.8827 g in Degrees: 25 de: Right 34.88733 Numbers (La bearance, uniform 67 6727 - 6768 6727 - 6768 6727 - 6768	90       Sighting Cue:       Body         Beaufort Sea State:       4
Initial sighting of Time: <u>11:44</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time and Time: <u>11:45</u> Species: <i>Tursiops tr</i> Features used in <u>up to dorsal fin</u> Representative in Photographer: <u>Calculated distar</u> Final Time and Time: <u>11:50</u> Calculated Dista Behavior and A	on Trac WP#: <u>1</u> On rin d Position WP#: Species mages us Erin nce from <b>Position</b> WP#: nce Trav	k          24       Lat:         Horizontal Bearin         Trackline:         Observer side         on of Sighting         25       Lat:         ID:       Robust body app         sed for Species ID:         Frame numbers:         Trackline:         of Sighting         26       Lat:         veled:       1.1         al Comments	34.8827 g in Degrees: 25 de: 34.88733 Numbers (Lu bearance, uniform 67 6727 - 6768 0.67 km 34.88121 3 km	90       Sighting Cue:       Body         Beaufort Sea State:       4
Initial sighting of Time: 11:44 Vertical Angle: On/Off Effort: Observer: E Observer: E Actual Time and Time: 11:45 Species: <i>Tursiops tr</i> Features used in up to dorsal fin Representative in Photographer: Calculated distar Final Time and Time: 11:50 Calculated Dista Behavior and A Traveling as a pair u	on Trac WP#: <u>1</u> On rin d Positie WP#: worcatus Species mages us <u>Erin</u> nee from <b>Position</b> WP#: nce Trav ddition	k          24       Lat:         Horizontal Bearin         Trackline:         Observer side         on of Sighting         25       Lat:         ID:       Robust body app         sed for Species ID:         Frame numbers:         Trackline:         of Sighting         26       Lat:         veled:       1.1         al Comments	34.8827 g in Degrees:	90       Sighting Cue:       Body         Beaufort Sea State:       4
Initial sighting of Time: 11:44 Vertical Angle: On/Off Effort: Observer: E Observer: E Actual Time and Time: 11:45 Species: <i>Tursiops tr</i> Features used in up to dorsal fin Representative in Photographer: Calculated distar Final Time and Time: 11:50 Calculated Dista Behavior and A Traveling as a pair u	on Trac WP#: <u>1</u> On rin d Positie WP#: worcatus Species mages us <u>Erin</u> nee from <b>Position</b> WP#: nce Trav ddition	k          24       Lat:         Horizontal Bearin         Trackline:         Observer side         on of Sighting         25       Lat:         ID:       Robust body app         sed for Species ID:         Frame numbers:         Trackline:         of Sighting         26       Lat:         veled:       1.1         al Comments	34.8827 g in Degrees:	90       Sighting Cue:       Body         Beaufort Sea State:       4

Monday, J	anuary 30	, 2012 Sig	hting # 3				
Initial sighting on Tra	ck	C	C				
Time: 11:57 WP#	28	Lat:	35.01103	L	ong:	-75.60	1892
Vertical Angle: 4	Horizon	ntal Bearin	g in Degrees:	90	Sighting	g Cue:	Breach
On/Off Effort: On	Т	rackline:	25	Beauf	ort Sea S	state:	4
Observer: Erin	C	bserver si	de: Right				
Actual Time and Position of Sighting							
Time: 12:03 WP#	30	Lat:	35.04841	L	ong:	-75.55	8142
Species:Megaptera novae	angliae		Numbers (I	Low/Hi	gh/Best)	: 1	/1/1
Features used in Specie	s ID: <u>Larg</u>	e knobby, w	hite pectoral fine	s, deep V	/ to cauda	l fin	
Representative images	used for S	Species ID:	6	5770, 678	82, 6784, 6	5789	
Photographer: Erin	Frame	numbers:	6770 - 679	95	Space	r:	6796
Calculated distance from	n Trackli	ne:	5.75 km				
Final Time and Positie	on of Sigl	nting					
Time: 12:17 WP#	31	Lat:	35.04384	L	ong:	-75.54	8710
Calculated Distance Tra	aveled:	1.0	)0 km				
<b>Behavior and Addition</b>	nal Comi	nents					
Saw animals splash from br	eaching - c	luring subse	quent sightings	animal c	love from	sight qu	ickly after
surfacing.							

Tuesday, January 31, 2012 ${ m Sighting}~\#$ 1
Initial sighting on Track
Time: 10:34 WP#: 65 Lat: 35.691722 Long: -74.630828
Vertical Angle: <u>1</u> Horizontal Bearing in Degrees: <u>100</u> Sighting Cue: <u>Splash</u>
On/Off Effort: On Trackline: <u>39</u> Beaufort Sea State: <u>4</u>
Observer: Erin Observer side: Left
Actual Time and Position of Sighting
Time: 10:42 WP#: 66 Lat: 35.691736 Long: -74.630091
Species: <i>Ziphius cavirostris</i> Numbers (Low/High/Best): 1/1/1
Features used in Species ID: Large white/ grey bodied animal. Scaring down back, dorsal fin set
far back on body
Representative images used for Species ID: 6799, 6800, 6802-04
Photographer:         Ryan         Frame numbers:         6797 - 6809         Spacer:         6810
Calculated distance from Trackline: 0.07 km
Final Time and Position of Sighting
Time:         10:42         WP#:         66         Lat:         35.692390         Long:         -74.624678
Calculated Distance Traveled: 0.49 km
Behavior and Additional Comments
Large body, hung at surface for a quick period. Observed one blow. Lots of scaring.
Tuesday, January 31, 2012 Sighting # 2
Tuesday, January 31, 2012 Sighting # 2 Initial sighting on Track
Initial sighting on Track
Initial sighting on Track           Time:         11:42         WP#:         80         Lat:         35.551803         Long:         -74.700371
Initial sighting on TrackTime:11:42WP#:80Lat:35.551803Long:-74.700371Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:Splash
Initial sighting on TrackTime:11:42WP#:80Lat:35.551803Long:-74.700371Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OnTrackline:37Beaufort Sea State:4
Initial sighting on Track         Time:       11:42       WP#:       80       Lat:       35.551803       Long:       -74.700371         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       4         Observer:       Erin       Observer side:       Left       Left
Initial sighting on TrackTime:11:42WP#:80Lat:35.551803Long:-74.700371Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OnTrackline:37Beaufort Sea State:4Observer:ErinObserver side:Left
Initial sighting on TrackTime:11:42WP#:80Lat:35.551803Long:-74.700371Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OnTrackline:37Beaufort Sea State:4Observer:ErinObserver side:Left
Initial sighting on TrackTime:11:42WP#:80Lat:35.551803Long:-74.700371Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OnTrackline:37Beaufort Sea State:4Observer:ErinObserver side:LeftActual Time and Position of SightingTime:11:46WP#:81Lat:35.560197Long:-74.700421Species:Unidentified MesoplodonNumbers (Low/High/Best):4/4/4
Initial sighting on TrackTime:11:42WP#:80Lat:35.551803Long:-74.700371Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OnTrackline:37Beaufort Sea State:4Observer:ErinObserver side:LeftActual Time and Position of SightingTime:11:46WP#:81Lat:35.560197Long:-74.700421Species:Unidentified MesoplodonNumbers (Low/High/Best):4/4/4
Initial sighting on TrackTime:11:42WP#:80Lat:35.551803Long:-74.700371Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OnTrackline:37Beaufort Sea State:4Observer:ErinObserver side:LeftActual Time and Position of SightingTime:11:46WP#:81Lat:35.560197Long:-74.700421Species:Unidentified MesoplodonNumbers (Low/High/Best):4/4/4Features used in Species ID:Large bodied animals with dorsal fin set way back on the body.Representative images used for Species ID:6812Photographer:RyanFrame numbers:6811 - 6814Spacer:6815
Initial sighting on Track         Time:       11:42       WP#:       80       Lat:       35.551803       Long:       -74.700371         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       4         Observer:       Erin       Observer side:       Left       4         Actual Time and Position of Sighting       Time:       11:46       WP#:       81       Lat:       35.560197       Long:       -74.700421         Species: Unidentified Mesoplodon       Numbers (Low/High/Best):       4/4/4         Features used in Species ID:       Large bodied animals with dorsal fin set way back on the body.         Representative images used for Species ID:       6812
Initial sighting on TrackTime:11:42WP#:80Lat:35.551803Long:-74.700371Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OnTrackline:37Beaufort Sea State:4Observer:ErinObserver side:LeftActual Time and Position of SightingTime:11:46WP#:81Lat:35.560197Long:-74.700421Species:Unidentified MesoplodonNumbers (Low/High/Best):4/4/4Features used in Species ID:Large bodied animals with dorsal fin set way back on the body.End to species ID:Photographer:RyanFrame numbers:6811-6814Spacer:6815Calculated distance from Trackline:0.93 km
Initial sighting on Track         Time:       11:42       WP#:       80       Lat:       35.551803       Long:       -74.700371         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       4         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       11:46       WP#:       81       Lat:       35.560197       Long:       -74.700421         Species:       Unidentified Mesoplodon       Numbers (Low/High/Best):       4/4/4         Features used in Species ID:       Large bodied animals with dorsal fin set way back on the body.
Initial sighting on TrackTime:11:42WP#:80Lat:35.551803Long:-74.700371Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OnTrackline:37Beaufort Sea State:4Observer:ErinObserver side:LeftActual Time and Position of SightingTime:11:46WP#:81Lat:35.560197Long:-74.700421Species:Unidentified MesoplodonNumbers (Low/High/Best):4/4/4Features used in Species ID:Large bodied animals with dorsal fin set way back on the body.Representative images used for Species ID:6812Photographer:RyanFrame numbers:6811 - 6814Spacer:6815Calculated distance from Trackline:0.93 kmFinal Time and Position of SightingTime:11:54WP#:82Lat:35.562393Long:-74.697688
Initial sighting on Track         Time:       11:42       WP#:       80       Lat:       35.551803       Long:       -74.700371         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       4         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       11:46       WP#:       81       Lat:       35.560197       Long:       -74.700421         Species:Unidentified Mesoplodon       Numbers (Low/High/Best):       4/4/4         Features used in Species ID:       Large bodied animals with dorsal fin set way back on the body.
Initial sighting on TrackTime:11:42WP#:80Lat:35.551803Long:-74.700371Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OnTrackline:37Beaufort Sea State:4Observer:ErinObserver side:LeftActual Time and Position of SightingTime:11:46WP#:81Lat:35.560197Long:-74.700421Species:Unidentified MesoplodonNumbers (Low/High/Best):4 / 4 / 4Features used in Species ID:Large bodied animals with dorsal fin set way back on the body.Representative images used for Species ID:6812Photographer:RyanFrame numbers:6811 - 6814Spacer:6815Calculated distance from Trackline:0.93 kmFinal Time and Position of SightingTime:11:54WP#:82Lat:35.562393Long:-74.697688Calculated Distance Traveled:0.35 kmBehavior and Additional Comments
Initial sighting on Track         Time:       11:42       WP#:       80       Lat:       35.551803       Long:       -74.700371         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       4         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       11:46       WP#:       81       Lat:       35.560197       Long:       -74.700421         Species:Unidentified Mesoplodon       Numbers (Low/High/Best):       4/4/4         Features used in Species ID:       Large bodied animals with dorsal fin set way back on the body.

Tues	sday, Ja	nuary 31,	2012 Sigh	iting # 3		
Initial sighting o	n Trac	k	C	C		
Time: 12:18	WP#:	85	Lat:	35.480831	Long:	-74.794658
Vertical Angle:	1	Horizon	tal Bearing	g in Degrees:	90 Sighting	Cue: Splash
On/Off Effort:	On	Tr	ackline:	85	Beaufort Sea Sta	ate:4
Observer: Rya	an	O	bserver sid	e: Right	_	
Actual Time and	l Positi	on of Sig	hting			
Time: 12:21	WP#:	86	Lat:	35.487627	Long:	-74.803840
Species:Unidentifie					.ow/High/Best):	
Features used in S	Species	ID: Large	e, fast, white	bodied animals	not staying on surfa	ace for more
than 30 seconds.		10.0	· 15			
Representative in					NA	NIA
Photographer:			numbers: _	1.12 km	Spacer:	NA
Calculated distant				1.12 km		
Final Time and 1			-		_	
Time: <u>12:37</u>		87		35.485791	Long:	-74.796125
Calculated Distan	ice Trav	veled:	0.72	2 km		
Behavior and Ac	dition	al Comn	nents			
Animals were traveli	ng throu	ugh the wa	ter very fast	. Not staying on	the surface for very	/ long. Unable
to get photographs.	While o	on this sigh	ting a group	of Tursiops carr	ne into view.	
			2012 Sigh	ting $\#$ 4		
Initial sighting o			T /			
Time: <u>12:18</u>	WP#:		Lat:	35.480831	Long:	
Vertical Angle:				g in Degrees:	<u>90</u> Sighting	
On/Off Effort:			ackline:		Beaufort Sea Sta	ate: 4
Observer: Rya			bserver sid	e: Right	_	
Actual Time and		U	. 0			
Time: 12:21		86	Lat:		Long:	
Species: Tursiops tru				· · · ·	.ow/High/Best):	6/6/6
Features used in S	species	ID: <u>Robu</u>	st uniform g	rey animals		
Poprosontativo in		and for Si	paging ID:		6022 6024	
Representative in	-	-	numbers:	6816 - 682	6822 - 6824	6829
Photographer: F Calculated distant	tyan			0810-082	8 Spacer:	0829
		Tradulir		1 1 2 km		
	ce from			1.12 km		
Final Time and	ce from Positio	n of Sigh	ting			
<b>Final Time and</b> I Time: <u>13:37</u>	ce from Position WP#:	n of Sigh 87	ting Lat:	35.485791	Long:	
Final Time and	ce from Position WP#:	n of Sigh 87	ting Lat:		Long:	
<b>Final Time and</b> I Time: <u>13:37</u>	ce from Position WP#: nce Trav	n of Sigh 87 veled:	ting Lat:	35.485791	Long:	
Final Time and D Time: <u>13:37</u> Calculated Distan	ce from Position WP#: nce Trav Idition	n of Sigh 87 veled: al Comm	ting Lat:	35.485791 2 km		
Final Time and I Time: <u>13:37</u> Calculated Distan Behavior and Ac	ce from Position WP#: nce Trav Idition	n of Sigh 87 veled: al Comm	ting Lat:	35.485791 2 km		
Final Time and I Time: <u>13:37</u> Calculated Distan Behavior and Ac	ce from Position WP#: nce Trav Idition	n of Sigh 87 veled: al Comm	ting Lat:	35.485791 2 km		

	Sighting # 5
Initial sighting on Track	
Time: <u>14:26</u> WP#: <u>96</u> Lat	: 35.411671 Long: -74.517878
Vertical Angle: 2 Horizontal B	earing in Degrees: <u>90</u> Sighting Cue: <u>Body</u>
On/Off Effort: On Trackli	ne: 35 Beaufort Sea State: 3
Observer: Erin Observ	ver side: Left
Actual Time and Position of Sighting	g
Time: 14:28 WP#: 97 Lat	: 35.418673 Long: -74.516484
Species:Balaenoptera acutorostrata	Numbers (Low/High/Best): 2/2/2
Features used in Species ID: Large dark	fusiform body, baleen whale with white pectoral fins.
Representative images used for Specie	
Photographer: <u>Ryan</u> Frame numl	1
Calculated distance from Trackline:	0.78 km
Final Time and Position of Sighting	
Time: <u>14:46</u> WP#: <u>98</u> Lat	: 35.432965 Long: -74.513941
Calculated Distance Traveled:	1.61 km
Behavior and Additional Comments	
Hanging just below the surface, staying close	
Tuesday, January 31, 2012	Sighting # 6
Initial sighting on Track	
$T_{1}$ $15.25$ $WDH$ 104 Lot	
	: <u>35.223686</u> Long: <u>-74.785283</u>
Vertical Angle: 2 Horizontal B	earing in Degrees: 60 Sighting Cue: Blow
Vertical Angle: 2 Horizontal B On/Off Effort: On Trackli	earing in Degrees:60Sighting Cue:Blowne:33Beaufort Sea State:3
Vertical Angle: 2 Horizontal B On/Off Effort: On Trackli	earing in Degrees: 60 Sighting Cue: Blow
Vertical Angle: <u>2</u> Horizontal B On/Off Effort: <u>On</u> Trackli Observer: <u>Ryan</u> Observ	earing in Degrees:       60       Sighting Cue:       Blow         ne:       33       Beaufort Sea State:       3         ver side:       Right       3       3
Vertical Angle: 2 Horizontal B On/Off Effort: On Trackli Observer: Ryan Observ Actual Time and Position of Sighting	earing in Degrees: <u>60</u> Sighting Cue: <u>Blow</u> ne: <u>33</u> Beaufort Sea State: <u>3</u> ver side: <u>Right</u>
Vertical Angle: <u>2</u> Horizontal B On/Off Effort: <u>On</u> Trackli Observer: <u>Ryan</u> Observ	earing in Degrees: <u>60</u> Sighting Cue: <u>Blow</u> ne: <u>33</u> Beaufort Sea State: <u>3</u> ver side: <u>Right</u>
Vertical Angle: 2 Horizontal B On/Off Effort: On Trackli Observer: Ryan Observ Actual Time and Position of Sighting Time: 15:35 WP#: 105 Lat Species: Physeter macrocephalus	earing in Degrees: 60 Sighting Cue: Blow ne: 33 Beaufort Sea State: 3 ver side: Right g :: 35.227815 Long: -74.785030
Vertical Angle: 2 Horizontal B On/Off Effort: On Trackli Observer: Ryan Observ Actual Time and Position of Sighting Time: 15:35 WP#: 105 Lat Species: Physeter macrocephalus Features used in Species ID: Large grey	earing in Degrees: 60 Sighting Cue: Blow ne: 33 Beaufort Sea State: 3 ver side: Right g :: 35.227815 Long: -74.785030 Numbers (Low/High/Best): 1/1/1
Vertical Angle: 2 Horizontal B On/Off Effort: On Trackli Observer: Ryan Observ Actual Time and Position of Sighting Time: 15:35 WP#: 105 Lat Species: Physeter macrocephalus	earing in Degrees: 60 Sighting Cue: Blow ne: 33 Beaufort Sea State: 3 ver side: Right g :: 35.227815 Long: -74.785030 Numbers (Low/High/Best): 1/1/1 colored animal with forward blow. Wrinkled appearance
Vertical Angle: 2 Horizontal B On/Off Effort: On Trackli Observer: Ryan Observ Actual Time and Position of Sighting Time: 15:35 WP#: 105 Lat Species: Physeter macrocephalus Features used in Species ID: Large grey to skin.	earing in Degrees: 60 Sighting Cue: Blow ne: 33 Beaufort Sea State: 3 ver side: Right g :: 35.227815 Long: -74.785030 Numbers (Low/High/Best): 1/1/1 colored animal with forward blow. Wrinkled appearance s ID: NA
Vertical Angle: 2 Horizontal B On/Off Effort: On Trackli Observer: Ryan Observ Actual Time and Position of Sighting Time: 15:35 WP#: 105 Lat Species: Physeter macrocephalus Features used in Species ID: Large grey to skin. Representative images used for Specie	earing in Degrees: 60 Sighting Cue: Blow ne: 33 Beaufort Sea State: 3 ver side: Right g :: 35.227815 Long: -74.785030 Numbers (Low/High/Best): 1/1/1 colored animal with forward blow. Wrinkled appearance s ID: NA
Vertical Angle: 2 Horizontal B On/Off Effort: On Trackli Observer: Ryan Observ Actual Time and Position of Sighting Time: 15:35 WP#: 105 Lat Species: Physeter macrocephalus Features used in Species ID: Large grey to skin. Representative images used for Specie Photographer: Ryan Frame numb Calculated distance from Trackline:	earing in Degrees: 60 Sighting Cue: Blow ne: 33 Beaufort Sea State: 3 ver side: Right g :: 35.227815 Long: -74.785030 Numbers (Low/High/Best): 1/1/1 colored animal with forward blow. Wrinkled appearance s ID: NA pers: NA Spacer: NA
Vertical Angle: 2 Horizontal B On/Off Effort: On Trackli Observer: Ryan Observ Actual Time and Position of Sighting Time: 15:35 WP#: 105 Lat Species: Physeter macrocephalus Features used in Species ID: Large grey to skin. Representative images used for Specie Photographer: Ryan Frame numb Calculated distance from Trackline: Final Time and Position of Sighting	earing in Degrees: 60 Sighting Cue: Blow ne: 33 Beaufort Sea State: 3 ver side: Right g :: 35.227815 Long: -74.785030 Numbers (Low/High/Best): 1/1/1 colored animal with forward blow. Wrinkled appearance is ID: NA Ders: NA Spacer: NA
Vertical Angle: 2 Horizontal B On/Off Effort: On Trackli Observer: Ryan Observ Actual Time and Position of Sighting Time: 15:35 WP#: 105 Lat Species: Physeter macrocephalus Features used in Species ID: Large grey to skin. Representative images used for Specie Photographer: Ryan Frame numb Calculated distance from Trackline:	earing in Degrees: 60 Sighting Cue: Blow ne: 33 Beaufort Sea State: 3 ver side: Right g :: 35.227815 Long: -74.785030 Numbers (Low/High/Best): 1/1/1 colored animal with forward blow. Wrinkled appearance is ID: NA Ders: NA Spacer: NA
Vertical Angle: 2 Horizontal B On/Off Effort: On Trackli Observer: Ryan Observ Actual Time and Position of Sighting Time: 15:35 WP#: 105 Lat Species: Physeter macrocephalus Features used in Species ID: Large grey to skin. Representative images used for Specie Photographer: Ryan Frame numb Calculated distance from Trackline: Final Time and Position of Sighting Time: 15:43 WP#: 106 Lat Calculated Distance Traveled:	earing in Degrees: 60 Sighting Cue: Blow ne: 33 Beaufort Sea State: 3 ver side: Right g :: 35.227815 Long: -74.785030 Numbers (Low/High/Best): 1/1/1 colored animal with forward blow. Wrinkled appearance is ID: NA o.46 km :: 35.225205 Long: -74.771976 1.22 km
Vertical Angle: <u>2</u> Horizontal B On/Off Effort: <u>On</u> Trackli Observer: <u>Ryan</u> Observ Actual Time and Position of Sighting Time: <u>15:35</u> WP#: <u>105</u> Lat Species: <i>Physeter macrocephalus</i> Features used in Species ID: <u>Large grey</u> to skin. Representative images used for Specie Photographer: <u>Ryan</u> Frame num Calculated distance from Trackline: <u></u> Final Time and Position of Sighting Time: <u>15:43</u> WP#: <u>106</u> Lat Calculated Distance Traveled: <u></u> Behavior and Additional Comments	earing in Degrees: 60 Sighting Cue: Blow ne: 33 Beaufort Sea State: 3 ver side: Right g :: 35.227815 Long: -74.785030 Numbers (Low/High/Best): 1/1/1 colored animal with forward blow. Wrinkled appearance is ID: NA o.46 km :: 35.225205 Long: -74.771976 1.22 km
Vertical Angle: 2 Horizontal B On/Off Effort: On Trackli Observer: Ryan Observ Actual Time and Position of Sighting Time: 15:35 WP#: 105 Lat Species: Physeter macrocephalus Features used in Species ID: Large grey to skin. Representative images used for Specie Photographer: Ryan Frame numb Calculated distance from Trackline: Final Time and Position of Sighting Time: 15:43 WP#: 106 Lat Calculated Distance Traveled:	earing in Degrees: 60 Sighting Cue: Blow ne: 33 Beaufort Sea State: 3 ver side: Right g :: 35.227815 Long: -74.785030 Numbers (Low/High/Best): 1/1/1 colored animal with forward blow. Wrinkled appearance is ID: NA o.46 km :: 35.225205 Long: -74.771976 1.22 km

On/Off Effort:       On       Trackline:       45       Beaufort Sea State:       4         Observer:       Ryan       Observer side:       Left       4         Actual Time and Position of Sighting         Time:       9:37       WP#:       6       Lat:       36.11883       Long:       -74.602939         Species:       Stenella coeruleoalba       Numbers (Low/High/Best):       400 / 475 /         Features used in Species ID:       Dark line from eye to pectoral and a second down to anus         Representative images used for Species ID:       6890, 6891, 6903, 6907, 6909, 6923, 6926, 692         Photographer:       Ryan       Frame numbers:       6877 - 6942       Spacer:       6943         Calculated distance from Trackline:       0.76 km       74.605667         Calculated Distance Traveled:       0.59 km       947       WP#:       7       Lat:       36.1237       Long:       -74.605667         Calculated Distance Traveled:       0.59 km       948       945       947       WP#:       7       Lat:       36.1237       Long:       -74.605667         Calculated Distance Traveled:       0.59 km       947       WP#:       7       Lat:       35.97938       Long:       -74.794661         Wednesday, Februar	9:35       WP#:       5       Lat:       36.12         Angle:       3       Horizontal Bearing in De         Effort:       On       Trackline:       45         r:       Ryan       Observer side:	grees: 90 Sighting Cue: Spla Beaufort Sea State: 4 Left 383 Long: -74.602939 bers (Low/High/Best): 400/475/ toral and a second down to anus 6891, 6903, 6907, 6909, 6923, 6926, 693 77 - 6942 Spacer: 6943 n 237 Long: -74.605667 ckly with large disturbance. Formed int adred.
Vertical Angle:       3       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splat         On/Off Effort:       On       Trackline:       45       Beaufort Sea State:       4         Observer:       Ryan       Observer side:       Left       4         Actual Time and Position of Sighting       Time:       9:37       WP#:       6       Lat:       36.11883       Long:       -74.602939         Species:Stenella coerulecalba       Numbers (Low/High/Best):       400 / 475 /         Features used in Species ID:       Dark line from eye to pectoral and a second down to anus         Representative images used for Species ID:       6877-6942       Spacer:       6943         Calculated distance from Trackline:       0.76 km       Final Time and Position of Sighting         Time:       9:47       WP#:       7       Lat:       36.1237       Long:       -74.605667         Calculated Distance Traveled:       0.59 km       Behavior and Additional Comments       Very large group of animals traveling fast and surfacing quickly with large disturbance. Formed int single group but then split into smaller groups of a few hundred.       Wednesday, February 1, 2012 Sighting #       2         Initial sighting on Track       Trackline:       43       Beaufort Sea State:       5         Observer:	Angle:       3       Horizontal Bearing in De         Effort:       On       Trackline:       45         r:       Ryan       Observer side:	grees: 90 Sighting Cue: Spla Beaufort Sea State: 4 Left 383 Long: -74.602939 bers (Low/High/Best): 400/475/ toral and a second down to anus 6891, 6903, 6907, 6909, 6923, 6926, 693 77 - 6942 Spacer: 6943 n 237 Long: -74.605667 ckly with large disturbance. Formed int adred.
On/Off Effort:       On       Trackline:       45       Beaufort Sea State:       4         Observer:       Ryan       Observer side:       Left         Actual Time and Position of Sighting         Time:       9:37       WP#:       6       Lat:       36.11883       Long:       -74.602939         Species:Stenella coeruleoalba       Numbers (Low/High/Best):       400/475 /         Features used in Species ID:       Dark line from eye to pectoral and a second down to anus         Representative images used for Species ID:       6890, 6891, 6903, 6907, 6909, 6923, 6926, 692         Photographer:       Ryan       Frame numbers:       6877 - 6942       Spacer:       6943         Calculated distance from Trackline:       0.76 km	Effort:       On       Trackline:       45         r:       Ryan       Observer side:	Beaufort Sea State:       4         Left
Observer:       Ryan       Observer side:       Left         Actual Time and Position of Sighting       Time:       9:37       WP#:       6       Lat:       36.11883       Long:       -74.602939         Species:Stenella coeruleoalba       Numbers (Low/High/Best):       400 / 475 /         Features used in Species ID:       Dark line from eye to pectoral and a second down to anus         Representative images used for Species ID:       6890, 6891, 6903, 6907, 6909, 6923, 6926, 692         Photographer:       Ryan       Frame numbers:       6877 - 6942       Spacer:       6943         Calculated distance from Trackline:       0.76 km       0.76 km       0.74.605667         Calculated Distance Traveled:       0.59 km       0.59 km       0.59 km         Behavior and Additional Comments       Werlenesday, February 1, 2012 Sighting # 2       100       Sighting on Track         Wednesday, February 1, 2012 Sighting # 2       100       Sighting Cue:       80         On/Off Effort:       On       Trackline:       43       Beaufort Sea State:       5         Observer:       Erin       Observer side:       Right       11/1       1/1       1/1         Actual Time and Position of Sighting       Trackline:       43       Beaufort Sea State:       5	r: Ryan Observer side: Fine and Position of Sighting 9:37 WP#: 6 Lat: 36.11 Stenella coeruleoalba Num used in Species ID: Dark line from eye to peed ntative images used for Species ID: 6890 apher: Ryan Frame numbers: 68 ed distance from Trackline: 0.76 k me and Position of Sighting 9:47 WP#: 7 Lat: 36.12 ed Distance Traveled: 0.59 km or and Additional Comments e group of animals traveling fast and surfacing qu up but then split into smaller groups of a few hum wednesday, February 1, 2012 Sighting # ighting on Track 10:32 WP#: 16 Lat: 35.97 Angle: 2 Horizontal Bearing in De Effort: On Trackline: 43 r: Erin Observer side:  Fine and Position of Sighting 10:32 WP#: 17 Lat: 35.97 Balaenoptera physalis Num	Left         383       Long:       -74.602939         bbers (Low/High/Best):       400 / 475 /         toral and a second down to anus       400 / 475 /         coral and a second down to anus       6891, 6903, 6907, 6909, 6923, 6926, 692         77 - 6942       Spacer:       6943         n       637       Long:       -74.605667         :37       Long:       -74.605667         ckly with large disturbance. Formed intendred.       5000000000000000000000000000000000000
Actual Time and Position of Sighting         Time:       9:37       WP#:       6       Lat:       36.11883       Long:       -74.602939         Species:Stenella coeruleoalba       Numbers (Low/High/Best):       400 / 475 /         Features used in Species ID:       Dark line from eye to pectoral and a second down to anus         Representative images used for Species ID:       6890, 6891, 6903, 6907, 6909, 6923, 6926, 692         Photographer:       Ryan       Frame numbers:       6877 - 6942       Spacer:       6943         Calculated distance from Trackline:       0.76 km	Fine and Position of Sighting         9:37       WP#:       6       Lat:       36.11         Stenella coeruleoalba       Num         used in Species ID:       Dark line from eye to peed         Intative images used for Species ID:       6890         apher:       Ryan       Frame numbers:       648         apher:       Ryan       Frame numbers:       648         ed distance from Trackline:       0.76 k         me and Position of Sighting       9:47       WP#:       7       Lat:       36.12         ed Distance Traveled:       0.59 km       0.59 km       0.59 km       0.59 km         or and Additional Comments       egroup of animals traveling fast and surfacing qu       0.12       10.12       Sighting on Track         10:32       WP#:       16       Lat:       35.97         Angle:       2       Horizontal Bearing in De       2         Effort:       On       Trackline:       43         r:       Erin       Observer side:       10:32         Time and Position of Sighting       17       Lat:       35.97         Balaenoptera physalis       Num	383       Long:       -74.602939         bers (Low/High/Best):       400 / 475 /         toral and a second down to anus         ,6891, 6903, 6907, 6909, 6923, 6926, 693         ,77 - 6942       Spacer:         6943         n         237       Long:         -74.605667         ckly with large disturbance. Formed integrate         addred.
Time:       9:37       WP#:       6       Lat:       36.11883       Long:       -74.602939         Species:Stenella coeruleoalba       Numbers (Low/High/Best):       400 / 475 /         Features used in Species ID:       Dark line from eye to pectoral and a second down to anus         Representative images used for Species ID:       6890, 6891, 6903, 6907, 6909, 6923, 6926, 692         Photographer:       Ryan       Frame numbers:       6877 - 6942       Spacer:       6943         Calculated distance from Trackline:       0.76 km	9:37       WP#:       6       Lat:       36.11         Stenella coeruleoalba       Num         used in Species ID:       Dark line from eye to pect         intative images used for Species ID:       6890         apher:       Ryan       Frame numbers:       6890         apher:       Ryan       Frame numbers:       6890         ed distance from Trackline:       0.76 k         me and Position of Sighting       9:47       WP#:       7       Lat:       36.12         ed Distance Traveled:       0.59 km         or and Additional Comments       e group of animals traveling fast and surfacing que oup but then split into smaller groups of a few hum         Wednesday, February 1, 2012 Sighting #         ighting on Track         10:32       WP#:       16       Lat:       35.97         Angle:       2       Horizontal Bearing in De         Effort:       On       Trackline:       43         r:       Erin       Observer side:	bers (Low/High/Best): 400 / 475 / toral and a second down to anus 6891, 6903, 6907, 6909, 6923, 6926, 693 77 - 6942 Spacer: 6943 m 237 Long: -74.605667 ckly with large disturbance. Formed int adred.
Species:Stenella coeruleoalba       Numbers (Low/High/Best): 400 / 475 /         Features used in Species ID:       Dark line from eye to pectoral and a second down to anus         Representative images used for Species ID:       6890, 6891, 6903, 6907, 6909, 6923, 6926, 692         Photographer:       Ryan       Frame numbers:       6877 - 6942       Spacer:       6943         Calculated distance from Trackline:       0.76 km	Stenella coeruleoalba       Num         used in Species ID:       Dark line from eye to pec         Intative images used for Species ID:       6890         apher:       Ryan       Frame numbers:       68         apher:       Ryan       Frame numbers:       68         ed distance from Trackline:       0.76 k         me and Position of Sighting         9:47       WP#:       7       Lat:       36.12         ed Distance Traveled:       0.59 km         or and Additional Comments         e group of animals traveling fast and surfacing que but then split into smaller groups of a few hur         Wednesday, February 1, 2012 Sighting #         ighting on Track         10:32       WP#:       16       Lat:       35.97         Angle:       2       Horizontal Bearing in De         Effort:       On       Trackline:       43         r:       Erin       Observer side:       Image:         Gibber of Sighting       10:32       WP#:       17       Lat:       35.97         Balaenoptera physalis       Num       Num       Num       Num	bers (Low/High/Best): 400 / 475 / toral and a second down to anus 6891, 6903, 6907, 6909, 6923, 6926, 693 77 - 6942 Spacer: 6943 m 237 Long: -74.605667 ckly with large disturbance. Formed int adred.
Features used in Species ID:       Dark line from eye to pectoral and a second down to anus         Representative images used for Species ID:       6890, 6891, 6903, 6907, 6909, 6923, 6926, 693         Photographer:       Ryan       Frame numbers:       6877 - 6942       Spacer:       6943         Calculated distance from Trackline:       0.76 km       691       6923, 6926, 693         Final Time and Position of Sighting       Time:       0.76 km       6943         Calculated Distance Traveled:       0.59 km       0.74,605667         Calculated Distance Traveled:       0.59 km       0.59 km         Behavior and Additional Comments       Wednesday, February 1, 2012 Sighting # 2       2         Initial sighting on Track       Time:       10.32       WP#:       16       Lat:       35,97938       Long:       -74,794661         Vertical Angle:       2       Horizontal Bearing in Degrees:       100       Sighting Cue:       Bo         Observer:       Erin       Observer side:       Right       Actual Time and Position of Sighting         Time:       10.32       WP#:       17       Lat:       35,97264       Long:       -74,79403         Species:Balaenoptera physalis       Numbers (Low/High/Best):       1/1/1       Features used in Species ID:       Large fusiform bo	used in Species ID:       Dark line from eye to peed         ntative images used for Species ID:       6890         apher:       Ryan       Frame numbers:       68         apher:       Ryan       Frame numbers:       68         ed distance from Trackline:       0.76 k         me and Position of Sighting         9:47       WP#:       7       Lat:       36.12         ed Distance Traveled:       0.59 km         or and Additional Comments         e group of animals traveling fast and surfacing que pup but then split into smaller groups of a few hund         Wednesday, February 1, 2012 Sighting #         ighting on Track         10:32       WP#:       16       Lat:       35.97         Angle:       2       Horizontal Bearing in De         Effort:       On       Trackline:       43         r:       Erin       Observer side:       10:32         Fime and Position of Sighting       10:32       WP#:       17       Lat:       35.97         Balaenoptera physalis       Num	toral and a second down to anus         6891, 6903, 6907, 6909, 6923, 6926, 693         77 - 6942       Spacer: 6943         n         37       Long: -74.605667         ckly with large disturbance. Formed intendred.         2
Representative images used for Species ID:       6890, 6891, 6903, 6907, 6909, 6923, 6926, 692         Photographer:       Ryan       Frame numbers:       6877 - 6942       Spacer:       6943         Calculated distance from Trackline:       0.76 km       6917       6917       6917       6917         Final Time and Position of Sighting       T       Lat:       36.1237       Long:       -74.605667         Calculated Distance Traveled:       0.59 km       0.59 km       0.59 km       0.59 km         Behavior and Additional Comments       Very large group of animals traveling fast and surfacing quickly with large disturbance. Formed int single group but then split into smaller groups of a few hundred.         Wednesday, February 1, 2012 Sighting #       2         Initial sighting on Track       Trackline:       43       Beaufort Sea State:       5         Observer:       16       Lat:       35.97938       Long:       -74.794661         Vertical Angle:       2       Horizontal Bearing in Degrees:       100       Sighting Cue:       Bo         On/Off Effort:       On       Trackline:       43       Beaufort Sea State:       5         Observer:       Erin       Observer side:       Right       Actual Time and Position of Sighting       1/1/1/1         Features used in Species	ntative images used for Species ID:       6890         apher:       Ryan       Frame numbers:       68         ed distance from Trackline:       0.76 k         ime and Position of Sighting         9:47       WP#:       7       Lat:       36.12         ed Distance Traveled:       0.59 km         or and Additional Comments         group of animals traveling fast and surfacing que but then split into smaller groups of a few hur         Wednesday, February 1, 2012 Sighting #         ighting on Track         10:32       WP#:       16       Lat:       35.97         Angle:       2       Horizontal Bearing in De         Effort:       On       Trackline:       43         r:       Erin       Observer side:	6891, 6903, 6907, 6909, 6923, 6926, 693 77 - 6942 Spacer: 6943 m 237 Long: -74.605667 ckly with large disturbance. Formed int adred. 24
Photographer:       Ryan       Frame numbers:       6877-6942       Spacer:       6943         Calculated distance from Trackline:       0.76 km         Final Time and Position of Sighting         Time:       9:47       WP#:       7       Lat:       36.1237       Long;       -74.605667         Calculated Distance Traveled:       0.59 km       Behavior and Additional Comments       Behavior and Additional Comments         Wey large group of animals traveling fast and surfacing quickly with large disturbance. Formed int single group but then split into smaller groups of a few hundred.       Formed at the split into smaller groups of a few hundred.         Wednesday, February 1, 2012 Sighting #       2         Initial sighting on Track       Trackline:       43       Beaufort Sea State:       5         Vertical Angle:       2       Horizontal Bearing in Degrees:       100       Sighting Cue:       Bo         Observer:       Erin       Observer side:       Right       Actual Time and Position of Sighting         Time:       10:32       WP#:       17       Lat:       35.97264       Long:       -74.79403         Species:Balaenoptera physalis       Numbers       Numbers (Low/High/Best):       1 / 1 / 1       1 / 1 / 1         Features used in Species ID:       Large fusiform body appearance, white colo	apher:       Ryan       Frame numbers:       68         ed distance from Trackline:       0.76 k         ime and Position of Sighting         9:47       WP#:       7       Lat:       36.12         ed Distance Traveled:       0.59 km         or and Additional Comments         e group of animals traveling fast and surfacing que but then split into smaller groups of a few hur         Wednesday, February 1, 2012 Sighting #         ighting on Track         10:32       WP#:       16       Lat:       35.97         Angle:       2       Horizontal Bearing in De         Effort:       On       Trackline:       43         r:       Erin       Observer side:       10:32         ID:32       WP#:       17       Lat:       35.97         Balaenoptera physalis       Num	77 - 6942       Spacer: 6943         m
Photographer:       Ryan       Frame numbers:       6877-6942       Spacer:       6943         Calculated distance from Trackline:       0.76 km         Final Time and Position of Sighting         Time:       9:47       WP#:       7       Lat:       36.1237       Long;       -74.605667         Calculated Distance Traveled:       0.59 km       Behavior and Additional Comments       Behavior and Additional Comments         Wey large group of animals traveling fast and surfacing quickly with large disturbance. Formed int single group but then split into smaller groups of a few hundred.       Formed at the split into smaller groups of a few hundred.         Wednesday, February 1, 2012 Sighting #       2         Initial sighting on Track       Trackline:       43       Beaufort Sea State:       5         Vertical Angle:       2       Horizontal Bearing in Degrees:       100       Sighting Cue:       Bo         Observer:       Erin       Observer side:       Right       Actual Time and Position of Sighting         Time:       10:32       WP#:       17       Lat:       35.97264       Long:       -74.79403         Species:Balaenoptera physalis       Numbers       Numbers (Low/High/Best):       1 / 1 / 1       1 / 1 / 1         Features used in Species ID:       Large fusiform body appearance, white colo	apher:       Ryan       Frame numbers:       68         ed distance from Trackline:       0.76 k         ime and Position of Sighting         9:47       WP#:       7       Lat:       36.12         ed Distance Traveled:       0.59 km         or and Additional Comments         e group of animals traveling fast and surfacing que but then split into smaller groups of a few hur         Wednesday, February 1, 2012 Sighting #         ighting on Track         10:32       WP#:       16       Lat:       35.97         Angle:       2       Horizontal Bearing in De         Effort:       On       Trackline:       43         r:       Erin       Observer side:       10:32         ID:32       WP#:       17       Lat:       35.97         Balaenoptera physalis       Num	77 - 6942       Spacer: 6943         m
Calculated distance from Trackline: 0.76 km Final Time and Position of Sighting Time: 9:47 WP#: 7 Lat: 36.1237 Long: -74.605667 Calculated Distance Traveled: 0.59 km Behavior and Additional Comments Very large group of animals traveling fast and surfacing quickly with large disturbance. Formed int single group but then split into smaller groups of a few hundred. Wednesday, February 1, 2012 Sighting # 2 Initial sighting on Track Time: 10:32 WP#: 16 Lat: 35.97938 Long: -74.794661 Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Bor On/Off Effort: On Trackline: 43 Beaufort Sea State: 5 Observer: Erin Observer side: Right Actual Time and Position of Sighting Time: 10:32 WP#: 17 Lat: 35.97264 Long: -74.79403 Species:Balaenoptera physalis Numbers (Low/High/Best): 1 / 1 / 1 Features used in Species ID: Large fusiform body appearance, white coloration on right side o mandible, small dorsal fin placed far back on the body. Representative images used for Species ID: 6947-6949 Photographer: Erin Frame numbers: 6944-6955 Spacer: 6956 Calculated distance from Trackline: 0.84 km Final Time and Position of Sighting Time: 10:44 WP#: 18 Lat: 35.99254 Long: -74.792350 Calculated Distance Traveled: 2.22 km Behavior and Additional Comments	ed distance from Trackline:       0.76 k         ime and Position of Sighting         9:47       WP#:       7       Lat:       36.12         ed Distance Traveled:       0.59 km         or and Additional Comments         e group of animals traveling fast and surfacing qu         oup but then split into smaller groups of a few hur         Wednesday, February 1, 2012 Sighting #         ighting on Track         10:32       WP#:       16       Lat:       35.97         Angle:       2       Horizontal Bearing in De         Effort:       On       Trackline:       43         r:       Erin       Observer side:	n Long: -74.605667 ckly with large disturbance. Formed int ndred.
Final Time and Position of Sighting         Time:       9:47       WP#:       7       Lat:       36.1237       Long:       -74.605667         Calculated Distance Traveled:       0.59 km	me and Position of Sighting         9:47       WP#:       7       Lat:       36.12         ed Distance Traveled:       0.59 km         or and Additional Comments         e group of animals traveling fast and surfacing que but then split into smaller groups of a few hume         Wednesday, February 1, 2012 Sighting #         ighting on Track         10:32       WP#:       16       Lat:       35.97         Angle:       2       Horizontal Bearing in De         Effort:       On       Trackline:       43         r:       Erin       Observer side:       10:32         WP#:       17       Lat:       35.97         Balaenoptera physalis       Num	Long: -74.605667 ckly with large disturbance. Formed int adred.
Time: 9:47 WP#: 7 Lat: 36.1237 Long: -74.605667 Calculated Distance Traveled: 0.59 km Behavior and Additional Comments Very large group of animals traveling fast and surfacing quickly with large disturbance. Formed int single group but then split into smaller groups of a few hundred. Wednesday, February 1, 2012 Sighting # 2 Initial sighting on Track Time: 10:32 WP#: 16 Lat: 35.97938 Long: -74.794661 Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Boo On/Off Effort: On Trackline: 43 Beaufort Sea State: 5 Observer: Erin Observer side: Right Actual Time and Position of Sighting Time: 10:32 WP#: 17 Lat: 35.97264 Long: -74.790403 Species:Balaenoptera physalis Numbers (Low/High/Best): 1 / 1 / 1 Features used in Species ID: Large fusiform body appearance, white coloration on right side o mandible, small dorsal fin placed far back on the body. Representative images used for Species ID: 6947-6949 Photographer: Erin Frame numbers: 6944-6955 Spacer: 6956 Calculated distance from Trackline: 0.84 km Final Time and Position of Sighting Time: 10:44 WP#: 18 Lat: 35.99254 Long: -74.792350 Calculated Distance Traveled: 2.22 km Behavior and Additional Comments	9:47       WP#:       7       Lat:       36.12         ed Distance Traveled:       0.59 km         or and Additional Comments         e group of animals traveling fast and surfacing que but then split into smaller groups of a few hure         Wednesday, February 1, 2012 Sighting #         ighting on Track         10:32       WP#:       16       Lat:       35.97         Angle:       2       Horizontal Bearing in De         Effort:       On       Trackline:       43         r:       Erin       Observer side:       10:32         Fine and Position of Sighting       10:32       WP#:       17       Lat:       35.97         Balaenoptera physalis       Num       Num       Num	ckly with large disturbance. Formed int ndred.
Calculated Distance Traveled: 0.59 km Behavior and Additional Comments Very large group of animals traveling fast and surfacing quickly with large disturbance. Formed int single group but then split into smaller groups of a few hundred. Wednesday, February 1, 2012 Sighting # 2 Initial sighting on Track Time: 10:32 WP#: 16 Lat: 35.97938 Long: -74.794661 Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Bo On/Off Effort: On Trackline: 43 Beaufort Sea State: 5 Observer: Erin Observer side: Right Actual Time and Position of Sighting Time: 10:32 WP#: 17 Lat: 35.97264 Long: -74.790403 Species:Balaenoptera physalis Numbers (Low/High/Best): 1 / 1 / 1 Features used in Species ID: Large fusiform body appearance, white coloration on right side of mandible, small dorsal fin placed far back on the body. Representative images used for Species ID: 6947-6949 Photographer: Erin Frame numbers: 6944-6955 Spacer: 6956 Calculated distance from Trackline: 0.84 km Final Time and Position of Sighting Time: 10:44 WP#: 18 Lat: 35.99254 Long: -74.792350 Calculated Distance Traveled: 2.22 km Behavior and Additional Comments	ed Distance Traveled: 0.59 km or and Additional Comments e group of animals traveling fast and surfacing qu bup but then split into smaller groups of a few hur Wednesday, February 1, 2012 Sighting # ighting on Track 10:32 WP#: 16 Lat: 35.97 Angle: 2 Horizontal Bearing in De Effort: On Trackline: 43 r: Erin Observer side: 17 Fime and Position of Sighting 10:32 WP#: 17 Lat: 35.97 Balaenoptera physalis Num	ckly with large disturbance. Formed int ndred.
Behavior and Additional Comments         Very large group of animals traveling fast and surfacing quickly with large disturbance. Formed int single group but then split into smaller groups of a few hundred.         Wednesday, February 1, 2012 Sighting # 2         Initial sighting on Track         Time:       10:32       WP#:       16       Lat:       35.97938       Long:       -74.794661         Vertical Angle:       2       Horizontal Bearing in Degrees:       100       Sighting Cue:       Box         On/Off Effort:       On       Trackline:       43       Beaufort Sea State:       5         Observer:       Erin       Observer side:       Right       Actual Time and Position of Sighting         Time:       10:32       WP#:       17       Lat:       35.97264       Long:       -74.790403         Species:Balaenoptera physalis       Numbers (Low/High/Best):       1/1/1       Features used in Species ID:       Large fusiform body appearance, white coloration on right side of mandible, small dorsal fin placed far back on the body.         Representative images used for Species ID:       6944 - 6955       Spacer:       6956         Calculated distance from Trackline:       0.84 km       10:44       WP#:       18       Lat:       35.99254       Long:       -74.792350         Cal	or and Additional Comments         group of animals traveling fast and surfacing quipup but then split into smaller groups of a few hundred with the split into smaller g	ndred.
Very large group of animals traveling fast and surfacing quickly with large disturbance. Formed int         single group but then split into smaller groups of a few hundred.         Wednesday, February 1, 2012 Sighting # 2         Initial sighting on Track         Time:       10:32         WP#:       16       Lat:         35.97938       Long:       -74.794661         Vertical Angle:       2       Horizontal Bearing in Degrees:       100       Sighting Cue:       Boo         On/Off Effort:       On       Trackline:       43       Beaufort Sea State:       5         Observer:       Erin       Observer side:       Right         Actual Time and Position of Sighting         Time:       10:32       WP#:       17       Lat:       35.97264       Long:       -74.790403         Species:Balaenoptera physalis       Numbers (Low/High/Best):       1 / 1 / 1         Features used in Species ID:       Large fusiform body appearance, white coloration on right side o         mandible, small dorsal fin placed far back on the body.       E947- 6949         Photographer:       Erin       Frame numbers:       6944 - 6955       Spacer:       6956         Calculated distance from Trackline:       0.84 km       E10:44       WP#:       18       Lat:	group of animals traveling fast and surfacing que but then split into smaller groups of a few hur wednesday, February 1, 2012 Sighting #         ighting on Track         10:32       WP#: 16       Lat: 35.97         Angle:       2       Horizontal Bearing in De Trackline: 43         r:       Erin       Observer side: 5 <b>Fine and Position of Sighting</b> 10:32       WP#: 17         Lat:       35.97         Balaenoptera physalis       Num	ndred.
single group but then split into smaller groups of a few hundred.         Wednesday, February 1, 2012 Sighting # 2         Initial sighting on Track         Time:       10:32       WP#:       16       Lat:       35.97938       Long:       -74.794661         Vertical Angle:       2       Horizontal Bearing in Degrees:       100       Sighting Cue:       Bo         On/Off Effort:       On       Trackline:       43       Beaufort Sea State:       5         Observer:       Erin       Observer side:       Right         Actual Time and Position of Sighting         Time:       10:32       WP#:       17       Lat:       35.97264       Long:       -74.790403         Species:Balaenoptera physalis       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Large fusiform body appearance, white coloration on right side or         mandible, small dorsal fin placed far back on the body.         Representative images used for Species ID:       6947- 6949         Photographer:       Erin       Frame numbers:       6944 - 6955       Spacer:       6956         Calculated distance from Trackline:       0.84 km       10:44       WP#:       18       Lat:       35.99254       Long:       -74.792350 <td< td=""><td>Wednesday, February 1, 2012 Sighting #         ighting on Track         10:32       WP#: 16       Lat: 35.97         Angle:       2       Horizontal Bearing in De         Effort:       On       Trackline: 43         r:       Erin       Observer side:</td><td>ndred.</td></td<>	Wednesday, February 1, 2012 Sighting #         ighting on Track         10:32       WP#: 16       Lat: 35.97         Angle:       2       Horizontal Bearing in De         Effort:       On       Trackline: 43         r:       Erin       Observer side:	ndred.
Wednesday, February 1, 2012 Sighting # 2         Initial sighting on Track         Time:       10:32       WP#:       16       Lat:       35.97938       Long:       -74.794661         Vertical Angle:       2       Horizontal Bearing in Degrees:       100       Sighting Cue:       Bo         On/Off Effort:       On       Trackline:       43       Beaufort Sea State:       5         Observer:       Erin       Observer side:       Right       Right       Actual Time and Position of Sighting         Time:       10:32       WP#:       17       Lat:       35.97264       Long:       -74.790403         Species:Balaenoptera physalis       Numbers (Low/High/Best):       1 / 1 / 1         Features used in Species ID:       Large fusiform body appearance, white coloration on right side c         mandible, small dorsal fin placed far back on the body.         Representative images used for Species ID:       6947- 6949         Photographer:       Erin       Frame numbers:       6944- 6955         Calculated distance from Trackline:       0.84 km       18       Lat:       35.99254       Long:       -74.792350         Calculated Distance Traveled:       2.22 km       Behavior and Additional Comments       2.22 km       Behavior and Additional Comments	Wednesday, February 1, 2012 Sighting #         ighting on Track         10:32       WP#: 16       Lat: 35.97         Angle:       2       Horizontal Bearing in De         Effort:       On       Trackline: 43         r:       Erin       Observer side:         Fime and Position of Sighting         10:32       WP#: 17       Lat: 35.97         Balaenoptera physalis       Nun	2
Wednesday, February 1, 2012 Sighting # 2         Initial sighting on Track         Time:       10:32       WP#:       16       Lat:       35.97938       Long:       -74.794661         Vertical Angle:       2       Horizontal Bearing in Degrees:       100       Sighting Cue:       Bo         On/Off Effort:       On       Trackline:       43       Beaufort Sea State:       5         Observer:       Erin       Observer side:       Right         Actual Time and Position of Sighting         Time:       10:32       WP#:       17       Lat:       35.97264       Long:       -74.790403         Species:Balaenoptera physalis       Numbers (Low/High/Best):       1 / 1 / 1         Features used in Species ID:       Large fusiform body appearance, white coloration on right side comandible, small dorsal fin placed far back on the body.         Representative images used for Species ID:       6947-6949         Photographer:       Erin       Frame numbers:       6944-6955       Spacer:       6956         Calculated distance from Trackline:       0.84 km	Wednesday, February 1, 2012 Sighting #         ighting on Track         10:32       WP#: 16       Lat: 35.97         Angle:       2       Horizontal Bearing in De         Effort:       On       Trackline: 43         r:       Erin       Observer side:         Fime and Position of Sighting         10:32       WP#: 17       Lat: 35.97         Balaenoptera physalis       Nun	2
Vertical Angle:       2       Horizontal Bearing in Degrees:       100       Sighting Cue:       Bor         On/Off Effort:       On       Trackline:       43       Beaufort Sea State:       5         Observer:       Erin       Observer side:       Right       5         Actual Time and Position of Sighting       Time:       10:32       WP#:       17       Lat:       35.97264       Long:       -74.790403         Species:Balaenoptera physalis       Numbers (Low/High/Best):       1 / 1 / 1         Features used in Species ID:       Large fusiform body appearance, white coloration on right side of mandible, small dorsal fin placed far back on the body.         Representative images used for Species ID:       6947-6949         Photographer:       Erin       Frame numbers:       6944-6955       Spacer:       6956         Calculated distance from Trackline:       0.84 km       10:44       WP#:       18       Lat:       35.99254       Long:       -74.792350         Calculated Distance Traveled:       2.22 km       2.22 km       End       Behavior and Additional Comments	Angle:       2       Horizontal Bearing in De         Effort:       On       Trackline:       43         r:       Erin       Observer side:	938 Long -74 794661
On/Off Effort:       On       Trackline:       43       Beaufort Sea State:       5         Observer:       Erin       Observer side:       Right       7         Actual Time and Position of Sighting       Time:       10:32       WP#:       17       Lat:       35.97264       Long:       -74.790403         Species:       Balaenoptera physalis       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Large fusiform body appearance, white coloration on right side of mandible, small dorsal fin placed far back on the body.         Representative images used for Species ID:       6944 - 6955       Spacer:       6956         Calculated distance from Trackline:       0.84 km       6944 - 6955       Spacer:       6956         Time:       10:44       WP#:       18       Lat:       35.99254       Long:       -74.792350         Calculated Distance Traveled:       2.22 km       Estimational Comments       8       6       6       6       6       6       6       7       74.792350	Effort:       On       Trackline:       43         r:       Erin       Observer side:	0
Observer:       Erin       Observer side:       Right         Actual Time and Position of Sighting       Time:       10:32       WP#:       17       Lat:       35.97264       Long:       -74.790403         Species:       Balaenoptera physalis       Numbers (Low/High/Best):       1 / 1 / 1         Features used in Species ID:       Large fusiform body appearance, white coloration on right side of mandible, small dorsal fin placed far back on the body.         Representative images used for Species ID:       6947-6949         Photographer:       Erin       Frame numbers:       6944-6955       Spacer:       6956         Calculated distance from Trackline:       0.84 km       0.84	r: Erin Observer side: <b>Fime and Position of Sighting</b> 10:32 WP#: 17 Lat: 35.97 Balaenoptera physalis Nun	
Actual Time and Position of Sighting         Time:       10:32       WP#:       17       Lat:       35.97264       Long:       -74.790403         Species:Balaenoptera physalis       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Large fusiform body appearance, white coloration on right side of mandible, small dorsal fin placed far back on the body.         Representative images used for Species ID:       6947-6949         Photographer:       Erin       Frame numbers:       6944-6955       Spacer:       6956         Calculated distance from Trackline:       0.84 km       0.84 km       10:44       WP#:       18       Lat:       35.99254       Long:       -74.792350         Calculated Distance Traveled:       2.22 km       2.22 km       10:44       WP#:       18       Lat:       35.99254       Long:       17.1792350	<b>Fime and Position of Sighting</b> 10:32 WP#: <u>17</u> Lat: <u>35.97</u> Balaenoptera physalis Nun	
Time:       10:32       WP#:       17       Lat:       35.97264       Long:       -74.790403         Species:       Balaenoptera physalis       Numbers (Low/High/Best):       1 / 1 / 1         Features used in Species ID:       Large fusiform body appearance, white coloration on right side of mandible, small dorsal fin placed far back on the body.         Representative images used for Species ID:       6947-6949         Photographer:       Erin       Frame numbers:       6944-6955       Spacer:       6956         Calculated distance from Trackline:       0.84 km       0.84 km       10:44       WP#:       18       Lat:       35.99254       Long:       -74.792350         Calculated Distance Traveled:       2.22 km       2.22 km       0       0       0       0	10:32 WP#: <u>17</u> Lat: <u>35.97</u> Balaenoptera physalis Nun	Right
Species:Balaenoptera physalis       Numbers (Low/High/Best):       1 / 1 / 1         Features used in Species ID:       Large fusiform body appearance, white coloration on right side of mandible, small dorsal fin placed far back on the body.         Representative images used for Species ID:       6947-6949         Photographer:       Erin       Frame numbers:         6944-6955       Spacer:       6956         Calculated distance from Trackline:       0.84 km         Final Time and Position of Sighting       Time:       10:44         Time:       10:44       WP#:       18         Lat:       35.99254       Long:       -74.792350         Calculated Distance Traveled:       2.22 km       Behavior and Additional Comments	Balaenoptera physalis Nun	
Features used in Species ID:       Large fusiform body appearance, white coloration on right side of mandible, small dorsal fin placed far back on the body.         Representative images used for Species ID:       6947-6949         Photographer:       Erin       Frame numbers:       6944-6955       Spacer:       6956         Calculated distance from Trackline:       0.84 km       0.84 km       6955       Spacer:       6956         Final Time and Position of Sighting       Time:       10:44       WP#:       18       Lat:       35.99254       Long:       -74.792350         Calculated Distance Traveled:       2.22 km       2.22 km       Behavior and Additional Comments       6000000000000000000000000000000000000		
mandible, small dorsal fin placed far back on the body.         Representative images used for Species ID:       6947-6949         Photographer:       Erin       Frame numbers:       6944-6955       Spacer:       6956         Calculated distance from Trackline:       0.84 km       0.84 km       6955       Spacer:       6956         Final Time and Position of Sighting       Time:       10:44       WP#:       18       Lat:       35.99254       Long:       -74.792350         Calculated Distance Traveled:       2.22 km       2.22 km       Calculated Distance Traveled:       2.22 km	used in Species ID: Large fusiform body app	
Representative images used for Species ID:       6947-6949         Photographer:       Erin       Frame numbers:       6944-6955       Spacer:       6956         Calculated distance from Trackline:       0.84 km       0.84 km       6956       Spacer:       6956         Final Time and Position of Sighting       Time:       10:44       WP#:       18       Lat:       35.99254       Long:       -74.792350         Calculated Distance Traveled:       2.22 km       2.22 km       Additional Comments       Comments		earance, white coloration on right side o
Photographer:       Erin       Frame numbers:       6944 - 6955       Spacer:       6956         Calculated distance from Trackline:       0.84 km         Final Time and Position of Sighting         Time:       10:44       WP#:       18       Lat:       35.99254       Long:       -74.792350         Calculated Distance Traveled:       2.22 km       End       Behavior and Additional Comments       Comments		6947 6949
Calculated distance from Trackline:       0.84 km         Final Time and Position of Sighting         Time:       10:44         WP#:       18         Lat:       35.99254         Calculated Distance Traveled:       2.22 km		
Final Time and Position of Sighting         Time:       10:44       WP#:       18       Lat:       35.99254       Long:       -74.792350         Calculated Distance Traveled:       2.22 km       2.22 km       Behavior and Additional Comments		1
Time:       10:44       WP#:       18       Lat:       35.99254       Long:       -74.792350         Calculated Distance Traveled:       2.22 km       2.22 km       Behavior and Additional Comments		
Calculated Distance Traveled: 2.22 km Behavior and Additional Comments	0 0	T
Behavior and Additional Comments		Long: -/4./92350
Animal dove during initial sighting but resurfaced ~15 minutes later.	r and Additional Comments	
	ove during initial sighting but resurfaced ~15 min	
		utes later.
		utes later.
		utes later.

Wednesday, February 1, 2012 Sighting $\#$ 3
Initial sighting on Track
Time: <u>11:40</u> WP#: <u>28</u> Lat: <u>35.83353</u> Long: <u>-74.462903</u>
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
On/Off Effort: On Trackline: 41 Beaufort Sea State: 5
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time:         11:41         WP#:         29         Lat:         35.83409         Long:         -74.463784
Species:Globicephala macrorhynchus       Numbers (Low/High/Best): 12/18/15
Features used in Species ID: Dark bodies, blunt square head with no extended rostrum.
Dorsal fin place 1/3 back the animals body.
Representative images used for Species ID: 6957, 6958
Photographer:       Erin       Frame numbers:       6957 - 6965       Spacer:       6965         Calculated distance from Trackline:       0.10 km
Final Time and Position of Sighting
Time:         11:50         WP#:         30         Lat:         35.83672         Long:         -74.459409
Calculated Distance Traveled: 0.49 km
Behavior and Additional Comments
Line of large and smaller animals traveling near the surface, animals surfacing to breath at a regular
interval.
Wednesday February 1, 2012 Sighting $\# A$
Wednesday, February 1, 2012 Sighting # 4
Initial sighting on Track
Initial sighting on Track           Time: 12:09         WP#: 34         Lat: 35.76275         Long: -74.822486
Initial sighting on Track         Time:       12:09       WP#:       34       Lat:       35.76275       Long:       -74.822486         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body
Initial sighting on TrackTime:12:09WP#:34Lat:35.76275Long:-74.822486Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:5
Initial sighting on TrackTime:12:09WP#:34Lat:35.76275Long:-74.822486Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:5Observer:ErinObserver side:Right
Initial sighting on Track         Time:       12:09       WP#:       34       Lat:       35.76275       Long:       -74.822486         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
Initial sighting on TrackTime:12:09WP#:34Lat:35.76275Long:-74.822486Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:5Observer:ErinObserver side:RightActual Time and Position of SightingTime:12:10WP#:35Lat:35.7642Long:-74.823749
Initial sighting on TrackTime:12:09WP#:34Lat:35.76275Long:-74.822486Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:5Observer:ErinObserver side:RightActual Time and Position of SightingInitial SightingInitial SightingTime:12:10WP#:35Lat:35.7642Long:-74.823749Species:Globicephala macrorhynchusNumbers (Low/High/Best):4/4/4
Initial sighting on TrackTime:12:09WP#:34Lat:35.76275Long:-74.822486Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:5Observer:ErinObserver side:RightActual Time and Position of SightingTime:12:10WP#:35Lat:35.7642Long:-74.823749Species:Globicephala macrorhynchusNumbers (Low/High/Best):4/4/4Features used in Species ID:Dark bodies, blunt square head with no extended rostrum.
Initial sighting on TrackTime:12:09WP#:34Lat:35.76275Long:-74.822486Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:5Observer:ErinObserver side:RightActual Time and Position of SightingTime:12:10WP#:35Lat:35.7642Long:-74.823749Species:Globicephala macrorhynchusNumbers (Low/High/Best):4/4/4Features used in Species ID:Dark bodies, blunt square head with no extended rostrum.Dorsal fin place 1/3 back the animals body.
Initial sighting on TrackTime:12:09WP#:34Lat:35.76275Long:-74.822486Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:5Observer:ErinObserver side:RightActual Time and Position of SightingTime:12:10WP#:35Lat:35.7642Long:-74.823749Species:Globicephala macrorhynchusNumbers (Low/High/Best):4/4/4Features used in Species ID:Dark bodies, blunt square head with no extended rostrum.Dorsal fin place 1/3 back the animals body.
Initial sighting on TrackTime:12:09WP#:34Lat:35.76275Long:-74.822486Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:5Observer:ErinObserver side:RightActual Time and Position of SightingTime:12:10WP#:35Lat:35.7642Long:-74.823749Species:Globicephala macrorhynchusNumbers (Low/High/Best):4/4/4Features used in Species ID:Dark bodies, blunt square head with no extended rostrum.Dorsal fin place 1/3 back the animals body.Representative images used for Species ID:6968 & 6972
Initial sighting on TrackTime:12:09WP#:34Lat:35.76275Long:-74.822486Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:5Observer:ErinObserver side:RightActual Time and Position of SightingTime:12:10WP#:35Lat:35.7642Long:-74.823749Species:Globicephala macrorhynchusNumbers (Low/High/Best):4/4/4Features used in Species ID:Dark bodies, blunt square head with no extended rostrum.Dorsal fin place 1/3 back the animals body.Representative images used for Species ID:6968 & 6972Photographer:ErinFrame numbers:6966 - 6973Spacer:6978Calculated distance from Trackline:0.20 km
Initial sighting on TrackTime:12:09WP#:34Lat:35.76275Long:-74.822486Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:5Observer:ErinObserver side:RightActual Time and Position of SightingTime:12:10WP#:35Lat:35.7642Long:-74.823749Species:Globicephala macrorhynchusNumbers (Low/High/Best):4/4/4Features used in Species ID:Dark bodies, blunt square head with no extended rostrum.Dorsal fin place 1/3 back the animals body.Representative images used for Species ID:6968 & 6972Photographer:ErinFrame numbers:6966 - 6973Spacer:6978Calculated distance from Trackline:0.20 km
Initial sighting on TrackTime:12:09WP#:34Lat:35.76275Long:-74.822486Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:5Observer:ErinObserver side:RightActual Time and Position of SightingTime:12:10WP#:35Lat:35.7642Long:-74.823749Species:Globicephala macrorhynchusNumbers (Low/High/Best):4/4/4Features used in Species ID:Dark bodies, blunt square head with no extended rostrum.Dorsal fin place 1/3 back the animals body.Representative images used for Species ID:6968 & 6972Photographer:ErinFrame numbers:6966 - 6973Spacer:6978Calculated distance from Trackline:0.20 km
Initial sighting on TrackTime:12:09WP#:34Lat:35.76275Long:-74.822486Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:5Observer:ErinObserver side:RightActual Time and Position of SightingTime:12:10WP#:35Lat:35.7642Long:-74.823749Species:Globicephala macrorhynchusNumbers (Low/High/Best):4/4/4Features used in Species ID:Dark bodies, blunt square head with no extended rostrum.Dorsal fin place 1/3 back the animals body.Representative images used for Species ID:6966 - 6973Spacer:6978Calculated distance from Trackline:0.20 kmFinal Time and Position of SightingTime:12:28WP#:37Lat:35.77193Long:-74.819553Calculated Distance Traveled:0.94 km
Initial sighting on TrackTime:12:09WP#:34Lat:35.76275Long:-74.822486Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:5Observer:ErinObserver side:RightActual Time and Position of SightingTime:12:10WP#:35Lat:35.7642Long:-74.823749Species:Globicephala macrorhynchusNumbers (Low/High/Best):4/4/4Features used in Species ID:Dark bodies, blunt square head with no extended rostrum.Dorsal fin place 1/3 back the animals body.Representative images used for Species ID:6968 & 6972Photographer:ErinFrame numbers:6966 - 6973Spacer:6978Calculated distance from Trackline:0.20 km10.20 km10.20 kmFinal Time and Position of SightingTime:12:28WP#:37Lat:35.77193Long:-74.819553

showing an association with one another.

Wee	dnesday, Fe	ebruary 1	I, 2012 S	Sight	ing # 5				
Initial sightin	g on Trac	k		C	C				
Time: 12:12	WP#:	36	Lat:		35.76828		Long:	-74.8	19007
Vertical Angle	e: <u>1</u>	Horizo	ntal Bea	iring i	in Degrees:	90	_ Sighting	g Cue:	Body
On/Off Effort:	On	]	Frackline	e:	40	Beau	ufort Sea S	tate: _	5
Observer:	Erin	(	Observei	r side	Right				
Actual Time	and Positi	on of Si	ighting						
Time: 12:12	-	36	Lat:		35.76828		Long:	-74.81	9007
Species:Delphin					Numbers (I				/ 20 / 18
Features used									e region
behind the blow					ith lighter co				
Representative	-		-				974 & 6975		
Photographer:			e numbe	rs:	6974 & 69	75	_ Space	r:	NA
Calculated dis					NA				
Final Time a	nd Positio	n of Sig	hting						
Time: NA	_ WP#:		Lat:		NA		Long:	Ν	A
Calculated Dis	stance Trav	veled:		NA	L .	_			
Behavior and	Addition	al Com	ments						
Only a single poi	nt of the an	imals actu	ual locatio	on was	taken.				
Animals traveline	g at modera	te pace s	urfacing f	reque	ntly.				
Sighting queue f	or these ani	mals the	same as t	hat fo	r sighting 4 as	specie	es were foun	id in the	e same
area but not asso	ciated with	one anot	ther.						
					•				
	dnesday, Fe		1, 2012 S	Sight	ing # 6				
Initial sightin	-		Lati		25 76020		<b>.</b>	74.0	10007
Time: 12:12	-		Lat:		35.76828			-74.8	
Vertical Angle On/Off Effort:			rial Bea	-	in Degrees:	90	Sighting	-	
Observer:	On Erin		Observei		40 : Right	Beat	ufort Sea S	state: _	5
				side	. Right				
Actual Time						_	-		
Time: 12:12	_ WP#:	36	Lat:		35.76828	/T	Long:	-74.8	
Species:Tursion					Numbers (1		<b>U</b> /		/10/9
Features used	in Species	ID: Whi	ite pedun	cle, ro	bust body app	pearan	ice, uniform	grey or	thoracic
region. Representative	images 11	sed for 9	Species	١D٠		6	976 & 6977		
Photographer:			e numbe		6976 & 69		Space	<b>r</b> .	NA
Calculated dis				15.	NA	//	Space	1	
					14/ 4				
Final Time a		-					T		
Time: NA	_ WP#:		Lat:		NA		Long:	N	IA
C-11-+1 D									
Calculated Dis				NA	l				
Behavior and	Addition	al Com							
Behavior and Point collected v	Addition	al Com	he anima:	ls loca	tion.	_			
Behavior and Point collected v Only a single sig	Addition vas an estim hting was m	al Com ation of t ade of th	he anima e animals	ils loca s they	tion. were not the c				
Behavior and Point collected v	Addition vas an estim hting was m for these ani	al Com ation of t ade of th mals the	he anima e animals same as t	ils loca s they	tion. were not the c				e same

Wednesday, February 1, 2012 ${ m Sighting}~\#~7$
Initial sighting on Track
Time: 12:29 WP#: 39 Lat: 35.76681 Long: -74.853803
Vertical Angle: <u>1</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Body</u>
On/Off Effort: On Trackline: 40 Beaufort Sea State: 5
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time: 12:31 WP#: 40 Lat: 35.77297 Long: -74.846489
Species:Stenella coeruleoalba Numbers (Low/High/Best): 200/300/250
Features used in Species ID: Dark line from eye to pectoral and a second down to anus
Representative images used for Species ID: 6989, 6990, 7007, 7013, 7019, 7029
Photographer: Erin Frame numbers: 6979-7043 Spacer: 7044
Calculated distance from Trackline: 0.95 km
Final Time and Position of Sighting
Time: 12:42 WP#: 42 Lat: 35.75891 Long: -74.856185
Calculated Distance Traveled: 1.79 km
Behavior and Additional Comments
String of animals numbering approximately 60, larger group joined the first during our observation
Each group numbering in the hundreds. Animals traveling in definite direction at a high rate of speed.
Each group numbering in the numbereds. Animals havening in demine direction at a high rate of speed.
Wednesday, February 1, 2012 Sighting # 8
Wednesday, February 1, 2012 Sighting # 8 Initial sighting on Track
Initial sighting on Track
Initial sighting on Track           Time:         14:48         WP#:         49         Lat:         35.01959         Long:         -74.840051
Initial sighting on TrackTime:14:48WP#:49Lat:35.01959Long:-74.840051Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:Body
Initial sighting on TrackTime:14:48WP#:49Lat:35.01959Long:-74.840051Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:Body
Initial sighting on TrackTime:14:48WP#:49Lat:35.01959Long:-74.840051Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:5Observer:RyanObserver side:Left
Initial sighting on Track         Time:       14:48       WP#:       49       Lat:       35.01959       Long:       -74.840051         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       31       Beaufort Sea State:       5         Observer:       Ryan       Observer side:       Left       Left
Initial sighting on TrackTime:14:48WP#:49Lat:35.01959Long:-74.840051Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:5Observer:RyanObserver side:Left
Initial sighting on TrackTime:14:48WP#:49Lat:35.01959Long:-74.840051Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:5Observer:RyanObserver side:Left-74.841419Actual Time and Position of SightingTime:14:50WP#:50Lat:35.03119Long:-74.841419Species:Balaenoptera physalisNumbers (Low/High/Best):2/2/22/2/2
Initial sighting on TrackTime:14:48WP#:49Lat:35.01959Long:-74.840051Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:5Observer:RyanObserver side:LeftActual Time and Position of SightingLong:-74.841419Species:Balaenoptera physalisNumbers (Low/High/Best):2/2/2Features used in Species ID:Large fusiform body appearance, varring white coloration along the
Initial sighting on TrackTime:14:48WP#:49Lat:35.01959Long:-74.840051Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:5Observer:RyanObserver side:Left-Actual Time and Position of SightingTime:14:50WP#:50Lat:35.03119Long:-74.841419Species:Balaenoptera physalisNumbers (Low/High/Best):2/2/2Features used in Species ID:Large fusiform body appearance, varring white coloration along the body, lighter coloration along the right mandible.
Initial sighting on TrackTime:14:48WP#:49Lat:35.01959Long:-74.840051Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:5Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:50WP#:50Lat:35.03119Long:-74.841419Species:Balaenoptera physalisNumbers (Low/High/Best):2/2/2Features used in Species ID:Large fusiform body appearance, varring white coloration along thebody, lighter coloration along the right mandible.Representative images used for Species ID:7045-7049
Initial sighting on TrackTime:14:48WP#:49Lat:35.01959Long:-74.840051Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:5Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:50WP#:50Lat:35.03119Long:-74.841419Species:Balaenoptera physalisNumbers (Low/High/Best):2/2/2Features used in Species ID:Large fusiform body appearance, varring white coloration along the body, lighter coloration along the right mandible.7045-7049
Initial sighting on TrackTime:14:48WP#:49Lat:35.01959Long:-74.840051Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:5Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:50WP#:50Lat:35.03119Long:-74.841419Species:Balaenoptera physalisNumbers (Low/High/Best):2/2/2Features used in Species ID:Large fusiform body appearance, varring white coloration along the body, lighter coloration along the right mandible.Representative images used for Species ID:7045-7049Photographer:7050Photographer:ErinFrame numbers:7045-7049Spacer:7050Calculated distance from Trackline:1.30 km1.30 km1.30 km1.30 km
Initial sighting on Track         Time:       14:48       WP#:       49       Lat:       35.01959       Long:       -74.840051         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       31       Beaufort Sea State:       5         Observer:       Ryan       Observer side:       Left
Initial sighting on TrackTime:14:48WP#:49Lat:35.01959Long:-74.840051Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:5Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:50WP#:50Lat:35.03119Long:-74.841419Species:Balaenoptera physalisNumbers (Low/High/Best):2 / 2 / 2Features used in Species ID:Large fusiform body appearance, varring white coloration along the body, lighter coloration along the right mandible.Representative images used for Species ID:7045-7049Spacer:7050Calculated distance from Trackline:1.30 km1.30 kmFinal Time and Position of SightingTime:15:04WP#:51Lat:35.03867Long:-74.842553
Initial sighting on TrackTime:14:48WP#:49Lat:35.01959Long:-74.840051Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:5Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:50WP#:50Lat:35.03119Long:-74.841419Species:Balaenoptera physalisNumbers (Low/High/Best):2 / 2 / 2Features used in Species ID:Large fusiform body appearance, varring white coloration along the2Photographer:ErinFrame numbers:7045-7049Photographer:ErinFrame numbers:7045-7049Spacer:7050Calculated distance from Trackline:1.30 kmFinal Time and Position of SightingTime:15:04WP#:51Lat:35.03867Long:-74.842553Calculated Distance Traveled:0.83 km0.83 km-74.842553-74.842553
Initial sighting on Track         Time:       14:48       WP#:       49       Lat:       35.01959       Long:       -74.840051         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       31       Beaufort Sea State:       5         Observer:       Ryan       Observer side:       Left       4         Actual Time and Position of Sighting       Item       14:50       WP#:       50       Lat:       35.03119       Long:       -74.841419         Species:       Balaenoptera physalis       Numbers (Low/High/Best):       2 / 2 / 2       2         Features used in Species ID:       Large fusiform body appearance, varring white coloration along the body, lighter coloration along the right mandible.       1000000000000000000000000000000000000
Initial sighting on TrackTime:14:48WP#:49Lat:35.01959Long:-74.840051Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:5Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:50WP#:50Lat:35.03119Long:-74.841419Species:Balaenoptera physalisNumbers (Low/High/Best):2 / 2 / 2Features used in Species ID:Large fusiform body appearance, varring white coloration along the2Photographer:ErinFrame numbers:7045-7049Photographer:ErinFrame numbers:7045-7049Spacer:7050Calculated distance from Trackline:1.30 kmFinal Time and Position of SightingTime:15:04WP#:51Lat:35.03867Long:-74.842553Calculated Distance Traveled:0.83 km0.83 km-74.842553-74.842553

Wedne	esday, F	ebruary 1	, 2012 Sig	ghting # 9			
Initial sighting	on Trac	k					
Time: 15:07	WP#:	53	Lat:	34.97076	Long	-7	4.781977
Vertical Angle:	1	Horizor	ntal Beari	ng in Degrees:	90 Sig	ghting Cu	ue: Body
On/Off Effort:	On	Т	rackline:	31	Beaufort	Sea State	5
Observer: R	yan	C	bserver s	side: Left			
Actual Time an	d Positi	on of Si	ghting				
Time: 15:15	WP#:	54	Lat:	34.97998	Long	74	4.790353
Species:Unidentifi	ied Balaer	nopteridae		Numbers (I	Low/High/	Best):	1/1/1
Features used in	Species	ID: Larg	e fusiform	body, light and da	irk coloratio	n along bo	ody.
Representative in	mages u	sed for S	pecies II	D:	NA		
Photographer:	Erin	Frame	numbers	: NA	S	Spacer: _	NA
Calculated distant	nce from	n Trackli	ne:	1.28 km			
Final Time and	Positio	n of Sigl	nting				
Time: 15:20	WP#:	55	Lat:	34.98496	Long	g:7	4.782849
Calculated Dista	nce Tra	veled:	0	0.87 km			
Behavior and A	ddition	al Comr	nents				
Streamline shape to	o the anir	nals body	, was obser	ved submerged ro	olling on its s	ide and d	iving to deeper
water. Light and d	ark colora	tion was s	een on the	e animals side, hea	d came to a	definite p	oint.
Animal never surfa	ced for a	second ob	servation.				

Wednesday, March 14, 2012 ${ m Sighting}~\#$ 1
Initial sighting on Track
Time: <u>11:58</u> WP#: <u>29</u> Lat: <u>34.756697</u> Long: <u>-75.280021</u>
Vertical Angle: <u>1</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Body</u>
On/Off Effort: On Trackline: 25 Beaufort Sea State: 3
Observer: Heather Observer side: Right
Actual Time and Position of Sighting
Time: 11:59 WP#: 30 Lat: 34.753415 Long: -75.273994
Species: Globicephala macrorhynchus Numbers (Low/High/Best): 20 / 23 / 21
Features used in Species ID: Black body, blunt head with no rostrum, large dorsal fin placed
~1/3 back on animals body.
Representative images used for Species ID: 7056 & 7070
Photographer: Heather Frame numbers: 7055 - 7078 Spacer: 7079
Calculated distance from Trackline: 0.66 km
Final Time and Position of Sighting
Time: 12:02 WP#: 31 Lat: 34.760847 Long: -75.270311
Calculated Distance Traveled: 0.89 km
Behavior and Additional Comments
Long line of animals with groups of 3 to 5 in closer proximity to one another
Wednesday, March 14, 2012 ${ m Sighting}$ # 2
Initial sighting on Track
Time: 12:06 WP#: 33 Lat: 34.825351 Long: -75.371196
Vertical Angle: <u>3</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Splash</u>
On/Off Effort: On Trackline: 25 Beaufort Sea State: 3
Observer: Ryan Observer side: Left
Actual Time and Position of Sighting
Time: 12:08 WP#: 34 Lat: 34.823642 Long: -75.371893
Species: Tursiops truncatus Numbers (Low/High/Best): 11/15/14
Features used in Species ID: Robust body, lighter blaze along sides trailing to dorsal fin
Animals with white peduncles
Representative images used for Species ID: 7081, 7085, 7087, 7091, 7092
Photographer: Heather Frame numbers: 7080-7109 Spacer: 7110
Calculated distance from Trackline: 0.20 km
Final Time and Position of Sighting
Time: 12:14 WP#: 35 Lat: 34.82407 Long: -75.370914
Calculated Distance Traveled: 0.10 km
Behavior and Additional Comments
Behavior and Additional Comments
Behavior and Additional Comments Pairs or threes breaching at the surface, some animals chasing on another. Once plane circled the group breaching stopped and they began directional travel at a moderate rate.

Wednesday, March 14, 2012 Sighting $\#$ 3
Initial sighting on Track
Time: 14:30 WP#: 45 Lat: 34.82969 Long: -75.242867
Vertical Angle:         1         Horizontal Bearing in Degrees:         90         Sighting Cue:         Body
On/Off Effort: On Trackline: 26 Beaufort Sea State: 2
Observer: Heather Observer side: Right
Actual Time and Position of Sighting
Time: 14:32 WP#: 46 Lat: 34.82944 Long: -75.255250
Species:Globicephala macrorhynchus         Numbers (Low/High/Best):         12 / 16 / 16
Features used in Species ID: Blunt head with no rostrum, black bodies, large dorsal fin placed
~1/3 the way back on the animals body
Representative images used for Species ID: 7123-25, 7130-32, & 7134
Photographer:       Heather       Frame numbers:       7113 - 7137       Spacer:       7138         Calculated distance from Trackline:       1.13 km
Final Time and Position of Sighting
Time: 14:35 WP#: 47 Lat: 34.829445 Long: -75.244667
Calculated Distance Traveled: 0.97 km
Behavior and Additional Comments
Three groups of between 4 and 6 individuals all of varying size, some whit coloration behind dorsal fin.
Wednesday March 14, 2012 Sighting # 1
Wednesday, March 14, 2012 Sighting # 4
<b>Initial sighting on Track</b> Time: 14:36 WP#: 49 Lat: 34.814578 Long: -75.221811
Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:26Beaufort Sea State:2
Observer: Ryan Observer side: Left
Actual Time and Position of Sighting
Time:         14:40         WP#:         50         Lat:         34.811058         Long:         -75.216392           Superiors:         Usershare:         Usershare:
Species: Unidentified Cetacean Numbers (Low/High/Best): <u>1/1/1</u>
Features used in Species ID:
Representative images used for Species ID: NA
Photographer: Heather Frame numbers: NA Spacer: NA
Calculated distance from Trackline: 0.63 km
Final Time and Position of Sighting         Time:       NA         VP#:       NA         Long:       NA
Time:     NA     WP#:     NA     Lat:     NA     Long:     NA       Calculated Distance Traveled:     NA
Behavior and Additional Comments
Only a brief initial sighting - could not estimate numbers
Assumed location collected.

Wednesday, March 14, 2012 Sighting $\#$ 5
Initial sighting on Track
Time:     15:34     WP#:     59     Lat:     34.786639     Long:     -74.924721
Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:28Beaufort Sea State:2
Observer: Ryan Observer side: Left
Actual Time and Position of Sighting
Time: 15:40 WP#: 60 Lat: 34.785733 Long: -74.933775
Species: Unidentified Cetacean Numbers (Low/High/Best): 1/1/1
Features used in Species ID:
Representative images used for Species ID: NA
Photographer: NA Frame numbers: NA Spacer: NA
Calculated distance from Trackline: 0.83 km
Final Time and Position of Sighting
Time: NA WP#: NA Lat: NA Long: NA
Calculated Distance Traveled: NA
Behavior and Additional Comments
Only a breif initial sighting - could not estimate numbers
Wednesday, March 14, 2012 Sighting # 6
Initial sighting on Track
Time: 16:26 WP#: 71 Lat: 34.957542 Long: -74.891237
Vertical Angle: <u>3</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Blow</u>
On/Off Effort: On Trackline: 30 Beaufort Sea State: 2
Observer: Heather Observer side: Right
Actual Time and Position of Sighting
Time:         16:27         WP#:         72         Lat:         34.959386         Long:         -74.896202
Species:Physeter macrocephalus         Numbers (Low/High/Best):         1/1/1
Features used in Species ID: Large square head, blowhole forward and on the left side, thin
bright white underslung jaw, dorsal ridge
Representative images used for Species ID:         7147, 7153, 7155, 7176, 7177, 7195           Photo served ser
Photographer:HeatherFrame numbers:7139-7197Spacer:7198Calculated distance from Trackline:0.50 km
Time: 16:30 WP#: 73 Lat: 34.955817 Long: -74.892746
Final Time and Position of SightingTime:16:30WP#:73Lat:34.955817Long:-74.892746Calculated Distance Traveled:0.51 km
Time: 16:30 WP#: 73 Lat: 34.955817 Long: -74.892746

Single animal taking a series of breathes at surface before submerging. Animal turned on its side and swimming with its mouth open - could see lower jaw. Animal dove for half a minute before resurfacing.

Distinctive markings, scarring on the area in front of the dorsal ridge - possible ID feature.

Wednesday, March 14, 2012 Sighting $\#$ 7
Initial sighting on Track
Time: 16:33 WP#: 75 Lat: 34.923099 Long: -74.845599
Vertical Angle: <u>3</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Body</u>
On/Off Effort: On Trackline: 30 Beaufort Sea State: 2
Observer: Ryan Observer side: Left
Actual Time and Position of Sighting
Time: 16:41 WP#: 76 Lat: 34.93307 Long: -74.838806
Species:Balaenoptera acutorostrata Numbers (Low/High/Best): 2/2/2
Features used in Species ID: White pigmentation on pectoral fins, dorsal fin placed well back on
body
Representative images used for Species ID: 7210-12, 7220-22, 7225, 7234, 7235, 7238
Photographer: Heather Frame numbers: 7199-7249 Spacer: 7250
Calculated distance from Trackline: 1.27 km
Final Time and Position of Sighting
Time: 16:42 WP#: 77 Lat: 34.910908 Long: -74.825100
Calculated Distance Traveled: 2.76 km
Behavior and Additional Comments
Mom and calf pair, upon circling calf stayed closer to mother and dove in sync with her. Calf up more
frequently than mother.
Wednesday, March 14, 2012 Sighting # 8
Wednesday, March 14, 2012 Sighting # 8 Initial sighting on Track
Initial sighting on Track
Initial sighting on Track           Time: 17:02         WP#: 81         Lat: 35.157604         Long: -75.034195
Initial sighting on Track           Time: 17:02         WP#: 81         Lat: 35.157604         Long: -75.034195
Initial sighting on Track         Time:       17:02       WP#:       81       Lat:       35.157604       Long:       -75.034195         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body
Initial sighting on TrackTime:17:02WP#:81Lat:35.157604Long:-75.034195Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:2Observer:RyanObserver side:Left
Initial sighting on Track         Time:       17:02       WP#:       81       Lat:       35.157604       Long:       -75.034195         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       31       Beaufort Sea State:       2         Observer:       Ryan       Observer side:       Left
Initial sighting on TrackTime:17:02WP#:81Lat:35.157604Long:-75.034195Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:2Observer:RyanObserver side:LeftLeftTime:17:02WP#:82Lat:35.159333Long:-75.040836
Initial sighting on TrackTime:17:02WP#:81Lat:35.157604Long:-75.034195Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:2Observer:RyanObserver side:LeftActual Time and Position of SightingTime:17:02WP#:82Lat:35.159333Long:-75.040836Species:Peponocephala electraNumbers (Low/High/Best):175 / 200 / 185
Initial sighting on TrackTime:17:02WP#:81Lat:35.157604Long:-75.034195Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:2Observer:RyanObserver side:LeftActual Time and Position of SightingTime:17:02WP#:82Lat:35.159333Long:-75.040836Species:Peponocephala electraNumbers (Low/High/Best):175 / 200 / 185Features used in Species ID:Elongated body, head triangular but rounded, no rostrum, dorsal fin
Initial sighting on TrackTime:17:02WP#:81Lat:35.157604Long:-75.034195Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:2Observer:RyanObserver side:LeftActual Time and Position of SightingTime:17:02WP#:82Lat:35.159333Long:-75.040836Species:Peponocephala electraNumbers (Low/High/Best):175 / 200 / 185Features used in Species ID:Elongated body, head triangular but rounded, no rostrum, dorsal fin at the midpoint of the body.
Initial sighting on TrackTime:17:02WP#:81Lat:35.157604Long:-75.034195Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:2Observer:RyanObserver side:LeftActual Time and Position of SightingTime:17:02WP#:82Lat:35.159333Long:-75.040836Species:Peponocephala electraNumbers (Low/High/Best):175 / 200 / 185Features used in Species ID:Elongated body, head triangular but rounded, no rostrum, dorsal fin at the midpoint of the body.Representative images used for Species ID:7261-2, 7270, 7273-4, 7282
Initial sighting on TrackTime:17:02WP#:81Lat:35.157604Long:-75.034195Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:2Observer:RyanObserver side:LeftActual Time and Position of SightingTime:17:02WP#:82Lat:35.159333Long:-75.040836Species:Peponocephala electraNumbers (Low/High/Best):175 / 200 / 185Features used in Species ID:Elongated body, head triangular but rounded, no rostrum, dorsal finat the midpoint of the body.Representative images used for Species ID:7261-2, 7270, 7273-4, 7282
Initial sighting on TrackTime:17:02WP#:81Lat:35.157604Long:-75.034195Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:2Observer:RyanObserver side:LeftActual Time and Position of SightingTime:17:02WP#:82Lat:35.159333Long:-75.040836Species:Peponocephala electraNumbers (Low/High/Best):175 / 200 / 185Features used in Species ID:Elongated body, head triangular but rounded, no rostrum, dorsal finat the midpoint of the body.Representative images used for Species ID:7261-2, 7270, 7273-4, 7282Photographer:HeatherFrame numbers:7251 - 7346Spacer:7347Calculated distance from Trackline:0.63 km
Initial sighting on Track         Time:       17:02       WP#:       81       Lat:       35.157604       Long:       -75.034195         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       31       Beaufort Sea State:       2         Observer:       Ryan       Observer side:       Left         Actual Time and Position of Sighting         Time:       17:02       WP#:       82       Lat:       35.159333       Long:       -75.040836         Species: Peponocephala electra       Numbers (Low/High/Best):       175 / 200 / 185       Features used in Species ID:       Elongated body, head triangular but rounded, no rostrum, dorsal fin         at the midpoint of the body.       Representative images used for Species ID:       7261-2, 7270, 7273-4, 7282         Photographer:       Heather       Frame numbers:       7251 - 7346       Spacer:       7347         Calculated distance from Trackline:       0.63 km       Image:       Image:
Initial sighting on TrackTime:17:02WP#:81Lat:35.157604Long:-75.034195Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:2Observer:RyanObserver side:LeftActual Time and Position of SightingTime:17:02WP#:82Lat:35.159333Long:-75.040836Species:Peponocephala electraNumbers (Low/High/Best):175 / 200 / 185Features used in Species ID:Elongated body, head triangular but rounded, no rostrum, dorsal fin at the midpoint of the body.Representative images used for Species ID:7261-2, 7270, 7273-4, 7282Photographer:HeatherFrame numbers:7251 - 7346Spacer:7347Calculated distance from Trackline:0.63 kmFinal Time and Position of SightingTime:17:09WP#:83Lat:35.15236Long:-75.027013
Initial sighting on TrackTime:17:02WP#:81Lat:35.157604Long:-75.034195Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:2Observer:RyanObserver side:LeftActual Time and Position of SightingTime:17:02WP#:82Lat:35.159333Long:-75.040836Species:Peponocephala electraNumbers (Low/High/Best):175 / 200 / 185Features used in Species ID:Elongated body, head triangular but rounded, no rostrum, dorsal fin at the midpoint of the body.Representative images used for Species ID:7261-2, 7270, 7273-4, 7282Photographer:HeatherFrame numbers:7251 - 7346Spacer:7347Calculated distance from Trackline:0.63 km63 km515236Long:-75.027013Time:17:09WP#:83Lat:35.15236Long:-75.027013Calculated Distance Traveled:1.48 km1.48 km1.48 km1.48 km1.48 km
Initial sighting on TrackTime:17:02WP#:81Lat:35.157604Long:-75.034195Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:2Observer:RyanObserver side:LeftActual Time and Position of SightingTime:17:02WP#:82Lat:35.15933Long:-75.040836Species:Peponocephala electraNumbers (Low/High/Best):175 / 200 / 185Features used in Species ID:Elongated body, head triangular but rounded, no rostrum, dorsal fin at the midpoint of the body.Representative images used for Species ID:7261-2, 7270, 7273-4, 7282Photographer:HeatherFrame numbers:7251 - 7346Spacer:7347Calculated distance from Trackline:0.63 kmTime:17:09WP#:83Lat:35.15236Long:-75.027013Calculated Distance Traveled:1.48 kmBehavior and Additional Comments
Initial sighting on TrackTime:17:02WP#:81Lat:35.157604Long:-75.034195Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:31Beaufort Sea State:2Observer:RyanObserver side:LeftActual Time and Position of SightingTime:17:02WP#:82Lat:35.159333Long:-75.040836Species:Peponocephala electraNumbers (Low/High/Best):175 / 200 / 185Features used in Species ID:Elongated body, head triangular but rounded, no rostrum, dorsal fin at the midpoint of the body.Representative images used for Species ID:7261-2, 7270, 7273-4, 7282Photographer:HeatherFrame numbers:7251 - 7346Spacer:7347Calculated distance from Trackline:0.63 km63 km515236Long:-75.027013Time:17:09WP#:83Lat:35.15236Long:-75.027013Calculated Distance Traveled:1.48 km1.48 km1.48 km1.48 km1.48 km

	ursuay, r	March 15	, 2012 S1g	ting # 1		
Initial sighting of	on Trac	k	C	C		
Time: 9:42	WP#:	4	Lat:	35.147156	Long:	-74.881733
Vertical Angle:	2	Horizoi	ntal Bearir	ng in Degrees:	90 Sighting	Cue: Body
On/Off Effort:				32	Beaufort Sea St	tate: 2
Observer: Ry	/an	C	)bserver si	de: Right		
Actual Time an	d Positi	on of Si	ghting			
Time: 9:42		5		35.143693	Long:	-74.88727
Species:Unidentifi	ed Mesopi	odon		Numbers (I	ow/High/Best):	
Features used in	Species	ID: Sma	ll pectoral fi			
Large body size.						
Representative in		sed for S	Species ID	:	7367, 7371, 7372	
	Ryan		numbers:		Spacer	: 7374
Calculated distar	ice from	Trackli	ne:	0.63 km		
Final Time and	Positio	ı of Sigl	hting			
Time: 9:48	WP#:	6	Lat:	35.150020	Long:	-74.878071
Calculated Dista	nce Trav	veled:	1.	09 km		
Behavior and A	ddition	al Comi	nents			
Two larger animals	with a thi	rd, smalle	er animal ha	nging close to on	e of the adults. Lar	rger animals ~18ft
long. Animals surfa						
Th	ureday M					
	ursuay, r	March 15	, 2012 Sig	ting # 2		
Initial sighting of			, 2012 Sig	thing $\#$ 2		
	on Trac		, 2012 Sig Lat:	hting # 2	Long:	-74.751476
Initial sighting of	on Trac WP#:	<b>k</b> 8	Lat:	35.100116	_	
Initial sighting of Time: 9:51	on Trac WP#: 2	<b>k</b> 8 Horizoı	Lat:	35.100116 ng in Degrees:		Cue: Body
Initial sighting of Time: 9:51 Vertical Angle: 0n/Off Effort:	on Trac WP#: 2	<b>k</b> <u>8</u> Horizon T	Lat:	35.100116 ng in Degrees: 32	90 Sighting	Cue: Body
Initial sighting of Time: 9:51 Vertical Angle: 0n/Off Effort:	Den Trac WP#: 2 On other	k <u>8</u> Horizon T C	Lat:	35.100116 ng in Degrees: 32	90 Sighting	Cue: Body
Initial sighting of Time: 9:51 Vertical Angle: 0 On/Off Effort: 0 Observer: Hea Actual Time and	on Trac WP#: 2 On ther d Position	k 8 Horizon T C on of Sig	Lat:	35.100116 ng in Degrees: 32 ide: Left	90 Sighting Beaufort Sea St	Cue: <u>Body</u> tate: 2
Initial sighting of Time: <u>9:51</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Hea</u>	On Trac WP#: 2 On ther d Positie WP#:	k 8 Horizon T C on of Sig	Lat:	35.100116 ng in Degrees: 32 ide: Left 35.101080	90 Sighting Beaufort Sea St	Cue: <u>Body</u> tate: <u>2</u>
Initial sighting of         Time:       9:51         Vertical Angle:       _         On/Off Effort:       _         Observer:       Heat         Actual Time and       _         Time:       9:53	on Trac WP#: 2 On ther d Positie WP#: ontalis	k Horizon T Con of Si 9	Lat:	<u>35.100116</u> ng in Degrees: <u>32</u> ide: <u>Left</u> <u>35.101080</u> Numbers (I	90 Sighting Beaufort Sea St Long: Low/High/Best):	-74.777675 25 / 26 / 26
Initial sighting of Time: 9:51 Vertical Angle: 0 On/Off Effort: 0 Observer: Hea Actual Time and Time: 9:53 Species: Stenella fr	on Trac WP#: <u>2</u> On tther d Positie WP#: ontalis Species	k Borizon T Con of Sig 9 ID: Whit	Lat:	<u>35.100116</u> ng in Degrees: <u>32</u> ide: <u>Left</u> <u>35.101080</u> Numbers (I	90 Sighting Beaufort Sea St Long: Low/High/Best):	-74.777675 25 / 26 / 26
Initial sighting of Time: 9:51 Vertical Angle: 0 On/Off Effort: 0 Observer: Hea Actual Time and Time: 9:53 Species: <i>Stenella fr</i> Features used in	on Trac WP#: 2 On ther d Positie WP#: contalis Species few of the	k Horizon T Con of Si 9 ID: <u>Whi</u>	Lat:	35.100116 ng in Degrees: 32 ide: Left 35.101080 Numbers (I trum, faint light an	90 Sighting Beaufort Sea St Long: Low/High/Best):	-74.777675 25 / 26 / 26 of color, some
Initial sighting of Time: 9:51 Vertical Angle: 0 On/Off Effort: 0 Observer: Hea Actual Time and Time: 9:53 Species: <i>Stenella fr</i> Features used in light spotting on a f	on Trac WP#: 2 On onther d Positie WP#: 5 pecies few of the nages us	k Horizon T Con of Si 9 ID: White animals. sed for S	Lat:	<u>35.100116</u> ng in Degrees: <u>32</u> ide: <u>Left</u> <u>35.101080</u> Numbers (I trum, faint light ar	90 Sighting Beaufort Sea St Long: Low/High/Best): ad dark alternation 389, 7390, 7403, 74	-74.777675 25 / 26 / 26 of color, some
Initial sighting of Time: 9:51 Vertical Angle: 0 On/Off Effort: 0 Observer: Hea Actual Time and Time: 9:53 Species: <i>Stenella fr</i> Features used in light spotting on a f Representative in	on Trac WP#: <u>2</u> On onther d Positie WP#: ontalis Species few of the nages us Ryan	k Horizon T Con of Sig 9 ID: Whit e animals. sed for S Frame	Lat:	<u>35.100116</u> ng in Degrees: <u>32</u> ide: <u>Left</u> <u>35.101080</u> Numbers (I trum, faint light an : <u>7383, 7</u> 7375 - 742	90 Sighting Beaufort Sea St Long: Low/High/Best): ad dark alternation 389, 7390, 7403, 74	-74.777675 25 / 26 / 26 of color, some 404, 7405
Initial sighting of Time: 9:51 Vertical Angle: 0 On/Off Effort: 0 Observer: Hea Actual Time and Time: 9:53 Species: Stenella fr Features used in light spotting on a f Representative in Photographer: 0	on Trac WP#: 2 On onther d Position WP#: 5 pecies few of the mages us Ryan ace from	k 8 Horizon T C on of Sig 9 ID: White animals. sed for S Frame Trackli	Lat:	<u>35.100116</u> ng in Degrees: <u>32</u> ide: <u>Left</u> <u>35.101080</u> Numbers (I trum, faint light an : <u>7383, 7</u> 7375 - 742	90 Sighting Beaufort Sea St Long: Low/High/Best): ad dark alternation 389, 7390, 7403, 74	-74.777675 25 / 26 / 26 of color, some 404, 7405
Initial sighting of Time: 9:51 Vertical Angle: 0 On/Off Effort: 0 Observer: Hea Actual Time and Time: 9:53 Species: <i>Stenella fr</i> Features used in light spotting on a f Representative in Photographer: 0 Calculated distar	on Trac WP#: 2 On onther d Position WP#: 5 pecies few of the mages us Ryan ace from	k Horizon T Con of Si 9 ID: White animals. sed for S Frame Trackli n of Sigl	Lat:	<u>35.100116</u> ng in Degrees: <u>32</u> ide: <u>Left</u> <u>35.101080</u> Numbers (I trum, faint light an : <u>7383, 7</u> 7375 - 742	90 Sighting Beaufort Sea St Long: Low/High/Best): ad dark alternation 389, 7390, 7403, 74	-74.777675 25 / 26 / 26 of color, some 404, 7405 : 7422
Initial sighting of Time: 9:51 Vertical Angle: 0 On/Off Effort: 0 Observer: Head Actual Time and Time: 9:53 Species: Stenella fr Features used in light spotting on a f Representative in Photographer: 0 Calculated distar Final Time and	on Trac WP#: 2 On onther d Position WP#: 5 pecies few of the nages us Ryan nee from Position WP#:	k 8 Horizon T C on of Si 9 ID: White animals. sed for S Frame Trackli n of Sigl 10	Lat:	35.100116 ng in Degrees: 32 ide: 1de: 35.101080 Numbers (I trum, faint light an  7383, 7 7375 - 742 2.39 km	90 Sighting Beaufort Sea St Long: Low/High/Best): nd dark alternation 389, 7390, 7403, 74 11 Spacer	-74.777675 25 / 26 / 26 of color, some 404, 7405 : 7422
Initial sighting of Time: 9:51 Vertical Angle: 0n/Off Effort: 0 Observer: Head Actual Time and Time: 9:53 Species: Stenella fr Features used in light spotting on a f Representative in Photographer: 0 Calculated distar Final Time and Time: 9:53 Calculated Dista	on Trac WP#: <u>2</u> On onther d Position WP#: ontalis Species few of the nages us Ryan nee from <b>Position</b> WP#: nce Trav	k 8 Horizon T C on of Si 9 ID: Whit animals. Sed for S Frame Trackli n of Sigl 10 /eled:	Lat:	<u>35.100116</u> ig in Degrees: <u>32</u> ide: <u>Left</u> <u>35.101080</u> Numbers (I trum, faint light an : <u>7383, 7</u> <u>7375 - 742</u> 2.39 km <u>35.105539</u>	90 Sighting Beaufort Sea St Long: Low/High/Best): nd dark alternation 389, 7390, 7403, 74 11 Spacer	-74.777675 25 / 26 / 26 of color, some 404, 7405 : 7422
Initial sighting of Time: 9:51 Vertical Angle: 0 On/Off Effort: 0 Observer: Hea Actual Time and Time: 9:53 Species: Stenella fr Features used in light spotting on a f Representative in Photographer: 0 Calculated distar Final Time and Time: 9:53 Calculated Dista Behavior and A	on Trac WP#: 2 On onther d Position WP#: ontalis Species few of the mages us Ryan nce from WP#: nce Trav ddition	k 8 Horizon T C on of Sig 9 ID: White animals. sed for S Frame Trackli n of Sigl 10 /eled: al Comi	Lat:	<u>35.100116</u> ig in Degrees: <u>32</u> ide: <u>Left</u> <u>35.101080</u> Numbers (I trum, faint light an : <u>7383, 7</u> <u>7375 - 742</u> 2.39 km <u>35.105539</u> 50 km	90 Sighting Beaufort Sea St Long: Low/High/Best): ad dark alternation 389, 7390, 7403, 74 1 Spacer Long:	Cue: <u>Body</u> tate: 2 -74.777675 25 / 26 / 26 of color, some 404, 7405 : 7422 -74.778713
Initial sighting of Time: 9:51 Vertical Angle: 0n/Off Effort: 0 Observer: Head Actual Time and Time: 9:53 Species: Stenella fr Features used in light spotting on a f Representative in Photographer: 0 Calculated distar Final Time and Time: 9:53 Calculated Dista	on Trac WP#: <u>2</u> On ontalis d Position WP#: ontalis Species few of the mages us Ryan nee from <b>Position</b> WP#: nce Trav ddition	k 8 Horizon T C on of Si 9 ID: Whit animals. sed for S Frame Trackli n of Sigl 10 /eled: al Common set to the set t	Lat:	<u>35.100116</u> ig in Degrees: <u>32</u> ide: <u>Left</u> <u>35.101080</u> Numbers (I trum, faint light an : <u>7383, 7</u> <u>7375 - 742</u> 2.39 km <u>35.105539</u> 50 km	90 Sighting Beaufort Sea St Long: Low/High/Best): ad dark alternation 389, 7390, 7403, 74 1 Spacer Long:	Cue: <u>Body</u> tate: 2 -74.777675 25 / 26 / 26 of color, some 404, 7405 : 7422 -74.778713

Thursday, March 15, 2012 $\operatorname{Sighting} \# 3$
Initial sighting on Track
Time:         10:09         WP#:         13         Lat:         35.032063         Long:         -74.396965
Vertical Angle: <u>1</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Body</u>
On/Off Effort:         Off         Trackline:         32 & 33         Beaufort Sea State:         2
Observer: Heather Observer side: Left
Actual Time and Position of Sighting
Time:         10:10         WP#:         14         Lat:         35.032775         Long:         -74.405086
Species:Balaenoptera acutorostrata       Numbers (Low/High/Best): 2/2/2
Features used in Species ID: Fusiform shape, white coloration across middle of pectoral fins,
small dorsal fin far back on body.
Representative images used for Species ID:7433, 7435, 7441, 7453, 7454, 7456, 7468
Photographer:    Ryan    Frame numbers:    7423 - 7474    Spacer:    7475
Calculated distance from Trackline: 0.74 km
Final Time and Position of Sighting
Time:         10:17         WP#:         15         Lat:         35.034741         Long:         -74.395515
Calculated Distance Traveled: 0.90 km
Behavior and Additional Comments
Mom calf pair sighted between tracklines 32 and 33, calf surfacing more frequently than mother.
Animals continued their pattern of surfacing and direction of travel throughout the encounter.
Thursday, March 15, 2012 Sighting # 4
Thursday, March 15, 2012 Sighting # 4 Initial sighting on Track
Initial sighting on Track           Time:         10:23         WP#:         18         Lat:         35.141339         Long:         -74.433726
Initial sighting on Track         Time:       10:23       WP#:       18       Lat:       35.141339       Long:       -74.433726         Vertical Angle:       2       Horizontal Bearing in Degrees:       60       Sighting Cue:       Body
Initial sighting on TrackTime:10:23WP#:18Lat:35.141339Long:-74.433726Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:BodyOn/Off Effort:OnTrackline:33Beaufort Sea State:2
Initial sighting on Track         Time:       10:23       WP#:       18       Lat:       35.141339       Long:       -74.433726         Vertical Angle:       2       Horizontal Bearing in Degrees:       60       Sighting Cue:       Body
Initial sighting on TrackTime:10:23WP#:18Lat:35.141339Long:-74.433726Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:BodyOn/Off Effort:OnTrackline:33Beaufort Sea State:2
Initial sighting on Track         Time:       10:23       WP#:       18       Lat:       35.141339       Long:       -74.433726         Vertical Angle:       2       Horizontal Bearing in Degrees:       60       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       33       Beaufort Sea State:       2         Observer:       Ryan       Observer side:       Right
Initial sighting on Track         Time:       10:23       WP#:       18       Lat:       35.141339       Long:       -74.433726         Vertical Angle:       2       Horizontal Bearing in Degrees:       60       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       33       Beaufort Sea State:       2         Observer:       Ryan       Observer side:       Right
Initial sighting on TrackTime:10:23WP#:18Lat:35.141339Long:-74.433726Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:BodyOn/Off Effort:OnTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:24WP#:19Lat:35.151913Long:-74.430711
Initial sighting on TrackTime:10:23WP#:18Lat:35.141339Long:-74.433726Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:BodyOn/Off Effort:OnTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:24WP#:19Lat:35.151913Long:-74.430711Species:Balaenoptera physalisNumbers (Low/High/Best):1/1/1
Initial sighting on TrackTime:10:23WP#:18Lat:35.141339Long:-74.433726Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:BodyOn/Off Effort:OnTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:24WP#:19Lat:35.151913Long:-74.430711Species:Balaenoptera physalisNumbers (Low/High/Best):1/1/1Features used in Species ID:Fusiform body shape. Lighter coloration in the right jaw area.Uniform coloration to pectoral fins.Representative images used for Species ID:7494, 7497
Initial sighting on TrackTime:10:23WP#:18Lat:35.141339Long:-74.433726Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:BodyOn/Off Effort:OnTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:24WP#:19Lat:35.151913Long:-74.430711Species:Balaenoptera physalisNumbers (Low/High/Best):1/1/1Features used in Species ID:Fusiform body shape. Lighter coloration in the right jaw area.Uniform coloration to pectoral fins.Representative images used for Species ID:7494, 7497Photographer:RyanFrame numbers:7476 - 7511Spacer:7512
Initial sighting on TrackTime:10:23WP#:18Lat:35.141339Long:-74.433726Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:BodyOn/Off Effort:OnTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:24WP#:19Lat:35.151913Long:-74.430711Species:Balaenoptera physalisNumbers (Low/High/Best):1/1/1Features used in Species ID:Fusiform body shape. Lighter coloration in the right jaw area.Uniform coloration to pectoral fins.Representative images used for Species ID:7494, 7497
Initial sighting on TrackTime:10:23WP#:18Lat:35.141339Long:-74.433726Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:BodyOn/Off Effort:OnTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:24WP#:19Lat:35.151913Long:-74.430711Species:Balaenoptera physalisNumbers (Low/High/Best):1/1/1Features used in Species ID:Fusiform body shape. Lighter coloration in the right jaw area.Uniform coloration to pectoral fins.Representative images used for Species ID:7494, 7497Photographer:RyanFrame numbers:7476 - 7511Spacer:7512
Initial sighting on TrackTime:10:23WP#:18Lat:35.141339Long:-74.433726Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:BodyOn/Off Effort:OnTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:24WP#:19Lat:35.151913Long:-74.430711Species:Balaenoptera physalisNumbers (Low/High/Best):1/1/1Features used in Species ID:Fusiform body shape. Lighter coloration in the right jaw area.Uniform coloration to pectoral fins.Representative images used for Species ID:7476 - 7511Spacer:7512Calculated distance from Trackline:1.21 km
Initial sighting on TrackTime:10:23WP#:18Lat:35.141339Long:-74.433726Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:BodyOn/Off Effort:OnTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:24WP#:19Lat:35.151913Long:-74.430711Species:Balaenoptera physalisNumbers (Low/High/Best):1/1/1Features used in Species ID:Fusiform body shape. Lighter coloration in the right jaw area.Uniform coloration to pectoral fins.Representative images used for Species ID:7494, 7497Photographer:RyanFrame numbers:7476 - 7511Spacer:7512Calculated distance from Trackline:1.21 kmFinal Time and Position of Sighting
Initial sighting on TrackTime:10:23WP#:18Lat:35.141339Long:-74.433726Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:BodyOn/Off Effort:OnTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:24WP#:19Lat:35.151913Long:-74.430711Species:Balaenoptera physalisNumbers (Low/High/Best):1 / 1 / 1Features used in Species ID:Fusiform body shape. Lighter coloration in the right jaw area.Uniform coloration to pectoral fins.Representative images used for Species ID:7476 - 7511Spacer:7512Calculated distance from Trackline:1.21 kmFinal Time and Position of SightingTime:10:27WP#:20Lat:35.152107Long:-74.426363Calculated Distance Traveled:0.40 km0.40 km0.40 km0.40 km
Initial sighting on TrackTime:10:23WP#:18Lat:35.141339Long:-74.433726Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:BodyOn/Off Effort:OnTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:24WP#:19Lat:35.151913Long:-74.430711Species:Balaenoptera physalisNumbers (Low/High/Best):1/1/1Features used in Species ID:Fusiform body shape. Lighter coloration in the right jaw area.Uniform coloration to pectoral fins.Representative images used for Species ID:7494, 7497Photographer:RyanFrame numbers:7476 - 7511Spacer:7512Calculated distance from Trackline:1.21 kmFinal Time and Position of SightingTime:10:27WP#:20Lat:35.152107Long:-74.426363Calculated Distance Traveled:0.40 km </td
Initial sighting on TrackTime:10:23WP#:18Lat:35.141339Long:-74.433726Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:BodyOn/Off Effort:OnTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:24WP#:19Lat:35.151913Long:-74.430711Species:Balaenoptera physalisNumbers (Low/High/Best):1 / 1 / 1Features used in Species ID:Fusiform body shape. Lighter coloration in the right jaw area.Uniform coloration to pectoral fins.Representative images used for Species ID:7476 - 7511Spacer:7512Calculated distance from Trackline:1.21 kmFinal Time and Position of SightingTime:10:27WP#:20Lat:35.152107Long:-74.426363Calculated Distance Traveled:0.40 km0.40 km0.40 km0.40 km

Initial sighting on Track
Time: <u>10:34</u> WP#: <u>22</u> Lat: <u>35.199494</u> Long: <u>-74.672795</u>
Vertical Angle:         2         Horizontal Bearing in Degrees:         100         Sighting Cue:         Body
On/Off Effort: On Trackline: 33 Beaufort Sea State: 2
Observer: Heather Observer side: Left
Actual Time and Position of Sighting
Time:         10:38         WP#:         24         Lat:         35.201177         Long:         -74.673247
Species:Globicephala macrorhynchus       Numbers (Low/High/Best): 24/25/25
Features used in Species ID: Large square head with no rostrum, Large dorsal fin places ~1/3
back on the animals body, dark body coloration with white area around dorsal fin.
Representative images used for Species ID:
Photographer:         Ryan         Frame numbers:         7513 - 7575         Spacer:         7576
Calculated distance from Trackline: 0.19 km
Final Time and Position of Sighting
Time:         10:44         WP#:         25         Lat:         35.205495         Long:         -74.673247
Calculated Distance Traveled: 0.5 km
Behavior and Additional Comments
Initial sighting of nine individuals in a close groups, additional animals were observed in smaller groups
seen within 300 ft. of the original group. Sighting 6 animals were observed in the same area as this
sighting and traveled below them during while the team circled both groups.
Thursday, March 15, 2012 ${ m Sighting}~\#$ 6
Initial sighting on Track
Time:         10:34         WP#:         22         Lat:         35.199494         Long:         -74.672795
Time:10:34WP#:22Lat:35.199494Long:-74.672795Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:Body
Time:10:34WP#:22Lat:35.199494Long:-74.672795Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:33Beaufort Sea State:2
Time:10:34WP#:22Lat:35.199494Long:-74.672795Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:33Beaufort Sea State:2Observer:RyanObserver side:Right
Time:10:34WP#:22Lat:35.199494Long:-74.672795Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of Sighting
Time:10:34WP#:22Lat:35.199494Long:-74.672795Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:37WP#:23Lat:35.198969Long:-74.674666
Time:10:34WP#:22Lat:35.199494Long:-74.672795Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:37WP#:23Lat:35.198969Long:-74.674666Species:Balaenoptera acutorostrataNumbers (Low/High/Best):2/2/2
Time:10:34WP#:22Lat:35.199494Long:-74.672795Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:37WP#:23Lat:35.198969Long:-74.674666Species:Balaenoptera acutorostrataNumbers (Low/High/Best):2/2/2Features used in Species ID:Fusiform body shape, white coloration to middle of each pectoral
Time:10:34WP#:22Lat:35.199494Long:-74.672795Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:37WP#:23Lat:35.198969Long:-74.674666Species:Balaenoptera acutorostrataNumbers (Low/High/Best):2/2/2Features used in Species ID:Fusiform body shape, white coloration to middle of each pectoralfin, small dorsal fin.
Time:10:34WP#:22Lat:35.199494Long:-74.672795Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:37WP#:23Lat:35.198969Long:-74.674666Species:Balaenoptera acutorostrataNumbers (Low/High/Best):2/2/2Features used in Species ID:Fusiform body shape, white coloration to middle of each pectoralfin, small dorsal fin.Representative images used for Species ID:7529, 7531, 7572
Time:10:34WP#:22Lat:35.199494Long:-74.672795Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:37WP#:23Lat:35.198969Long:-74.674666Species:Balaenoptera acutorostrataNumbers (Low/High/Best):2 / 2 / 2Features used in Species ID:Fusiform body shape, white coloration to middle of each pectoralfin, small dorsal fin.Representative images used for Species ID:7529, 7531, 7572Photographer:RyanFrame numbers:7513 - 7575Spacer:7576
Time:10:34WP#:22Lat:35.199494Long:-74.672795Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:37WP#:23Lat:35.198969Long:-74.674666Species:Balaenoptera acutorostrataNumbers (Low/High/Best):2/2/2Features used in Species ID:Fusiform body shape, white coloration to middle of each pectoralfin, small dorsal fin.Representative images used for Species ID:7529, 7531, 7572Photographer:RyanFrame numbers:7513 - 7575Spacer:7576Calculated distance from Trackline:0.18 km0.18 km0.18 km
Time:10:34WP#:22Lat:35.199494Long:-74.672795Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:37WP#:23Lat:35.198969Long:-74.674666Species:Balaenoptera acutorostrataNumbers (Low/High/Best):2/2/22/2/2Features used in Species ID:Fusiform body shape, white coloration to middle of each pectoralfin, small dorsal fin.Representative images used for Species ID:7529, 7531, 75727576Photographer:RyanFrame numbers:7513 - 7575Spacer:7576Calculated distance from Trackline:0.18 km0.18 km60.18 km
Time:10:34WP#:22Lat:35.199494Long:-74.672795Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:37WP#:23Lat:35.198969Long:-74.674666Species:Balaenoptera acutorostrataNumbers (Low/High/Best):2 / 2 / 2Features used in Species ID:Fusiform body shape, white coloration to middle of each pectoralfin, small dorsal fin.Representative images used for Species ID:7529, 7531, 7572Photographer:RyanFrame numbers:7513 - 7575Spacer:Calculated distance from Trackline:0.18 kmFinal Time and Position of SightingTime:10:44WP#:25Lat:35.205495Long:-74.671966
Time:10:34WP#:22Lat:35.199494Long:-74.672795Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:37WP#:23Lat:35.198969Long:-74.674666Species:Balaenoptera acutorostrataNumbers (Low/High/Best):2/2/22/2/2Features used in Species ID:Fusiform body shape, white coloration to middle of each pectoralfin, small dorsal fin.Representative images used for Species ID:7529, 7531, 75727576Photographer:RyanFrame numbers:7513 - 7575Spacer:7576Calculated distance from Trackline:0.18 km0.18 km60.18 km
Time:10:34WP#:22Lat:35.199494Long:-74.672795Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:37WP#:23Lat:35.198969Long:-74.674666Species:Balaenoptera acutorostrataNumbers (Low/High/Best):2 / 2 / 2Features used in Species ID:Fusiform body shape, white coloration to middle of each pectoralfin, small dorsal fin.Representative images used for Species ID:7529, 7531, 7572Photographer:RyanFrame numbers:7513 - 7575Spacer:Calculated distance from Trackline:0.18 kmFinal Time and Position of SightingTime:10:44WP#:25Lat:35.205495Long:-74.671966
Time:10:34WP#:22Lat:35.199494Long:-74.672795Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:33Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:10:37WP#:23Lat:35.198969Long:-74.674666Species:Balaenoptera acutorostrataNumbers (Low/High/Best):2/2/22/2/2Features used in Species ID:Fusiform body shape, white coloration to middle of each pectoralfin, small dorsal fin.Representative images used for Species ID:7529,7531,7572Photographer:RyanFrame numbers:7513 - 7575Spacer:7576Calculated distance from Trackline:0.18 kmFinal Time and Position of SightingTime:10:44WP#:25Lat:35.205495Long:-74.671966Calculated Distance Traveled:0.77 km

while they were at the surface.

Thursday	/, March 15, 2012 $\mathrm{Sigl}$	nting # 7		
Initial sighting on Tr	ack	C		
Time: <u>10:47</u> WP7	#: <u>27</u> Lat:	35.228325	Long:	-74.809822
Vertical Angle: 3	Horizontal Bearing	g in Degrees:	90 Sighting	Cue: Splash
On/Off Effort: On			Beaufort Sea St	
Observer: Ryan	Observer sid	le: Right		
Actual Time and Pos	ition of Sighting			
		35.239920	Long:	-74.805528
Species:Peponocephala			ow/High/Best):	
Features used in Speci			8	
•				
Representative images	used for Species ID:	7579, 7592,	7607, 7624, 7625	, 7629, 7634
Photographer: Ryan	Frame numbers:	7577 - 7644	Spacer	7645
Calculated distance fro	om Trackline:	1.35 km		
Final Time and Posit	ion of Sighting			
	#: <u>29</u> Lat:	35.236201	Long:	-74.809254
Calculated Distance T		3 km		
Behavior and Addition				
Very large group of dolphi		ng ~1/4 mile long	Several distinct	sub-groups
unidirectional travel.	ins travening in a long stri	ing in a mile long	<u>, several distinct</u>	
Thursday	/, March 15, 2012 $\operatorname{Sigl}$	nting # 8		
Initial sighting on Tr	e			
	4: 34 Lat:	35.551895	Long:	-74.776984
Vertical Angle: 1			90 Sighting	
On/Off Effort: On			Beaufort Sea St	
Observer: Heather	Observer sid	le: Left		
Actual Time and Pos	— ition of Sighting		-	
Time: <u>11:21</u> WP <sub>7</sub>	0 0	35 55008/	Long	-74 773731
Species: Tursiops truncatu			ow/High/Best):	
Features used in Speci			• •	
to dorsal fin.		curance, annorm	gicy coloration w	
Representative images	used for Species ID:	7649, 7650,	7653, 7661, 7665	, 7667, 7668
Photographer: Ryan	-	7646 - 7671		: 7672
Calculated distance fro				·
Final Time and Posit				
	4: 36 Lat:	25 551574	Long	74 770011
Calculated Distance T		35.551574	Long:	-/4.//0211
		I NIII		
Behavior and Addition				
Distinct sub groups all spr		r traveling in diffe	erent directions. V	Vhen animals
surfaces blows were clearl	y visible.			

Thursday, March 15, 2012 $\operatorname{Sighting} \# 9$
Initial sighting on Track
Time: 11:28 WP#: 38 Lat: 35.553080 Long: -74.688497
Vertical Angle: <u>3</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Body</u>
On/Off Effort: On Trackline: 37 Beaufort Sea State: 2
Observer: Heather Observer side: Left
Actual Time and Position of Sighting
Time: 11:31 WP#: 39 Lat: 35.558571 Long: -74.689945
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best): 8/8/8
Features used in Species ID: Robust body appearance, uniform grey coloration
Representative images used for Species ID:7680, 7688, 7694, 7696, 7700, 7701, 7706, 7709
Photographer: Ryan Frame numbers: 7673 - 7711 Spacer: 7712
Calculated distance from Trackline: 0.63 km
Final Time and Position of Sighting
Time:         11:32         WP#:         40         Lat:         35.566833         Long:         -74.693174
Calculated Distance Traveled: 0.96 km
Behavior and Additional Comments
Small group but lots of activity - animals moving quickly in groups of 2 or 3, some smaller individuals
included in the group.
Thursday, March 15, 2012 Sighting $\#$ 10
Thursday, March 15, 2012 Sighting # 10
Initial sighting on Track
Initial sighting on Track           Time:         11:35         WP#:         42         Lat:         35.554330         Long:         -74.566584
Initial sighting on Track           Time:         11:35         WP#:         42         Lat:         35.554330         Long:         -74.566584
Initial sighting on TrackTime:11:35WP#:42Lat:35.554330Long:-74.566584Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:Body
Initial sighting on TrackTime:11:35WP#:42Lat:35.554330Long:-74.566584Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:37Beaufort Sea State:3Observer:HeatherObserver side:Left
Initial sighting on Track         Time:       11:35       WP#:       42       Lat:       35.554330       Long:       -74.566584         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       3         Observer:       Heather       Observer side:       Left       Image: Left       Actual Time and Position of Sighting
Initial sighting on TrackTime:11:35WP#:42Lat:35.554330Long:-74.566584Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:37Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:11:35WP#:42Lat:35.554330Long:-74.566584
Initial sighting on TrackTime:11:35WP#:42Lat:35.554330Long:-74.566584Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:37Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:11:35WP#:42Lat:35.554330Long:-74.566584Species:Unidentified CetaceanNumbers (Low/High/Best):1/1/1
Initial sighting on TrackTime:11:35WP#:42Lat:35.554330Long:-74.566584Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:37Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:11:35WP#:42Lat:35.554330Long:-74.566584Species:Unidentified CetaceanNumbers (Low/High/Best):1/1/1Features used in Species ID:Only a sighting que was observed - location is given as the point
Initial sighting on TrackTime:11:35WP#:42Lat:35.554330Long:-74.566584Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:37Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:11:35WP#:42Lat:35.554330Long:-74.566584Species:Unidentified CetaceanNumbers (Low/High/Best):1/1/1Features used in Species ID:Only a sighting que was observed - location is given as the pointwhere que was observed not of the animal(s)
Initial sighting on TrackTime:11:35WP#:42Lat:35.554330Long:-74.566584Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:37Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:11:35WP#:42Lat:35.554330Long:-74.566584Species:Unidentified CetaceanNumbers (Low/High/Best):1/1/1Features used in Species ID:Only a sighting que was observed - location is given as the pointwhere que was observed not of the animal(s)NA
Initial sighting on TrackTime:11:35WP#:42Lat:35.554330Long:-74.566584Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:37Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:11:35WP#:42Lat:35.554330Long:-74.566584Species:Unidentified CetaceanNumbers (Low/High/Best):1/1/1Features used in Species ID:Only a sighting que was observed - location is given as the pointwhere que was observed not of the animal(s)Representative images used for Species ID:NAPhotographer:RyanFrame numbers:NASpacer:NA
Initial sighting on TrackTime:11:35WP#:42Lat:35.554330Long:-74.566584Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:37Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:11:35WP#:42Lat:35.554330Long:-74.566584Species:Unidentified CetaceanNumbers (Low/High/Best):1/1/1Features used in Species ID:Only a sighting que was observed - location is given as the pointwhere que was observed not of the animal(s)Representative images used for Species ID:NAPhotographer:RyanFrame numbers:NASpacer:NACalculated distance from Trackline:NA
Initial sighting on Track         Time:       11:35       WP#:       42       Lat:       35.554330       Long:       -74.566584         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       3         Observer:       Heather       Observer side:       Left
Initial sighting on Track         Time:       11:35       WP#:       42       Lat:       35.554330       Long:       -74.566584         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       3         Observer:       Heather       Observer side:       Left
Initial sighting on Track         Time:       11:35       WP#:       42       Lat:       35.554330       Long:       -74.566584         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       3         Observer:       Heather       Observer side:       Left         Actual Time and Position of Sighting         Time:       11:35       WP#:       42       Lat:       35.554330       Long:       -74.566584         Species:       Unidentified Cetacean       Numbers (Low/High/Best):       1 / 1 / 1         Features used in Species ID:       Only a sighting que was observed - location is given as the point         where que was observed not of the animal(s)       Representative images used for Species ID:       NA         Photographer:       Ryan       Frame numbers:       NA       Spacer:       NA         Calculated distance from Trackline:       NA       NA       Spacer:       NA         Final Time and Position of Sighting       Time:       NA       Long:       NA         Calculated Distance Traveled:       NA       Long:       NA
Initial sighting on Track         Time:       11:35       WP#:       42       Lat:       35.554330       Long:       -74.566584         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       3         Observer:       Heather       Observer side:       Left         Actual Time and Position of Sighting         Time:       11:35       WP#:       42       Lat:       35.554330       Long:       -74.566584         Species:       Unidentified Cetacean       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Only a sighting que was observed - location is given as the point         where que was observed not of the animal(s)       Representative images used for Species ID:       NA         Photographer:       Ryan       Frame numbers:       NA       Spacer:       NA         Calculated distance from Trackline:       NA       Spacer:       NA       Calculated Distance Traveled:       NA         Ehavior and Additional Comments       NA       Long:       NA       Calculated Distance Traveled:       NA
Initial sighting on Track         Time:       11:35       WP#:       42       Lat:       35.554330       Long:       -74.566584         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       3         Observer:       Heather       Observer side:       Left       Left         Actual Time and Position of Sighting       Time:       11:35       WP#:       42       Lat:       35.554330       Long:       -74.566584         Species:       Unidentified Cetacean       Numbers (Low/High/Best):       1 / 1 / 1         Features used in Species ID:       Only a sighting que was observed - location is given as the point         where que was observed not of the animal(s)       Representative images used for Species ID:       NA         Photographer:       Ryan       Frame numbers:       NA       Spacer:       NA         Calculated distance from Trackline:       NA       Spacer:       NA       Calculated Distance Traveled:       NA         Calculated Distance Traveled:       NA       Long:       NA       Calculated Distance Traveled:       NA

Thu	ırsday,	March 15,	2012 Sigl	nting # 11		
Initial sighting o	n Trac	:k	C	C		
Time: 12:09	WP#:	48	Lat:	35.624597	Long:	-74.691061
Vertical Angle:	1	Horizon	tal Bearing	g in Degrees:	U	g Cue: Body
On/Off Effort:	On	Tı	ackline:	38	Beaufort Sea S	-
Observer: Rya	an	0	bserver sic	le: Right		
Actual Time and	l Positi	ion of Sig	hting			
Time: 12:10	WP#:		Lat:	35.628645	Long:	-74.682070
Species: Tursiops tru	uncatus				Low/High/Best)	: 30 / 40 / 35
Features used in S		ID: Robu	st body app			
Representative in					7759 & 7761	
Photographer:				7750 - 77	69 Space	r:7770
Calculated distan	ce fron	n Tracklir	ne:	0.93 km		
Final Time and 1	Positio	n of Sigh	ting			
Time: 12:14	WP#:	50	Lat:	35.638268	Long:	-74.681652
Calculated Distar	ice Tra	veled:	1.0	7 km		
Behavior and Ac	ldition	al Comn	nents			
Long spread out gro	up of ar	nimals sepa	arated into s	maller groups,	individuals within t	the group
appeared with white	e pedun	cles, some	aerial activit	y displayed.		
			~			
			2012 Sigl	nting $\#$ 12		
Initial sighting o			T = 4:			
Time: <u>12:16</u>	WP#:		Lat:	35.622455	Long:	-74.744606
Vertical Angle:			ackline:	g in Degrees: 28		
On/Off Effort: Observer: Rya			bserver sic		Beaufort Sea S	tate: <u>3</u>
				ie. Right		
Actual Time and		-				
Time: <u>12:18</u>		53	Lat:			
Species: Tursiops tru				· · · · · · · · · · · · · · · · · · ·	Low/High/Best)	35 / 45 / 40
Features used in S	species	SID: <u>Robu</u>	ist body app	earance, unifor	m grey coloration.	
Representative in	19066 11	sed for S	necies ID:		7759 & 7761	
Photographer:	-		numbers:	7750 - 77		r: 7770
Calculated distan				1.47 km	<u>os</u> space	1
			-			
Final Time and I			-	NIA	Lange	NIA
Time: NA	WP#:		Lat:	NA	Long:	NA
Calculated Distar				NA	-	
Behavior and Ac	Idition	al Comn	nents			

Thursday, March 15, 2012 Sighting $\#$ 13	
Initial sighting on Track	
Time: <u>12:32</u> WP#: <u>55</u> Lat: <u>35.622075</u> Long: <u>-75.060253</u>	
Vertical Angle: <u>3</u> Horizontal Bearing in Degrees: <u>60</u> Sighting Cue: <u>Body</u>	
On/Off Effort: On Trackline: <u>38</u> Beaufort Sea State: <u>3</u>	
Observer: Heather Observer side: Left	
Actual Time and Position of Sighting	
Time:         12:36         WP#:         56         Lat:         35.616915         Long:         -75.052653	
Species:Megaptera novaeangliae Numbers (Low/High/Best): 1/1/1	_
Features used in Species ID: Large nodular pectoral fins with white coloration, ventral pleats distinct fluke shape.	_
Representative images used for Species ID:	_
Photographer: Ryan Frame numbers: 7771 - 7829 Spacer: 7830	
Calculated distance from Trackline: 0.89 km	
Final Time and Position of Sighting	
Time: NA WP#: NA Lat: NA Long: NA	
Calculated Distance Traveled: NA	_
Behavior and Additional Comments	
Carcass floating up-side-down with a number of sharks circling and feeding on it.	
Thursday, March 15, 2012 Sighting $\#$ 14	
Initial sighting on Track	
Time: 14:14 WP#: 63 Lat: 36.123971 Long: -74.839722	
Vertical Angle:         1         Horizontal Bearing in Degrees:         100         Sighting Cue:         Body	
On/Off Effort: On Trackline: 45 Beaufort Sea State: 3	
Observer: Heather Observer side: Left	
Actual Time and Position of Sighting	
Time:         14:18         WP#:         64         Lat:         36.126358         Long:         -74.845911	
Species: Tursiops truncatus         Numbers (Low/High/Best):         7/9/8	
Features used in Species ID: Robust body appearance, lighter grey blaze to dorsal fin	_
	_
Representative images used for Species ID: 7841, 7849, 7854-56	-
Photographer:RyanFrame numbers:7831 - 7861Spacer:7862Calculated distance from Trackline:0.61 km	-
Final Time and Position of Sighting	
Time:         14:21         WP#:         65         Lat:         36.124796         Long:         -74.844991	
Calculated Distance Traveled: 0.19 km	
Behavior and Additional Comments	
Small group of animals, tightly packed traveling together.	

Initial sighting on Track           Time:         14:25         WP#:         68         Lat:         36.124183         Long:         -74.669558
Time: 14:25 WP#: 68 Lat: 36.124183 Long: -74.669558
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 45 Beaufort Sea State: 2
Observer: Heather Observer side: Left
Actual Time and Position of Sighting
Time:         14:28         WP#:         69         Lat:         36.136306         Long:         -74.671118
Species:Tursiops truncatus         Numbers (Low/High/Best):         4/4/4
Features used in Species ID: Robust body, white peduncle, uniform grey coloration except for lighter blaze to dorsal fin.
Representative images used for Species ID: 7863-65, 7867, 7869, 7884
Photographer:         Ryan         Frame numbers:         7863 - 7890         Spacer:         7891
Calculated distance from Trackline: 1.36 km
Final Time and Position of Sighting
Time:         14:30         WP#:         70         Lat:         36.141028         Long:         -74.671995
Calculated Distance Traveled: 0.53 km
Behavior and Additional Comments
White peduncle coloration clearly visible in all animals, two groups of two animals all showing very
little motion while hanging close to the surface.
Thursday, March 15, 2012 Sighting # 16
Initial sighting on Track
Time:         14:32         WP#:         72         Lat:         36.125311         Long:         -74.605225
Time:14:32WP#:72Lat:36.125311Long:-74.605225Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:Body
Time:14:32WP#:72Lat:36.125311Long:-74.605225Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:2
Time:14:32WP#:72Lat:36.125311Long:-74.605225Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:2Observer:RyanObserver side:Right
Time:14:32WP#:72Lat:36.125311Long:-74.605225Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of Sighting
Time:14:32WP#:72Lat:36.125311Long:-74.605225Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:33WP#:73Lat:36.125825Long:-74.614163
Time:14:32WP#:72Lat:36.125311Long:-74.605225Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:33WP#:73Lat:36.125825Long:-74.614163Species:Tursiops truncatusNumbers (Low/High/Best):24/30/26
Time:14:32WP#:72Lat:36.125311Long:-74.605225Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:33WP#:73Lat:36.125825Long:-74.614163Species:Tursiops truncatusNumbers (Low/High/Best):24/30/26Features used in Species ID:Uniform grey coloration except for lighter blaze to dorsal fin
Time:14:32WP#:72Lat:36.125311Long:-74.605225Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:33WP#:73Lat:36.125825Long:-74.614163Species:Tursiops truncatusNumbers (Low/High/Best):24 / 30 / 26Features used in Species ID:Uniform grey coloration except for lighter blaze to dorsal finRobust body appearance
Time:14:32WP#:72Lat:36.125311Long:-74.605225Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:33WP#:73Lat:36.125825Long:-74.614163Species:Tursiops truncatusNumbers (Low/High/Best):24 / 30 / 26Features used in Species ID:Uniform grey coloration except for lighter blaze to dorsal finRobust body appearanceRepresentative images used for Species ID:7895, 7899, 7900, 7905-07
Time:14:32WP#:72Lat:36.125311Long:-74.605225Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:33WP#:73Lat:36.125825Long:-74.614163Species:Tursiops truncatusNumbers (Low/High/Best):24 / 30 / 26Features used in Species ID:Uniform grey coloration except for lighter blaze to dorsal finRobust body appearance
Time:14:32WP#:72Lat:36.125311Long:-74.605225Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:33WP#:73Lat:36.125825Long:-74.614163Species:Tursiops truncatusNumbers (Low/High/Best):24 / 30 / 26Features used in Species ID:Uniform grey coloration except for lighter blaze to dorsal finRobust body appearanceRepresentative images used for Species ID:7895, 7899, 7900, 7905-07Photographer:RyanFrame numbers:7892 - 7918Spacer:7919Calculated distance from Trackline:0.80 km0.80 km0.80 km
Time:14:32WP#:72Lat:36.125311Long:-74.605225Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:33WP#:73Lat:36.125825Long:-74.614163Species:Tursiops truncatusNumbers (Low/High/Best):24/30/26Features used in Species ID:Uniform grey coloration except for lighter blaze to dorsal finRobust body appearanceRepresentative images used for Species ID:7895, 7899, 7900, 7905-07Photographer:RyanFrame numbers:7892 - 7918Spacer:7919Calculated distance from Trackline:0.80 kmFinal Time and Position of Sighting
Time:14:32WP#:72Lat:36.125311Long:-74.605225Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:33WP#:73Lat:36.125825Long:-74.614163Species:Tursiops truncatusNumbers (Low/High/Best):24 / 30 / 26Features used in Species ID:Uniform grey coloration except for lighter blaze to dorsal finRobust body appearanceRepresentative images used for Species ID:7895, 7899, 7900, 7905-07Photographer:RyanFrame numbers:7892 - 7918Spacer:Calculated distance from Trackline:0.80 kmFinal Time and Position of SightingTime:14:35WP#:74Lat:36.126679Long:-74.613571
Time:14:32WP#:72Lat:36.125311Long:-74.605225Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:33WP#:73Lat:36.125825Long:-74.614163Species:Tursiops truncatusNumbers (Low/High/Best):24 / 30 / 26Features used in Species ID:Uniform grey coloration except for lighter blaze to dorsal finRobust body appearanceRepresentative images used for Species ID:7895, 7899, 7900, 7905-07Photographer:RyanFrame numbers:7892 - 7918Spacer:7919Calculated distance from Trackline:0.80 kmFinal Time and Position of SightingTime:14:35WP#:74Lat:36.126679Long:-74.613571
Thursday, March 15, 2012 Sighting $\#$ 17
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Initial sighting on Track
Time:         14:42         WP#:         77         Lat:         36.112570         Long:         -74.409144
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Splash
On/Off Effort:         On         Trackline:         45         Beaufort Sea State:         3
Observer: Ryan Observer side: Right
Actual Time and Position of Sighting
Time:         14:47         WP#:         78         Lat:         36.126091         Long:         -74.417143
Species: Delphinus delphis Numbers (Low/High/Best): 60 / 90 / 75
Features used in Species ID: Yellow coloration from rostrum back to dorsal fin region meeting
with white coloration from peduncle in a V shape. Yellow pectorals and internal area of dorsal fin.
Representative images used for Species ID:7957, 7960, 7964Photographer:RyanFrame numbers:7920 - 8017Spacer:8018
Photographer:       Ryan       Frame numbers:       7920 - 8017       Spacer:       8018         Calculated distance from Trackline:       1.67 km
Final Time and Position of Sighting
Time:         14:48         WP#:         79         Lat:         36.128927         Long:         -74.415035
Calculated Distance Traveled: 0.37 km
Behavior and Additional Comments
Mixed group
Thursday, March 15, 2012 Sighting # 18
Thursday, March 15, 2012 Sighting # 18 Initial sighting on Track
Initial sighting on Track
Initial sighting on Track           Time:         14:42         WP#:         77         Lat:         36.112570         Long:         -74.406144
Initial sighting on Track         Time:       14:42       WP#:       77       Lat:       36.112570       Long:       -74.406144         Vertical Angle:       2       Horizontal Bearing in Degrees:       60       Sighting Cue:       Splash
Initial sighting on TrackTime:14:42WP#:77Lat:36.112570Long:-74.406144Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:RyanObserver side:Right
Initial sighting on Track         Time:       14:42       WP#:       77       Lat:       36.112570       Long:       -74.406144         Vertical Angle:       2       Horizontal Bearing in Degrees:       60       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       45       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right
Initial sighting on TrackTime:14:42WP#:77Lat:36.112570Long:-74.406144Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:RyanObserver side:Right
Initial sighting on TrackTime:14:42WP#:77Lat:36.112570Long:-74.406144Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:RyanObserver side:RightTime: 14:47WP#:78Lat:36.126091Long:-74.417143
Initial sighting on TrackTime:14:42WP#:77Lat:36.112570Long:-74.406144Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:47WP#:78Lat:36.126091Long:-74.417143Species:Stenella coeruleoalbaNumbers (Low/High/Best):60 / 90 / 75
Initial sighting on TrackTime:14:42WP#:77Lat:36.112570Long:-74.406144Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:47WP#:78Lat:36.126091Long:-74.417143Species:Stenella coeruleoalbaNumbers (Low/High/Best):60 / 90 / 75Features used in Species ID:Strong narrow blaze to dorsal fin, white peduncle colorationconnected to ventral coloration, smaller dorsal fin, light colored pectoral fins.Representative images used for Species ID:7934, 7935, 7937, 7948, 7950, 7956, 7961, 7976
Initial sighting on TrackTime:14:42WP#:77Lat:36.112570Long:-74.406144Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:47WP#:78Lat:36.126091Long:-74.417143Species:Stenella coeruleoalbaNumbers (Low/High/Best):60 / 90 / 7560 / 90 / 75Features used in Species ID:Strong narrow blaze to dorsal fin, white peduncle colorationconnected to ventral coloration, smaller dorsal fin, light colored pectoral fins.Representative images used for Species ID:7934, 7935, 7937, 7948, 7950, 7956, 7961, 7976Photographer:RyanFrame numbers:7920-8017Spacer:8018
Initial sighting on TrackTime:14:42WP#:77Lat:36.112570Long:-74.406144Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:47WP#:78Lat:36.126091Long:-74.417143Species:Stenella coeruleoalbaNumbers (Low/High/Best):60 / 90 / 75Features used in Species ID:Strong narrow blaze to dorsal fin, white peduncle colorationconnected to ventral coloration, smaller dorsal fin, light colored pectoral fins.Representative images used for Species ID:7934, 7935, 7937, 7948, 7950, 7956, 7961, 7976
Initial sighting on TrackTime:14:42WP#:77Lat:36.112570Long:-74.406144Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:47WP#:78Lat:36.126091Long:-74.417143Species:Stenella coeruleoalbaNumbers (Low/High/Best):60 / 90 / 7560 / 90 / 75Features used in Species ID:Strong narrow blaze to dorsal fin, white peduncle colorationconnected to ventral coloration, smaller dorsal fin, light colored pectoral fins.Representative images used for Species ID:7934, 7935, 7937, 7948, 7950, 7956, 7961, 7976Photographer:RyanFrame numbers:7920-8017Spacer:8018
Initial sighting on TrackTime:14:42WP#:77Lat:36.112570Long:-74.406144Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:47WP#:78Lat:36.126091Long:-74.417143Species:Stenella coeruleoalbaNumbers (Low/High/Best):60 / 90 / 75Features used in Species ID:Strong narrow blaze to dorsal fin, white peduncle colorationconnected to ventral coloration, smaller dorsal fin, light colored pectoral fins.Representative images used for Species ID:7934, 7935, 7937, 7948, 7950, 7956, 7961, 7976Photographer:RyanFrame numbers:7920 - 8017Spacer:8018Calculated distance from Trackline:1.80 km1.80 kmTime:14:48WP#:79Lat:36.128927Long:-74.415035
Initial sighting on TrackTime:14:42WP#:77Lat:36.112570Long:-74.406144Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:47WP#:78Lat:36.126091Long:-74.417143Species:Stenella coeruleoalbaNumbers (Low/High/Best):60 / 90 / 75Features used in Species ID:Strong narrow blaze to dorsal fin, white peduncle colorationconnected to ventral coloration, smaller dorsal fin, light colored pectoral fins.Representative images used for Species ID:7934, 7935, 7937, 7948, 7950, 7956, 7961, 7976Photographer:RyanFrame numbers:7920 - 8017Spacer:8018Calculated distance from Trackline:1.80 kmI.80 kmI.80 km
Initial sighting on TrackTime:14:42WP#:77Lat:36.112570Long:-74.406144Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:47WP#:78Lat:36.126091Long:-74.417143Species:Stenella coeruleoalbaNumbers (Low/High/Best):60 / 90 / 75Features used in Species ID:Strong narrow blaze to dorsal fin, white peduncle colorationconnected to ventral coloration, smaller dorsal fin, light colored pectoral fins.Representative images used for Species ID:7934, 7935, 7937, 7948, 7950, 7956, 7961, 7976Photographer:RyanFrame numbers:7920 - 8017Spacer:8018Calculated distance from Trackline:1.80 km1.80 kmTime:14:48WP#:79Lat:36.128927Long:-74.415035
Initial sighting on TrackTime:14:42WP#:77Lat:36.112570Long:-74.406144Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:47WP#:78Lat:36.126091Long:-74.417143Species:Stenella coeruleoalbaNumbers (Low/High/Best):60 / 90 / 75Features used in Species ID:Strong narrow blaze to dorsal fin, white peduncle colorationconnected to ventral coloration, smaller dorsal fin, light colored pectoral fins.Representative images used for Species ID:7934, 7935, 7937, 7948, 7950, 7956, 7961, 7976Photographer:RyanFrame numbers:7920 - 8017Spacer:Final Time and Position of SightingTime:14:48WP#:79Lat:36.128927Long:-74.415035Calculated Distance Traveled:0.37 km
Initial sighting on TrackTime:14:42WP#:77Lat:36.112570Long:-74.406144Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:47WP#:78Lat:36.126091Long:-74.417143Species:Stenella coeruleoalbaNumbers (Low/High/Best):60 / 90 / 75Features used in Species ID:Strong narrow blaze to dorsal fin, white peduncle colorationconnected to ventral coloration, smaller dorsal fin, light colored pectoral fins.Representative images used for Species ID:7934, 7935, 7937, 7948, 7950, 7956, 7961, 7976Photographer:RyanFrame numbers:7920 - 8017Spacer:8018Calculated distance from Trackline:1.80 kmI.80 kmI.80 km
Initial sighting on TrackTime:14:42WP#:77Lat:36.112570Long:-74.406144Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:47WP#:78Lat:36.126091Long:-74.417143Species:Stenella coeruleoalbaNumbers (Low/High/Best):60/90/7560/90/75Features used in Species ID:Strong narrow blaze to dorsal fin, white peduncle colorationconnected to ventral coloration, smaller dorsal fin, light colored pectoral fins.Representative images used for Species ID:7934, 7935, 7937, 7948, 7950, 7956, 7961, 7976Photographer:RyanFrame numbers:7920 - 8017Spacer:8018Calculated distance from Trackline:1.80 kmImme:14:48WP#:79Lat:36.128927Long:-74.415035Galculated Distance Traveled:0.37 kmImme:0.37 kmImme:Imme:Imme:Imme:Imme:Behavior and Additional Comments0.37 kmImme:Imme:Imme:Imme:Imme:Imme:

Thursday, March 15, 2012 Sighting $\#$ 19
Initial sighting on Track
Time: 14:55 WP#: 83 Lat: 36.047535 Long: -74.400501
Vertical Angle: <u>1</u> Horizontal Bearing in Degrees: <u>60</u> Sighting Cue: <u>Body</u>
On/Off Effort: On Trackline: 44 Beaufort Sea State: 2
Observer: Ryan Observer side: Right
Actual Time and Position of Sighting
Time: 14:59 WP#: 84 Lat: 36.051086 Long: -74.393703
Species:Balaenoptera physalis Numbers (Low/High/Best): 3/3/3
Features used in Species ID: Large fusiform body, white coloration to the right lower jaw
Small dorsal fin placed far back on the animals body.
Representative images used for Species ID: 8019, 8024, 8036, 8042, 8043
Photographer:         Ryan         Frame numbers:         8019 - 8053         Spacer:         8054
Calculated distance from Trackline: 0.73 km
Final Time and Position of Sighting
Time: NA WP#: NA Lat: NA Long: NA
Calculated Distance Traveled: NA
Behavior and Additional Comments
Blows when animals surfaced clearly visible, single animal plus a pair. basking shark also observed in
the same area.
Thursday, March 15, 2012 Sighting $\#$ 20
Initial sighting on Track
Time: 15:36 WP#: 93 Lat: 35.980421 Long: -74.851128
Vertical Angle: <u>3</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Body</u>
On/Off Effort:         On         Trackline:         43         Beaufort Sea State:         3
Observer: Heather Observer side: Left
Actual Time and Position of Sighting
Time: 15:42 WP#: 94 Lat: 35.989608 Long: -74.849415
Species:Tursiops truncatus     Numbers (Low/High/Best):     15 / 25 / 20
Features used in Species ID: Uniform grey coloration except for lighter blaze to dorsal fin and
white peduncle patter, robust body appearance.
Representative images used for Species ID: 8072 & 8073
Photographer: Ryan Frame numbers: 8055 - 8076 Spacer: 8077
Calculated distance from Trackline: 1.03 km
Final Time and Position of Sighting
Time: NA WP#: NA Lat: NA Long: NA
Calculated Distance Traveled: NA
Behavior and Additional Comments
Large group packed close to one another, whole group dove and traveled subsurface for an extended
period of time.

Thursday, March 15, 2012 Sighting $\#$ 21
Initial sighting on Track
Time: 15:46 WP#: 96 Lat: 35.980603 Long: -74.760411
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
On/Off Effort: On Trackline: 43 Beaufort Sea State: 3
Observer: Heather Observer side: Left
Actual Time and Position of Sighting
Time: 15:48 WP#: 97 Lat: 35.982781 Long: -74.763415
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best): 14/16/15
Features used in Species ID: Robust body appearance, uniform grey coloration except for light
grey blaze to dorsal fin and white peduncle coloration.
Representative images used for Species ID: 8083-85, 8088-8093, 8106, 8108, 8113, 8122, 8124
Photographer: Ryan Frame numbers: 8078 - 8128 Spacer: 8129
Calculated distance from Trackline: 0.36 km
Final Time and Position of Sighting
Time: 15:50 WP#: 98 Lat: 35.984069 Long: -74.757607
Calculated Distance Traveled: 0.54 km
Behavior and Additional Comments
Not much activity, tightly packed group with white peduncles
Thursday, March 15, 2012 Sighting $\#$ 22
Initial sighting on Track
Time: 16:00 WP#: 103 Lat: 35.979766 Long: -74.352462
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 43 Beaufort Sea State: 3
Observer: Heather Observer side: Left
Actual Time and Position of Sighting
Time:         16:01         WP#:         104         Lat:         35.980901         Long:         -74.353094
Species: Globicephala macrorhynchus Numbers (Low/High/Best): 16 / 20 / 18
Features used in Species ID: large square head with no rostrum, dorsal fin places 1/3 back on the
animals body, black body coloration except for white around peduncle and D fin, short fins
Representative images used for Species ID: 8133, 8134, 8154, 8158-61
Photographer: Ryan Frame numbers: 8130-8125 Spacer: 8126
Calculated distance from Trackline: 0.14 km
Final Time and Position of Sighting
Time: 16:14 WP#: 106 Lat: 35.992243 Long: -74.328614
Calculated Distance Traveled: 2.54 km
Behavior and Additional Comments
Traveling near one another separated from dolphins (sightings 23 &24) by several hundred yards.
Consistent slow travel to group - no signs of interaction with dolphins.

Thursday, March 15, 2012 Sighting $\#$ 23
Initial sighting on Track
Time: 16:00 WP#: 103 Lat: 35.979766 Long: -74.352462
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: Off Trackline: 43 Beaufort Sea State: 3
Observer: Heather Observer side: Left
Actual Time and Position of Sighting
Time:         16:01         WP#:         105         Lat:         35.981214         Long:         -74.345163
Species:Delphinus delphis         Numbers (Low/High/Best):         105 / 115 / 110
Features used in Species ID: Cream yellow color along midline of body to dorsal fin, white
coloration from peduncle to dorsal fin, lighter colored pectoral fins.
Representative images used for Species ID:8198, 8199, 8202, 8217, 8258, 8288, 8289, 8314
Photographer: Ryan Frame numbers: 8130 - 8425 Spacer: 8426
Calculated distance from Trackline: 0.67 km
Final Time and Position of SightingTime:16:14WP#:106Lat:35.992243Long:-74.328614
Calculated Distance Traveled: 1.93 km
Behavior and Additional Comments
Lots of aerial activity within the group, multiple larger groups with a number of outliers.
Thursday, March 15, 2012 Sighting # 24
Initial sighting on Track
Initial sighting on Track           Time:         16:00         WP#:         103         Lat:         35.979766         Long:         -74.352462
Initial sighting on TrackTime:16:00WP#:103Lat:35.979766Long:-74.352462Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:Body
Initial sighting on TrackTime:16:00WP#:103Lat:35.979766Long:-74.352462Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:43Beaufort Sea State:3
Initial sighting on TrackTime:16:00WP#:103Lat:35.979766Long:-74.352462Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:Body
Initial sighting on TrackTime:16:00WP#:103Lat:35.979766Long:-74.352462Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:43Beaufort Sea State:3
Initial sighting on Track         Time:       16:00       WP#:       103       Lat:       35.979766       Long:       -74.352462         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       Off       Trackline:       43       Beaufort Sea State:       3         Observer:       Heather       Observer side:       Left
Initial sighting on TrackTime:16:00WP#:103Lat:35.979766Long:-74.352462Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:43Beaufort Sea State:3Observer:HeatherObserver side:Left
Initial sighting on TrackTime:16:00WP#:103Lat:35.979766Long:-74.352462Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:43Beaufort Sea State:3Observer:HeatherObserver side:LeftLeftTime:16:01WP#:105Lat:35.981214Long:-74.345163
Initial sighting on TrackTime:16:00WP#:103Lat:35.979766Long:-74.352462Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:43Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:16:01WP#:105Lat:35.981214Long:-74.345163Species:Stenella coeruleoalbaNumbers (Low/High/Best):105 / 115 / 110
Initial sighting on TrackTime:16:00WP#:103Lat:35.979766Long:-74.352462Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:43Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:16:01WP#:105Lat:35.981214Long:-74.345163Species:Stenella coeruleoalbaNumbers (Low/High/Best):105 / 115 / 110Features used in Species ID:Dark stripe from rostrum to eye then to pectoral fin and back along
Initial sighting on TrackTime:16:00WP#:103Lat:35.979766Long:-74.352462Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:43Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:16:01WP#:105Lat:35.981214Long:-74.345163Species:Stenella coeruleoalbaNumbers (Low/High/Best):105 / 115 / 110Features used in Species ID:Dark stripe from rostrum to eye then to pectoral fin and back along animals body, narrow distinct light blaze to area of dorsal fin.
Initial sighting on TrackTime:16:00WP#:103Lat:35.979766Long:-74.352462Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:43Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:16:01WP#:105Lat:35.981214Long:-74.345163Species:Stenella coeruleoalbaNumbers (Low/High/Best):105 / 115 / 110Features used in Species ID:Dark stripe from rostrum to eye then to pectoral fin and back alonganimals body, narrow distinct light blaze to area of dorsal fin.Representative images used for Species ID:8143, 8147, 8182, 8193, 8194, 8195, 8210, 8211
Initial sighting on TrackTime:16:00WP#:103Lat:35.979766Long:-74.352462Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:43Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:16:01WP#:105Lat:35.981214Long:-74.345163Species:Stenella coeruleoalbaNumbers (Low/High/Best):105 / 115 / 110Features used in Species ID:Dark stripe from rostrum to eye then to pectoral fin and back along animals body, narrow distinct light blaze to area of dorsal fin.Representative images used for Species ID:8143, 8147, 8182, 8193, 8194, 8195, 8210, 8211Photographer:RyanFrame numbers:8130 - 8425Spacer:8426Calculated distance from Trackline:0.68 km
Initial sighting on Track         Time:       16:00       WP#:       103       Lat:       35.979766       Long:       -74.352462         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       Off       Trackline:       43       Beaufort Sea State:       3         Observer:       Heather       Observer side:       Left         Actual Time and Position of Sighting         Time:       16:01       WP#:       105       Lat:       35.981214       Long:       -74.345163         Species:       Stenella coeruleoalba       Numbers (Low/High/Best):       105 / 115 / 110         Features used in Species ID:       Dark stripe from rostrum to eye then to pectoral fin and back along         animals body, narrow distinct light blaze to area of dorsal fin.         Representative images used for Species ID:       8143, 8147, 8182, 8193, 8194, 8195, 8210, 8211         Photographer:       Ryan       Frame numbers:       8130 - 8425       Spacer:       8426         Calculated distance from Trackline:       0.68 km
Initial sighting on TrackTime:16:00WP#:103Lat:35.979766Long:-74.352462Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:43Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:16:01WP#:105Lat:35.981214Long:-74.345163Species:Stenella coeruleoalbaNumbers (Low/High/Best):105 / 115 / 110Features used in Species ID:Dark stripe from rostrum to eye then to pectoral fin and back along animals body, narrow distinct light blaze to area of dorsal fin.Representative images used for Species ID:8143, 8147, 8182, 8193, 8194, 8195, 8210, 8211Photographer:RyanFrame numbers:8130 - 8425Spacer:8426Calculated distance from Trackline:0.68 kmTime:16:14WP#:106Lat:35.882243Long:-74.328614
Initial sighting on TrackTime:16:00WP#:103Lat:35.979766Long:-74.352462Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:43Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:16:01WP#:105Lat:35.981214Long:-74.345163Species:Stenella coeruleoalbaNumbers (Low/High/Best):105 / 115 / 110Features used in Species ID:Dark stripe from rostrum to eye then to pectoral fin and back alonganimals body, narrow distinct light blaze to area of dorsal fin.Representative images used for Species ID:8143, 8147, 8182, 8193, 8194, 8195, 8210, 8211Photographer:RyanFrame numbers:8130 - 8425Spacer:Final Time and Position of SightingTime:16:14WP#:106Lat:35.882243Long:-74.328614Calculated Distance Traveled:NA
Initial sighting on TrackTime:16:00WP#:103Lat:35.979766Long:-74.352462Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:43Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:16:01WP#:105Lat:35.981214Long:-74.345163Species:Stenella coeruleoalbaNumbers (Low/High/Best):105 / 115 / 110Features used in Species ID:Dark stripe from rostrum to eye then to pectoral fin and back along animals body, narrow distinct light blaze to area of dorsal fin.Representative images used for Species ID:8143, 8147, 8182, 8193, 8194, 8195, 8210, 8211Photographer:RyanFrame numbers:8130 - 8425Spacer:8426Calculated distance from Trackline:0.68 kmFinal Time and Position of SightingTime:16:14WP#:106Lat:35.882243Long:-74.328614Calculated Distance Traveled:NABehavior and Additional Comments
Initial sighting on TrackTime:16:00WP#:103Lat:35.979766Long:-74.352462Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:43Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:16:01WP#:105Lat:35.981214Long:-74.345163Species:Stenella coeruleoalbaNumbers (Low/High/Best):105 / 115 / 110Features used in Species ID:Dark stripe from rostrum to eye then to pectoral fin and back alonganimals body, narrow distinct light blaze to area of dorsal fin.Representative images used for Species ID:8143, 8147, 8182, 8193, 8194, 8195, 8210, 8211Photographer:RyanFrame numbers:8130 - 8425Spacer:Final Time and Position of SightingTime:16:14WP#:106Lat:35.882243Long:-74.328614Calculated Distance Traveled:NA
Initial sighting on TrackTime:16:00WP#:103Lat:35.979766Long:-74.352462Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:43Beaufort Sea State:3Observer:HeatherObserver side:LeftActual Time and Position of SightingTime:16:01WP#:105Lat:35.981214Long:-74.345163Species:Stenella coeruleoalbaNumbers (Low/High/Best):105 / 115 / 110Features used in Species ID:Dark stripe from rostrum to eye then to pectoral fin and back alonganimals body, narrow distinct light blaze to area of dorsal fin.Representative images used for Species ID:8143, 8147, 8182, 8193, 8194, 8195, 8210, 8211Photographer:RyanFrame numbers:8130 - 8425Spacer:Calculated distance from Trackline:0.68 kmFinal Time and Position of SightingTime:16:14WP#:106Lat:35.882243Long:-74.328614Calculated Distance Traveled:NABehavior and Additional Comments

Thursday, March 15, 2012 Sighting $\#$ 25	
Initial sighting on Track	
Time: 16:28 WP#: 110 Lat: 35.688026 Long: -74.499732	
Vertical Angle: <u>1</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Body</u>	,
On/Off Effort: On Trackline: 39 Beaufort Sea State: 3	
Observer: Ryan Observer side: Right	
Actual Time and Position of Sighting	
Time: 16:28 WP#: 110 Lat: 35.688026 Long: -74.499732	
Species: Unidentified Cetacean Numbers (Low/High/Best): 2/2/2	
Features used in Species ID: Animal not relocated after initial que	
Representative images used for Species ID:NA	
Photographer: <u>Ryan</u> Frame numbers: <u>NA</u> Spacer: <u>NA</u>	
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	
Animal not relocated after initial que	
Thursday, March 15, 2012 Sighting $\#$ 26	
Initial sighting on Track	
Time: 16:40 WP#: 112 Lat: 35.689169 Long: -74.763096	
Vertical Angle: 1 Horizontal Bearing in Degrees: 60 Sighting Cue: Splas	h
On/Off Effort: On Trackline: 39 Beaufort Sea State: 3	
Observer: Ryan Observer side: Right	
Actual Time and Position of Sighting	
Time: 16:41 WP#: 113 Lat: 35.693636 Long: -74.757051	
Species: Delphinus delphis Numbers (Low/High/Best): 100 / 150 / 12	25
Features used in Species ID: Yellow coloration from head back to dorsal fin below the animals	
midline. White coloration from peduncle to dorsal fin making a v shape.	
Representative images used for Species ID: 8431 & 8444	
Photographer:         Ryan         Frame numbers:         8427 - 8490         Spacer:         8491	
Calculated distance from Trackline: 0.74 km	

## Final Time and Position of Sighting

Time:	16:48	WP#:	114	Lat:	35.405759	Long:	-74.741883
Calcula	ted Dist	ance Trav	veled:		NA		

## **Behavior and Additional Comments**

Very active group, widely dispersed. Traveling at a high rate of speed with fast shallow surfacings making images of body difficult to obtain.

Thursday, May 3, 2012 Sighting $\#$ 1
Initial sighting on Track
Time:         11:18         WP#:         15         Lat:         35.109885         Long:         -75.088772
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splas
On/Off Effort: On Trackline: <u>30</u> Beaufort Sea State: <u>2</u>
Observer: Ryan Observer side: Right
Actual Time and Position of Sighting
Time:         11:20         WP#:         16         Lat:         35.104194         Long:         -75.087699
Species: Grampus griseus Numbers (Low/High/Best): 7/18/13
Features used in Species ID: Grey, robust, blunt head cleft in melon
Representative images used for Species ID: <u>11, 31, 32, 42, 44-46, 48, 49, 52, 69</u>
Photographer: Ryan Frame numbers: 1-71 Spacer: 72
Calculated distance from Trackline: 0.64 km
Final Time and Position of Sighting
Time:         11:27         WP#:         17         Lat:         35.100020         Long:         -75.095129
Calculated Distance Traveled: 0.82 km
Behavior and Additional Comments
Lots of jumping, traveling very fast, staying spaced out, one subgroup.
Thursday, May 3, 2012 Sighting # 2
Initial sighting on Track
Time:         15:20         WP#:         22         Lat:         35.322825         Long:         -75.201685
Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OffTrackline:33-34Beaufort Sea State:2
On/Off Effort:OffTrackline:33-34Beaufort Sea State:2Observer:RyanObserver side:Right
Actual Time and Position of Sighting
Time:         15:22         WP#:         33         Lat:         35.324588         Long:         -75.206974
Species: Stenella frontalis Numbers (Low/High/Best): 16/25/19
Features used in Species ID: Alternating light and dark pattern down body, spotting
Depresentative images used for Species ID: 72.74.00
Representative images used for Species ID:73, 74, 80Photographer:RyanFrame numbers:73 - 85Spacer:86
Photographer:RyanFrame numbers:73 - 85Spacer:86Calculated distance from Trackline:0.52 km
Final Time and Position of Sighting
Time:         15:24         WP#:         34         Lat:         35.329445         Long:         -75.205207
Time:         15:24         WP#:         34         Lat:         35.329445         Long:         -75.205207
Time:         15:24         WP#:         34         Lat:         35.329445         Long:         -75.205207           Calculated Distance Traveled:         0.56 km         0.56 km         -75.205207
Time:       15:24       WP#:       34       Lat:       35.329445       Long:       -75.205207         Calculated Distance Traveled:       0.56 km       0.56 km       Behavior and Additional Comments

	Thursda	y, May	3, 2012 §	Sigh	ting # 3				
Initial sighting of	on Trac	k		C	C				
Time: 16:06	WP#:	42	Lat:		35.407388		Long:	-74.928	8051
Vertical Angle:	1	Horizo	ontal Bea	aring	in Degrees:		•		
On/Off Effort:	On		Tracklin	e:	3	Beau			
Observer: Ry	/an		Observe	r side	e: Right				
Actual Time an	d Positi	on of S	Sighting						
Time: 16:11	WP#:	43	Lat:		35.406789		Long:	-74.929	029
Species: Tursiops ti	runcatus		_		Numbers (I	Low/H	ligh/Best):	4 /	4/4
Features used in	Species	ID: Un	iform grey	/ bodi	es with white p	edunc	:le		
Representative in	nages us	sed for	Species	ID:		93, 9	95, 101, 102		
Photographer:	Ryan	Fram	e numbe	ers:	87 - 104		Spacer	:	105
Calculated distar	nce from	Track	line:		0.11 km				
Final Time and	Position	ı of Sig	ghting						
Time: 16:16	WP#:	44	Lat:		35.409225	]	Long:	-74.921	876
Calculated Dista	nce Trav	veled:		0.70	km				
Behavior and A	ddition	al Con	iments						
Staying close toget	her, millir	ng then <sup>-</sup>	traveling f	ast, w	hite peduncles				

Friday, May 4, 2012 Sighting $\#$ 1
Initial sighting on Track
Time:         9:52         WP#:         5         Lat:         36.123509         Long:         -74.986138
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 45 Beaufort Sea State: 1
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time:         9:52         WP#:         6         Lat:         36.112706         Long:         -74.990582
Species:Stenella frontalisNumbers (Low/High/Best):45 / 50 / 48
Features used in Species ID: Alternating light and dark body coloration, white tip to rostrum
Slender body appearance, spotting present on larger animals.
Representative images used for Species ID:10 & 12Photographer:ErinFrame numbers:1-17Spacer:18
Final Time and Position of Sighting
Time:         9:54         WP#:         7         Lat:         36.119045         Long:         -74.98586
Calculated Distance Traveled: 0.82 km
Behavior and Additional Comments
Densely packed group all within 1-2 body lengths of one another. Animals showing little directional
travelling staying in the same area through out the sighting. Animals showed more characteristics
of inshore spotted dolphins having more spotting and light dark alternating body color.
Friday, May 4, 2012 Sighting # 2
Initial sighting on Track
Time: 10:03 WP#: 11 Lat: 36.121464 Long: -74.657081
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Spals
On/Off Effort:         On         Trackline:         45         Beaufort Sea State:         1
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time:         10:11         WP#:         12         Lat:         36.113022         Long:         -74.660513
Species: Delphinus delphis Numbers (Low/High/Best): 35 / 40 / 37
Features used in Species ID: Yellow coloration along midline from rostrum to trailing edge of d
white coloration from peduncle meeting yellow in v shape. Yellow coloration to pectoral fins.
Representative images used for Species ID: 30, 32, & 35
Photographer:         Erin         Frame numbers:         19 - 37         Spacer:         38
Calculated distance from Trackline: 0.99 km
Final Time and Position of Sighting
Time: NA WP#: NA Lat: NA Long: NA
Calculated Distance Traveled: NA
Behavior and Additional Comments
Animals hanging at the surface in smaller sub groups of between 7-10 individuals. Three groups
observed in area with interactions within groups observed.
Lot of splashing occurred when animals surfaced.

	Frida	y, May 4, 201	<sup>2</sup> Sigh	ting # 3		
Initial sighting	on Trac	k	C	C		
Time: 10:13	WP#:	14 La	at:	36.119861	Long:	-74.564540
Vertical Angle:	1	Horizontal I	Bearing	0 —	Sighting	Cue: Splash
On/Off Effort: _			line:		eaufort Sea Sta	ate: 1
Observer:	Erin	Obser	ver side	e: Right		
Actual Time ar	nd Positi	on of Sightii	ng			
Time: 10:14	WP#:	15 La	at:	36.118288	Long:	-74.558515
Species:Delphinu					w/High/Best):	
Features used in						
white coloration fr				shape. Yellow co		ral fins.
Representative i		-		20 57	42	<b>F7</b>
Photographer:		Frame nun		39 - 56	Spacer:	57
Calculated dista				0.57 km	-	
Final Time and			-			
Time: <u>10:17</u>			at:	36.113911	Long:	-74.557510
Calculated Dista	ance Trav	veled:	0.50	km		
Behavior and A	Addition	al Comment	ts			
One large, densely	v packed gi	roup - splashin	g while a	at the surface. Ani	mals changing po	osition within the
group and interact	ting with a	ne another the	en diving	sub surface, out o	of sight for period	ls of time.
	Frida	May 4 201		time # 1		
Initial sighting		iy, May 4, 201 Iz	2 Sigh	ting # 4		
Initial sighting	on Trac	k		-	Lange	74 462020
Time: 10:20	on Trac WP#:	<b>k</b> 18 La	at:	36.120743	Long:	
Time: <u>10:20</u> Vertical Angle:	on Trac WP#: 3	<b>k</b> <u>18</u> La Horizontal I	at: Bearing	36.120743 in Degrees:	Sighting	Cue: Blow
Time: <u>10:20</u> Vertical Angle: On/Off Effort:	on Trac WP#: 3 On	<b>k</b> <u>18</u> La Horizontal I Track	at: Bearing line:	36.120743 in Degrees: 45 B	· · · · · · · · · · · · · · · · · · ·	Cue: Blow
Time: <u>10:20</u> Vertical Angle: On/Off Effort: <u></u> Observer: <u></u>	on Trac WP#: 3 On Ryan	k <u>18</u> La Horizontal I Track Obser	at: Bearing line: rver side	36.120743 in Degrees:	Sighting	Cue: Blow
Time: <u>10:20</u> Vertical Angle: On/Off Effort: <u></u> Observer: <u>R</u> Actual Time ar	on Trac WP#: 3 On Ryan d Positi	k <u>18</u> La Horizontal I Track Obser on of Sightin	at: Bearing line: rver side	36.120743 in Degrees: 45 B e:Left	Sighting eaufort Sea Sta	Cue: <u>Blow</u> ate: 1
Time: <u>10:20</u> Vertical Angle: On/Off Effort: <u></u> Observer: <u>R</u> Actual Time ar Time: <u>10:21</u>	on Trac WP#: <u>3</u> On Ryan on Positie WP#:	k <u>18</u> La Horizontal I Track Obser on of Sightin 19 La	at: Bearing line: rver side	36.120743 in Degrees: 45 B e: 36.129849	Sighting eaufort Sea Sta	Cue: <u>Blow</u> ate: <u>1</u>
Time: <u>10:20</u> Vertical Angle: On/Off Effort: <u></u> Observer: <u>R</u> Actual Time ar Time: <u>10:21</u> Species: <i>Physeter</i>	on Trac WP#: 3 On Ryan od Positi WP#: macrocept	k <u>18</u> La Horizontal I Track Obsen on of Sightin <u>19</u> La nalus	at: Bearing line: rver side ng at:	36.120743 in Degrees: <u>9</u> 45 B e: <u>Left</u> 36.129849 Numbers (Lov	Sighting eaufort Sea Sta Long:	Cue: Blow ate: 1 -74.468156 2/2/2
Time: <u>10:20</u> Vertical Angle: On/Off Effort: <u></u> Observer: <u>R</u> Actual Time ar Time: <u>10:21</u> Species: <i>Physeter</i> Features used in	on Trac WP#: 3 On Ryan <b>nd Positi</b> WP#: macroceph a Species	k <u>18</u> La Horizontal I Track Obser on of Sightin <u>19</u> La nalus ID: Large squ	at: Bearing line: cver side ng at: aare heac	36.120743         in Degrees:       9         45       B         e:       Left         36.129849       Numbers (Low         with blow hole factors	Sighting eaufort Sea Sta Long:	Cue: Blow ate: 1 -74.468156 2/2/2
Time: 10:20 Vertical Angle: On/Off Effort: Observer: R Actual Time an Time: 10:21 Species: Physeter Features used in "knuckles" on dors	on Trac WP#: <u>3</u> On Ryan <b>d Positi</b> WP#: macroceph Species al ridge, w	k <u>18</u> La Horizontal I Track Obser on of Sightin <u>19</u> La nalus ID: Large squ rinkled body e	at: Bearing line: cver side ng at: at: are heac specially	36.120743         in Degrees:       9         45       B         e:       Left         36.129849       Numbers (Low         with blow hole factors	Sighting 6 eaufort Sea Sta Long:	Cue: Blow ate: 1 -74.468156 2/2/2
Time: <u>10:20</u> Vertical Angle: On/Off Effort: <u></u> Observer: <u>F</u> Actual Time ar Time: <u>10:21</u> Species: <i>Physeter</i> Features used in "knuckles" on dors Representative i	on Trac WP#: <u>3</u> On Ryan <b>nd Positi</b> WP#: macroceph a Species al ridge, w images us	k <u>18</u> La Horizontal I Track Obser on of Sightin <u>19</u> La nalus ID: Large squ rinkled body e sed for Speci	at: Bearing line: cver side ng at: at: uare heac specially ies ID: _	36.120743 in Degrees: <u>9</u> 45 B e: <u>Left</u> 36.129849 Numbers (Low d with blow hole far posterior.	20 Sighting 0 eaufort Sea Sta Long:	Cue: <u>Blow</u> ate: <u>1</u> -74.468156 <u>2 / 2 / 2</u> d off to one side
Time: <u>10:20</u> Vertical Angle: On/Off Effort: <u></u> Observer: <u>R</u> Actual Time ar Time: <u>10:21</u> Species: <i>Physeter</i> Features used in "knuckles" on dors Representative i Photographer: <u></u>	on Trac WP#: <u>3</u> On Ryan <b>nd Positi</b> WP#: macroceph Species sal ridge, w images us Erin	k <u>18</u> La Horizontal I Track Obser on of Sightin <u>19</u> La nalus ID: Large squ rinkled body e sed for Speci Frame nun	at: Bearing line: cver side ng at: at: uare heac specially ies ID: _	36.120743 in Degrees: 45 B e: Be: 36.129849 Numbers (Low d with blow hole fa posterior. 58 - 81	Sighting 6 eaufort Sea Sta Long:	Cue: <u>Blow</u> ate: <u>1</u> -74.468156 <u>2 / 2 / 2</u> d off to one side
Time: <u>10:20</u> Vertical Angle: On/Off Effort: <u></u> Observer: <u>R</u> Actual Time ar Time: <u>10:21</u> Species: <i>Physeter</i> Features used in "knuckles" on dors Representative i Photographer: <u>Calculated dista</u>	on Trac WP#: <u>3</u> On Ryan <b>d Positi</b> <i>macroceph</i> Species al ridge, w images us <u>Erin</u> unce from	k          18       La         Horizontal I       Track         Track       Obser         on of Sighting       19         19       La         Dalus       Large square         ID:       Large square         rinkled body e       Seed for Specia         Frame num       Trackline:	at: Bearing line: rver side ng at: at: at: at: at: at: at: at: at: at: bers:	36.120743 in Degrees: <u>9</u> 45 B e: <u>Left</u> 36.129849 Numbers (Low d with blow hole far posterior.	20 Sighting 0 eaufort Sea Sta Long:	Cue: <u>Blow</u> ate: <u>1</u> -74.468156 <u>2 / 2 / 2</u> d off to one side
Time: 10:20 Vertical Angle: On/Off Effort: Observer: R Actual Time and Time: 10:21 Species: Physeter of Features used in "knuckles" on dors Representative in Photographer: Calculated dista Final Time and	on Trac WP#: <u>3</u> On Ryan <b>d Positi</b> macroceph a Species al ridge, w images us Erin unce from <b>l Positio</b>	k          18       La         Horizontal I       Track         Obser       Obser         on of Sightin       19         19       La         aalus       ID: Large squ         rinkled body e       Sed for Specific         Frame num       Trackline:         n of Sighting       10	at: Bearing line: cver side ng at: at: at: at: at: at: at: at: bers: g	36.120743 in Degrees: 9 45 B 2: Left 36.129849 Numbers (Lov d with blow hole far posterior. 58 - 81 1.08 km	Long: Long: Sighting Control Cong: Long: Sighting Cong: Long: Sighting Congression (Congression) (Co	Cue: Blow ate: 1 -74.468156 2/2/2 d off to one side 82
Time: 10:20 Vertical Angle: On/Off Effort: Observer: R Actual Time ar Time: 10:21 Species: Physeter Features used in "knuckles" on dors Representative in Photographer: Calculated dista Final Time and Time: 10:21	on Trac WP#: <u>3</u> On Ryan <b>nd Position</b> <i>macroceph</i> a Species al ridge, w images us Erin unce from <b>I Position</b> WP#:	k          18       La         Horizontal I       Track         Track       Obser         on of Sightin       19         19       La         alus       Large squ         rinkled body e       Seed for Special         Frame num       Trackline:         n of Sighting       20         20       La	at: Bearing line: cver side ng at: at: g at:	36.120743 in Degrees: 45 B e: 36.129849 Numbers (Low with blow hole far posterior. 58 - 81 1.08 km 36.128327	Long: Long: Sighting Control Cong: Long: Sighting Cong: Long: Sighting Congression (Congression) (Co	Cue: <u>Blow</u> ate: <u>1</u> -74.468156 <u>2 / 2 / 2</u> d off to one side
Time: 10:20 Vertical Angle: On/Off Effort: Observer: R Actual Time and Time: 10:21 Species: Physeter Features used in "knuckles" on dors Representative in Photographer: Calculated dista Final Time and Time: 10:21 Calculated Dista	on Trac WP#: <u>3</u> On Ryan <b>d Positi</b> WP#: macroceph a Species al ridge, w images us Erin unce from <b>I Position</b> WP#: ance Trav	k          18       La         Horizontal I       Track         Obser       Track         on of Sightin       19         19       La         alus       ID: Large square         rinkled body esed for Special       Frame num         Trackline:	at: Bearing line: cver side ng at: ies ID: _ nbers: g at: 0.45	36.120743 in Degrees: 45 B e: 36.129849 Numbers (Low with blow hole far posterior. 58 - 81 1.08 km 36.128327	Long: Long: Sighting Control Cong: Long: Sighting Cong: Long: Sighting Congression (Congression) (Co	Cue: Blow ate: 1 -74.468156 2/2/2 d off to one side 82
Time: 10:20 Vertical Angle: On/Off Effort: Observer: <b>R</b> <b>Actual Time ar</b> Time: 10:21 Species: <i>Physeter</i> Features used in "knuckles" on dors Representative i Photographer: Calculated dista <b>Final Time and</b> Time: 10:21 Calculated Dista <b>Behavior and</b> A	on Trac WP#: <u>3</u> On Ryan <b>IN Position</b> MP#: macroceph Species al ridge, w images us <u>Erin</u> Ince from <b>I Position</b> WP#: ance Trav	k          18       La         Horizontal I       Track         Track       Obser         on of Sightin       19         19       La         10:       Large square         rinkled body e       10         sed for Specia       Frame num         Trackline:	at: Bearing line: rver side ng at: at: g at: 0.45	36.120743 in Degrees: 45 B e: 36.129849 Numbers (Low d with blow hole far posterior. 58 - 81 1.08 km 36.128327 km	20 Sighting 0 eaufort Sea Sta Long:	Cue: <u>Blow</u> ate: <u>1</u> -74.468156 <u>2 / 2 / 2</u> d off to one side <u>82</u> -74.463494
Time: 10:20 Vertical Angle: On/Off Effort: Observer: R Actual Time and Time: 10:21 Species: Physeter of Features used in "knuckles" on dors Representative in Photographer: Calculated dista Final Time and Time: 10:21 Calculated Dista Behavior and A Second animal app	on Trac WP#: <u>3</u> On Ryan <b>nd Positi</b> macroceph a Species al ridge, w images us Erin unce from <b>I Position</b> WP#: ance Trav Addition	k          18       La         Horizontal I       Track         Obser       Track         on of Sightin       19         19       La         alus       ID: Large squ         rinkled body esed for Specific       Frame num         Trackline:	at: Bearing line: cver side ng at: at: at: bers: g at: 0.45	36.120743 in Degrees: 45 B e: 36.129849 Numbers (Low d with blow hole far posterior. 58 - 81 1.08 km 36.128327 km Sighting occurred	20 Sighting 0 eaufort Sea Sta Long:	Cue: <u>Blow</u> ate: <u>1</u> -74.468156 <u>2 / 2 / 2</u> d off to one side <u>82</u> -74.463494
Time: 10:20 Vertical Angle: On/Off Effort: Observer: <b>R</b> <b>Actual Time ar</b> Time: 10:21 Species: <i>Physeter</i> Features used in "knuckles" on dors Representative i Photographer: Calculated dista <b>Final Time and</b> Time: 10:21 Calculated Dista <b>Behavior and</b> A	on Trac WP#: <u>3</u> On Ryan <b>nd Positi</b> macroceph a Species al ridge, w images us Erin unce from <b>I Position</b> WP#: ance Trav Addition	k          18       La         Horizontal I       Track         Obser       Track         on of Sightin       19         19       La         alus       ID: Large squ         rinkled body esed for Specific       Frame num         Trackline:	at: Bearing line: cver side ng at: at: at: bers: g at: 0.45	36.120743 in Degrees: 45 B e: 36.129849 Numbers (Low d with blow hole far posterior. 58 - 81 1.08 km 36.128327 km Sighting occurred	20 Sighting 0 eaufort Sea Sta Long:	Cue: <u>Blow</u> ate: <u>1</u> -74.468156 <u>2 / 2 / 2</u> d off to one side <u>82</u> -74.463494

Friday, May 4, 2012 Sighting $\#$ 5
Initial sighting on Track
Time: 10:20 WP#: 18 Lat: 36.120743 Long: -74.463989
Vertical Angle: <u>1</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Body</u>
On/Off Effort:         Off         Trackline:         45         Beaufort Sea State:         1
Observer: Ryan Observer side: Left
Actual Time and Position of Sighting
Time:         10:25         WP#:         21         Lat:         36.126969         Long:         -74.460064
Species:Tursiops truncatus         Numbers (Low/High/Best):         6/8/7
Features used in Species ID: Robust body appearance, uniform coloration except for white
pigmentation on peduncle.
Representative images used for Species ID:86 & 89Photographer:ErinFrame numbers:83 - 92Spacer:93
Final Time and Position of Sighting
Time:         10:27         WP#:         22         Lat:         36.120183         Long:         -74.457443
Calculated Distance Traveled: 0.79 km
Behavior and Additional Comments
A couple of small groups widely spaced from one another. White peduncles clearly visible.
Observed while circling sperm whales
Friday May 1 2012 Sighting H 6
Friday, May 4, 2012 Sighting # 6 Initial sighting on Track
Time: 10:31 WP#: 25 Lat: 36.118302 Long: -74.395113
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 45 Beaufort Sea State: 1
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time:         10:32         WP#:         26         Lat:         36.116379         Long:         -74.394527           Species:         Tursiops truncatus         Numbers (Low/High/Best):         37 / 41 / 39
Features used in Species ID: Robust body appearance with uniform grey coloration across body
reduces about in species in. <u>nobust body appearance with amoningrey coloration across body</u>
Representative images used for Species ID: 96 & 97
Photographer: Erin Frame numbers: 94 - 104 Spacer: 105
Calculated distance from Trackline: 0.22 km
Final Time and Position of Sighting
Time:         10:35         WP#:         27         Lat:         36.116884         Long:         -74.398342
Calculated Distance Traveled: 0.35 km
Behavior and Additional Comments
Behavior and Additional Comments

Friday, May 4, 2012 Sighting $\# 7$
Initial sighting on Track
Time: NA WP#: NA Lat: NA Long: NA
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort:         Off         Trackline:         45         Beaufort Sea State:         1
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time: 10:42 WP#: 30 Lat: 36.125553 Long: -74.342572
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best): 8/8/8
Features used in Species ID: Uniform grey colorations with white peduncles, robust body
appearance.
Representative images used for Species ID: 108 & 109
Photographer:         Erin         Frame numbers:         106 - 120         Spacer:         121
Calculated distance from Trackline: NA
Final Time and Position of Sighting
Time:         10:43         WP#:         31         Lat:         36.123705         Long:         -74.344016
Calculated Distance Traveled: 0.24 km
Behavior and Additional Comments
Well spread group. Animals sighted while investigating whale shark which was the original sighting
que.
Friday, May 4, 2012 Sighting # 8
Initial sighting on Track
Initial sighting on Track           Time:         10:53         WP#:         36         Lat:         36.042353         Long:         -74.587124
Initial sighting on TrackTime:10:53WP#:36Lat:36.042353Long:-74.587124Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:Body
Initial sighting on TrackTime:10:53WP#:36Lat:36.042353Long:-74.587124Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:44Beaufort Sea State:1
Initial sighting on TrackTime:10:53WP#:36Lat:36.042353Long:-74.587124Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:44Beaufort Sea State:1Observer:RyanObserver side:Left
Initial sighting on Track         Time:       10:53       WP#:       36       Lat:       36.042353       Long:       -74.587124         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       44       Beaufort Sea State:       1         Observer:       Ryan       Observer side:       Left       Left
Initial sighting on TrackTime:10:53WP#:36Lat:36.042353Long:-74.587124Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:44Beaufort Sea State:1Observer:RyanObserver side:LeftLeftTime:11:00WP#:37Lat:36.038311Long:-74.582717
Initial sighting on TrackTime:10:53WP#:36Lat:36.042353Long:-74.587124Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:44Beaufort Sea State:1Observer:RyanObserver side:LeftActual Time and Position of SightingTime:11:00WP#:37Lat:36.038311Long:-74.582717Species:Unidentified MesoplodonNumbers (Low/High/Best):1/1/1
Initial sighting on TrackTime:10:53WP#:36Lat:36.042353Long:-74.587124Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:44Beaufort Sea State:1Observer:RyanObserver side:LeftTime and Position of SightingTime:11:00WP#:37Lat:36.038311Long:-74.582717
Initial sighting on Track         Time:       10:53       WP#:       36       Lat:       36.042353       Long:       -74.587124         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       44       Beaufort Sea State:       1         Observer:       Ryan       Observer side:       Left       1         Actual Time and Position of Sighting       Time:       11:00       WP#:       37       Lat:       36.038311       Long:       -74.582717         Species:       Unidentified Mesoplodon       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Large body, small pectoral fins and dorsal fin.
Initial sighting on Track         Time:       10:53       WP#:       36       Lat:       36.042353       Long:       -74.587124         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       44       Beaufort Sea State:       1         Observer:       Ryan       Observer side:       Left       Left         Actual Time and Position of Sighting       Time:       11:00       WP#:       37       Lat:       36.038311       Long:       -74.582717         Species:Unidentified Mesoplodon       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Large body, small pectoral fins and dorsal fin.         Mone
Initial sighting on Track         Time:       10:53       WP#:       36       Lat:       36.042353       Long:       -74.587124         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       44       Beaufort Sea State:       1         Observer:       Ryan       Observer side:       Left       Left         Actual Time and Position of Sighting       Time:       11:00       WP#:       37       Lat:       36.038311       Long:       -74.582717         Species:       Unidentified Mesoplodon       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Large body, small pectoral fins and dorsal fin.
Initial sighting on Track         Time:       10:53       WP#:       36       Lat:       36.042353       Long:       -74.587124         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       44       Beaufort Sea State:       1         Observer:       Ryan       Observer side:       Left       1         Actual Time and Position of Sighting       Time:       11:00       WP#:       37       Lat:       36.038311       Long:       -74.582717         Species:       Unidentified Mesoplodon       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Large body, small pectoral fins and dorsal fin.         Photographer:       Erin       Frame numbers:       none         Photographer:       Erin       Frame numbers:       no images       Spacer:       none         Calculated distance from Trackline:       0.60 km       0.60 km       10.00 km       10.00 km       10.00 km
Initial sighting on Track         Time:       10:53       WP#:       36       Lat:       36.042353       Long:       -74.587124         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       44       Beaufort Sea State:       1         Observer:       Ryan       Observer side:       Left       1         Actual Time and Position of Sighting       Time:       11:00       WP#:       37       Lat:       36.038311       Long:       -74.582717         Species:       Unidentified Mesoplodon       Numbers (Low/High/Best):       1/1/1       1/1/1         Features used in Species ID:       Large body, small pectoral fins and dorsal fin.       1/1/1         Photographer:       Erin       Frame numbers:       no images       Spacer:       none         Photographer:       Erin       Frame numbers:       0.60 km       Spacer:       none         Final Time and Position of Sighting
Initial sighting on Track         Time:       10:53       WP#:       36       Lat:       36.042353       Long:       -74.587124         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       44       Beaufort Sea State:       1         Observer:       Ryan       Observer side:       Left       Left         Actual Time and Position of Sighting       Time:       11:00       WP#:       37       Lat:       36.038311       Long:       -74.582717         Species:       Unidentified Mesoplodon       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Large body, small pectoral fins and dorsal fin.
Initial sighting on Track         Time:       10:53       WP#:       36       Lat:       36.042353       Long:       -74.587124         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       44       Beaufort Sea State:       1         Observer:       Ryan       Observer side:       Left       Left         Actual Time and Position of Sighting       Time:       11:00       WP#:       37       Lat:       36.038311       Long:       -74.582717         Species:Unidentified Mesoplodon       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Large body, small pectoral fins and dorsal fin.
Initial sighting on Track         Time:       10:53       WP#:       36       Lat:       36.042353       Long:       -74.587124         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       44       Beaufort Sea State:       1         Observer:       Ryan       Observer side:       Left       Left         Actual Time and Position of Sighting       Time:       11:00       WP#:       37       Lat:       36.038311       Long:       -74.582717         Species:       Unidentified Mesoplodon       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Large body, small pectoral fins and dorsal fin.
Initial sighting on Track         Time:       10:53       WP#:       36       Lat:       36.042353       Long:       -74.587124         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       44       Beaufort Sea State:       1         Observer:       Ryan       Observer side:       Left       Left         Actual Time and Position of Sighting       Time:       11:00       WP#:       37       Lat:       36.038311       Long:       -74.582717         Species:Unidentified Mesoplodon       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Large body, small pectoral fins and dorsal fin.
Initial sighting on Track         Time:       10:53       WP#:       36       Lat:       36.042353       Long:       -74.587124         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       44       Beaufort Sea State:       1         Observer:       Ryan       Observer side:       Left       Left         Actual Time and Position of Sighting       Time:       11:00       WP#:       37       Lat:       36.038311       Long:       -74.582717         Species:       Unidentified Mesoplodon       Numbers (Low/High/Best):       1/1/1       Features used in Species ID:       Large body, small pectoral fins and dorsal fin.         Persentative images used for Species ID:       none       none         Photographer:       Erin       Frame numbers:       no images       Spacer:       none         Photographer:       Erin       Frame numbers:       no images       Spacer:       none         Photographer:       Erin       Frame numbers:       NA       Long:       NA         Calculated distance from Trackline:       0.60 km       Image:       NA       Calculated Distance Traveled:       NA

	Friday, N	1ay 4, 2012 ${ m Si}$	ghting # 9		
Initial sighting o	on Track				
Time: <u>11:04</u>	WP#:3	9 Lat:	36.043725	Long:	-74.681414
Vertical Angle:	<u>1</u> Ho	rizontal Bear	ing in Degrees:	45 Sight	ting Cue: Splash
On/Off Effort:	On	Trackline:	44	Beaufort Se	a State: 1
Observer: E	rin	Observer	side: Right		
Actual Time and	d Position o	of Sighting			
Time: 11:05	WP#: 4	0 Lat:	36.041401	Long:	-74.684002
Species:Delphinus	delphis		Numbers (	Low/High/Be	est): 40 / 50 / 45
Features used in	Species ID:	Yellow colorat	ion along midline	to ventral area	pelow dorsal fin
lighter grey /white	coloration fro	m peduncle me	eting yellow form		attern. Light pectorals.
Representative in					
Photographer:			s: <u>122 - 13</u>	SP8 Spa	acer: 139
Calculated distar	ice from Tra	ackline:	0.35 km		
Final Time and	Position of	Sighting			
Time: 11:07	WP#:4	1 Lat:	36.047293	Long:	-74.685466
Calculated Distar	nce Travele	d:(	0.67 km		
Behavior and A	dditional C	Comments			
Dense group traveli					
		·			
	Friday, N	1ay 4, 2012 ${ m Si}$	ghting # 10		
Initial sighting of	on Track				
Time: 11:34	WP#: 5		35.975614	Long:	
Vertical Angle:				110 Sight	ting Cue: Splash
On/Off Effort:		Trackline:		Beaufort Se	a State: 1
Observer: Ry	an	Observer	side: Left		
Actual Time and	d Position o	of Sighting			
Time: 11:39	WP#: 5	1 Lat:	35.988005	Long:	-74.735377
Species:Delphinus					est): 200 / 250 / 225
Features used in	Species ID:	Yellow colorat	ion along midline	to ventral area	below dorsal fin
lighter grey /white	coloration fro	m peduncle me	eting yellow form	ning hourglass p	attern. Light pectorals.
Representative in	-	for Species II	D:	142, 146, 152, 15	5 & 162
Photographer:		rame numbers		55 Spa	acer: 166
Calculated distar	ice from Tra	ackline:	1.38 km		
Final Time and	Position of	Sighting			
Time: NA	WP#: N	A Lat:	NA	Long:	NA
Calculated Dista					
Pohavior and A	-	d:	NA		
Dellavior and A	nce Travele		NA		
	nce Travele dditional C	comments		ine. Lots of splay	
	nce Travele dditional C ed groups tra	Comments veling slowly in		ine. Lots of splas	shing while surfacing

Fr	iday, May 4, 2012 ${ m Sigl}$	nting # 11		
Initial sighting on Tr	ack	C		
Time: 11:42 WP	#: <u>53</u> Lat:	35.974300	Long:	-74.634677
Vertical Angle: 2	Horizontal Bearing	g in Degrees: 9	•	
On/Off Effort:On		43 Be	eaufort Sea Sta	te:1
Observer: Ryan	Observer sid	le: Left		
Actual Time and Pos	ition of Sighting			
Time: 11:43 WP	#: 54 Lat:	35.977379	Long: -	74.634714
Species:Ziphius cavirostr	is	Numbers (Lov	v/High/Best):	2/2/2
Features used in Speci	es ID: Small pectoral fir	ns, small dorsal fin p	aced far back on	animals body.
Representative images				
Photographer: Erin			Spacer:	190
Calculated distance fro	om Trackline:	0.34 km	1	
<b>Final Time and Posit</b>	ion of Sighting			
Time: 11:44 WP	#: 55 Lat:	35.975891	Long:	-74.641809
Calculated Distance T	raveled: 0.6	6 km	_	
Behavior and Addition	onal Comments			
Pair of animals surfacing a	t regular intervals before	diving deep and ou	it of sight.	
Fr	iday, May 4, 2012 ${ m Sig}$	nting # 12		
Initial sighting on Tr	ack	C		
Time: 11:46 WP	#: 57 Lat:	35.974276	Long:	-74.583458
Vertical Angle: 2	Horizontal Bearing	g in Degrees: 9	0 Sighting (	Cue: Splash
On/Off Effort: On	Trackline:	43 Be	aufort Sea Sta	te: 1
Observer: Erin	Observer sid	le: Right		
Actual Time and Pos	ition of Sighting			
Time: 11:52 WP	0 0	35.979662	Long:	74.557988
Species:Stenella frontalis		Numbers (Lov		55 / 60 / 58
Features used in Speci		· · · · · · · · · · · · · · · · · · ·	<u> </u>	
body, spotting only visible				
Representative images	used for Species ID:	19	5, 196, 202 & 203	
Photographer: Erin	Frame numbers:	191 - 208	Spacer:	209
Calculated distance fro	om Trackline:	2.37 km		
Final Time and Posit	ion of Sighting			
Time: NA WP		NA	Long:	NA
Calculated Distance T	H. NA Lat.			
			· · ·	
Rohavior and Additi	raveled:	NA	- <u>B</u>	
Behavior and Additio	raveled:	NA		
Closely spaced group trav	raveled:I onal Comments reling slowly with frequer	NA		
	raveled:I onal Comments reling slowly with frequer	NA		

Friday, May 4, 2012 Sighting $\#$ 13	
Initial sighting on Track	
Time: <u>11:52</u> WP#: <u>60</u> Lat: <u>35.974399</u> Long: <u>-</u>	74.529432
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting C	Cue: Body
On/Off Effort: On Trackline: 43 Beaufort Sea Stat	te:1
Observer: Ryan Observer side: Left	
Actual Time and Position of Sighting	
Time: 11:53 WP#: 61 Lat: 35.973742 Long: -7	74.529780
Species: Tursiops truncatus Numbers (Low/High/Best):	12/15/13
Features used in Species ID: Robust body appearance, uniform grey coloration exc	ept for lighter
coloration across peduncle region.	
Representative images used for Species ID: 210, 215, & 217	
Photographer: Erin Frame numbers: 210-219 Spacer:	220
Calculated distance from Trackline: 0.08 km	
Final Time and Position of Sighting	
Time: 11:56 WP#: 62 Lat: 35.973524 Long: -	74.538430
Calculated Distance Traveled: 0.78 km	
Behavior and Additional Comments	
Traveling in stretched out lines.	
Friday, May 4, 2012 Sighting # 14	
Initial sighting on Track	
Time: 12:12 WP#: 67 Lat: 35.905070 Long:	
Vertical Angle: <u>1</u> Horizontal Bearing in Degrees: <u>60</u> Sighting C	
On/Off Effort: On Trackline: 42 Beaufort Sea Stat	te: 1
Observer: Erin Observer side: Right	
Actual Time and Position of Sighting	
Time: 12:14 WP#: 68 Lat: 35.907999 Long: -7	74.635989
Species: Tursiops truncatus Numbers (Low/High/Best):	18/25/23
Features used in Species ID: Robust body appearance, uniform grey coloration exc	ept for lighter
coloration across peduncle region.	
Representative images used for Species ID: 222 & 223	
Photographer: Erin Frame numbers: 221-228 Spacer:	229
Calculated distance from Trackline: 0.83 km	
Final Time and Position of Sighting	
Time:     NA     WP#:     NA     Lat:     NA     Long:	NA
Calculated Distance Traveled: NA	
Behavior and Additional Comments	
Multiple groups all with slow travel near the surface. White peduncles clearly visible.	

Friday, May 4, 2012 Sighting $\#$ 15	
Initial sighting on Track	
Time: 13:56 WP#: 80 Lat: 35.830982 Long: -74.72	7038
Vertical Angle: <u>2</u> Horizontal Bearing in Degrees: <u>60</u> Sighting Cue:	Body
On/Off Effort: On Trackline: 41 Beaufort Sea State:	1
Observer: Erin Observer side: Right	
Actual Time and Position of Sighting	
Time: 13:57 WP#: 81 Lat: 35.821674 Long: -74.724	824
Species: <i>Ziphius cavirostris</i> Numbers (Low/High/Best): 3	/3/3
Features used in Species ID: Small pectora fins, small dorsal fin placed far back on anima	s body.
Representative images used for Species ID: 231 & 233	
FilotoStuphen FilotoStuphen Spacer	234
Calculated distance from Trackline: 1.05 km	
Final Time and Position of Sighting	
Time: <u>13:58</u> WP#: <u>82</u> Lat: <u>35.829477</u> Long: <u>-74.72</u>	5450
Calculated Distance Traveled: 0.87 km	
Behavior and Additional Comments	
One animal much whiter than other, only at the surface for a brief period before diving deep	out of
sight.	
Friday, May 4, 2012 Sighting $\#$ 16	
Initial sighting on Track	
Time:         13:59         WP#:         84         Lat:         35.830369         Long:         -74.66	
Vertical Angle:         3         Horizontal Bearing in Degrees:         110         Sighting Cue:	
On/Off Effort:         On         Trackline:         41         Beaufort Sea State:	1
Observer: Ryan Observer side: Left	
Actual Time and Position of Sighting	
Time: 14:00 WP#: 85 Lat: 35.843667 Long: -74.666	5141
	35 / 32
Features used in Species ID: Uniform grey coloration, robust body appearance.	
Representative images used for Species ID: 236	
	242
Calculated distance from Trackline: 1.49 km	
Final Time and Position of Sighting	
Time:         14:03         WP#:         86         Lat:         35.848992         Long:         -74.66	5287
Calculated Distance Traveled: 0.60 km	
Behavior and Additional Comments	
Two groups of animals.	

Friday, May 4, 2012 Sighting $\#$ 17	
Initial sighting on Track	
Time: 14:05 WP#: 88 Lat: 35.834051	Long:74.583971
	45 Sighting Cue: Body
On/Off Effort: On Trackline: 41 H	Beaufort Sea State:1
Observer: Erin Observer side: Right	
Actual Time and Position of Sighting	
Time: 14:06 WP#: 89 Lat: 35.825246	Long: -74.586393
	w/High/Best): 38 / 43 / 40
Features used in Species ID: Robust body appearance, uniform	grey coloration except for lighter
white peduncle coloration.	
Representative images used for Species ID:	245 & 247
Photographer: Erin Frame numbers: 243 - 260	Spacer:261
Calculated distance from Trackline: 1.00 km	
Final Time and Position of Sighting	
Time: NA WP#: NA Lat: NA	Long: NA
Calculated Distance Traveled: NA	
Behavior and Additional Comments	
Multiple groups near patchy sargassum.	
Friday, May 4, 2012 Sighting $\#$ 18	
Initial sighting on Track	
Time: 14:22 WP#: 93 Lat: 35.757505	Long: -74.503445
	90 Sighting Cue: Splash
	Beaufort Sea State:1
Observer: Erin Observer side: Right	
Actual Time and Position of Sighting	
Time: 14:23 WP#: 94 Lat: 35.758378	Long:74.497698
	w/High/Best): 30 / 38 / 34
Features used in Species ID: Robust body appearance, uniform	grey coloration except for lighter
white peduncle coloration.	
Representative images used for Species ID:	266 & 269
Photographer: Erin Frame numbers: 262 - 270	Spacer:271
Calculated distance from Trackline: 0.53 km	_
Final Time and Position of Sighting	
Time: 14:25 WP#: 96 Lat: 35.760466	Long: -74.496310
Calculated Distance Traveled: 0.26 km	
Behavior and Additional Comments	

Single dense group with a few single outliers.

Friday, May 4, 2012 Sighting # 19         Initial sighting on Track         Time:       14:28       WP#: 99       Lat: 35.761786       Long: -74.584402         Vertical Angle:       2       Horizontal Bearing in Degrees: 90       Sighting Cue: Body
Time:         14:28         WP#:         99         Lat:         35.761786         Long:         -74.584402
e
ventical Angle. <u>2</u> Horizontal Bearing in Degrees. <u>50</u> Signing Cue. <u>Body</u>
On/Off Effort: On Trackline: 41 Beaufort Sea State: 1
Observer: Ryan Observer side: Left
Actual Time and Position of Sighting
Time: 14:28 WP#: 100 Lat: 35.767991 Long: -74.577045
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best): 40/60/50
Features used in Species ID: Uniform grey coloration, robust body appearance and dorsal fin.
Representative images used for Species ID: 279, 281, 282, & 283
Photographer: Erin Frame numbers: 272 - 283 Spacer: 284
Calculated distance from Trackline: 0.96 km
Final Time and Position of Sighting
Time: NA WP#: NA Lat: NA Long: NA
Calculated Distance Traveled: NA
Behavior and Additional Comments
Multiple groups covering both sides of the trackline. Four groups with between 10 - 15 animals in each
Subgroup approached passing tanker and began bow riding.
Friday, May 4, 2012 Sighting # 20 Initial sighting on Track
Time:14:34WP#:102Lat:35.757415Long:-74.662514Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:1Observer:RvanObserver side:Left
Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:1Observer:RyanObserver side:Left
Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:1Observer:RyanObserver side:LeftActual Time and Position of Sighting
Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:1Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:36WP#:103Lat:35.761736Long:-74.656952
Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:1Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:36WP#:103Lat:35.761736Long:-74.656952Species:Globicephala macrorhynchusNumbers (Low/High/Best):5 / 5 / 5
Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       40       Beaufort Sea State:       1         Observer:       Ryan       Observer side:       Left       1         Actual Time and Position of Sighting         Time:       14:36       WP#:       103       Lat:       35.761736       Long:       -74.656952         Species:       Globicephala macrorhynchus       Numbers (Low/High/Best):       5 / 5 / 5         Features used in Species ID:       Black bodied animals, large square head with no rostrum. Some
Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       40       Beaufort Sea State:       1         Observer:       Ryan       Observer side:       Left       1         Actual Time and Position of Sighting         Time:       14:36       WP#:       103       Lat:       35.761736       Long:       -74.656952         Species:       Globicephala macrorhynchus       Numbers (Low/High/Best):       5 / 5 / 5         Features used in Species ID:       Black bodied animals, large square head with no rostrum. Some         lighter coloration on peduncle.       1
Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       40       Beaufort Sea State:       1         Observer:       Ryan       Observer side:       Left       1         Actual Time and Position of Sighting         Time:       14:36       WP#:       103       Lat:       35.761736       Long:       -74.656952         Species:       Globicephala macrorhynchus       Numbers (Low/High/Best):       5 / 5 / 5         Features used in Species ID:       Black bodied animals, large square head with no rostrum. Some         lighter coloration on peduncle.       287
Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:1Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:36WP#:103Lat:35.761736Long:-74.656952Species:Globicephala macrorhynchusNumbers (Low/High/Best):5 / 5 / 5Features used in Species ID:Black bodied animals, large square head with no rostrum. Somelighter coloration on peduncle.Representative images used for Species ID:287Photographer:ErinFrame numbers:285 - 288Spacer:289
Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       40       Beaufort Sea State:       1         Observer:       Ryan       Observer side:       Left       1         Actual Time and Position of Sighting       Time:       14:36       WP#:       103       Lat:       35.761736       Long:       -74.656952         Species:       Globicephala macrorhynchus       Numbers (Low/High/Best):       5 / 5 / 5         Features used in Species ID:       Black bodied animals, large square head with no rostrum. Some         lighter coloration on peduncle.       Representative images used for Species ID:       287         Photographer:       Erin       Frame numbers:       285 - 288       Spacer:       289         Calculated distance from Trackline:       0.69 km       0.69 km       1000000000000000000000000000000000000
Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       40       Beaufort Sea State:       1         Observer:       Ryan       Observer side:       Left       Left         Actual Time and Position of Sighting       Time:       14:36       WP#:       103       Lat:       35.761736       Long:       -74.656952         Species:       Globicephala macrorhynchus       Numbers (Low/High/Best):       5 / 5 / 5         Features used in Species ID:       Black bodied animals, large square head with no rostrum. Some         lighter coloration on peduncle.       Representative images used for Species ID:       287         Photographer:       Erin       Frame numbers:       285 - 288       Spacer:       289         Calculated distance from Trackline:       0.69 km       M       M       Final Time and Position of Sighting
Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:1Observer:RyanObserver side:Left1Actual Time and Position of SightingTime:14:36WP#:103Lat:35.761736Long:-74.656952Species:Globicephala macrorhynchusNumbers (Low/High/Best):5 / 5 / 5Features used in Species ID:Black bodied animals, large square head with no rostrum. Somelighter coloration on peduncle.Representative images used for Species ID:287Photographer:ErinFrame numbers:285 - 288Spacer:289Calculated distance from Trackline:0.69 kmFinal Time and Position of SightingTime:14:40WP#:104Lat:35.762005Long:-74.651617
Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:1Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:36WP#:103Lat:35.761736Long:-74.656952Species:Globicephala macrorhynchusNumbers (Low/High/Best):5/5/55/5/5Features used in Species ID:Black bodied animals, large square head with no rostrum. SomeIghter coloration on peduncle.Representative images used for Species ID:287Photographer:ErinFrame numbers:285 - 288Spacer:289Calculated distance from Trackline:0.69 kmFinal Time and Position of SightingTime:14:40WP#:104Lat:35.762005Long:-74.651617Calculated Distance Traveled:0.48 km0.48 km10.48 km10.48 km
Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:1Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:36WP#:103Lat:35.761736Long:-74.656952Species:Globicephala macrorhynchusNumbers (Low/High/Best):5 / 5 / 5Features used in Species ID:Black bodied animals, large square head with no rostrum. SomeIlighter coloration on peduncle.287Photographer:ErinFrame numbers:285 - 288Spacer:289Calculated distance from Trackline:0.69 km574.651617Time:14:40WP#:104Lat:35.762005Long:-74.651617Calculated Distance Traveled:0.48 kmBehavior and Additional Comments0.48 km0.48 km
Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:1Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:36WP#:103Lat:35.761736Long:-74.656952Species:Globicephala macrorhynchusNumbers (Low/High/Best):5/5/55/5/5Features used in Species ID:Black bodied animals, large square head with no rostrum. SomeIghter coloration on peduncle.Representative images used for Species ID:287Photographer:ErinFrame numbers:285 - 288Spacer:289Calculated distance from Trackline:0.69 kmFinal Time and Position of SightingTime:14:40WP#:104Lat:35.762005Long:-74.651617Calculated Distance Traveled:0.48 km0.48 km0.48 km0.48 km
Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:40Beaufort Sea State:1Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:36WP#:103Lat:35.761736Long:-74.656952Species:Globicephala macrorhynchusNumbers (Low/High/Best):5 / 5 / 5Features used in Species ID:Black bodied animals, large square head with no rostrum. SomeIIighter coloration on peduncle.Representative images used for Species ID:287Photographer:ErinFrame numbers:285 - 288Spacer:289Calculated distance from Trackline:0.69 km104Lat:35.762005Long:-74.651617Calculated Distance Traveled:0.48 kmBehavior and Additional Comments0.48 km104Lat:35.762005Long:-74.651617

	Frida	y, May 4, 201	<sup>2</sup> Sigh	ting # 21		
Initial sighting or	1 Tracl	K				
			at:	35.757272	Long:	-74.813943
Vertical Angle:			-	-	<u>110</u> Sighting	g Cue: Body
On/Off Effort:			line:		Beaufort Sea S	tate: <u>1</u>
Observer: Rya	n	Obser	ver sid	e: <u>Left</u>	_	
Actual Time and	Positio	on of Sightii	ıg			
Time: 14:49	WP#:	108 La	at:	35.748995	Long:	-74.799130
Species:Globicephal					Low/High/Best):	
Features used in S			ck bodie	d animals with	blunt square head	s. Wide dorsal
fin placed ~1/3 back						
Representative im	•	-		200 200	296, 298 & 299	200
$\mathcal{O}$ I —	irin	Frame num	ibers: _	290 - 299 1.62 km	Space	r: <u>300</u>
Calculated distanc				1.02 KIII		
Final Time and P						
	WP#:		at:	35.755245	Long:	-74.795795
Calculated Distance	ce Trav	eled:	0.76	5 km	1	
Behavior and Ad	ditiona	l Comment	S			
Staying sub surface b	etween	brief periods u	up for air			
	Frido		2 Cial	tin ~ # 22		
Initial sighting or		y, May 4, 201	2 Sigh	ting # 22		
Initial sighting or	ı Tracl	K _		0	Lang	74 720110
Time: 15:14	n Tracl WP#:	κ 121 La	at:	35.688860	Long:	-74.730110
Time: <u>15:14</u> Vertical Angle:	n <b>Tracl</b> WP#:	<b>x</b> <u>121</u> La Horizontal I	at: Bearing	35.688860 in Degrees:	90 Sighting	g Cue: Body
Time: <u>15:14</u> Vertical Angle: <u></u> On/Off Effort: <u></u>	n <b>Tracl</b> WP#: On	k <u>121</u> La Horizontal I Track	at: Bearing line:	35.688860 in Degrees: 39		g Cue: Body
Time: <u>15:14</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u>	n Tracl WP#: 2 On n	k <u>121</u> La Horizontal I Track Obser	at: Bearing line: ver sid	35.688860 in Degrees: 39	90 Sighting	g Cue: Body
Time: <u>15:14</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> Actual Time and	n Tracl WP#: On Positic	k <u>121</u> La Horizontal I Track Obser On of Sightin	at: Bearing line: ver sid	35.688860 in Degrees: 39 e: Left	90 Sighting Beaufort Sea S	g Cue: Body tate: 2
Time: <u>15:14</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> Actual Time and Time: <u>15:15</u>	n Tracl WP#: _ 	k <u>121</u> La Horizontal I Track Obser on of Sightin <u>122</u> La	at: Bearing line: ver sid	35.688860 in Degrees: 39 e: Left 35.692604	90 Sighting Beaufort Sea S  Long:	-74.734785
Time: <u>15:14</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> <b>Actual Time and</b> Time: <u>15:15</u> Species: <i>Unidentified</i>	n Tracl WP#: _ 	k <u>121</u> La Horizontal I Track Obser <b>on of Sightin</b> <u>122</u> La odon	at: Bearing line: ver sid ng at:	35.688860 in Degrees: 39 e: Left 35.692604 Numbers (I	90 Sighting Beaufort Sea S Long: Low/High/Best):	-74.734785
Time: <u>15:14</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> Actual Time and Time: <u>15:15</u> Species: <i>Unidentified</i> Features used in S	n Tracl WP#: On n Positic WP#: Mesoph pecies	k <u>121</u> La Horizontal I Track Obser On of Sightin <u>122</u> La odon ID: <u>Small dor</u>	at: Bearing line: ver sid ng at: sal fin pl	35.688860 in Degrees: 39 e: Left 35.692604 Numbers (I	90 Sighting Beaufort Sea S Long: Low/High/Best):	-74.734785
Time: <u>15:14</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> Actual Time and Time: <u>15:15</u> Species: <i>Unidentified</i> Features used in S tapered head leading	n Tracl WP#: _ 	k <u>121</u> La Horizontal I Track Obser <b>on of Sightin</b> <u>122</u> La odon ID: <u>Small dor</u> rum. Large bo	at: Bearing line: ver sid ng at: sal fin pl dy size.	35.688860 in Degrees: 39 e: Left 35.692604 Numbers (I	90 Sighting Beaufort Sea S Long: Low/High/Best): on the animals boo	-74.734785
Time: <u>15:14</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> Actual Time and Time: <u>15:15</u> Species: <i>Unidentified</i> Features used in S tapered head leading Representative image	n Tracl WP#:	k <u>121</u> La Horizontal I Track Obser <b>on of Sightin</b> <u>122</u> La odon ID: <u>Small dor</u> um. Large bo sed for Speci	at: Bearing line: ver sid ng at: sal fin pl dy size. es ID:	35.688860 in Degrees: 39 e: Left 35.692604 Numbers (I aced well back	90 Sighting Beaufort Sea S Long: Low/High/Best): on the animals boo	<pre>cue: Body tate: 2 -74.734785 -74.734785 -1/1/1 dy, smooth</pre>
Time: <u>15:14</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> Actual Time and Time: <u>15:15</u> Species: <i>Unidentified</i> Features used in S tapered head leading Representative ima Photographer: <u>E</u>	n Tracl WP#: _ On Positic WP#: Mesoph pecies to rostr ages us rin	k <u>121</u> La Horizontal I Track Obser <b>on of Sightin</b> <u>122</u> La odon ID: <u>Small dor</u> rum. Large bo red for Speci Frame nun	at: Bearing line: ver sid ng at: sal fin pl dy size. es ID:	35.688860 in Degrees: 39 e: Left 35.692604 Numbers (I aced well back	90 Sighting Beaufort Sea S Long: Low/High/Best): on the animals boo	<pre>cue: Body tate: 2 -74.734785 -74.734785 -1/1/1 dy, smooth</pre>
Time: <u>15:14</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> <b>Actual Time and</b> Time: <u>15:15</u> Species: <i>Unidentified</i> Features used in S tapered head leading Representative ima Photographer: <u>E</u> Calculated distanc	n Tracl WP#: On Positic WP#: d Mesople pecies g to rostr ages us rin te from	k <u>121</u> La Horizontal H Track Obser <b>on of Sightin</b> <u>122</u> La odon ID: <u>Small dor</u> rum. Large bo red for Speci Frame num Trackline:	at: Bearing line: ver sid ng at: at: sal fin pl dy size. les ID: nbers:	35.688860 in Degrees: 39 e: Left 35.692604 Numbers (I aced well back	90 Sighting Beaufort Sea S Long: Low/High/Best): on the animals boo	<pre>cue: Body tate: 2 -74.734785 -74.734785 -1/1/1 dy, smooth</pre>
Time: <u>15:14</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> <b>Actual Time and</b> Time: <u>15:15</u> Species: <i>Unidentified</i> Features used in S tapered head leading Representative im Photographer: <u>E</u> Calculated distanc <b>Final Time and P</b>	n Track WP#: On n Positic WP#: d Mesoph pecies to rostr ages us to rostr ages us crin ce from Position	k <u>121</u> La Horizontal I Track Obser <b>on of Sightin</b> <u>122</u> La odon ID: <u>Small dor</u> rum. Large bo red for Speci Frame num Trackline: _ <b>of Sighting</b>	at: Bearing line: ver sid ng at: at: sal fin pl dy size. les ID: bers: g	35.688860 in Degrees: 39 e: Left 35.692604 Numbers (I aced well back NA 0.59 km	90 Sighting Beaufort Sea S Long: Low/High/Best): on the animals boo NA Spaces	<pre>cue: Body tate: 2 -74.734785 -74.734785 -1/1/1 dy, smooth c: NA</pre>
Time: <u>15:14</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> <b>Actual Time and</b> Time: <u>15:15</u> Species: <i>Unidentified</i> Features used in S tapered head leading Representative imit Photographer: <u>E</u> Calculated distance <b>Final Time and P</b> Time: <u>15:16</u>	h Track WP#: On Positic WP#: d Mesoph pecies to rostr ages us rin re from <b>Position</b> WP#:	k 121 La Horizontal H Track Obser on of Sightin 122 La odon ID: Small dor um. Large bo red for Speci Frame num Trackline: 123 La	at: Bearing line: ver side ng at: at: g at:	35.688860 in Degrees: 39 e: Left 35.692604 Numbers (I aced well back NA 0.59 km 35.691930	90 Sighting Beaufort Sea S Long: Low/High/Best): on the animals boo	<pre>cue: Body tate: 2 -74.734785 -74.734785 -1/1/1 dy, smooth</pre>
Time: <u>15:14</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> Actual Time and Time: <u>15:15</u> Species: <i>Unidentified</i> Features used in S tapered head leading Representative im: Photographer: <u>E</u> Calculated distanc Final Time and P Time: <u>15:16</u> Calculated Distance	h Track WP#: On n Position WP#: d Mesoph pecies to rostri ages us rin ce from WP#: wP#: ce Trav	k <u>121</u> La Horizontal I Track Obser <b>on of Sightin</b> <u>122</u> La odon ID: <u>Small dor</u> rum. Large bo red for Speci Frame num Trackline: <b>of Sighting</b> <u>123</u> La reled:	at: Bearing line: ver side ng at: at: g at: 0.08	35.688860 in Degrees: 39 e: Left 35.692604 Numbers (I aced well back NA 0.59 km	90 Sighting Beaufort Sea S Long: Low/High/Best): on the animals boo NA Spaces	<pre>cue: Body tate: 2 -74.734785 -74.734785 -1/1/1 dy, smooth c: NA</pre>
Time: <u>15:14</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> <b>Actual Time and</b> Time: <u>15:15</u> Species: <i>Unidentified</i> Features used in S tapered head leading Representative imit Photographer: <u>E</u> Calculated distance <b>Final Time and P</b> Time: <u>15:16</u>	h Track WP#: On Positic WP#: d Mesoph pecies to rostri ages us in to rostri to rostri	k       121     La       Horizontal I     Track       Obser     Track       obs     Track       122     La       odon     Small dor       ID:     Small dor       um.     Large bo       red for Speci     Frame nun       Trackline:        of Sighting     123       123     La       reled:	at: Bearing line: ver sid ng at: at: sal fin pl dy size. es ID: ] nbers: g at: 0.08	35.688860 in Degrees: 39 e: Left 35.692604 Numbers (I aced well back NA 0.59 km 35.691930 3 km	90 Sighting Beaufort Sea S Long: Low/High/Best): on the animals boo NA Spaces	<pre>cue: Body tate: 2 -74.734785 -74.734785 -1/1/1 dy, smooth c: NA</pre>

Friday, May 4, 2012 $\operatorname{Sighting} \# 23$
Initial sighting on Track
Time: 15:18 WP#: 125 Lat: 35.686349 Long: -74.689301
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 39 Beaufort Sea State: 2
Observer: Ryan Observer side: Left
Actual Time and Position of Sighting
Time:         15:22         WP#:         126         Lat:         35.985520         Long:         -74.688836
Species: Tursiops truncatus       Numbers (Low/High/Best): 26 / 35 / 30
Features used in Species ID: Uniform grey body coloration except for white peduncle region
Robust body appearance.
Representative images used for Species ID: <u>301 &amp; 304</u>
Photographer:     Erin     Frame numbers:     301-313     Spacer:     314
Calculated distance from Trackline: 0.10 km
Final Time and Position of Sighting
Time:         15:23         WP#:         127         Lat:         35.688322         Long:         -74.685446
Calculated Distance Traveled: 0.40 km
Behavior and Additional Comments
Large group traveling together - broke into smaller more dense groups. Lot of subsurface travel
White peduncles clearly visible.
Friday, May 4, 2012 Sighting # 24
Initial sighting on Track
Time:     15:25     WP#:     129     Lat:     35.688786     Long:     -74.608397       Vertical Angle:     2     Horizontal Baseling in Degreese     20     Sighting Cual     Desture
Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:39Beaufort Sea State:1
Oh/Off Effort.     Off     Hackfille.     39     Beaufort Sea State.       Observer:     Erin     Observer side:     Right
Actual Time and Position of Sighting
Time:         15:26         WP#:         130         Lat:         35.682618         Long:         -74.603401           Species////ide//Sectors//ide//Sectors///ide//Sectors//ide//Sectors//ide//Sectors//ide//Sectors//ide//Sectors//ide//Sectors//ide//Sectors//ide//Sectors//ide//Sectors//ide//Sectors//ide//Sectors//ide//Sectors//ide//Sectors//ide//Sectors//ide//Sectors//ide//Sectors//ide//Sectors//ide//Sectors//ide//ide//Sectors//ide//ide//Sectors//ide//ide//Sectors//ide//ide//Sectors//ide//ide//Sectors//ide//ide//ide//ide//ide//ide//ide//id
Species:Unidentified Mesoplodon       Numbers (Low/High/Best): 1 / 1 / 1         Features used in Species ID: Small dorsal fin placed well back on the animals body, smooth
tapered head leading to rostrum. Large body size.
Representative images used for Species ID: NA
Photographer: Erin Frame numbers: NA Spacer: NA
Calculated distance from Trackline: 0.82 km
Final Time and Position of Sighting
That Thic and Toshion of Signing
Time: 15.26 WP#: 131 Lat: 25.601494 Long: 74.602610
Time:15:26WP#:131Lat:35.691484Long:-74.603619Calculated Distance Traveled:0.99 km
Calculated Distance Traveled: 0.99 km
0

## **Behavior and Additional Comments**

Multiple groups interacting with one another along a current line. Groups were disperse with lots of splashing at the surface with considerable time spent deep below the surface.

Friday, June 8, 2012 Sighting $\#$ 1
Initial sighting on Track
Time: 10:17 WP#: 6 Lat: 34.521601 Long: -75.651604
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 20 Beaufort Sea State: 4
Observer: Ryan Observer side: Right
Actual Time and Position of Sighting
Time: 10:18 WP#: 7 Lat: 34.535699 Long: -75.645087
Species: Unidentified Delphinid Numbers (Low/High/Best): 8/8/8
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: 1.68 km
Final Time and Position of Sighting
Time:         10:32         WP#:         8         Lat:         34.534933         Long:         -75.642230
Calculated Distance Traveled: 0.28 km
Behavior and Additional Comments
No photos, no resight. Estimates of location.
Friday, June 8, 2012 Sighting # 2         Initial sighting on Track         Time:       11:47       WP#:       20       Lat:       34.734383       Long:       -75.513334         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       23       Beaufort Sea State:       3         Observer:       Erin       Observer side:       Left
Actual Time and Position of Sighting
Time: 11:49 WP#: 21 Lat: 34.723967 Long: -75.511635
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best): 20 / 28 / 25
Features used in Species ID: Uniform gray robust animal with white peduncles
Representative images used for Species ID: 10, 11, 17, 18
Photographer: Ryan Frame numbers: 1 - 24 Spacer: 25
Calculated distance from Trackline: 1.17 km
Final Time and Position of Sighting
Time: 11:59 WP#: 22 Lat: 34.729783 Long: -75.507934
Calculated Distance Traveled: 0.73 km
Behavior and Additional Comments
Logging at the surface, 2 groups one with about 8 and the other with 12+. No travel
Logging at the surface, 2 groups one with about 6 and the other with 12+. NO fraver

Frid	ay, June 8, 2012 $\operatorname{Sigh}$	nting # 3		
Initial sighting on Tra	ck	C		
Time: 14:38 WP#	: <u>34</u> Lat:	34.764822	Long:	75.417480
Vertical Angle: 1	-		Sighting C	
On/Off Effort: On			eaufort Sea Star	te:2
Observer: Erin	_ Observer sid	le: Left		
Actual Time and Posi	tion of Sighting			
Time: 14:39 WP#			Long:	
Species: Tursiops truncatus	;	Numbers (Low	/High/Best):	12/17/15
Features used in Specie	s ID: Large robust unif	orm gray animals w	ith white pedunc	les
D		2	2 42 44 40 50	
Representative images Photographer: Ryan	-		2, 42-44, 49, 50	63
Calculated distance from			Spacer:	05
		0.5 1 111	_	
Final Time and Positie		24760660	T	75 410010
	: <u>36</u> Lat:	34.769668	Long:	/5.418812
Calculated Distance Tra		J KM		
Behavior and Addition				
Hanging just below the sur	face, regular surfacing, r	not traveling, facing	different directio	ns.
Frid <b>Initial sighting on Tra</b> Time: <u>15:35</u> WP# Vertical Angle: <u>1</u> On/Off Effort: <u>On</u> Observer: <u>Erin</u>	: <u>48</u> Lat: <u></u> Horizontal Bearing	34.805102 g in Degrees: 90 26 Be	Long: o Sighting C eaufort Sea Star	Cue: Body
Actual Time and Posi	tion of Sighting			
Time: 15:37 WP#	: 49 Lat:	34.811290	•	75.211198
Species:Grampus griseus		Numbers (Low	· · _	7/10/8
Features used in Specie	s ID: Light gray to whit	te bodied animals w	ith scarring and a	a blunt head
	10 0 1 10			
Representative images			64, 73, 84, 85	
Photographer: Ryan		64 - 113	Spacer:	114
Calculated distance from		0.70 km	-	
Final Time and Position	e e			
Time: 15:42 WP#	: 50 Lat:	34.807190	Long:	75.208041
Calculated Distance Tra	aveled: 0.54	4 km		
Behavior and Addition	nal Comments			
Milling just below the surfa	ce, rolling around, stayir	ng in a tight group.		

	Friday, Jur	ne 8, 2012 ${ m Sig}$	ghting # 5		
Initial sighting or	n Track				
Time: 15:43	WP#: 52	Lat:	34.795875	Long:	-75.193204
Vertical Angle:	2 Hor			90 Sighting	
	On	Trackline:		Beaufort Sea St	ate:1
Observer: Erir	1	Observer s	ide: Left	_	
Actual Time and		0 0			
Time: 15:47	-	Lat:		Long:	
Species:Stenella clyr				.ow/High/Best):	
Features used in S					, lighter gray
coloration running de					40
Representative im Photographer:				81, 197, 210, 211, 2	
Calculated distance				Spacer:	205
			0.09 111		
Final Time and P		0 0	24 002254	T	75 10(007
	WP#: 54		34.803351	Long:	-75.196037
Calculated Distan			.22 km	_	
Behavior and Ad					
Lots of splashing, hug	ge spaced ou	t group, short k	ourst out of the wa	ter. Calf present	
Initial sighting or Time: <u>15:59</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Erin</u>	n Track WP#: <u>56</u> <u>3</u> Hor On	izontal Beari Trackline:	34.747912 ng in Degrees:	Long: 90 Sighting Beaufort Sea St	Cue: Body
Actual Time and	Position of	f Sighting			
Time: <u>16:02</u> Species: <i>Unidentified</i> Features used in S				Long: .ow/High/Best): als	-75.130554 2/2/2
Representative im	ages used f	or Species ID	):	273-275	
Photographer: <u>R</u> Calculated distanc		ame numbers	: 266 - 278 0.70 km	Spacer	279
Final Time and <b>P</b>	osition of S	Sighting			
	WP#: 58	0 0	34.750346	Long:	-75.126887
Calculated Distan	ce Traveled	: 0	.44 km		
Behavior and Ad				-	
One individual was si			a close together		
		.e other, stayin	g close together.		

Saturday, June 9, 2012 Sighting # 1	
Initial sighting on Track	
Time: <u>9:11</u> WP#: <u>4</u> Lat: <u>35.210545</u>	Long:74.975975
Vertical Angle: Horizontal Bearing in Degrees	: <u>90</u> Sighting Cue: <u>Blow</u>
On/Off Effort: On Trackline: 32	Beaufort Sea State: 3
Observer: Erin Observer side: Right	
Actual Time and Position of Sighting	
Time: 9:15 WP#: 5 Lat: 35.205705	Long: -74.956640
	(Low/High/Best): 8 / 10 / 9
Features used in Species ID: Large square head, black body	
animals body. Pectorals to to before dorsal fin.	-
Representative images used for Species ID:	6&7
Photographer: Erin Frame numbers: 1 - 11	Spacer: 12
Calculated distance from Trackline: 1.83 km	
Final Time and Position of Sighting	
Time: 9:24 WP#: 6 Lat: 35.221070	Long:74.973535
Calculated Distance Traveled: 2.30 km	
Behavior and Additional Comments	
A couple of groups observed - circled on a pair of animals, one lan	
Pair showed normal surfacing behavior with no signs of avoidance	.e.
Saturday, June 9, 2012 $Sighting # 2$	
Time: 10:23 WP#: 17 Lat: 35.342726	Long:74.887691
Vertical Angle: 2 Horizontal Bearing in Degrees	: <u>110</u> Sighting Cue: <u>Body</u>
On/Off Effort: On Trackline: 34	Beaufort Sea State: 3
Observer: Erin Observer side: Right	
Actual Time and Position of Sighting	
Time: 10:24 WP#: 18 Lat: 35.343964	Long: -74.889252
	(Low/High/Best): 11/12/11
Features used in Species ID: Robust body appearance, unifo	
fin.	
Representative images used for Species ID:	14, 16, 17, 20
Photographer: Erin Frame numbers: 13 - 2	1 Spacer: 22
Calculated distance from Trackline: 0.20 km	
Final Time and Position of Sighting	
Time: 10:31 WP#: 19 Lat: 35.334858	Long: -74.902508
Calculated Distance Traveled: 1.57 km	
Behavior and Additional Comments	
2 groups one of 3-4 individuals and another of 8.	
Groups spent lots of time below the surface. While at the surface	displayed energenic surfacings
causing lost of disturbance.	
<u>v</u>	

0  $\mathbf{C} := \mathbf{1} \cdot \mathbf{1}$ 

Saturday, June 9, 2012 Sighting $\#$ 3
Initial sighting on Track
Time: 10:33 WP#: 21 Lat: 35.342101 Long: -74.863121
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort:         On         Trackline:         34         Beaufort Sea State:         3
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time: 10:39 WP#: 22 Lat: 35.335487 Long: -74.876690
Species:Tursiops truncatus         Numbers (Low/High/Best):         34/35/34
Features used in Species ID: Robust body appearance, uniform grey coloration, large dorsal fin.
Representative images used for Species ID: 24, 28, 31, 33
Photographer:    Erin    Frame numbers:    23 - 33    Spacer:    34
Calculated distance from Trackline: 1.43 km
Final Time and Position of Sighting
Time:         10:39         WP#:         23         Lat:         35.336707         Long:         -74.879624
Calculated Distance Traveled: 0.30 km
Behavior and Additional Comments
Two groups with 15 animals in each plus a few outliers around each sub-group.
Saturday, June 9, 2012 Sighting $\#$ 4
Initial sighting on Track
Time:         11:01         WP#:         27         Lat:         35.411169         Long:         -74.502101
Vertical Angle:         1         Horizontal Bearing in Degrees:         100         Sighting Cue:         Body
On/Off Effort:         On         Trackline:         35         Beaufort Sea State:         3
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time:         11:04         WP#:         29         Lat:         35.412325         Long:         -74.494889
Species:Ziphius cavirostris         Numbers (Low/High/Best):         2 / 2 / 2
Features used in Species ID: Large body size, head conical shaped, small pectoral fins,
dorsal fin small and placed far back on the animals body.
Representative images used for Species ID: 35 & 37
Photographer:         Erin         Frame numbers:         35 - 40         Spacer:         41
Calculated distance from Trackline: 0.67 km
Final Time and Position of Sighting
Time: 11:10 WP#: 30 Lat: 35.414586 Long: -74.494338
Calculated Distance Traveled: 0.26 km
Behavior and Additional Comments
White head to animals. Two animals of different sizes.

Saturday, June 9, 2012 Sighting $\#$ 5
Initial sighting on Track
Time: 11:19 WP#: 33 Lat: 35.410281 Long: -74.853305
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 35 Beaufort Sea State: 3
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time:         11:20         WP#:         34         Lat:         35.409601         Long:         -74.851604
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best): 2/2/2
Features used in Species ID: Uniform grey coloration, robust body and dorsal fin.
Representative images used for Species ID: 44
Photographer:ErinFrame numbers:42 - 44Spacer:45Calculated distance from Trackline:0.17 km
Final Time and Position of Sighting
Time:         11:31         WP#:         35         Lat:         35.413182         Long:         -74.843687
Calculated Distance Traveled: 0.82 km
Behavior and Additional Comments
A pair of animals spending considerable time below the surface. Spent time locating and positioning
plane in order to get photographs.
Friday June 8 2012 Sighting $\#$ 6
Friday, June 8, 2012 Sighting # 6
Initial sighting on Track
Initial sighting on Track           Time:         13:41         WP#:         46         Lat:         36.123836         Long:         -74.425623
Initial sighting on TrackTime:13:41WP#:46Lat:36.123836Long:-74.425623Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:Body
Initial sighting on TrackTime:13:41WP#:46Lat:36.123836Long:-74.425623Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:3
Initial sighting on TrackTime:13:41WP#:46Lat:36.123836Long:-74.425623Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:ErinObserver side:Right
Initial sighting on Track         Time:       13:41       WP#:       46       Lat:       36.123836       Long:       -74.425623         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       45       Beaufort Sea State:       3         Observer:       Erin       Observer side:       Right
Initial sighting on TrackTime:13:41WP#:46Lat:36.123836Long:-74.425623Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:47Lat:36.128285Long:-74.414388
Initial sighting on TrackTime:13:41WP#:46Lat:36.123836Long:-74.425623Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:47Lat:36.128285Long:-74.414388Species:Globicephala macrorhynchusNumbers (Low/High/Best):5/10/8
Initial sighting on TrackTime:13:41WP#:46Lat:36.123836Long:-74.425623Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingImage: Sighting Cue:-74.414388Species:Globicephala macrorhynchusNumbers (Low/High/Best):5/10/8Features used in Species ID:Large black bodied animals with square heads, large broad based
Initial sighting on TrackTime:13:41WP#:46Lat:36.123836Long:-74.425623Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:47Lat:36.128285Long:-74.414388Species:Globicephala macrorhynchusNumbers (Low/High/Best):5/10/8
Initial sighting on TrackTime:13:41WP#:46Lat:36.123836Long:-74.425623Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:47Lat:36.128285Long:-74.414388Species:Globicephala macrorhynchusNumbers (Low/High/Best):5 / 10 / 85Features used in Species ID:Large black bodied animals with square heads, large broad baseddorsal fin place ~1/3 back the animals body. Pectoral fins do not extend past start of dorsal fin.
Initial sighting on TrackTime:13:41WP#:46Lat:36.123836Long:-74.425623Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:47Lat:36.128285Long:-74.414388Species:Globicephala macrorhynchusNumbers (Low/High/Best):5/10/8Features used in Species ID:Large black bodied animals with square heads, large broad baseddorsal fin place ~1/3 back the animals body.Pectoral fins do not extend past start of dorsal fin.Representative images used for Species ID:65, 67, 71, 73, 75
Initial sighting on TrackTime:13:41WP#:46Lat:36.123836Long:-74.425623Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:47Lat:36.128285Long:-74.414388Species:Globicephala macrorhynchusNumbers (Low/High/Best):5 / 10 / 8Features used in Species ID:Large black bodied animals with square heads, large broad baseddorsal fin place ~1/3 back the animals body. Pectoral fins do not extend past start of dorsal fin.Representative images used for Species ID:65, 67, 71, 73, 75Photographer:ErinFrame numbers:46 - 60Spacer:77
Initial sighting on TrackTime:13:41WP#:46Lat:36.123836Long:-74.425623Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:47Lat:36.128285Long:-74.414388Species:Globicephala macrorhynchusNumbers (Low/High/Best):5 / 10 / 8Features used in Species ID:Large black bodied animals with square heads, large broad baseddorsal fin place ~1/3 back the animals body.Pectoral fins do not extend past start of dorsal fin.Representative images used for Species ID:65, 67, 71, 73, 75Photographer:ErinFrame numbers:46 - 60Spacer:77Calculated distance from Trackline:1.12 km
Initial sighting on Track         Time:       13:41       WP#:       46       Lat:       36.123836       Long:       -74.425623         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       45       Beaufort Sea State:       3         Observer:       Erin       Observer side:       Right         Actual Time and Position of Sighting         Time:       13:45       WP#:       47       Lat:       36.128285       Long:       -74.414388         Species:       Globicephala macrorhynchus       Numbers (Low/High/Best):       5 / 10 / 8         Features used in Species ID:       Large black bodied animals with square heads, large broad based         dorsal fin place ~1/3 back the animals body. Pectoral fins do not extend past start of dorsal fin.         Representative images used for Species ID:       65, 67, 71, 73, 75         Photographer:       Erin       Frame numbers:       46 - 60       Spacer:       77         Calculated distance from Trackline:       1.12 km       Time       Time       Time       Time
Initial sighting on TrackTime:13:41WP#:46Lat:36.123836Long:-74.425623Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:47Lat:36.128285Long:-74.414388Species:Globicephala macrorhynchusNumbers (Low/High/Best):5 / 10 / 8Features used in Species ID:Large black bodied animals with square heads, large broad baseddorsal fin place ~1/3 back the animals body.Pectoral fins do not extend past start of dorsal fin.Representative images used for Species ID:65, 67, 71, 73, 75Photographer:ErinFrame numbers:46 - 60Spacer:77Calculated distance from Trackline:1.12 kmFinal Time and Position of SightingTime:13:56WP#:50Lat:36.124848Long:-74.422104
Initial sighting on TrackTime:13:41WP#:46Lat:36.123836Long:-74.425623Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:47Lat:36.128285Long:-74.414388Species:Globicephala macrorhynchusNumbers (Low/High/Best):5 / 10 / 8Features used in Species ID:Large black bodied animals with square heads, large broad baseddorsal fin place ~1/3 back the animals body.Pectoral fins do not extend past start of dorsal fin.Representative images used for Species ID:65, 67, 71, 73, 75Photographer:ErinFrame numbers:46 - 60Spacer:77Calculated distance from Trackline:1.12 kmFinal Time and Position of SightingTime:13:56WP#:50Lat:36.124848Long:-74.422104Calculated Distance Traveled:0.69 kmBehavior and Additional Comments
Initial sighting on TrackTime:13:41WP#:46Lat:36.123836Long:-74.425623Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:45Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:47Lat:36.128285Long:-74.414388Species:Globicephala macrorhynchusNumbers (Low/High/Best):5 / 10 / 8Features used in Species ID:Large black bodied animals with square heads, large broad baseddorsal fin place ~1/3 back the animals body. Pectoral fins do not extend past start of dorsal fin.Representative images used for Species ID:65, 67, 71, 73, 75Photographer:ErinFrame numbers:46 - 60Spacer:77Calculated distance from Trackline:1.12 kmFinal Time and Position of SightingTime:13:56WP#:50Lat:36.124848Long:-74.422104Calculated Distance Traveled:0.69 km

S	aturday,	June 9, 2012	Sigh	ting # 7				
Initial sighting on	Track		-	-				
Time: 13:41	WP#:	46 Lat:		36.123836	L	ong:	-74.425	623
Vertical Angle:	2 F	Horizontal Be	earing	in Degrees:	90	Sighting		Body
	Off	Tracklin	-	-	Beauf	ort Sea Sta		3
Observer: Erin	I	Observ	er sid	e: Right				
Actual Time and	Positio	n of Sighting	E					
	WP#:	0 0	-	36.131861	L	ong:	-74.410	493
Species:Grampus gri	seus —			Numbers (L		<u> </u>		8/7
Features used in S		D: Tall slender	dorsal					ase in
center. Animals with								
Representative ima	ages use	ed for Species	s ID:		51, 52	, 55, 56, 60		
Photographer: E	rin	Frame numb	ers:	61 - 76		Spacer:		77
Calculated distance	e from [	Frackline:		1.63 km				
Final Time and P	osition	of Sighting						
Time: 13:56	WP#:	50 Lat	:	36.124848	L	ong:	-74.422	104
Calculated Distanc	e Trave	eled:	1.30	) km		0		
Behavior and Ad	litional	Comments			_			
Animals observed wh			ŧ6					
		g on signing "						
S	aturday,	June 9, 2012	Sigh	ting # 8				
Initial sighting on			U	U				
	WP#:			36.018529	L	ong:	-74.471	665
Vertical Angle:			aring		_	0		Blow
On/Off Effort:			U U	44		ort Sea Sta		3
Observer: Erin	1			e: Right				
Actual Time and	 Positio				_			
Time: <u>14:08</u>				26.059001	Т	ong:	7/ /71	1/12
Species:Globicephal				Numbers (L		ong:		
Features used in Spectrum						- / /		2/2
fins to dorsal surface,	•							
Representative ima				ancie. Large se		, 81, 86	asca ac	// 50/ 1111.
Photographer: E	-	Frame numb		78 - 88	17	Spacer:		89
Calculated distance			<u> </u>	4.50 km		Space.		
Final Time and P				26 050527	т	0.00.01	74 464	(24
	WP#: _			36.058537	L	ong:	-74.464	624
Calculated Distanc			0.59	κm				
Behavior and Ad	ditional	Comments						
Animals surfacing wit	h front 1	/3 of body exiti	ng wa	ter with large ex	khales th	nat were clea	arly visil	ble.

Saturday, June 9, 2012 Sighting $\#$ 9
Initial sighting on Track
Time: 14:19 WP#: 58 Lat: 36.048791 Long: -74.642529
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Blow
On/Off Effort: On Trackline: 44 Beaufort Sea State: 3
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time:         14:20         WP#:         59         Lat:         36.048126         Long:         -74.642296
Species:Globicephala macrorhynchus         Numbers (Low/High/Best): 30 / 35 / 31
Features used in Species ID: Large square head, dark bodied except for lighter pigmentstion from
pectorals to peduncle, broad based dorsal fin ~1/3 back the animals body.
Representative images used for Species ID:90, 97, 99, 106, 113
Photographer:         Erin         Frame numbers:         90 - 113         Spacer:         114
Calculated distance from Trackline: 0.08 km
Final Time and Position of Sighting
Time:         14:24         WP#:         60         Lat:         36.056512         Long:         -74.642864
Calculated Distance Traveled: 0.93 km
Behavior and Additional Comments
Two groups, one of ~20 animals hanging at the surface and the second group of ~15 animals hanging
below the surface.
Saturday, June 9, 2012 Sighting # 10
Saturday, June 9, 2012 Sighting # 10 Initial sighting on Track
e e
Initial sighting on Track         Time:       14:27       WP#:       62       Lat:       36.047013       Long:       -74.733772         Vertical Angle:       3       Horizontal Bearing in Degrees:       110       Sighting Cue:       Splash
Initial sighting on TrackTime:14:27WP#:62Lat:36.047013Long:-74.733772Vertical Angle:3Horizontal Bearing in Degrees:110Sighting Cue:SplashOn/Off Effort:OnTrackline:44Beaufort Sea State:3
Initial sighting on Track         Time:       14:27       WP#:       62       Lat:       36.047013       Long:       -74.733772         Vertical Angle:       3       Horizontal Bearing in Degrees:       110       Sighting Cue:       Splash
Initial sighting on TrackTime:14:27WP#:62Lat:36.047013Long:-74.733772Vertical Angle:3Horizontal Bearing in Degrees:110Sighting Cue:SplashOn/Off Effort:OnTrackline:44Beaufort Sea State:3
Initial sighting on Track         Time:       14:27       WP#:       62       Lat:       36.047013       Long:       -74.733772         Vertical Angle:       3       Horizontal Bearing in Degrees:       110       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       44       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Left
Initial sighting on Track         Time:       14:27       WP#:       62       Lat:       36.047013       Long:       -74.733772         Vertical Angle:       3       Horizontal Bearing in Degrees:       110       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       44       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Left         Actual Time and Position of Sighting       Image: Sighting       Sighting
Initial sighting on TrackTime:14:27WP#:62Lat:36.047013Long:-74.733772Vertical Angle:3Horizontal Bearing in Degrees:110Sighting Cue:SplashOn/Off Effort:OnTrackline:44Beaufort Sea State:3Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:33WP#:63Lat:36.049014Long:-74.720814
Initial sighting on Track         Time:       14:27       WP#:       62       Lat:       36.047013       Long:       -74.733772         Vertical Angle:       3       Horizontal Bearing in Degrees:       110       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       44       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Left         Actual Time and Position of Sighting         Time:       14:33       WP#:       63       Lat:       36.049014       Long:       -74.720814         Species:       Turnsiops truncatus       Numbers (Low/High/Best):       31 / 28 / 29       Features used in Species ID:       Uniform grey coloration, robust body appearance, white peduncle         coloration on peduncle.       Uniform grey coloration, robust body appearance, white peduncle       Coloration on peduncle.
Initial sighting on TrackTime:14:27WP#:62Lat:36.047013Long:-74.733772Vertical Angle:3Horizontal Bearing in Degrees:110Sighting Cue:SplashOn/Off Effort:OnTrackline:44Beaufort Sea State:3Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:33WP#:63Lat:36.049014Long:-74.720814Species:TurncatusNumbers (Low/High/Best):31 / 28 / 29Features used in Species ID:Uniform grey coloration, robust body appearance, white pedunclecoloration on peduncle.Representative images used for Species ID:124, 125, 131, 136, 137
Initial sighting on TrackTime:14:27WP#:62Lat:36.047013Long:-74.733772Vertical Angle:3Horizontal Bearing in Degrees:110Sighting Cue:SplashOn/Off Effort:OnTrackline:44Beaufort Sea State:3Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:33WP#:63Lat:36.049014Long:-74.720814Species:Tursiops truncatusNumbers (Low/High/Best):31 / 28 / 29Features used in Species ID:Uniform grey coloration, robust body appearance, white pedunclecoloration on peduncle.Representative images used for Species ID:124, 125, 131, 136, 137Photographer:ErinFrame numbers:115 - 139Spacer:140
Initial sighting on TrackTime:14:27WP#:62Lat:36.047013Long:-74.733772Vertical Angle:3Horizontal Bearing in Degrees:110Sighting Cue:SplashOn/Off Effort:OnTrackline:44Beaufort Sea State:3Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:33WP#:63Lat:36.049014Long:-74.720814Species:TurncatusNumbers (Low/High/Best):31 / 28 / 29Features used in Species ID:Uniform grey coloration, robust body appearance, white pedunclecoloration on peduncle.Representative images used for Species ID:124, 125, 131, 136, 137
Initial sighting on TrackTime:14:27WP#:62Lat:36.047013Long:-74.733772Vertical Angle:3Horizontal Bearing in Degrees:110Sighting Cue:SplashOn/Off Effort:OnTrackline:44Beaufort Sea State:3Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:33WP#:63Lat:36.049014Long:-74.720814Species:Tursiops truncatusNumbers (Low/High/Best):31 / 28 / 29Features used in Species ID:Uniform grey coloration, robust body appearance, white pedunclecoloration on peduncle.Representative images used for Species ID:124, 125, 131, 136, 137Photographer:ErinFrame numbers:115 - 139Spacer:140
Initial sighting on TrackTime:14:27WP#:62Lat:36.047013Long:-74.733772Vertical Angle:3Horizontal Bearing in Degrees:110Sighting Cue:SplashOn/Off Effort:OnTrackline:44Beaufort Sea State:3Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:33WP#:63Lat:36.049014Long:-74.720814Species:Tursiops truncatusNumbers (Low/High/Best):31/28/29Features used in Species ID:Uniform grey coloration, robust body appearance, white pedunclecoloration on peduncle.Representative images used for Species ID:124, 125, 131, 136, 137Photographer:ErinFrame numbers:115 - 139Spacer:140Calculated distance from Trackline:1.19 km1.19 km1.19 km1.19 km1.19 km1.19 km
Initial sighting on Track         Time:       14:27       WP#:       62       Lat:       36.047013       Long:       -74.733772         Vertical Angle:       3       Horizontal Bearing in Degrees:       110       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       44       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Left       44       Beaufort Sea State:       3         Actual Time and Position of Sighting       Time:       14:33       WP#:       63       Lat:       36.049014       Long:       -74.720814         Species:       Tursiops truncatus       Numbers (Low/High/Best):       31 / 28 / 29       Features used in Species ID:       Uniform grey coloration, robust body appearance, white peduncle         coloration on peduncle.       Representative images used for Species ID:       124, 125, 131, 136, 137         Photographer:       Erin       Frame numbers:       115 - 139       Spacer:       140         Calculated distance from Trackline:       1.19 km       Internet and Position of Sighting       Internet and Position of Sighting
Initial sighting on TrackTime:14:27WP#:62Lat:36.047013Long:-74.733772Vertical Angle:3Horizontal Bearing in Degrees:110Sighting Cue:SplashOn/Off Effort:OnTrackline:44Beaufort Sea State:3Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:33WP#:63Lat:36.049014Long:-74.720814Species:Tursiops truncatusNumbers (Low/High/Best):31 / 28 / 29Features used in Species ID:Uniform grey coloration, robust body appearance, white pedunclecoloration on peduncle.Representative images used for Species ID:124, 125, 131, 136, 137Photographer:ErinFrame numbers:115 - 139Spacer:140Calculated distance from Trackline:1.19 kmInternet and Position of SightingInternet and Position of SightingTime:14:36WP#:64Lat:36.051145Long:-74.725803
Initial sighting on TrackTime:14:27WP#:62Lat:36.047013Long:-74.733772Vertical Angle:3Horizontal Bearing in Degrees:110Sighting Cue:SplashOn/Off Effort:OnTrackline:44Beaufort Sea State:3Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:33WP#:63Lat:36.049014Long:-74.720814Species:FurnicatusNumbers (Low/High/Best):31/28/29Features used in Species ID:Uniform grey coloration, robust body appearance, white pedunclecoloration on peduncle.Representative images used for Species ID:124, 125, 131, 136, 137Photographer:ErinFrame numbers:115 - 139Spacer:140Calculated distance from Trackline:1.19 kmFinal Time and Position of SightingTime:14:36WP#:64Lat:36.051145Long:-74.725803Calculated Distance Traveled:0.51 km0.51 km0.51 km
Initial sighting on TrackTime:14:27WP#:62Lat:36.047013Long:-74.733772Vertical Angle:3Horizontal Bearing in Degrees:110Sighting Cue:SplashOn/Off Effort:OnTrackline:44Beaufort Sea State:3Observer:RyanObserver side:LeftActual Time and Position of SightingTime:14:33WP#:63Lat:36.049014Long:-74.720814Species:Tursiops truncatusNumbers (Low/High/Best):31 / 28 / 29Features used in Species ID:Uniform grey coloration, robust body appearance, white pedunclecoloration on peduncle.Representative images used for Species ID:124, 125, 131, 136, 137Photographer:ErinFrame numbers:115 - 139Spacer:140Calculated distance from Trackline:1.19 kmFinal Time and Position of SightingTime:14:36WP#:64Lat:36.051145Long:-74.725803Calculated Distance Traveled:0.51 km

Animals displayed white peduncles.

Saturday, June 9, 2012 Sighting $\#$ 11
Initial sighting on Track
Time: 15:03 WP#: 71 Lat: 35.978561 Long: -74.659583
Vertical Angle: <u>3</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Jump</u>
On/Off Effort: On Trackline: 43 Beaufort Sea State: 3
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time: 15:04 WP#: 72 Lat: 35.958967 Long: -74.654650
Species: Tursiops truncatus Numbers (Low/High/Best): 20/23/21
Features used in Species ID: Robust body appearance, uniform grey coloration.
Representative images used for Species ID: 143, 145, 148
Photographer: Erin Frame numbers: 141 - 149 Spacer: 150
Calculated distance from Trackline: 2.22 km
Final Time and Position of Sighting
Time: 15:08 WP#: 73 Lat: 35.967823 Long: -74.652794
Calculated Distance Traveled: 1.00 km
Behavior and Additional Comments
Animals traveling on either side of a sargassum line with lots of splashing at the surface. Animals we
well dispersed from one another but all were exhibiting similar behavior.
Saturday, June 9, 2012 Sighting # 12Initial sighting on TrackTime:15:11WP#:75Lat:35.983204Long:-74.510706Vertical Angle:3Horizontal Bearing in Degrees:110Sighting Cue:Body
On/Off Effort: On Trackline: 43 Beaufort Sea State: 3
Deadloft Sea State.
Observer: Rvan Observer side: Left
Actual Time and Position of Sighting
Actual Time and Position of Sighting         Time:       15:16       WP#:       76       Lat:       35.996854       Long:       -74.512985
Actual Time and Position of Sighting         Time: 15:16       WP#: 76       Lat: 35.996854       Long: -74.512985         Species: Tursiops truncatus       Numbers (Low/High/Best): 18 / 25 / 22
Actual Time and Position of Sighting         Time: 15:16       WP#: 76       Lat: 35.996854       Long: -74.512985         Species: Tursiops truncatus       Numbers (Low/High/Best): 18 / 25 / 22
Actual Time and Position of Sighting         Time:       15:16       WP#:       76       Lat:       35.996854       Long:       -74.512985         Species:       Tursiops truncatus       Numbers (Low/High/Best):       18 / 25 / 22         Features used in Species ID:       Robust body appearance, white peduncle coloration, uniform grey
Actual Time and Position of Sighting         Time: 15:16       WP#: 76       Lat: 35.996854       Long: -74.512985         Species: Tursiops truncatus       Numbers (Low/High/Best): 18 / 25 / 22         Features used in Species ID: Robust body appearance, white peduncle coloration, uniform grey         Representative images used for Species ID: 162, 165, 170
Actual Time and Position of Sighting         Time:       15:16       WP#:       76       Lat:       35.996854       Long:       -74.512985         Species:       Tursiops truncatus       Numbers (Low/High/Best):       18 / 25 / 22         Features used in Species ID:       Robust body appearance, white peduncle coloration, uniform grey         Representative images used for Species ID:       162, 165, 170         Photographer:       Erin       Frame numbers:       151 - 173
Actual Time and Position of Sighting         Time: 15:16       WP#: 76       Lat: 35.996854       Long: -74.512985         Species: Tursiops truncatus       Numbers (Low/High/Best): 18 / 25 / 22         Features used in Species ID: Robust body appearance, white peduncle coloration, uniform grey         Representative images used for Species ID: 162, 165, 170         Photographer: Erin       Frame numbers: 151 - 173       Spacer: 174         Calculated distance from Trackline: 1.53 km
Actual Time and Position of Sighting         Time:       15:16       WP#:       76       Lat:       35.996854       Long:       -74.512985         Species:       Tursiops truncatus       Numbers (Low/High/Best):       18 / 25 / 22         Features used in Species ID:       Robust body appearance, white peduncle coloration, uniform grey         Representative images used for Species ID:       162, 165, 170         Photographer:       Erin       Frame numbers:       151 - 173         Calculated distance from Trackline:       1.53 km         Final Time and Position of Sighting
Actual Time and Position of Sighting         Time:       15:16       WP#:       76       Lat:       35.996854       Long:       -74.512985         Species:       Tursiops truncatus       Numbers (Low/High/Best):       18/25/22         Features used in Species ID:       Robust body appearance, white peduncle coloration, uniform grey         Representative images used for Species ID:       162, 165, 170         Photographer:       Erin       Frame numbers:       151 - 173       Spacer:       174         Calculated distance from Trackline:       1.53 km       1.53 km       Final Time and Position of Sighting         Time:       15:26       WP#:       77       Lat:       35.995329       Long:       -74.508584
Actual Time and Position of Sighting         Time:       15:16       WP#:       76       Lat:       35.996854       Long:       -74.512985         Species:       Tursiops truncatus       Numbers (Low/High/Best):       18 / 25 / 22         Features used in Species ID:       Robust body appearance, white peduncle coloration, uniform grey         Representative images used for Species ID:       162, 165, 170         Photographer:       Erin       Frame numbers:       151 - 173         Calculated distance from Trackline:       1.53 km         Final Time and Position of Sighting         Time:       15:26       WP#:       77         Calculated Distance Traveled:       0.43 km
Actual Time and Position of Sighting         Time: 15:16       WP#: 76       Lat: 35.996854       Long: -74.512985         Species: Tursiops truncatus       Numbers (Low/High/Best): 18 / 25 / 22         Features used in Species ID: Robust body appearance, white peduncle coloration, uniform grey         Representative images used for Species ID: 162, 165, 170         Photographer: Erin       Frame numbers: 151 - 173         Spacer: 174         Calculated distance from Trackline: 1.53 km         Final Time and Position of Sighting         Time: 15:26       WP#: 77         Lat: 35.995329       Long: -74.508584         Calculated Distance Traveled: 0.43 km         Behavior and Additional Comments
Actual Time and Position of Sighting         Time:       15:16       WP#:       76       Lat:       35.996854       Long:       -74.512985         Species:       Tursiops truncatus       Numbers (Low/High/Best):       18 / 25 / 22         Features used in Species ID:       Robust body appearance, white peduncle coloration, uniform grey         Representative images used for Species ID:       162, 165, 170         Photographer:       Erin       Frame numbers:       151 - 173       Spacer:       174         Calculated distance from Trackline:       1.53 km         Final Time and Position of Sighting         Time:       15:26       WP#:       77       Lat:       35.995329       Long:       -74.508584         Calculated Distance Traveled:       0.43 km       0.43 km       M       0.43 km         Behavior and Additional Comments       Group traveling at moderate speed at the surface. Changed behavior by diving from the surface to
Actual Time and Position of Sighting         Time: 15:16       WP#: 76       Lat: 35.996854       Long: -74.512985         Species: Tursiops truncatus       Numbers (Low/High/Best): 18 / 25 / 22         Features used in Species ID: Robust body appearance, white peduncle coloration, uniform grey         Representative images used for Species ID: 162, 165, 170         Photographer: Erin       Frame numbers: 151 - 173         Spacer: 174         Calculated distance from Trackline: 1.53 km         Final Time and Position of Sighting         Time: 15:26       WP#: 77         Lat: 35.995329       Long: -74.508584         Calculated Distance Traveled: 0.43 km         Behavior and Additional Comments

	Saturday	y, June 9	, 2012 Sigh	ting # 13		
Initial sighting	on Trac	k	-	-		
Time: 15:42	WP#:	81	Lat:	35.913096	Long:	-74.634989
Vertical Angle:					90 Sighting	g Cue: Splash
On/Off Effort: _		-	rackline:		Beaufort Sea S	tate: <u>3</u>
Observer: E	rin	C	bserver sid	e: Right		
Actual Time an	d Positi	on of Si	ghting			
Time: 15:43	WP#:	82	Lat:	35.922541	Long:	-74.638361
Species:Globiceph					Low/High/Best)	
Features used in			bodied anim	nals, large squar	e head, broad bas	ed dorsal fin
placed ~1/3 back t						
Representative i	•			175 100	175 & 179	101
Photographer:			numbers: _	175 - 180 1.09 km	Space	r: <u>181</u>
Calculated distan				1.09 KIII		
Final Time and		_	-			
Time: 15:45	WP#:		Lat:	35.918940	Long:	-74.630591
Calculated Dista	nce Trav	veled:	0.8	1 km		
<b>Behavior and A</b>	ddition	al Comi	nents			
Pair of animals of u	nequal lei	ngth.				
	Coturdo		2042 0:-1	4:		
Initial sighting			, 2012 Sign	ting # 14		
Initial sighting			Lat:	25 000150	Longi	74 000601
Time: <u>15:51</u> Vertical Angle:		85			Long:	
On/Off Effort:			rackline:		Beaufort Sea S	g Cue: Body State: 3
	irin		bserver sid		Deautort Sea S	
					_	
Actual Time an			0 0		T	
Time: <u>15:54</u>					_ •	-74.814962
Species:Globiceph Features used in				,	Low/High/Best)	
placed ~1/3 back t	-		c bodied anim	iais, large squar	e nead, broad bas	ed dorsal lin
Representative i			Species ID:		188	
Photographer:	-		numbers:	182 - 188		r: 189
Calculated dista			-	0.97 km		1. 105
Final Time and		-		25 01 4020	Longi	74 000104
Time: <u>16:00</u>	WP#:		Lat:	35.914920	Long:	-74.822184
Calculated Dista				5 km		
Behavior and A						
Two aroups logain	a at the su	urface, ha	nging vertica	l in the water co	olumn with their h	eads at surface and

tails deeper.

	Sunday	, June 10,	2012 Sig	ghting # 1				
Initial sighting	on Trac	k	-					
Time: 10:52	WP#:	88	Lat:	35.831550	Long	g:	74.975	112
Vertical Angle:	1	Horizon	tal Beari	ng in Degrees:	90 Si	ghting (	Cue:	Body
On/Off Effort:	On	Ti	rackline:	41	Beaufort	Sea Sta	te:	2
Observer: E	rin	0	bserver s	side: Left				
Actual Time an	d Positi	on of Sig	ghting					
Time: 10:55				35.834870	Long	g: -	74.987	720
Species:Tursiops t	runcatus			Numbers (1	Low/High/	Best):	7 /	10/8
Features used in	Species	ID: Robu	ıst, uniforn	n gray animals				
Representative i								
Photographer:						Spacer:		46
Calculated distant	nce from	n Tracklin	ne:	1.20 km				
Final Time and	Positio	n of Sigh	iting					
Time: <u>11:00</u>	WP#:	90	Lat:	35.835809	Long	g:	74.989	839
Calculated Dista	ince Tra	veled:	0	.22 km				
Behavior and A	ddition	al Comn	nents					
Tight group, not tra	aveling fa	st. Lots of	rolling.					
Initial sighting Time: <u>11:08</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>R</u> Actual Time an Time: <u>11:08</u> Species: <i>Globiceph</i> Features used in Representative i	on Trac WP#: 2 On yan d Positi WP#: aala macro Species	k <u>93</u> Horizon Tr O on of Sig 94 orhynchus ID: Largu	Lat: tal Beari rackline: bserver s <b>ghting</b> Lat: e black ani	41 side: Right 35.823113 Numbers (J mals with blunt h	90 Si Beaufort Long Low/High/	Sea Sta g: Best): _ ge dorsal	Cue:	Blow 2
Photographer:	Ryan		numbers			Spacer:		76
Calculated distan	<u> </u>	Tracklin	ne.	0.97 km		1		
	nce from	I I I ackin	IC.					
Final Time and								
Final Time and Time: 11:13	Positio	n of Sigh	iting		Long	r: -	74,675	158
Time: 11:13	Positio WP#:	n of Sigh 95	ting Lat:	35.824732	Long		-74.675	158
Time: <u>11:13</u> Calculated Dista	Positio WP#: ince Tra	n of Sigh	nting Lat:0		Long	g: <u> </u>	-74.675	158
Time: <u>11:13</u> Calculated Dista <b>Behavior and</b> A	Positio WP#: ince Tra ddition	n of Sigh  veled: al Comm	ting Lat: 0 nents	35.824732 ).18 km	Long	g:	74.675	158
Time: <u>11:13</u> Calculated Dista	Positio WP#: ince Tra ddition	n of Sigh  veled: al Comm	ting Lat: 0 nents	35.824732 ).18 km	Long	; <u> </u>	74.675	158

	Sunday,	June 10, 2	2012 Sigl	nting # 3		
Initial sighting	on Trac	k	-	-		
Time: 11:20	WP#:	99	Lat:	35.836200	Long:	-74.370563
Vertical Angle:	3				110 Sighting	Cue: Splash
On/Off Effort: _	On	Tra	ackline:	41	Beaufort Sea St	ate:4
Observer: R	yan	Ob	oserver sic	le: Right		
Actual Time an	id Positi	on of Sig	hting			
Time: 11:21	WP#:	100	Lat:	35.830699	Long:	-74.380440
Species:Tursiops t					Low/High/Best):	30 / 45 / 40
Features used in	Species	ID: <u>Robus</u>	st, uniform	gray animals		
<b></b>		1.0 0				
Representative i					87, 93, 94	122
Photographer:					Spacer	133
Calculated dista				1.08 km		
Final Time and		0	0			
Time: <u>11:29</u>	-				Long:	-74.370434
Calculated Dista				4 km	1	
Behavior and A						
Traveling just belo	w the surfa	ace, lots of	splashing.			
	Sunday	June 10	2012 Sigl	nting # 4		
Initial sighting			51 <u>5</u> 1	iting //		
Time: 11:47			Lat:	35.763063	Long:	-74.833116
Vertical Angle:	-					
On/Off Effort:			ackline:		Beaufort Sea St	
Observer:	rin			le: Left		
Actual Time an	d Positi	on of Sig	hting			
Time: 11:53		-	-	35 767227	Long:	-74.830361
Species:Globicepl					Low/High/Best):	
1 ,			black to da	× .	with a blunt head a	
fin	-					
Representative i	mages us	sed for Sp	becies ID:		136	
Photographer:			numbers:	134 - 142	2 Spacer	: 143
Calculated dista	nce from	Tracklin	e:	0.53 km		
Final Time and	Position	n of Sight	ting			
Time: 12:04	WP#:	108	Lat:	35.764918	Long:	-74.806705
Calculated Dista	ince Trav	veled:	2.1	5 km		
Behavior and A	ddition	al Comm	ents			
Just below the surf						
			. ,			

	Sunday	, June 10	), 2012 §	Sigh	ting $\#$ 5					
Initial sighting	g on Trac	k		-	-					
Time: 13:53	WP#:	117	Lat:		35.689403		Long:		-74.806	818
Vertical Angle:	2	Horizo	ntal Bea	ring	in Degrees:	90	Sigh	ting (	Cue:	Body
On/Off Effort:	On	Г	rackline	e:	39	Bea	ufort Se	a Sta	te:	2
Observer:	Erin	(	Observer	r sid	e: Left					
Actual Time a	nd Positi	on of Si	ghting							
Time: 13:54	WP#:	118	Lat:		35.689751		Long:	-	74.809	128
Species:Globicer	hala macr	orhynchus	5 -		Numbers (I	Low/	High/Be	est):	38/	50 / 45
Features used in	n Species	ID: Larg	ge dark gi	ray to	black animal v	vith b	lunt head	ls and	large d	lorsal
fin with light gray	suspende	rs								
Representative		sed for S	Species	ID:			155			
Photographer:			e numbe		153 - 190	)	Spa	acer:	1	191
Calculated dista	ance from	n Trackli	ine:		0.21 km					
Final Time and	d Positio	n of Sig	hting							
Time: 14:01	WP#:	119	Lat:		35.690589		Long:		-74.792	155
Calculated Dist	ance Tra	veled:		1.54	↓ km		-			
Behavior and	Addition	al Com	ments							
Logging at the su				There	e were also a gro	oup o	f hamme	rhead	sharks	and
manta rays in the			<u> </u>							
	Sunday	, June 10	), 2012 S	Sigh	ting # 6					
Initial sighting	g on Trac	k								
Time: 14:08		123	-		35.691800		Long:			676
Vertical Angle:				-			_ 0	-		Body
On/Off Effort:			rackline			Bea	ufort Se	a Sta	te:	3
Observer:	Ryan	(	Observer	r sid	e: Right					
Actual Time a	nd Positi	on of Si	ghting							
Time: 14:09	WP#:	124	Lat:		35.689615		Long:	-	74.553	820
Species:Tursiops			_		Numbers (I				28 /	38 / 35
Features used in	n Species	ID: Rob	ust unifo	rm g	ray animals witl	h whi	te peduno	cles		
Representative	•		-				, 198, 212	2, 231		
Photographer:			e numbe	rs:	192 - 238	3	Spa	acer:	4	239
Calculated dista	ance from	n Trackli	ine:		0.26 km					
Final Time and	d Positio	n of Sig	hting							
Time: 14:13	WP#:	125	Lat:		35.687696		Long:		-74.545	975
Calculated Dist	ance Tra	veled:	-	0.74	l km		_			
Behavior and	Addition	al Com	ments							
Tightly packed gr				surfa	ce. Two subaro	ups				
5) parenear gr										

Sunday, June 10, 2012 ${ m Sig}$	hting # 7
Initial sighting on Track	-
Time: <u>14:31</u> WP#: <u>129</u> Lat:	35.622672 Long: -74.661796
Vertical Angle: 2 Horizontal Bearing	
On/Off Effort: <u>On</u> Trackline:	38 Beaufort Sea State: 3
Observer: Ryan Observer s	ide: <u>Right</u>
Actual Time and Position of Sighting	
Time: 14:32 WP#: 130 Lat:	35.622873 Long: -74.662187
Species:Stenella frontalis	Numbers (Low/High/Best): 20 / 30 / 25
Features used in Species ID: Slender, light gr	ay body with blaze ending at mid dorsal fin
Representative images used for Species ID	
Photographer: Ryan Frame numbers:	-
Calculated distance from Trackline:	0.04 KIII
Final Time and Position of Sighting	
Time:         14:49         WP#:         131         Lat:	
	77 km
Behavior and Additional Comments	
Traveling fast just beneath the surface, 2 groups	
Sunday, June 10, 2012 ${ m Sig}$	unting # 8
Initial sighting on Track	fitting # 0
Time: 14:52 WP#: 133 Lat:	35.623620 Long: -74.768107
Vertical Angle: 2 Horizontal Bearing	
On/Off Effort: On Trackline:	
	ide: Left
Actual Time and Position of Sighting	
Time: <u>N/A</u> WP#: <u>N/A</u> Lat:	N/A Long: N/A
Species: Ziphius cavirostris	Numbers (Low/High/Best): 1/1/1
1	e scaring, brownish colored head, small pectorals,
dorsal fin set way back on body	
Representative images used for Species ID	: N/A
Photographer: <u>N/A</u> Frame numbers:	N/A Spacer: N/A
Calculated distance from Trackline:	N/A
Final Time and Position of Sighting	
Time: 14:56 WP#: 134 Lat:	35.614247 Long: -74.760269
Calculated Distance Traveled:	N/A
Behavior and Additional Comments	
No resight, white bodied, brown peduncle and flu	ike possible Zca
to resigne, while bouled, brown peddhele and he	

Sunday, June 10, 2012 Sighting $\#$ 9
Initial sighting on Track
Time: 15:26 WP#: 144 Lat: 35.550242 Long: -74.568120
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 37 Beaufort Sea State: 3
Observer: Erin Observer side: Left
Actual Time and Position of Sighting
Time: 15:27 WP#: 145 Lat: 35.557147 Long: -74.574964
Species: Tursiops truncatusNumbers (Low/High/Best):25 / 40 / 35
Features used in Species ID: Robust, uniform gray animal
Representative images used for Species ID: 299, 300, 305, 308, 309, 320, 321
Photographer:    Ryan    Frame numbers:    294 - 323    Spacer:    324
Calculated distance from Trackline: 0.99 km
Final Time and Position of Sighting
Time: 15:30 WP#: 146 Lat: 35.554908 Long: -74.567186
Calculated Distance Traveled: 0.75 km
Behavior and Additional Comments
2 groups, lots of splashing, traveling just below the surface, some scattered.
Sunday, June 10, 2012 Sighting $\#$ 10
Initial sighting on Track
Time:         15:35         WP#:         148         Lat:         35.549766         Long:         -74.456180
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort:         On         Trackline:         37         Beaufort Sea State:         3
On/Off Effort:         On         Trackline:         37         Beaufort Sea State:         3
On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       3         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting
On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       3         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting
On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       3         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       15:34       WP#:       149       Lat:       35.556768       Long:       -74.461219
On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       3         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       15:34       WP#:       149       Lat:       35.556768       Long:       -74.461219         Species:       Stenella clymene       Numbers (Low/High/Best):       80 / 115 / 100         Features used in Species ID:       Sharp pointed rostrum with black down center and edges
On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       3         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       15:34       WP#:       149       Lat:       35.556768       Long:       -74.461219         Species:       Stenella clymene       Numbers (Low/High/Best):       80 / 115 / 100         Features used in Species ID:       Sharp pointed rostrum with black down center and edges         Representative images used for Species ID:       334, 337, 350, 351, 353, 355-357, 359, 362, 374
On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       3         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       15:34       WP#:       149       Lat:       35.556768       Long:       -74.461219         Species:       Stenella clymene       Numbers (Low/High/Best):       80 / 115 / 100         Features used in Species ID:       Sharp pointed rostrum with black down center and edges         Representative images used for Species ID:       334, 337, 350, 351, 353, 355-357, 359, 362, 374         Photographer:       Ryan       Frame numbers:       325 - 379       Spacer:       380
On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       3         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       15:34       WP#:       149       Lat:       35.556768       Long:       -74.461219         Species:       Stenella clymene       Numbers (Low/High/Best):       80 / 115 / 100         Features used in Species ID:       Sharp pointed rostrum with black down center and edges         Representative images used for Species ID:       334, 337, 350, 351, 353, 355-357, 359, 362, 374         Photographer:       Ryan       Frame numbers:       325 - 379       Spacer:       380         Calculated distance from Trackline:       0.90 km       0.90 km       0.90 km       0.90 km
On/Off Effort:       On       Trackline:       37       Beaufort Sea State:       3         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       15:34       WP#:       149       Lat:       35.556768       Long:       -74.461219         Species:       Stenella clymene       Numbers (Low/High/Best):       80 / 115 / 100         Features used in Species ID:       Sharp pointed rostrum with black down center and edges         Representative images used for Species ID:       334, 337, 350, 351, 353, 355-357, 359, 362, 374         Photographer:       Ryan       Frame numbers:       325 - 379       Spacer:       380         Calculated distance from Trackline:       0.90 km       90 km       M
On/Off Effort:OnTrackline:37Beaufort Sea State:3Observer:ErinObserver side:LeftActual Time and Position of SightingTime:15:34WP#:149Lat:35.556768Long:-74.461219Species:Stenella clymeneNumbers (Low/High/Best):80/115/100Features used in Species ID:Sharp pointed rostrum with black down center and edgesRepresentative images used for Species ID:334, 337, 350, 351, 353, 355-357, 359, 362, 374Photographer:RyanFrame numbers:325 - 379Spacer:380Calculated distance from Trackline:0.90 km90 kmFinal Time and Position of SightingTime:15:39WP#:150Lat:35.560398Long:-74.453310
On/Off Effort:OnTrackline:37Beaufort Sea State:3Observer:ErinObserver side:LeftActual Time and Position of SightingTime:15:34WP#:149Lat:35.556768Long:-74.461219Species:Stenella clymeneNumbers (Low/High/Best):80 / 115 / 100Features used in Species ID:Sharp pointed rostrum with black down center and edgesRepresentative images used for Species ID:334, 337, 350, 351, 353, 355-357, 359, 362, 374Photographer:RyanFrame numbers:325 - 379Spacer:380Calculated distance from Trackline:0.90 km
On/Off Effort:OnTrackline:37Beaufort Sea State:3Observer:ErinObserver side:LeftActual Time and Position of SightingTime:15:34WP#:149Lat:35.556768Long:-74.461219Species:Stenella clymeneNumbers (Low/High/Best):80/115/100Features used in Species ID:Sharp pointed rostrum with black down center and edgesRepresentative images used for Species ID:334, 337, 350, 351, 353, 355-357, 359, 362, 374Photographer:RyanFrame numbers:325 - 379Spacer:380Calculated distance from Trackline:0.90 km90 kmFinal Time and Position of SightingTime:15:39WP#:150Lat:35.560398Long:-74.453310
On/Off Effort:OnTrackline:37Beaufort Sea State:3Observer:ErinObserver side:LeftActual Time and Position of SightingTime:15:34WP#:149Lat:35.556768Long:-74.461219Species:Stenella clymeneNumbers (Low/High/Best):80 / 115 / 100Features used in Species ID:Sharp pointed rostrum with black down center and edgesRepresentative images used for Species ID:334, 337, 350, 351, 353, 355-357, 359, 362, 374Photographer:RyanFrame numbers:325 - 379Spacer:380Calculated distance from Trackline:0.90 km
On/Off Effort:OnTrackline:37Beaufort Sea State:3Observer:ErinObserver side:LeftActual Time and Position of SightingTime:15:34WP#:149Lat:35.556768Long:-74.461219Species:Stenella clymeneNumbers (Low/High/Best):80/115/100Features used in Species ID:Sharp pointed rostrum with black down center and edgesRepresentative images used for Species ID:334, 337, 350, 351, 353, 355-357, 359, 362, 374Photographer:RyanFrame numbers:325 - 379Spacer:380Calculated distance from Trackline:0.90 kmFinal Time and Position of SightingTime:15:39WP#:150Lat:35.560398Long:-74.453310Calculated Distance Traveled:0.82 kmBehavior and Additional Comments80Calculated Comments
Thursday, August 30, 2012 $\mathbf{Sighting} \# 1$
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Initial sighting on Track
Time: 10:10 WP#: 5 Lat: 34.54738 Long: -75.536078
Vertical Angle: <u>1</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Bod</u>
On/Off Effort: On Trackline: 21 Beaufort Sea State: 3
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time: 10:14 WP#: 6 Lat: 34.54913 Long: -75.543718
Species:Unidentified Mesoplodon         Numbers (Low/High/Best):         3/3/3
Features used in Species ID: Robust body, small dorsal and pectoral fins, tapered head to rostru
Representative images used for Species ID:NA
Photographer: Erin Frame numbers: NA Spacer: NA
Calculated distance from Trackline: 0.73 km
Final Time and Position of Sighting
Time:         10:17         WP#:         7         Lat:         34.54519         Long:         -75.54737
Calculated Distance Traveled: 0.55 km
Behavior and Additional Comments
Final position is assumed location, animals only sighted once.
Brownish body coloration, big bodies with small pectoral fins. All animals uniform in color and size.
Thursday, August 30, 2012 Sighting # 2
Initial sighting on Track
Initial sighting on Track           Time:         13:44         WP#:         28         Lat:         35.61682         Long:         -74.881575
Initial sighting on TrackTime:13:44WP#:28Lat:35.61682Long:-74.881575Vertical Angle:2Horizontal Bearing in Degrees:45Sighting Cue:Spla
Initial sighting on TrackTime:13:44WP#:28Lat:35.61682Long:-74.881575Vertical Angle:2Horizontal Bearing in Degrees:45Sighting Cue:SplaOn/Off Effort:OnTrackline:38Beaufort Sea State:2
Initial sighting on TrackTime:13:44WP#:28Lat:35.61682Long:-74.881575Vertical Angle:2Horizontal Bearing in Degrees:45Sighting Cue:SplaOn/Off Effort:OnTrackline:38Beaufort Sea State:2Observer:ErinObserver side:Right
Initial sighting on Track         Time:       13:44       WP#:       28       Lat:       35.61682       Long:       -74.881575         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Spla         On/Off Effort:       On       Trackline:       38       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Right         Actual Time and Position of Sighting
Initial sighting on TrackTime:13:44WP#:28Lat:35.61682Long:-74.881575Vertical Angle:2Horizontal Bearing in Degrees:45Sighting Cue:SplaOn/Off Effort:OnTrackline:38Beaufort Sea State:2Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:29Lat:35.60842Long:-74.87663
Initial sighting on TrackTime:13:44WP#:28Lat:35.61682Long:-74.881575Vertical Angle:2Horizontal Bearing in Degrees:45Sighting Cue:SplaOn/Off Effort:OnTrackline:38Beaufort Sea State:2Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:29Lat:35.60842Long:-74.87663Species:Tursiops truncatusNumbers (Low/High/Best):23 / 35 / 3
Initial sighting on TrackTime:13:44WP#:28Lat:35.61682Long:-74.881575Vertical Angle:2Horizontal Bearing in Degrees:45Sighting Cue:SplaOn/Off Effort:OnTrackline:38Beaufort Sea State:2Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:29Lat:35.60842Long:-74.87663
Initial sighting on Track         Time:       13:44       WP#:       28       Lat:       35.61682       Long:       -74.881575         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Spla         On/Off Effort:       On       Trackline:       38       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Right       2         Actual Time and Position of Sighting       Time:       13:45       WP#:       29       Lat:       35.60842       Long:       -74.87663         Species: Tursiops truncatus       Numbers (Low/High/Best):       23 / 35 / 3         Features used in Species ID:       Robust, uniform grey animal
Initial sighting on Track         Time:       13:44       WP#:       28       Lat:       35.61682       Long:       -74.881575         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Spla         On/Off Effort:       On       Trackline:       38       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Right       2         Actual Time and Position of Sighting       Time:       13:45       WP#:       29       Lat:       35.60842       Long:       -74.87663         Species: Tursiops truncatus       Numbers (Low/High/Best):       23 / 35 / 3         Features used in Species ID:       Robust, uniform grey animal
Initial sighting on TrackTime:13:44WP#:28Lat:35.61682Long:-74.881575Vertical Angle:2Horizontal Bearing in Degrees:45Sighting Cue:SplaOn/Off Effort:OnTrackline:38Beaufort Sea State:2Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:29Lat:35.60842Long:-74.87663Species:Fursiops truncatusNumbers (Low/High/Best):23 / 35 / 3Features used in Species ID:Representative images used for Species ID:7, 10, 12, 13Photographer:ErinFrame numbers:1 - 22Spacer:23
Initial sighting on Track         Time:       13:44       WP#:       28       Lat:       35.61682       Long:       -74.881575         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Spla         On/Off Effort:       On       Trackline:       38       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Right       2         Actual Time and Position of Sighting       Time:       13:45       WP#:       29       Lat:       35.60842       Long:       -74.87663         Species: Tursiops truncatus       Numbers (Low/High/Best):       23 / 35 / 3       3         Features used in Species ID:       Robust, uniform grey animal       23 / 35 / 3         Photographer:       Erin       Frame numbers:       1 - 22       Spacer:       23         Calculated distance from Trackline:       1.04 km       1.04 km       1.04 km       1.04 km
Initial sighting on Track         Time:       13:44       WP#:       28       Lat:       35.61682       Long:       -74.881575         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Spla         On/Off Effort:       On       Trackline:       38       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Right       2         Actual Time and Position of Sighting       Time:       13:45       WP#:       29       Lat:       35.60842       Long:       -74.87663         Species:       Tursiops truncatus       Numbers (Low/High/Best):       23 / 35 / 3         Features used in Species ID:       Robust, uniform grey animal         Representative images used for Species ID:         7, 10, 12, 13       Photographer:       Erin       Frame numbers:       1 - 22       Spacer:       23         Calculated distance from Trackline:       1.04 km       Internet and Position of Sighting       Internet and Position of Sighting
Initial sighting on TrackTime:13:44WP#:28Lat:35.61682Long:-74.881575Vertical Angle:2Horizontal Bearing in Degrees:45Sighting Cue:SplaOn/Off Effort:OnTrackline:38Beaufort Sea State:2Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:29Lat:35.60842Long:-74.87663Species:Tursiops truncatusNumbers (Low/High/Best):23/35/3Features used in Species ID:7, 10, 12, 13Photographer:ErinFrame numbers:1 - 22Spacer:23Calculated distance from Trackline:1.04 km1.04 km1Final Time and Position of SightingTime:13:47WP#:30Lat:35.61097Long:-74.882123
Initial sighting on TrackTime:13:44WP#:28Lat:35.61682Long:-74.881575Vertical Angle:2Horizontal Bearing in Degrees:45Sighting Cue:SplaOn/Off Effort:OnTrackline:38Beaufort Sea State:2Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:29Lat:35.60842Long:-74.87663Species:Tursiops truncatusNumbers (Low/High/Best):23 / 35 / 35Features used in Species ID:Robust, uniform grey animalRepresentative images used for Species ID:7, 10, 12, 13Photographer:ErinFrame numbers:1 - 22Spacer:23Calculated distance from Trackline:1.04 kmFinal Time and Position of SightingTime:13:47WP#:30Lat:35.61097Long:-74.882123Calculated Distance Traveled:0.57 km
Initial sighting on TrackTime:13:44WP#:28Lat:35.61682Long:-74.881575Vertical Angle:2Horizontal Bearing in Degrees:45Sighting Cue:SplaOn/Off Effort:OnTrackline:38Beaufort Sea State:2Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:29Lat:35.60842Long:-74.87663Species:Tursiops truncatusNumbers (Low/High/Best):23 / 35 / 3Features used in Species ID:Robust, uniform grey animalRepresentative images used for Species ID:7, 10, 12, 13Photographer:ErinFrame numbers:1 - 22Calculated distance from Trackline:1.04 kmFinal Time and Position of SightingTime:13:47WP#:30Lat:35.61097Long:-74.882123Calculated Distance Traveled:0.57 kmBehavior and Additional Comments
Initial sighting on Track         Time:       13:44       WP#:       28       Lat:       35.61682       Long:       -74.881575         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Spla         On/Off Effort:       On       Trackline:       38       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Right       2         Actual Time and Position of Sighting       Time:       13:45       WP#:       29       Lat:       35.60842       Long:       -74.87663         Species:       Tursiops truncatus       Numbers (Low/High/Best):       23 / 35 / 3       5         Features used in Species ID:       Robust, uniform grey animal       23 / 35 / 3         Photographer:       Erin       Frame numbers:       1 - 22       Spacer:       23         Calculated distance from Trackline:       1.04 km       104 km       104 km       104 km       104 km         Final Time and Position of Sighting       Calculated Distance Traveled:       0.57 km       10,57 km       10,57 km
Initial sighting on TrackTime:13:44WP#:28Lat:35.61682Long:-74.881575Vertical Angle:2Horizontal Bearing in Degrees:45Sighting Cue:SplaOn/Off Effort:OnTrackline:38Beaufort Sea State:2Observer:ErinObserver side:RightActual Time and Position of SightingTime:13:45WP#:29Lat:35.60842Long:-74.87663Species:Tursiops truncatusNumbers (Low/High/Best):23 / 35 / 3Features used in Species ID:Robust, uniform grey animalRepresentative images used for Species ID:7, 10, 12, 13Photographer:ErinFrame numbers:1 - 22Calculated distance from Trackline:1.04 kmFinal Time and Position of SightingTime:13:47WP#:30Lat:35.61097Long:-74.882123Calculated Distance Traveled:0.57 kmBehavior and Additional Comments

Thursday, August 30, 2012 Sighting $\#$ 3	
Initial sighting on Track	
Time: 13:50 WP#: 32 Lat: 35.62127 Long: -74.79565	
Vertical Angle: <u>1</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Body</u>	
On/Off Effort: On Trackline: 38 Beaufort Sea State: 2	
Observer: Ryan Observer side: Left	
Actual Time and Position of Sighting	
Time:         13:53         WP#:         33         Lat:         35.62725         Long:         -74.80044	_
Species: Globicephala macrorhynchus       Numbers (Low/High/Best):       16 / 20 / 18	_
Features used in Species ID: Black body, light colored suspenders, blunt head	_
Representative images used for Species ID: 24 & 26	_
Photographer: <u>Erin</u> Frame numbers: <u>24 - 28</u> Spacer: <u>29</u>	
Calculated distance from Trackline: 0.79 km	-
Final Time and Position of Sighting	
Time:   NA   WP#:   NA   Lat:   NA   Long:   NA	
Calculated Distance Traveled: NA	_
Behavior and Additional Comments	
Multiple small, densely packed groups hanging at the surface.	
Thursday, August 30, 2012 Sighting $\#$ 4	
Initial sighting on Track	
Time: 13:57 WP#: 36 Lat: 35.62037 Long: -74.6580	_
Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:38Beaufort Sea State:2	_
Observer: Erin Observer side: Right	
Actual Time and Position of Sighting	i.
Time:         13:59         WP#:         37         Lat:         35.61976         Long:         -74.659026           Species: Tursiops truncatus         Numbers (Low/High/Best):         8 / 10 / 11	-
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best): <u>8 / 10 / 11</u> Features used in Species ID: Robust, uniform grey	-
reactives used in Species 1D. hobas, anioningrey	-
Representative images used for Species ID: 31, 33, 37, 41	Τ
Photographer: Erin Frame numbers: 30 - 40 Spacer: 42	
Calculated distance from Trackline: 0.11 km	
Final Time and Position of Sighting	
Time: 14:03 WP#: 39 Lat: 35.63127 Long: -74.66035	
Calculated Distance Traveled: 1.29 km	
Behavior and Additional Comments	
Initial sighting of traveling group at the surface. Group split with some animals taking up bow riding o	f

a passing cargo vessel while other potion of group continued slow travel along boats wake.

Thursday, August 30, 2012 Sighting $\#$ 5
Initial sighting on Track
Time:         13:57         WP#:         36         Lat:         35.62037         Long:         -74.65800
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 38 Beaufort Sea State: 2
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time:         14:01         WP#:         38         Lat:         35.63028         Long:         -74.66576
Species: Grampus griseus Numbers (Low/High/Best): 5/7/6
Features used in Species ID: Grey, blunt head with cleft in the middle, white scaring
Representative images used for Species ID: 47
Photographer: Erin Frame numbers: 42 - 49 Spacer: 50
Calculated distance from Trackline: 1.31 km
Final Time and Position of Sighting
Time:         14;03         WP#:         39         Lat:         35.63127         Long:         -74.66035
Calculated Distance Traveled: 0.50 km
Behavior and Additional Comments
Group of Risso's not mixed with bottlenose dolphin in sighting 4 but in the same area and both species
were detected at the same time and by the same sighting que.
Thursday, August 30, 2012 Sighting $\#$ 6
Initial sighting on Track
Time:         14:07         WP#:         41         Lat:         35.62076         Long:         -74.51007
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Blow
On/Off Effort: On Trackline: 38 Beaufort Sea State: 3
Observer: Ryan Observer side: Left
Actual Time and Position of Sighting
Time:         14:08         WP#:         42         Lat:         35.61773         Long:         -74.507810
Species:Tursiops truncatusNumbers (Low/High/Best):7/10/9
Features used in Species ID: Robust, uniform grey
Representative images used for Species ID: 52 & 54
Photographer: Erin Frame numbers: 51-55 Spacer: 56
Calculated distance from Trackline: 0.39 km
Final Time and Position of Sighting
Time:         14:11         WP#:         43         Lat:         35.62206         Long:         -74.50497
Calculated Distance Traveled: 0.55 km
Behavior and Additional Comments
Multiple groups of 2 or 3 animals all showing slow travel at the surface.

Thursday,	August 30, 2012 Si	ghting # 7		
Initial sighting on Tra	ick	0 0		
Time: 14:27 WP#	: <u>48</u> Lat: _	35.69867	Long:7	74.69707
Vertical Angle: 1	Horizontal Bear		90 Sighting Cu	ue: Body
On/Off Effort: On	_ Trackline:		Beaufort Sea State	2
Observer: Erin	Observer	side: Right		
Actual Time and Posi	tion of Sighting			
Time: 14:27 WP#	: 49 Lat:	35.69240	Long:7	4.69460
Species: Ziphius cavirostri			Low/High/Best):	
Features used in Specie		hite scaring on bo	dy, brownish head, do	rsal fin set
far back on body, short pe				
Representative images	-		59 & 60	
Photographer: Erin	Frame number		Spacer:	61
Calculated distance fro	m Trackline:	0.73 km		
<b>Final Time and Positi</b>	on of Sighting			
Time: 14:32 WP#	: 50 Lat:	35.69805	Long:	74.68947
Calculated Distance Tr	aveled:	0.78 km		
<b>Behavior and Additio</b>	nal Comments			
Light white body coloratio	n except for darker ca	udal area. Upon in	itial sighting animal su	urfaced a few
·	· · · · · · · · · · · · · · · · · · ·	· · ·	le break before diving	
times before drying. The a				5
times before arving. The a				
	August 30, 2012 <b>S</b> i	ghting # 8		
	August 30, 2012 Si	ghting # 8		
Thursday,	August 30, 2012 Sj ick	ghting # 8 35.692521	Long: -7	4.808789
Thursday, Initial sighting on Tra	August 30, 2012 Si ick : <u>52</u> Lat:	35.692521	Long:7 90 Sighting Cu	
Thursday, Initial sighting on Tra Time: <u>14;35</u> WP#	August 30, 2012 Si ick : <u>52</u> Lat: Horizontal Bear	35.692521 ing in Degrees:		ue: Body
Thursday, <b>Initial sighting on Tra</b> Time: <u>14;35</u> WP# Vertical Angle: <u>2</u>	August 30, 2012 Si ick : <u>52</u> Lat: Horizontal Bear	35.692521 ing in Degrees: 39	90 Sighting Cu	ue: Body
Thursday, <b>Initial sighting on Tr:</b> Time: <u>14;35</u> WP# Vertical Angle: <u>2</u> On/Off Effort: <u>On</u> Observer: <u>Ryan</u>	August 30, 2012 Sinck : <u>52</u> Lat: Horizontal Bear Trackline: Observer	35.692521 ing in Degrees: 39	90 Sighting Cu	ue: Body
Thursday, <b>Initial sighting on Tra</b> Time: <u>14;35</u> WP# Vertical Angle: <u>2</u> On/Off Effort: <u>On</u> Observer: <u>Ryan</u> <b>Actual Time and Posi</b>	August 30, 2012 Sinck : <u>52</u> Lat: Horizontal Bear Trackline: Observer tion of Sighting	35.692521 ing in Degrees: 39 side: Left	90 Sighting Cu Beaufort Sea State	ue: <u>Body</u> c: 2
Thursday, <b>Initial sighting on Tra</b> Time: <u>14;35</u> WP# Vertical Angle: <u>2</u> On/Off Effort: <u>On</u> Observer: <u>Ryan</u> <b>Actual Time and Posi</b> Time: <u>14:38</u> WP#	August 30, 2012 Sinck : <u>52</u> Lat: Horizontal Bear Trackline: Observer tion of Sighting : <u>53</u> Lat:	35.692521 ing in Degrees: 39 side: Left 35.69167	90 Sighting Cu Beaufort Sea State Long:	ue: <u>Body</u> e: <u>2</u> 4.800817
Thursday, <b>Initial sighting on Tra</b> Time: <u>14;35</u> WP# Vertical Angle: <u>2</u> On/Off Effort: <u>On</u> Observer: <u>Ryan</u> <b>Actual Time and Posi</b> Time: <u>14:38</u> WP# Species: <i>Globicephala ma</i>	August 30, 2012 Sinck : <u>52</u> Lat: Horizontal Bear Trackline: Observer tion of Sighting : <u>53</u> Lat: crorhynchus	<u>35.692521</u> ing in Degrees: <u>39</u> side: <u>Left</u> <u>35.69167</u> Numbers (I	90 Sighting Cu Beaufort Sea State Long: -74 Low/High/Best):	ue: <u>Body</u> c: 2
Thursday, <b>Initial sighting on Tra</b> Time: <u>14;35</u> WP# Vertical Angle: <u>2</u> On/Off Effort: <u>On</u> Observer: <u>Ryan</u> <b>Actual Time and Posi</b> Time: <u>14:38</u> WP#	August 30, 2012 Sinck : <u>52</u> Lat: Horizontal Bear Trackline: Observer tion of Sighting : <u>53</u> Lat: crorhynchus	<u>35.692521</u> ing in Degrees: <u>39</u> side: <u>Left</u> <u>35.69167</u> Numbers (I	90 Sighting Cu Beaufort Sea State Long: -74 Low/High/Best):	ue: <u>Body</u> e: <u>2</u> 4.800817
Thursday, <b>Initial sighting on Tra</b> Time: <u>14;35</u> WP# Vertical Angle: <u>2</u> On/Off Effort: <u>On</u> Observer: <u>Ryan</u> <b>Actual Time and Posi</b> Time: <u>14:38</u> WP# Species: <i>Globicephala ma</i> Features used in Specie	August 30, 2012 Sinck : <u>52</u> Lat: Horizontal Bear Trackline: Observer tion of Sighting : <u>53</u> Lat: crorhynchus es ID: Black body, lig	35.692521 ing in Degrees: 39 side: Left 35.69167 Numbers (I hter colored suspe	90 Sighting Cu Beaufort Sea State Long: Low/High/Best): nders, blunt head	ue: <u>Body</u> e: <u>2</u> 4.800817
Thursday, <b>Initial sighting on Tra</b> Time: <u>14;35</u> WP# Vertical Angle: <u>2</u> On/Off Effort: <u>On</u> Observer: <u>Ryan</u> <b>Actual Time and Posi</b> Time: <u>14:38</u> WP# Species: <i>Globicephala ma</i> Features used in Specie Representative images	August 30, 2012 Sinck : <u>52</u> Lat: Horizontal Bear Trackline: Observer tion of Sighting : <u>53</u> Lat: crorhynchus es ID: <u>Black body, lig</u> used for Species II	35.692521 ing in Degrees: 39 side: Left 35.69167 Numbers (I hter colored suspe D:	90 Sighting Cu Beaufort Sea State Long: -74 Low/High/Best): nders, blunt head	ue: <u>Body</u> : <u>2</u> 4.800817 40 / 42 / 41
Thursday, <b>Initial sighting on Tra</b> Time: <u>14;35</u> WP# Vertical Angle: <u>2</u> On/Off Effort: <u>On</u> Observer: <u>Ryan</u> <b>Actual Time and Posi</b> Time: <u>14:38</u> WP# Species: <i>Globicephala ma</i> Features used in Specie Representative images Photographer: <u>Erin</u>	August 30, 2012 Sinck : <u>52</u> Lat: Horizontal Bear Trackline: Observer tion of Sighting : <u>53</u> Lat: crorhynchus es ID: Black body, lig used for Species II Frame number	35.692521         ing in Degrees:         39         side:       Left         35.69167         Numbers (I         hter colored suspe         D:	90 Sighting Cu Beaufort Sea State Long: Low/High/Best): nders, blunt head	ue: <u>Body</u> e: <u>2</u> 4.800817
Thursday, <b>Initial sighting on Tra</b> Time: <u>14;35</u> WP# Vertical Angle: <u>2</u> On/Off Effort: <u>On</u> Observer: <u>Ryan</u> <b>Actual Time and Posi</b> Time: <u>14:38</u> WP# Species: <i>Globicephala ma</i> Features used in Specie Representative images Photographer: <u>Erin</u> Calculated distance from	August 30, 2012 Sinck : <u>52</u> Lat: Horizontal Bear Trackline: Observer tion of Sighting : <u>53</u> Lat: crorhynchus es ID: Black body, lig used for Species II Frame numbers m Trackline:	35.692521 ing in Degrees: 39 side: Left 35.69167 Numbers (I hter colored suspe D:	90 Sighting Cu Beaufort Sea State Long: -74 Low/High/Best): nders, blunt head	ue: <u>Body</u> : <u>2</u> 4.800817 40 / 42 / 41
Thursday, <b>Initial sighting on Tra</b> Time: <u>14;35</u> WP# Vertical Angle: <u>2</u> On/Off Effort: <u>On</u> Observer: <u>Ryan</u> <b>Actual Time and Posi</b> Time: <u>14:38</u> WP# Species: <i>Globicephala ma</i> Features used in Specie Representative images Photographer: <u>Erin</u> Calculated distance fro <b>Final Time and Positi</b>	August 30, 2012 Sj ick : 52 Lat: Horizontal Bear Trackline: Observer tion of Sighting : 53 Lat: crorhynchus es ID: Black body, lig used for Species II Frame number m Trackline: on of Sighting	35.692521         ing in Degrees:         39         side:       Left         35.69167         Numbers (I         hter colored suspe         0:         s:       62 - 68         0.73 km	90 Sighting Cu Beaufort Sea State Long:74 Low/High/Best): nders, blunt head 62 & 65 Spacer:	ue: <u>Body</u> 2: 2 4.800817 40 / 42 / 41 69
Thursday, <b>Initial sighting on Tra</b> Time: <u>14;35</u> WP# Vertical Angle: <u>2</u> On/Off Effort: <u>On</u> Observer: <u>Ryan</u> <b>Actual Time and Posi</b> Time: <u>14:38</u> WP# Species: <i>Globicephala ma</i> Features used in Specie Representative images Photographer: <u>Erin</u> Calculated distance fro <b>Final Time and Positi</b> Time: <u>14:38</u> WP#	August 30, 2012 Sinck : <u>52</u> Lat: Horizontal Bear Trackline: Observer tion of Sighting : <u>53</u> Lat: crorhynchus es ID: <u>Black body</u> , lig used for Species II Frame number m Trackline: <u>on of Sighting</u> : <u>54</u> Lat:	35.692521 ing in Degrees: 39 side: Left 35.69167 Numbers (I hter colored suspe D: 62 - 68 0.73 km 35.692998	90 Sighting Cu Beaufort Sea State Long: -74 Low/High/Best): nders, blunt head	ue: <u>Body</u> 2: 2 4.800817 40 / 42 / 41 69
Thursday, <b>Initial sighting on Tra</b> Time: <u>14;35</u> WP# Vertical Angle: <u>2</u> On/Off Effort: <u>On</u> Observer: <u>Ryan</u> <b>Actual Time and Posi</b> Time: <u>14:38</u> WP# Species: <i>Globicephala ma</i> Features used in Specie Representative images Photographer: <u>Erin</u> Calculated distance fro <b>Final Time and Positi</b> Time: <u>14:38</u> WP# Calculated Distance Tra	August 30, 2012 Sinck : <u>52</u> Lat: Horizontal Bear Trackline: Observer tion of Sighting : <u>53</u> Lat: crorhynchus es ID: Black body, lig used for Species II Frame numbers m Trackline: on of Sighting : <u>54</u> Lat: aveled:	35.692521         ing in Degrees:         39         side:       Left         35.69167         Numbers (I         hter colored suspe         0:         5:       62 - 68         0.73 km	90 Sighting Cu Beaufort Sea State Long:74 Low/High/Best): nders, blunt head 62 & 65 Spacer:	ue: <u>Body</u> 2: 2 4.800817 40 / 42 / 41 69
Thursday, <b>Initial sighting on Tra</b> Time: <u>14;35</u> WP# Vertical Angle: <u>2</u> On/Off Effort: <u>On</u> Observer: <u>Ryan</u> <b>Actual Time and Posi</b> Time: <u>14:38</u> WP# Species: <i>Globicephala ma</i> Features used in Specie Representative images Photographer: <u>Erin</u> Calculated distance fro <b>Final Time and Positi</b> Time: <u>14:38</u> WP#	August 30, 2012 Sinck : <u>52</u> Lat: Horizontal Bear Trackline: Observer tion of Sighting : <u>53</u> Lat: crorhynchus es ID: Black body, lig used for Species II Frame numbers m Trackline: on of Sighting : <u>54</u> Lat: aveled:	35.692521 ing in Degrees: 39 side: Left 35.69167 Numbers (I hter colored suspe D: 62 - 68 0.73 km 35.692998	90 Sighting Cu Beaufort Sea State Long:74 Low/High/Best): nders, blunt head 62 & 65 Spacer:	ue: <u>Body</u> 2: 2 4.800817 40 / 42 / 41 69
Thursday, <b>Initial sighting on Tra</b> Time: <u>14;35</u> WP# Vertical Angle: <u>2</u> On/Off Effort: <u>On</u> Observer: <u>Ryan</u> <b>Actual Time and Posi</b> Time: <u>14:38</u> WP# Species: <i>Globicephala ma</i> Features used in Specie Representative images Photographer: <u>Erin</u> Calculated distance fro <b>Final Time and Positi</b> Time: <u>14:38</u> WP# Calculated Distance Tra	August 30, 2012 Sinck : <u>52</u> Lat: Horizontal Bear Trackline: Observer tion of Sighting : <u>53</u> Lat: crorhynchus es ID: Black body, lig used for Species II Frame numbers m Trackline: on of Sighting : <u>54</u> Lat: aveled: <u></u>	35.692521 ing in Degrees: 39 side: Left 35.69167 Numbers (I hter colored suspe D: 62 - 68 0.73 km 35.692998 0.32 km	90 Sighting Cu Beaufort Sea State 	ue: <u>Body</u> 2 4.800817 40 / 42 / 41 69 4.797710
Thursday, Initial sighting on Tra Time: 14;35 WP# Vertical Angle: 2 On/Off Effort: On Observer: Ryan Actual Time and Posi Time: 14:38 WP# Species:Globicephala ma Features used in Specie Representative images Photographer: Erin Calculated distance fro Final Time and Positi Time: 14:38 WP# Calculated Distance Tr Behavior and Additio	August 30, 2012 Sinck : <u>52</u> Lat: Horizontal Bear Trackline: Observer tion of Sighting : <u>53</u> Lat: crorhynchus es ID: Black body, lig used for Species II Frame numbers m Trackline: on of Sighting : <u>54</u> Lat: aveled: <u></u>	35.692521 ing in Degrees: 39 side: Left 35.69167 Numbers (I hter colored suspe D: 62 - 68 0.73 km 35.692998 0.32 km	90 Sighting Cu Beaufort Sea State 	ue: <u>Body</u> 2 4.800817 40 / 42 / 41 69 4.797710
Thursday, Initial sighting on Tra Time: 14;35 WP# Vertical Angle: 2 On/Off Effort: On Observer: Ryan Actual Time and Posi Time: 14:38 WP# Species:Globicephala ma Features used in Specie Representative images Photographer: Erin Calculated distance fro Final Time and Positi Time: 14:38 WP# Calculated Distance Tr Behavior and Additio	August 30, 2012 Sinck : <u>52</u> Lat: Horizontal Bear Trackline: Observer tion of Sighting : <u>53</u> Lat: crorhynchus es ID: Black body, lig used for Species II Frame numbers m Trackline: on of Sighting : <u>54</u> Lat: aveled: <u></u>	35.692521 ing in Degrees: 39 side: Left 35.69167 Numbers (I hter colored suspe D: 62 - 68 0.73 km 35.692998 0.32 km	90 Sighting Cu Beaufort Sea State 	ue: <u>Body</u> 2 4.800817 40 / 42 / 41 69 4.797710

Initial sighting on Track	
Time: 14:59 WP#: 62 Lat: 35.76324	Long:
Vertical Angle: <u>2</u> Horizontal Bearing in Degrees: _	
On/Off Effort: Trackline:40	Beaufort Sea State: 2
Observer: Erin Observer side: Right	_
Actual Time and Position of Sighting	
Time: 15:00 WP#: 63 Lat: 35.755539	Long: -74.809280
Species: Globicephala macrorhynchus Numbers (L	.ow/High/Best):4/4/4
Features used in Species ID: Black body, lighter colored susper	nders, blunt head
Representative images used for Species ID:	71 & 74
Photographer: Erin Frame numbers: 70 - 77	Spacer:78
Calculated distance from Trackline: 0.87 km	Space:
Final Time and Position of Sighting	
Time: 15:03 WP#: 64 Lat: 35.75629	Long: -74.80721
Calculated Distance Traveled: 0.20 km	Long
Behavior and Additional Comments	-
Animals hanging at the surface.	
Thursday, August 30, 2012 ${ m Sighting}~\#~10$	
Initial sighting on Track	
<b>Initial sighting on Track</b> Time: 15:07 WP#: 66 Lat: 35.76158	Long: -74 65722
Time: 15:07 WP#: 66 Lat: 35.76158	Long: -74.65722 90 Sighting Cue: Body
Time:15:07WP#:66Lat:35.76158Vertical Angle:2Horizontal Bearing in Degrees:	90 Sighting Cue: Body
Time:15:07WP#:66Lat:35.76158Vertical Angle:2Horizontal Bearing in Degrees:	90 Sighting Cue: Body
Time:15:07WP#:66Lat:35.76158Vertical Angle:2Horizontal Bearing in Degrees:	90 Sighting Cue: Body
Time:15:07WP#:66Lat:35.76158Vertical Angle:2Horizontal Bearing in Degrees:On/Off Effort:OnTrackline:40Observer:RyanObserver side:LeftActual Time and Position of Sighting	90       Sighting Cue:       Body         Beaufort Sea State:       2
Time:15:07WP#:66Lat:35.76158Vertical Angle:2Horizontal Bearing in Degrees:On/Off Effort:OnTrackline:40Observer:RyanObserver side:LeftActual Time and Position of SightingTime:15:08WP#:67Lat:35.76149	90       Sighting Cue:       Body         Beaufort Sea State:       2         Long:       -74.65969
Time:15:07WP#:66Lat:35.76158Vertical Angle:2Horizontal Bearing in Degrees:	90 Sighting Cue: Body Beaufort Sea State: 2 Long: -74.65969 Low/High/Best): 14/16/15
Time:       15:07       WP#:       66       Lat:       35.76158         Vertical Angle:       2       Horizontal Bearing in Degrees:       0         On/Off Effort:       On       Trackline:       40         Observer:       Ryan       Observer side:       Left         Actual Time and Position of Sighting         Time:       15:08       WP#:       67       Lat:       35.76149         Species:       Globicephala macrorhynchus       Numbers (L         Features used in Species ID:       Black body, lighter colored susper	90 Sighting Cue: Body Beaufort Sea State: 2 Long: -74.65969 Low/High/Best): 14/16/15
Time:       15:07       WP#:       66       Lat:       35.76158         Vertical Angle:       2       Horizontal Bearing in Degrees:       0         On/Off Effort:       On       Trackline:       40         Observer:       Ryan       Observer side:       Left         Actual Time and Position of Sighting         Time:       15:08       WP#:       67       Lat:       35.76149         Species:       Globicephala macrorhynchus       Numbers (L         Features used in Species ID:       Black body, lighter colored susper         Representative images used for Species ID:	90       Sighting Cue:       Body         Beaufort Sea State:       2
Time:       15:07       WP#:       66       Lat:       35.76158         Vertical Angle:       2       Horizontal Bearing in Degrees:       0         On/Off Effort:       On       Trackline:       40         Observer:       Ryan       Observer side:       Left         Actual Time and Position of Sighting         Time:       15:08       WP#:       67       Lat:       35.76149         Species:       Globicephala macrorhynchus       Numbers (L         Features used in Species ID:       Black body, lighter colored susper         Representative images used for Species ID:       79-85	90       Sighting Cue:       Body         Beaufort Sea State:       2
Time:       15:07       WP#:       66       Lat:       35.76158         Vertical Angle:       2       Horizontal Bearing in Degrees:       0         On/Off Effort:       On       Trackline:       40         Observer:       Ryan       Observer side:       Left         Actual Time and Position of Sighting         Time:       15:08       WP#:       67       Lat:       35.76149         Species:       Globicephala macrorhynchus       Numbers (L         Features used in Species ID:       Black body, lighter colored susper         Representative images used for Species ID:	90       Sighting Cue:       Body         Beaufort Sea State:       2
Time:       15:07       WP#:       66       Lat:       35.76158         Vertical Angle:       2       Horizontal Bearing in Degrees:       0         On/Off Effort:       On       Trackline:       40         Observer:       Ryan       Observer side:       Left         Actual Time and Position of Sighting       Time:       15:08       WP#:       67       Lat:       35.76149         Species:       Globicephala macrorhynchus       Numbers (L         Features used in Species ID:       Black body, lighter colored susper         Representative images used for Species ID:       Photographer:       79-85         Calculated distance from Trackline:       0.22 km         Final Time and Position of Sighting       10.22 km	90       Sighting Cue:       Body         Beaufort Sea State:       2
Time:15:07WP#:66Lat:35.76158Vertical Angle:2Horizontal Bearing in Degrees:On/Off Effort:OnTrackline:40Observer:RyanObserver side:LeftActual Time and Position of SightingTime:15:08WP#:67Lat:Species:Globicephala macrorhynchusNumbers (LFeatures used in Species ID:Black body, lighter colored susperRepresentative images used for Species ID:79-85Calculated distance from Trackline:0.22 kmFinal Time and Position of SightingTime:15:09WP#:68Lat:35.76468	90       Sighting Cue:       Body         Beaufort Sea State:       2
Time:       15:07       WP#:       66       Lat:       35.76158         Vertical Angle:       2       Horizontal Bearing in Degrees:       0         On/Off Effort:       On       Trackline:       40         Observer:       Ryan       Observer side:       Left         Actual Time and Position of Sighting       Time:       15:08       WP#:       67       Lat:       35.76149         Species:       Globicephala macrorhynchus       Numbers (L       Features used in Species ID:       Numbers (L         Representative images used for Species ID:       Photographer:       Erin       Frame numbers:       79 - 85         Calculated distance from Trackline:       0.22 km       0.22 km	90       Sighting Cue:       Body         Beaufort Sea State:       2
Time:15:07WP#:66Lat:35.76158Vertical Angle:2Horizontal Bearing in Degrees:On/Off Effort:OnTrackline:40Observer:RyanObserver side:LeftActual Time and Position of SightingTime:15:08WP#:67Lat:Species:Globicephala macrorhynchusNumbers (LFeatures used in Species ID:Black body, lighter colored susperRepresentative images used for Species ID:79-85Calculated distance from Trackline:0.22 kmFinal Time and Position of SightingTime:15:09WP#:68Lat:35.76468	90       Sighting Cue:       Body         Beaufort Sea State:       2

Thursday, August 30, 2012 Sighting $\#$ 11
Initial sighting on Track
Time: 15:13 WP#: 72 Lat: 35.76187 Long: -74.515866
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 40 Beaufort Sea State: 2
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time: 15:13 WP#: 73 Lat: 35.75882 Long: -74.52516
Species: Grampus griseus Numbers (Low/High/Best): 4/4/4
Features used in Species ID: Grey body, blunt head with cleft in middle, white scaring
Representative images used for Species ID: 92 & 93
Photographer: <u>Erin</u> Frame numbers: <u>87 - 98</u> Spacer: <u>99</u>
Calculated distance from Trackline: 0.90 km
Final Time and Position of Sighting
Time: 15:13 WP#: 74 Lat: 35.76408 Long: -74.50678
Calculated Distance Traveled: 1.76 km
Behavior and Additional Comments
Light coloration due to scarring.
Thursday, August 30, 2012 Sighting # 12
Initial sighting on Track
Time:     15:23     WP#:     78     Lat:     35.83240     Long:     -74.403074
Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:41Beaufort Sea State:3
On/Off Effort:OnTrackline:41Beaufort Sea State:3Observer:RyanObserver side:Left
Actual Time and Position of Sighting
Time:         15:27         WP#:         79         Lat:         35.82854         Long:         -74.398137
Species: <i>Ziphius cavirostris</i> Numbers (Low/High/Best): <u>4/4/4</u>
Features used in Species ID: Light grey body, white scaring, brownish head, small pectorals
dorsal fin way back on body         Representative images used for Species ID:         113, 126, 130
Photographer: Erin Frame numbers: 100 - 134 Spacer: 135
Calculated distance from Trackline: 0.62 km
Final Time and Position of SightingTime:15:27WP#:80Lat:35.83020Long:-74.40101
Time:15:27WP#:80Lat:35.83020Long:-74.40101Calculated Distance Traveled:0.32 km
Behavior and Additional Comments

Animals took between 3 - 4 breaths before diving together, no resight.

		lugust oo	, 2012 01	ighting # 13		
Initial sighting (	on Trac	k		0		
Time: 15:33			Lat:	35.83470	Long:	-74.647235
Vertical Angle:	1	Horizon	ntal Bear	ing in Degrees:	90 Sighting	
On/Off Effort:			rackline		Beaufort Sea Sta	
Observer: Ry	yan	C	Observer	side: Left		
Actual Time an	d Positi	on of Si	ghting			
Time: 15:34			Lat:	35.83518	Long:	-74.64317
Species:Tursiops ti	-				.ow/High/Best):	
Features used in		ID: Rob	ust, unifor			
	1					
Representative in					137 & 138	
Photographer:	Erin	Frame	number		Spacer:	144
Calculated distar	nce from	Trackli	ne:	0.37 km		
Final Time and	Positio	n of Sigl	hting			
Time: 15:37	WP#:	85	Lat:	35.83469	Long:	-74.636906
Calculated Dista	nce Trav	veled:	(	0.57 km		
Behavior and A	ddition	al Comr	ments			
				ng, then grouped to	gether and began o	directional travel.
					<u> </u>	
Thu	ursday, A	ugust 30	, 2012 Si	ighting # 14		
Thu Initial sighting			, 2012 Si	ighting # 14		
	on Trac	k		ighting # 14 35.83362	Long:	-74.689910
Initial sighting of Time: 15:38	on Trac WP#:	<b>k</b> 87	Lat:	0 0	_	
Initial sighting of Time: 15:38	on Trac WP#: 2	<b>k</b> <u>87</u> Horizon	Lat:	35.83362	_	Cue: Body
Initial sighting of Time: <u>15:38</u> Vertical Angle:	on Trac WP#: 2 On	<b>k</b> <u>87</u> Horizor T	Lat:	35.83362	90 Sighting	Cue: Body
Initial sighting of Time: <u>15:38</u> Vertical Angle: _ On/Off Effort: _	on Trac WP#: 2 On yan	k 87 Horizon T C	Lat:	35.83362 ing in Degrees:	90 Sighting	Cue: Body
Initial sighting Time: <u>15:38</u> Vertical Angle: On/Off Effort: <u></u> Observer: <u>Ry</u> Actual Time an	on Trac WP#: 2 On yan d Positi	k <u>87</u> Horizor T C on of Sig	Lat:	35.83362 ing in Degrees: _ :41 side:Left	90 Sighting Beaufort Sea Sta	Cue: <u>Body</u> ate: 1
Initial sighting Time: <u>15:38</u> Vertical Angle: On/Off Effort: <u></u> Observer: <u>Ry</u> Actual Time an	on Trac WP#: 2 On yan d Positi WP#:	k <u>87</u> Horizor T C on of Sig	Lat:	35.83362 ing in Degrees: : 41 side: Left 35.841997	90 Sighting Beaufort Sea Sta	Cue: <u>Body</u> ate: <u>1</u>
Initial sighting         Time:       15:38         Vertical Angle:          On/Off Effort:          Observer:       Ry         Actual Time an       Time:         Time:       15:34         Species:       Ziphius cal	on Trac WP#: <u>2</u> On yan d Positi WP#: wvirostris	k 87 Horizon T C on of Si 84	Lat:	35.83362 ing in Degrees: : 41 side: Left 35.841997	90 Sighting Beaufort Sea Sta Long: .ow/High/Best):	Cue: <u>Body</u> ate: <u>1</u> -74.688174 1/1/1
Initial sighting         Time:       15:38         Vertical Angle:          On/Off Effort:          Observer:       Ry         Actual Time an       Time:         Time:       15:34         Species:       Ziphius cal	on Trac WP#: <u>2</u> On yan d Positi WP#: Species	k 87 Horizon T C on of Si 84	Lat:	35.83362 ing in Degrees: : 41 side: Left 35.841997 Numbers (L	90 Sighting Beaufort Sea Sta Long: .ow/High/Best):	Cue: <u>Body</u> ate: <u>1</u> -74.688174 1/1/1
Initial sighting of Time: <u>15:38</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>Ry</u> Actual Time an Time: <u>15:34</u> Species: <i>Ziphius ca</i> Features used in	on Trac WP#: 2 On yan d Positi WP#: Species dy	k Horizon T C on of Si 84 ID: Ligh	Lat:	35.83362 ing in Degrees: : 41 side: Left 35.841997 Numbers (L ite scaring, brownis	90 Sighting Beaufort Sea Sta Long: .ow/High/Best):	Cue: <u>Body</u> ate: <u>1</u> -74.688174 1/1/1
Initial sighting of Time: <u>15:38</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Ry</u> Actual Time an Time: <u>15:34</u> Species: <i>Ziphius ca</i> Features used in set way back on bo	on Trac WP#: <u>2</u> On yan d Positi WP#: Species dy mages u	k Horizon T C on of Sig 84 ID: Ligh	Lat:	35.83362 ing in Degrees: _ :	90 Sighting Beaufort Sea Sta Long: .ow/High/Best): .h head, small pecto 146 & 147	Cue: <u>Body</u> ate: <u>1</u> -74.688174 1/1/1
Initial sighting of Time: 15:38 Vertical Angle: 0n/Off Effort: 0 Observer: Ry Actual Time an Time: 15:34 Species: Ziphius ca Features used in set way back on bo Representative in	on Trac WP#: 2 On yan d Positi WP#: Species dy mages us Erin	k Horizon T Con of Sig 84 ID: Ligh sed for S Frame	Lat:	35.83362 ing in Degrees: _ :	90 Sighting Beaufort Sea Sta Long: .ow/High/Best): .h head, small pecto 146 & 147	Cue: <u>Body</u> ate: <u>1</u> -74.688174 <u>1/1/1</u> prals, dorsal fin
Initial sighting of Time: 15:38 Vertical Angle: 0n/Off Effort: 0 Observer: Ry Actual Time an Time: 15:34 Species: Ziphius ca Features used in set way back on bo Representative in Photographer: 0 Calculated distan	on Trac WP#: <u>2</u> On yan d Positi WP#: Species dy mages un Erin nce from	k 87 Horizon T C on of Sig 84 ID: Ligh sed for S Frame Trackli	Lat:	35.83362 ing in Degrees: :41 side:Left 35.841997 Numbers (L ite scaring, brownis D: s:145 - 148	90 Sighting Beaufort Sea Sta Long: .ow/High/Best): .h head, small pecto 146 & 147	Cue: <u>Body</u> ate: <u>1</u> -74.688174 <u>1/1/1</u> prals, dorsal fin
Initial sighting of Time: <u>15:38</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Ry</u> Actual Time an Time: <u>15:34</u> Species: <i>Ziphius ca</i> Features used in set way back on bo Representative in Photographer: <u></u> Calculated distan Final Time and	on Trac WP#: 2 On yan d Positi WP#: Species dy mages un Erin nce from Position	k 87 Horizon T C on of Sig 84 ID: Ligh sed for S Frame Trackli n of Sigl	Lat:	35.83362         ing in Degrees:         :       41         side:       Left         35.841997         Numbers (L         Numbers (L         site scaring, brownis         D:         s:       145 - 148         0.94 km	90 Sighting Beaufort Sea Sta Long:	Cue: <u>Body</u> ate: <u>1</u> -74.688174 <u>1 / 1 / 1</u> prals, dorsal fin <u>149</u>
Initial sighting of         Time:       15:38         Vertical Angle:          On/Off Effort:          Observer:          Observer:          Actual Time an       Time:         Time:       15:34         Species:       Ziphius ca         Features used in       set way back on bo         Representative in       Photographer:         Calculated distan       Final Time and         Time:       15:40	on Trac WP#: <u>2</u> On yan d Positi WP#: Species dy mages us Erin nce from Position WP#:	k 87 Horizon T C on of Sig 84 ID: Ligh sed for S Frame Trackli n of Sigl 89	Lat:	35.83362 ing in Degrees: _ :	90 Sighting Beaufort Sea Sta Long: .ow/High/Best): .h head, small pecto 146 & 147	Cue: <u>Body</u> ate: <u>1</u> -74.688174 <u>1 / 1 / 1</u> prals, dorsal fin <u>149</u>
Initial sighting of Time: 15:38 Vertical Angle: 0n/Off Effort: 0 Observer: Ry Actual Time an Time: 15:34 Species: Ziphius ca Features used in set way back on bo Representative in Photographer: 0 Calculated distant Final Time and Time: 15:40 Calculated Distant	on Trac WP#: <u>2</u> On yan d Positi WP#: Species dy mages us Erin nce from <b>Position</b> WP#: nce Trav	k 87 Horizon T C on of Sig 84 ID: Ligh sed for S Frame Trackli n of Sigl 89 veled:	Lat:	35.83362         ing in Degrees:         :       41         side:       Left         35.841997         Numbers (L         Numbers (L         site scaring, brownis         D:         s:       145 - 148         0.94 km	90 Sighting Beaufort Sea Sta Long:	Cue: <u>Body</u> ate: <u>1</u> -74.688174 <u>1 / 1 / 1</u> prals, dorsal fin <u>149</u>
Initial sighting of         Time:       15:38         Vertical Angle:          On/Off Effort:          Observer:          Observer:          Actual Time an       Time:         Time:       15:34         Species:       Ziphius ca         Features used in       set way back on bo         Representative in       Photographer:         Calculated distan       Final Time and         Time:       15:40	on Trac WP#: <u>2</u> On yan d Positi WP#: Species dy mages us Erin nce from <b>Position</b> WP#: nce Trav	k 87 Horizon T C on of Sig 84 ID: Ligh sed for S Frame Trackli n of Sigl 89 veled:	Lat:	35.83362 ing in Degrees: _ :	90 Sighting Beaufort Sea Sta Long:	Cue: <u>Body</u> ate: <u>1</u> -74.688174 <u>1 / 1 / 1</u> prals, dorsal fin <u>149</u>
Initial sighting of Time: 15:38 Vertical Angle: 0n/Off Effort: 0 Observer: Ry Actual Time an Time: 15:34 Species: Ziphius ca Features used in set way back on bo Representative in Photographer: 0 Calculated distant Final Time and Time: 15:40 Calculated Distant	on Trac WP#: <u>2</u> On yan d Positi WP#: Species dy mages us Erin nce from <b>Position</b> WP#: nce Trav	k 87 Horizon T C on of Sig 84 ID: Ligh sed for S Frame Trackli n of Sigl 89 veled:	Lat:	35.83362 ing in Degrees: _ :	90 Sighting Beaufort Sea Sta Long:	Cue: <u>Body</u> ate: <u>1</u> -74.688174 <u>1 / 1 / 1</u> prals, dorsal fin <u>149</u>

Thu	ursday, A	ugust 3	0, 2012 <mark>S</mark>	ight	ting # 15				
Initial sighting	on Trac	k		U	C				
Time: 15:42	WP#:	91	Lat:		35.83268	L	ong:	-74.80	357
Vertical Angle:	2	Horizo	ontal Bea	ring	in Degrees:	60	Sighting	Cue:	Body
On/Off Effort:	On	-	Frackline	:	41	Beauf	ort Sea St	ate:	1
Observer: E	rin	(	Observer	· side	Right				
Actual Time an	d Positi	on of S	ighting						
Time: 15:44	WP#:	92	Lat:		35.83423	L	ong:	-74.833	176
Species:Globiceph							igh/Best):	7/	7/7
Features used in									
Representative in	mages us	sed for	Species 1	ID:		15	0 & 151		
Photographer:	Erin	Fram	e number	rs:	150 - 156	5	Spacer		157
Calculated distant	nce from	Track	ine:		2.7 km				
Final Time and	Positio	n of Sig	ghting						
Time: NA	WP#:	NA	Lat:		NA	L	ong:	NA	
Calculated Dista	nce Trav	veled:		N	Α				
Behavior and A	ddition	al Com	ments						
Two groups, one of	f 3 and on	e of 4.							

Initial sighting of		ember 21, 2012 ${ m S}$			
	n Trac		0 0		
Time: 10:44			34.676398	Long:75.5	65940
Vertical Angle:			ring in Degrees:	-	
On/Off Effort:			22	Beaufort Sea State:	3
Observer: Rya	an	Observer	side: Right		
Actual Time and	Positi	on of Sighting			
Time: 10:48			34.669830	Long: -75.50	66572
Species:Globicepha	-			_ 0	3/5/5
Features used in S			black body with blu	nt head	
Representative im				158, 159, 167	
Photographer:				0 Spacer:	171
Calculated distance	ce from	Trackline:	0.73 km		
Final Time and I	Positio	n of Sighting			
Time: 10:54	WP#:	13 Lat:	34.667600	Long:75.5	78843
Calculated Distan	ce Trav	veled:	1.15 km		
Behavior and Ad	dition	al Comments			
Came up for a quick	breath, t	raveling fast, skim	ming the surface. Y	oung trailing behind.	
		ember 21, 2012 ${ m S}$	ighting # 2		
Initial sighting of			24.005670	I	()(()
Time: <u>15:28</u> Vertical Angle:			34.895679	Long: <u>-75.0</u> 90 Sighting Cue:	09000
On/Off Effort:			28	Beaufort Sea State:	
OII/OII EIIOII.		TIACKIIIC	. 20	Deautori Sea State.	Body
	an	Observer	side: Right	_	Body
Observer: Rya			side: Right		Body
Observer: Rya	l Positi	on of Sighting			Body 3
Observer: Rya Actual Time and Time: 15:29	l <b>Positi</b> WP#:	on of Sighting	34.897389		Body 3 69119
Observer: Rya Actual Time and Time: 15:29 Species: Ziphius cav	l <b>Positi</b> WP#: ]	on of Sighting 43 Lat:	34.897389 Numbers (I	Low/High/Best):	Body 3
Observer: Rya Actual Time and Time: 15:29 Species: Ziphius cav	l <b>Positi</b> WP#: ]	on of Sighting 43 Lat:	34.897389 Numbers (I	Low/High/Best):	Body 3 69119
Observer: Rya Actual Time and Time: 15:29 Species: Ziphius cav Features used in S	<b>Positi</b> WP#: <i>virostris</i> Species	on of Sighting <u>43</u> Lat: _ ID: Large white b	34.897389 Numbers (l pody with tan pedur	Low/High/Best): ncle and fluke	Body 3 69119
Observer: Rya Actual Time and Time: 15:29 Species: Ziphius cav Features used in S Representative im	<b>Positi</b> WP#: virostris Species	on of Sighting 43 Lat: ID: Large white b sed for Species I	34.897389 Numbers (I body with tan pedur	Low/High/Best):; ncle and fluke 173, 175	Body 3 69119 2/2/2
Observer: <b>Actual Time and</b> Time: Species: <i>Ziphius cav</i> Features used in S  Representative im Photographer:	l <b>Positi</b> WP#: <i>iriostris</i> Species nages us Ryan	on of Sighting <u>43</u> Lat: ID: Large white b sed for Species I Frame number	34.897389 Numbers (I body with tan pedur ID:	Low/High/Best): ncle and fluke 173, 175	Body 3 69119
Observer: Actual Time and Time: Species: Ziphius cav Features used in S  Representative im Photographer: Calculated distance	I <b>Positi</b> WP#: ] birostris Species nages us Ryan ce from	on of Sighting 43 Lat: _ ID: Large white b sed for Species I Frame number Trackline:	34.897389 Numbers (I body with tan pedur	Low/High/Best):; ncle and fluke 173, 175	Body 3 69119 2/2/2
Observer: Rya Actual Time and Time: 15:29 Species: Ziphius cav Features used in S Representative im Photographer: F Calculated distance Final Time and I	l Positie WP#: ] Species nages us Ryan ce from Positio	on of Sighting 43 Lat: ID: Large white b sed for Species I Frame number Trackline: n of Sighting	34.897389 Numbers (I pody with tan pedur ID:	Low/High/Best): ncle and fluke 173, 175 8Spacer:	Body 3 69119 2/2/2 179
Observer:	l Positie WP#: ] virostris Species nages us Ryan ce from Position WP#:	on of Sighting 43 Lat: ID: Large white b sed for Species I Frame number Trackline: n of Sighting 44 Lat:	34.897389 Numbers (I body with tan pedur ID: rs: 172 - 178 0.20 km 34.890760	Low/High/Best): ncle and fluke 173, 175 8 Spacer:	Body 3 69119 2/2/2
Observer: <b>Actual Time and</b> Time: Species: <i>Ziphius cav</i> Features used in S  Representative im Photographer: Calculated distance <b>Final Time and I</b> Time: Calculated Distance	I Positie WP#: ] virostris Species nages us Ryan ce from Position WP#: nce Trav	on of Sighting         43       Lat:         ID:       Large white b         sed for Species I         Frame number         Trackline:         n of Sighting         44       Lat:         veled:	34.897389 Numbers (I pody with tan pedur ID:	Low/High/Best): ncle and fluke 173, 175 8Spacer:	Body 3 69119 2/2/2 179
Observer: Rya Actual Time and Time: 15:29 Species: Ziphius cav Features used in S Representative im Photographer: F Calculated distance Final Time and I Time: 15:34 Calculated Distan Behavior and Ad	I Position WP#: ] birostris Species nages us Ryan ce from Position WP#: nce Trav	on of Sighting 43 Lat: ID: Large white b sed for Species I Frame number Trackline: n of Sighting 44 Lat: veled: al Comments	34.897389 Numbers (1 body with tan pedur (D:	Low/High/Best): ncle and fluke 173, 175 8Spacer:	Body 3 69119 2/2/2 179
Observer: <b>Actual Time and</b> Time: Species: <i>Ziphius cav</i> Features used in S  Representative im Photographer: Calculated distance <b>Final Time and I</b> Time: Calculated Distance	I Position WP#: ] birostris Species nages us Ryan ce from Position WP#: nce Trav	on of Sighting 43 Lat: ID: Large white b sed for Species I Frame number Trackline: n of Sighting 44 Lat: veled: al Comments	34.897389 Numbers (1 body with tan pedur (D:	Low/High/Best): ncle and fluke 173, 175 8Spacer:	Body 3 69119 2/2/2 179
Observer: Rya Actual Time and Time: 15:29 Species: Ziphius cav Features used in S Representative im Photographer: F Calculated distance Final Time and I Time: 15:34 Calculated Distan Behavior and Ad	I Position WP#: ] birostris Species nages us Ryan ce from Position WP#: nce Trav	on of Sighting 43 Lat: ID: Large white b sed for Species I Frame number Trackline: n of Sighting 44 Lat: veled: al Comments	34.897389 Numbers (1 body with tan pedur (D:	Low/High/Best): ncle and fluke 173, 175 8Spacer:	Body 3 69119 2/2/2 179
Observer: Rya Actual Time and Time: 15:29 Species: Ziphius cav Features used in S Representative im Photographer: F Calculated distance Final Time and I Time: 15:34 Calculated Distan Behavior and Ad	I Position WP#: ] birostris Species nages us Ryan ce from Position WP#: nce Trav	on of Sighting 43 Lat: ID: Large white b sed for Species I Frame number Trackline: n of Sighting 44 Lat: veled: al Comments	34.897389 Numbers (1 body with tan pedur (D:	Low/High/Best): ncle and fluke 173, 175 8Spacer:	Body 3 69119 2/2/2 179

Friday, November 30, 2012 Sighting $\#$ 1
Initial sighting on Track
Time: <u>12:41</u> WP#: <u>5</u> Lat: <u>35.044073</u> Long: <u>-75.015596</u>
Vertical Angle: <u>1</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Body</u>
On/Off Effort: On Trackline: <u>30</u> Beaufort Sea State: <u>4</u>
Observer: Erin Observer side: Left
Actual Time and Position of Sighting
Time: 12:46 WP#: 6 Lat: 35.041624 Long: -75.008259
Species: Tursiops truncatus       Numbers (Low/High/Best): 13 / 13 / 13
Features used in Species ID: Uniform grey, robust animals, white peduncles
Representative images used for Species ID: 4,7
Photographer:     Ryan     Frame numbers:     1 - 13     Spacer:     14
Calculated distance from Trackline: 0.72 km
Final Time and Position of Sighting
Time:         12:56         WP#:         7         Lat:         35.035101         Long:         -75.018943
Calculated Distance Traveled: 1.21 km
Behavior and Additional Comments
2 groups (one of 3 and one of 10), spread out when we circled, not staying on the surface long
Friday, November 30, 2012 Sighting # 2 Initial sighting on Track Time: 13:19 WP#: 15 Lat: 35.111311 Long: -74.967855
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 31 Beaufort Sea State: 4
Observer: Ryan Observer side: Right
Actual Time and Position of Sighting
Time:         13:23         WP#:         16         Lat:         35.111504         Long:         -74.976190
Species: Unidentified Mesoplodon Numbers (Low/High/Best): 3/3/3
Features used in Species ID: Long body, dorsal fin set way back on body, uniform greyish brown
long rostrum
Representative images used for Species ID: N/A
Photographer:         Ryan         Frame numbers:         N/A         Spacer:         N/A
Calculated distance from Trackline: 0.76 km
Final Time and Position of Sighting
Time: 13:34 WP#: 17 Lat: 35.118230 Long: -74.974261
Calculated Distance Traveled: 0.77 km
Behavior and Additional Comments
Spaced out, logging at the surface, dove when we circled, no photos

	ber 30, 2012 $\operatorname{Sigh}$	ting # 3	
Initial sighting on Track	_	-	
Time: <u>13:19</u> WP#:		35.111311	Long:74.967855
Vertical Angle: <u>3</u> H		-	
On/Off Effort:Off	Trackline:		aufort Sea State: <u>4</u>
Observer: Ryan	Observer side	e: Right	
Actual Time and Position	0 0		
	16 Lat:		Long:74.976190
Species:Ziphius cavirostris		Numbers (Low/	/High/Best): <u>5/5/5</u>
Features used in Species II		fin small and set wa	y back on body, white scaring
down body, brown head, long		51	, 52, 53, 73, 78
Representative images use Photographer: <u>Ryan</u>	Frame numbers:		Spacer:80
Calculated distance from T			Spacer
Final Time and Position	0 0	25 110220	T
Time: <u>13:34</u> WP#:		35.118230	Long: -74.974261
Calculated Distance Trave		KIII	
Behavior and Additional			
Swimming close together, chai	nging directions		
Initial sighting on TrackTime:13:54WP#:		35.206940	Long: -75.008217
Vertical Angle: 1 H	-	in Degrees: 90	Sighting Cue: Body
On/Off Effort: On	Trackling		
On/Off Effort: On	Trackline:	32 Bea	aufort Sea State: 3
Observer: Erin	Observer side	32 Bea	
Observer: Erin Actual Time and Positior	Observer side of Sighting	32 Bea	aufort Sea State: <u>3</u>
Observer: Erin Actual Time and Position Time: N/A WP#:	Observer side of Sighting	32 Bea	Long: N/A
Observer: Erin Actual Time and Position Time: N/A WP#: Species: Tursiops truncatus	Observer side of Sighting N/A Lat:	32 Bea e: Left N/A Numbers (Low/	Long: N/A /High/Best): 2/4/4
Observer: Erin Actual Time and Position Time: N/A WP#:	Observer side of Sighting N/A Lat:	32 Bea e: Left N/A Numbers (Low/	Long: N/A /High/Best): 2/4/4
Observer: Erin Actual Time and Position Time: N/A WP#: Species: Tursiops truncatus Features used in Species II	Observer side of Sighting N/A Lat: D: Uniform grey anim	32 Bea e: Left N/A Numbers (Low/	Long: N/A /High/Best): 2/4/4 es
Observer: <u>Erin</u> Actual Time and Position Time: <u>N/A</u> WP#: Species: <i>Tursiops truncatus</i> Features used in Species II Representative images use	Observer side <b>of Sighting</b> <u>N/A</u> Lat: D: <u>Uniform grey animal</u> d for Species ID:	32 Bea e: Left N/A Numbers (Low/ nals, white peduncle	Long: N/A /High/Best): 2/4/4 ss
Observer: <u>Erin</u> Actual Time and Position Time: <u>N/A</u> WP#: Species: <i>Tursiops truncatus</i> Features used in Species II Representative images use	Observer side of Sighting N/A Lat: D: Uniform grey anin d for Species ID: Frame numbers:	32 Bea e: Left N/A Numbers (Low/	Long: N/A /High/Best): 2/4/4 es
Observer: <u>Erin</u> Actual Time and Position Time: <u>N/A</u> WP#: Species: <i>Tursiops truncatus</i> Features used in Species II Representative images use Photographer: <u>N/A</u> Calculated distance from T	Observer side of Sighting N/A Lat: D: Uniform grey anim d for Species ID: Frame numbers:	32 Bea e: Left N/A Numbers (Low/ nals, white peduncle	Long: N/A /High/Best): 2/4/4 ss
Observer: Erin Actual Time and Position Time: N/A WP#: Species: Tursiops truncatus Features used in Species II Representative images use Photographer: N/A Calculated distance from T Final Time and Position of	Observer side of Sighting N/A Lat: D: Uniform grey anin d for Species ID: Frame numbers: Trackline:	32 Bea e: Left N/A Numbers (Low/ nals, white peduncle N/A N/A	Long:     N/A       /High/Best):     2/4/4       vs     N/A       N/A     N/A
Observer:       Erin         Actual Time and Position         Time:       N/A       WP#:         Species:       Tursiops truncatus         Features used in Species II         Representative images use         Photographer:       N/A         Calculated distance from T         Final Time and Position of         Time:       N/A         WP#:	Observer side         of Sighting         N/A       Lat:         D: Uniform grey aning         d for Species ID:         Frame numbers:         Trackline:         of Sighting         N/A         Lat:	32 Bea e: Left N/A Numbers (Low/ nals, white peduncle N/A N/A	Long: N/A /High/Best): 2/4/4 ss
Observer:       Erin         Actual Time and Position         Time:       N/A       WP#:         Species:       Tursiops truncatus         Features used in Species II         Representative images use         Photographer:       N/A         Calculated distance from T         Final Time and Position of         Time:       N/A         WP#:       Calculated Distance Trave	Observer side         of Sighting         N/A       Lat:         D:       Uniform grey animal         d for Species ID:       Frame numbers:         Frame numbers:       Frackline:         of Sighting       N/A         N/A       Lat:         Ied:       N/A	32 Bea e: Left N/A Numbers (Low/ nals, white peduncle N/A N/A	Long:     N/A       /High/Best):     2/4/4       vs     N/A       N/A     N/A
Observer:       Erin         Actual Time and Position         Time:       N/A       WP#:         Species:       Tursiops truncatus         Features used in Species II         Representative images use         Photographer:       N/A         Calculated distance from T         Final Time and Position of         Time:       N/A         VP#:       Calculated Distance Trave         Behavior and Additional	Observer side         of Sighting         N/A       Lat:         D:       Uniform grey animal         d for Species ID:       Frame numbers:         Frame numbers:       Frackline:         of Sighting       N/A         N/A       Lat:         Ied:       N/A	32 Bea e: Left N/A Numbers (Low/ nals, white peduncle N/A N/A	Long:     N/A       /High/Best):     2/4/4       vs     N/A       N/A     N/A
Observer:       Erin         Actual Time and Position         Time:       N/A       WP#:         Species:       Tursiops truncatus         Features used in Species II         Representative images use         Photographer:       N/A         Calculated distance from T         Final Time and Position of         Time:       N/A         WP#:       Calculated Distance Trave	Observer side         of Sighting         N/A       Lat:         D:       Uniform grey animal         d for Species ID:       Frame numbers:         Frame numbers:       Frackline:         of Sighting       N/A         N/A       Lat:         Ied:       N/A	32 Bea e: Left N/A Numbers (Low/ nals, white peduncle N/A N/A	Long:     N/A       /High/Best):     2/4/4       vs     N/A       N/A     N/A

Friday, November 30, 2012 Sighting $\#$ 5
Initial sighting on Track
Time: 14:33 WP#: 27 Lat: 35.148825 Long: -74.442816
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 33 Beaufort Sea State: 3
Observer: Ryan Observer side: Right
Actual Time and Position of Sighting
Time: 14:34 WP#: 28 Lat: 35.154434 Long: -74.441113
Species: <i>Physeter macrocephalus</i> Numbers (Low/High/Best): 6/6/6
Features used in Species ID: Large, robust, blunt head, grey, blow forward
Representative images used for Species ID: 93, 107, 118, 119, 147, 149
Photographer: Ryan Frame numbers: 81 - 162 Spacer: 163
Calculated distance from Trackline: 0.64 km
Final Time and Position of Sighting
Time:         14:46         WP#:         29         Lat:         35.147380         Long:         -74.445225
Calculated Distance Traveled: 0.87 km
Behavior and Additional Comments
3 logging at the surface, swimming a body length apart with juvenile in the middle. Juvenile minke
whale was also swimming with them, just ahead of them and below the surface. Three more pma
off in the distance
Friday, November 30, 2012 ${ m Sighting}~\#~~6$
Initial sighting on Track
Time:         14;33         WP#:         27         Lat:         35.148825         Long:         -74.442816
Time:14;33WP#:27Lat:35.148825Long:-74.442816Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:Splash
Time:14;33WP#:27Lat:35.148825Long:-74.442816Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OffTrackline:33Beaufort Sea State:3
Time:14;33WP#:27Lat:35.148825Long:-74.442816Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OffTrackline:33Beaufort Sea State:3Observer:RyanObserver side:Right
Time:14;33WP#:27Lat:35.148825Long:-74.442816Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OffTrackline:33Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of Sighting
Time:14;33WP#:27Lat:35.148825Long:-74.442816Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OffTrackline:33Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:34WP#:28Lat:35.154434Long:-74.441113
Time:14;33WP#:27Lat:35.148825Long:-74.442816Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OffTrackline:33Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:34WP#:28Lat:35.154434Long:-74.441113Species:Balaenoptera acutorostrataNumbers (Low/High/Best):1/1/1
Time:14;33WP#:27Lat:35.148825Long:-74.442816Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OffTrackline:33Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:34WP#:28Lat:35.154434Long:-74.441113
Time:       14;33       WP#:       27       Lat:       35.148825       Long:       -74.442816         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       Off       Trackline:       33       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right         Actual Time and Position of Sighting         Time:       14:34       WP#:       28       Lat:       35.154434       Long:       -74.441113         Species:       Balaenoptera acutorostrata       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Black body, short white pectorals
Time:       14;33       WP#:       27       Lat:       35.148825       Long:       -74.442816         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       Off       Trackline:       33       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right         Actual Time and Position of Sighting         Time:       14:34       WP#:       28       Lat:       35.154434       Long:       -74.441113         Species:       Balaenoptera acutorostrata       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Black body, short white pectorals         Representative images used for Species ID:       143, 144, 145
Time:14;33WP#:27Lat:35.148825Long:-74.442816Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OffTrackline:33Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:34WP#:28Lat:35.154434Long:-74.441113Species:Balaenoptera acutorostrataNumbers (Low/High/Best):1/1/1Features used in Species ID:Black body, short white pectoralsRepresentative images used for Species ID:143, 144, 145Photographer:RyanFrame numbers:81 - 162Spacer:163
Time:       14;33       WP#:       27       Lat:       35.148825       Long:       -74.442816         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       Off       Trackline:       33       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right         Actual Time and Position of Sighting         Time:       14:34       WP#:       28       Lat:       35.154434       Long:       -74.441113         Species:       Balaenoptera acutorostrata       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Black body, short white pectorals         Representative images used for Species ID:       143, 144, 145
Time:14;33WP#:27Lat:35.148825Long:-74.442816Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OffTrackline:33Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:34WP#:28Lat:35.154434Long:-74.441113Species:Balaenoptera acutorostrataNumbers (Low/High/Best):1/1/1Features used in Species ID:Black body, short white pectoralsRepresentative images used for Species ID:143, 144, 145Photographer:RyanFrame numbers:81 - 162Spacer:163
Time:14;33WP#:27Lat:35.148825Long:-74.442816Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OffTrackline:33Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:34WP#:28Lat:35.154434Long:-74.441113Species:Balaenoptera acutorostrataNumbers (Low/High/Best):1/1/1Features used in Species ID:Black body, short white pectoralsRepresentative images used for Species ID:143, 144, 145Photographer:RyanFrame numbers:81 - 162Spacer:163Calculated distance from Trackline:0.64 km163Final Time and Position of SightingTime:14:46WP#:29Lat:35.147380Long:-74.445225
Time:14;33WP#:27Lat:35.148825Long:-74.442816Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OffTrackline:33Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:34WP#:28Lat:35.154434Long:-74.441113Species:Balaenoptera acutorostrataNumbers (Low/High/Best):1/1/1Features used in Species ID:Black body, short white pectoralsRepresentative images used for Species ID:Photographer:RyanFrame numbers:81 - 162Spacer:163Calculated distance from Trackline:0.64 km0.64 km163163
Time:14;33WP#:27Lat:35.148825Long:-74.442816Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OffTrackline:33Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:34WP#:28Lat:35.154434Long:-74.441113Species:Balaenoptera acutorostrataNumbers (Low/High/Best):1/1/1Features used in Species ID:Black body, short white pectoralsRepresentative images used for Species ID:143, 144, 145Photographer:RyanFrame numbers:81 - 162Spacer:163Calculated distance from Trackline:0.64 km163Final Time and Position of SightingTime:14:46WP#:29Lat:35.147380Long:-74.445225
Time:14;33WP#:27Lat:35.148825Long:-74.442816Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OffTrackline:33Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:34WP#:28Lat:35.154434Long:-74.441113Species:Balaenoptera acutorostrataNumbers (Low/High/Best):1/1/1Features used in Species ID:Black body, short white pectoralsRepresentative images used for Species ID:143, 144, 145Photographer:RyanFrame numbers:81 - 162Spacer:163Calculated distance from Trackline:0.64 km163Cong:-74.445225Time:14:46WP#:29Lat:35.147380Long:-74.445225Calculated Distance Traveled:0.69 km0.69 km0.69 km0.69 km0.69 km
Time:14;33WP#:27Lat:35.148825Long:-74.442816Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OffTrackline:33Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:34WP#:28Lat:35.154434Long:-74.441113Species:Balaenoptera acutorostrataNumbers (Low/High/Best):1/1/1Features used in Species ID:Black body, short white pectorals

Friday, November 30, 2012 Sighting $\# 7$
nitial sighting on Track
Time: 14:51 WP#: 31 Lat: 35.206940 Long: -74.298909
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
Dn/Off Effort: On Trackline: 33 Beaufort Sea State: 3
Observer: Ryan Observer side: Right
Actual Time and Position of Sighting
Time: N/A WP#: N/A Lat: N/A Long: N/A
Species: Ziphius cavirostris Numbers (Low/High/Best): 5/5/5
Features used in Species ID: Long body, dorsal fin sits way back on the body, white scaring
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:         14:58         WP#:         34         Lat:         35.200557         Long:         -74.685430
Calculated Distance Traveled: N/A
Sehavior and Additional Comments
lo resight
Friday, November 30, 2012 Sighting # 8
Friday, November 30, 2012 Sighting # 8 nitial sighting on Track
ee
nitial sighting on TrackTime:15:20WP#:40Lat:35.340172Long:-74.877815Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:Body
Initial sighting on Track           Time: 15:20         WP#: 40         Lat: 35.340172         Long: -74.877815
nitial sighting on TrackTime:15:20WP#:40Lat:35.340172Long:-74.877815Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:Body
Initial sighting on TrackTime:15:20WP#:40Lat:35.340172Long:-74.877815Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyDn/Off Effort:OnTrackline:34Beaufort Sea State:3
Initial sighting on Track         Time:       15:20       WP#:       40       Lat:       35.340172       Long:       -74.877815         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         Dn/Off Effort:       On       Trackline:       34       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right
initial sighting on TrackFime:15:20WP#:40Lat:35.340172Long:-74.877815Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:34Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingFime:15:22WP#:41Lat:35.330792Long:-74.878582
Initial sighting on Track         Time:       15:20       WP#:       40       Lat:       35.340172       Long:       -74.877815         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         Dn/Off Effort:       On       Trackline:       34       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right
initial sighting on TrackFime:15:20WP#:40Lat:35.340172Long:-74.877815Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:34Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingFime:15:22WP#:41Lat:35.330792Long:-74.878582Species:Tursiops truncatusNumbers (Low/High/Best):15 / 20 / 17
Initial sighting on Track         Fime:       15:20       WP#:       40       Lat:       35.340172       Long:       -74.877815         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       34       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right       3         Actual Time and Position of Sighting       Fime:       15:22       WP#:       41       Lat:       35.330792       Long:       -74.878582         Species:       Tursiops truncatus       Numbers (Low/High/Best):       15 / 20 / 17         Features used in Species ID:       Uniform grey animals, white peduncles
Initial sighting on Track         Fime:       15:20       WP#:       40       Lat:       35.340172       Long:       -74.877815         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         Dn/Off Effort:       On       Trackline:       34       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right         Actual Time and Position of Sighting         Fime:       15:22       WP#:       41       Lat:       35.330792       Long:       -74.878582         Species:       Tursiops truncatus       Numbers (Low/High/Best):       15 / 20 / 17         Features used in Species ID:       Uniform grey animals, white peduncles
Initial sighting on Track         Fime:       15:20       WP#:       40       Lat:       35.340172       Long:       -74.877815         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       34       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right       3         Actual Time and Position of Sighting       Fime:       15:22       WP#:       41       Lat:       35.330792       Long:       -74.878582         Species:       Tursiops truncatus       Numbers (Low/High/Best):       15 / 20 / 17         Features used in Species ID:       Uniform grey animals, white peduncles
Initial sighting on TrackFime:15:20WP#:40Lat:35.340172Long:-74.877815Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:34Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingFime:15:22WP#:41Lat:35.330792Long:-74.878582Species:Fursiops truncatusNumbers (Low/High/Best):15 / 20 / 17Features used in Species ID:Uniform grey animals, white pedunclesRepresentative images used for Species ID:164, 166, 167, 172, 176Photographer:RyanFrame numbers:164 - 191Spacer:192
nitial sighting on Track         Fime:       15:20       WP#:       40       Lat:       35.340172       Long:       -74.877815         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       34       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right       3         Actual Time and Position of Sighting       Fime:       15:22       WP#:       41       Lat:       35.330792       Long:       -74.878582         Species:       Tursiops truncatus       Numbers (Low/High/Best):       15 / 20 / 17         Features used in Species ID:       Uniform grey animals, white peduncles         Representative images used for Species ID:       164, 166, 167, 172, 176         Photographer:       Ryan       Frame numbers:       164 - 191       Spacer:       192         Calculated distance from Trackline:       1.05 km       192       3       3
nitial sighting on TrackFime:15:20WP#:40Lat:35.340172Long:-74.877815Vertical Angle:1Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:34Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingFime:15:22WP#:41Lat:35.330792Long:-74.878582Species:Tursiops truncatusNumbers (Low/High/Best):15 / 20 / 17Features used in Species ID:Uniform grey animals, white pedunclesRepresentative images used for Species ID:164, 166, 167, 172, 176Photographer:RyanFrame numbers:164 - 191Spacer:192Calculated distance from Trackline:1.05 kmFinal Time and Position of SightingFinal Time and Position of Sighting
initial sighting on Track         Fime:       15:20       WP#:       40       Lat:       35.340172       Long:       -74.877815         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       34       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right       3       3         Actual Time and Position of Sighting       Time:       15:22       WP#:       41       Lat:       35.330792       Long:       -74.878582         Species: Tursiops truncatus       Numbers (Low/High/Best):       15 / 20 / 17         Features used in Species ID:       Uniform grey animals, white peduncles         Representative images used for Species ID:       164, 166, 167, 172, 176         Photographer:       Ryan       Frame numbers:       164 - 191       Spacer:       192         Calculated distance from Trackline:       1.05 km       192       192       192         Calculated Distance Traveled:       0.48 km       0.48 km       104 km       105 km
nitial sighting on Track         Fime:       15:20       WP#:       40       Lat:       35.340172       Long:       -74.877815         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         Dn/Off Effort:       On       Trackline:       34       Beaufort Sea State:       3         Dbserver:       Ryan       Observer side:       Right       3       3         Actual Time and Position of Sighting       Time:       15:22       WP#:       41       Lat:       35.330792       Long:       -74.878582         Species:       Tursiops truncatus       Numbers (Low/High/Best):       15 / 20 / 17         Sequestative images used for Species ID:       164, 166, 167, 172, 176         Photographer:       Ryan       Frame numbers:       164 - 191       Spacer:       192         Calculated distance from Trackline:       1.05 km       1.05 km       192       192       192         Calculated Distance Traveled:       0.48 km       0.48 km       104 - 191       105 - 74.880740       104 - 191       105 - 74.880740
initial sighting on Track         Fime:       15:20       WP#:       40       Lat:       35.340172       Long:       -74.877815         Vertical Angle:       1       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       34       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right       3       3         Actual Time and Position of Sighting       Time:       15:22       WP#:       41       Lat:       35.330792       Long:       -74.878582         Species: Tursiops truncatus       Numbers (Low/High/Best):       15 / 20 / 17         Features used in Species ID:       Uniform grey animals, white peduncles         Representative images used for Species ID:       164, 166, 167, 172, 176         Photographer:       Ryan       Frame numbers:       164 - 191       Spacer:       192         Calculated distance from Trackline:       1.05 km       192       192       192         Calculated Distance Traveled:       0.48 km       0.48 km       104 km       105 km

Friday, November 30, 2012 Sighting $\#$ 9		
Initial sighting on Track		
Time: 15:29 WP#: 44 Lat: 35.332009	Long:	-74.785398
Vertical Angle: <u>2</u> Horizontal Bearing in Degrees: <u>9</u>	Sighting (	Cue: Body
On/Off Effort: On Trackline: 34 Be	aufort Sea Sta	ite: <u>3</u>
Observer: Ryan Observer side: Right		
Actual Time and Position of Sighting		
Time: N/A WP#: N/A Lat: N/A	Long:	N/A
Species: Ziphius cavirostris Numbers (Low	/High/Best):	4/4/4
Features used in Species ID: Long body, dorsal fin sits way back, lo	ong rostrum, wh	ite scaring
down body		
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: 15:34 WP#: 45 Lat: 35.337687	Long:	-74.773168
Calculated Distance Traveled: N/A		
Behavior and Additional Comments		
in line formation, no resight		

Saturday, December 1, 2012 Sighting $\#$ 1
Initial sighting on Track
Time: 10:04 WP#: 12 Lat: 35.482147 Long: -74.638990
Vertical Angle: <u>1</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Body</u>
On/Off Effort: On Trackline: 37 Beaufort Sea State: 4
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time: 10:09 WP#: 13 Lat: 35.483571 Long: -74.646833
Species: <i>Ziphius cavirostris</i> Numbers (Low/High/Best): 1/1/1
Features used in Species ID: Light coloration, small pectoral and dorsal fin, ~20ft long.
Representative images used for Species ID: NA
Photographer:         Erin         Frame numbers:         NA         Spacer:         NA
Calculated distance from Trackline: 0.73 km
Final Time and Position of Sighting
Time: NA WP#: NA Lat: NA Long: NA
Calculated Distance Traveled: NA
Behavior and Additional Comments
Animal with light body coloration with slightly darker head. Tapered head small pectoral and dorsal fin
Saturday, December 1, 2012 Sighting # 2
Saturday, December 1, 2012 Sighting # 2 Initial sighting on Track
6 6
Initial sighting on Track         Time:       10:35       WP#:       20       Lat:       35.553940       Long:       -74.792848         Vertical Angle:       4       Horizontal Bearing in Degrees:       90       Sighting Cue:       Spalsh
Initial sighting on Track           Time: 10:35         WP#: 20         Lat: 35.553940         Long: -74.792848
Initial sighting on Track         Time:       10:35       WP#:       20       Lat:       35.553940       Long:       -74.792848         Vertical Angle:       4       Horizontal Bearing in Degrees:       90       Sighting Cue:       Spalsh
Initial sighting on TrackTime:10:35WP#:20Lat:35.553940Long:-74.792848Vertical Angle:4Horizontal Bearing in Degrees:90Sighting Cue:SpalshOn/Off Effort:OnTrackline:38Beaufort Sea State:3Observer:ErinObserver side:Right
Initial sighting on Track         Time:       10:35       WP#:       20       Lat:       35.553940       Long:       -74.792848         Vertical Angle:       4       Horizontal Bearing in Degrees:       90       Sighting Cue:       Spalsh         On/Off Effort:       On       Trackline:       38       Beaufort Sea State:       3         Observer:       Erin       Observer side:       Right
Initial sighting on TrackTime:10:35WP#:20Lat:35.553940Long:-74.792848Vertical Angle:4Horizontal Bearing in Degrees:90Sighting Cue:SpalshOn/Off Effort:OnTrackline:38Beaufort Sea State:3Observer:ErinObserver side:RightTime: 10:36WP#:21Lat:35.559816Long:-74.792280
Initial sighting on Track         Time:       10:35       WP#:       20       Lat:       35.553940       Long:       -74.792848         Vertical Angle:       4       Horizontal Bearing in Degrees:       90       Sighting Cue:       Spalsh         On/Off Effort:       On       Trackline:       38       Beaufort Sea State:       3         Observer:       Erin       Observer side:       Right
Initial sighting on TrackTime:10:35WP#:20Lat:35.553940Long:-74.792848Vertical Angle:4Horizontal Bearing in Degrees:90Sighting Cue:SpalshOn/Off Effort:OnTrackline:38Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:10:36WP#:21Lat:35.559816Long:-74.792280Species:Stenella frontalisNumbers (Low/High/Best):24/28/26
Initial sighting on TrackTime:10:35WP#:20Lat:35.553940Long:-74.792848Vertical Angle:4Horizontal Bearing in Degrees:90Sighting Cue:SpalshOn/Off Effort:OnTrackline:38Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:10:36WP#:21Lat:35.559816Long:-74.792280Species:Stenella frontalisNumbers (Low/High/Best):24 / 28 / 26Features used in Species ID:Alternating light and dark coloration to body, slight spotting along
Initial sighting on TrackTime:10:35WP#:20Lat:35.553940Long:-74.792848Vertical Angle:4Horizontal Bearing in Degrees:90Sighting Cue:SpalshOn/Off Effort:OnTrackline:38Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:10:36WP#:21Lat:35.559816Long:-74.792280Species:Stenella frontalisNumbers (Low/High/Best):24 / 28 / 26Features used in Species ID:Alternating light and dark coloration to body, slight spotting alongbody, some animals with white tips to the rostrum.
Initial sighting on TrackTime:10:35WP#:20Lat:35.553940Long:-74.792848Vertical Angle:4Horizontal Bearing in Degrees:90Sighting Cue:SpalshOn/Off Effort:OnTrackline:38Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:10:36WP#:21Lat:35.559816Long:-74.792280Species:Stenella frontalisNumbers (Low/High/Best):24 / 28 / 26Features used in Species ID:Alternating light and dark coloration to body, slight spotting alongbody, some animals with white tips to the rostrum.4 & 11
Initial sighting on TrackTime:10:35WP#:20Lat:35.553940Long:-74.792848Vertical Angle:4Horizontal Bearing in Degrees:90Sighting Cue:SpalshOn/Off Effort:OnTrackline:38Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:10:36WP#:21Lat:35.559816Long:-74.792280Species:Stenella frontalisNumbers (Low/High/Best):24 / 28 / 26Features used in Species ID:Alternating light and dark coloration to body, slight spotting alongbody, some animals with white tips to the rostrum.Representative images used for Species ID:4 & 11Photographer:ErinFrame numbers:1-29Spacer:30Calculated distance from Trackline:0.66 km
Initial sighting on Track         Time:       10:35       WP#:       20       Lat:       35.553940       Long:       -74.792848         Vertical Angle:       4       Horizontal Bearing in Degrees:       90       Sighting Cue:       Spalsh         On/Off Effort:       On       Trackline:       38       Beaufort Sea State:       3         Observer:       Erin       Observer side:       Right         Actual Time and Position of Sighting         Time:       10:36       WP#:       21       Lat:       35.559816       Long:       -74.792280         Species:       Stenella frontalis       Numbers (Low/High/Best):       24 / 28 / 26         Features used in Species ID:       Alternating light and dark coloration to body, slight spotting along       body, some animals with white tips to the rostrum.         Representative images used for Species ID:       4 & 11         Photographer:       Erin       Frame numbers:       1-29       Spacer:       30         Calculated distance from Trackline:       0.66 km       M       4       4
Initial sighting on TrackTime:10:35WP#:20Lat:35.553940Long:-74.792848Vertical Angle:4Horizontal Bearing in Degrees:90Sighting Cue:SpalshOn/Off Effort:OnTrackline:38Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:10:36WP#:21Lat:35.559816Long:-74.792280Species:Stenella frontalisNumbers (Low/High/Best):24 / 28 / 26Features used in Species ID:Alternating light and dark coloration to body, slight spotting alongbody, some animals with white tips to the rostrum.Representative images used for Species ID:4 & 11Photographer:ErinFrame numbers:1-29Spacer:30Calculated distance from Trackline:0.66 kmFinal Time and Position of SightingTime:10:41WP#:22Lat:35.566214Long:-74.794487
Initial sighting on TrackTime:10:35WP#:20Lat:35.553940Long:-74.792848Vertical Angle:4Horizontal Bearing in Degrees:90Sighting Cue:SpalshOn/Off Effort:OnTrackline:38Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:10:36WP#:21Lat:35.559816Long:-74.792280Species:Stenella frontalisNumbers (Low/High/Best):24 / 28 / 26Features used in Species ID:Alternating light and dark coloration to body, slight spotting alongbody, some animals with white tips to the rostrum.Representative images used for Species ID:4 & 11Photographer:ErinFrame numbers:1-29Spacer:30Calculated distance from Trackline:0.66 kmFinal Time and Position of SightingTime:10:41WP#:22Lat:35.566214Long:-74.794487Calculated Distance Traveled:0.74 km
Initial sighting on TrackTime:10:35WP#:20Lat:35.553940Long:-74.792848Vertical Angle:4Horizontal Bearing in Degrees:90Sighting Cue:SpalshOn/Off Effort:OnTrackline:38Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:10:36WP#:21Lat:35.559816Long:-74.792280Species:Stenella frontalisNumbers (Low/High/Best):24 / 28 / 26Features used in Species ID:Alternating light and dark coloration to body, slight spotting alongbody, some animals with white tips to the rostrum.Representative images used for Species ID:4 & 11Photographer:ErinFrame numbers:1-29Spacer:30Calculated distance from Trackline:0.66 kmTime:10:41WP#:22Lat:35.566214Long:-74.794487Calculated Distance Traveled:0.74 kmBehavior and Additional Comments
Initial sighting on TrackTime:10:35WP#:20Lat:35.553940Long:-74.792848Vertical Angle:4Horizontal Bearing in Degrees:90Sighting Cue:SpalshOn/Off Effort:OnTrackline:38Beaufort Sea State:3Observer:ErinObserver side:RightActual Time and Position of SightingTime:10:36WP#:21Lat:35.559816Long:-74.792280Species:Stenella frontalisNumbers (Low/High/Best):24 / 28 / 26Features used in Species ID:Alternating light and dark coloration to body, slight spotting alongbody, some animals with white tips to the rostrum.Representative images used for Species ID:4 & 11Photographer:ErinFrame numbers:1-29Spacer:30Calculated distance from Trackline:0.66 kmFinal Time and Position of SightingTime:10:41WP#:22Lat:35.566214Long:-74.794487Calculated Distance Traveled:0.74 km

behavior during our observations.

Saturday, December 1, 2012 Sighting $\#$ 3
Initial sighting on Track
Time: 10:49 WP#: 25 Lat: 35.554109 Long: -74.451652
Vertical Angle: <u>3</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Body</u>
On/Off Effort: On Trackline: 38 Beaufort Sea State: 4
Observer: Ryan Observer side: Left
Actual Time and Position of Sighting
Time: 10:59 WP#: 26 Lat: 35.559542 Long: -74.461530
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best): 2/2/2
Features used in Species ID: Robust body appearance, grey coloration lighter blaze to behind
dorsal fin.
Representative images used for Species ID: 37 & 38
Photographer:    Erin    Frame numbers:    31-41    Spacer:    42
Calculated distance from Trackline: 1.08 km
Final Time and Position of Sighting
Time: 11:01 WP#: 27 Lat: 35.551972 Long: -74.460779
Calculated Distance Traveled: 0.84 km
Behavior and Additional Comments
Single animal with lighter grey head and thorax and lighter peduncle region. Animal surfaced quickly
then spent extended time below the surface. Two additional animals also observed, potentially a
juvenile as it was ~3/4 the adults size.
-
Saturday, December 1, 2012 Sighting $\#$ 4
Initial sighting on Track
Time:         11:04         WP#:         30         Lat:         35.548079         Long:         -74.359471
Vertical Angle:         2         Horizontal Bearing in Degrees:         90         Sighting Cue:         Splash
On/Off Effort:         On         Trackline:         38         Beaufort Sea State:         3
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time:         11:05         WP#:         31         Lat:         35.541047         Long:         -74.357903
Species: Globicephala macrorhynchus Numbers (Low/High/Best): 1/1/1
Features used in Species ID: Large square head, black body coloration with lighter suspenders
before dorsal fin, large dorsal fin $\sim$ 1/3 back the body
Representative images used for Species ID: 44, 45 & 50
Representative images used for Species ID:44, 45 & 50Photographer:ErinFrame numbers:43-42Spacer:53
Representative images used for Species ID: 44, 45 & 50
Representative images used for Species ID:44, 45 & 50Photographer:ErinFrame numbers:43-42Spacer:53
Representative images used for Species ID:44,45 & 50Photographer:ErinFrame numbers:43-42Spacer:53Calculated distance from Trackline:0.79 kmFinal Time and Position of Sighting
Representative images used for Species ID:44,45 & 50Photographer:ErinFrame numbers:43-42Spacer:53Calculated distance from Trackline:0.79 kmFinal Time and Position of Sighting
Representative images used for Species ID:44, 45 & 50Photographer:ErinFrame numbers:43-42Spacer:53Calculated distance from Trackline:0.79 kmFinal Time and Position of SightingTime:11:06WP#:32Lat:35.545466Long:-74.355275Calculated Distance Traveled:0.55 km0.55 kmCalculated Distance Traveled:0.55 km
Representative images used for Species ID:       44, 45 & 50         Photographer:       Erin       Frame numbers:       43-42       Spacer:       53         Calculated distance from Trackline:       0.79 km       0.79 km         Final Time and Position of Sighting       Time:       11:06       WP#:       32       Lat:       35.545466       Long:       -74.355275         Calculated Distance Traveled:       0.55 km       Behavior and Additional Comments       0.55 km       Distance Traveled:       0.55 km
Representative images used for Species ID:44, 45 & 50Photographer:ErinFrame numbers:43-42Spacer:53Calculated distance from Trackline:0.79 kmFinal Time and Position of SightingTime:11:06WP#:32Lat:35.545466Long:-74.355275Calculated Distance Traveled:0.55 km0.55 kmCalculated Distance Traveled:0.55 km

Saturday, December 1, 2012 ${ m Sigh}$	ting # 5		
Initial sighting on Track	-		
Time: <u>13:06</u> WP#: <u>43</u> Lat:	36.118932	Long:	-74.497152
Vertical Angle: <u>3</u> Horizontal Bearing	in Degrees: 90	Sighting	Cue: Body
On/Off Effort: Trackline:		ufort Sea Sta	ate: <u>3</u>
Observer: Ryan Observer side	e: Left		
Actual Time and Position of Sighting			
Time: <u>13:10</u> WP#: <u>44</u> Lat:	36.121488	Long:	-74.505460
Species:Globicephala macrorhynchus			
Features used in Species ID: Black body colorate	tion, large square he	ad, dorsal fin p	laced ~1/3
down animals body.		F 4 0 F F	
Representative images used for Species ID:		54 & 55	EG
Photographer: <u>Erin</u> Frame numbers: _	54 & 55 0.80 km	Spacer:	56
Calculated distance from Trackline:	0.00 KIII		
Final Time and Position of Sighting			
	36.127240	Long:	-74.499386
Calculated Distance Traveled: 0.84	- km		
Behavior and Additional Comments			
Three animals swimming as singles with large distar	nces between them.	Definite direc	tion to travel.
Saturday, December 1, 2012 Sigh Initial sighting on Track Time: <u>13:18</u> WP#: <u>47</u> Lat: <u></u> Vertical Angle: <u>2</u> Horizontal Bearing	<u>36.120238</u> in Degrees: <u>90</u>	_ 0 0	Cue: Body
On/Off Effort: <u>On</u> Trackline: <u></u> Observer: Ryan Observer side		ufort Sea Sta	ate: 2
	e: Left		
Actual Time and Position of Sighting			
Time: <u>13:20</u> WP#: <u>48</u> Lat:		Long:	
Species: Globicephala macrorhynchus	Numbers (Low/	<b>U</b> /	5/5/5
Features used in Species ID: Black body, large of	uorsai fin placed ~1/	5 Dack on anin	nais body.
Representative images used for Species ID:		57	
Photographer: Erin Frame numbers:		57	
Calculated distance from Trackline:	57 & 58	Snacer	59
	57 & 58 0.98 km	Spacer:	59
	57 & 58 0.98 km	Spacer:	59
Final Time and Position of Sighting	0.98 km		
Final Time and Position of Sighting         Time:       13:24       WP#:       49       Lat:	0.98 km 36.132564	Spacer:	-74.368132
Final Time and Position of SightingTime:13:24WP#:49Lat:Calculated Distance Traveled:1.24	0.98 km 36.132564		
Final Time and Position of SightingTime:13:24WP#:49Lat:Calculated Distance Traveled:1.24Behavior and Additional Comments	0.98 km 36.132564		
Final Time and Position of SightingTime:13:24WP#:49Lat:Calculated Distance Traveled:1.24	0.98 km 36.132564		

Saturday, December 1, 2012 Sighting # 7
Initial sighting on Track
Time: 14:05 WP#: 59 Lat: 35.973787 Long: -74.671210
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 43 Beaufort Sea State: 3
Observer: Ryan Observer side: Left
Actual Time and Position of Sighting
Time:         14:16         WP#:         60         Lat:         35.970768         Long:         -74.670173
Species: Globicephala macrorhynchus Numbers (Low/High/Best): 5/5/5
Features used in Species ID: Black body coloration, square head and large dorsal fin ~1/3 back
animals body.
Representative images used for Species ID: NA
Photographer: Erin Frame numbers: NA Spacer: NA
Calculated distance from Trackline: 0.35 km
Final Time and Position of Sighting
Time:   NA   WP#:   NA   Lat:   NA   Long:   NA
Calculated Distance Traveled: NA
Behavior and Additional Comments
A well dispersed group of animals showing hard surfacing then diving out of sight. Definite dedicated
traveling behavior. Difficult to photograph.
Saturday, December 1, 2012 Sighting $\#$ 8
Initial sighting on Track
Time: 14:25 WP#: 63 Lat: 35.973536 Long: -74.323910
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 43 Beaufort Sea State: 3
Observer: Ryan Observer side: Left
Actual Time and Position of Sighting
Time:         14:25         WP#:         64         Lat:         35.973986         Long:         -74.328506           Species:         Globicephala macrorhynchus         Numbers (Low/High/Best):         12 / 14 / 13
Features used in Species ID: Black body, square head large dorsal fin placed ~1/3 way back
animals body.
Representative images used for Species ID: 65 & 66
Photographer: Erin Frame numbers: 60-68 Spacer: 69
Calculated distance from Trackline: 0.42 km
Final Time and Desition of Sighting
Final Time and Position of Sighting
Time:         14:28         WP#:         65         Lat:         35.977343         Long:         -74.324014
Time:         14:28         WP#:         65         Lat:         35.977343         Long:         -74.324014           Calculated Distance Traveled:         0.55 km         0.55 km         -74.324014<
Time:       14:28       WP#:       65       Lat:       35.977343       Long:       -74.324014         Calculated Distance Traveled:       0.55 km       Behavior and Additional Comments       0.55 km       0.55 km
Time:         14:28         WP#:         65         Lat:         35.977343         Long:         -74.324014           Calculated Distance Traveled:         0.55 km         0.55 km         -74.324014<
Time:       14:28       WP#:       65       Lat:       35.977343       Long:       -74.324014         Calculated Distance Traveled:       0.55 km       0.55 km       Behavior and Additional Comments

Saturday, D	ecember 1, 2012 <b>S</b>	Sighting # 9		
Initial sighting on Tra	ck	0 0		
Time: 14:32 WP#	: <u>67</u> Lat:	35.902945	Long:	-74.440059
Vertical Angle: 2	Horizontal Bea	aring in Degrees:	90 Sighting	Cue: Body
On/Off Effort: On	Tracklin	e: 42	Beaufort Sea Sta	ate: 3
Observer: Erin	Observe	r side: Right		
Actual Time and Posi	tion of Sighting			
Time: 14:36 WP#	: 68 Lat:	35.903755	Long:	-74.436792
Species:Globicephala mad	rorhynchus	Numbers (I	.ow/High/Best):	3/3/3
Features used in Specie	s ID: Black body, I	large square head, laı	ge dorsal fin placed	~1/3 the way
back animals body.				
Representative images	used for Species	ID:	73 & 74	
Photographer: Erin	Frame numbe	ers: 70-74	Spacer:	75
Calculated distance from	m Trackline:	0.31 km		
Final Time and Positi	on of Sighting			
Time: 14:36 WP#	: 69 Lat:	35.898889	Long:	-74.436404
Calculated Distance Tra	aveled:	0.54 km		
Behavior and Additio	nal Comments			
Animals well spaced apart	from one another.			

Sunday, December 2, 2012 ${ m Sighting}$ # $$ 1	
Initial sighting on Track	
Time: 9:02 WP#: 3 Lat: 34.747658	Long:
Vertical Angle: <u>2</u> Horizontal Bearing in Degrees:	90 Sighting Cue: Body
On/Off Effort: On Trackline: 20	Beaufort Sea State: 2
Observer: Erin Observer side: Left	
Actual Time and Position of Sighting	
Time: 9:03 WP#: 4 Lat: 34.745702	Long: -75.932835
Species:Megaptera novaeangliae Numbers (I	Low/High/Best): 1/1/1
Features used in Species ID: Large black, baleen while with wh	nite pectorals
Representative images used for Species ID:	9, 23
Photographer: Ryan Frame numbers: 1-37	Spacer: <u></u> 38
Calculated distance from Trackline: 0.32 km	
Final Time and Position of Sighting	
Time: 9:12 WP#: 5 Lat: 34.750012	Long: -75.939570
Calculated Distance Traveled: 0.78 km	
Behavior and Additional Comments	
Hanging just below the surface, some deeper dives. Not surfacing	much
Sunday, December 2, 2012 Sighting # 2	
Initial sighting on Track	
Time: 9:21 WP#: 8 Lat: 34.546350	Long: <u>-75.665174</u>
Vertical Angle: <u>1</u> Horizontal Bearing in Degrees:	90 Sighting Cue: Body
On/Off Effort:OnTrackline:20Observer:ErinObserver side:Left	Beaufort Sea State: 3
Actual Time and Position of Sighting	
Time: 9:23 WP#: 9 Lat: 34.550714	
1 /	Low/High/Best): 6/6/6
Features used in Species ID: Uniform grey animals, robust, wh	ite peduncles
Poprosontative images used for Species ID:	46-49, 52
Representative images used for Species ID:         Photographer:       Ryan         Frame numbers:       39 - 53	Spacer: 54
Calculated distance from Trackline: 0.59 km	Space1
Final Time and Position of Sighting	
Time: 9:31 WP#: 10 Lat: 34.541610	Long:75.667585
Calculated Distance Traveled: 1.15 km	
Behavior and Additional Comments	
Traveling, jumping, deeper dives, feeding, evasive	

Su	nday, Deo	cember 2	2, 2012 Si	ighting # 3		
Initial sighting	on Trac	k				
Time: <u>9:36</u>	WP#:	9	Lat:	34.446008	Long:	-75.527835
Vertical Angle:	1			ing in Degrees:	100 Sighting	g Cue: Body
On/Off Effort: _	On			: 20	Beaufort Sea S	tate: <u>3</u>
Observer:	Erin	(	Observer	side: Left		
Actual Time ar	nd Positi	on of Si	ghting			
Time: 9:37	WP#:	12	Lat:	34.449417	Long:	-75.524725
Species:Ziphius c	avirostris			Numbers (I	Low/High/Best):	8/8/8
Features used in	n Species	ID: Lon	g white bo	ody, brown head, do	orsal fin set way ba	ck on body
<b>D</b>	•	1.0	<b>~ · ·</b>	<b>D</b>		
Representative i					55,62	05
Photographer:					Space	r: 85
Calculated dista				0.47 km		
Final Time and			<u> </u>			
Time: <u>9:40</u>				34.447233	Long:	-75.533096
Calculated Dista				0.81 km	1	
<b>Behavior and</b> A						
Logging, doing de	ep dives, s	taying 2-	3 body len	ngths apart		
Initial sighting Time: 9:42 Vertical Angle: On/Off Effort: 0 Observer: F Actual Time ar	on Trac WP#: 2 On Ryan ad Positi	k <u>15</u> Horizo T ( on of Si	Lat:	ighting # 4 34.406405 ring in Degrees: 20 side: Right 34.408173	_	tate: 3
Initial sightingTime:9:42Vertical Angle:On/Off Effort:Observer:FActual Time arTime:9:43Species:Unidential	on Trac WP#: 2 On Ryan nd Positi WP#:	k 15 Horizo: T (0 on of Si 16 lodon	Lat:	34.406405 ring in Degrees: : 20 side: Right 34.408173 Numbers (L	90 Sighting Beaufort Sea S Long: Low/High/Best):	-75.489960 -74 / 4 / 4
Initial sightingTime:9:42Vertical Angle:On/Off Effort:Observer:FActual Time arTime:9:43Species:Unidential	on Trac WP#: 2 On Ryan nd Positi WP#:	k 15 Horizo: T (0 on of Si 16 lodon	Lat:	34.406405 ting in Degrees: 20 side: Right 34.408173	90 Sighting Beaufort Sea S Long: Low/High/Best):	-75.489960 -74 / 4 / 4
Initial sighting Time: 9:42 Vertical Angle: On/Off Effort: 0 Observer: F Actual Time ar Time: 9:43 Species: Unidentif Features used in	on Trac WP#: 2 On Ryan <b>nd Positi</b> WP#: fied Mesop	k 15 Horizo: T ( on of Si 16 lodon ID: Lon	Lat:	34.406405 ring in Degrees: 20 side: Right 34.408173 Numbers (Lown body, long rost	90 Sighting Beaufort Sea S Long: Low/High/Best): rum, dorsal fin way	-75.489960 -74 / 4 / 4
Initial sighting Time: 9:42 Vertical Angle: On/Off Effort: 0 Observer: F Actual Time an Time: 9:43 Species: Unidentii Features used in Representative i	on Trac WP#: 2 On Ryan nd Positi WP#: fied Mesop n Species	k 15 Horizo: T (0 on of Si 16 lodon ID: Lon sed for S	Lat:	34.406405 ing in Degrees: 20 side: Right 34.408173 Numbers (L own body, long rost D:	90 Sighting Beaufort Sea S Long: Low/High/Best): rum, dorsal fin way 88, 89, 93, 94	g Cue: Body tate: 3 -75.489960 : 4/4/4 y back on body
Initial sighting Time: 9:42 Vertical Angle: On/Off Effort: 0 Observer: F Actual Time ar Time: 9:43 Species: Unidentif Features used in Representative in Photographer: 0	on Trac WP#: 2 On Ryan <b>nd Positi</b> WP#: fied Mesop n Species images un Ryan	k 15 Horizo: T C on of Si 16 lodon ID: Lon sed for S Frame	Lat:	34.406405 ing in Degrees: 2 : 20 side: Right 34.408173 Numbers (L own body, long rost D: s: 86 - 105	90 Sighting Beaufort Sea S Long: Low/High/Best): rum, dorsal fin way	g Cue: Body tate: 3 -75.489960 : 4/4/4 y back on body
Initial sighting Time: 9:42 Vertical Angle: On/Off Effort: 0 Observer: F Actual Time an Time: 9:43 Species: Unidentif Features used in Representative in Photographer: 0 Calculated dista	on Trac WP#: 2 On Ryan <b>nd Positi</b> WP#: fied Mesop n Species images un Ryan	k 15 Horizor T C on of Si 16 10 10 ID: Lon sed for S Frame Trackli	Lat:	34.406405 ing in Degrees: 20 side: Right 34.408173 Numbers (L own body, long rost D:	90 Sighting Beaufort Sea S Long: Low/High/Best): rum, dorsal fin way 88, 89, 93, 94	g Cue: Body tate: 3 -75.489960 : 4/4/4 y back on body
Initial sighting Time: 9:42 Vertical Angle: On/Off Effort: 0 Observer: F Actual Time ar Time: 9:43 Species: Unidential Features used in Representative in Photographer: 0 Calculated dista Final Time and	on Trac WP#: 2 On Ryan of Positi WP#: fied Mesop of Species images us Ryan unce from I Position	k 15 Horizo T (0 on of Si 16 10 10: Lon Sed for S Frame Tracklin n of Sig	Lat:	34.406405         ring in Degrees:         :       20         side:       Right         34.408173         Numbers (I         own body, long rost         D:         rs:       86 - 105         0.76 km	90 Sighting Beaufort Sea S Long: Low/High/Best): rum, dorsal fin way 88, 89, 93, 94 Space	g Cue:       Body         tate:       3         -75.489960         :       4/4/4         y back on body         :       106
Initial sighting         Time:       9:42         Vertical Angle:         On/Off Effort:         Observer:       F         Actual Time and         Time:       9:43         Species:       Unidential         Features used in         Representative in         Photographer:       Calculated distand         Final Time and         Time:       9:45	on Trac WP#: 2 On Ryan ad Positi WP#: fied Mesop a Species images us Ryan ince from I Position WP#:	k 15 Horizo: 7 0 0 0 16 10 10 10 10 10 10 10 10 10 10	Lat:	34.406405 ing in Degrees: 20 side: Right 34.408173 Numbers (L own body, long rost D: 5: 86 - 105 0.76 km 34.402725	90 Sighting Beaufort Sea S Long: Low/High/Best): rum, dorsal fin way 88, 89, 93, 94	g Cue: Body tate: 3 -75.489960 : 4/4/4 y back on body
Initial sighting Time: 9:42 Vertical Angle: On/Off Effort: 0 Observer: F Actual Time ar Time: 9:43 Species: Unidential Features used in Representative in Photographer: 0 Calculated dista Final Time and Time: 9:45 Calculated Dista	on Trac WP#: 2 On Ryan of Positi WP#: fied Mesop of Species images us Ryan unce from <b>H Position</b> WP#: ance Trav	k 15 Horizo T C on of Si 16 10 10 10 10 Lon Sed for S Frame Trackli n of Sig 17 veled:	Lat:	34.406405         ring in Degrees:         :       20         side:       Right         34.408173         Numbers (I         own body, long rost         D:         rs:       86 - 105         0.76 km	90 Sighting Beaufort Sea S Long: Low/High/Best): rum, dorsal fin way 88, 89, 93, 94 Space	g Cue:       Body         tate:       3         -75.489960         :       4/4/4         y back on body         :       106
Initial sighting Time: 9:42 Vertical Angle: On/Off Effort: 0 Observer: F Actual Time ar Time: 9:43 Species: Unidentif Features used in Representative if Photographer: 0 Calculated dista Final Time and Time: 9:45 Calculated Dista Behavior and A	on Trac WP#: 2 On Ryan ad Positi WP#: fied Mesop a Species images us Ryan ince from the Position WP#: ance Trav	k 15 Horizor T C on of Si 16 lodon ID: Lon sed for S Frame Trackli n of Sig 17 veled:	Lat:	34.406405 ing in Degrees: 20 side: <u>Right</u> 34.408173 Numbers (I own body, long rost D: <u>86 - 105</u> 0.76 km 34.402725 0.64 km	90 Sighting Beaufort Sea S Long: Low/High/Best): rum, dorsal fin way 88, 89, 93, 94 Space	g Cue:       Body         tate:       3         -75.489960         :       4/4/4         y back on body         :       106
Initial sighting Time: 9:42 Vertical Angle: On/Off Effort: 0 Observer: F Actual Time ar Time: 9:43 Species: Unidential Features used in Representative in Photographer: 0 Calculated dista Final Time and Time: 9:45 Calculated Dista	on Trac WP#: 2 On Ryan ad Positi WP#: fied Mesop a Species images us Ryan ince from the Position WP#: ance Trav	k 15 Horizor T C on of Si 16 lodon ID: Lon sed for S Frame Trackli n of Sig 17 veled:	Lat:	34.406405 ing in Degrees: 20 side: <u>Right</u> 34.408173 Numbers (I own body, long rost D: <u>86 - 105</u> 0.76 km 34.402725 0.64 km	90 Sighting Beaufort Sea S Long: Low/High/Best): rum, dorsal fin way 88, 89, 93, 94 Space	g Cue:       Body         tate:       3         -75.489960         :       4/4/4         y back on body         :       106

Initial sighting on Track
Initial signing on Track
Time: 10:11 WP#: 26 Lat: 34.733215 Long: -75.775983
Vertical Angle: <u>3</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Body</u>
On/Off Effort: On Trackline: 21 Beaufort Sea State: 3
Observer: Erin Observer side: Left
Actual Time and Position of Sighting
Time: 10:12 WP#: 27 Lat: 34.723346 Long: -75.782118
Species: Stenella frontalis Numbers (Low/High/Best): 65 / 95 / 85
Features used in Species ID: Alternating light and dark pattern down body
Representative images used for Species ID:107, 108, 129, 147, 167, 175
Photographer: Ryan Frame numbers: 107-176 Spacer: 177
Calculated distance from Trackline: 1.23 km
Final Time and Position of Sighting
Time: 10:18 WP#: 28 Lat: 34.722061 Long: -75.786974
Calculated Distance Traveled: 0.47 km
Behavior and Additional Comments
Traveling fast in a group, 1-2 body lengths apart. Quick to hit the surface, traveling just below.
Sunday, December 2, 2012 Sighting # 6
Initial sighting on Track
Vertical Angle: <u>3</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Splash</u>
Vertical Angle:3Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OnTrackline:22Beaufort Sea State:2
Vertical Angle:3Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OnTrackline:22Beaufort Sea State:2Observer:ErinObserver side:Left
Vertical Angle:3Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OnTrackline:22Beaufort Sea State:2Observer:ErinObserver side:LeftActual Time and Position of Sighting
Vertical Angle:3Horizontal Bearing in Degrees:90Sighting Cue:SplashOn/Off Effort:OnTrackline:22Beaufort Sea State:2Observer:ErinObserver side:LeftActual Time and Position of SightingTime:10:28WP#:34Lat:34.819990Long:-75.746810
Vertical Angle:       3       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       22       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Left       10:28       WP#:       34       Lat:       34.819990       Long:       -75.746810         Species:       Turnsiops truncatus       Numbers (Low/High/Best):       4/7/6
Vertical Angle:       3       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       22       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Left       10:28       WP#:       34       Lat:       34.819990       Long:       -75.746810         Species:       Turnsiops truncatus       Numbers (Low/High/Best):       4/7/6
Vertical Angle:       3       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       22       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Left       1000000000000000000000000000000000000
Vertical Angle:       3       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       22       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Left       2         Actual Time and Position of Sighting         Time:       10:28       WP#:       34       Lat:       34.819990       Long:       -75.746810         Species:       Tursiops truncatus       Numbers (Low/High/Best):       4/7/6         Features used in Species ID:       Representative images used for Species ID:       180, 181, 200, 202
Vertical Angle:       3       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       22       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Left       1000000000000000000000000000000000000
Vertical Angle:       3       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       22       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Left       2         Actual Time and Position of Sighting       Time:       10:28       WP#:       34       Lat:       34.819990       Long:       -75.746810         Species:       Tursiops truncatus       Numbers (Low/High/Best):       4/7/6         Features used in Species ID:       Robust, grey animals with white peduncles         Representative images used for Species ID:       180, 181, 200, 202         Photographer:       Ryan       Frame numbers:       178 - 203       Spacer:       204         Calculated distance from Trackline:       0.47 km       0.47 km       0.47 km
Vertical Angle:       3       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       22       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Left       2         Actual Time and Position of Sighting       Time:       10:28       WP#:       34       Lat:       34.819990       Long:       -75.746810         Species: Tursiops truncatus       Numbers (Low/High/Best):       4/7/6         Features used in Species ID:       Robust, grey animals with white peduncles         Representative images used for Species ID:       180, 181, 200, 202         Photographer:       Ryan       Frame numbers:       178 - 203       Spacer:       204         Calculated distance from Trackline:       0.47 km       Mark       50.47 km       50.47 km
Vertical Angle:       3       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       22       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Left       2       2         Actual Time and Position of Sighting       Time:       10:28       WP#:       34       Lat:       34.819990       Long:       -75.746810         Species:       Tursiops truncatus       Numbers (Low/High/Best):       4/7/6         Features used in Species ID:       Robust, grey animals with white peduncles         Representative images used for Species ID:       180, 181, 200, 202         Photographer:       Ryan       Frame numbers:       178 - 203       Spacer:       204         Calculated distance from Trackline:       0.47 km       M       178 - 203       Spacer:       204         Final Time and Position of Sighting       Time:       10:30       WP#:       35       Lat:       34.825046       Long:       -75.742448
Vertical Angle:       3       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       22       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Left       2         Actual Time and Position of Sighting       Time:       10:28       WP#:       34       Lat:       34.819990       Long:       -75.746810         Species:       Tursiops truncatus       Numbers (Low/High/Best):       4/7/6         Features used in Species ID:       Robust, grey animals with white peduncles         Representative images used for Species ID:       180, 181, 200, 202         Photographer:       Ryan       Frame numbers:       178 - 203       Spacer:       204         Calculated distance from Trackline:       0.47 km
Vertical Angle:       3       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       22       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Left       2         Actual Time and Position of Sighting       Time:       10:28       WP#:       34       Lat:       34.819990       Long:       -75.746810         Species:       Tursiops truncatus       Numbers (Low/High/Best):       4/7/6         Features used in Species ID:       Robust, grey animals with white peduncles         Representative images used for Species ID:       180, 181, 200, 202         Photographer:       Ryan       Frame numbers:       178 - 203       Spacer:       204         Calculated distance from Trackline:       0.47 km
Vertical Angle:       3       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       22       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Left       2         Actual Time and Position of Sighting         Time:       10:28       WP#:       34       Lat:       34.819990       Long:       -75.746810         Species:       Tursiops truncatus       Numbers (Low/High/Best):       4 / 7 / 6         Features used in Species ID:       Robust, grey animals with white peduncles         Representative images used for Species ID:       180, 181, 200, 202         Photographer:       Ryan       Frame numbers:       178 - 203       Spacer:       204         Calculated distance from Trackline:       0.47 km       0.47 km         Final Time and Position of Sighting       Time:       10:30       WP#:       35       Lat:       34.825046       Long:       -75.742448         Calculated Distance Traveled:       0.69 km       0.69 km       Behavior and Additional Comments
Vertical Angle:       3       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       22       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Left       2       2         Actual Time and Position of Sighting       Time:       10:28       WP#:       34       Lat:       34.819990       Long:       -75.746810         Species:       Tursiops truncatus       Numbers (Low/High/Best):       4/7/6         Features used in Species ID:       Robust, grey animals with white peduncles         Representative images used for Species ID:       180, 181, 200, 202         Photographer:       Ryan       Frame numbers:       178 - 203       Spacer:       204         Calculated distance from Trackline:       0.47 km       178 - 203       Spacer:       204         Final Time and Position of Sighting       Time:       10:30       WP#:       35       Lat:       34.825046       Long:       -75.742448

Sunday, December 2, 2012 Sighting $\# 7$
Initial sighting on Track
Time: 10:37 WP#: 39 Lat: 34.678187 Long: -75.565476
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 22 Beaufort Sea State: 3
Observer: Erin Observer side: Left
Actual Time and Position of Sighting
Time: 10:38 WP#: 40 Lat: 34.682574 Long: -75.562758
Species: Tursiops truncatus       Numbers (Low/High/Best): 4/4/4
Features used in Species ID: Robust, grey animals with white peduncles
Representative images used for Species ID:         209, 210, 217, 219, 223, 234, 235
Photographer:       Ryan       Frame numbers:       205 - 242       Spacer:       243         Calculated distance from Trackline:       0.55 km
Final Time and Position of Sighting
Time:         10:39         WP#:         41         Lat:         34.686739         Long:         -75.565582
Calculated Distance Traveled: 0.53 km
Behavior and Additional Comments
Swimming just below the surface, feeding, staying close together
Sunday, December 2, 2012 Sighting # 8         Initial sighting on Track         Time:       10:43       WP#:       43       Lat:       34.594281       Long:       -75.454063         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       22       Beaufort Sea State:       3         Observer:       Erin       Observer side:       Left
Actual Time and Position of Sighting
Time:       10:44       WP#:       44       Lat:       34.600899       Long:       -75.457848         Species:       Globicephala macrorhynchus       Numbers (Low/High/Best):       9 / 12 / 10         Features used in Species ID:       Black body, blunt head, large dorsal fin
Species:Globicephala macrorhynchus         Numbers (Low/High/Best):         9/12/10
Species: Globicephala macrorhynchus       Numbers (Low/High/Best): 9/12/10         Features used in Species ID:       Black body, blunt head, large dorsal fin
Species: Globicephala macrorhynchus       Numbers (Low/High/Best): 9/12/10         Features used in Species ID:       Black body, blunt head, large dorsal fin         Representative images used for Species ID:       244, 256, 257, 258         Photographer:       Ryan         Frame numbers:       244 - 271         Spacer:       272
Species: Globicephala macrorhynchus       Numbers (Low/High/Best):       9 / 12 / 10         Features used in Species ID:       Black body, blunt head, large dorsal fin         Representative images used for Species ID:       244, 256, 257, 258         Photographer:       Ryan       Frame numbers:       244 - 271         Calculated distance from Trackline:       0.81 km
Species: Globicephala macrorhynchus       Numbers (Low/High/Best):       9 / 12 / 10         Features used in Species ID:       Black body, blunt head, large dorsal fin         Representative images used for Species ID:       244, 256, 257, 258         Photographer:       Ryan       Frame numbers:       244 - 271         Calculated distance from Trackline:       0.81 km
Species: Globicephala macrorhynchus       Numbers (Low/High/Best):       9 / 12 / 10         Features used in Species ID:       Black body, blunt head, large dorsal fin       9 / 12 / 10         Representative images used for Species ID:       244, 256, 257, 258       9         Photographer:       Ryan       Frame numbers:       244 - 271       Spacer:       272         Calculated distance from Trackline:       0.81 km       0.81 km       9       10         Final Time and Position of Sighting       Time:       10:46       WP#:       45       Lat:       34.602325       Long:       -75.448891
Species: Globicephala macrorhynchus       Numbers (Low/High/Best):       9 / 12 / 10         Features used in Species ID:       Black body, blunt head, large dorsal fin         Representative images used for Species ID:       244, 256, 257, 258         Photographer:       Ryan       Frame numbers:       244 - 271         Calculated distance from Trackline:       0.81 km       272         Final Time and Position of Sighting       Time:       10:46       WP#:       45       Lat:       34.602325       Long:       -75.448891         Calculated Distance Traveled:       0.84 km       0.84 km       0.84 km       0.84 km
Species: Globicephala macrorhynchus       Numbers (Low/High/Best):       9/12/10         Features used in Species ID:       Black body, blunt head, large dorsal fin         Representative images used for Species ID:       244, 256, 257, 258         Photographer:       Ryan       Frame numbers:       244 - 271         Calculated distance from Trackline:       0.81 km         Final Time and Position of Sighting         Time:       10:46       WP#:       45       Lat:       34.602325       Long:       -75.448891         Calculated Distance Traveled:       0.84 km       0.84 km       Macro State Stat

Sunday, December 2, 2012 Sighting $\#$ 9
Initial sighting on Track
Time:         11:04         WP#:         49         Lat:         34.639317         Long:         -75.389857
Vertical Angle:         1         Horizontal Bearing in Degrees:         60         Sighting Cue:         Body
On/Off Effort: On Trackline: 23 Beaufort Sea State: 3
Observer: Erin Observer side: Left
Actual Time and Position of Sighting
Time:         11:05         WP#:         50         Lat:         34.643750         Long:         -75.394300
Species:Ziphius cavirostris         Numbers (Low/High/Best):         5 / 5 / 5
Features used in Species ID: Long white body, brown head, dorsal fin way down body
Representative images used for Species ID:       N/A         Photographer:       Ryan       Frame numbers:       N/A
Photographer:         Ryan         Frame numbers:         N/A         Spacer:         N/A           Calculated distance from Trackline:         0.64 km         0.64 km <td< td=""></td<>
Final Time and Position of Sighting
Time:         11:09         WP#:         51         Lat:         34.639347         Long:         -75.392130
Calculated Distance Traveled: 0.53 km
Behavior and Additional Comments
No photos
·
·
Logging at the surface, dove when we flew over
·
Logging at the surface, dove when we flew over
Logging at the surface, dove when we flew over Sunday, December 2, 2012 Sighting # 10
Logging at the surface, dove when we flew over Sunday, December 2, 2012 Sighting # 10 Initial sighting on Track
Logging at the surface, dove when we flew over         Sunday, December 2, 2012 Sighting # 10         Initial sighting on Track         Time:       13:10       WP#:       60       Lat:       34.890417       Long:       -75.586209
Logging at the surface, dove when we flew over         Sunday, December 2, 2012 Sighting # 10         Initial sighting on Track         Time:       13:10         WP#:       60       Lat:       34.890417         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Body
Logging at the surface, dove when we flew over         Sunday, December 2, 2012 Sighting # 10         Initial sighting on Track         Time:       13:10       WP#:       60       Lat:       34.890417       Long:       -75.586209         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       24       Beaufort Sea State:       1
Logging at the surface, dove when we flew over         Sunday, December 2, 2012 Sighting # 10         Initial sighting on Track         Time:       13:10       WP#:       60       Lat:       34.890417       Long:       -75.586209         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       24       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left       Left
Logging at the surface, dove when we flew over         Sunday, December 2, 2012 Sighting # 10         Initial sighting on Track         Time:       13:10       WP#:       60       Lat:       34.890417       Long:       -75.586209         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       24       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left       Left
Logging at the surface, dove when we flew over         Sunday, December 2, 2012 Sighting # 10         Initial sighting on Track         Time:       13:10       WP#:       60       Lat:       34.890417       Long:       -75.586209         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       24       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       13:11       WP#:       61       Lat:       34.884608       Long:       -75.560403
Logging at the surface, dove when we flew over         Sunday, December 2, 2012 Sighting # 10         Initial sighting on Track         Time:       13:10       WP#:       60       Lat:       34.890417       Long:       -75.586209         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       24       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       13:11       WP#:       61       Lat:       34.884608       Long:       -75.560403         Species:Stenella frontalis       Numbers (Low/High/Best):       75 / 100 / 80
Logging at the surface, dove when we flew over         Sunday, December 2, 2012 Sighting # 10         Initial sighting on Track         Time:       13:10       WP#:       60       Lat:       34.890417       Long:       -75.586209         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       24       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       13:11       WP#:       61       Lat:       34.884608       Long:       -75.560403         Species:Stenella frontalis       Numbers (Low/High/Best):       75 / 100 / 80
Logging at the surface, dove when we flew over         Sunday, December 2, 2012 Sighting # 10         Initial sighting on Track         Time:       13:10       WP#:       60       Lat:       34.890417       Long:       -75.586209         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       24       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       13:11       WP#:       61       Lat:       34.884608       Long:       -75.560403         Species:Stenella frontalis       Numbers (Low/High/Best):       75 / 100 / 80         Features used in Species ID: Alternating light and dark pattern down body       91
Logging at the surface, dove when we flew over         Sunday, December 2, 2012 Sighting # 10         Initial sighting on Track         Time:       13:10       WP#:       60       Lat:       34.890417       Long:       -75.586209         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       24       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       13:11       WP#:       61       Lat:       34.884608       Long:       -75.560403         Species:       Stenella frontalis       Numbers (Low/High/Best):       75 / 100 / 80         Features used in Species ID:       Alternating light and dark pattern down body
Logging at the surface, dove when we flew over         Sunday, December 2, 2012 Sighting # 10         Initial sighting on Track         Time:       13:10       WP#:       60       Lat:       34.890417       Long:       -75.586209         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       24       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       13:11       WP#:       61       Lat:       34.884608       Long:       -75.560403         Species: Stenella frontalis       Numbers (Low/High/Best):       75 / 100 / 80         Features used in Species ID:       Alternating light and dark pattern down body         Representative images used for Species ID:       280, 291, 300-302, 312, 324, 330, 335, 357         Photographer:       Ryan       Frame numbers:       273 - 400       Spacer:       401
Logging at the surface, dove when we flew over         Sunday, December 2, 2012 Sighting # 10         Initial sighting on Track         Time:       13:10       WP#:       60       Lat:       34.890417       Long:       -75.586209         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       24       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left       Left         Actual Time and Position of Sighting       Time:       13:11       WP#:       61       Lat:       34.884608       Long:       -75.560403         Species:Stenella frontalis       Numbers (Low/High/Best):       75 / 100 / 80         Features used in Species ID:       Alternating light and dark pattern down body         Representative images used for Species ID:       280, 291, 300-302, 312, 324, 330, 335, 357         Photographer:       Ryan       Frame numbers:       273 - 400       Spacer:       401         Calculated distance from Trackline:       2.44 km       Material       401       401
Logging at the surface, dove when we flew over         Sunday, December 2, 2012 Sighting # 10         Initial sighting on Track         Time:       13:10       WP#:       60       Lat:       34.890417       Long:       -75.586209         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       24       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       13:11       WP#:       61       Lat:       34.884608       Long:       -75.560403         Species: Stenella frontalis       Numbers (Low/High/Best):       75 / 100 / 80         Features used in Species ID:       Alternating light and dark pattern down body         Representative images used for Species ID:       280, 291, 300-302, 312, 324, 330, 335, 357         Photographer:       Ryan       Frame numbers:       273 - 400       Spacer:       401         Calculated distance from Trackline:       2.44 km       Final Time and Position of Sighting
Logging at the surface, dove when we flew over         Sunday, December 2, 2012 Sighting # 10         Initial sighting on Track         Time:       13:10       WP#:       60       Lat:       34.890417       Long:       -75.586209         Vertical Angle:       2       Horizontal Bearing in Degrees:       45       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       24       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left       Left         Actual Time and Position of Sighting       Time:       13:11       WP#:       61       Lat:       34.884608       Long:       -75.560403         Species:Stenella frontalis       Numbers (Low/High/Best):       75 / 100 / 80         Features used in Species ID:       Alternating light and dark pattern down body         Representative images used for Species ID:       280, 291, 300-302, 312, 324, 330, 335, 357         Photographer:       Ryan       Frame numbers:       273 - 400       Spacer:       401         Calculated distance from Trackline:       2.44 km       Material       401       101

Large group, traveling fast, jumping, darting different directions

Sunday, December 2, 2012 Sighting # 11
Initial sighting on Track
Time: <u>13:27</u> WP#: <u>66</u> Lat: <u>34.774250</u> Long: <u>-75.425548</u>
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Splash
On/Off Effort: On Trackline: 24 Beaufort Sea State: 2
Observer: Erin Observer side: Left
Actual Time and Position of Sighting
Time: 13:28 WP#: 67 Lat: 34.777744 Long: -75.423560
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best): 10/15/10
Features used in Species ID: Robust, grey animals with white peduncles
Representative images used for Species ID: 410, 414, 418, 419
Photographer:         Ryan         Frame numbers:         402 - 420         Spacer:         421
Calculated distance from Trackline: 0.43 km
Final Time and Position of Sighting
Time: 13:30 WP#: 68 Lat: 34.779807 Long: -75.419636
Calculated Distance Traveled: 0.43 km
Behavior and Additional Comments
Spaced into 2 groups, traveling
Sunday, December 2, 2012 Sighting # 12
Initial sighting on Track
Initial sighting on Track           Time:         14:05         WP#:         78         Lat:         35.027097         Long:         -75.629516
Initial sighting on Track         Time:       14:05       WP#:       78       Lat:       35.027097       Long:       -75.629516         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body
Initial sighting on Track         Time:       14:05       WP#:       78       Lat:       35.027097       Long:       -75.629516         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       25       Beaufort Sea State:       1
Initial sighting on Track         Time:       14:05       WP#:       78       Lat:       35.027097       Long:       -75.629516         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       25       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left
Initial sighting on Track         Time:       14:05       WP#:       78       Lat:       35.027097       Long:       -75.629516         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       25       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left
Initial sighting on TrackTime:14:05WP#:78Lat:35.027097Long:-75.629516Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:25Beaufort Sea State:1Observer:ErinObserver side:LeftImage: 14:12WP#:79Lat:35.019581Long:-75.633433
Initial sighting on Track         Time:       14:05       WP#:       78       Lat:       35.027097       Long:       -75.629516         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       25       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       14:12       WP#:       79       Lat:       35.019581       Long:       -75.633433         Species:       Megaptera novaeangliae       Numbers (Low/High/Best):       1/1/1
Initial sighting on TrackTime:14:05WP#:78Lat:35.027097Long:-75.629516Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:25Beaufort Sea State:1Observer:ErinObserver side:LeftImage: 14:12WP#:79Lat:35.019581Long:-75.633433
Initial sighting on Track         Time:       14:05       WP#:       78       Lat:       35.027097       Long:       -75.629516         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       25       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       14:12       WP#:       79       Lat:       35.019581       Long:       -75.633433         Species:       Megaptera novaeangliae       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Black body, baleen whale, dorsal fin
Initial sighting on Track         Time:       14:05       WP#:       78       Lat:       35.027097       Long:       -75.629516         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       25       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       14:12       WP#:       79       Lat:       35.019581       Long:       -75.633433         Species:       Megaptera novaeangliae       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Black body, baleen whale, dorsal fin
Initial sighting on TrackTime:14:05WP#:78Lat:35.027097Long:-75.629516Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:25Beaufort Sea State:1Observer:ErinObserver side:LeftActual Time and Position of SightingTime:14:12WP#:79Lat:35.019581Long:-75.633433Species:Megaptera novaeangliaeNumbers (Low/High/Best):1/1/1Features used in Species ID:Black body, baleen whale, dorsal finRepresentative images used for Species ID:423, 426, 451, 476, 486Photographer:RyanFrame numbers:422 - 506Spacer:507
Initial sighting on TrackTime:14:05WP#:78Lat:35.027097Long:-75.629516Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:25Beaufort Sea State:1Observer:ErinObserver side:LeftActual Time and Position of SightingTime:14:12WP#:79Lat:35.019581Long:-75.633433Species:Megaptera novaeangliaeNumbers (Low/High/Best):1 / 1 / 1Features used in Species ID:Black body, baleen whale, dorsal finRepresentative images used for Species ID:423, 426, 451, 476, 486Photographer:RyanFrame numbers:422 - 506Spacer:507Calculated distance from Trackline:0.91 km
Initial sighting on Track         Time:       14:05       WP#:       78       Lat:       35.027097       Long:       -75.629516         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       25       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       14:12       WP#:       79       Lat:       35.019581       Long:       -75.633433         Species:       Megaptera novaeangliae       Numbers (Low/High/Best):       1 / 1 / 1         Features used in Species ID:       Black body, baleen whale, dorsal fin         Representative images used for Species ID:       423, 426, 451, 476, 486         Photographer:       Ryan       Frame numbers:       422 - 506       Spacer:       507         Calculated distance from Trackline:       0.91 km       M       Final Time and Position of Sighting
Initial sighting on Track         Time:       14:05       WP#:       78       Lat:       35.027097       Long:       -75.629516         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       25       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       14:12       WP#:       79       Lat:       35.019581       Long:       -75.633433         Species:Megaptera novaeangliae       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Black body, baleen whale, dorsal fin         Representative images used for Species ID:       423, 426, 451, 476, 486         Photographer:       Ryan       Frame numbers:       422 - 506       Spacer:       507         Calculated distance from Trackline:       0.91 km       502       507       507         Final Time and Position of Sighting       1       1.01 km       50.023768       Long:       -75.644898
Initial sighting on Track         Time:       14:05       WP#:       78       Lat:       35.027097       Long:       -75.629516         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       25       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       14:12       WP#:       79       Lat:       35.019581       Long:       -75.633433         Species:       Megaptera novaeangliae       Numbers (Low/High/Best):       1 / 1 / 1         Features used in Species ID:       Black body, baleen whale, dorsal fin         Representative images used for Species ID:       423, 426, 451, 476, 486         Photographer:       Ryan       Frame numbers:       422 - 506       Spacer:       507         Calculated distance from Trackline:       0.91 km       M       Final Time and Position of Sighting
Initial sighting on Track         Time:       14:05       WP#:       78       Lat:       35.027097       Long:       -75.629516         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       25       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left         Actual Time and Position of Sighting         Time:       14:12       WP#:       79       Lat:       35.019581       Long:       -75.633433         Species:Megaptera novaeangliae       Numbers (Low/High/Best):       1/1/1         Features used in Species ID:       Black body, baleen whale, dorsal fin         Representative images used for Species ID:       423, 426, 451, 476, 486         Photographer:       Ryan       Frame numbers:       422 - 506       Spacer:       507         Calculated distance from Trackline:       0.91 km       502       507       507         Final Time and Position of Sighting       1       1.01 km       50.023768       Long:       -75.644898
Initial sighting on Track         Time:       14:05       WP#:       78       Lat:       35.027097       Long:       -75.629516         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       25       Beaufort Sea State:       1         Observer:       Erin       Observer side:       Left       1         Actual Time and Position of Sighting       Time:       14:12       WP#:       79       Lat:       35.019581       Long:       -75.633433         Species:       Megaptera novaeangliae       Numbers (Low/High/Best):       1 / 1 / 1         Features used in Species ID:       Black body, baleen whale, dorsal fin         Representative images used for Species ID:       423, 426, 451, 476, 486         Photographer:       Ryan       Frame numbers:       422 - 506       Spacer:       507         Calculated distance from Trackline:       0.91 km       1       1       1         Final Time and Position of Sighting       Time:       1.4:44       WP#:       80       Lat:       35.023768       Long:       -75.644898         Calculated Distance       Traveled:       1.14 km       1.14 km       1.14 km

### The Sighting Summary Sheet

The Sighting Summary, adapted from the Sighting Data Sheet used in the field, integrates data gathered in the field with results from lab analyses to provide a full summary of each marine mammal sighting (note – this sheet only deals with marine mammal sightings). A Sighting Summary is to be completed for all sightings, including sightings made while off-effort during transits between survey legs, as well as sighting cues that never led to a sighting that was 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-heading 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*" is used. If the animal could be ID'd as a cetacean only, then "unidentified cetacean" is used. 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" is used.

**Criteria used to identify species:** Which species specific diagnostic features were used in classifying a sighting to species (see information on diagnosis of 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 is used, in that only animals roughly half the size of the associated larger animal (the presumed mother) are designated as calves.

**Calculated Distance from Track Line:** The distances between the break track waypoint (2.0) and the initial position of each sighting (2.4) is calculated using the online software 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 are rounded to 0.1 km.

**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. If taking a shot of the interior of the plane, put the camera focus setting on "manual", take the picture, then immediately set it back to "automatic".

#### **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 to the presence of the plane.

## January 30, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Megaptera novaeangliae	1	1	4	25
Tursiops truncatus	1	3	4	25
Unidentified delphinid	1	1	4	20
Caretta caretta	1	1	3	26
Unidentified sea turtle	1	1	3	27
Unidentified chondrichthyes	1	1	3	29



## January 31, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Balaenoptera acutorostrata	1	2	4	35
Delphinus delphis	1	1	3	34
Unidentified mesoplodon	1	4	4	37
Unidentified mesoplodon	1	3	4	36
Physeter macrocephalus	1	1	3	33
Tursiops truncatus	1	6	4	36
Ziphius cavirostris	1	1	4	39
Manta birostris	1	1	4	38
Unidentified chodrichthyes	5	6	3 to 4	-



## February 1, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Unidentified balaenopterid	1	1	5	31
Balaenoptera physalus	1	1	5	43
Balaenoptera physalus	1	2	5	31
Delphinus delphis	1	18	5	40
Globicephala macrorhynchus	1	15	5	41
Globicephala macrorhynchus	1	4	5	40
Stenella coeruleoalba	1	450	4	45
Stenella coeruleoalba	1	250	5	40
Tursiops truncatus	1	9	5	40
Unidentified sea turtle	1	1	3	45
Manta birostris	1	1	5	40
Unidentified chondrichetheyes	1	1	5	42



# March 14, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Balaenoptera acutorostrata	1	2	2	30
Unidentified cetacean	1	1	2	26
Unidentified cetacean	1	1	2	28
Globicephala macrorhynchus	1	21	3	25
Globicephala macrorhynchus	1	16	2	26
Megaptera novaeangliae	1	1	2	inshore
Peponocephala electra	1	185	2	31
Physeter macrocephalus	1	1	2	30
Tursiops truncatus	1	14	3	25
Caretta caretta	4	5	1 to 3	-
Unidentified sea turtle	1	1	3	23
Mola mola	1	1	2	27
Manta birostris	4	4	2 to 3	-
Unidentified chondrichthyes	6	10	1 to 3	-



### Appendix D

# March 15, 2012



Species	Number of	Number of	Beaufort Sea	Line Number	
	Sightings	Individuals	State	Line Humber	1
Balaenoptera acutorostrata	1	2	2	-	*
Balaenoptera acutorostrata	1	2	2	33	*
Balaenoptera physalus	1	1	2	33	
Balaenoptera physalus	1	3	2	44	
Unidentified cetacean	1	1	3	37	
Delphinus delphis	1	75	3	45	
Delphinus delphis	1	110	3	43	*
Delphinus delphis	1	125	3	39	
Globicephala macrorhynchus	1	25	2	33	
Globicephala macrorhynchus	1	18	3	43	
Unidentified Mesoplodon	1	3	2	32	
Megaptera novaeangliae	1	1	3	38	Δ
Peponocephala electra	1	210	2	33	
Stenella coeruleoalba	1	75	3	45	
Stenella coeruleoalba	1	110	3	43	*
Stenella frontalis	1	26	2	32	
Tursiops truncatus	1	28	3	37	
Tursiops truncatus	1	8	3	37	
Tursiops truncatus	1	35	3	38	
Tursiops truncatus	1	40	3	38	
Tursiops truncatus	1	8	3	45	
Tursiops truncatus	1	4	2	45	
Tursiops truncatus	1	26	2	45	
Tursiops truncatus	1	20	3	43	
Tursiops truncatus	1	15	3	43	
Unidentified cetacean	1	2	3	39	
Caretta caretta	3	5	3	-	
Unidentified sea turtle	1	1	3	45	
Mola mola	4	6	2	-	
Manta birostris	1	1	3	37	
Unidentified chondrichthyes	2	2	2 to 3	-	



May 3, 2012



Species	Number of	Number of	Beaufort Sea	Line Number
Species	Sightings	Individuals	State	Line Number
Grampus griseus	1	13	2	32
Stenella frontalis	1	19	3	-
Tursiops truncatus	1	4	3	37
Caretta caretta	4	4	2	-
Manta birostris	1	1	3	34



### Appendix D

### May 4, 2012



Oracias	Number of	Number of	Beaufort Sea	Line Neurober
Species	Sightings	Individuals	State	Line Number
Delphinus delphis	1	37	1	45
Delphinus delphis	1	40	1	45
Delphinus delphis	1	45	1	44
Delphinus delphis	1	225	1	43
Globicephala macrorhynchus	1	5	1	40
Globicephala macrorhynchus	1	11	1	40
Unidentified mesoplodon	1	1	1	44
Unidentified mesoplodon	1	1	2	39
Unidentified mesoplodon	1	1	1	39
Megaptera novaeangliae	1	1	2	38
Physeter macrocephalus	1	2	1	45
Stenella frontalis	1	48	1	45
Stenella frontalis	1	58	1	43
Tursiops truncatus	1	7	1	45
Tursiops truncatus	1	39	1	45
Tursiops truncatus	1	8	1	45
Tursiops truncatus	1	13	1	43
Tursiops truncatus	1	23	1	42
Tursiops truncatus	1	32	1	41
Tursiops truncatus	1	40	1	41
Tursiops truncatus	1	34	1	40
Tursiops truncatus	1	50	1	40
Tursiops truncatus	1	30	2	39
Tursiops truncatus	1	48	2	38
Tursiops truncatus	1	8	2	38
Tursiops truncatus	1	2	2	38
Physeter macrocephalus	1	2	1	43
Physeter macrocephalus	1	3	1	41
Caretta caretta	18	35	1 to 3	-
Unidentified sea turtle	2	2	1 to 2	-
Mola mola	2	2	1	-
Manta birostris	14	24	1 to 2	-
Unidentified chondrichthyes	7	17	2 to 3	-



# June 8, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Unidentified delphinid	1	8	4	20
Grampus griseus	1	8	1	26
Unidentified mesoplodon	1	2	1	26
Stenella clymene	1	65	1	26
Tursiops truncatus	1	25	3	23
Tursiops truncatus	1	15	2	24
Caretta caretta	1	2	2	26
Manta birostris	2	2	2	24



June 9, 2012



Spacias	Number of	Number of	Beaufort Sea	Line Number
Species	Sightings	Individuals	State	Line Number
Grampus griseus	1	7	3	45
Globicephala macrorhynchus	1	9	3	32
Globicephala macrorhynchus	1	8	3	45
Globicephala macrorhynchus	1	2	3	44
Globicephala macrorhynchus	1	31	3	44
Globicephala macrorhynchus	1	2	3	42
Globicephala macrorhynchus	1	11	3	42
Tursiops truncatus	1	11	3	34
Tursiops truncatus	1	34	3	34
Tursiops truncatus	1	2	3	35
Tursiops truncatus	1	29	3	44
Tursiops truncatus	1	21	3	43
Tursiops truncatus	1	22	3	43
Ziphius cavirostris	1	2	3	35
Caretta caretta	3	3	3	-
Manta birostris	6	9	3	-
Rhino bonasus	2	215	3	-


# June 10, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Globicephala macrorhynchus	1	7	2	41
Globicephala macrorhynchus	1	12	3	40
Globicephala macrorhynchus	1	45	2	39
Stenella clymene	1	100	3	37
Stenella frontalis	1	25	3	38
Tursiops truncatus	1	8	2	41
Tursiops truncatus	1	40	4	41
Tursiops truncatus	1	35	3	39
Tursiops truncatus	1	35	3	37
Ziphius cavirostris	1	1	3	38
Caretta caretta	3	3	2 to 3	-
Manta birostris	3	3	2 to 4	-
Unidentified chondrichthyes	2	2	2 to 3	-



## August 30, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Grampus griseus	1	6	2	38
Grampus griseus	1	4	3	40
Globicephala macrorhynchus	1	18	2	38
Globicephala macrorhynchus	1	41	2	39
Globicephala macrorhynchus	1	4	2	40
Globicephala macrorhynchus	1	15	2	40
Globicephala macrorhynchus	1	7	1	41
Unidentified Mesoplodon	1	3	3	21
Tursiops truncatus	1	33	2	38
Tursiops truncatus	1	11	2	38
Tursiops truncatus	1	9	3	38
Tursiops truncatus	1	18	1	41
Ziphius cavirostris	1	1	2	39
Ziphius cavirostris	1	4	3	41
Ziphius cavirostris	1	1	1	41
Caretta caretta	4	4	2 to 3	-
Manta birostris	4	5	2	-



# September 21, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Globicephala macrorhynchus	1	5	3	22
Ziphius cavirostris	1	2	3	28
Caretta caretta	1	1	4	20
Manta birostris	2	3	3	-



## November 30, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number	
Balaenoptera acutorostrata	1	1	3	33	*
Unidentified mesoplodon	1	3	4	31	L
Physeter macrocephalus	1	6	3	33	L
Tursiops truncatus	1	13	4	30	L
Tursiops truncatus	1	4	3	32	L
Tursiops truncatus	1	17	3	34	
Ziphius cavirostris	1	5	4	31	*
Ziphius cavirostris	1	5	3	33	
Ziphius cavirostris	1	4	3	34	



### December 1, 2012



Species	Number of	Number of	Beaufort Sea	Line Number
Species	Sightings	Individuals	State	Line Number
Globicephala macrorhynchus	1	1	3	38
Globicephala macrorhynchus	1	3	3	45
Globicephala macrorhynchus	1	5	2	45
Globicephala macrorhynchus	1	5	3	43
Globicephala macrorhynchus	1	13	3	43
Globicephala macrorhynchus	1	3	3	42
Stenella frontalis	1	26	3	38
Tursiops truncatus	1	2	4	38
Ziphius cavirostris	1	1	4	37
Caretta caretta	2	2	3 to 4	-
Unidentified chondrichthyes	4	5	3	-



## December 2, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Globicephala macrorhynchus	1	10	3	22
Unidentified mesoplodon	1	4	3	20
Megaptera novaeangliae	1	1	2	20
Megaptera novaeangliae	1	1	1	25
Stenella frontalis	1	85	3	21
Stenella frontalis	1	80	1	24
Tursiops truncatus	1	6	3	20
Tursiops truncatus	1	6	2	22
Tursiops truncatus	1	4	3	22
Tursiops truncatus	1	10	2	24
Ziphius cavirostris	1	8	3	20
Ziphius cavirostris	1	5	3	23
Caretta caretta	6	6	1 to 2	-
Unidentified sea turtle	2	2	1 to 2	-
Manta birostris	1	1	1	21
Unidentified chondrichthyes	2	2	2 to 3	1



### PROTECTED SPECIES MONITORING IN THE VIRGINIA CAPES OPAREA OFF HATTERAS, NC JANUARY 2012 - DECEMBER 2012



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### **Cape Hatteras Vessel Surveys**

### Methodology

#### Study Area

The study area within the Virginia Capes (VACAPES) OPAREA is located east of Cape Hatteras, NC and incorporates a large portion of the Cape Hatteras Special Research Area (CHSRA), designated by NOAA Fisheries. The area is approximately 16000 km<sup>2</sup> in extent and straddles the continental shelf break, including both shelf and pelagic waters (Figure 1). The survey area excludes nearshore coastal waters where the spatial distribution and relative abundance of coastal bottlenose dolphins (*Tursiops truncatus*) has been well established (Torres *et al.* 2003; Torres *et al.* 2005).



Figure 1. Map of the Cape Hatteras survey area.

#### **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. Vessel surveys were conducted to address questions of residency and population structure of several cetacean species in the Cape Hatteras study area. Specifically, the objectives of these surveys were to: (1) document the distribution of marine mammals off Cape Hatteras; and (2) collect photo-identification images and biopsy samples from representative cetacean species in this area.

Surveys for cetaceans and other marine megafauna were conducted from a variety of survey platforms including large research vessels, offshore charter fishing vessels and small rigid hull inflatables. The F/V *Sea Creature* and R/V *Cape Hatteras* were used during dedicated AFAST photo-ID and biopsy surveys conducted in February, March and October 2012. Funding for ship time aboard the R/V *Cape* 



*Figure 2*. Vessel survey platforms, the F/V *Hog Wild* (a), and the R/V *SRVx and* R/V *Exocetus* (b).

*Hatteras* was provided by the Duke/University of North Carolina Oceanographic Consortium (DUNCOC). Additional surveys were conducted from the F/V *Hog Wild*, the R/V *SRVx*, and the R/V *Exocetus* (Figures 2a and b); the F/V *Samanna* and the R/V *Wavelet* were used for a behavioral response study of short-finned pilot whales funded by the Strategic Environmental Research and Development Program (SERDP) conducted during the summer of 2012. Observations were made from the rigid hull inflatable or from the vessels' flying bridge 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 track. The location, species and behavior of each cetacean group was recorded, along with the location and species for each turtle sighting. Environmental conditions (weather, sea state, depth and sea surface temperature) were recorded at each sighting and whenever sighting conditions changed, using an iPad tablet and a linked GPS unit.

In addition, photo-identification and biopsy techniques were used to examine the use of the Cape Hatteras survey area by individual cetaceans. Thus, whenever possible, photographs of cetaceans for individual photo-identification were obtained; these photographs were also used to confirm species identification at each sighting and to compare identification features with those used by the aerial survey team. Photographs were obtained 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. Remote biopsy sampling methods were employed to collect small skin and blubber samples using a variety of 27 kg – 68 kg pull crossbows, depending on the species and sampling distance. Biopsy samples were obtained with a specialized 2.5 cm stainless biopsy tip attached to a modified bolt, typically fired from the bow of the survey vessel.

#### Passive Acoustic Monitoring

Three types of passive acoustic monitoring techniques were employed in the Cape Hatteras survey area: a towed hydrophone array, an autonomous glider outfitted with an acoustic recorder, and autonomous bottom-mounted High-frequency Acoustic Recording Packages (HARPs).

#### Towed array

During the October 2012 survey, a four-element hydrophone array was towed approximately 170 m behind the R/V *Cape Hatteras* to detect the presence of vocalizing cetaceans. Acoustic signals were transmitted to an analog-to-digital converter/mixer (MOTU Traveler, MOTU, Cambridge, MA) sampling at 192 kHz. Continuous recordings were made on laptop computers using *Pamguard 1.11.02* and *Ishmael 1.0* software. Recordings were made the entire time the array was in the water, and monitored in real time by an acoustician.

#### Seaglider

On 09 October 2012, a buoyancy-driven iRobot Seaglider® was deployed at 35.3638° N, 74.8068° W to collect autonomous passive acoustic recordings of vocalizing cetaceans along the continental shelf break. The glider was outfitted with a digital acoustic monitor (DMON) programmed to make continuous acoustic recordings at a sampling rate of 120 kHz. At each surfacing, the glider transmitted its geographic coordinates and received course instructions from a shore-based pilot via satellite link. During the two-day deployment, the glider completed nine dives to depths up to 900 m, collecting approximately 18 hours of recordings. Due to the strong current of the Gulf Stream, the glider was unable to maintain position along the shelf break and drifted 63 km to the northeast. The glider was retrieved by the R/V *Cape Hatteras* on 10 October at 35.7881° N, 74.3413° W.

#### **Bottom-mounted Recorders**

To collect time-series of acoustic data in the Cape Hatteras survey area, autonomous Highfrequency Acoustic Recording Packages (HARPs; Wiggins and Hildebrand 2007) were utilized. The HARP data-logging system includes a 16-bit A/D converter, a hydrophone suspended approximately 12 m above the seafloor, an acoustic release system, ballast weights, and flotation (Figure 3). 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.

A HARP was deployed at a depth of 950 m at 35.34054° N, 74.85761° W (Site A) on 15 March 2012 and recovered 9 on October 2012 (Table 1, Figure 4), yielding a deployment period of 208 days. Another HARP was subsequently deployed on 9 October 2012 in 970 m of water at 35.34058° N, 74.85590° W (Site A). This instrument is still in the field and is expected to be recovered during spring 2013. Both HARPs were programmed to sample continuously at 200 kHz. Data collection during the initial 2012 Cape Hatteras Site A deployment was limited by an instrument malfunction, which caused recording to stop on 11 April 2012. The deployment

provided a total of 636.75 hours of data over the 28 days the instrument recorded (15 March 2012 - 11 April 2012).



*Figure 3*. Schematic diagram showing details of 2012 Cape Hatteras Site A HARP deployments. Note that diagram is not drawn to scale.

Site	Deployment Date	Retrieval Date		Longitude	-	Sampling Rate	Duty Cycle	Amount of data
1A	15-Mar-12	9-Oct-12	35.34054	-74.85761	950	200 kHz	Continuous	0.5 TB*
2A	9-Oct-12		35.34060	-74.85590	970	200 kHz	Continuous	

\*compressed



*Figure 4.* Location of the HARP deployment site in the Cape Hatteras survey area.

#### Data Analysis

Vessel survey effort and sighting data were compiled and mapped using *ArcGIS* 10.1 to illustrate the location of effort and sightings within the study area. All vessel sighting data from January 2012 through December 2012 have been posted on the data repository OBIS-SEAMAP (http://seamap.env.duke.edu/).

#### Acoustic Analysis

#### Towed Array Analysis

Towed array recordings were analyzed using *Raven 1.4* software to view spectrograms. Tenminute time bins were scored for presence or absence of odontocete vocalizations, categorized as either whistles/tonal sounds or echolocation clicks/pulsed sounds. The towed array was not sensitive to frequencies below 2 kHz, so mysticete vocalizations were not able to be detected.

#### Seaglider

Acoustic recordings collected by the glider were analyzed using *Raven* 1.4 software to view spectrograms. During periods when the glider was making course corrections or adjusting its buoyancy (i.e., running internal motors), the acoustic record was unusable due to noise. These intermittent periods of noise lasted from 2 to 290 s. After removing these periods of noise, the remaining recordings were analyzed for cetacean vocalizations. As original signal levels were low, the sound files were amplified by a factor of five to make detections more audible and clearly visible in spectrograms. Sixty-second time bins were scored for presence or absence of odontocete vocalizations, categorized as either whistles/tonal sounds or echolocation clicks/pulsed sounds.

#### 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). New compression code was implemented starting in July 2010 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 using a *MATLAB*-based acoustic program called Triton (Hildebrand Lab at Scripps Institution of Oceanography, CA) to create 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 data from the first Cape Hatteras Site A HARP deployment were manually scanned for marine mammal vocalizations using the "logger" version of Triton (v1.81.20121030). The effective frequency range of the HARP (10 Hz – 100 kHz) was divided into two parts for this manual review: 10-1000 Hz and 1-100 kHz. The resulting LTSAs had resolutions of 5 s in time and 1 Hz in frequency (for the data decimated by a factor of 100: 10-1000 Hz band) and 5 s in time and 100 Hz in frequency (for the original data: 1-100 kHz band). LTSAs that were decimated by a factor of 100 were inspected for sounds produced by mysticetes. Non-decimated LTSAs were inspected for odontocete whistles and clicks. The presence of vocalizations, assigned to species when possible, was determined in one-minute bins.

#### Data Storage

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

#### Results

#### Survey Effort

In February, March and October 2012, 423.9 km were surveyed during approximately 35.2 hours of dedicated marine mammal and sea turtle vessel surveys (Table 2, Figure 5). Sighting conditions were relatively poor during the four-day research cruise aboard the R/V *Cape Hatteras*, with most survey effort conducted in Beaufort Sea State (BSS) 4. An additional 625.5 km and 120.4 hours of effort occurred in May, June, August and September 2012 during the pilot whale behavioral response study (Table 2, Figure 5). Sighting conditions during these latter surveys ranged from excellent to poor (BSS 0 to 5).

Sea Distance Survey Time At Sea Time State Surveyed (km) (hrs:min) (hrs:min) Date Platform F/V Sea Creature 27-Feb-12 2-4 77.8 5:56 10:15 15-Mar-12 1-3 106.5 10:32 F/V Sea Creature 6:00 40.0 3-May-12 2-4 3:37 3:37 R/V *Exocetus* 3-4 3-May-12 34.4 3:14 3:14 R/V Wavelet 3-May-12 n/a n/a n/a 19:00 R/V SRVx 4-May-12 0-1 88.5 9:10 9:10 R/V *Exocetus* 4-May-12 0-2 9:47 R/V Wavelet 39.0 9:47 4-May-12 n/a 21.6 6:24 24:00 R/V SRVx 12-May-12 2-3 74.9 10:15 9:40 R/V *Exocetus* 2-3 12-May-12 39.6 11:14 11:30 R/V Wavelet 12-May-12 n/a 44.4 13:21 24:00 R/V SRVx 9-Jun-12 2-4 26.7 4:02 8:37 R/V *Exocetus* 10-Jun-12 2-3 19.2 5:53 10:34 R/V *Exocetus* 0-2 11-Jun-12 25.5 7:36 11:50 R/V *Exocetus* 20-Jun-12 1-3 6:32 10:25 R/V Exocetus 45.4 21-Jun-12 3 6:36 R/V *Exocetus* 8.1 1:45 31-Aug-12 3-4 25.2 4:24 9:29 R/V Exocetus 31-Aug-12 3-4 39.5 4:24 9:17 F/V Samanna 2-Sep-12 0-2 23.3 5:04 10:35 R/V *Exocetus* F/V Samanna 2-Sep-12 0-2 30.2 5:04 10:35 8-Oct-12 4 17.8 1:38 24:00 R/V Cape Hatteras 9-Oct-12 4-5 37.5 5:38 24:00 R/V *Cape Hatteras* 

10:15

5:47

24:00

24:00

R/V Cape Hatteras

R/V Cape Hatteras

10-Oct-12

11-Oct-12

4

4-5

117.4

66.9

*Table 2.* Dates, kilometers and hours surveyed during vessel surveys in the Cape Hatteras survey area, January 2012 – December 2012. Survey effort between May and September 2012 (shaded in gray) was conducted during the pilot whale behavioral response study.



*Figure 5.* Survey effort in the Cape Hatteras survey area, January 2012 – December 2012.

<u>Sightings</u>

One hundred thirty cetacean sightings, comprising approximately 6200 individuals, were observed during the reporting period. Sightings of species observed in 2012 included: fin whales (*Balaenoptera physalus*; n = 1), common dolphins (*Delphinus delphis*; n = 11), short-finned pilot whales (n = 52), Risso's dolphins (*Grampus griseus*; n = 2), sperm whales (*Physeter macrocephalus*; n = 4), Atlantic spotted dolphins (*Stenella frontalis*; n = 2), bottlenose dolphins (n = 54), Cuvier's beaked whales (*Ziphius cavirostris*; n = 1) and three unidentified delphinids (Tables 3 and 4). No mixed-species groups were observed. In addition, two loggerhead sea turtles (*Caretta caretta*) and one unidentified sea turtle were recorded during vessel surveys in the survey area (Tables 5 and 6).

				Depth	Temp		Group	Biopsy	
Date	Time	Latitude	Longitude	(m)	$(\mathbf{C}^{0})$	Species	Size	Samples	Images
27-Feb-12	8:32	35.32475	-74.97490	102.4	21.3	T. truncatus	12	1	101
27-Feb-12	9:43	35.31228	-74.94492	274.3	21.7	T. truncatus	25	0	0
27-Feb-12	10:10	35.27835	-74.86606	1584.9	22.8	P. macrocephalus	2	0	64
27-Feb-12	11:07	35.19706	-74.82328	2316.5	23.7	G. macrorhynchus	30	0	1
27-Feb-12	12:25	35.20783	-74.87241	1981.2	23.6	P. macrocephalus	1	0	29
27-Feb-12	12:42	35.22635	-74.86561	no data	no data	T. truncatus	5	0	11
27-Feb-12	13:05	35.22117	-74.88532	1828.8	23.6	P. macrocephalus	3	0	70
15-Mar-12	9:30	35.33286	-74.83520	1524	24.6	P. macrocephalus	1	0	8
15-Mar-12	10:07	35.47135	-74.79906	457.2	24.3	Z. cavirostris	2	0	0
15-Mar-12	10:20	35.46951	-74.80684	365.8	24.1	T. truncatus	40	0	20
15-Mar-12	11:14	35.56340	-74.78881	274.3	23.1	D. delphis	750	0	36
15-Mar-12	11:39	35.60939	-74.78642	365.8	21.3	T. truncatus	100	2	138
15-Mar-12	13:27	35.57420	-74.79146	274.3	21.4	D. delphis	400	0	59
03-May-12	14:24	35.32082	-74.93017	no data	no data	T. truncatus	5	0	0
03-May-12	14:42	35.37069	-74.90216	no data	no data	T. truncatus	6	0	0
03-May-12	14:45	35.39150	-74.86758	no data	no data	T. truncatus	8	0	0
03-May-12	15:05	35.41724	-74.87065	no data	no data	T. truncatus	6	0	0
03-May-12	15:26	35.46554	-74.81459	no data	no data	T. truncatus	9	0	0
03-May-12	15:53	35.51108	-74.80909	no data	no data	T. truncatus	8	1	7
03-May-12	16:16	35.51998	-74.80069	no data	no data	T. truncatus	1	0	0
03-May-12	16:24	35.52789	-74.79877	no data	no data	T. truncatus	4	1	13
04-May-12	6:25	35.75758	-74.80231	no data	no data	G. macrorhynchus	35	2	16
04-May-12	6:38	35.75997	-74.80291	no data	no data	G. macrorhynchus	4	0	186
04-May-12	7:31	35.77239	-74.78662	no data	no data	G. macrorhynchus	2	0	9
04-May-12	7:40	35.77897	-74.78685	no data	no data	G. macrorhynchus	16	0	46
04-May-12	8:07	35.78198	-74.79107	no data	no data	G. macrorhynchus	15	2	2
04-May-12	8:28	35.77750	-74.79748	no data	no data	G. macrorhynchus	12	2	31
04-May-12	8:38	35.77391	-74.79969	no data	no data	G. macrorhynchus	15	0	67
04-May-12	9:02	35.77903	-74.81185	no data	no data	G. macrorhynchus	10	2	41
04-May-12	9:39	35.73380	-74.80877	no data	no data	T. truncatus	7	0	23
04-May-12	9:51	35.73409	-74.80820	no data	no data	T. truncatus	4	2	27
04-May-12	10:05	35.72094	-74.81472	no data	no data	T. truncatus	7	2	49
04-May-12	12:06	35.86798	-74.81832	no data	no data	G. macrorhynchus	200	0	54
04-May-12	12:11	35.87120	-74.81889	no data	no data	G. macrorhynchus	25	2	76
04-May-12	13:18	35.89091	-74.80133	no data	no data	T. truncatus	18	0	0
04-May-12	13:40	35.88188	-74.76211	no data	no data	D. delphis	25	1	22
04-May-12	14:30	35.90865	-74.80591	no data	no data	D. delphis	75	0	0
04-May-12	14:55	35.85173	-74.80334	no data	no data	D. delphis	50	0	5
04-May-12	15:41	35.92730	-74.81920	no data	no data	T. truncatus	20	0	4
04-May-12	17:39	35.93250	-74.80820	no data	no data	B. physalus	3	0	0

*Table 3*. Cetacean sightings from vessel surveys in the Cape Hatteras survey area, January 2012 – December 2012.

				Depth	Temp		Group	Biopsy	
Date	Time	Latitude	Longitude	(m)	$(\mathbf{C}^{0})$	Species	Size	Samples	Images
12-May-12	6:25	35.74843	-74.79619	no data	no data	S. frontalis	80	0	0
12-May-12	6:40	35.71658	-74.80292	no data	no data	G. macrorhynchus	225	3	214
12-May-12	7:21	35.73322	-74.80705	no data	no data	G. macrorhynchus	15	0	0
12-May-12	7:27	35.73501	-74.80724	no data	no data	G. macrorhynchus	18	0	22
12-May-12	7:29	35.73337	-74.80549	no data	no data	D. delphis	90	0	0
12-May-12	7:40	35.74128	-74.80586	no data	no data	G. macrorhynchus	5	0	0
12-May-12	7:49	35.74329	-74.80684	no data	no data	G. macrorhynchus	12	0	5
12-May-12	8:11	35.75157	-74.80600	no data	no data	G. macrorhynchus	50	0	33
12-May-12	8:47	35.76180	-74.81129	no data	no data	G. macrorhynchus	4	0	22
12-May-12	9:13	35.77386	-74.82154	no data	no data	G. macrorhynchus	9	1	8
12-May-12	9:24	35.77905	-74.82572	no data	no data	G. macrorhynchus	20	2	15
12-May-12	9:48	35.78925	-74.80994	no data	no data	G. macrorhynchus	12	2	25
12-May-12	10:36	35.81605	-74.83760	no data	no data	D. delphis	10	0	0
12-May-12	10:43	35.76249	-74.81832	no data	no data	T. truncatus	1	0	0
12-May-12	11:29	35.81415	-74.83582	no data	no data	D. delphis	40	2	14
12-May-12	11:32	35.82182	-74.84522	no data	no data	T. truncatus	3	0	0
12-May-12	13:33	35.82878	-74.84924	no data	no data	D. delphis	500	0	16
12-May-12	15:33	35.83531	-74.84611	no data	no data	D. delphis	30	0	0
12-May-12	15:40	35.83111	-74.84867	no data	no data	D. delphis	400	2	12
12-May-12	15:53	35.82910	-74.84933	no data	no data	G. macrorhynchus	100	2	66
12-May-12	16:21	35.82927	-74.85794	no data	no data	G. macrorhynchus	12	2	37
12-May-12	16:33	35.82852	-74.86164	no data	no data	G. macrorhynchus	15	0	26
12-May-12	16:48	35.83122	-74.85789	no data	no data	G. macrorhynchus	80	1	23
09-Jun-12	7:50	35.77431	-74.84212	no data	no data	T. truncatus	125	0	0
09-Jun-12	8:26	35.67017	-74.80161	no data	no data	G. macrorhynchus	500	0	215
09-Jun-12	8:29	35.70654	-74.80683	no data	no data	T. truncatus	15	0	0
09-Jun-12	10:19	35.66924	-74.79764	no data	no data	T. truncatus	25	0	4
10-Jun-12	7:55	35.66504	-74.79563	no data	no data	T. truncatus	200	0	0
10-Jun-12	7:58	35.66462	-74.79564	no data	no data	G. macrorhynchus	350	2	178
11-Jun-12	7:36	35.65376	-74.80552	no data	no data	G. macrorhynchus	400	2	678
11-Jun-12	8:59	35.65407	-74.78836	no data	no data	T. truncatus	50	0	0
20-Jun-12	7:44	35.64840	-74.82772	no data	no data	T. truncatus	7	0	0
20-Jun-12	7:48	35.64935	-74.81069	no data	no data	T. truncatus	5	0	0
20-Jun-12	8:02	35.67620	-74.80597	no data	no data	T. truncatus	20	0	0
20-Jun-12	8:21	35.73983	-74.82216	no data	no data	T. truncatus	12	0	0
20-Jun-12	8:50	35.86422	-74.84343	no data	no data	G. macrorhynchus	75	2	551
20-Jun-12	10:07	35.86083	-74.75019	1097.3	22.8	S. frontalis	6	0	0
20-Jun-12	10:21	35.88327	-74.84688	no data	no data	T. truncatus	30	0	9
20-Jun-12	13:44	35.85953	-74.85173	no data	no data	T. truncatus	6	0	0
21-Jun-12	8:03	35.85997	-74.84825	no data	no data	T. truncatus	4	0	0
21-Jun-12	8:05	35.85887	-74.84655	no data	no data	G. macrorhynchus	150	0	26

*Table 3 cont*. Cetacean sightings from vessel surveys in the Cape Hatteras survey area, January 2012– December 2012.

Temp Depth Group **Biopsy** Longitude (C<sup>0</sup>) Samples Images Date Time Latitude (m) **Species** Size 21-Jun-12 35.84684 -74.84924 8:07 no data no data G. macrorhynchus 21 0 0 21-Jun-12 9:24 35.87041 -74.84398 no data T. truncatus 10 0 0 no data 0 39 31-Aug-12 8:28 35.78733 -74.84516 350 25.7 G. macrorhynchus 14 31-Aug-12 9:25 35.77604 -74.83273 no data no data G. macrorhynchus 17 0 24 31-Aug-12 9:42 35.78505 -74.84220 5 0 20 no data no data G. griseus 31-Aug-12 35.78636 -74.83774 15 9 10:03 no data no data G. macrorhynchus 0 31-Aug-12 35.76120 -74.83438 G. macrorhynchus 20 78 10:48 no data 25.5 1 31-Aug-12 35.74551 -74.83189 0 10:56 no data no data G. griseus 3 2 9 31-Aug-12 -74.83125 no data G. macrorhynchus 6 0 11:53 35.74080 no data 02-Sep-12 35.78594 -74.88399 14 8:06 no data T. truncatus 0 no data 1 3 02-Sep-12 35.79807 -74.87353 G. macrorhynchus 225 267 8:24 no data no data 02-Sep-12 8:52 35.81287 -74.86696 193.9 27.6 G. macrorhynchus 4 0 19 02-Sep-12 35.84562 -74.84350 10:15 no data no data T. truncatus 1 0 0 02-Sep-12 35.89090 -74.83536 12 12:00 no data no data T. truncatus 0 0 02-Sep-12 12:43 35.89307 -74.83549 415.1 28.2 G. macrorhynchus 19 0 87 12 08-Oct-12 11:15 35.45194 -74.94609 no data no data T. truncatus 0 10 08-Oct-12 11:39 35.39599 -74.90475 55.7 26.3 T. truncatus 2 0 0 08-Oct-12 -74.87709 12:00 35.36881 419.7 27.1 T. truncatus 2 0 1 08-Oct-12\* 7:54 35.33761 -74.85473 no data no data G. macrorhynchus 8 0 0 08-Oct-12\* 35.34404 -74.85093 G. macrorhynchus 3 0 0 8:35 no data no data 09-Oct-12 11:28 35.36068 -74.92671 24.4 T. truncatus 3 0 0 no data 09-Oct-12 11:45 35.36710 -74.95118 no data 24.3 T. truncatus 2 0 0 09-Oct-12 35.38323 -74.89640 T. truncatus 16:37 424 28.3 6 0 15 35.37670 09-Oct-12 16:50 -74.87507 823 28.3 T. truncatus 5 0 0 3 09-Oct-12 17:26 35.36183 -74.81441 1375 28.5 T. truncatus 0 0 5 10-Oct-12 14:23 35.62675 -74.60406 1800 27.9 0 G. macrorhynchus 1 10-Oct-12 35.57437 -74.72291 T. truncatus 5 0 22 15:08 1240 27.8 Unid. delphinid 0 10-Oct-12 15:21 35.55620 -74.76113 893 27.4unk. 0 10-Oct-12 35.54815 15:23 -74.76916 893 27.3 G. macrorhynchus 4 0 0 10-Oct-12 15:29 35.54639 -74.77627 709.7 24.6 G. macrorhynchus 12 0 0 -74.79305 709 10-Oct-12 15:38 35.52861 24.6 T. truncatus 3 0 0 10-Oct-12 16:25 35.47683 -74.80213 423.6 27.8 T. truncatus 6 0 0 -74.81992 4 10-Oct-12 16:54 35.43871 427 27.7 Unid. delphinid 0 0 10-Oct-12 17:04 35.42656 -74.82314 372 27.6 T. truncatus 4 0 0 -74.82988 27.5 10-Oct-12 17:14 35.40975 445.8 T. truncatus 4 0 0 45 10-Oct-12 17:27 35.39687 -74.83501 542 27.5 T. truncatus 6 0 10-Oct-12 35.36393 18:08 -74.86160 400 27.5 T. truncatus 30 0 5 10-Oct-12 35.33082 -74.88398 27.5 Unid. delphinid 0 18:15 400 8 0 10-Oct-12 18:29 35.32835 -74.88594 416 27.9 T. truncatus 10 0 40 11-Oct-12 12:43 35.42895 -74.81044 no data no data G. macrorhynchus 8 0 0 11-Oct-12 13:01 35.40689 -74.82105 no data no data G. macrorhynchus 6 0 0

*Table 3 cont*. Cetacean sightings from vessel surveys in the Cape Hatteras survey area, January 2012– December 2012.

Date	Time	Latitude	Longitude	Depth (m)	Temp (C <sup>o</sup> )	Species	Group Size	Biopsy Samples	Images
	-		6	. ,		Speeks	SIL	Samples	mages
11-Oct-12	13:07	35.39958	-74.82483	no data	no data	G. macrorhynchus	6	0	0
11-Oct-12	13:49	35.35058	-74.85211	no data	no data	G. macrorhynchus	5	0	0
11-Oct-12	15:00	35.26578	-74.89597	no data	no data	G. macrorhynchus	4	0	0
11-Oct-12	15:11	35.25268	-74.90347	no data	no data	G. macrorhynchus	4	0	0
11-Oct-12	16:15	35.27635	-74.88658	no data	no data	G. macrorhynchus	5	0	0
11-Oct-12	16:24	35.27287	-74.88509	1400	27.2	G. macrorhynchus	12	0	4
11-Oct-12	17:16	35.18276	-74.99826	500	no data	T. truncatus	15	0	0
11-Oct-12	18:38	35.06367	-75.17264	no data	no data	T. truncatus	6	0	0
*off effort									

*Table 3 cont*. Cetacean sightings from vessel surveys in the Cape Hatteras survey area, January 2012– December 2012.

*Table 4*. Number of sightings and mean group size for each species observed during all vessel surveys in the Cape Hatteras survey area.

		Sightings		
Species	2009	2011	2012	Mean Group Size
Balaenoptera physalus	0	0	1	1.0±0.0
Delphinus delphis	0	6	11	183.5±212.4
Globicephala macrorhynchus	9	33	52	39.7±83.4
Grampus griseus	1	2	2	10.8±13.3
Physeter macrocephalus	0	1	4	1.6±0.9
Stenella frontalis	0	8	2	66.8±88.1
Stenella/Delphinus mix	0	1	0	85.0±0.0
Tursiops truncatus	23	27	54	17.8±27.9
Tursiops/Stenella mix	0	1	0	100.0±0.0
Ziphius cavirostris	0	3	1	2.0±0.8
Unid. delphinid	1	0	3	4.7±3.1
Total:	34	82	130	

*Table 5*. Sea turtle sightings made from vessel surveys in the Cape Hatteras survey area, January 2012 – December 2012.

				Depth	Temp		Group
Date	Time	Latitude	Longitude	(m)	$(\mathbf{C}^{0})$	Species	Size
15-Mar-12	13:24	35.57758	-74.79057	274.3	21.3	Unid. sea turtle	1
03-May-12	3:01	35.41730	-74.85256	no data	no data	Caretta caretta	1
09-Oct-12	10:58	35.34830	-74.88319	no data	no data	Caretta caretta	1

*Table 6*. Number of sea turtle sightings and mean group size for each species observed during all vessel surveys in the Cape Hatteras survey area.

Species	2009	2011	2012	Mean Group Size
Caretta caretta	2	0	2	1.0±0.0
Unid. sea turtle	0	0	1	1.0±0.0
Total:	2	0	3	

#### Distributions and Habitat Associations of Cetaceans and Sea Turtles

The distribution of marine mammals and sea turtle sightings is presented in Figures 6 through 16. Short-finned pilot whales and bottlenose dolphins were encountered along the entire shelf break, whereas common dolphins and sperm whales were observed more frequently in the northern and southern ranges of the survey area, respectively. Sea turtles were observed on three occasions along the shelf break (Figure 16).



*Figure 6*. Distribution of all cetacean sightings made during vessel surveys in the Cape Hatteras survey area, January 2012 - December 2012.



*Figure 7.* Distribution of fin whale sightings indicating group size observed during vessel surveys in the Cape Hatteras survey area, January 2012 - December 2012.



*Figure 8.* Distribution of common dolphin sightings indicating group size observed during vessel surveys in the Cape Hatteras survey area, January 2012 - December 2012.



*Figure 9.* Distribution of short-finned pilot whale sightings indicating group size observed during vessel surveys in the Cape Hatteras survey area, January 2012 - December 2012.



*Figure 10.* Distribution of Risso's dolphin sightings indicating group size observed during vessel surveys in the Cape Hatteras survey area, January 2012 - December 2012.



*Figure 11.* Distribution of sperm whale sightings indicating group size observed during vessel surveys in the Cape Hatteras survey area, January 2012 - December 2012.



*Figure 12.* Distribution of Atlantic spotted dolphin sightings indicating group size observed during vessel surveys in the Cape Hatteras survey area, January 2012 - December 2012.



*Figure 13.* Distribution of bottlenose dolphin sightings indicating group size observed during vessel surveys in the Cape Hatteras survey area, January 2012 - December 2012.



*Figure 14.* Distribution of Cuvier's beaked whale sightings indicating group size observed during vessel surveys in the Cape Hatteras survey area, January 2012 - December 2012.



*Figure 15.* Distribution of unidentified delphinid sightings indication group size observed during vessel surveys in the Cape Hatteras survey area, January 2012 - December 2012.


*Figure 16.* Distribution of sea turtle sightings made during vessel surveys in the Cape Hatteras survey area, January 2012 - December 2012.

## Seasonality of Effort and Sightings

Pilot whales and bottlenose dolphins were the cetacean species most frequently observed off Cape Hatteras and were recorded during six of the seven months surveyed in 2012 (Table 3, Figure 17). Pilot whales, bottlenose dolphins and Risso's dolphins have been observed in all three years of survey effort off Cape Hatteras (including the limited survey effort conducted in 2009). Common dolphins were the third most commonly observed cetacean in 2012 and occurred in large groups (Table 4), but were encountered on only two survey days in the spring (Figure 17). Sperm whales and Cuvier's beaked whales were seen in both 2011 and 2012, but only in winter months (Tables 3 and 4, Figure 17). Common dolphins, sperm whales, Atlantic spotted dolphins and Cuvier's beaked whales were recorded in both 2011 and 2012. Sightings of sea turtles observed in each month of survey effort are depicted in Figure 18.



*Figure 17*. Number of cetacean sightings by month and effort (kilometers surveyed) for vessel surveys conducted in the Cape Hatteras survey area, January 2012 - December 2012.



*Figure 18.* Number of sea turtle sightings by month and effort (kilometers surveyed) for vessel surveys conducted in the Cape Hatteras survey area, January 2012 - December 2012.

# **Biopsy Sampling**

A total of 48 biopsy samples were collected from common dolphins (n = 5), pilot whales (n = 33), and bottlenose dolphins (n = 10) during vessel surveys in the Cape Hatteras survey area in 2012 (Table 7, Figure 19). Skin samples will be analyzed for sex, population structure and ecotype (for bottlenose dolphins) in the coming months. Voucher specimens of these samples will be archived with the Southeast Fisheries Science Center in Lafayette, LA.

Date	Time	Latitude	Longitude	Species	Sample #
27-Feb-12	9:07	35.32565	-74.95434	T. truncatus	ZTS-12-017
15-Mar-12	11:43	35.60738	-74.78570	T. truncatus	ZTS-12-018
15-Mar-12	11:55	35.59564	-74.78589	T. truncatus	ZTS-12-019
3-May-12	16:29	35.52964	-74.79842	T. truncatus	ASF-12-001
3-May-12	15:55	35.51199	-74.80915	T. truncatus	AJR-12-001
4-May-12	10:48	35.80625	-74.82287	G. macrorhynchus	DMW-12-003
4-May-12	10:56	35.80745	-74.82513	G. macrorhynchus	AJR-12-002
4-May-12	9:56	35.73668	-74.80759	T. truncatus	ASF-12-005
4-May-12	9:57	35.73619	-74.80826	T. truncatus	ASF-12-006
4-May-12	10:23	35.71665	-74.81758	T. truncatus	DWJ-12-005
4-May-12	10:42	35.71770	-74.82387	T. truncatus	DWJ-12-006
4-May-12	13:18	35.88414	-74.80476	G. macrorhynchus	ASF-12-007
4-May-12	13:21	35.88541	-74.80557	G. macrorhynchus	ASF-12-008
4-May-12	13:43	35.88314	-74.76342	D. delphis	DWJ-12-007
4-May-12	6:40	35.76007	-74.79821	G. macrorhynchus	DWJ-12-001
4-May-12	8:03	35.78338	-74.79190	G. macrorhynchus	DWJ-12-002
4-May-12	8:33	35.77425	-74.79953	G. macrorhynchus	ASF-12-002
4-May-12	8:35	35.77460	-74.79988	G. macrorhynchus	ASF-12-003
4-May-12	9:07	35.77925	-74.81310	G. macrorhynchus	DWJ-12-003
4-May-12	9:11	35.78006	-74.81227	G. macrorhynchus	DWJ-12-004
12-May-12	11:31	35.81242	-74.83441	D. delphis	DWJ-12-010
12-May-12	11:36	35.81386	-74.83308	D. delphis	DWJ-12-011
12-May-12	15:45	35.82757	-74.85163	D. delphis	DWJ-12-012
12-May-12	15:48	35.82890	-74.84965	D. delphis	DWJ-12-013
12-May-12	15:56	35.82943	-74.84890	G. macrorhynchus	ASF-12-012
12-May-12	15:59	35.82955	-74.84869	G. macrorhynchus	ASF-12-013
12-May-12	16:23	35.82953	-74.85886	G. macrorhynchus	DWJ-12-014
12-May-12	16:29	35.82831	-74.85901	G. macrorhynchus	DWJ-12-015
12-May-12	16:53	35.83246	-74.85738	G. macrorhynchus	ASF-12-014
12-May-12	9:17	35.77638	-74.82158	G. macrorhynchus	ASF-12-009
12-May-12	9:26	35.78000	-74.82639	G. macrorhynchus	ASF-12-010
12-May-12	9:29	35.78094	-74.82723	G. macrorhynchus	ASF-12-011
12-May-12	9:52	35.79140	-74.81110	G. macrorhynchus	DWJ-12-008
12-May-12	9:54	35.79263	-74.81215	G. macrorhynchus	DWJ-12-009
12-May-12	13:02	35.81615	-74.85230	G. macrorhynchus	DMW-12-004
12-May-12	16:43	35.86056	-74.84271	G. macrorhynchus	ZTS-12-025
12-May-12	19:07	35.89589	-74.82608	G. macrorhynchus	HJF-12-011

*Table 7.* Biopsy samples collected in the Cape Hatteras survey area, January 2012 – December 2012.

Date	Time	Latitude	Longitude	Species	Sample #
10-Jun-12	12:28	35.68119	-74.80234	G. macrorhynchus	ZTS-12-027
10-Jun-12	13:44	35.68210	-74.80244	G. macrorhynchus	ZTS-12-028
11-Jun-12	14:20	35.72237	-74.81664	G. macrorhynchus	HJF-12-012
11-Jun-12	14:45	35.72331	-74.81794	G. macrorhynchus	HJF-12-013
20-Jun-12	13:09	35.87769	-74.85482	G. macrorhynchus	ZTS-12-029
20-Jun-12	13:29	35.86564	-74.85274	G. macrorhynchus	ZTS-12-030
31-Aug-12	12:43	35.78429	-74.83548	G. macrorhynchus	DMW-12-011
2-Sep-12	8:13	35.78793	-74.88362	T. truncatus	ZTS-12-041
2-Sep-12	12:31	35.89796	-74.82880	G. macrorhynchus	ZTS-12-042
2-Sep-12	12:39	35.90362	-74.82632	G. macrorhynchus	ZTS-12-043
2-Sep-12	12:50	35.91158	-74.82343	G. macrorhynchus	ZTS-12-044

*Table 7 cont.* Biopsy samples collected in the Cape Hatteras survey area, January 2012 – December 2012.



*Figure 19.* Locations of biopsy samples collected in the Cape Hatteras survey area, January 2012 – December 2012.

#### Photographic Effort

In total, 4111 digital images were taken during effort in the Cape Hatteras study area in 2012 for species identification and 2635 were analyzed for individual recognition (Table 8). Every attempt was made to photograph all animals encountered, both to validate species identification and to develop photo-identification catalogs for cetacean species in the Cape Hatteras survey area.

Images of newly identified dolphins were added to existing photo-identification catalogs in the Cape Hatteras survey area (Table 8). Photo-identification is now complete for all sightings made in February and March 2012. Although no matches were made in 2012, twenty-seven bottlenose dolphins were added to the catalog (Table 8). One sperm whale was matched to another individual photographed earlier on the same day.

One hundred seventeen short-finned pilot whales photographed in 2012 were compared to the existing Cape Hatteras catalog for this species (Table 8) and a number of these pilot whales were matched (Table 9, Figure 20). Pilot whale 7-019 was observed on 09 and 10 June 2012; this animal was first photographed on 04 September 2006. Gm-12-162a was also seen on 04 September 2006 and subsequently photographed and biopsied on 30 May 2008 before being photographed again on 09 and 10 June 2012. Genetic analysis determined that this individual was a male. Pilot whale 6-006 was photographed and biopsied on 24 August 2007 and photographed again on 11 June 2012; genetic analysis determined that this individual was also a male. Three pilot whales photographed in 2012 were tagged in 2011: 1-002 tagged on 27 May 2011; 7-009 tagged on 29 May 2011; and 6-001 tagged on 14 June 2011. All three of these

individuals were photographed on 12 May 2012. Our photo-identification results demonstrate

that at least some of the short-fined pilot whales in this area are present over multiple years and

may be resident to the area (Figure 20).

The catalogs of short-finned pilot whales in the Cape Hatteras (n = 136) and Onslow Bay

(n = 16) survey areas were compared, but no matches were found between the two sites.

*Table 8.* Summary of photo-id effort and number of biopsy samples collected in the Cape Hatteras survey area, January 2012 – December 2012. Note that number of sightings reflects photo-ID analysis completed for sightings in 2012 only and not the total number of sightings from previous effort.

			Catalog Size	Number of Matches	Number of Biopsy
Species	Images	Sightings	(2009-2012)	(2009-2012)	Samples (2012)
Delphinus delphis	95	2	5	0	5
Globicephala macrorhynchus	2107	9	136	14	33
Grampus griseus	0	0	1	0	0
Physeter macrocephalus	163	4	1	1	0
Tursiops truncatus	270	28	78	0	10

*Table 9.* Photo-identification matches of short-finned pilot whales observed during focal follows in 2012 and during previous research effort in the CHSRA. Note that only images obtained from tagged or biopsied animals in previous years were compared to animals photographed in 2012.

Whale ID	2006	2007	2008	2010	2011	2012
1-002					Х	Х
6-001					Х	Х
6-006		Х				Х
7-009					Х	Х
7-019	Х					Х
Gm_12_162	Х		Х			Х



*Figure 20.* Photo-identification matches of short-finned pilot whales observed in the Cape Hatteras survey area.

### Passive Acoustic Monitoring

### Towed Array Analysis

Acoustic surveys were conducted during three days of vessel surveys in the Cape Hatteras study area, resulting in 33.8 hours of recordings between 09 October 2012 and 11 October 2012. Whistles were detected during 23.2 hours, making up 68.5% of the total recording time. Clicks were detected during 19 hours, making up 56.2% of the total recording time (Table 10). Species confirmation for these acoustic detections was not possible due to high sea states that prevented positive visual identification of the animals present in the area, but the species present and recorded included pilot whales and bottlenose dolphins. Additionally, there was a single acoustic detection of sperm whale clicks on 11 October 2012, from 11:41-12:00 EDT (Table 10).

*Table 10.* Summary of odontocete vocalizations detected in acoustic recordings collected during towed hydrophone array deployments in the Cape Hatteras study area, October 2012.

Species	Call type	Total detection duration (h)	Percent of total recording time
Unid. odontocete	Whistles	23.2	68.5
Unid. odontocete	Clicks	19.0	56.2
Physeter macrocephalus	Clicks	0.3	0.88

### Seaglider Analysis

During a two-day deployment from 09-10 October 2012, approximately 18 hours of passive acoustic recordings were collected by the autonomous glider. After removing periods that were unusable due to internal glider noise, which made up approximately 10% of the total recording time, the remaining 16.6 hours were analyzed for cetacean vocalizations. Whistles were detected

during 12.9 hours, making up 78.6% of the total recording time. Clicks were detected during 8.0 hours, making up 48.8% of the total recording time (Table 11).

*Table 11.* Summary of odontocete vocalizations detected in acoustic recordings collected during an autonomous seaglider deployment in the Cape Hatteras study area, October 2012.

		<b>Total detection</b>	Percent of total
Species	Call type	duration (h)	recording time
Unid. odontocete	Whistles	12.9	78.6
Unid. odontocete	Clicks	8.0	48.8
Unid. odontocete	All (whistles & clicks)	13.5	81.5

### Harp Analysis

Underwater ambient noise during the 2012 Hatteras (Site A) HARP deployment is shown in Figure 21. Table 12 summarizes the detected and identified marine mammal vocalizations for this deployment. Figures 22-28 show the daily occurrence patterns for the different marine mammal groups (classified to species when possible).

Mysticete vocalizations detected during the deployment consisted of fin whale 20 Hz pulses and minke whale pulse trains. No blue, sei, humpback, or North Atlantic right whale vocalizations were identified. Fin whales were present in approximately half the recording days (Figure 22), based on occurrence of visibly distinct 20 Hz pulses. However, this represents a minimum estimate of fin whale vocal activity, since increased energy in the 20 Hz band was often observed, likely due to distant calling fin whales. Periods of increased energy without distinct pulses were not included in the fin whale occurrence summary and figures, but are reflected by a peak in ambient noise at 20 Hz (Figure 21). Minke whale pulse trains, including speed-up, slow-

down, and regular type pulse trains, were present in all recording days except for 11 April 2012 (Figure 23). Slow-down pulse trains occurred most frequently.

Detected odontocete vocalizations included clicks, whistles, and burst-pulses (Figures 24-28). Most of these detections were assigned to the unidentified odontocete category. These vocalizations were present nearly continuously throughout the deployment, and consisted of overlapping detections of multiple groups and species (Figure 24). Clicks produced by Kogia spp. were detected once during the deployment, on 27 March 2012 (Figure 25). Sperm whales were present throughout the deployment, with detections on all but two days (10 -11 April 2012) (Figure 26). Risso's dolphins were detected twice, on 16 March 2012 and 30 March 2012 (Figure 27). There were eleven detections of beaked whale clicks on separate days throughout the deployment (Figure 28), summarized in Table 13. Using custom *Matlab* scripts, spectral characteristics of clicks from these vocal events were measured and compared with known beaked whale species templates. Each vocal event was tentatively identified as either *Mesoplodon europaeus* (8 events) or *Ziphius cavirostris* (3 events).



Figure 21. Monthly averages of ambient noise at Cape Hatteras Site A for March – April 2012.

<i>Table 12.</i> Summary of detections of marine mammal vocalizations at Site A for March – April
2012.

Species	Call type	Total duration of vocalizations (hours)	Percent of recording duration	Days with vocalizations	Percent of recording days
Fin whale	20 Hz	45.13	7.09	14	50.00
Minke whale	pulse train (slow-down, speed-up, regular)	51.5	8.10	27	96.43
Unidentified odontocete	clicks/whistles/ burst-pulses	491.57	77.20	28	100
<i>Kogia</i> spp.	clicks	0.1	0.02	1	3.57
Sperm whale	clicks	65.27	10.25	26	92.86
Risso's dolphins	clicks	2.47	0.39	2	7.14
Beaked whale spp.	clicks	1.77	0.28	11	39.29

Date & Time (GMT)	Duration (h:min)	Tentative species ID
3/15/12 19:04	00:08	M. europaeus
3/18/12 17:38	00:04	M. europaeus
3/20/12 18:34	00:12	M. europaeus
3/21/12 18:45	00:18	M. europaeus
3/25/12 07:09	00:06	M. europaeus
3/27/12 09:57	00:11	Z. cavirostris
3/28/12 15:45	00:05	M. europaeus
3/30/12 11:06	00:06	M. europaeus
4/5/12 03:25	00:06	Z. cavirostris
4/6/12 08:00	00:08	Z. cavirostris
4/11/12 00:46	00:11	M. europaeus

*Table 13.* Summary of detected beaked whale click events, including duration of each event and tentative species identification based on spectral characteristics of clicks.



*Figure 22.* Fin whale 20 Hz pulse detections (black bars) for the 2012 Cape Hatteras Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).



*Figure 23.* Minke whale pulse train detections (black bars) for the 2012 Cape Hatteras Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).



*Figure 24.* Unidentified odontocete vocalization detections (black bars) for the 2012 Cape Hatteras Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).



*Figure 25. Kogia* spp. click detections (black bars) for the 2012 Cape Hatteras Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).



*Figure 26.* Sperm whale click detections (black bars) for the 2012 Cape Hatteras Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).



*Figure 27.* Risso's dolphin click detections (black bars) for the 2012 Cape Hatteras Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).



*Figure 28.* Beaked whale click detections for the 2012 Cape Hatteras Site A deployment. Colors indicate tentative species identification: *M. europaeus* (blue) and *Z. cavirostris* (red). Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).

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# Analysis of Aerial Surveys conducted off Cape Hatteras, 2012

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# ABSTRACT

This report describes the analysis of data collected during aerial surveys off Cape Hatteras, undertaken by the University of North Carolina at Wilmington, for the period January 2012 to December 2012. The aim of the analysis was to estimate the abundance of cetaceans and turtles in the region of interest using density surface modelling and other methods. Detection functions were generated for the species groups dolphins, baleen whales, other whales (beaked, pilot and sperm whales combined) and turtles. There were sufficient detections to generate spatio-temporal abundance estimates (uncorrected for availability bias or perception bias) for bottlenose dolphins, loggerhead turtles and a species group made up of pilot whales and beaked whales. Predicted abundance of bottlenose dolphins varied between 490 animals (95% confidence interval; 220 – 900) in February and 1,430 animals (20 – 2510) in August. Predicted abundance of beaked and pilot whales varied between 390 (160 - 1,150) in February and 1,110 (460 - 3,030) in September. Predicted abundance of loggerhead turtles varied between 60 (30 - 100) in February and 190 (110 - 330) in May. For Stenella sp. dolphins, sperm whales (*Physeter macrocephalus*), baleen whales and leatherback turtles, abundance estimates were obtained assuming no spatio-temporal fluctuations due to the small number of group detections for these species. The average predicted abundance for Stenella sp. dolphins was 1,300 animals (95% confidence interval: 500 - 2,500). The predicted abundance for sperm whales was just 10 animals (0 - 27). The predicted abundance of baleen whales was also 10(4 - 17) and for leatherback turtles it was 3(0 - 9).

# **INTRODUCTION**

The Cape Hatteras aerial surveys were carried out by the University of North Carolina at Wilmington (UNCW) almost every month, from late January to early December 2012. The aim of the surveys was to obtain relative abundance estimates for cetaceans and turtles in the region and where possible maps of predicted abundance.

# SURVEY METHODS

## Region of interest and survey area

The Hatteras region and associated bathymetry along with survey tracks are given in figure 1. The survey region covered an area of  $15,765 \text{ km}^2$  and covers both shallow shelf waters and deeper abyssal waters.

## Survey effort

Twenty-six transect lines were aligned mainly east-west across the region to the north of Cape Hatteras and northwest-southeast in the region to the south of Cape Hatteras (Figure 1). Not all transects were covered each month.

Figure 1. Hatteras survey/prediction region with depth (m) indicated by colours. Each grid cell has dimensions 1/30 degree of latitude and 1/30 of a degree of longitude. Grey lines indicate midpoint of segments. Data is show from all months.



### Aerial search protocol

The plane flew at a height of 305 m above sea level. Two observers (one on either side of the plane) searched for marine animals and when an animal was detected, they recorded vertical and horizontal angle to the sighting, species and group size. When a whale or dolphin was detected, search effort was stopped and the plane left the transect line to investigate the sighting and confirm species and group size. Search effort was resumed along the transect line after leaving the sighting. Environmental conditions were also recorded.

Estimates of perpendicular distance from the transect line to the sighting were obtained either by reference to direct estimates of distance by observers, trigonometry from the declination angle of the plane to the observed animals or, for cetaceans, by trigonometry, from the position of the plane at first observation of the animals and subsequent location directly above the animals.

#### STATISTICAL METHODS

The aim of the analysis was to estimate a density map for each species/taxa using the count method of Hedley *et al.* (2004, 1999). However, the numbers of sightings of some taxa were too few to estimate a density surface so instead a uniform surface was assumed – this was equivalent to undertaking a conventional line transect sampling analysis (Buckland *et al.* 2001).

For each taxa, the probability of detection associated with each sighting (assuming full detection on the trackline) was first estimated and this was then used to estimate abundance in small segments of the trackline. These estimated densities formed the response variable in a generalized additive model (GAM) with location, habitat and temporal variables as potential explanatory variables. After model selection, the chosen models were used to estimate density for the region of interest and abundance was obtained by numerically integrating under the predicted density surface. Note that the resulting abundances are relative (rather than absolute) because they do not take into account imperfect detection on the transect line nor the availability of animals at the surface.

### Estimation of detection probabilities

In conventional line transect sampling, the probability of detection depends only on the perpendicular distance of the sighting to the transect (y) and at zero perpendicular distance the probability of detection is assumed to be one (denoted by g(0)=1). Both a hazard-rate  $(1-\exp(-y/\sigma)^{-b})$  and a half-normal  $(\exp(-y^2/2\sigma^2))$  form were considered as suitable forms for the detection functions ( $\sigma$  is the scale parameter) the most appropriate form for the relevant data (Buckland *et al.* 2001). The effects of covariates, other than perpendicular distance, were incorporated into the detection function model by setting the scale parameter in the model to be an exponential function of the covariates (Marques 2001). Thus, the probability of detection becomes a multivariate function, g(y, v), representing the probability of detection at perpendicular distance y and covariates v ( $v = v_1,...,v_Q$  where Q is the number of covariates). The scale term,  $\sigma$ , has the form:

$$\sigma_{k} = \exp\left(\beta_{0} + \sum_{q=1}^{Q} (\beta_{q} v_{kq})\right)$$

and  $\beta_0$  and  $\beta_q$  (q=1,...,Q) are parameters to be estimated. With this formulation, it is assumed that the covariates affect the rate at which detection probability decreases as a function of distance, but not the shape of the detection function. The covariates considered for inclusion into the detection function were Beaufort sea state, group size, cloud cover, visibility, glare and species. A forward, stepwise selection procedure was used to decide which covariates to include in the model, with a minimum Akaike's Information Criterion (AIC) inclusion criterion. All model selection was performed using a set of customised functions (mrds v.2.0.6, Laake et al. 2013) within the statistical programming package *R* (*R* Developmental Core Team, 2002). This facilitated estimation of variance within *R* (see below).

Some of the data from Hatteras was supplemented by additional survey data from the UNCW right whale surveys to increase sample sizes for detection function fitting. Despite this there was a paucity of sightings for individual species and so data were amalgamated across species into four groups with presumed similar detectabilities; all dolphin species, balaenopterid whales, other whales and turtles.

### Estimation of density surfaces

The 'count model' of Hedley *et al.* (2004) was implemented to model the trend in spatial distribution of the different species. The response variable for this model is the estimated number of individuals in a small segment *i* of trackline,  $\hat{N}_i$ , calculated using an estimator similar to the Horvitz-Thompson estimator (Horvitz and Thompson 1952), as follows:

$$\hat{N}_{i} = \sum_{j=1}^{n_{i}} \frac{s_{ij}}{\int_{o}^{w} \hat{g}(y, v_{ij}) \pi(y) dy}, \qquad i = 1, \dots, T,$$

where for segment i,  $\int_{0}^{w} \hat{g}(y, v_{ij}) \pi(y) dy$  is the estimated probability of detection of the *j*th detected group,  $n_i$  is the number of detected groups in the segment and  $s_{ij}$  is the size of the *j*th group. The total number of transect segments is denoted by *T*. By assumption,  $\pi(y)$ , the probability density function of actual (not necessarily observed) perpendicular distances is uniform up to the truncation distance; this is satisfied by locating transects randomly or with a random start point.

Having obtained the estimated number of individuals in each segment, the density in segment *i*,  $\hat{D}_i$ , was estimated from  $\hat{N}_i / a_i$  where  $a_i$  is the area of segment *i*. Segment area was calculated as the length of the segment multiplied by twice the truncation distance which was decided when modelling the detection function. The realised transect lines were divided up into distinct segments based on when vessels had gone on or off effort and whether there was a change in environmental characteristics. A target segment length of 10km was chosen as an appropriate compromise between maximising the ratio of non-zero to zero segments, maintaining environmental resolution and giving some measure of spatial independence, although some segments were much smaller if there had been a break in effort or change in environmental conditions. Due to the different sizes of each segment, the segment area was included as a weight (a term with a known regression coefficient) in the subsequent model.

The main aim was to fit a model with which to predict abundance. The environmental covariates considered for inclusion in the abundance models were longitude (*Lon*) and latitude (*Lat*), depth (*Depth*) and sea surface temperature (*SST*). Day of the year (*Dayofyear*) was fitted as a cyclic cubic spline so the smooth function for *Dayofyear* would have the same values at the start and end of the range of data values. Depths were obtained from the ETOPO1 one minute resolution relief data available from NOAA

(http://www.ngdc.noaa.gov/mgg/global/global.html). Depths were associated with effort segments by finding the closest point in the bathymetry data to the midpoint of the effort segments using great circle distances. *SST* was obtained from NOAA Optimum Interpolation 1/4 Degree Daily Sea Surface Temperature data obtained from the Advanced Very High Resolution Radiometer (AVHRR) available from <a href="http://eclipse.ncdc.noaa.gov/pub/OI-daily-v2/NetCDF/">http://eclipse.ncdc.noaa.gov/pub/OI-daily-v2/NetCDF/</a> as described in part in Reynolds *et al.* 2007 and allocated to the appropriate segment by great circle distance and appropriate date.

Unsurprisingly, *Temp* was strongly related to *Dayofyear*, and *Lon*, *Lat* were correlated *Depth*, thus, the inclusion of only one of these correlated variables in the final models should not be interpreted as necessarily precluding the influence of others.

After preliminary analysis, it was decided that the most appropriate modelling process should use a two stage process; first modelling the presence-absence of animals in segments followed by modelling the density in non-zero segments (i.e. segments where animals were detected). The two resulting surfaces were then multiplied together to obtain estimated density. Generalized cross validation implemented in the *mgcv* package (v. 1.7-13. Wood 2006) in *R* (v. 2.15.0) was used for covariate selection in the presence-absence GAM augmented with diagnostic plots, using the principles described in Wood (2001). All non-factor covariates were considered for inclusion in the model as one dimensional (1D) smooths of untransformed covariate value and *Lat* and *Lon* were also considered as a two dimensional (2D) smooth. Taking into account the low percentage of segments containing sightings, a maximum of 4 degrees of freedom (5 knots) was allowed in the selection of 1D smooths and 11 degrees of freedom (12 knots) was allowed in the case of the 2D smooth, thus allowing moderate flexibility but reducing the possibility of fitting unrealistically complicated functions.

## Prediction

The selected models were used to predict density of marine animals using a 2 minute resolution prediction grid. Animal abundance was estimated by numerically integrating under this predicted density surface.

## Variance estimation

Variance was estimated by repeating (1,000 times) the entire abundance estimation process on samples drawn from the data to obtain a distribution of abundance estimates. Samples were obtained by sampling transects, at random and with replacement, such that the selected effort reflected the effort in the original sample. Confidence intervals were obtained from this resampling-derived distribution using the 2.5% and 97.5% percentiles to obtain the lower and upper limits, respectively, thus excluding the most extreme values.

# RESULTS

### Summary of search effort and number of sightings

The aerial surveys realised 9,190 km of search effort over the 12 months of the survey). The total numbers of sightings within the relevant truncation distances are given in Table 1 along with the group encounter rate (per km) and effort per month.

### **Detection functions**

Fitted detection functions to the binned data for the four species groups are shown in figure 2 with details and resultant detection probabilities (assuming g(0)=1) in table 2. Sightings for all species groups were right truncated to avoid a long tail in the estimated detection function. Of particular note was that the perpendicular distances for turtles were left truncated at 100m (i.e. distances within 100m of the trackline were excluded from analyses and 100m was subtracted from all remaining distances). The raw distribution of turtle distances is given in figure 3.

Table 1. Sightings and effort by month. Hatteras data only.

Table 1. Signtings and	Month	Sightings	Sightings after truncation	Effort	(No of group sightings after truncation/km)
	Jan	2	2	1332	0.002
	Feb	4	4	583	0.007
	March	14	14	1461	0.010
	May	19	18	1165	0.015
All dolphin species	Jun	17	15	1904	0.008
	Aug	6	6	704	0.009
	Sep	0	0	736	0
	Nov	3	3	318	0.009
	Dec	8	8	988	0.008
	Jan	2	1	1332	0.001
	Feb	3	3	583	0.005
	March	4	4	1461	0.003
	May	1	1	1165	0.001
Baleen whales	Jun	0	0	1904	0
	Aug	0	0	704	0
	Sep	0	0	736	0
	Nov	0	0	318	0
	Dec	2	2	988	0.002
Other whales (pilot	Jan	4	4	1332	0.003
whales, beaked	Feb	2	2	583	0.003
whales, melon-headed	March	9	8	1461	0.005
whales and sperm	May	8	8	1165	0.007
whales)**	Jun	12	12	1904	0.006
	Aug	8	8	704	0.011
	Sep	2	2	736	0.003
	Nov	4	4	318	0.013
	Dec	11	11	988	0.011
Turtles	Jan	3	3	1332	0.002
	Feb	1	1	583	0.002
	March	9	9	1461	0.006
	May	24	23	1165	0.020
	Jun	7	6	1904	0.003
	Aug	4	3	704	0.004
	Sep	1	1	736	0.001
	Nov	0	0	318	0
	Dec	10	10	988	0.010

Table 2. Summary of realized sightings, N, (within truncation distance) and fitted detection function (DF) models (HN=half normal) for various species groups. All data were binned into 200m intervals.

Species group	Truncation (m)	N	DF form	Covariates in addition to distance	Mean resultant detection probability (se)
All dolphin species	1400	70	HN	-	0.608 (0.063)
Baleen whales*	1400	16	HN	-	0.990 (0.277)
Other whales (pilot whales, beaked whales, melon-headed whales and sperm whales)**	1200	59	HN	Beaufort Sea State	0.640 (0.076)
Turtles	400 with left truncation at 100m	56	HN	Glare	0.829 (0.134)

\*Includes 5 sightings from the UNCW right whale surveys. \*\*Includes one sighting from UNCW right whale surveys.



*Figure 2. Fitted detection functions overlaid onto scaled perpendicular distance distributions. a. dolphins b. baleen whales, c. other whales & d. turtles(after left truncation at 100 m). N.B. distances were binned for model fitting into 200m intervals.* 

Figure 3. Actual distribution of turtle estimated perpendicular distance.



#### Density surface models

There were 1,003 segments in the realized data set with a mean length of 9.16km. As in previous analyses of survey data from this region e.g. Read *et al.* (under review), the data were characterised by having many segments with no sightings and only a few segments where animals were sighted (e.g. beaked and pilot whales were seen in only 54 segments out of 1,003). The segment densities are obviously also temporally correlated. No simple, optimal solution to modelling data of this type is currently available and so, as mentioned previously, segment densities were modelled as two-stage process with presence-absence modelled followed by non-zero densities modelled assuming a gamma distribution (*Dayofyear* was not considered for this model because in the bootstrap there was not be enough variability in this variable to cover the temporal prediction range). This approach, analogous to a hurdle model (Mullahy 1986), is not ideal in that the non-zero densities were very low indicating that some of the zeros may not be 'true' zeros (i.e. animals are never present) but 'transient' zeros (i.e. animals could be present but they were either not detected or did not happen to be there at that point). A zero-inflated approach (i.e. assuming response distributions developed to accommodate large numbers of zeros in the data) was tried, however, the models were very unstable.

In the case of *Stenella* dolphins, baleen whales and sperm whales there were too few non-zero data to fit a model and so a uniform surface was assumed (i.e. no spatio-temporal effect was fitted to the data). The final models chosen for bottlenose dolphins, other whales and loggerhead turtles are given in table 3.

Species	Presence-absence model (Numer of segment	Nonzero presence model		
	Selected model	Explained deviance %	Selected model (number of segments)	Explained deviance %
Bottlenose dolphin	s(Lon, Lat) + s(Depth) + s(Dayofyear)	21.4	s(Lon) + s(SST) (n = 45)	27.3
Other whales	s(Lon, Lat) + s(Depth) + s(Dayofyear) + s(SST)	26.4	s(Lon) (n = 54)	20.6
Loggerhead turtles	s(Lon, Lat) + s(Depth) + s(SST)	32.1	s(Lon, Lat) (n = 39)	34.4

Table 3. Summary of predictive density surface models, where s(var) indicates a smooth function of var, and percentage of deviance explained by the model.

## Estimates of abundance

Estimates of abundance are given in in table 4. Predicted abundance of bottlenose dolphins reached a peak in August and a nadir in November. Predicted abundance of the other whales peaked in September and reached a nadir in February and predicted abundance of loggerhead turtles reached a May and a nadir in February. Illustrations of the distribution of the densities in the peak surveyed months for bottlenose dolphins, non-baleen whales and loggerhead turtles are given in figures 4 - 6.

Table 4. Estimated minimum numbers of marine animals off Hatteras 2012.

Species	Month*	Mean Density
		(95% confidence interval)
Bottlenose dolphin	Feb	490 (220 - 900)
	March	980 (470 - 1830)
	May	1350 (790 – 2570)
	Jun	1240 (570 – 2130)
	Aug	1430 (20 – 2510)
	Sep	970 (30 – 2770)
	Nov	400 (90 - 820)
	Assuming no spatio-temporal variation	870 (550 - 1260)
Stenella sp.	Assuming no spatio-temporal variation	1300 (500 - 2500)
Baleen whales	Assuming no spatio-temporal variation	10 (4 - 17)
Sperm whales	Assuming no spatio-temporal variation	10 (0 – 27)
Beaked and pilot whales	Feb	390 (160 - 1150)
	March	570 (160 - 1360)
	May	600 (290 - 1180)
	Jun	650 (330 - 1300)
	Aug	950 (200 - 2130)
	Sep	1110 (460 – 3030)
	Nov	520 (220 - 1290)
	Assuming no spatio-temporal variation	650 (320 - 1310)
Leatherback turtle	Assuming no spatio-temporal variation	3 (0-9)
Loggerhead turtle	Feb	60 (30 - 100)
	March	150 (80 - 210)
	May	190 (110 - 330)
	Jun	180 (90 - 330)
	Aug	90 (0 - 210)
	Sep	160 (60 - 340)
	Nov	130 (60 – 210)
	Assuming no spatio-temporal variation	150 (90 - 220)

\*No predictions provides for January (as the only day in the month surveyed was  $31^{st}$ ) and December (as dates surveyed were  $1^{st}$  and  $2^{nd}$ ).

Figure 4. Predicted relative density (animals/km<sup>2</sup>) surfaces for bottlenose dolphin in August. Grey dots represent the midpoints of segments and the red circles have area proportionate to the adjusted observed densities per segment area.



Figure 5. Predicted relative density (animals/km<sup>2</sup>) surfaces for beaked and non-baleen whales in September. Grey dots represent the midpoints of segments and the red circles have area proportionate to the adjusted observed densities per segment area



Longitude

Figure 6. Predicted relative density (animals/km<sup>2</sup>) surface for loggerhead turtles in May 2012. Grey dots represent the midpoints of segments and the red circles have area proportionate to the adjusted observed densities per segment area.



### Habitat Preferences

To provide some explanation as to the habitat preferences of bottlenose dolphin and loggerhead turtles in the region, presence-absence models were fitted without latitude and longitude as potential explanatory variables (and using the generalised cross validation score as the model selection criteria). In this case, the final, fitted models, after backwards model selection, consisted of smooths of *Depth* and *Dayofyear* for bottlenose dolphin and *SST*, *Depth* and *Dayofyear* for loggerhead turtles. The response curves to the final fitted models are given in figures 7 and 8. The overriding driver of bottlenose distribution was *Depth*, as was the case for loggerhead turtles (indicated by the wide range of the scale of the *y*-axes in figures 7 and 8). Bottlenose dolphin avoided water deeper than 2,600m whereas turtles exhibited a preference for very shallow and very deep water.



Figure 7. Plot of the probability of bottlenose dolphin presence in response to a. Dayofyear b. Depth on the logistic scale.





# DISCUSSION

The abundance estimates presented here should be regarded as minimum estimates because they do not include submerged animals or take into account the under estimation of animals on the trackline. Although only one year of data has been analysed, there is evidence for seasonality in the species/species groups where temporal models were able to be fitted. Nevertheless the monthly estimates should also be looked on as provisional given that they are derived from only one years' worth of data. As more data is collected from this region more patterns may become discernible.

The shape of the observed perpendicular distance distribution for turtles was not as expected (i.e. it did not decrease away from the trackline). Although distances were binned into 200m intervals and the detection function model fitted to the binned data, it is worth considering possible reasons for the strange shape. Of specific interest is how observers estimated the distances of animals that were seen a long way in front of the plane.

Monthly estimates generally agree in order with observed group encounter rates (Table 1 versus Table 4) with one notable exception: medium sized whales are predicted in great abundance in September. This appears to be because a region of high abundance is predicted where there was no effort (Figure 5).

The habitat preference curves (figures 7 and 8) do not wholly agree with the density surface maps. In May, bottlenose dolphins were predicted to occur on the continental slope whereas the presence only model predicted a more uniform distribution to a depth of 2,200m. This discrepancy arose from the addition of *Lon* and *Lat* in the presence-absence model as well as the non-zero density component, which is not included in the habitat preference modelling.

Similarly, the habitat preference model for loggerhead turtles suggested a bimodal distribution in shallow and deep water but the density surface model predicted animals in shallow waters only. Care should be taken when interpreting loggerhead turtle response to temperature as the time animals spend in the surface waters is affected by temperature (Hochscheid *et al.* 2010).

# Recommendations for the future

Assuming the USWTR survey work is on-going, issues of potential interest in future work might include:

- 1. Investigation of the distribution of reported distances for turtles during the aerial surveys.
- 2. Investigation of reliable methods for estimating g(0) without using double-observer survey methods. Options could include cue-based methods and use of appropriate availability correction methods based on data on availability patterns for each species.
- 3. Further elucidation of the environmental drivers of cetacean density in the area of interest, perhaps by the use of additional variables.
- 4. Records of water opaqueness may be useful to collect and, hence, include as a covariate in the detection function for turtles.
- 5. If availability of animals is considered important, data on diving patterns should be collected.
- 6. Where logistically possible, it is desirable to have effort in both the northern and southern half of the survey area each month so the models do not need to extrapolate (e.g. Figure 5).

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# PROTECTED SPECIES MONITORING IN THE CHERRY POINT OPAREA ONSLOW BAY, NORTH CAROLINA JANUARY 2012 - DECEMBER 2012



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Submitted to: The Department of the Navy Norfolk, VA

## **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). Vessel survey effort was conducted both inside and outside the original study area, with a focus on prevailing bathymetric and oceanographic features influencing the study area, such as the 200-m and 1000-m isobaths and Gulf Stream front. These features are known to attract marine mammals and sea turtles in this area, so survey effort was focused on these features to maximize the number of encounters. This resulted in surveys of areas to the north and east of the proposed USWTR site that have not been covered in previous years.



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

## **Vessel Survey Data Collection**

#### Visual Surveys

During this reporting period vessel survey effort focused on addressing questions of residency and population structure for odontocetes, as previous analysis of photo-identification data from Onslow Bay suggest a considerable level of residency in this area, despite a relatively low level of sampling.

Visual surveys for marine mammals and sea turtles were conducted at a speed of approximately 10 knots, primarily from the F/V *Sensation* (Figure 2), a 16 m offshore fishing vessel. One survey was conducted from the F/V *Diamond Girl*, which is



the F/V *Diamond Girl*, which is *Figure 2*. Vessel survey platform, the F/V *Sensation*. very similar in size and configuration. Observations were made from the flying bridge (5.0 m above waterline) 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. The location, species and behavior of each cetacean group were recorded. If turtles were encountered, the location and species were recorded. Environmental conditions (weather, sea state, depth and sea surface temperature) were recorded at each sighting and whenever sighting conditions changed. Sighting and environmental data were recorded using an iPad tablet and GPS unit.

In addition, use of the Onslow Bay survey area by individual cetaceans was examined using photo-identification and biopsy techniques. Photographs were used to confirm species identification and to compare identification features with those used by the aerial survey team. Photographs were taken with Canon or Nikon digital SLR (equipped with 100-400 mm zoom lenses) in 24-bit color at a resolution of 3072 X 2048 pixels and saved in .jpg format. Remote biopsy sampling methods were employed to collect small skin and blubber samples using a variety of 27 kg – 68 kg pull crossbows, depending on the species and sampling distance. Biopsy samples were obtained with a specialized 2.5 cm stainless biopsy tip attached to a modified bolt, typically fired from the stern of the survey vessel.

## Passive Acoustic Monitoring

Passive acoustic data were collected in the Onslow Bay survey area using autonomous bottommounted recorders.

#### **Bottom-mounted Recorders**

To collect time-series of acoustic data in the Onslow Bay survey area, autonomous Highfrequency Acoustic Recording Packages (HARPs; Wiggins and Hildebrand 2007) were utilized. The HARP data-logging system includes a 16-bit A/D converter, a hydrophone suspended approximately 12 m above the seafloor, an acoustic release system, ballast weights, and flotation (Figure 3). 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.

Since August 2011, three HARPs have been deployed at Onslow Bay Site E (Table 1, Figure 4). The first HARP was deployed in 952 m at 33.77794° N, 75.92641° W on 18 August 2011, and retrieved on 13 July 2012, for a deployment period of 330 days. The second HARP was deployed in 914 m at 33.78666° N, 75.92915° W on 13 July 2012, and retrieved on 24 October 2012, for a deployment period of 103 days. The third HARP was deployed in 853 m at 33.78696° N, 75.92801° W on 24 October 2012. This HARP is still out in the field and expected to be recovered in late spring or early summer 2013. All three HARPs sampled at 200 kHz on a duty cycle of five minutes on/five minutes off. The August 2011 – July 2012 deployment provided data during 73 days (19 August 2011 – 1 December 2011). The July – October 2012 deployment provided data during 80 days (14 July 2012 – 2 October 2012). Both of these deployments yielded less data than expected, likely due to issues with the firmware when collecting duty-cycled data. Future deployments will record continuously to avoid these issues.



*Figure 3.* Schematic diagram showing details of Site E Onslow Bay HARP deployments between 2011 – present. Note that diagram is not drawn to scale.

Site	Deployment	Retrieval	Latitude	Longitude	Depth	Sampling	Duty Cycle	Amount
Site	Date	Date	Latitude	Longitude	(m)	Rate	Duty Cycle	of data
1A	9-Oct-07	27-May-08	33.7914	-76.5238	162	200 kHz	5-min on/5-min off	2.0 TB
2B	30-May-08	24-Nov-08	33.8111	-76.4283	232	200 kHz	5-min on/5-min off	2.0 TB
3A	24-Apr-09	16-Sep-09	33.7895	-76.5192	174	200 kHz	5-min on/5-min off	2.0 TB
4A	8-Nov-09	19-Jun-10	33.7873	-76.5241	171	200 kHz	5-min on/10-min off	1.2 TB
4C	8-Nov-09	19-Jun-10	33.6778	-76.4769	335	200 kHz	5-min on/10-min off	2.0 TB
5A	29-Jul-10	10-Jun-11	33.7932	-76.5162	171	200 kHz	5-min on/5-min off	3.4 TB
5D	29-Jul-10	10-Jun-11	33.5807	-76.5502	338	200 kHz	5-min on/5-min off	3.3 TB
6E	18-Aug-11	13-Jul-12	33.7779	-75.9264	952	200 kHz	5-min on/5-min off	0.7 TB
7E	13-Jul-12	24-Oct-12	33.7867	-75.9292	914	200kHz	5-min on/5-min off	0.7 TB
8E	24-Oct-12		33.7870	-75.9280	853	200kHz	5-min on/5-min off	

Table 1. Harp deployments in the Onslow Bay survey area.



Figure 4. 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* 10.1 to illustrate the location of effort and sightings within the study area. All sighting data collected from January 2012 through December 2012 have been posted on the data repository OBIS-SEAMAP (http://seamap.env.duke.edu/).

## Acoustic Analysis

#### 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). New compression code was implemented starting in July 2010 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 using a *MATLAB*-based acoustic program called Triton (Hildebrand Lab at Scripps Institution of Oceanography, CA) to create 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.

Data from the three 2011-2012 Site E HARP deployments have not yet been analyzed. The data from the 2010-2011 Site A HARP deployment (depth: 171 m; location: 33.79316° N,

76.51620° W; recording period: 30 July 2010 – 3 March 2011; amount of data: 2831.8 hrs during 216 days; Table 1, Figure 4) were manually scanned for marine mammal vocalizations using the "logger" version of *Triton* (v1.81.20121030). The effective frequency range of the HARP (10 Hz – 100 kHz) was divided into two parts for this manual review: 10-1000 Hz and 1-100 kHz. The resulting LTSAs had resolutions of 5 s in time and 1 Hz in frequency (for the data decimated by a factor of 100: 10-1000 Hz band) and 5 s in time and 100 Hz in frequency (for the original data: 1-100 kHz band). LTSAs that were decimated by a factor of 100 were inspected for sounds produced by mysticetes. Non-decimated LTSAs were inspected for odontocete whistles, clicks, and burst-pulses as well as mid-frequency active sonar. The presence of vocalizations and mid-frequency active sonar was determined in one-minute bins, and vocalizations were assigned to species when possible.

#### Data Storage

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

## Results

# Vessel Survey Effort

Between 01 January 2012 and 31 December 2012, six surveys were conducted, covering 496.8 km and 31.5 hours of photo-identification and biopsy effort (Table 2, Figure 5). Surveys were conducted in Beaufort Sea States (BSS) 1 to 4 (Figure 6). Most survey effort (70.8%) was conducted in good to fair conditions (BSS 2-3); 26.6% of effort was conducted in poor sighting conditions (BSS 4).

*Table 2*. Dates, kilometers, and hours surveyed during vessel surveys in the Onslow Bay survey area, January 2012 – December 2012.

Date	Distance Surveyed (km)	Survey Time (hrs:mm)
31-Jan-12	42.7	3:22
8-Feb-12	77.8	4:37
1-Jun-12	86.9	5:44
24-Oct-12	83.0	6:18
10-Nov-12	119.0	6:42
3-Dec-12	87.4	4:47



Figure 5. Survey effort in the Onslow Bay survey area, January 2012 – December 2012.



*Figure 6.* Total distance surveyed by Beaufort Sea State during vessel surveys in the Onslow Bay survey area, January 2012 – December 2012.

## Marine Mammals and Sea Turtle Sightings

Twelve cetacean sightings were recorded during vessel surveys in Onslow Bay during 2012, including: Risso's dolphins (*Grampus griseus*; n = 1); *Mesoplodon* spp. (n = 2); Atlantic spotted dolphins (*Stenella frontalis*; n = 1); bottlenose dolphins (*Tursiops truncatus*; n = 7); and one unidentified small whale (Tables 3 and 4). No mixed-species groups were observed. Sightings per unit effort was highest in BSS 2 and 3 and lowest in BSS 4, with no cetaceans observed in BSS 1 (Figure 7).

Two loggerhead sea turtles (*Caretta caretta*) were sighted during vessel surveys in Onslow Bay during 2012 (Tables 5 and 6).

				Depth	Temp		Group	Biopsy	
Date	Time	Latitude	Longitude	(m)	$(\mathbf{C}^{0})$	Species	Size	Samples	Images
31-Jan-12*	9:06	34.00423	-76.01622	488.3	20.1	T. truncatus	20	2	167
31-Jan-12	12:22	33.75776	-75.84635	914.4	24.4	Unid. small whale	1	0	0
31-Jan-12	13:17	33.79999	-75.85713	914.4	24.6	Mesoplodon spp.	4	0	5
31-Jan-12	14:03	33.92055	-75.93716	658.4	24.7	T. truncatus	3	0	8
1-Jun-12	11:50	34.09204	-75.80366	726.0	26.7	T. truncatus	13	0	77
1-Jun-12	14:00	34.19700	-75.92630	380.4	26.8	T. truncatus	6	1	70
24-Oct-12	8:37	34.43334	-75.84347	143.2	27.2	G. griseus	60	5	536
24-Oct-12	13:06	34.21774	-75.65561	1699.3	28.1	Mesoplodon spp.	1	0	0
24-Oct-12	14:42	34.25463	-75.75308	685.8	28.1	T. truncatus	18	2	28
10-Nov-12	8:17	34.09186	-76.75617	31.1	21.3	S. frontalis	150	2	170
10-Nov-12	10:30	33.59810	-76.78538	146.9	25.2	T. truncatus	6	1	111
10-Nov-12	11:21	33.57810	-76.77543	180.7	25.3	T. truncatus	14	2	277

*Table 3*. Cetacean sightings observed during vessel surveys in the Onslow Bay survey area, January 2012 – December 2012.

\*off effort

*Table 4*. Number of cetacean sightings and mean group size for each species observed during Year 1 (June 2007 – June 2008), Year 2 (July 2008 – June 2009), Year 3 (July 2009 – June 2010), Year 4 (July 2010 – December 2011), and Year 5 (January 2012 – December 2012) of vessel surveys in the Onslow Bay survey area.

		Sightings							
Species	Year 1	Year 2	Year 3	Year 4 Line Transect	Year 4 Photo-ID/Biopsy	Year 5 Photo-ID/Biopsy	Mean Group Size		
Mesoplodon spp.	0	0	0	0	0	2	2.5±2.1		
Globicephala spp.	1	0	2	0	0	0	31.0±20.1		
Grampus griseus	3	0	3	0	0	1	34.7±15.7		
Stenella frontalis	6	17	17	5	4	1	19.2±34.5		
Tursiops truncatus	23	14	29	6	1	7	11.2±13.3		
Steno bredanensis	0	0	1	0	0	0	27.0±0.0		
Unid. delphinid	3	2	3	0	0	0	1.7±0.5		
Unid. small whale	0	0	0	0	0	1	1.0±0.0		
Total:	36	33	55	11	5	12			



*Figure 7*. Number of cetacean sightings, corrected for kilometers on effort, observed in each Beaufort Sea State for vessel surveys in the Onslow Bay survey area, January 2012 – December 2012.

*Table 5*. Sea turtle sightings made from vessel surveys in the Onslow Bay survey area, January 2012 – December 2012.

Date	Time	Latitude	Longitude	Depth (m)	Temp (C <sup>o</sup> )	Species	Group Size
10-Nov-12	9:47	33.85189	-76.79433	41.3	23.9	C. caretta	1
3-Dec-12	14:23	34.16599	-76.21274	56.3	15.1	C. caretta	1

*Table 6*. Number of sea turtle sightings and mean group size for each species observed during Year 1 (June 2007 – June 2008), Year 2 (July 2008 – June 2009), Year 3 (July 2009 – June 2010), Year 4 (July 2010 – December 2011), and Year 5 (January 2012 – December 2012) of vessel surveys in the Onslow Bay survey area..

		Year 4 Year 4 Year 5						
Species	Year 1	Year 2	Year 3	Line Transect	Photo-ID/Biopsy	Photo-ID/Biopsy	Mean Group Size	
Caretta caretta	19	49	47	2	1	2	1.0±0.1	
Dermochelys coriacea	0	0	2	0	0	0	1.0±0.0	
Unid. sea turtle	1	0	1	0	0	0	1.0±0.0	
Total:	20	49	50	2	1	2		

## Distributions and Habitat Associations of Cetaceans and Sea Turtles

The distribution of marine mammals and sea turtles is presented in Figures 8 through 11. 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 observed 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 beaked whales and unidentified small whale were observed in deeper, offshore waters, well to the east (and offshore of) the original survey area (Figure 8). All sea turtles were observed in relatively shallow waters over the continental shelf (Figure 11).



*Figure 8.* Distribution of all cetacean sightings made during vessel surveys in the Onslow Bay survey area, January 2012 - December 2012.



*Figure 9.* Distribution of bottlenose dolphin sightings indicating group size made during vessel surveys in the Onslow Bay survey area, January 2012 – December 2012.



*Figure 10.* Distribution of all other cetacean sightings indicating group size made during vessel surveys in the Onslow Bay survey area, January 2012 – December 2012.



*Figure 11*. Distribution of sea turtle sightings made during vessel surveys in the Onslow Bay survey area, January 2012 – December 2012.

## Seasonality of Effort and Sightings

Due to unfavorable weather conditions, offshore surveys were not conducted in several months, which resulted in limited effort in 2012. It is, therefore, difficult to identify seasonal trends in cetacean and sea turtle distribution. Bottlenose dolphins were the most commonly encountered cetacean in the survey area. The two sightings of *Mesoplodon* spp. were recorded east of the original survey area in autumn and winter. Loggerheads were the only sea turtle species observed and were only seen during winter surveys. The number of sightings is depicted below by species for both cetaceans and sea turtles during each month of surveys (Figures 12 and 13).



*Figure 12.* Number of cetacean sightings by month and effort (km surveyed) during vessel surveys in the Onslow Bay survey area, January 2012 – December 2012.



*Figure 13.* Number of sea turtle sightings by month and effort (km surveyed) during vessel surveys in the Onlsow Bay survey area, January 2012 – December 2012.

# **Biopsy Sampling**

A total of fifteen biopsy samples were collected in 2012 in Onslow Bay from: bottlenose

dolphins (n = 8), Risso's dolphins (n = 5) and Atlantic spotted dolphins (n = 2)(Table 7, Figure

14). Skin samples will be analyzed for sex and population identity in the coming months.

Voucher specimens of these samples are archived with the Southeast Fisheries Science Center in

Lafayette, LA.

Date	Time	Latitude	Longitude	Species	Sample #	Photo-ID Code
31-Jan-12	9:24	33.99776	-76.00808	T. truncatus	ZTS-12-015	Tt_6-029_OB
31-Jan-12	9:37	33.99996	-76.00591	T. truncatus	ZTS-12-016	Tt_7-027_OB
1-Jun-12	14:13	34.20215	-75.93194	T. truncatus	ZTS-12-026	Not distinctive
24-Oct-12	8:54	34.43584	-75.84518	G. griseus	ZTS-12-053	No ID photos
24-Oct-12	9:07	34.43605	-75.84764	G. griseus	ZTS-12-054	Gg_4-002_OB
24-Oct-12	9:13	34.43670	-75.84851	G. griseus	ZTS-12-055	No ID photos
24-Oct-12	9:22	34.43703	-75.84884	G. griseus	ZTS-12-056	Gg_9-006_OB
24-Oct-12	9:31	34.43692	-75.84788	G. griseus	ZTS-12-057	Gg_4-004_OB
24-Oct-12	14:48	34.26005	-75.75545	T. truncatus	ZTS-12-058	No ID photos
24-Oct-12	14:53	34.26382	-75.75120	T. truncatus	ZTS-12-059	Tt_8-018_OB
10-Nov-12	8:52	34.04532	-76.74152	S. frontalis	ZTS-12-060	Sf_9-026_OB
10-Nov-12	9:01	34.04372	-76.73562	S. frontalis	ZTS-12-061	Sf_8-019_OB
10-Nov-12	10:41	33.59426	-76.78155	T. truncatus	HJF-12-019	No ID photos
10-Nov-12	11:27	33.57456	-76.77519	T. truncatus	ZTS-12-062	Tt_9-042_OB
10-Nov-12	11:53	33.55908	-76.76921	T. truncatus	ZTS-12-063	Tt_6-031_OB

*Table 7.* Biopsy samples (and corresponding photo-identification codes) collected in the Onslow Bay survey area, January 2012 – December 2012.



*Figure 14.* Locations of biopsy samples collected in the Onslow Bay survey area, January 2012 – December 2012.

### Photographic Effort

Approximately 1444 digital images were taken during 2012 for species confirmation and individual identification. 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. Individuals were identified to species in nine of the twelve encounters. In two sightings, one of an unidentified whale and one of the genus *Mesoplodon*, no images were obtained in the third sighting, and the animal was identified to the genus *Mesoplodon*.

Images of newly identified dolphins were added to existing photo-identification catalogs in Onslow Bay (Tables 7 and 8). Photo-identification analysis is now complete for all images taken through December 2012. Since the beginning of the monitoring program in 2007, seven bottlenose dolphins and three Atlantic spotted dolphins have been re-sighted (Figure 15). In total, approximately 5% of bottlenose dolphins (7 of 139) and 4% (3 of 78) of Atlantic spotted dolphins identified in Onslow Bay have been resighted, despite limited sampling effort. Interestingly, two bottlenose dolphins (7-015 and 8-009) were seen together in both April 2009 and 2010. One bottlenose dolphin (Ttr 1-004) has now been photographed on three separate occasions. Furthermore, one Atlantic spotted dolphin (Sfr-8004) biopsied and photographed on 12 September 2011 was matched to an animal photographed on 28 June 2001 and on 24 June 2002 during surveys conducted in near-shore coastal waters of Onslow Bay (Figure 15). We also matched an additional Atlantic spotted dolphin from the same 12 September 2011 group to Sf 9-023\_MCB, photographed a month earlier on 19 August 2011 during surveys in the coastal waters off of Camp Lejeune, NC (Figure 15). These resigntings suggest some degree of residency for both bottlenose dolphins and Atlantic spotted dolphins within the study area. To date, no other species photographed has been resighted. However the number of sightings and catalog sizes for these species are very small. In addition, the photo-identification catalogs of bottlenose dolphins and Atlantic spotted dolphins from the Jacksonville and Onslow Bay survey areas were compared, but no matches were found between the two sites. 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. 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.

*Table 8.* Summary of photo-identification effort and number of biopsy samples collected during vessel-based surveys in Onslow Bay, January 2012 – December 2012.

Species	Images	Sightings	Catalog Size (2007-2012)	Number of Matches (2007-2012)	Number of Biopsy Samples (2012)
Grampus griseus	536	1	22	0	5
Stenella frontalis	170	1	78	3	2
Tursiops truncatus	738	7	139	7	8



Figure 15. Locations of photo-identification matches of dolphins in the Onslow Bay survey area.

#### Passive Acoustic Monitoring

## HARP Analysis

Underwater ambient noise during this deployment is shown in Figure 16. Table 9 summarizes the detected and identified marine mammal vocalizations for the 2010-2011 Site A HARP deployment. Figures 17-26 show the daily occurrence patterns for the different marine mammal groups (classified to species when possible). Figure 27 shows the occurrence of sonar.

Blue whales were present primarily from September 2010 to the end January 2011 (Figure 17). Type A and B blue whale calls were detected, mainly as song but also occasionally as individual calls. Also, 26 – 27 Hz sounds, which are similar to the calls produced by Antarctic blue whales, were detected between 31 July 2010 and 16 August 2010 (Figure 18).

Fin whale 20-Hz pulses were present starting as early as 19 August 2010, although most detections occurred between December 2010 and February 2011, with a minor peak in October 2010 (Figure 19). In previous deployments, fin whale calls peaked between January and March.

Minke whale pulse trains (mainly slow-down pulse trains) were detected between 12 December 2010 and the last day of the recording period, 3 March 2011 (Figure 20). Peaks in pulse train calls occurred from the end of December through the end of February, similar to the previous findings of peaks between January and March for earlier deployments.

North Atlantic right whale up-calls were detected on two days (18 October 2010 and 29 January 2011) during the 2010-2011 Site A deployment (Figure 21). Moans and variable calls were also

detected on 29 January 2011. These are the first detections of North Atlantic right whales at Site A in Onslow Bay. The timing coincides with the migration of this species to and from the breeding grounds.

Downsweeps similar to those ascribed to sei whales by Baumgartner *et al.* (2008) were detected on 18 October 2010 and between 17 November 2010 and 1 March 2011 (Figure 22). Peaks in these types of calls occurred between 30 November – 1 December 2010 and 18 – 26 January 2011. The general occurrence and peaks in detections are similar to previous findings in Onslow Bay.

Three pulses, unidentified to species, with frequencies sweeping down from approximately 90 - 60 Hz were detected on 26 December 2010. These three pulses followed 10 minutes after the detection of a single variable call (frequency range approximately between 280 - 330 Hz), also unassigned to a species.

Detected odontocete vocalizations included clicks, whistles, and burst-pulses (Figures 23-26). Most of these detections (93%) were assigned to the unidentified odontocete category (Figure 23). As found in previous winter deployments at Site A during 2007-2008 and 2009-2010, a strong pulse of longer-duration and clustered unidentified odontocete vocal events was seen during the 2010-2011 deployment starting in November and ending in January (Figure 23). *Kogia* spp. were present on only four days during the 2010-2011 Site A deployment (Figure 24), which is consistent with the sporadic occurrence found during previous deployments. Risso's dolphins were also detected throughout the deployment with a stronger nocturnal presence, again agreeing with earlier findings (Figure 25). Sperm whales were detected mainly between November and the end of February, during both day and night (Figure 26).



Figure 16. Monthly averages of ambient noise at Site A for July 2010 – March 2011.

*Table 9*. Summary of detections of marine mammal vocalizations at Site A for July 2010 – March 2011.

Species	Call type	Total duration of vocalizations (hours)	Percent of recording duration	Days with vocalizations	Percent of recording days
Blue whale	A and B calls (mainly A)	57.35	2.02	72	33.03
Possible blue whale	26 – 27 Hz	8.17	0.29	7	3.21
Fin whale	20 Hz	93.67	3.31	65	29.82
Minke whale	pulse train (slow-down, speed-up, regular)	48.58	1.72	56	25.69
North Atlantic right whale	Up-call, moan, variable call	0.43	0.02	2	0.92
Possible sei whale	downsweep	9.95	0.35	20	9.17
Unidentified odontocete	clicks, whistles, burst-pulses	441.27	15.58	207	94.95
Kogia spp.	clicks	0.27	0.01	4	1.83
Risso's dolphin	clicks	12.63	0.45	19	8.72
Sperm whale	clicks	5.45	0.19	14	6.42



*Figure 17.* Blue whale Type A and B call detections (black bars) for the 2010-2011 Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).



*Figure 18.* Detections of 26 - 27 Hz sounds (black bars) possibly produced by blue whales for the 2010-2011 Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).



*Figure 19.* Fin whale 20-Hz pulse detections (black bars) for the 2010-2011 Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).



*Figure 20.* Minke whale detections (black bars) for the 2010-2011 Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).



*Figure 21*. North Atlantic right whale detections (black bars) for the 2010-2011 Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).



*Figure 22.* Downsweep detections (black bars) that may be produced by sei whales (Baumgartner *et al.* 2008) for the 2010-2011 Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).



*Figure 23.* Unidentified odontocete vocalization detections (black bars) for the 2010-2011 Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).



*Figure 24. Kogia* spp. click detections (black bars) for the 2010-2011 Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).


*Figure 25.* Risso's dolphin click detections (black bars) for the 2010-2011 Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).



*Figure 26*. Sperm whale click detections (black bars) for the 2010-2011 Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).



*Figure 27*. Mid-frequency active sonar (black bars) detected during the 2010-2011 Site A deployment. Shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil).

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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 January 2012 and December 2012. The goal was to survey the entire site (10 tracklines) twice per calendar month, which was achieved in January, April, May and July. In September and November 16 tracklines were flown while in March 8 lines were surveyed. During the months of February, June, August, October and December of 2012 no surveys were conducted due to unfavorable weather conditions. A total of 120 tracklines covering 9853 km were surveyed across seven months.

A total of 75 sightings of 1153 cetaceans were recorded while on effort in the study area (Table 1, Figure 1). Six species of cetaceans were observed including: bottlenose dolphins (*Tursiops truncatus*; 35 sightings of 351 individuals), Atlantic spotted dolphins (*Stenella frontalis*; 28 sightings of 657 individuals), Risso's dolphins (*Grampus griseus*; six sightings of 75 individuals), rough-toothed dolphins (*Steno bredanensis*; two sightings of 63 individuals), short-finned pilot whales (*Globicephala macrorhynchus*; one sightings of 2 individuals), and a single humpback whale (*Megaptera novaeangliae*). During two sightings (totaling four individuals) dolphin species identity could not be established with 100 percent certainty (*i.e.* "unidentified delphinids"). Also two off effort sightings short-finned pilot whales were observed just offshore of the survey site while transiting between tracklines. Cetacean sighting rates varied across months with peaks in January and July.

A total of 319 sea turtles were recorded during the study period. Of these turtle sightings, 274 were identified as loggerheads (*Caretta caretta*), 17 as leatherbacks (*Dermochelys coriacea*), and 28 as "unidentified sea turtles" (Tables 10 and 11, Figure 12 and 13). Sea turtles were detected during each day of survey effort, with higher abundances observed in March and July (Figures 14a-c).

As has been demonstrated in our earlier reports and 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, McAlarney *et al.* 2011). Effort corrected cetacean and sea turtle sightings were higher in sea states of 1 or 2 than in sea states  $\geq$  3 (Figures 4b & 14b).

In addition to cetaceans and sea turtles, other pelagic marine vertebrates including ocean sunfish and multiple species of sharks and rays were observed (Tables 12-16, Figure 15). Military, commercial, and recreational vessel traffic was also recorded inside the survey area (Tables 17-19, Figures 16-18).

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Jacksonville, Florida survey area.	vey area.												
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	# of Individuals	150		99	108	131	60		84		28		657
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Grainpus griseus	# of Individuals	5					49		13		8		75
Takinahala maanhaah	# of Sightings					÷							٦
Globicephiala macromynchus	# of Individuals					2							2
these brademonie	# of Sightings						-				-		2
Sterio Dreuarterisis	# of Individuals						35				28		63
According according	# of Sightings	1											٢
wedahrera novaeanynae	# of Individuals	1											1
I Inidentified delahinid	# of Sightings								1		٢		2
	# of Individuals								2		2		4
	Total sightings	21	0	9	9	8	0 16	0	11	0	7	0	75
	Total individuals	341	0	78	147	153 (	0 210	0	148	0	76	0	1153



*Figure 1.* All cetacean sightings during aerial surveys conducted in Jacksonville, Florida from January 2012 to December 2012.

#### 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, Figure 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, but see Foley *et al.* 2011). Aerial Early Warning System (EWS) surveys have been conducted in northern Florida and southern Georgia for the past 16 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.

Safety and communication protocols for transiting through the EWS areas were established in January 2009 when offshore survey effort began. 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 (Figure 2). We have maintained these safety and communication protocols throughout the reporting period.

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.

Transect Line	Eastern	Waypoint	Western	Waypoint
Line	Latitude	Longitude	Latitude	Longitude
1	29.965011	-79.801416	29.965011	-80.700000
2	30.031263	-79.801416	30.031263	-80.700000
3	30.099694	-79.801416	30.099694	-80.700000
4	30.165763	-79.801416	30.165763	-80.700000
5	30.232227	-79.801416	30.232227	-80.700000
6	30.299477	-79.801416	30.299477	-80.700000
7	30.365152	-79.801416	30.365152	-80.700000
8	30.432797	-79.801416	30.432797	-80.700000
9	30.498866	-79.801416	30.498866	-80.700000
10	30.566233	-79.801416	30.566233	-80.700000

Table 2. Coordinates for trackline end points for the Jacksonville, Florida survey area.



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

#### Results

A total of 120 tracklines comprising 9853 km were surveyed during the 12 month reporting period from January 2012 through December 2012. Minimum coverage of ten tracklines was achieved in 6 of 12 months, and in March eight tracklines were flown. Unfavorable survey conditions precluded surveys from being conducted during the other five months (Table 3).

An average Beaufort Sea State (BSS) value was calculated each survey month 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 1 to 5, with the majority of the surveys flown in a BSS 3 (51.1%) (Figures 3a-c). Cetacean sighting rates dropped off dramatically at sea state greater than two. Low sighting rates in BSS 1 is likely a result of limited survey time spent in these conditions rather than decreased detection of cetaceans (Figures 4a-c).

The mean sighting distance for all cetacean sightings was 0.68 km with greater than 75% of sightings occurring within 1 km of the trackline (Figure 5a). The mean sighting distance varied less than 0.3 km across the BSS values recorded (Figure 5b). Average sighting distances were calculated after removing outliers and excluded the single sighting where a sighting distance was not obtained. 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 2.09, 2.41 and 4.07 km from the trackline).

Date	Tracklines Flown AM	Tracklines Flown PM	Total km Flown	Hobbs Hours
23-Jan-2012	NA	10 to 5	478.68	4.5
24-Jan-2012	1 to 6	7, 8, 9, 6	850.97	7.9
25-Jan-2012	5 to 8	N/A	328.30	4.4
29-Mar-2012	8 to 5	4 to 1	551.50	6.0
18-Apr-2012	10 to 5	1 to 4	861.15	6.9
19-Apr-2012	1 to 6	7 to 10	862.00	6.4
16-May-2012	10 to 5	4 to 1	751.75	6.3
17-May-2012	5 to 10	4 to 1	847.55	7.7
6-Jul-2012	10 to 5	4 to 1	858.70	7.6
7-Jul-2012	1 to 6	7 to 10	841.05	7.4
22-Sep-2012	5 to 10	4 to 1	769.60	7.5
23-Sep-2012	5 to 10	N/A	514.70	4.1
4-Nov-2012	1 to 6	10 to 7	844.15	7.2
5-Nov-2012	10 to 5	N/A	493.25	3.4
		Total	9853.35	87.3

*Table 3.* Tracklines, km flown and Hobbs hours during aerial surveys of the Jacksonville, Florida survey area from January 2012 to December 2012. Trackline numbers are listed in the order in which they were flown.



*Figure 3a.* Total distance surveyed per Beaufort Sea State from January 2012 to December 2012 during aerial surveys in the Jacksonville, Florida survey area.



*Figure 3b.* Effort by Beaufort Sea State for each day from January 2012 to December 2012 during aerial surveys in the Jacksonville, Florida survey area.



*Figure 3c.* Average Beaufort Sea State for each month from January 2012 to December 2012 during aerial surveys in the Jacksonville, Florida survey area. Values were calculated using the formula AvgBSS = [(Distance @ BSS 1\*1)+.../Total distance flown that day].



*Figure 4a.* Number of cetacean sightings per Beaufort Sea State from January 2012 to December 2012 during aerial surveys in the Jacksonville, Florida survey area.



*Figure 4b.* Cetacean sightings per 1000 km flown by Beaufort Sea State from January 2012 to December 2012 during aerial surveys in the Jacksonville, Florida survey area.



*Figure 4c.* Cetacean sightings per 1000 km surveyed and the average Beaufort Sea State per month from January 2012 to December 2012 during aerial surveys in the Jacksonville, Florida survey area.



*Figure 5a.* Sighting distances by Beaufort Sea State for 71 of 75 cetacean sightings (one without sighting distance & three outliers) from January 2012 to December 2012 during aerial surveys in the Jacksonville, Florida survey area.



*Figure 5b.* Average sighting distances by Beaufort Sea State for 70 of 75 cetacean sightings (one without sighting distance, three outliers & only single sighting in BSS 4 which is not shown here) from January 2012 to December 2012 during aerial surveys in the Jacksonville, Florida survey area. Error bars denote standard deviation for each category.

#### Marine Mammal Sightings

A total of 75 sightings of 1153 individual cetaceans, representing six species were observed while on effort during the reporting period. The only endangered species encountered inside the study area was a single humpback whale observed in January. All identified species encountered 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 E. Daily sightings are summarized in Appendix G.

### Bottlenose dolphin (Tursiops truncatus) (Table 4, Figure 6)

Bottlenose dolphins were the most frequently encountered cetacean (35 sightings for a total of 351 individuals). While group size ranged from 1 to 85 (mean=10), over 77% of sightings contained 10 or fewer individuals. 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 there was no obvious relationship between group size and bathymetry (Figure 6). This species was encountered during each month surveyed. 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).

Date	Time	പ Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
23-Jan-12	13:21	5	30.569777	-80.445247	Е	10	2	90°	1
23-Jan-12	14:16	20	30.518887	-80.210413	W	9	2	90°	5
23-Jan-12	15:23	45	30.369298	-80.280478	W	7	2	90°	30
23-Jan-12	16:25	61	30.233261	-80.356791	W	5	3	45°	85
24-Jan-12	9:56	6	29.965240	-80.047545	E	1	2	100°	10
24-Jan-12	10:36	15	30.032596	-80.062563	W	2	1	90°	10
24-Jan-12	13:02	46	30.308654	-80.568021	W	6	1	90°	1
24-Jan-12	14:50	54	30.367200	-80.664158	Е	7	2	100°	1
24-Jan-12	15:01	61	30.369999	-80.329043	Е	7	2	100°	1
24-Jan-12	15:19	67	30.367006	-79.885305	Е	7	1	100°	20
24-Jan-12	16:52	90	30.306925	-80.344782	W	6	1	90°	8
25-Jan-12	10:20	105	30.232391	-80.254267	Е	5	1	90°	7
25-Jan-12	10:32	111	30.238935	-80.070583	Е	5	1	100°	4
25-Jan-12	11:31	125	30.355313	-80.367444	E	7	1	100°	2
29-Mar-12	15:57	54	30.029261	-80.439651	Е	2	2	60°	4
29-Mar-12	16:20	60	29.971966	-80.092957	W	1	2	60°	8
18-Apr-12	13:22	32	29.968271	-80.382697	E	1	2	100°	3
18-Apr-12	14:42	46	30.102057	-80.076377	Е	3	2	90°	8
19-Apr-12	9:34	10	30.032347	-80.262068	W	2	2	90°	28
17-May-12	15:24	68	30.112312	-79.858667	W	3	3	90°	20
6-Jul-12	14:08	43	30.100361	-80.196561	W	3	2	90°	7
6-Jul-12	15:54	74	29.970666	-80.321597	W	1	1	90°	6
7-Jul-12	10:45	15	30.164944	-80.367496	W	4	1	60°	8
7-Jul-12	12:08	41	30.305426	-80.649478	W	6	3	60°	3
7-Jul-12	13:42	49	30.370784	-80.559474	Е	7	2	90°	2
7-Jul-12	14:02	56	30.372047	-79.963499	Е	7	1	90°	8
7-Jul-12	14:28	66	30.434672	-79.932294	W	8	1	90°	2
22-Sep-12	9:25	13	30.236453	-80.410724	Е	5	2	60°	12
22-Sep-12	11:32	41	30.430898	-80.365577	W	8	2	90°	11
22-Sep-12	14:58	71	30.108173	-80.009283	W	3	2	90°	6
22-Sep-12	15:03	75	30.112812	-80.053932	W	3	1	90°	12
22-Sep-12		89	29.968701	-79.965453	W	1	1	90°	8
4-Nov-12	10:12	20	30.101503	-80.060750	Е	3	1	90°	5
4-Nov-12	13:30	37	30.563090	-80.196563	Е	10	1	90°	3
4-Nov-12	13:54	42	30.563003	-79.859421	E	10	1	90°	2

*Table 4*. Bottlenose dolphin (*Tursiops truncatus*) sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.



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

### Atlantic Spotted Dolphin (Stenella frontalis) (Table 5, Figure 7)

The Atlantic spotted dolphin was the second most frequently sighted, and numerically most abundant, species encountered in the survey area and were seen in every month surveyed (28 sightings for a total of 657 individuals). Group size ranged from 2 to 75 (mean=23.4). This species was encountered exclusively in shallow water over the continental shelf (Figure. 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 at or within the 200 m isobath, and a less spotted, smaller form that occurs further offshore and around deep island archipelagoes (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 26798 (CV=0.66) and was determined by aerial and vessel observations; the status of the stock(s) is/are unknown (Waring *et al.* 2011).

*Table 5.* Atlantic spotted dolphin (*Stenella frontalis*) sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
23-Jan-12	13:36	11	30.557850	-80.333953	Е	10	2	90°	75
23-Jan-12	14:30	25	30.494180	-80.356793	W	9	1	120°	4
24-Jan-12	15:56	77	30.431846	-80.639311	W	8	2	90°	4
25-Jan-12	<b>1</b> 1:40	130	30.370021	-80.316988	Е	7	1	90°	15
25-Jan-12	12:37	142	30.438325	-80.293544	W	8	2	90°	52
29-Mar-12	15:10	33	30.096882	-80.440277	W	3	2	100°	44
29-Mar-12	15:28	37	30.101111	-80.507489	W	3	1	100°	6
29-Mar-12	15:47	46	30.029672	-80.519755	Е	2	3	90°	3
29-Mar-12	15:51	50	30.031855	-80.476396	Е	2	2	90°	13
18-Apr-12	15:23	52	30.173850	-80.401034	W	4	2	90°	50
19-Apr-12	11:33	32	30.310782	-80.369910	W	6	3	90°	20
19-Apr-12	14:56	63	30.573341	-80.520768	W	10	2	90°	38
16-May-12	8:57	6	30.570136	-80.230107	Е	10	2	90°	37
16-May-12	9:48	15	30.430951	-80.635714	Е	8	2	90°	7
16-May-12	10:08	20	30.419954	-80.444755	Е	8	2	100°	15
17-May-12	9:08	6	30.226719	-80.469996	Е	5	1	90°	14
17-May-12	10:15	22	30.354373	-80.593331	Е	7	2	90°	28
17-May-12	14:55	59	30.185141	-80.468611	Е	4	2	100°	30
6-Jul-12	14:25	50	30.105186	-80.481128	W	3	3	90°	30
6-Jul-12	14:37	54	30.096958	-80.625291	W	3	3	60°	12
7-Jul-12	10:54	21	30.165538	-80.562010	W	4	1	90°	2
7-Jul-12	11:15	29	30.227034	-80.388729	Е	5	2	90°	8
7-Jul-12	14:52	70	30.438204	-80.411598	W	8	1	90°	38
22-Sep-12	9:13	7	30.223389	-80.494131	Е	5	2	90°	26
22-Sep-12	10:39	27	30.353680	-80.465409	Е	7	3	90°	22
22-Sep-12	12:21	55	30.561522	-80.180946	W	10	2	90°	26
23-Sep-12	12:10	25	30.233932	-80.702387	W	5	2	90°	10
4-Nov-12	14:32	52	30.503127	-80.694210	W	9	3	90°	28



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

<u>Risso's Dolphin</u> (Grampus griseus) (Table 6, Figure 8)

This species was encountered six times for a total of 75 individuals (Figure 8). Group size for this species ranged from 5 to 18 individuals (mean=12.5). Risso's dolphins were recorded in four of the seven months surveyed, and were only observed in deeper, offshore waters. Risso's dolphin have been found 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.* 2011). 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.* 2011). The status of this species in the western Atlantic is unknown (Waring *et al.* 2011).

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
25-Jan-12	12:06	136	30.369693	-79.833103	E	7	2	90°	5
6-Jul-12	9:32	8	30.504503	-79.998388	W	9	2	90°	17
6-Jul-12	15:20	68	30.029203	-80.080207	Е	2	3	90°	18
7-Jul-12	14:17	62	30.424355	-79.903836	W	8	3	110°	14
22-Sep-12	11:03	33	30.368550	-79.990999	Е	7	2	90°	13
4-Nov-12	15:02	59	30.433770	-79.937191	Е	8	2	60°	8

*Table 6*. Risso's dolphin (*Grampus griseus*) sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.



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

### Short-finned Pilot Whale (Globicephala macrorhynchus) (Table 7, Figure 9)

A single pair of short-finned pilot whales were encountered while on effort. There were two additional off effort sightings of this species on the eastern end of the range that were encountered while transiting between tracklines. Group sizes ranged from 2 to 8 individuals with a mean group size of four. 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 (Figure 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. (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 24,674. The status of short-finned pilot whales in the U.S. Atlantic is currently unknown (Waring *et al.* 2011).

*Table 7*. Short-finned pilot whale (*Globicephala macrorhynchus*) sightings in the Jacksonville, Florida survey area from January 2012 to December 2012. Asterisk denotes off effort sightings.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	
17-May-12	10:38	28	30.358238	-79.981219	Е	7	2	90°	2	
17-May-12	11:00	33	30.399736	-79.790061			2	90°	2	*
17-May-12	16:22	83	29.971244	-79.795325	Е	2	3	100°	8	*



*Figure 9*. Short-finned pilot whale (*Globicephala macrorhynchus*) sightings. Asterisk denotes off effort sightings.

# Rough-toothed Dolphin (Steno bredanensis) (Table 8, Figure 10)

A single sighting of this species occurred in each of two months (July and November) for a total of 63 individuals (Table 8). As in past years, sightings occurred inside of the 100m isobath in the continental shelf waters (Figure 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.* Rough-toothed dolphin (*Steno bredanensis*) sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
6-Jul-12	14:49	60	30.033889	-80.680810	Е	2	2	90°	35
4-Nov-12	8:54	5	29.967288	-80.295223	E	1	3	100°	28



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

# Humpback whale (Megaptera novaeangliae) (Table 9, Figure 11)

A single adult humpback whale was sighted over the continental slope; this is only the second 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.* 2012). 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.* 2012). This species is listed as endangered under the Endangered Species Act.

*Table 9.* Humpback whale (*Megaptera novaeangliae*) sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.



Figure 11. Humpback whale (Megaptera novaeangliae) sighting.

# Sea Turtles (Tables 10 and 11, Figures 12a – 14)

A total of 319 sea turtles were observed during the reporting period. Sighting rates were negatively correlated with Beaufort Sea State, with rates declining at higher sea states (Figure 12b). Sea turtles were observed every day of survey effort with the highest sighting rates occurring in January, March and July (Figure 12c). Observation rates ranged from a low of 8.22 /1000 km flown in November to 67.09 /1000km in March (Figure 12c). Loggerhead sea turtles (*Caretta caretta*) constituted the majority of sea turtle sightings (85.9%), followed by leatherback sea turtles (*Dermochelys coriacea*) (5.3%). 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 (accounted for 8.8% of sightings). Sea turtle species are listed below in order of decreasing number of sightings (*i.e.* most commonly sighted species first).



*Figure 12a.* Total number of sea turtle sightings by Beaufort Sea State in the Jacksonville, Florida survey area from January 2012 to December 2012.



*Figure 12b.* Sea turtle sightings per 1000 km flown by Beaufort Sea State in the Jacksonville, Florida survey area from January 2012 to December 2012.



*Figure 12c.* Sea turtle sightings per 1000 km surveyed and the average Beaufort Sea State per month in the Jacksonville, Florida survey area from January 2012 to December 2012.

# Loggerhead Sea Turtle (Caretta caretta) (Table 10, Figure 13)

A total of 274 loggerhead sea turtles were observed and this species was encountered on every day of survey effort. Loggerheads were predominantly recorded in the shallower waters over the continental shelf, although a small number of individuals occurred beyond the shelf break (Figure 12). 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).

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
23-Jan-12	13:14	2	30.567502	-80.655764	Е	10	1	90°	2
23-Jan-12	13:15	4	30.567293	-80.600892	Е	10	1	90°	1
23-Jan-12	13:44	14	30.567855	-80.255747	Е	10	1	60°	1
23-Jan-12	14:11	15	30.500095	-80.196812	w	9	2	90°	1
23-Jan-12	14:24	18	30.499981	-80.264428	W	9	2	90°	1
23-Jan-12	14:39	29	30.501364	-80.506400	W	9	2	90°	1
23-Jan-12	14:41	22	30.500220	-80.577427	w	9	2	90°	1
23-Jan-12	14:45	32	30.436019	-80.529695	Е	8	2	90°	1
23-Jan-12	14:47	25	30.435744	-80.433259	Е	8	2	90°	2
23-Jan-12	14:50	35	30.432806	-80.326035	Е	8	3	60°	3
23-Jan-12	14:52	36	30.431819	-80.266100	Е	8	1	90°	2
23-Jan-12	14:54	26	30.432589	-80.178342	E	8	2	90°	1
23-Jan-12	15:43	51	30.301246	-80.659971	E	6	1	90°	1
23-Jan-12	15:45	36	30.301034	-80.568405	E	6	1	90°	1
23-Jan-12	15:48	37	30.299538	-80.477207	Е	6	2	90°	1
23-Jan-12	15:50	52	30.298970	-80.378227	E	6	1	90°	4
23-Jan-12	16:21	59	30.231086	-80.258395	W	5	1	90°	1
23-Jan-12	16:36	49	30.231915	-80.462334	w	5	2	90°	1
24-Jan-12	11:43	31	30.168955	-80.140984	W	4	2	90°	1
24-Jan-12	11:47	35	30.167342	-80.269580	W	4	1	90°	1
24-Jan-12	12:45	46	30.302269	-80.322899	w	6	1	60°	1
24-Jan-12	14:54	57	30.365028	-80.537089	E	7	1	90°	1
24-Jan-12	14:57	58	30.366003	-80.433005	E	7	1	90°	2
24-Jan-12	14:59	59	30.367510	-80.366139	E	7	2	90°	1
24-Jan-12	15:47	74	30.432687	-80.380116	w	8	2	60°	2
24-Jan-12	15:53	75	30.432309	-80.597609	w	8	2	60°	1
24-Jan-12	16:06	75	30.500034	-80.609319	E	9	2	90°	3
24-Jan-12	16:11	77	30.500316	-80.398078	E	9	1	90°	2
24-Jan-12	16:15	78	30.500405	-80.281196	E	9	2	90°	2
24-Jan-12	16:16	79	30.500446	-80.213089	E	9	2	60°	2
24-Jan-12	16:39	88	30.299314	-79.959830	Ŵ	6	1	90°	1
24-Jan-12	16:50	88	30.299740	-80.328559	Ŵ	6	2	60°	1
25-Jan-12	11:10	113	30.298853	-80.597509	w	6	2	60°	1
25-Jan-12	11:21	123	30.367364	-80.486713	E	7	1	90°	2
25-Jan-12	11:23	117	30.366807	-80.422319	E	7	2	90°	1
29-Mar-12				-80.051229	_	8	2	90°	1
29-Mar-12			30.365938		W	7	2	90°	1
29-Mar-12				-80.342932	E	6	2	100°	1
29-Mar-12 29-Mar-12		11 17	30.232872	-80.342932	W	5	2	90°	1
29-Mar-12 29-Mar-12		24	30.232872	-80.650118	E	5 4	2	90°	1
29-Mar-12 29-Mar-12			30.165806		E	4	2	90°	1
29-Mar-12 29-Mar-12		25 26	30.165806		E	4	2	60°	1
29-Mar-12 29-Mar-12		20		-80.526160 -80.392297	E	4	2	90°	1
			30.166364		E	4	_	90°	_
29-Mar-12		24	30.166338		_	_	2		2
	15:07	28	30.100611	-80.371715	W	3	2	90°	3
29-Mar-12	15:09	30	30.100615		W	3	2	90°	1
29-Mar-12			30.103228		W	3	1	90°	1
29-Mar-12	15:35	40	30.100198	-80.628695	W	3	2	90°	1

*Table 10.* Loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.
Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
29-Mar-12	15:36	35	30.100125	-80.652350	W	3	1	60°	2
29-Mar-12	15:37	36	30.100052	-80.685309	W	3	1	90°	3
29-Mar-12	15:42	43	30.030844	-80.631153	E	2	2	90°	1
29-Mar-12	15:44	44	30.031357	-80.574786	E	2	2	60°	1
29-Mar-12	15:44	39	30.031343	-80.566586	E	2	2	90°	3
29-Mar-12	16:28	50	29.966036	-80.321870	W	1	1	90°	2
29-Mar-12	16:29	63	29.966042	-80.350415	W	1	1	60°	1
29-Mar-12	16:31	64	29.965974	-80.413241	W	1	2	90°	2
29-Mar-12	16:33	51	29.965862	-80.497539	W	1	2	90°	2
29-Mar-12	16:34	52	29.965774	-80.536903	W	1	1	90°	2
29-Mar-12	16:37	53	29.965533	-80.632278	w	1	2	90°	2
18-Apr-12	9:08	4	30.566413	-80.158997	E	10	1	90°	1
18-Apr-12	9:56	12	30.434294	-80.422103	E	8	2	100°	1
18-Apr-12	10:29	18	30.367434	-80.310509	W	7	2	90°	1
18-Apr-12	10:51	22	30.300563	-80.400465	Е	6	2	90°	1
18-Apr-12	11:24	26	30.234374	-80.300022	W	5	1	90°	1
18-Apr-12	11:24	27	30.234844	-80.312213	W	5	2	60°	1
18-Apr-12	14:37	44	30.099307	-80.189720	Е	3	1	100°	1
19-Apr-12	9:48	14	30.030832	-80.490290	W	2	2	90°	1
19-Apr-12	10:03	17	30.101364	-80.435450	Е	3	2	90°	1
19-Apr-12	10:50	24	30.234347	-80.677805	Е	5	1	90°	1
19-Apr-12	11:45	25	30.302725	-80.657434	W	6	2	90°	1
19-Apr-12	13:17	42	30.367870	-80.602153	E	7	2	90°	1
19-Apr-12	13:55	36	30.434085	-80.342227	W	8	1	<b>4</b> 5°	1
19-Apr-12	14:01	52	30.432040	-80.548825	W	8	2	90°	1
19-Apr-12	14: <b>1</b> 0	40	30.499120	-80.618707	E	9	1	90°	2
19-Apr-12	14:11	41	30.499802	-80.575189	Е	9	1	90°	2
19-Apr-12	14:13	42	30.500468	-80.519810	Е	9	2	90°	3
19-Apr-12	14:19	56	30.498441	-80.309270	Е	9	2	60°	1
19-Apr-12	14:54	49	30.567464	-80.489518	W	10	2	90°	2
16-May-12	8:52	3	30.565342	-80.337144	Е	10	2	90°	1
16-May-12	9:36	10	30.501056	-80.472982	W	9	1	90°	1
16-May-12	10:01	18	30.432699	-80.466753	E	8	2	90°	1
16-May-12	10:17	18	30.432621	-80.363945	Е	8	2	90°	1
16-May-12	10:19	23	30.433801	-80.295960	E	8	1	90°	1
16-May-12	10:54	30	30.367082	-80.508822	w	7	1	90°	1
16-May-12				-80.546786	w	7	2	90°	1
16-May-12		23		-80.596790	W	7	1	90°	1
16-May-12	12:36	28	30.297614	-80.631316	E	6	2	90°	1
16-May-12		29		-80.595427	Е	6	2	90°	2
16-May-12		32		-80.349245	E	6	2	90°	2
16-May-12		35		-80.314516	W	5	1	90°	1
16-May-12		42		-80.344261	W	5	1	90°	1
16-May-12		45		-80.637862	W	5	1	90°	1
16-May-12		39		-80.661515	Е	4	1	90°	2
17-May-12		3		-80.635436	Е	5	1	90°	1
17-May-12		6		-80.405995		5	2	60°	1
17-May-12	9:23	9	30.230042	-80.359900	Е	5	1	90°	1

*Table 10 (Continued).* Loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.

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17-May-12	9:23	7	30.230417	-80.370395	E	5	2	60°	1
17-May-12	9:26	8	30.226601	-80.267142	E	5	1	90°	1
17-May-12	10:00	18	30.298737	-80.489108	W	6	2	90°	2
17-May-12	10:02	16	30.297698	-80.561244	W	6	2	90°	1
17-May-12	10:23	24	30.361843	-80.510286	E	7	2	90°	1
17-May-12	11:17	38	30.432772	-80.268854	W	8	1	90°	1
17-May-12		42	30.499232	-80.588332	E	9	1	90°	2
17-May-12		43	30.499051	-80.527044	E	9	1	90°	2
17-May-12		50	30.565321	-80.501261	W	10	1	90°	1
17-May-12		55	30.164664	-80.608910	E	4		90°	
17-May-12 17-May-12		46 56	30.164973 30.165238	-80.597396 -80.566838	E	4	3	90° 90°	2
17-May-12	15:04	62	30.165238	-80.306858	E	4	2	90°	3
17-May-12	15:50	59	30.100949	-80.612361	W	3	2	90°	1
17-May-12		75	30.030055	-80.621409	E	2	2	90°	2
17-May-12		76	30.031578	-80.422592	E	2	2	90°	1
17-May-12		78	30.0313786	-80.277553	E	2	2	60°	1
· · · · ·		68	29.967269		W	2	1	90°	1
17-May-12 17-May-12	16:46	69	29.967269	-80.513122 -80.686161	W	1	2	90°	2
6-Jul-12	16:50 8:58	3	30.572256	-80.621994	E	10	2	90°	2
6-Jul-12	9:03	3	30.568260	-80.461366	W	10	2	90°	1
6-Jul-12	9:44	8	30.493900	-80.250708	E	9	1	60°	1
6-Jul-12	9:54	11	30.499530	-80.594548	W	9	1	90°	2
6-Jul-12	10:06	12	30.434664	-80.440908	W	8	1	90°	1
6-Jul-12	11:41	27	30.232727	-80.479206	W	5	2	90°	1
6-Jul-12	11:44	29	30.232016	-80.600842	W	5	1	60°	1
6-Jul-12	11:46	30	30.231544	-80.645421	w	5	1	90°	2
6-Jul-12	13:27	36	30.160331	-80.679757	E	4	1	90°	2
6-Jul-12	13:30	37	30.165447	-80.587993	E	4	2	60°	1
6-Jul-12	13:34	38	30.169242	-80.433571	E	4	3	90°	2
6-Jul-12	14:22	48	30.098936	-80.445747	W	3	2	90°	1
6-Jul-12	15:03	63	30.027378	-80.608809	E	2	1	90°	1
6-Jul-12	15:06	47	30.033238	-80.492129	Е	2	2	90°	1
6-Jul-12	15:08	65	30.034275	-80.392864	Е	2	2	90°	3
6-Jul-12	15:09	48	30.034470	-80.366432	Е	2	3	60°	1
6-Jul-12	16:10		29.966835	-80.527848		1	2	90°	2
6-Jul-12	16:10			-80.514699		1	2	90°	1
7-Jul-12	9:55	12	30.031347		W	2	1	90°	1
7-Jul-12	10:03	11	30.101067	-80.617521	Е	3	2	90°	1
7-Jul-12	10:07	15	30.101840	-80.491498	Е	3	1	90°	1
7-Jul-12	10:51	18	30.166494		W	4	2	90°	1
7-Jul-12	11:01	24	30.166454	-80.625526	W	4	2	90°	1
7-Jul-12	11:02	25	30.165657	-80.664484	W	4	1	90°	1
7-Jul-12	11:13	28	30.233423		Е	5	2	90°	1
7-Jul-12	11:56	36	30.300029	-80.288361	W	6	2	90°	1
7-Jul-12	12:01	37	30.300649		W	6	2	60°	1
7-Jul-12	12:01	34	30.300646		W	6	1	90°	1
7-Jul-12	12:03	35	30.300630	-80.555378	W	6	2	90°	2

*Table 10 (Continued)*. Loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.

Table 10 (Continued). Loggerhead sea turtle
(Caretta caretta) sightings in the Jacksonville, Florida
survey area from January 2012 to December 2012.

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7-Jul-12	12:05	36	30.300186	-80.630821	W	6	1	90°	1
7-Jul-12	13:39	43	30.370364	-80.608476	E	7	1	90°	1
7-Jul-12	13:46	52	30.371259	-80.509841	E	7	2	90°	1
7-Jul-12	13:52	53	30.366664	-80.268908	E	7	2	90°	1
7-Jul-12	14:42	56	30.430130	-80.308014	W	8	1	60°	3
7-Jul-12	14:58	61	30.434524	-80.479283	W	8 8	2	90°	4
7-Jul-12 7-Jul-12	15:00 15:01	62 75	30.431395 30.430466	-80.567943 -80.612538	W	8	1	90° 90°	3
7-Jul-12 7-Jul-12	15:01	63	30.430466	-80.639977	W	8	2	90°	5
7-Jul-12 7-Jul-12	15:02	76	30.431631	-80.659447	W	8	2	90°	1
7-Jul-12 7-Jul-12	15:03	64	30.432398	-80.685624	W	8	2	90°	3
7-Jul-12	15:04	77	30.433585	-80.707478	W	8	1	90°	1
7-Jul-12	15:10	68	30.501522	-80.572115	E	9	1	90°	4
7-Jul-12	15:11	80	30.502444	-80.540985	E	9	2	90°	1
7-Jul-12	15:52	77	30.566451	-80.404868	w	10	2	90°	3
7-Jul-12	15:55	78	30.565841	-80.517845	W	10	1	90°	3
22-Sep-12	9:07	4	30.229617	-80.623165	E	5	1	90°	1
22-Sep-12	9:08	4	30.229290	-80.607476	E	5	2	60°	1
22-Sep-12	9:09	6	30.228946	-80.566670	E	5	2	90°	2
22-Sep-12		7	30.231372	-80.513109	E	5	2	60°	2
22-Sep-12	9:11	5	30.230729	-80.494103	E	5	2	90°	1
22-Sep-12		11	30.230605	-80.440167	E	5	1	90°	1
22-Sep-12		11	30.229873	-80.430054	E	5	1	60°	1
22-Sep-12		16	30.230755	-80.350533	E	5	2	60°	1
22-Sep-12		20	30.300265	-80.392016	W	6	2	90°	1
22-Sep-12	10:18	18	30.298483	-80.566926	W	6	1	90°	1
22-Sep-12		24	30.364167	-80.612878	Е	7	2	60°	1
22-Sep-12		25	30.362579	-80.342022	Е	7	2	90°	2
22-Sep-12		47	30.497636	-80.662401	Е	9	1	90°	1
22-Sep-12	12:00	49	30.495850	-80.315575	Е	9	1	90°	1
22-Sep-12	14:26	63	30.163569	-80.600266	Е	4	2	90°	2
22-Sep-12		65	30.168136	-80.515547	Е	4	1	90°	1
22-Sep-12		82	30.031341	-80.586391	Е	2	2	90°	1
22-Sep-12		62	30.031646	-80.567155	Е	2	1	90°	1
22-Sep-12		83	30.029498	-80.524238	Е	2	2	90°	2
23-Sep-12		5	30.501049	-80.300105	W	9	2	90°	1
23-Sep-12		17	30.364979		W	7	2	90°	1
23-Sep-12		19	30.299003		E	6	1	90°	1
23-Sep-12		25	30.233180		W	5	2	90°	1
4-Nov-12	10:20	23	30.101534		E	3	3	90°	1
4-Nov-12	10:45	20	30.166320	-80.500509	W	4	1	90°	1
4-Nov-12	10:47	21	30.166902		W	4	1	90°	1
4-Nov-12	11:37	28	30.300051	-80.458720	W	6	1	90°	1
4-Nov-12	13:28	35	30.566241	-80.200771	E	10	2	90°	1
4-Nov-12	14:46	57	30.435825	-80.507166	E	8	2	90°	2
4-Nov-12	14:48	51	30.436392	-80.418131	E	8	2	90°	1
5-Nov-12	10:10	13	30.364232	-80.566537	W	7	1	90°	1
5-Nov-12	<b>1</b> 1:0 <b>1</b>	21	30.232797	-80.492333	W	5	1	90°	1



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

#### Leatherback Sea Turtle (Dermochelys coriacea) (Table 11, Figure 14)

A total of 17 leatherback sea turtles were recorded inshore of the 100m shelf break. This species was observed in six of the seven months surveyed (absent in March). 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).

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
23-Jan-12	14:36	28	30.504147	-80.409327	W	9	2	100°	1
19-Apr-12	11:45	36	30.303089	-80.674046	W	6	1	90°	1
19-Apr-12	14:02	37	30.433067	-80.592436	W	8	2	90°	1
19-Apr-12	14:12	55	30.500773	-80.533136	Е	9	1	90°	1
17-May-12	10:04	17	30.298184	-80.617778	V	6	1	90°	1
17-May-12	10:10	21	30.362356	-80.650883	Е	7	2	90°	1
17-May-12	14:51	57	30.165384	-80.550295	Е	4	2	90°	1
17-May-12	15:51	72	30.099994	-80.630689	V	3	1	90°	1
6-Jul-12	11:00	21	30.300662	-80.504112	Е	6	2	90°	1
6-Jul-12	11:42	28	30.232834	-80.499869	W	5	1	90°	1
7-Jul-12	11:08	26	30.232266	-80.644050	Е	5	2	90°	1
7-Jul-12	12:04	38	30.300176	-80.609426	W	6	1	90°	1
7-Jul-12	15:01	74	30.430744	-80.586973	W	8	2	90°	1
7-Jul-12	15:13	69	30.500747	-80.466550	Е	9	1	90°	1
7-Jul-12	15:14	82	30.499485	-80.438705	Е	9	1	90°	1
22-Sep-12	11:41	33	30.433164	-80.544823	W	8	2	90°	1
5-Nov-12	9:35	9	30.432880	-80.308620	Е	8	2	90°	1

*Table 11*. Leatherback sea turtle (*Dermochelys coriacea*) sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.



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

Pelagic Bony Fishes Osteichthyes (Table 12, Figure 15).

Two ocean sunfish (Mola mola) were recorded over the continental shelf in January.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
24-Jan-12	16:04	82	30.504214	-80.680173	Е	9	1	90°	1
25-Jan-12	12:50	136	30.432914	-80.489350	W	8	1	90°	1

*Table 12.* Ocean sunfish (*Mola mola*) sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.

Cartilaginous Fishes Chondrichthyes (Tables 13-16, Figure 15).

Eighteen manta rays (*Manta birostris*) occurred throughout the survey site with 39% of sightings occurring in January (Table 13). One large group of cownose rays (*Rhinoptera bonasus*) was recorded over the continental shelf in January (Table 14). A single whale shark (*Rhincodon typus*) was recorded in January over the continental shelf (Table 15). A total of 35 sharks were recorded during the reporting period (Table 16), twenty-six were identified as hammerhead sharks (*Sphyrna* spp.) all others listed as unidentified sharks. Sharks were seen throughout the study period with no discernable spatial or temporal trends.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
24-Jan-12	9:51	6	29.966337	-80.185537	E	1	1	90°	1
24-Jan-12	12:41	44	30.303067	-80.194575	W	6	2	60°	1
24-Jan-12	16:19	82	30.500272	-80.103493	Е	9	1	90°	1
25-Jan-12	9:30	98	30.233192	-80.458395	E	5	2	90°	2
25-Jan-12	10:58	118	30.299283	-80.169524	W	6	1	90°	1
25-Jan-12	12:31	129	30.432693	-80.138629	W	8	2	60°	1
18-Apr-12	10:27	17	30.369542	-80.234487	W	7	2	90°	1
7-Jul-12	9:03	3	29.965952	-80.654093	Е	1	1	90°	1
7-Jul-12	15:44	86	30.568077	-80.108742	W	10	2	90°	2
22-Sep-12	9:06	3	30.229617	-80.656144	Е	5	1	90°	3
22-Sep-12	9:09	5	30.228720	-80.583081	Е	5	2	100°	2
23-Sep-12	11:06	18	30.366531	-80.512814	W	7	1	90°	1
4-Nov-12	9:16	8	29.966455	-79.818108	Е	1	3	90°	1

*Table 13.* Manta ray (*Manta birostris*) sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.

*Table 14.* Cownose ray (*Rhinoptera bonasus*) sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
25-Jan-12	11:18	122	30.364823	-80.618180	E	7	2	90°	200

*Table 15.* Whale shark (*Rhincodon typus*) sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
23-Jan-12	16:37	64	30.232296	-80.484114	W	5	1	90°	1

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #
23-Jan-12	14:48	34	30.435159	-80.400088	Е	8	2	45°	1
24-Jan-12	10:18	10	29.979389		Е	1	3	110°	3
24-Jan-12	10:44	18	30.034628	-80.159377	W	2	1	90°	1
24-Jan-12	12:11	41	30.233052		Е	5	1	90°	1
24-Jan-12	14:59	58	30.367441	-80.370900	Е	7	2	90°	1
24-Jan-12	15:47	69	30.432671	-80.374307	W	8	1	90°	1
24-Jan-12	16:11	84	30.500327	-80.396119	Е	9	1	90°	1
24-Jan-12	16:11	76	30.500283	-80.427712	Е	9	2	90°	1
24-Jan-12	16:18	81	30.500311	-80.136378	Е	9	1	90°	1
24-Jan-12	16:47	87	30.299769	-80.225074	W	6	1	90°	1
25-Jan-12	10:26	108	30.233780	-80.205890	Е	5	2	90°	1
25-Jan-12	11:04	111	30.299510	-80.376364	W	6	2	90°	1
25-Jan-12	11:52	134	30.366741	-80.243632	Е	7	1	90°	2
25-Jan-12	12:51	149	30.432742	-80.543400	W	8	1	90°	1
19-Apr-12	11:23	21	30.298135	-80.076020	W	6	2	90°	1
19-Apr-12	13:23	43	30.366195	-80.352732	Е	7	2	90°	1
16-May-12	14:20	56	30.030674	-80.212296	Е	2	1	90°	1
17-May-12	9:04	4	30.231024	-80.486094	Е	5	1	90°	2
17-May-12	16:02	62	30.029216	-80.448767	Е	2	2	90°	1
17-May-12	16:17	79	30.029267	-79.881078	Е	2	2	90°	1
17-May-12	16:44	89	29.969028	-80.464167	Å	1	1	90°	1
17-May-12	16:50	90	29.966468	-80.661594	R	1	2	90°	1
6-Jul-12	11:17	21	30.299004	-79.868178	W	6	1	45°	1
7-Jul-12	9:39	7	30.034304	-80.013150	W	2	3	90°	1
7-Jul-12	10:09	16	30.101024	-80.422142	Е	3	2	90°	1
7-Jul-12	14:40	55	30.427521	-80.256848	W	8	1	90°	1
7-Jul-12	15:27	73	30.499691	-79.995348	Е	9	1	90°	1
22-Sep-12	16:05	69	29.966282	-80.059059	W	1	2	90°	1
4-Nov-12	11:32	27	30.300121	-80.274071	W	6	2	90°	1
4-Nov-12	14:13	42	30.499841	-80.195566	W	9	2	60°	1
5-Nov-12	9:39	10	30.436082	-80.135957	Е	8	2	90°	1

*Table 16.* Shark sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.



*Figure 15.* Manta ray (*Manta birostris*), ocean sunfish (*Mola mola*), cownose ray (*Rhinoptera bonasus*), whale shark (*Rhincodon typus*), and shark sightings.

### Vessel Sightings

Commercial (Table 17, Figure 16)

A total of 28 commercial vessels (*e.g.* tankers, car carriers, and container vessels) were observed in the study site.

Table 17. Commercial vessel sightings in the Jacksonville, Florida survey area
from January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	Comments
23-Jan-12	16:19	46	30.229589	-80.156253	W	5	1	90°	2	Tug and barge
24-Jan-12	9:48	4	29.967778	-80.268901	Е	1	3	90°	1	Tanker
24-Jan-12	11:54	34	30.167814	-80.494194	W	4	3	60°	1	Stellwagon
24-Jan-12	12:52	48	30.300393	-80.544813	W	6	1	45°	1	Car carrier
25-Jan-12	11:24	118	30.366660	-80.394635	Е	7	2	45°	1	Research vessel
29-Mar-12		3	30.432191	-80.510916	Е	8	3	60°	1	Cargo vessel
29-Mar-12	11:35	8	30.366138	-80.263142	W	7	3	45°	1	Tanker
29-Mar-12	11:58	14	30.300118	-80.354200	Е	6	2	60°	1	Cargo vessel
18-Apr-12		21	30.300159	-80.678809	Е	6	2	90°	1	Tug and barge
18-Apr-12	13:59	37	30.034488	-79.979186	W	2	1	30°	1	Tanker
18-Apr-12	14:17	40	30.033739	-80.599601	W	2	1	45°	1	Container vessel
19-Apr-12	11:27	29	30.301685	-80.212470	W	6	3	60°	1	Tanker (resight)
19-Apr-12	11:39	35	30.301336	-80.425903	W	6	2	90°	1	Frigate (resight)
16-May-12	9:11	6	30.566277	-79.920413	Е	10	3	60°	1	NOAA Research vessel
17-May-12	9:53	16	30.297197	-80.192377	W	6	3	30°	1	Tanker
17-May-12	11:26	39	30.431628	-80.610217	W	8	2	45°	2	Tug and barge
6-Jul-12	9:11	4	30.567219	-80.128155	Е	10	2	45°	1	Container vessel
6-Jul-12	10:48	18	30.365021	-80.567687	W	7	4	45°	1	Car carrier
6-Jul-12	10:56	19	30.302323	-80.677700	W	6	3	60°	1	Car carrier
7-Jul-12	10:16	17	30.100116	-80.132641	Е	3	4	45°	1	Tanker
7-Jul-12	13:53	54	30.366729	-80.239834	Е	7	2	60°	1	Research vessel
7-Jul-12	15:47	87	30.566993	-80.213809	W	10	3	60°	1	Cargo vessel
22-Sep-12	10:51	30	30.364349	-80.248851	Е	7	2	60°	1	Research vessel
23-Sep-12	9:15	3	30.566849	-80.491128	Е	10	2	60°	1	Commercial fishing vessel
4-Nov-12	10:03	14	30.100615	-80.303637	Е	3	2	90°	1	Salvage boat
4-Nov-12	14:08	41	30.498237	-79.992369	W	9	3	60°	1	Barge



Figure 16. Large commercial shipping vessel sightings.

Military (Table 18, Figure 17)

A total of 9 U.S. military vessels were seen during the reporting period.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	Comments
24-Jan-12	10:30	14	30.037247	-79.920285	W	2	2	60°	1	Warship
24-Jan-12	11:25	30	30.095146	-79.964526	Е	3	3	45°	4	3 warships, 1 carrier
25-Jan-12	10:39	114	30.233041	-80.030458	Е	5	2	90°	1	Warship
19-Apr-12	10:56	25	30.233724	-80.426002	Е	5	3	60°	2	Military tanker and frigate
16-May-12	9:30	9	30.501480	-80.274758	W	9	1	90°	1	Warship

*Table 18.* Military vessel sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.



Figure 17. Military vessel sightings.

Other Vessels (Table 19, Figure 18)

A total of 104 other vessels were recorded in the survey area with all but three classified as recreational fishing vessels.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	Comments
23-Jan-12	15:50	38	30.298830	-80.372947	E	6	2	45°	4	Recreational fishing vessel
23-Jan-12	15:51	53	30.299744	-80.337044	E	6	1	100°	1	Sailboat
23-Jan-12	15:53	54	30.300407	-80.295180	E	6	2	45°	1	Recreational fishing vessel
24-Jan-12	11:16	26	30.101270	-80.296678	E	3	3	30°	1	Recreational fishing vessel
24-Jan-12	11:46	34	30.167618	-80.240891	W	4	2	60°	1	Recreational fishing vessel
24-Jan-12	11:56	35	30.168351	-80.549916	W	4	3	45°	4	Recreational fishing vessel
24-Jan-12	12:14	43	30.231582	-80.257070	E	5	1	45°	1	Recreational fishing vessel
	15:45	73	30.432762	-80.307390	W	8	3	90°	1	Recreational fishing vessel
	17:00	91	30.299582	-80.391955	W	6	3	45°	1	Recreational fishing vessel
25-Jan-12	9:31	99	30.233221	-80.440978	E	5	2	45°	1	Recreational fishing vessel
		100	30.231403	-80.295746	E	5	3	90°	1	Recreational fishing vessel
25-Jan-12	11:00	110	30.299451	-80.247276	W	6	1	90°	2	Recreational fishing vessel
	11:01		30.299278	-80.287074	W	6	3	45°	1	Recreational fishing vessel
25-Jan-12		123	30.366643	-80.277565	E	7	2	60°	2	Recreational fishing vessel
	12:47	148	30.433556	-80.398768	W	8	1	90°	1	Recreational fishing vessel
29-Mar-12		3		-80.217917	Е	8	1	90°	1	Recreational fishing vessel
	12:27	15	30.233157	-80.257175	W	5	1	60°	1	Recreational fishing vessel
29-Mar-12		19	30.233007	-80.438675	W	5	2	60°	1	Recreational fishing vessel
29-Mar-12		31	30.100616	-80.430067	W	3	1	60°	1	Recreational fishing vessel
18-Apr-12	10:55	24	30.297753	-80.257373	Е	6	3	60°	1	Recreational fishing vessel
19-Apr-12		3	29.965140	-80.658403	Е	1	3	45°	1	Recreational fishing vessel
19-Apr-12		13	30.034167	-80.302580	W	2	1	90°	1	Recreational fishing vessel
19-Apr-12		18	30.233202	-80.189901	Е	5	1	90°	1	Recreational fishing vessel
19-Apr-12		49	30.430909	-79.908398	W	8	3	110°	1	Recreational fishing vessel
16-May-12		25	30.432848	-80.206163	Е	8	3	90°	1	Recreational fishing vessel
16-May-12		28		-79.996099	W	7	2	60°	1	Recreational fishing vessel
16-May-12		48	30.160967	-80.267361	Е	4	3	90°	1	Recreational fishing vessel
17-May-12		3	30.233500	-80.606840	Е	5	2	90°	1	Recreational fishing vessel
17-May-12		17	30.297832	-80.383691	W	6	3	60°	1	Recreational fishing vessel
17-May-12		20	30.363597	-80.666132	Е	7	3	90°	1	Recreational fishing vessel
17-May-12		25	30.363111	-80.228834	Е	7	2	45°	1	Recreational fishing vessel
17-May-12		36	30.432466	-80.155239	W	8	2	90°	1	Recreational fishing vessel
17-May-12		37	30.499269	-80.222547	Е	9	2	60°	1	Recreational fishing vessel
17-May-12		58	30.098994	-80.278285	W	3	3	90°	1	Recreational fishing vessel
17-May-12		63	30.031277	-80.428463	Е	2	2	30°	1	Recreational fishing vessel
6-Jul-12	10:06	11	30.435035	-80.463697	W	8	3	60°	1	Recreational fishing vessel
6-Jul-12	11:12	20	30.300629	-80.076464	W	6	1	30°	1	Sailboat
6-Jul-12	11:46	31	30.231536	-80.655667	W	5	1	90°	1	Recreational fishing vessel
6-Jul-12	14:18	47	30.100957	-80.293182	W	3	3	90°	1	Recreational fishing vessel
6-Jul-12	14:23	37	30.099484	-80.469860	W	3	2	60°	1	Recreational fishing vessel

*Table 19.* Other vessel sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.

*Table 19 (Continued).* Other vessel sightings in the Jacksonville, Florida survey area from January 2012 to December 2012.

Date	Time	Way Point	Latitude	Longitude-1	Heading	Track Number	Angle out	Degree Forward	Best #	Comments
6-Jul-12	15:02	46	30.025366	-80.641235	Е	2	3	90°	1	Recreational fishing vessel
6-Jul-12	15:05	64	30.031941	-80.523089	E	2	3	45°	1	Recreational fishing vessel
6-Jul-12	16:05	55	29.963605	-80.355815	W	1	2	60°	1	Recreational fishing vessel
7-Jul-12	9:08	4	29.965374	-80.456601	E	1	2	45° 90°	1	Recreational fishing vessel
7-Jul-12	9:08	3	29.965383	-80.457234	E	1	3	90° 45°	1	Recreational fishing vessel
7-Jul-12 7-Jul-12	9:15 9:52	5 10	29.965445 30.031746	-80.186785 -80.463290	E W	1	2	45°	1	Recreational fishing vessel Recreational fishing vessel
7-Jul-12 7-Jul-12	9:52	11	30.031746	-80.531220	W	2	2	45 60°	1	Recreational fishing vessel
7-Jul-12 7-Jul-12	14:56	60	30.431075	-80.426484	W	8	∠ 3	90°	1	Recreational fishing vessel
7-Jul-12 7-Jul-12	14:59	73		-80.522654	W	8	2	90°	2	Recreational fishing vessel
7-Jul-12	15:09	67	30.500788	-80.626404	E	9	2	90°	4	Recreational fishing vessel
7-Jul-12	15:13	81	30.500980		E	9	2	60°	1	Recreational fishing vessel
22-Sep-12	9:06	3	30.231007	-80.682574	E	5	1	90°	1	Recreational fishing vessel
22-Sep-12	9:22	10	30.232518	-80.466608	E	5	1	90°	1	Recreational fishing vessel
22-Sep-12	9:22	10	30.232734	-80.469390	E	5	2	90°	1	Research vessel
22-Sep-12		23	30.363355	-80.687434	E	7	3	60°	2	Recreational fishing vessel
22-Sep-12		21	30.363629	-80.676464	E	7	3	60°	1	Recreational fishing vessel
22-Sep-12	10:29	22	30.362974	-80.555979	E	7	2	90°	2	Recreational fishing vessel
22-Sep-12		25	30.363846	-80.538328	Е	7	3	60°	1	Recreational fishing vessel
22-Sep-12		44	30.432827	-80.435163	W	8	3	60°	3	Recreational fishing vessel
22-Sep-12	11:52	48	30.496698	-80.577983	Е	9	1	90°	1	Recreational fishing vessel
22-Sep-12	12:03	36	30.496989	-80.209667	E	9	3	60°	1	Recreational fishing vessel
23-Sep-12	10:00	6	30.498816	-80.592780	W	9	1	90°	1	Recreational fishing vessel
23-Sep-12		6	30.498840	-80.596719	W	9	2	60°	1	Recreational fishing vessel
23-Sep-12	10:12	9	30.433118	-80.470260	Е	8	3	90°	1	Recreational fishing vessel
23-Sep-12	10:14	10	30.432807	-80.394764	Е	8	3	90°	1	Recreational fishing vessel
4-Nov-12	8:46	3	29.964476	-80.434357	Е	1	1	60°	1	Recreational fishing vessel
4-Nov-12	8:47	3	29.964981	-80.392535	Е	1	2	60°	1	Recreational fishing vessel
4-Nov-12	9:38	10	30.031702	-80.259775	W	2	2	90°	3	Sailboat and 2 Recreational fishing vessels
4-Nov-12	9:42	11	30.032839		W	2	2	90°	1	Recreational fishing vessel
4-Nov-12	9:57	17	30.101223	-80.531273	Е	3	2	90°	2	Recreational fishing vessel
4-Nov-12	10:03	18	30.100539	-80.295554	Е	3	3	60°	1	Recreational fishing vessel
4-Nov-12	10:39	19	30.167787	-80.261798	W	4	2	90°	1	Recreational fishing vessel
4-Nov-12	11:00	28	30.233832	-80.437756	Е	5	2	60°	2	Recreational fishing vessel
4-Nov-12	11:05	24	30.232548	-80.266400	Е	5	1	90°	1	Recreational fishing vessel
4-Nov-12	13:27	33	30.566555	-80.235968	Е	10	2	60°	1	Recreational fishing vessel
4-Nov-12	14:26	50	30.500599	-80.513790	W	9	2	60°	1	Recreational fishing vessel
4-Nov-12	14:28	45	30.499688	-80.574130	W	9	2	60°	1	Recreational fishing vessel
4-Nov-12	14:47	50	30.436727	-80.487093	E	8	2	60°	3	Recreational fishing vessel
5-Nov-12	9:19	7	30.497883	-80.602257	W I	9	1	60°	1	Recreational fishing vessel
5-Nov-12	9:34	8	30.434591	-80.356064	Е	8	2	90°	1	Recreational fishing vessel



Figure 18. Other vessel sightings.

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## AERIAL SURVEY DATA SHEET

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Date:	Appena	IX A		Obser	rver Si	de:		_			GPS#							Page_	of
Pilot/Co-	Pilot_				-	Obse	rvers L	.eft/Ri	ght:						Hobbs	s:			
Time	Waypoint #	Event	Heading	Track #	Observer R / L	Visibility	BSS	Cloud	Glare L	Glare R	Vertical Angle	Horizontal degree	Sighting Cue	Species	Reliability	Min #	Max #	Best Est	Comments

### **Codes for Variables on USWTR Aerial Survey Data Sheet**

Date: Month, Day, Year	<b>Track#:</b> opportunistic track line=99
Event:	
1.1 = On effort/on track	2.0 = Sighting-breaking track/off effort (real time)
1.2 = Off effort	2.3 = Vessel sighting
3.1 = Change in environmental conditions	<ul><li>2.4 = Sighting of marine mammal (real location)</li><li>2.41 = Location of Sighting Cue, No Animals sighted</li></ul>
10.0 = Opportunistic sighting(s)	2.42 = Break from sighting
PF = Preflight	
XB = Cross Beach	2.7 = Sighting of sea turtle (real location)
WU = Wheels Up	2.8 = Sighting of large vessel (Military, commercial,
WD = Wheels Down	etc.)
TE = Transit Leg on Effort	2.9 = Unidentified sighting, requires comments

### **Confidence of cue**

- 1 = definite
- 2 = probable
- 3 = possible/unsure

### **Beaufort 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 >65%, waves >5 feet 6 = too rough too survey

### **Cloud Cover:**

01 = clear 02 = partly cloudy 03 = continuous layer of clouds 04 = rain 05 = haze 99 = other, requires comments

### Glare

0 = No glare	1 = 0-25 %
2 = 25 - 50 %	3 = >50%

### Visibility:

- 1 = clear to horizon
- 2 = half the distance to the horizon
- 3 =less than half the distance to the horizon

#### **Sighting Cues:**

- 1 = Blow
- 2 =Splash
- 3 = Body Part
- 4 = Breach
- 5 =Other (needs 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.

Cetaceans         End           North Atlantic right whale         Eubalaena glacialis         Egl           Winke whale         Balaenoptera acutorostrata         Bac           sei whale         Balaenoptera borealis         Bbo           In whale         Balaenoptera borealis         Bbo           Brydes whale         Balaenoptera deni         Bed           umpback whale         Megaptera novacangliae         Mno           nidentified balaenopterid         Family Balaenopteradee         Pma           sygent sperm whale         Kogia breviceps         Kbr           Waarf sperm whale         Kogia sima         Ksi           midentified Kogia         Kogia sima         Ksi           Northern bottlenose whale         Hyperoodon ampullatus         Ham           Cuvier's beaked whale         Genus Mesopiodon         MESO           Cuvier's beaked whale         Genus Mesopiodon         MESO           midentified beaked whale         Procoena phocoena         Pph           abor porpoise         Phocoena phocoena         Pph           orcinus orca         Oor         Oor           midentified beaked whale         Feresa attenuata         Fat           abs killer whale         Pseudorca crassidens         Per </th <th>Common Name</th> <th>Scientific Name</th> <th>Species Code</th>	Common Name	Scientific Name	Species Code
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Kemp's ridley       Lepidochelys kempii       Lke         hawksbill       Eretmochelys imbricata       Eim         inidentified sea turtle       TURT         Other interesting sightings          ocean sunfish       Mola mola       Mmo         pasking shark       Cetorhinus maximus       Cma         whale shark       Rhincodon typus       Rty         manta ray       Manta birostris       Mbi			
Eretmochelys imbricata     Eim       unidentified sea turtle     TURT       Other interesting sightings     TURT       Ocean sunfish     Mola mola       boxeshing shark     Cetorhinus maximus       Chail shark     Rhincodon typus       Rty     Manta birostris		· · · · · · · · · · · · · · · · · · ·	
Inidentified sea turtle     TURT       Other interesting sightings     Image: Context in the sight in the shark       Ocean sunfish     Mola mola       Mola mola     Mmo       Cetorhinus maximus     Cma       whale shark     Rhincodon typus       Rty     Manta birostris       Mbi			-
Other interesting sightings     Mola mola       ocean sunfish     Mola mola       basking shark     Cetorhinus maximus       whale shark     Rhincodon typus       manta ray     Manta birostris		Eretmochelys imbricata	
And a molaMmoDasking sharkCetorhinus maximusCmaWhale sharkRhincodon typusRtyNanta rayManta birostrisMbi	inidentified sea turtle		TURT
Mola molaMmobasking sharkCetorhinus maximusCmawhale sharkRhincodon typusRtymanta rayManta birostrisMbi	Other interacting sightings		
Dasking sharkCetorhinus maximusCmawhale sharkRhincodon typusRtymanta rayManta birostrisMbi		Mola mola	Mmo
whale sharkRhincodon typusRtymanta rayManta birostrisMbi			
manta ray Manta birostris Mbi			

Appendix B

		C A	Sighting #		
Initial sighting	on Trac	:k	0 0		
Time:	WP#:	Lat:		Long:	
Vertical Angle:		Horizontal Bea	aring in Degrees:	Sighting C	Cue:
On/Off Effort:		Tracklin	e:	Beaufort Sea Stat	e:
Observer:		Observe	r side:		
Actual Time an	d Positi	ion of Sighting			
Time:	WP#:	Lat:		Long:	
Species:			Numbers (I	Low/High/Best):	
Features used in	Species	ID:			
Representative i	•	1	-		
Photographer:				Spacer: _	
Calculated dista	nce fron	1 Trackline:			
Final Time and	Positio	n of Sighting			
Time:	WP#:	Lat:		Long:	
Calculated Dista	ince Tra	veled:			
Behavior and A	ddition	al Comments			

Pilot in Command: <u>Cameron</u> Second in Command:	Stan Plane: N1353L
Observers: Erin - Left, Ryan - Right	HODDS 94 4 1810 /
Time take off: <u>12:54</u> Land for lunch: NA	HOBBS Start: <u>1810.4</u>
Track Lines and Direction (e.g. N to S) Flown: <u>10 to 5</u>	
Track Lines and Direction (e.g. 17 to 5) Flown. <u>10 to 5</u>	
Take off after lunch: <u>NA</u>	HOBBS Stop: <u>1814.9</u>
Land: 17:12	HOBBS Total: 4.5
Track Lines and Direction (e.g. N to S) Flown: NA	
Overall weather: AM flights fogged in, PM clearing with m	oderate seas
General Obser	vations
Calm winds, fog persisting throughout the morning restrict	ing visibility. Afternoon flights covered six lines
and recorded six sighting consisting of bottlenose and spo	
observed inside the range. Thick fog inshore caused us to	o truncate six miles from lines eight and nine.
	Transit effort leg:NO
	Date: Jan 24, 2012
USWTR Daily Plan	
Pilot in Command: Cameron Second in Command:	e Log Sheet
Pilot in Command: Cameron Second in Command: Observers: Ryan - Left, Erin - Right	e Log Sheet
	e Log Sheet
Pilot in Command: <u>Cameron</u> Second in Command: Observers: <u>Ryan - Left, Erin - Right</u> Time take off: <u>9:11</u> Land for lunch: <u>13:34</u>	E Log Sheet       Stan       Plane: N1353L
Pilot in Command: <u>Cameron</u> Second in Command: Observers: <u>Ryan - Left, Erin - Right</u> Time take off: <u>9:11</u>	E Log Sheet       Stan       Plane: N1353L
Pilot in Command: <u>Cameron</u> Second in Command: Observers: <u>Ryan - Left, Erin - Right</u> Time take off: <u>9:11</u> Land for lunch: <u>13:34</u> Track Lines and Direction (e.g. N to S) Flown: <u>1 to 6</u>	e Log Sheet Stan Plane: N1353L HOBBS Start: 1814.9
Pilot in Command: <u>Cameron</u> Second in Command: Observers: <u>Ryan - Left, Erin - Right</u> Time take off: <u>9:11</u> Land for lunch: <u>13:34</u> Track Lines and Direction (e.g. N to S) Flown: <u>1 to 6</u> Take off after lunch: <u>14:28</u>	e Log Sheet          Stan       Plane: N1353L         HOBBS Start: 1814.9         HOBBS Stop: 1822.8
Pilot in Command: <u>Cameron</u> Second in Command: Observers: <u>Ryan - Left, Erin - Right</u> Time take off: <u>9:11</u> Land for lunch: <u>13:34</u> Track Lines and Direction (e.g. N to S) Flown: <u>1 to 6</u> Take off after lunch: <u>14:28</u> Land: <u>17:30</u>	e Log Sheet Stan Plane: N1353L HOBBS Start: 1814.9
Pilot in Command: <u>Cameron</u> Second in Command: Observers: <u>Ryan - Left, Erin - Right</u> Time take off: <u>9:11</u> Land for lunch: <u>13:34</u> Track Lines and Direction (e.g. N to S) Flown: <u>1 to 6</u> Take off after lunch: <u>14:28</u> Land: <u>17:30</u> Track Lines and Direction (e.g. N to S) Flown: 7 to 9, 6	e Log Sheet         Stan       Plane: N1353L         HOBBS Start: 1814.9         HOBBS Stop: 1822.8         HOBBS Total: 7.9
Pilot in Command: <u>Cameron</u> Second in Command: Observers: <u>Ryan - Left, Erin - Right</u> Time take off: <u>9:11</u> Land for lunch: <u>13:34</u> Track Lines and Direction (e.g. N to S) Flown: <u>1 to 6</u> Take off after lunch: <u>14:28</u> Land: <u>17:30</u> Track Lines and Direction (e.g. N to S) Flown: <u>7 to 9, 6</u> Overall weather: <u>Hazy, continuous layers of clouds, BSS</u>	e Log Sheet         Stan       Plane: <u>N1353L</u> HOBBS Start: <u>1814.9</u> HOBBS Stop: <u>1822.8</u> HOBBS Total: <u>7.9</u>
Pilot in Command: Cameron Second in Command: Observers: Ryan - Left, Erin - Right Time take off: 9:11 Land for lunch: 13:34 Track Lines and Direction (e.g. N to S) Flown: 1 to 6 Take off after lunch: 14:28 Land: 17:30 Track Lines and Direction (e.g. N to S) Flown: 7 to 9, 6 Overall weather: Hazy, continuous layers of clouds, BSS General Obser	e Log Sheet          Stan       Plane: N1353L         HOBBS Start: 1814.9         HOBBS Stop: 1822.8         HOBBS Total: 7.9         2-3         vations
Pilot in Command: Cameron Second in Command: Observers: Ryan - Left, Erin - Right Time take off: 9:11 Land for lunch: 13:34 Track Lines and Direction (e.g. N to S) Flown: 1 to 6 Take off after lunch: 14:28 Land: 17:30 Track Lines and Direction (e.g. N to S) Flown: 7 to 9, 6 Overall weather: Hazy, continuous layers of clouds, BSS	Stan       Plane: N1353L         HOBBS Start: 1814.9         HOBBS Stop: 1822.8         HOBBS Total: 7.9         2-3         vations         ess. Nine sightings of bottlenose and spotted
Pilot in Command: <u>Cameron</u> Second in Command: Observers: <u>Ryan - Left, Erin - Right</u> Time take off: <u>9:11</u> Land for lunch: <u>13:34</u> Track Lines and Direction (e.g. N to S) Flown: <u>1 to 6</u> Take off after lunch: <u>14:28</u> Land: <u>17:30</u> Track Lines and Direction (e.g. N to S) Flown: <u>7 to 9, 6</u> Overall weather: <u>Hazy, continuous layers of clouds, BSS</u> <b>General Obser</b> Nice day out with BSS between 2-3 and winds 10 knt or left	Stan       Plane: N1353L         HOBBS Start: 1814.9         HOBBS Stop: 1822.8         HOBBS Total: 7.9         2-3         vations         ess. Nine sightings of bottlenose and spotted
Pilot in Command: <u>Cameron</u> Second in Command: Observers: <u>Ryan - Left, Erin - Right</u> Time take off: <u>9:11</u> Land for lunch: <u>13:34</u> Track Lines and Direction (e.g. N to S) Flown: <u>1 to 6</u> Take off after lunch: <u>14:28</u> Land: <u>17:30</u> Track Lines and Direction (e.g. N to S) Flown: <u>7 to 9, 6</u> Overall weather: <u>Hazy, continuous layers of clouds, BSS</u> <b>General Obser</b> Nice day out with BSS between 2-3 and winds 10 knt or left	Stan       Plane: N1353L         HOBBS Start: 1814.9         HOBBS Stop: 1822.8         HOBBS Total: 7.9         2-3         vations         ess. Nine sightings of bottlenose and spotted
Pilot in Command: <u>Cameron</u> Second in Command: Observers: <u>Ryan - Left, Erin - Right</u> Time take off: <u>9:11</u> Land for lunch: <u>13:34</u> Track Lines and Direction (e.g. N to S) Flown: <u>1 to 6</u> Take off after lunch: <u>14:28</u> Land: <u>17:30</u> Track Lines and Direction (e.g. N to S) Flown: <u>7 to 9, 6</u> Overall weather: <u>Hazy, continuous layers of clouds, BSS</u> <b>General Obser</b> Nice day out with BSS between 2-3 and winds 10 knt or left	Stan       Plane: N1353L         HOBBS Start: 1814.9         HOBBS Stop: 1822.8         HOBBS Total: 7.9         2-3         vations         ess. Nine sightings of bottlenose and spotted
Pilot in Command: <u>Cameron</u> Second in Command: Observers: <u>Ryan - Left, Erin - Right</u> Time take off: <u>9:11</u> Land for lunch: <u>13:34</u> Track Lines and Direction (e.g. N to S) Flown: <u>1 to 6</u> Take off after lunch: <u>14:28</u> Land: <u>17:30</u> Track Lines and Direction (e.g. N to S) Flown: <u>7 to 9, 6</u> Overall weather: <u>Hazy, continuous layers of clouds, BSS</u> <b>General Obser</b> Nice day out with BSS between 2-3 and winds 10 knt or left	Stan       Plane: N1353L         HOBBS Start: 1814.9         HOBBS Stop: 1822.8         HOBBS Total: 7.9         2-3         vations         ess. Nine sightings of bottlenose and spotted
Pilot in Command: <u>Cameron</u> Second in Command: Observers: <u>Ryan - Left, Erin - Right</u> Time take off: <u>9:11</u> Land for lunch: <u>13:34</u> Track Lines and Direction (e.g. N to S) Flown: <u>1 to 6</u> Take off after lunch: <u>14:28</u> Land: <u>17:30</u> Track Lines and Direction (e.g. N to S) Flown: <u>7 to 9, 6</u> Overall weather: <u>Hazy, continuous layers of clouds, BSS</u> <b>General Obser</b> Nice day out with BSS between 2-3 and winds 10 knt or left	Stan       Plane: N1353L         HOBBS Start: 1814.9         HOBBS Stop: 1822.8         HOBBS Total: 7.9         2-3         vations         ess. Nine sightings of bottlenose and spotted

Pilot in Command: <u>Cameron</u> Second in Command: <u>Stan</u>	Plane: N1353L
Observers: Erin - Left, Ryan - Right Time take off: 9:02	HOBBS Start: 1822.8
Land for lunch: 13:15	
Track Lines and Direction (e.g. N to S) Flown: 5 to 8	_
Take off after lunch: NA	HOBBS Stop: <u>1827.2</u>
Land: NA	HOBBS Total: 4.4
Track Lines and Direction (e.g. N to S) Flown: NA Overall weather: Overcast but calmer seas	_
General Observations	
Flew four lines in the morning with seven sightings including bottlenose	and spotted dolphins as well as
a small group of Risso's dolphin and a single humpback whale.	
	Tropsit offort lociNO
	Transit effort leg:NO
USWTR Daily Plane Log Sheet	Date: <u>Mar 29, 20</u> 12
USWTR Daily Plane Log Sheet Pilot in Command: Cameron Second in Command: Stan	Date: <u>Mar 29, 20</u> 12 Plane: <u>N1314S</u>
Pilot in Command: Cameron Second in Command: Stan Observers: Ryan - Left, Erin - Right	Plane: N1314S
Pilot in Command: Cameron Second in Command: Stan Observers: Ryan - Left, Erin - Right Time take off: 10:02	
Pilot in Command: <u>Cameron</u> Second in Command: <u>Stan</u> Observers: <u>Ryan - Left, Erin - Right</u> Time take off: <u>10:02</u> Land for lunch: <u>13:01</u>	Plane: N1314S
Pilot in Command: Cameron Second in Command: Stan Observers: Ryan - Left, Erin - Right Time take off: 10:02	Plane: N1314S
Pilot in Command: Cameron Second in Command: Stan Observers: Ryan - Left, Erin - Right Time take off: 10:02 Land for lunch: 13:01 Track Lines and Direction (e.g. N to S) Flown: 8 to 5 Take off after lunch: 14:22	Plane: <u>N1314S</u> HOBBS Start: <u>902.6</u> HOBBS Stop: <u>908.6</u>
Pilot in Command: <u>Cameron</u> Second in Command: <u>Stan</u> Observers: <u>Ryan - Left, Erin - Right</u> Time take off: <u>10:02</u> Land for lunch: <u>13:01</u> Track Lines and Direction (e.g. N to S) Flown: <u>8 to 5</u> Take off after lunch: <u>14:22</u> Land: <u>16:56</u>	Plane: <u>N1314S</u> HOBBS Start: <u>902.6</u>
Pilot in Command: <u>Cameron</u> Second in Command: <u>Stan</u> Observers: <u>Ryan - Left, Erin - Right</u> Time take off: <u>10:02</u> Land for lunch: <u>13:01</u> Track Lines and Direction (e.g. N to S) Flown: <u>8 to 5</u> Take off after lunch: <u>14:22</u> Land: <u>16:56</u> Track Lines and Direction (e.g. N to S) Flown: <u>4 to 1</u>	Plane: <u>N1314S</u> HOBBS Start: <u>902.6</u> HOBBS Stop: <u>908.6</u>
Pilot in Command: <u>Cameron</u> Second in Command: <u>Stan</u> Observers: <u>Ryan - Left, Erin - Right</u> Time take off: <u>10:02</u> Land for lunch: <u>13:01</u> Track Lines and Direction (e.g. N to S) Flown: <u>8 to 5</u> Take off after lunch: <u>14:22</u> Land: <u>16:56</u>	Plane: <u>N1314S</u> HOBBS Start: <u>902.6</u> HOBBS Stop: <u>908.6</u>
Pilot in Command: Cameron Second in Command: Stan Observers: Ryan - Left, Erin - Right Time take off: 10:02 Land for lunch: 13:01 Track Lines and Direction (e.g. N to S) Flown: 8 to 5 Take off after lunch: 14:22 Land: 16:56 Track Lines and Direction (e.g. N to S) Flown: 4 to 1 Overall weather: Hazy, BSS 2-4 <b>General Observations</b> No sightings in the morning, rough seas. Had to skip lines 10 and 9 due	Plane: N1314S HOBBS Start: 902.6 HOBBS Stop: 908.6 HOBBS Total: 6 
Pilot in Command: Cameron       Second in Command: Stan         Observers: Ryan - Left, Erin - Right         Time take off: 10:02         Land for lunch: 13:01         Track Lines and Direction (e.g. N to S) Flown: 8 to 5         Take off after lunch: 14:22         Land: 16:56         Track Lines and Direction (e.g. N to S) Flown: 4 to 1         Overall weather: Hazy, BSS 2-4         General Observations         No sightings in the morning, rough seas. Had to skip lines 10 and 9 due afternoon BSS was 2 and we had six sightings of bottlenose and spotter	Plane: N1314S HOBBS Start: 902.6 HOBBS Stop: 908.6 HOBBS Total: 6 
Pilot in Command: Cameron Second in Command: Stan Observers: Ryan - Left, Erin - Right Time take off: 10:02 Land for lunch: 13:01 Track Lines and Direction (e.g. N to S) Flown: 8 to 5 Take off after lunch: 14:22 Land: 16:56 Track Lines and Direction (e.g. N to S) Flown: 4 to 1 Overall weather: Hazy, BSS 2-4 <b>General Observations</b> No sightings in the morning, rough seas. Had to skip lines 10 and 9 due	Plane: <u>N1314S</u> HOBBS Start: <u>902.6</u> HOBBS Stop: <u>908.6</u> HOBBS Total: <u>6</u>
Pilot in Command: Cameron       Second in Command: Stan         Observers: Ryan - Left, Erin - Right         Time take off: 10:02         Land for lunch: 13:01         Track Lines and Direction (e.g. N to S) Flown: 8 to 5         Take off after lunch: 14:22         Land: 16:56         Track Lines and Direction (e.g. N to S) Flown: 4 to 1         Overall weather: Hazy, BSS 2-4         General Observations         No sightings in the morning, rough seas. Had to skip lines 10 and 9 due afternoon BSS was 2 and we had six sightings of bottlenose and spotter	Plane: <u>N1314S</u> HOBBS Start: <u>902.6</u> HOBBS Stop: <u>908.6</u> HOBBS Total: <u>6</u>
Pilot in Command: Cameron       Second in Command: Stan         Observers: Ryan - Left, Erin - Right         Time take off: 10:02         Land for lunch: 13:01         Track Lines and Direction (e.g. N to S) Flown: 8 to 5         Take off after lunch: 14:22         Land: 16:56         Track Lines and Direction (e.g. N to S) Flown: 4 to 1         Overall weather: Hazy, BSS 2-4         General Observations         No sightings in the morning, rough seas. Had to skip lines 10 and 9 due afternoon BSS was 2 and we had six sightings of bottlenose and spotter	Plane: N1314S HOBBS Start: 902.6 HOBBS Stop: 908.6 HOBBS Total: 6 
Pilot in Command: Cameron       Second in Command: Stan         Observers: Ryan - Left, Erin - Right         Time take off: 10:02         Land for lunch: 13:01         Track Lines and Direction (e.g. N to S) Flown: 8 to 5         Take off after lunch: 14:22         Land: 16:56         Track Lines and Direction (e.g. N to S) Flown: 4 to 1         Overall weather: Hazy, BSS 2-4         General Observations         No sightings in the morning, rough seas. Had to skip lines 10 and 9 due afternoon BSS was 2 and we had six sightings of bottlenose and spotter	Plane: N1314S HOBBS Start: 902.6 HOBBS Stop: 908.6 HOBBS Total: 6 

Pilot in Command: Bob Second in Command: Greg	Plane: M1275M
Observers: Erin - Left, Ryan - Right Time take off: 8:35	HOBBS Start: <u>657.9</u>
Land for lunch: 11:55	110DD5 5444
Track Lines and Direction (e.g. N to S) Flown: 10 to 5	
Take off after lunch: 12:44	HOBBS Stop: <u>664.8</u>
Land: <u>4:00</u>	HOBBS Total: 6.9
Track Lines and Direction (e.g. N to S) Flown: <u>1 to 4</u> Overall weather: AM - fair, PM - better	
General Observations	
Winds 10-15knts overcast, chance of showers	toooon cightingo
AM - BSS 3-4 better offshore and subsiding as the day went on - no ce	etacean signtings
PM - BSS 2-3, three sightings: 2 bottlenose & 1 spotted dolphins	
	T
	Transit effort leg:NO
USWTR Daily Plane Log Sheet	Date: <u>Apr 19, 20</u> 12
Pilot in Command: Bob Second in Command: Greg Observers: Ryan - Left, Erin - Right	t Plane: <u>N1275M</u>
Pilot in Command: Bob Second in Command: Greg Observers: Ryan - Left, Erin - Right Time take off: 8:30	t
Pilot in Command: Bob Second in Command: Greg Observers: Ryan - Left, Erin - Right	t Plane: <u>N1275M</u>
Pilot in Command: Bob Second in Command: Greg Observers: Ryan - Left, Erin - Right Time take off: 8:30 Land for lunch: 12:08 Track Lines and Direction (e.g. N to S) Flown: 1 to 6	t Plane: <u>N1275M</u> HOBBS Start: <u>664.8</u>
Pilot in Command: Bob Second in Command: Greg Observers: Ryan - Left, Erin - Right Time take off: 8:30 Land for lunch: 12:08	t Plane: <u>N1275M</u>
Pilot in Command: Bob Second in Command: Greg Observers: Ryan - Left, Erin - Right Time take off: 8:30 Land for lunch: 12:08 Track Lines and Direction (e.g. N to S) Flown: 1 to 6 Take off after lunch: 12:56 Land: 15:25 Track Lines and Direction (e.g. N to S) Flown: 7 to 10	t Plane: <u>N1275M</u> HOBBS Start: <u>664.8</u> HOBBS Stop: <u>671.2</u>
Pilot in Command: Bob Second in Command: Greg Observers: Ryan - Left, Erin - Right Time take off: 8:30 Land for lunch: 12:08 Track Lines and Direction (e.g. N to S) Flown: 1 to 6 Take off after lunch: 12:56 Land: 15:25 Track Lines and Direction (e.g. N to S) Flown: 7 to 10 Overall weather: Cloudy and windy, some rain, BSS 2-4	t Plane: <u>N1275M</u> HOBBS Start: <u>664.8</u> HOBBS Stop: <u>671.2</u>
Pilot in Command: Bob Second in Command: Greg Observers: Ryan - Left, Erin - Right Time take off: 8:30 Land for lunch: 12:08 Track Lines and Direction (e.g. N to S) Flown: 1 to 6 Take off after lunch: 12:56 Land: 15:25 Track Lines and Direction (e.g. N to S) Flown: 7 to 10 Overall weather: Cloudy and windy, some rain, BSS 2-4 General Observations	t Plane: <u>N1275M</u> HOBBS Start: <u>664.8</u>  HOBBS Stop: <u>671.2</u> HOBBS Total: <u>6.4</u>
Pilot in Command: Bob Second in Command: Greg Observers: Ryan - Left, Erin - Right Time take off: 8:30 Land for lunch: 12:08 Track Lines and Direction (e.g. N to S) Flown: 1 to 6 Take off after lunch: 12:56 Land: 15:25 Track Lines and Direction (e.g. N to S) Flown: 7 to 10 Overall weather: Cloudy and windy, some rain, BSS 2-4	t Plane: <u>N1275M</u> HOBBS Start: <u>664.8</u>  HOBBS Stop: <u>671.2</u> HOBBS Total: <u>6.4</u>
Pilot in Command: Bob Second in Command: Greg Observers: Ryan - Left, Erin - Right Time take off: 8:30 Land for lunch: 12:08 Track Lines and Direction (e.g. N to S) Flown: 1 to 6 Take off after lunch: 12:56 Land: 15:25 Track Lines and Direction (e.g. N to S) Flown: 7 to 10 Overall weather: Cloudy and windy, some rain, BSS 2-4 General Observations	t Plane: <u>N1275M</u> HOBBS Start: <u>664.8</u>  HOBBS Stop: <u>671.2</u> HOBBS Total: <u>6.4</u>
Pilot in Command: Bob Second in Command: Greg Observers: Ryan - Left, Erin - Right Time take off: 8:30 Land for lunch: 12:08 Track Lines and Direction (e.g. N to S) Flown: 1 to 6 Take off after lunch: 12:56 Land: 15:25 Track Lines and Direction (e.g. N to S) Flown: 7 to 10 Overall weather: Cloudy and windy, some rain, BSS 2-4 General Observations	t Plane: <u>N1275M</u> HOBBS Start: <u>664.8</u>  HOBBS Stop: <u>671.2</u> HOBBS Total: <u>6.4</u>
Pilot in Command: Bob Second in Command: Greg Observers: Ryan - Left, Erin - Right Time take off: 8:30 Land for lunch: 12:08 Track Lines and Direction (e.g. N to S) Flown: 1 to 6 Take off after lunch: 12:56 Land: 15:25 Track Lines and Direction (e.g. N to S) Flown: 7 to 10 Overall weather: Cloudy and windy, some rain, BSS 2-4 General Observations	t Plane: <u>N1275M</u> HOBBS Start: <u>664.8</u>  HOBBS Stop: <u>671.2</u> HOBBS Total: <u>6.4</u>

Pilot in Command: Bob Second in Command: Josh	Plane: N337CH
Observers: Ryan - Left, Erin - Right Time take off: 8:27	HOBBS Start: 3528.9
Land for lunch: 11:18	
Track Lines and Direction (e.g. N to S) Flown: 10 to 7	
Take off after lunch: 12:17	HOBBS Stop: <u>3535.2</u>
Land: 15:21	HOBBS Total: 6.3
Track Lines and Direction (e.g. N to S) Flown: 6 to 1 Overall weather: Cloudy, hazy BSS 2-3	
General Observations	in the afternoon with showers
Three sightings of spotted dolphins in the morning. Weather turned ba and thunderstorms. Lines were truncated early. No sightings in the aff	
	Transit effort leg:NO
	Iransit effort leg:
USWTR Daily Plane Log Sheet	
Pilot in Command: Josh Second in Command: Bob	
Pilot in Command: Josh Second in Command: Bob Observers: Erin - Left, Ryan - Right	t Plane: <u>N337CH</u>
Pilot in Command: Josh Second in Command: Bob Observers: Erin - Left, Ryan - Right Time take off: 8:38	t
Pilot in Command: Josh Second in Command: Bob Observers: Erin - Left, Ryan - Right Time take off: 8:38	t Plane: <u>N337CH</u>
Pilot in Command: Josh Second in Command: Bob Observers: Erin - Left, Ryan - Right Time take off: 8:38 Land for lunch: 12:39 Track Lines and Direction (e.g. N to S) Flown: 5 to 10	t Plane: <u>N337CH</u> HOBBS Start: <u>3535.2</u>
Pilot in Command: Josh Second in Command: Bob Observers: Erin - Left, Ryan - Right Time take off: 8:38 Land for lunch: 12:39 Track Lines and Direction (e.g. N to S) Flown: 5 to 10 Take off after lunch: 14:28	t Plane: <u>N337CH</u>
Pilot in Command: Josh Second in Command: Bob Observers: Erin - Left, Ryan - Right Time take off: 8:38 Land for lunch: 12:39 Track Lines and Direction (e.g. N to S) Flown: 5 to 10 Take off after lunch: 14:28 Land: 17:22 Track Lines and Direction (e.g. N to S) Flown: 4 to 1	t Plane: <u>N337CH</u> HOBBS Start: <u>3535.2</u> HOBBS Stop: <u>3542.9</u>
Pilot in Command: Josh Second in Command: Bob Observers: Erin - Left, Ryan - Right Time take off: 8:38 Land for lunch: 12:39 Track Lines and Direction (e.g. N to S) Flown: 5 to 10 Take off after lunch: 14:28 Land: 17:22	t Plane: <u>N337CH</u> HOBBS Start: <u>3535.2</u> HOBBS Stop: <u>3542.9</u>
Pilot in Command: Josh Second in Command: Bob Observers: Erin - Left, Ryan - Right Time take off: 8:38 Land for lunch: 12:39 Track Lines and Direction (e.g. N to S) Flown: 5 to 10 Take off after lunch: 14:28 Land: 17:22 Track Lines and Direction (e.g. N to S) Flown: 4 to 1 Overall weather: Very nice, only fewer sightings than expected.	t Plane: <u>N337CH</u> HOBBS Start: <u>3535.2</u> HOBBS Stop: <u>3542.9</u>
Pilot in Command: Josh Second in Command: Bob Observers: Erin - Left, Ryan - Right Time take off: 8:38 Land for lunch: 12:39 Track Lines and Direction (e.g. N to S) Flown: 5 to 10 Take off after lunch: 14:28 Land: 17:22 Track Lines and Direction (e.g. N to S) Flown: 4 to 1 Overall weather: Very nice, only fewer sightings than expected. General Observations	Plane: <u>N337CH</u> HOBBS Start: <u>3535.2</u> HOBBS Stop: <u>3542.9</u> HOBBS Total: <u>7.7</u>
Pilot in Command: Josh Second in Command: Bob Observers: Erin - Left, Ryan - Right Time take off: 8:38 Land for lunch: 12:39 Track Lines and Direction (e.g. N to S) Flown: 5 to 10 Take off after lunch: 14:28 Land: 17:22 Track Lines and Direction (e.g. N to S) Flown: 4 to 1 Overall weather: Very nice, only fewer sightings than expected. General Observations AM - low sea states with last 10-15 miles increasing to BSS 2-3	tPlane: <u>N337CH</u> HOBBS Start: <u>3535.2</u> HOBBS Stop: <u>3542.9</u> HOBBS Total: <u>7.7</u>
Pilot in Command: Josh Second in Command: Bob Observers: Erin - Left, Ryan - Right Time take off: 8:38 Land for lunch: 12:39 Track Lines and Direction (e.g. N to S) Flown: 5 to 10 Take off after lunch: 14:28 Land: 17:22 Track Lines and Direction (e.g. N to S) Flown: 4 to 1 Overall weather: Very nice, only fewer sightings than expected. General Observations AM - low sea states with last 10-15 miles increasing to BSS 2-3 PM - delayed start because of storms moving through, seas remained to	t Plane: N337CH HOBBS Start: 3535.2 HOBBS Stop: 3542.9 HOBBS Total: 7.7 mainly BSS 1 nned pilot whales

Pilot in Command: Dave	_ Second in Command: Josh	Plane: N1275M
Observers: Erin - Left, Ryan - Rig	ght	
Time take off: 8:39	_	HOBBS Start: <u>677.0</u>
Land for lunch: 12:09	-	
Track Lines and Direction (e.g.	N to S) Flown: <u>10 to 5</u>	
Take off after lunch: 13:06		HOBBS Stop: <u>684.6</u>
Land: <u>16:44</u>		HOBBS Total: 7.6
Track Lines and Direction (e.g. Overall weather: Fair to good, cl	N to S) Flown: <u>4 to 1</u> ear skies	
	<b>General Observations</b>	
	litions offshore slightly better. Trackl	
	on trackline 9. Inshore portion of bo	x with large lines of algal blooms
(Trichodesmium).		
In the PM BSS decreased to ma	inly 2 with 6 sightings: 2 Sfr, 2Ttr, 1 (	Ggr, 1 Sbr
		Transit effort leg:NO
		Date: Jul 7, 2012
	USWTR Daily Plane Log She	eet
Pilot in Command: <u>Dave</u>	_ Second in Command: Josh	
Observers: Ryan - Left, Erin - Rig	_ Second in Command: Josh	Plane: <u>N1275M</u>
Observers: Ryan - Left, Erin - Rig Time take off: 8:38	_ Second in Command: Josh	eet
Observers: Ryan - Left, Erin - Rig	_ Second in Command: Josh ght	Plane: <u>N1275M</u>
Observers: Ryan - Left, Erin - Rig Time take off: 8:38 Land for lunch: 12:32 Track Lines and Direction (e.g. 1	_ Second in Command: Josh ght	eet Plane: <u>N1275M</u> HOBBS Start: <u>684.6</u>
Observers: <u>Ryan - Left, Erin - Rig</u> Time take off: <u>8:38</u> Land for lunch: <u>12:32</u> Track Lines and Direction (e.g. <u>13:18</u>	_ Second in Command: Josh ght	Plane: N1275M         HOBBS Start: 684.6         HOBBS Stop: 691.9
Observers: Ryan - Left, Erin - Rig Time take off: 8:38 Land for lunch: 12:32 Track Lines and Direction (e.g. 1 Take off after lunch: 13:18 Land: 16:20	Second in Command: <u>Josh</u> ght  N to S) Flown: <u>1 to 6</u>	eet Plane: <u>N1275M</u> HOBBS Start: <u>684.6</u>
Observers: Ryan - Left, Erin - Rig Time take off: 8:38 Land for lunch: 12:32 Track Lines and Direction (e.g. 1 Take off after lunch: 13:18 Land: 16:20 Track Lines and Direction (e.g. 1	Second in Command: <u>Josh</u> <u>ght</u> N to S) Flown: <u>1 to 6</u> N to S) Flown: <u>7 to 10</u>	Plane: N1275M         HOBBS Start: 684.6         HOBBS Stop: 691.9
Observers: Ryan - Left, Erin - Rig Time take off: 8:38 Land for lunch: 12:32 Track Lines and Direction (e.g. 1 Take off after lunch: 13:18 Land: 16:20	Second in Command: Josh ght N to S) Flown: <u>1 to 6</u> N to S) Flown: <u>7 to 10</u> the morning, hazy	Plane: N1275M         HOBBS Start: 684.6         HOBBS Stop: 691.9
Observers: Ryan - Left, Erin - Rig Time take off: 8:38 Land for lunch: 12:32 Track Lines and Direction (e.g. 1 Take off after lunch: 13:18 Land: 16:20 Track Lines and Direction (e.g. 1 Overall weather: BSS 3 most of	Second in Command: <u>Josh</u> <u>ght</u> N to S) Flown: <u>1 to 6</u> N to S) Flown: <u>7 to 10</u>	Plane: N1275M         HOBBS Start: 684.6         HOBBS Stop: 691.9         HOBBS Total: 7.3
Observers: Ryan - Left, Erin - Rig Time take off: 8:38 Land for lunch: 12:32 Track Lines and Direction (e.g. 1 Take off after lunch: 13:18 Land: 16:20 Track Lines and Direction (e.g. 1 Overall weather: BSS 3 most of	Second in Command: Josh ght N to S) Flown: <u>1 to 6</u> N to S) Flown: <u>7 to 10</u> the morning, hazy General Observations	Plane: N1275M         HOBBS Start: 684.6         HOBBS Stop: 691.9         HOBBS Total: 7.3
Observers: Ryan - Left, Erin - Rig Time take off: 8:38 Land for lunch: 12:32 Track Lines and Direction (e.g. 1) Take off after lunch: 13:18 Land: 16:20 Track Lines and Direction (e.g. 1) Overall weather: BSS 3 most of Four sightings before lunch of bo	Second in Command: Josh ght N to S) Flown: <u>1 to 6</u> N to S) Flown: <u>7 to 10</u> the morning, hazy General Observations	Plane: N1275M         HOBBS Start: 684.6         HOBBS Stop: 691.9         HOBBS Total: 7.3
Observers: Ryan - Left, Erin - Rig Time take off: 8:38 Land for lunch: 12:32 Track Lines and Direction (e.g. 1) Take off after lunch: 13:18 Land: 16:20 Track Lines and Direction (e.g. 1) Overall weather: BSS 3 most of Four sightings before lunch of bo	Second in Command: Josh ght N to S) Flown: <u>1 to 6</u> N to S) Flown: <u>7 to 10</u> the morning, hazy General Observations	Plane: N1275M         HOBBS Start: 684.6         HOBBS Stop: 691.9         HOBBS Total: 7.3
Observers: Ryan - Left, Erin - Rig Time take off: 8:38 Land for lunch: 12:32 Track Lines and Direction (e.g. 1) Take off after lunch: 13:18 Land: 16:20 Track Lines and Direction (e.g. 1) Overall weather: BSS 3 most of Four sightings before lunch of bo	Second in Command: Josh ght N to S) Flown: <u>1 to 6</u> N to S) Flown: <u>7 to 10</u> the morning, hazy General Observations	Plane: N1275M         HOBBS Start: 684.6         HOBBS Stop: 691.9         HOBBS Total: 7.3
Observers: Ryan - Left, Erin - Rig Time take off: 8:38 Land for lunch: 12:32 Track Lines and Direction (e.g. 1 Take off after lunch: 13:18 Land: 16:20 Track Lines and Direction (e.g. 1 Overall weather: BSS 3 most of Four sightings before lunch of bo	Second in Command: Josh ght N to S) Flown: <u>1 to 6</u> N to S) Flown: <u>7 to 10</u> the morning, hazy General Observations	Plane: N1275M         HOBBS Start: 684.6         HOBBS Stop: 691.9         HOBBS Total: 7.3

Duan Left Frin	Second in Command: Josh	Plane: <u>N1375L</u>
Observers: Ryan - Left, Erin Time take off: 8:45	i - Right	HOBBS Start: 2709.9
Land for lunch: 13:02		HOBBS Start: 2700.0
Track Lines and Direction (	(e.g. N  to  S) Flown: 5 to 10	
Take off after lunch: 14:03		HOBBS Stop: 2717.4
Land: <u>16:47</u>		HOBBS Total: 7.5
Track Lines and Direction (	(e.g. N to S) Flown: $\frac{4 \text{ to } 1}{1}$	
Overall weather: Overcast,	BSS 1-3, showers on the east end of lir	IES
	General Observations	
		Transit effort leg:
	USWTR Daily Plane Log Sł	Date:
	Second in Command:	heet
Observers:	Second in Command:	heet Plane:
Observers: Time take off:	Second in Command:	heet
Observers: Time take off: Land for lunch:	Second in Command:	heet Plane: HOBBS Start:
Observers: Time take off: Land for lunch: Track Lines and Direction (	Second in Command:	heet Plane: HOBBS Start:
Observers: Time take off: Land for lunch: Track Lines and Direction ( Take off after lunch:	Second in Command:	heet Plane: HOBBS Start: HOBBS Stop:
Observers: Time take off: Land for lunch: Track Lines and Direction ( Take off after lunch: Land: Track Lines and Direction (	Second in Command: 	heet Plane: HOBBS Start: HOBBS Stop: HOBBS Total:
Observers: Time take off: Land for lunch: Track Lines and Direction ( Take off after lunch: Land:	Second in Command: 	heet Plane: HOBBS Start: HOBBS Stop: HOBBS Total:
Observers: Time take off: Land for lunch: Track Lines and Direction ( Take off after lunch: Land: Track Lines and Direction (	Second in Command: 	heet Plane: HOBBS Start: HOBBS Stop: HOBBS Total:
Observers: Time take off: Land for lunch: Track Lines and Direction ( Take off after lunch: Land: Track Lines and Direction (	Second in Command: 	heet Plane: HOBBS Start: HOBBS Stop: HOBBS Total:
Observers: Time take off: Land for lunch: Track Lines and Direction ( Take off after lunch: Land: Track Lines and Direction (	Second in Command: 	heet Plane: HOBBS Start: HOBBS Stop: HOBBS Total:
Observers: Time take off: Land for lunch: Track Lines and Direction ( Take off after lunch: Land: Track Lines and Direction (	Second in Command: 	heet Plane: HOBBS Start: HOBBS Stop: HOBBS Total:

Pilot in Command: Bob Second in Command: Sam	Plane: <u>N1275M</u>
Observers: Erin - Left, Ryan - Right	
Time take off: 8:17 Land for lunch: 12:02	HOBBS Start: 705.9
Track Lines and Direction (e.g. N to S) Flown: <u>1 to 6</u>	
Track Lines and Direction (e.g. N to S) Flowin: 100	—
Take off after lunch: 12:58	HOBBS Stop: 713.1
Land: 16:02	HOBBS Total: 7.2
Track Lines and Direction (e.g. N to S) Flown: 10 to 7	
Overall weather: BSS 3 the entire day, winds increasing throughout	
General Observations	
AM - 3 sightings in 6 lines (Sbr, Ttr & Unid)	
PM - 4 sightings in 4 lines (Ttr, Sfr, & Ggr)	
	Transit effort leg:NO
	Date: <u>Nov 5, 201</u> 2
USWTR Daily Plane Log Sheet	Date: <u>Nov 5, 201</u> 2
Pilot in Command: Bob Second in Command: Sam	Date: <u>Nov 5, 201</u> 2 Plane: <u>N1275M</u>
Pilot in Command: Bob Second in Command: Sam Observers: Ryan - Left, Erin - Right	Plane: <u>N1275M</u>
Pilot in Command: Bob Second in Command: Sam Observers: Ryan - Left, Erin - Right Time take off: 8:15	
Pilot in Command: Bob Second in Command: Sam Observers: Ryan - Left, Erin - Right Time take off: 8:15 Land for lunch: 11:28	Plane: <u>N1275M</u>
Pilot in Command: Bob Second in Command: Sam Observers: Ryan - Left, Erin - Right Time take off: 8:15	Plane: <u>N1275M</u>
Pilot in Command: Bob Second in Command: Sam Observers: Ryan - Left, Erin - Right Time take off: 8:15 Land for lunch: 11:28 Track Lines and Direction (e.g. N to S) Flown: 10 to 5	Plane: <u>N1275M</u> HOBBS Start: <u>713.1</u>
Pilot in Command: Bob Second in Command: Sam Observers: Ryan - Left, Erin - Right Time take off: 8:15 Land for lunch: 11:28 Track Lines and Direction (e.g. N to S) Flown: 10 to 5 Take off after lunch: NA	Plane: <u>N1275M</u> HOBBS Start: <u>713.1</u> HOBBS Stop: <u>716.5</u>
Pilot in Command: Bob       Second in Command: Sam         Observers: Ryan - Left, Erin - Right       Time take off: 8:15         Land for lunch: 11:28       Track Lines and Direction (e.g. N to S) Flown: 10 to 5         Take off after lunch: NA       Land: NA	Plane: <u>N1275M</u> HOBBS Start: <u>713.1</u>
Pilot in Command: Bob Second in Command: Sam Observers: Ryan - Left, Erin - Right Time take off: 8:15 Land for lunch: 11:28 Track Lines and Direction (e.g. N to S) Flown: 10 to 5 Take off after lunch: NA Land: NA Track Lines and Direction (e.g. N to S) Flown: NA	Plane: <u>N1275M</u> HOBBS Start: <u>713.1</u> HOBBS Stop: <u>716.5</u>
Pilot in Command: Bob       Second in Command: Sam         Observers: Ryan - Left, Erin - Right         Time take off: 8:15         Land for lunch: 11:28         Track Lines and Direction (e.g. N to S) Flown: 10 to 5         Take off after lunch: NA         Land: NA         Track Lines and Direction (e.g. N to S) Flown: NA         Overall weather: Windy, hazy, BSS 3-5	Plane: <u>N1275M</u> HOBBS Start: <u>713.1</u> HOBBS Stop: <u>716.5</u>
Pilot in Command: Bob Second in Command: Sam Observers: Ryan - Left, Erin - Right Time take off: 8:15 Land for lunch: 11:28 Track Lines and Direction (e.g. N to S) Flown: 10 to 5 Take off after lunch: NA Land: NA Track Lines and Direction (e.g. N to S) Flown: NA Overall weather: Windy, hazy, BSS 3-5 General Observations	Plane: <u>N1275M</u> HOBBS Start: <u>713.1</u> HOBBS Stop: <u>716.5</u> HOBBS Total: <u>3.4</u>
Pilot in Command: Bob       Second in Command: Sam         Observers: Ryan - Left, Erin - Right       Time take off: 8:15         Time take off: 8:15       Image: Second in Command: Sam         Land for lunch: 11:28       Track Lines and Direction (e.g. N to S) Flown: 10 to 5         Take off after lunch: NA       Image: Second in Command: Sam         Land: NA       Image: Track Lines and Direction (e.g. N to S) Flown: NA         Overall weather: Windy, hazy, BSS 3-5	Plane: <u>N1275M</u> HOBBS Start: <u>713.1</u> HOBBS Stop: <u>716.5</u> HOBBS Total: <u>3.4</u>
Pilot in Command: Bob Second in Command: Sam Observers: Ryan - Left, Erin - Right Time take off: 8:15 Land for lunch: 11:28 Track Lines and Direction (e.g. N to S) Flown: 10 to 5 Take off after lunch: NA Land: NA Track Lines and Direction (e.g. N to S) Flown: NA Overall weather: Windy, hazy, BSS 3-5 General Observations	Plane: <u>N1275M</u> HOBBS Start: <u>713.1</u> HOBBS Stop: <u>716.5</u> HOBBS Total: <u>3.4</u>
Pilot in Command: Bob Second in Command: Sam Observers: Ryan - Left, Erin - Right Time take off: 8:15 Land for lunch: 11:28 Track Lines and Direction (e.g. N to S) Flown: 10 to 5 Take off after lunch: NA Land: NA Track Lines and Direction (e.g. N to S) Flown: NA Overall weather: Windy, hazy, BSS 3-5 General Observations	Plane: <u>N1275M</u> HOBBS Start: <u>713.1</u> HOBBS Stop: <u>716.5</u> HOBBS Total: <u>3.4</u>
Pilot in Command: Bob Second in Command: Sam Observers: Ryan - Left, Erin - Right Time take off: 8:15 Land for lunch: 11:28 Track Lines and Direction (e.g. N to S) Flown: 10 to 5 Take off after lunch: NA Land: NA Track Lines and Direction (e.g. N to S) Flown: NA Overall weather: Windy, hazy, BSS 3-5 General Observations	Plane: <u>N1275M</u> HOBBS Start: <u>713.1</u> HOBBS Stop: <u>716.5</u> HOBBS Total: <u>3.4</u>
Pilot in Command: Bob Second in Command: Sam Observers: Ryan - Left, Erin - Right Time take off: 8:15 Land for lunch: 11:28 Track Lines and Direction (e.g. N to S) Flown: 10 to 5 Take off after lunch: NA Land: NA Track Lines and Direction (e.g. N to S) Flown: NA Overall weather: Windy, hazy, BSS 3-5 General Observations	Plane: <u>N1275M</u> HOBBS Start: <u>713.1</u> HOBBS Stop: <u>716.5</u> HOBBS Total: <u>3.4</u>
Pilot in Command: Bob Second in Command: Sam Observers: Ryan - Left, Erin - Right Time take off: 8:15 Land for lunch: 11:28 Track Lines and Direction (e.g. N to S) Flown: 10 to 5 Take off after lunch: NA Land: NA Track Lines and Direction (e.g. N to S) Flown: NA Overall weather: Windy, hazy, BSS 3-5 General Observations	Plane: <u>N1275M</u> HOBBS Start: <u>713.1</u> HOBBS Stop: <u>716.5</u> HOBBS Total: <u>3.4</u>

Monday, January 23, 2012 ${ m Sighting}~\#$ 1	
Initial sighting on Track	
Time: 13:30 WP#: 4 Lat: 30.566819 Long: -80.44298	1
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Sr	olash
On/Off Effort: On Trackline: 10 Beaufort Sea State:	2
Observer: Erin Observer side: Left	
Actual Time and Position of Sighting	
Time: 13:21 WP#: 5 Lat: 30.569777 Long: -80.445247	7
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best): 1/1/	
Features used in Species ID: Large uniform grey, robust body	
Representative images used for Species ID: 6198	
Photographer: Ryan Frame numbers: 6195-6199 Spacer: 6200	)
Calculated distance from Trackline: 0.39 km	
Final Time and Position of Sighting	
Time: <u>13:36</u> WP#: <u>6</u> Lat: <u>30.576074</u> Long: <u>-80.45138</u>	1
Calculated Distance Traveled: 0.91 km	
Behavior and Additional Comments	
Avoidance behavior	
Deep dives as soon as we flew over. Otherwise just hung below the surface.	
Monday, January 23, 2012 Sighting # 2	
Initial sighting on Track	
Time: <u>13:36</u> WP#: <u>9</u> Lat: <u>30.566549</u> Long: <u>-80.344833</u>	
	lody
	2
Observer: Ryan Observer side: Right	
Actual Time and Position of Sighting	
Time:         13:36         WP#:         10         Lat:         30.557850         Long:         -80.333953	3
Species:Stenella frontalis       Numbers (Low/High/Best):       65 / 80	
Features used in Species ID: <u>Alternating light and dark pattern down body</u> , white tip on rost	rum
spotting Representative images used for Species ID: 6266, 6242, 6219, 6215	
Photographer: Ryan Frame numbers: 6201 - 6281 Spacer: 6282	2
Calculated distance from Trackline: 1.42 km	-
Final Time and Position of Sighting	<i>c</i>
Time:         13:41         WP#:         11         Lat:         30.563291         Long:         -80.33010	6
Calculated Distance Traveled: 0.71 km	
Behavior and Additional Comments	
5 groups, lots of splashing, jumping, clumping together and circling	

Monday, January 23, 2012 Sighting $\#$ 3
Initial sighting on Track
Time: 14:11 WP#: 19 Lat: 30.499605 Long: -80.221808
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 9 Beaufort Sea State: 3
Observer: Ryan Observer side: Right
Actual Time and Position of Sighting
Time: 14:16 WP#: 20 Lat: 30.518887 Long: -80.210413
Species: Tursiops truncatus Numbers (Low/High/Best): 5/5/5
Features used in Species ID: Uniform grey body, robust
Representative images used for Species ID: 6297, 6296, 6290
Photographer: Ryan Frame numbers: 6283 - 6309 Spacer: 6310
Calculated distance from Trackline: 2.41 km
Final Time and Position of Sighting
Time: 14:22 WP#: 21 Lat: 30.513436 Long: -80.224197
Calculated Distance Traveled: 1.45 km
Behavior and Additional Comments
Staying tight together, circling, splashing. Swimming just below the surface and doing deeper dives.
Monday, January 23, 2012 Sighting # 4
Initial sighting on Track
Time:         14:27         WP#:         24         Lat:         30.499874         Long:         -80.365288           Vertical Analysis         1         Harizontal Description in Description         120         Sighting Court         20
Vertical Angle: 1 Horizontal Bearing in Degrees: 120 Sighting Cue: Body
On/Off Effort:       On       Trackline:       9       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Left
UDServer Frin UDServer side Left
Actual Time and Position of Sighting
Actual Time and Position of Sighting         Time:       14:30       WP#:       25       Lat:       30.494180       Long:       -80.356793
Actual Time and Position of Sighting         Time:       14:30       WP#:       25       Lat:       30.494180       Long:       -80.356793         Species:Stenella frontalis       Numbers (Low/High/Best):       4/4/4
Actual Time and Position of Sighting         Time:       14:30       WP#:       25       Lat:       30.494180       Long:       -80.356793
Actual Time and Position of Sighting         Time:       14:30       WP#:       25       Lat:       30.494180       Long:       -80.356793         Species:       Stenella frontalis       Numbers (Low/High/Best):       4 / 4 / 4         Features used in Species ID:       Alternating light and dark pattern down body, white tip on rostrum
Actual Time and Position of Sighting         Time:       14:30       WP#:       25       Lat:       30.494180       Long:       -80.356793         Species:Stenella frontalis       Numbers (Low/High/Best):       4/4/4         Features used in Species ID:       Alternating light and dark pattern down body, white tip on rostrum         spotting
Actual Time and Position of Sighting         Time:       14:30       WP#:       25       Lat:       30.494180       Long:       -80.356793         Species:Stenella frontalis       Numbers (Low/High/Best):       4/4/4         Features used in Species ID:       Alternating light and dark pattern down body, white tip on rostrum         spotting         Representative images used for Species ID:       6311, 6321, 6322
Actual Time and Position of Sighting         Time:       14:30       WP#:       25       Lat:       30.494180       Long:      80.356793         Species:Stenella frontalis       Numbers (Low/High/Best):       4/4/4         Features used in Species ID:       Alternating light and dark pattern down body, white tip on rostrum         spotting         Representative images used for Species ID:       6311, 6321, 6322         Photographer:       Ryan       Frame numbers:       6311 - 6322       Spacer:       6323         Calculated distance from Trackline:       1.03 km       1.03 km       1.03 km       1.03 km
Actual Time and Position of Sighting         Time:       14:30       WP#:       25       Lat:       30.494180       Long:      80.356793         Species:Stenella frontalis       Numbers (Low/High/Best):       4 / 4 / 4         Features used in Species ID:       Alternating light and dark pattern down body, white tip on rostrum         spotting         Representative images used for Species ID:       6311, 6321, 6322         Photographer:       Ryan       Frame numbers:       6311 - 6322       Spacer:       6323         Calculated distance from Trackline:       1.03 km       International State Interna
Actual Time and Position of Sighting         Time:       14:30       WP#:       25       Lat:       30.494180       Long:      80.356793         Species:Stenella frontalis       Numbers (Low/High/Best):       4/4/4         Features used in Species ID:       Alternating light and dark pattern down body, white tip on rostrum         spotting         Representative images used for Species ID:       6311, 6321, 6322         Photographer:       Ryan       Frame numbers:       6311 - 6322       Spacer:       6323         Calculated distance from Trackline:       1.03 km       1.03 km       1.03 km       1.03 km
Actual Time and Position of Sighting         Time:       14:30       WP#:       25       Lat:       30.494180       Long:      80.356793         Species:Stenella frontalis       Numbers (Low/High/Best):       4/4/4         Features used in Species ID:       Alternating light and dark pattern down body, white tip on rostrum         spotting         Representative images used for Species ID:       6311, 6321, 6322         Photographer:       Ryan       Frame numbers:       6311 - 6322       Spacer:       6323         Calculated distance from Trackline:       1.03 km       International State Internatinternational State International State Int
Actual Time and Position of Sighting         Time:       14:30       WP#:       25       Lat:       30.494180       Long:      80.356793         Species:       Stenella frontalis       Numbers (Low/High/Best):       4/4/4         Features used in Species ID:       Alternating light and dark pattern down body, white tip on rostrum         spotting         Representative images used for Species ID:       6311, 6321, 6322         Photographer:       Ryan       Frame numbers:       6311 - 6322       Spacer:       6323         Calculated distance from Trackline:       1.03 km       Internet and Position of Sighting       Internet
Actual Time and Position of Sighting         Time:       14:30       WP#:       25       Lat:       30.494180       Long:      80.356793         Species:Stenella frontalis       Numbers (Low/High/Best):       4/4/4         Features used in Species ID:       Alternating light and dark pattern down body, white tip on rostrum         spotting         Representative images used for Species ID:       6311, 6321, 6322         Photographer:       Ryan       Frame numbers:       6311 - 6322       Spacer:       6323         Calculated distance from Trackline:       1.03 km       International State Internatinternational State International State Int
Actual Time and Position of Sighting         Time:       14:30       WP#:       25       Lat:       30.494180       Long:      80.356793         Species:       Stenella frontalis       Numbers (Low/High/Best):       4/4/4         Features used in Species ID:       Alternating light and dark pattern down body, white tip on rostrum         spotting         Representative images used for Species ID:       6311, 6321, 6322         Photographer:       Ryan       Frame numbers:       6311 - 6322       Spacer:       6323         Calculated distance from Trackline:       1.03 km       Internet and Position of Sighting       Internet

Monday, January 23, 2	2012 Sigh	ting # 5		
Initial sighting on Track	-	-		
Time: <u>15:22</u> WP#: <u>44</u>	Lat:	30.365508	Long:	-80.278413
Vertical Angle: 2 Horizonta	al Bearing	in Degrees: 9	0 Sighting	Cue: Body
		_	eaufort Sea Sta	
Observer: Ryan Ob	server sid	e: Right		
Actual Time and Position of Sigh	nting			
Time: 15:23 WP#: 45	Lat:	30.369298	Long:	-80.280478
Species: Tursiops truncatus		Numbers (Lov	· · ·	
Features used in Species ID: Grey u	niform, rob	ust body		
Representative images used for Sp				
Photographer: <u>Ryan</u> Frame n			Spacer:	6358
Calculated distance from Trackline	e:	0.47 km		
Final Time and Position of Sight	ing			
Time: 15:27 WP#: 46	Lat:	30.377736	Long:	-80.280670
Calculated Distance Traveled:	0.94	l km	6	
Behavior and Additional Comm	ents			
Animals spaced out, hanging just below		Some deeper dive	25	
initials spaced out, hanging just below	the surface			
Monday, January 23, 2 Initial sighting on Track	2012 Sigh	ting # 6		
Time: 16:24 WP#: 60	Lat:	30.232001	Long:	-80.352978
Vertical Angle: 3 Horizonta	al Bearing	in Degrees: 4	U	
	ckline:		eaufort Sea Sta	
Observer: Ryan Ob	server sid	e: Right		
Actual Time and Position of Sigh	nting			
Time: 16:25 WP#: 61		30 233261	Long:	-80 356791
Species: Tursiops truncatus		Numbers (Lov	•	
Features used in Species ID: Unifor	m grey, rob	· · · · ·		
	<u> </u>			
Representative images used for Sp	ecies ID:		6364	
Photographer: Ryan Frame n	umbers:	6359 - 6395	Spacer:	6396
Calculated distance from Trackline	e:	0.39 km		
Final Time and Position of Sight	ing			
Time: 16:33 WP#: 62	Lat:	30.238022	Long:	-80.348604
Calculated Distance Traveled:		5 km	0	
Behavior and Additional Comm				
5 main groups with some scattered. Ani		ng darting hangin	a just below the	surface
5 main groups with some scattered. Am	mais jumpli	ig, darting, hangin	g just below the	surface.

Tuesday, Jo	anuary 24, 2012 ${ m Sig}$	shting #		
Initial sighting on Tra	ck	-		
Time: 9:54 WP#:	5 Lat:	29.965144	Long:	-80.05041
Vertical Angle: 2		ng in Degrees:	0	Cue: Splash
On/Off Effort: On	Trackline:	0 0	Beaufort Sea St	
Observer: Erin	Observer si	ide: Right		
Actual Time and Posit	ion of Sighting			
	6 Lat:	29.965240	Long:	-80.04755
Species: Tursiops truncatus			low/High/Best):	
Features used in Species	s ID: Robust body ap			
Animals with lighter grey pe				
Representative images u			6425 & 6427	
Photographer: Erin	Frame numbers:	6410 - 643	1 Spacer	: 6431
Calculated distance from	n Trackline:	0.28 km		
Final Time and Positio	on of Sighting			
Time: 10:10 WP#:	7 Lat:	29.971732	Long:	-80.08658
Calculated Distance Tra	veled: 3.	82 km		
<b>Behavior and Additior</b>	al Comments			
Small group splashing at the		ick resights but co	ould not track grou	p consistently.
		<u> </u>	<b>J</b>	
Tuesday, Ja	anuary 24, 2012 ${ m Sig}$	ting # 2		
Tuesday, Ja Initial sighting on Tra	C C	hting # 2		
Initial sighting on Tra	ck	<pre>shting # 2 30.032932</pre>	Long:	-80.06428
Initial sighting on Tra	c <b>k</b> <u>14</u> Lat:	30.032932	Long: 90Sighting	
Initial sighting on Trac Time: 10:35 WP#:	c <b>k</b> <u>14</u> Lat:	30.032932		Cue: Body
Initial sighting on Trac Time: <u>10:35</u> WP#: Vertical Angle: <u>1</u>	ck <u>14</u> Lat: Horizontal Bearin Trackline:	30.032932 ng in Degrees:	90 Sighting	Cue: Body
Initial sighting on TracTime:10:35WP#:Vertical Angle:1On/Off Effort:OnObserver:Erin	ck <u>14</u> Lat: Horizontal Bearin Trackline: Observer si	30.032932 ng in Degrees:2	90 Sighting	Cue: Body
Initial sighting on TracTime:10:35WP#:Vertical Angle:1On/Off Effort:OnObserver:ErinActual Time and Posit	ck <u>14</u> Lat: Horizontal Bearir Trackline: Observer si ion of Sighting	30.032932 ng in Degrees: 2 ide: Right	90 Sighting Beaufort Sea St	Cue: Body ate: 3
Initial sighting on TradTime:10:35WP#:Vertical Angle:1On/Off Effort:OnObserver:ErinActual Time and PositTime:10:36WP#:	ck       14     Lat:       Horizontal Bearin       Trackline:       Observer si       ion of Sighting       15     Lat:	30.032932 ng in Degrees: 2 2 ide: Right 30.032596	90 Sighting Beaufort Sea St Long:	Cue: <u>Body</u> ate: <u>3</u>
Initial sighting on TradTime:10:35WP#:Vertical Angle:1On/Off Effort:OnObserver:ErinActual Time and PositTime:10:36WP#:Species:Tursiops truncatus	ck          14       Lat:         Horizontal Bearin         Trackline:         Observer si         ion of Sighting         15       Lat:	<u>30.032932</u> ng in Degrees: ide: <u>30.032596</u> Numbers (L	90 Sighting Beaufort Sea St Long: .ow/High/Best):	Cue: <u>Body</u> ate: <u>3</u> -80.06256 9/11/10
Initial sighting on TradTime:10:35WP#:Vertical Angle:1On/Off Effort:OnObserver:ErinActual Time and PositTime:10:36WP#:	ck          14       Lat:         Horizontal Bearir         Trackline:         Observer si         ion of Sighting         15       Lat:         s ID:       Robust body ap	<u>30.032932</u> ng in Degrees: ide: <u>30.032596</u> Numbers (L	90 Sighting Beaufort Sea St Long: .ow/High/Best):	Cue: <u>Body</u> ate: <u>3</u> -80.06256 9/11/10
Initial sighting on TracTime:10:35WP#:Vertical Angle:1On/Off Effort:OnObserver:ErinActual Time and PositTime:10:36WP#:Species:Tursiops truncatusFeatures used in Species:	ck          14       Lat:         Horizontal Bearin         Trackline:         Observer si         ion of Sighting         15       Lat:         s ID:       Robust body ap         eduncle area.	30.032932 ng in Degrees: 2 ide: Right 30.032596 Numbers (L pearance, lighter	90 Sighting Beaufort Sea St Long: .ow/High/Best):	Cue: <u>Body</u> ate: <u>3</u> -80.06256 9/11/10 e dorsal fin.
Initial sighting on TradTime:10:35WP#:Vertical Angle:1On/Off Effort:OnObserver:ErinActual Time and PositTime:10:36WP#:Species:Tursiops truncatusFeatures used in Species:Animals with lighter grey per	ck          14       Lat:         Horizontal Bearin         Trackline:         Observer si         ion of Sighting         15       Lat:         s ID:       Robust body ap         eduncle area.	30.032932 ng in Degrees: ide: 30.032596 Numbers (L pearance, lighter	90 Sighting Beaufort Sea St Long: Low/High/Best): blaze to behind the 6434, 6442, 6444	Cue: <u>Body</u> ate: <u>3</u> -80.06256 <u>9/11/10</u> e dorsal fin.
Initial sighting on Tradition         Time:       10:35       WP#:         Vertical Angle:       1         On/Off Effort:       On         Observer:       Erin         Actual Time and Posit         Time:       10:36         Species:       Turnsiops truncatus         Features used in Species         Animals with lighter grey per         Representative images used	ck          14       Lat:         Horizontal Bearin         Trackline:         Observer si         ion of Sighting         15       Lat:         s ID:       Robust body ap         eduncle area.         used for Species ID         Frame numbers:	30.032932 ng in Degrees: ide: 30.032596 Numbers (L pearance, lighter	90 Sighting Beaufort Sea St Long: .ow/High/Best): blaze to behind the 6434, 6442, 6444	Cue: <u>Body</u> ate: <u>3</u> -80.06256 <u>9/11/10</u> e dorsal fin.
Initial sighting on TracTime:10:35WP#:Vertical Angle:1On/Off Effort:OnObserver:ErinActual Time and PositTime:10:36WP#:Species:Tursiops truncatusFeatures used in Species:Animals with lighter grey perRepresentative images uPhotographer:ErinCalculated distance from	ck          14       Lat:         Horizontal Bearin         Trackline:         Observer si         ion of Sighting         15       Lat:         s ID:       Robust body ap         eduncle area.         used for Species ID         Frame numbers:         n Trackline:	<u>30.032932</u> ng in Degrees: ide: 30.032596 Numbers (L pearance, lighter : 6432 - 644	90 Sighting Beaufort Sea St Long: .ow/High/Best): blaze to behind the 6434, 6442, 6444	Cue: <u>Body</u> ate: <u>3</u> -80.06256 <u>9/11/10</u> e dorsal fin.
Initial sighting on Trac         Time:       10:35       WP#:         Vertical Angle:       1         On/Off Effort:       On         Observer:       Erin         Actual Time and Posit         Time:       10:36         WP#:         Species:         Features used in Species:         Animals with lighter grey per         Representative images uphotographer:         Erin         Calculated distance from         Final Time and Position	ck          14       Lat:         Horizontal Bearin         Trackline:         Observer si         ion of Sighting         15       Lat:         s ID:       Robust body ap         eduncle area.         used for Species ID         Frame numbers:         n Trackline:         on of Sighting	30.032932 ng in Degrees: ide: 30.032596 Numbers (L pearance, lighter : 6432 - 644 0.17 km	90 Sighting Beaufort Sea St Long:	Cue: <u>Body</u> ate: <u>3</u> -80.06256 9 / 11 / 10 e dorsal fin. : <u>6449</u>
Initial sighting on Tradition         Time:       10:35       WP#:         Vertical Angle:       1         On/Off Effort:       On         Observer:       Erin         Actual Time and Positi         Time:       10:36         Species:       Turnsiops truncatus         Features used in Species         Animals with lighter grey persentative images u         Photographer:       Erin         Calculated distance from         Final Time and Position	ck          14       Lat:         Horizontal Bearin         Trackline:         Observer si         ion of Sighting         15       Lat:         s ID:       Robust body ap         eduncle area.         used for Species ID         Frame numbers:         n Trackline:         0         16	<u>30.032932</u> ng in Degrees: ide: 30.032596 Numbers (L pearance, lighter : 6432 - 644	90 Sighting Beaufort Sea St Long: .ow/High/Best): blaze to behind the 6434, 6442, 6444	Cue: <u>Body</u> ate: <u>3</u> -80.06256 <u>9/11/10</u> e dorsal fin.
Initial sighting on Trac         Time:       10:35       WP#:         Vertical Angle:       1         On/Off Effort:       On         Observer:       Erin         Actual Time and Posit         Time:       10:36         Species:       Tursiops truncatus         Features used in Species         Animals with lighter grey persentative images uphotographer:         Erin         Calculated distance from         Time:       10:40         WP#:         Calculated Distance Trace	ck          14       Lat:         Horizontal Bearin         Trackline:         Observer si         ion of Sighting         15       Lat:         s ID:       Robust body ap         eduncle area.         used for Species ID         Frame numbers:         n Trackline:         on of Sighting         16       Lat:         weled:       0.	30.032932 ng in Degrees: ide: ide: 30.032596 Numbers (L pearance, lighter : 6432 - 644 0.17 km 30.038843	90 Sighting Beaufort Sea St Long:	Cue: <u>Body</u> ate: <u>3</u> -80.06256 9 / 11 / 10 e dorsal fin. : <u>6449</u>
Initial sighting on TradTime:10:35WP#:Vertical Angle:1On/Off Effort:OnObserver:ErinActual Time and PositTime:10:36WP#:Species:Tursiops truncatusFeatures used in Species:Animals with lighter grey partRepresentative images uPhotographer:ErinCalculated distance fromFinal Time and PositionTime:10:40WP#:Calculated Distance TraBehavior and Additior	ck          14       Lat:         Horizontal Bearin         Trackline:         Observer si         ion of Sighting         15       Lat:         s ID:       Robust body ap         eduncle area.         used for Species ID         Frame numbers:         n Trackline:         0         16         Lat:         0.         nal Comments	30.032932 ng in Degrees: ide: ide: 30.032596 Numbers (L pearance, lighter : 6432 - 644 0.17 km 30.038843 74 km	90 Sighting Beaufort Sea St  Long: Low/High/Best): blaze to behind the 6434, 6442, 6444 8 Spacer  Long:	Cue: <u>Body</u> ate: <u>3</u> -80.06256 <u>9 / 11 / 10</u> e dorsal fin. : <u>6449</u> -80.06533
Initial sighting on Trac         Time:       10:35       WP#:         Vertical Angle:       1         On/Off Effort:       On         Observer:       Erin         Actual Time and Posit         Time:       10:36         Species:       Tursiops truncatus         Features used in Species         Animals with lighter grey persentative images uphotographer:         Erin         Calculated distance from         Time:       10:40         WP#:         Calculated Distance Trace	ck          14       Lat:         Horizontal Bearin         Trackline:         Observer si         ion of Sighting         15       Lat:         s ID:       Robust body ap         eduncle area.         used for Species ID         Frame numbers:         n Trackline:         0         16         Lat:         0.         nal Comments	30.032932 ng in Degrees: ide: ide: 30.032596 Numbers (L pearance, lighter : 6432 - 644 0.17 km 30.038843 74 km	90 Sighting Beaufort Sea St  Long: Low/High/Best): blaze to behind the 6434, 6442, 6444 8 Spacer  Long:	Cue: <u>Body</u> ate: <u>3</u> -80.06256 <u>9 / 11 / 10</u> e dorsal fin. : <u>6449</u> -80.06533

Tuesday, January 24, 2012 Sighting $\#$ 3	
Initial sighting on Track	
Time: 12:52 WP#: 45 Lat: 30.301212 Long:	-80.56538
Vertical Angle: <u>1</u> Horizontal Bearing in Degrees: <u>90</u> Sighting C	Cue: Body
On/Off Effort: On Trackline: 6 Beaufort Sea Stat	te:
Observer: Erin Observer side: Right	
Actual Time and Position of Sighting	
Time: 13:02 WP#: 46 Lat: 30.308654 Long: -	-80.56802
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best):	1/1/1
Features used in Species ID: No images collected	
Representative images used for Species ID: <u>No images collected</u>	
Photographer: Erin Frame numbers: NA Spacer:	NA
Calculated distance from Trackline: 0.86 km	
Final Time and Position of Sighting	
	-80.57010
Calculated Distance Traveled: 0.23 km	
Behavior and Additional Comments	
Single animal that was difficult to relocate as it spent an increased amount of time subn	nerged with
only a few quick surfacings.	
Tuesday, January 24, 2012 Sighting # 4	
Initial sighting on Track	~~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~
Time: 14:47 WP#: 53 Lat: 30.371280 Long:	
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting C	
On/Off Effort: On Trackline: 7 Beaufort Sea Stat Observer: Erin Observer side: Right	te: 2
Actual Time and Position of Sighting	
	-80.66416
Species: Tursiops truncatus Numbers (Low/High/Best):	1/1/1
Features used in Species ID: Robust body appearance lighter blaze to behind dors	al fin.
More uniform grey coloration to body - no white peduncle.	
Representative images used for Species ID:6463 & 6464Photographer:ErinFrame numbers:6462 - 6468Spacer:	6469
Photographer:ErinFrame numbers:6462 - 6468Spacer:Calculated distance from Trackline:0.59 km	0409
Final Time and Position of Sighting	
•	-80.66037
Calculated Distance Traveled: 0.44 km	
Behavior and Additional Comments	
Single animal traveling at moderate pace.	
Tuesday, January 24, 2012 Sighting $\#$ 5	
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Initial sighting on Track	
Time: 14:59 WP#: 60 Lat: 30.367333 Long: -80.34124	
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Spalsh	
On/Off Effort: On Trackline: 7 Beaufort Sea State: 2	
Observer: Ryan Observer side: Left	
Actual Time and Position of Sighting	
Time:         15:01         WP#:         61         Lat:         30.369999         Long:         -80.32904	
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best): 1/1/1	
Features used in Species ID: Uniform grey coloration with robust body appearance.	
Representative images used for Species ID:6480	
Photographer: Erin Frame numbers: 6469-6483 Spacer: 6484	
Calculated distance from Trackline: 1.21 km	
Final Time and Position of Sighting	
Time: 15:04 WP#: 62 Lat: 30.37097 Long: -80.33933	
Calculated Distance Traveled: 1.0 km	
Behavior and Additional Comments	
Single animal, may have been splashing at surface before circling began.	
Single animal, may have been splasning at surface before circling began.	
Tuesday, January 24, 2012 Sighting $\#$ 6	
Initial sighting on Track	
Time: 15:17 WP#: 66 Lat: 30.363874 Long: -79.87699	
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Body	
On/Off Effort: On Trackline: 7 Beaufort Sea State: 3	
Observer: Ryan Observer side: Left	
Actual Time and Position of Sighting	
Time:         15:19         WP#:         67         Lat:         30.367066         Long:         -79.88531	
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best): 18/20/20	
Features used in Species ID: Robust body appearance, lighter grey blaze to behind dorsal fin.	
Representative images used for Species ID: 6488 & 6504	
Photographer: Frame numbers: 6485 - 6510 Spacer: 6511	
Calculated distance from Trackline: 0.87 km	
Final Time and Position of Sighting	
Time:         15:24         WP#:         68         Lat:         30.368616         Long:         -79.88122	
Calculated Distance Traveled: 0.43 km	
Calculated Distance Traveled: 0.43 km	
Behavior and Additional Comments	
Behavior and Additional Comments Two groups with nine individuals in each, both groups appear to have white peduncles. Animals	
Behavior and Additional Comments	

Tues	day, Jan	nuary 24, 2	012 Sigh	ting # 7			
Initial sighting or	n Track	K	U	C			
Time: 15:55	WP#: _	76	Lat:	30.432181	Long:	-80.64	016
Vertical Angle:	2	Horizonta	l Bearing	in Degrees:	90 Sigh	ting Cue:	Body
On/Off Effort:	On	Tra	ckline:	8	Beaufort Se	a State:	2
Observer: Erii	า	Ob	server side	e: Right			
Actual Time and	Positio	n of Sigh	ting				
Time: 15:56	WP#:	77	Lat:	30.431846	Long:_	-80.63	931
Species:Stenella from				Numbers (L			/ 4 / 4
Features used in S						ze terminatir	ng at
dorsal fin. White tip t					· · · ·		
Representative im							
Photographer:				6512 - 652	9 Spa	acer:6	530
Calculated distance	e from	Trackline	:	0.08 km			
Final Time and <b>F</b>		-	ing				
			Lat:	30.434285	Long:	-80.63	994
Calculated Distan	ce Trav	eled:	0.28	km	_		
Behavior and Ad	ditiona	l Comme	ents				
Animals just traveling	<b>j</b> .						
-			o ( o C' 1				
			12 Sign	ting $\#$ 8			
Initial sighting of			Lat	20.200604	T	00.24	-00
	WP#:		Lat:	30.299694	Long: 90 Sigh		
Vertical Angle: On/Off Effort:				6	Beaufort Se	ting Cue: _	Body 2
Observer: Eri				e: Right	Deautort Se	a State	2
				. <u>Night</u>			
Actual Time and		0	0	20.20/025	T	00.24	470
Time: <u>16:52</u>		90	Lat:				
Species:Tursiops tru Features used in S			bodyappo	Numbers (L	•		/8/8
reatures used in S	pecies			arance, light bio		uursariin.	
Representative im	ages 11s	ed for Sp	ecies ID <sup>.</sup>		6533		
Photographer:	U	Frame n		6531 - 653		acer: 6	537
Calculated distance				0.95 km	<u> </u>		
Final Time and <b>F</b>							
	WP#:	-	Lat:	20 200161	Long	00 24	042
Calculated Distan			0.51	30.309161	Long.	-80.34	943
				NIII	1		
Behavior and Ad							
Two groups with thre	ee anima	Is and one	with two ar	nimals. Travelin	g just below th	ne surface slo	owly.

Wedn			, 51 <u>5</u> 1	U			
Initial sighting							
Time: <u>9:34</u>		100		30.233385		····B·	-80.33931
Vertical Angle:				g in Degrees:		Sighting	
On/Off Effort:			Frackline:	5	Beauf	ort Sea Sta	ate:
Observer: F	Ryan	. (	Observer sid	le: Right			
Actual Time a	nd Positi	ion of Si	ighting				
Time: 9:50	WP#:		Lat:	30.196954	L	ong:	-80.33552
Species:Megapte				Numbers (			1/1
Features used in	1 Species	s ID: Lar	ge black anim	al with white p	ectoral fir	ns and a larg	ge fluke
Dennegentetisse		and for	Creation ID.		65/	11,6543	
Representative Photographer:			e numbers:	6541 - 65			· 654
Calculated dista				4.07 km	7	Spacer:	
				1.07 KIII			
Final Time and		-		20 105 171	·	_	00.0000
Time: <u>10:13</u>	WP#:		Lat:	30.195471	L	ong:	-80.36080
Calculated Dist				4 km	-		
Behavior and A							
Doing long deep o							
short duration sur	facing. Su						ace again t
						c	
	iesday, Ja	anuary 2	left the area b 5, 2012 Sigł		ias no res	urface.	
	iesday, Ja	anuary 2: <b>:k</b>	5, 2012 Sigl				-80.25761
Wedn Initial sighting Time: 10:17	esday, Ja on Trac WP#:	anuary 28 2 <b>k</b> 104	5, 2012 Sigh Lat:	nting # 2	L		
Wedn Initial sighting	esday, Ja on Trac WP#:	anuary 28 2 <b>k</b> 104 Horizo	5, 2012 Sigh Lat:	nting # 2 30.233846	L 	ong:	Cue: E
Wedn Initial sighting Time: <u>10:17</u> Vertical Angle: On/Off Effort:	esday, Ja on Trac WP#: 1	anuary 25 c <b>k</b> 104 Horizo	5, 2012 Sigf Lat: ontal Bearing	nting # 2 30.233846 g in Degrees: 5	L 	ong: Sighting	Cue: E
Wedn Initial sighting Time: <u>10:17</u> Vertical Angle: On/Off Effort: <u></u> Observer:	esday, Ja on Trac WP#: <u>1</u> On Erin	anuary 25 ck 104 Horizo 7 (	5, 2012 Sigh Lat: ontal Bearing Frackline: Observer sid	nting # 2 30.233846 g in Degrees: 5	L 	ong: Sighting	Cue: E
Wedn Initial sighting Time: <u>10:17</u> Vertical Angle: On/Off Effort:	esday, Ja on Trac WP#: <u>1</u> On Erin	anuary 25 2 <b>k</b> 104 Horizo 7 ( <b>ion of S</b> i	5, 2012 Sigh Lat: ontal Bearing Frackline: Observer sid	nting # 2 30.233846 g in Degrees: 5	L  Beauf	ong: Sighting ort Sea Sta	Cue: E
Wedn Initial sighting Time: <u>10:17</u> Vertical Angle: On/Off Effort: <u></u> Observer: <u></u> Actual Time an	esday, Ja on Trac WP#: <u>1</u> On Erin M Positi WP#:	anuary 25 2 <b>k</b> 104 Horizo 7 ( <b>ion of S</b> i	5, 2012 Sigh Lat:	nting # 2 30.233846 g in Degrees: 5 de: Left	L 90 Beauf	ong: Sighting ort Sea Sta ong:	Cue: E ate:
Wedn Initial sighting Time: 10:17 Vertical Angle: On/Off Effort: 0 Observer: 10:20 Species: Tursiops	nesday, Ja on Trac WP#: <u>1</u> On Erin nd Positi WP#: truncatus	anuary 25 ck 104 Horizo 7 ( ion of S 105	5, 2012 Sigh Lat: ontal Bearing Frackline: _ Observer sic <b>ighting</b> Lat:	nting # 2 30.233846 g in Degrees: 5 de: Left 30.232391 Numbers (	L 90 Beauf	ong: Sighting ort Sea Sta ong:	Cue: ate: -80.25426
Wedn Initial sighting Time: 10:17 Vertical Angle: On/Off Effort: 0 Observer: 0 Actual Time and Time: 10:20 Species: <i>Tursiops</i> Features used in	esday, Ja on Trac WP#: <u>1</u> On Erin md Positi WP#: truncatus n Species	anuary 25 <b>ck</b> 104 Horizo 7 ( ion of Si 105 s ID: Uni	5, 2012 Sigh Lat:	nting # 2 <u>30.233846</u> g in Degrees: <u>5</u> de: <u>Left</u> <u>30.232391</u> Numbers ( bust animals	L Beauf L Low/Hi	ong: Sighting ort Sea Sta ong: gh/Best):	Cue: ate: -80.25426
Wedn Initial sighting Time: 10:17 Vertical Angle: On/Off Effort: 0 Observer: Actual Time and Time: 10:20 Species: Tursiops Features used in Representative	nesday, Ja on Trac WP#: <u>1</u> On Erin md Positi WP#: truncatus n Species images u	anuary 25 ck 104 Horizo 7 ( ion of Si 105 s ID: <u>Uni</u> used for	5, 2012 Sigh Lat: ontal Bearing Frackline: _ Observer sic <b>ighting</b> Lat: form grey, rob	nting # 2 <u>30.233846</u> g in Degrees: <u>5</u> de: <u>Left</u> <u>30.232391</u> Numbers ( bust animals	L  L Low/Hi 	ong: Sighting ort Sea Sta ong: gh/Best): 58, 6570	Cue: ate: -80.25426 6 / 10
Wedn Initial sighting Time: 10:17 Vertical Angle: On/Off Effort: Observer: Actual Time and Time: 10:20 Species: <i>Tursiops</i> Features used in Representative Photographer:	esday, Ja on Trac WP#: <u>1</u> On Erin nd Positi WP#: truncatus n Species images u Ryan	anuary 28 ck 104 Horizo 7 ( ion of Si 105 s ID: Uni used for f	5, 2012 Sigh Lat:	nting # 2 <u>30.233846</u> g in Degrees: <u>5</u> de: <u>Left</u> <u>30.232391</u> Numbers ( <u>bust animals</u> <u>6549 - 65</u>	L  L Low/Hi 	ong: Sighting ort Sea Sta ong: gh/Best):	Cue: ate: -80.25426 6 / 10
Wedn Initial sighting Time: 10:17 Vertical Angle: On/Off Effort: Observer: Actual Time and Time: 10:20 Species: <i>Tursiops</i> Features used in Representative Photographer: Calculated dista	esday, Ja on Trac WP#: 1 On Erin nd Positi WP#: truncatus n Species images u Ryan ance from	anuary 25 ck 104 Horizo 7 ( ion of Si 105 s ID: Uni ised for Framo n Trackl	5, 2012 Sigh Lat: ontal Bearing Frackline: _ Observer sic <b>ighting</b> Lat: form grey, rob Species ID: e numbers: ine:	nting # 2 <u>30.233846</u> g in Degrees: <u>5</u> de: <u>Left</u> <u>30.232391</u> Numbers ( bust animals	L  L Low/Hi 	ong: Sighting ort Sea Sta ong: gh/Best): 58, 6570	Cue: ate: -80.25426 6 / 10
Wedn Initial sighting Time: 10:17 Vertical Angle: On/Off Effort: Observer: Actual Time and Time: 10:20 Species: <i>Tursiops</i> Features used in Representative Photographer:	nesday, Ja on Trac WP#: 1 On Erin nd Positi WP#: truncatus n Species images u Ryan ance from	anuary 25 ck 104 Horizo 7 ( ion of Si 105 s ID: Uni ised for Framo n Trackl	5, 2012 Sigh Lat: ontal Bearing Frackline: _ Observer sic <b>ighting</b> Lat: form grey, rob Species ID: e numbers: ine:	nting # 2 <u>30.233846</u> g in Degrees: <u>5</u> de: <u>Left</u> <u>30.232391</u> Numbers ( <u>bust animals</u> <u>6549 - 65</u>	L  L Low/Hi 	ong: Sighting ort Sea Sta ong: gh/Best): 58, 6570	Cue: ate: -80.25426 6 / 10
Wedn Initial sighting Time: 10:17 Vertical Angle: On/Off Effort: 0 Observer: 0 Actual Time and Time: 10:20 Species: <i>Tursiops</i> Features used in Representative Photographer: 0 Calculated dista Final Time and	esday, Ja on Trac WP#: <u>1</u> On Erin M Positi WP#: truncatus n Species images u Ryan ance fron d Positio	anuary 25 ck 104 Horizo 7 ( ion of Si 105 s ID: Uni ised for Framo n Trackl	5, 2012 Sigh Lat:	nting # 2 <u>30.233846</u> g in Degrees: <u>5</u> de: <u>Left</u> <u>30.232391</u> Numbers ( <u>bust animals</u> <u>6549 - 65</u>	L Beauf L Low/Hi 	ong: Sighting ort Sea Sta ong: gh/Best): 58, 6570	Cue: ate: -80.25426 6 / 10
Wedn Initial sighting Time: 10:17 Vertical Angle: On/Off Effort: Observer: Actual Time and Time: 10:20 Species: <i>Tursiops</i> Features used in Representative Photographer: Calculated dista	nesday, Ja on Trac WP#: 1 On Erin md Positi WP#: truncatus n Species images u Ryan ance fron d Positio WP#:	anuary 28 <b>k</b> 104 Horizo 7 <b>ion of S</b> 105 s ID: <u>Uni</u> used for Framo n Trackl <b>in of Sig</b> 106	5, 2012 Sigh	nting # 2 30.233846 g in Degrees: 5 de: Left 30.232391 Numbers ( bust animals 6549 - 65 0.36 km	L Beauf L Low/Hi 	ong: Sighting ort Sea Sta ong: gh/Best): 58, 6570 Spacer:	Cue: ate: -80.25426 6 / 10 :657
Wedn Initial sighting Time: 10:17 Vertical Angle: On/Off Effort: 0 Observer: 10:20 Species: Tursiops Features used in Representative Photographer: 0 Calculated distance Final Time and Time: 10:25 Calculated Distance	esday, Ja on Trac WP#: <u>1</u> On Erin <b>nd Positi</b> WP#: truncatus n Species images u Ryan ance fron <b>d Positio</b> WP#: ance Tra	anuary 25 <b>ck</b> 104 Horizo ion of Si 105 s ID: Uni used for Frama n Trackl n of Sig 106 veled:	5, 2012 Sigh Lat: Irackline: Observer sid ighting Lat: form grey, rok Species ID: e numbers: ine: hting Lat: 0.2	nting # 2 30.233846 g in Degrees: 5 de: Left 30.232391 Numbers ( bust animals 6549 - 65 0.36 km 30.233304	L Beauf L Low/Hi 	ong: Sighting ort Sea Sta ong: gh/Best): 58, 6570 Spacer:	Cue: ate: -80.25426 6 / 10 :657
Wedn Initial sighting Time: 10:17 Vertical Angle: On/Off Effort: Observer: Actual Time and Time: 10:20 Species: <i>Tursiops</i> Features used in Representative Photographer: Calculated dista Final Time and Time: 10:25	esday, Ja on Trac WP#: 1 On Erin nd Positi WP#: truncatus n Species images u Ryan ance fron d Positio WP#: ance Tra	anuary 28 k 104 Horizo ion of Si 105 is ID: Uni ised for Framo n Tracklin n of Sig 106 veled:	5, 2012 Sigh	nting # 2 30.233846 g in Degrees: 5 de: Left 30.232391 Numbers ( bust animals 6549 - 65 0.36 km 30.233304 5 km	L Beauf L Low/Hi 	ong: Sighting ort Sea Sta ong: gh/Best): 58, 6570 Spacer:	Cue: ate: -80.25426 6 / 10 :657
Wedn Initial sighting Time: 10:17 Vertical Angle: On/Off Effort: Observer: Actual Time and Time: 10:20 Species: <i>Tursiops</i> Features used in Representative and Photographer: Calculated dista Final Time and Time: 10:25 Calculated Dista	esday, Ja on Trac WP#: 1 On Erin nd Positi WP#: truncatus n Species images u Ryan ance fron d Positio WP#: ance Tra	anuary 28 k 104 Horizo ion of Si 105 is ID: Uni ised for Framo n Tracklin n of Sig 106 veled:	5, 2012 Sigh	nting # 2 30.233846 g in Degrees: 5 de: Left 30.232391 Numbers ( bust animals 6549 - 65 0.36 km 30.233304 5 km	L Beauf L Low/Hi 	ong: Sighting ort Sea Sta ong: gh/Best): 58, 6570 Spacer:	Cue: ate: -80.25426 6 / 10 :657
Wedn Initial sighting Time: 10:17 Vertical Angle: On/Off Effort: Observer: Actual Time and Time: 10:20 Species: <i>Tursiops</i> Features used in Representative and Photographer: Calculated dista Final Time and Time: 10:25 Calculated Dista	esday, Ja on Trac WP#: 1 On Erin nd Positi WP#: truncatus n Species images u Ryan ance fron d Positio WP#: ance Tra	anuary 28 k 104 Horizo ion of Si 105 is ID: Uni ised for Framo n Tracklin n of Sig 106 veled:	5, 2012 Sigh	nting # 2 30.233846 g in Degrees: 5 de: Left 30.232391 Numbers ( bust animals 6549 - 65 0.36 km 30.233304 5 km	L Beauf L Low/Hi 	ong: Sighting ort Sea Sta ong: gh/Best): 58, 6570 Spacer:	Cue: ate: -80.25426 6 / 10 :657

Wednesday, January 25, 2012 Sighting $\#$ 3
Initial sighting on Track
Time: 10:30 WP#: 110 Lat: 30.233482 Long: -80.067473
Vertical Angle: Horizontal Bearing in Degrees: Sighting Cue: Splash
On/Off Effort: On Trackline: 5 Beaufort Sea State: 3
Observer: Erin Observer side: Left
Actual Time and Position of Sighting
Time: 10:32 WP#: 111 Lat: 30.238935 Long: -80.070583
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best): 4/4/4
Features used in Species ID: Large robust animals with uniform grey color
Representative images used for Species ID:6589
Photographer:         Ryan         Frame numbers:         6574 - 6601         Spacer:         6602
Calculated distance from Trackline: 0.68 km
Final Time and Position of Sighting
Time: 10;38 WP#: 112 Lat: 30.231433 Long: -80.075357
Calculated Distance Traveled: 0.95 km
Behavior and Additional Comments
White peduncle, swimming just below the surface, regular surfacing, swimming in a V. 1 calf
Wednesday, January 25, 2012 Sighting # 4
Initial sighting on Track
Time:         11:25         WP#:         124         Lat:         30.366791         Long:         -80.366897
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
On/Off Effort:       On       Trackline:       7       Beaufort Sea State:       2         Observer:       Erin       Observer side:       Left
Actual Time and Position of Sighting
Time:         11:31         WP#:         125         Lat:         30.355313         Long:         -80.367444
Species: Tursiops truncatus Numbers (Low/High/Best): 2/2/2
Features used in Species ID: Robust grey bodied animals with white peduncles
Representative images used for Species ID: 6605
Photographer: Ryan Frame numbers: 6603 - 6607 Spacer: 6608
Photographer:RyanFrame numbers:6603 - 6607Spacer:6608Calculated distance from Trackline:1.28 km
Photographer:       Ryan       Frame numbers:       6603 - 6607       Spacer:       6608         Calculated distance from Trackline:       1.28 km       1.28 km       6008         Final Time and Position of Sighting       6008       6008       6008
Photographer:       Ryan       Frame numbers:       6603 - 6607       Spacer:       6608         Calculated distance from Trackline:       1.28 km       1.28 km       Final Time and Position of Sighting         Time:       11:37       WP#:       126       Lat:       30.360571       Long:       -80.378397
Photographer:       Ryan       Frame numbers:       6603 - 6607       Spacer:       6608         Calculated distance from Trackline:       1.28 km       1.28 km       6008       6008         Final Time and Position of Sighting       Time:       11:37       WP#:       126       Lat:       30.360571       Long:       -80.378397         Calculated Distance Traveled:       1.20 km       1.20 km       1.20 km       1.20 km
Photographer:       Ryan       Frame numbers:       6603 - 6607       Spacer:       6608         Calculated distance from Trackline:       1.28 km       1.28 km       6008       6008         Final Time and Position of Sighting       Time:       11:37       WP#:       126       Lat:       30.360571       Long:       -80.378397         Calculated Distance Traveled:       1.20 km       1.20 km       1.20 km       1.20 km
Photographer:       Ryan       Frame numbers:       6603 - 6607       Spacer:       6608         Calculated distance from Trackline:       1.28 km       1.28 km       Final Time and Position of Sighting         Time:       11:37       WP#:       126       Lat:       30.360571       Long:       -80.378397
Photographer:       Ryan       Frame numbers:       6603 - 6607       Spacer:       6608         Calculated distance from Trackline:       1.28 km         Final Time and Position of Sighting         Time:       11:37       WP#:       126       Lat:       30.360571       Long:       -80.378397         Calculated Distance Traveled:       1.20 km         Behavior and Additional Comments

Wednesday, Jan	uary 25, 2012 $\mathrm{Si}$	ghting # 5		
Initial sighting on Track	Ϋ́Υ.			
Time: 11:39 WP#:	129 Lat:	30.366954	Long:	-80.314845
Vertical Angle: 1	Horizontal Beari	ing in Degrees: 90	Sighting	Cue: Body
On/Off Effort: On	Trackline:	7 Bea	aufort Sea Sta	ate: <u>3</u>
Observer: Erin	Observer s	side: Left		
Actual Time and Positio	n of Sighting			
Time: 11:40 WP#:	0 0	30.370021	Long:	-80.316988
Species:Stenella frontalis		Numbers (Low)	·	
Features used in Species 1	D: Alternating lig			
Representative images us			38, 6643, 6644,	
Photographer: Ryan	Frame numbers		Spacer:	6659
Calculated distance from	Trackline:	0.40 km		
Final Time and Position	of Sighting			
Time: 11:50 WP#:	131 Lat:	30.365154	Long:	-80.319550
Calculated Distance Trav	eled:	).59 km	C	
<b>Behavior and Additiona</b>	l Comments			
Traveling fast, in a tight group				
	,			
Wednesday, Jar	nuary 25, 2012 ${ m Si}_{ m c}$	ghting # 6		
Initial sighting on Track	Σ.			
	135 Lat:	30.365913	Long:	
Vertical Angle: 2			Sighting	
On/Off Effort: On			aufort Sea Sta	ate: 2
Observer: Erin	Observer s	side: Left		
Actual Time and Positio	n of Sighting			
Time: 12:06 WP#:	136 Lat:	30.369693	Long:	-79.833103
Species:Grampus griseus		Numbers (Low,		5/5/5
Features used in Species 1	D: Large grey boc	lies with blunt, white h	eads.	
Representative images us	-		6671, 6684, 66	
Photographer: Ryan	Frame numbers		Spacer:	6697
Calculated distance from	Trackline:	0.45 km		
Final Time and Position	of Sighting			
Time: 12:20 WP#:	137 Lat:	30.383790	Long:	-79.836739
Calculated Distance Trav	eled:1	I.61 km		
<b>Behavior and Additiona</b>	l Comments			
A group of Ggr with 1 Ttr mixe		vith quick breaths on th	e surface. Spre	ad out but then
came together.		1		
<u> </u>				

Wedne	sday, Ja	nuary 2	5, 2012 S	light	ing # 7				
Initial sighting of	on Trac	k		C	C				
Time: <u>12:35</u>					_		Long:		
Vertical Angle:				-				Cue: Spla	
On/Off Effort:	On	, ,	Frackline	e:	8	Beau	fort Sea Sta	.te: 3	
Observer: Ry	van		Observer	side	Right				
Actual Time and	d Positi	on of S	ighting						
Time: 12:37	WP#:	142	Lat:		30.438325		Long:	80.293544	
Species:Stenella fr	ontalis				Numbers (L	.ow/H	ligh/Best):	40 / 55 /	52
Features used in	Species	ID: Alt	ernating li	ght a	nd dark pattern	dowr	body, white	tip to nose,	
spotting									
Representative in	nages u	sed for	Species 1	ID:	66	698, 67	704, 6707, 671	3,	
Photographer:	Ryan	Fram	e numbe	rs:	6698 - 672	5	Spacer:	6726	
Calculated distar							-		
Final Time and	Positio	n of Sig	ghting						
Time: 12:41	WP#:	143	Lat:		30.423128		Long:	-80.290206	
Calculated Distar	nce Trav	veled:		1.72	km				
Behavior and A	ddition	al Com	ments						
4+ groups with 5-7	individua	als in eac	h. 1 large g	group	o of 20+ animals	s. Each	n group is swir	nming close	e
together. Some gro	ups are t	raveling	fast while	other	rs are hardly mo	oving.			

Thursday, March 29, 2012 Sighting $\#$ 1
Initial sighting on Track
Time: 15:10 WP#: 32 Lat: 30.100599 Long: -80.447042
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
On/Off Effort: On Trackline: <u>3</u> Beaufort Sea State: <u>2</u>
Observer: Ryan Observer side: Left
Actual Time and Position of Sighting
Time:         5:10         WP#:         33         Lat:         30.096882         Long:         -80.440277
Species:Stenella frontalis         Numbers (Low/High/Best):         40 / 47 / 44
Features used in Species ID: Alternating light and dark pattern down body, spotting
Democrate time income a film Conscience ID: 0546 0556
Representative images used for Species ID:8546,8556Photographer:ErinFrame numbers:8542 - 8563Spacer:8564
Photographer:       Erin       Frame numbers:       8542 - 8563       Spacer:       8564         Calculated distance from Trackline:       0.77 km
Final Time and Position of Sighting
Time:         15:24         WP#:         34         Lat:         30.088721         Long:        80.432966
Calculated Distance Traveled: 1.15 km
Behavior and Additional Comments
2 groups of animals, one of 20+ and the other slightly smaller. Hanging at the surface.
Thursday, March 29, 2012 Sighting # 2         Initial sighting on Track         Time:       15:27       WP#:       36       Lat:       30.100505       Long:       -80.516793         Vertical Angle:       1       Horizontal Bearing in Degrees:       100       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       3       Beaufort Sea State:       2
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time:         15:28         WP#:         37         Lat:         30.101111         Long:         -80.507489
Species: Stenella frontalis Numbers (Low/High/Best): 6/6/6
Features used in Species ID: Alternating light and dark pattern down body, spotting
Representative images used for Species ID: 8567, 8571, 8576
Photographer:ErinFrame numbers:8565 - 8588Spacer:8589Calculated distance from Trackline:0.90 km
Final Time and Position of Sighting
Time:         15:31         WP#:         36         Lat:         30.100362         Long:         -80.509758
Calculated Distance Traveled: 0.23 km
Behavior and Additional Comments
Mom calf pair, moving fast, lots of jumping, spread out in pairs

ТІ	nursday, N	/larch 29, 2012 ${ m Sig}$	ghting # 3		
Initial sighting	on Tracl				
Time: <u>15:45</u>			30.031461		-80.524573
-		Horizontal Bearing			
On/Off Effort: _			2	Beaufort Sea S	tate: 2
Observer: R	yan	Observer s	ide: Left		
Actual Time ar	nd Positio	on of Sighting			
Time: 15:47	WP#:	46 Lat:	30.029672	Long:	-80.519755
Species:Stenella f			Numbers (L		
Features used in	Species	ID: Alternating ligh	t and dark patterr	n down body, spot	ting
		sed for Species ID		8591	
		Frame numbers		0 Space	r: 8601
Calculated dista	nce from	Trackline:	0.50 km		
Final Time and	Position	n of Sighting			
Time: 15:49	WP#:	47 Lat:	30.032896	Long:	-80.513971
Calculated Dista	ance Trav	veled: 0	.66 km		
Behavior and A	Additiona	al Comments			
Pair of animals on i	initial sight	ting, 3rd observed o	nce circling		
			<u> </u>		
TI	nursday, N	/larch 29, 2012 ${ m Sig}$	ghting # 4		
Initial sighting	on Tracl	k			
Time: 15:50	WP#:	42 Lat:	30.031551	Long:	-80.475763
-		Horizontal Bearing		90 Sighting	g Cue: Body
On/Off Effort:	On	Trackline:	2	Beaufort Sea S	tate: 2
Observer:	Erin	Observer s	ide: Right		
Actual Time ar	nd Positio	on of Sighting			
Time: 15:51	WP#:	50 Lat:	30.031855	Long:	-80.476396
Species:Stenella f				Low/High/Best)	
1		ID: Alternating ligh		- /	
Representative i	mages us	sed for Species ID	):	8615, 8626	
Photographer:	Erin	Frame numbers	8602 - 862	8 Space	r: 8629
Calculated dista	nce from	Trackline:	0.07 km		
Final Time and	Positior	n of Sighting			
Time: 15:54	WP#:	51 Lat:	30.026656	Long:	-80.479940
Calculated Dista	-		.67 km		
Behavior and A				-	
ivilling and circling	in a timbe	hall fact moving			
	g in a tight	ball, fast moving			

Thursday,	March 29, 2012 Sigh	iting # 5		
Initial sighting on Tra	ck	-		
Time: 15:56 WP#:	44 Lat:	30.031707	Long:80	0.441709
Vertical Angle: 2	Horizontal Bearing	g in Degrees: 60	Sighting Cu	ie: Splash
On/Off Effort: On	Trackline:		aufort Sea State	
Observer: Erin	Observer sid	e: Right		
Actual Time and Posit	ion of Sighting			
	0 0	30.029261	Long: -80	).439651
Species: Tursiops truncatus		Numbers (Low		
Features used in Species		oust animals, white p	eduncle	
1				
Representative images u	used for Species ID:	86	32, 8635, 8638	
Photographer: Erin	Frame numbers:	8630 - 8643	Spacer:	8644
Calculated distance from	n Trackline:	0.34 km		
Final Time and Positio	on of Sighting			
Time: 16:03 WP#:	55 Lat:	30.025501	Long: -80	0.430537
Calculated Distance Tra	veled: 0.9	7 km	6	
Behavior and Addition	nal Comments			
Animals spread out, singles		n initial sighting, sind	ale calf, spending i	more time
below surface		· · · · · · · · · · · · · · · · · · ·	9.e ea, op er an ig i	
Thursday,	March 29, 2012 Sigh	iting # 6		
Initial sighting on Tra-	ck			
Time: 16:17 WP#:	48 Lat:	29.964709	Long:80	0.094097
Vertical Angle: 2	Horizontal Bearing	g in Degrees: 60	Sighting Cu	ie: Splash
On/Off Effort: On	Trackline:	1 Be	aufort Sea State	: 2
Observer: Erin	Observer sid	e: Right		
Actual Time and Posit	ion of Sighting			
Time: 16:20 WP#:	60 Lat:	29.971966	Long: -80	).092957
Species:Tursiops truncatus		Numbers (Low	-	8/8/8
Features used in Species				
Representative images u	used for Species ID:		8651	
Photographer: Erin	Frame numbers:	8645 - 8655	Spacer:	8656
Calculated distance from	n Trackline:	0.81 km		
Final Time and Positio	on of Sighting			
Time: 16:20 WP#:		29.970229	Long: -80	0.001120
Calculated Distance Tra				0.091120
	veled: 0.26	5 km		0.091120
		5 km		0.091120
Behavior and Addition	al Comments	5 km		0.091120
	al Comments	ó km		0.091120
Behavior and Addition	al Comments	5 km		0.091120

Initial sighting on Trac	y, April 18, 2012 ${ m Sig}$	ginning # i		
initial signting on fra	ck	-		
	31 Lat:	29.968803	Long:	-80.375806
Vertical Angle: 2		ng in Degrees:	100 Sighting	Cue: Body
On/Off Effort: On		1	Beaufort Sea S	
Observer: Erin	Observer si	ide: Left		
Actual Time and Posit	ion of Sighting			
		29.968271	Long:	-80.382697
Species: Tursiops truncatus			ow/High/Best):	
Features used in Species				
r outdrob ubou in species	<u> </u>			
Representative images u	used for Species ID	):	8657, 8658	
Photographer: Ryan	-		59 Spacer	: 8670
Calculated distance from		0.67 km	1	
Final Time and Positio	n of Sighting			
	33 Lat:	29.972933	Long:	-80.388536
Calculated Distance Tra		76 km	Long	00.500550
			-	
Behavior and Addition				
Traveling on surface or just	below, swimming clos	se together.		
Initial sighting on Trac Time: 14:41 WP#:	45 Lat:	ghting # 2	Long:	
Vertical Angle: 2		ng in Degrees:	90 Sighting	Cue: Body
On/Off Effort: On	Trackline:	ng in Degrees:	_ 0	Cue: Body
On/Off Effort: On Observer: Erin	Trackline: Observer si	ng in Degrees:	90 Sighting	Cue: Body
On/Off Effort: On	Trackline: Observer si	ng in Degrees:	90 Sighting	Cue: Body
On/Off Effort: On Observer: Erin	Trackline: Observer si ion of Sighting	ng in Degrees: 3 ide:Left	90 Sighting	g Cue: <u>Body</u> tate: <u>3</u>
On/Off Effort: On Observer: Erin Actual Time and Posit Time: 14:42 WP#: Species: <i>Tursiops truncatus</i>	Trackline: Observer si ion of Sighting 46 Lat:	ng in Degrees: <u>3</u> ide: <u>Left</u> <u>30.102057</u> Numbers (L	90 Sighting Beaufort Sea St Long: Low/High/Best):	Cue: Body tate: 3
On/Off Effort: On Observer: Erin Actual Time and Posit Time: 14:42 WP#:	Trackline: Observer si ion of Sighting 46 Lat:	ng in Degrees: <u>3</u> ide: <u>Left</u> <u>30.102057</u> Numbers (L	90 Sighting Beaufort Sea St Long: Low/High/Best):	Cue: Body tate: 3
On/Off Effort: On Observer: Erin Actual Time and Posit Time: 14:42 WP#: Species: <i>Tursiops truncatus</i> Features used in Species	Trackline: Observer si ion of Sighting 46 Lat: s ID: <u>Uniform grey bo</u>	ng in Degrees: <u>3</u> ide: Left 30.102057 Numbers (L	90 Sighting Beaufort Sea St Long: .ow/High/Best):	Cue: Body tate: 3 -80.076377 5/10/8
On/Off Effort: On Observer: Erin Actual Time and Posit Time: 14:42 WP#: Species: <i>Tursiops truncatus</i> Features used in Species Representative images u	Trackline: Observer si ion of Sighting <u>46</u> Lat: s ID: Uniform grey bound used for Species ID	ng in Degrees: ide: 30.102057 Numbers (L ody, white pedunc 2:	90 Sighting Beaufort Sea St Long: Low/High/Best): :le	cue: Body tate: 3 -80.076377 5 / 10 / 8 690, 8700-01
On/Off Effort: On Observer: Erin Actual Time and Posit Time: 14:42 WP#: Species: Tursiops truncatus Features used in Species Representative images u Photographer: Ryan	Trackline: Observer si ion of Sighting <u>46</u> Lat: s ID: <u>Uniform grey bo</u> used for Species ID Frame numbers:	ng in Degrees:	90 Sighting Beaufort Sea St Long: Low/High/Best): :le	cue: Body tate: 3 -80.076377 5 / 10 / 8 690, 8700-01
On/Off Effort: On Observer: Erin Actual Time and Posit Time: 14:42 WP#: Species: <i>Tursiops truncatus</i> Features used in Species Representative images u	Trackline: Observer si ion of Sighting <u>46</u> Lat: s ID: <u>Uniform grey bo</u> used for Species ID Frame numbers:	ng in Degrees: ide: 30.102057 Numbers (L ody, white pedunc 2:	90 Sighting Beaufort Sea St Long: Low/High/Best): :le	cue: Body tate: 3 -80.076377 5 / 10 / 8 690, 8700-01
On/Off Effort: On Observer: Erin Actual Time and Posit Time: 14:42 WP#: Species: Tursiops truncatus Features used in Species Representative images u Photographer: Ryan	Trackline: Observer si ion of Sighting 46 Lat: s ID: Uniform grey bo used for Species ID Frame numbers: n Trackline:	ng in Degrees:	90 Sighting Beaufort Sea St Long: Low/High/Best): :le	cue: Body tate: 3 -80.076377 5 / 10 / 8 690, 8700-01
On/Off Effort: On Observer: Erin Actual Time and Posit Time: 14:42 WP#: Species: <i>Tursiops truncatus</i> Features used in Species Representative images u Photographer: Ryan Calculated distance from Final Time and Positio	Trackline: Observer si ion of Sighting 46 Lat: s ID: Uniform grey bo used for Species ID Frame numbers: n Trackline:	ng in Degrees:	90 Sighting Beaufort Sea St Long: Low/High/Best): :le	cue: Body tate: 3 -80.076377 5 / 10 / 8 690, 8700-01
On/Off Effort: On Observer: Erin Actual Time and Posit Time: 14:42 WP#: Species: <i>Tursiops truncatus</i> Features used in Species Representative images u Photographer: Ryan Calculated distance from Final Time and Positio	Trackline: Observer si ion of Sighting 46 Lat: s ID: Uniform grey bound used for Species ID Frame numbers: n Trackline: on of Sighting	ng in Degrees: <u>3</u> ide: Left <u>30.102057</u> Numbers (L ody, white pedunc <u>8673-74, 86</u> <u>8671 to 870</u> 0.59 km	90 Sighting Beaufort Sea St Long:	cue: Body tate: 3 -80.076377 5 / 10 / 8 690, 8700-01 :: 8704
On/Off Effort: On Observer: Erin Actual Time and Posit Time: 14:42 WP#: Species: <i>Tursiops truncatus</i> Features used in Species Representative images u Photographer: Ryan Calculated distance from Final Time and Position Time: 14:52 WP#: Calculated Distance Tra	Trackline:         Observer si         ion of Sighting         46       Lat:         s ID:       Uniform grey box         used for Species ID         Frame numbers:         n Trackline:         on of Sighting         47         Lat:         uveled:         1.	ng in Degrees:	90 Sighting Beaufort Sea St Long:	cue: Body tate: 3 -80.076377 5 / 10 / 8 690, 8700-01 :: 8704
On/Off Effort: On Observer: Erin Actual Time and Posit Time: 14:42 WP#: Species: <i>Tursiops truncatus</i> Features used in Species Representative images u Photographer: Ryan Calculated distance from Final Time and Positio Time: 14:52 WP#: Calculated Distance Tra Behavior and Addition	Trackline: Observer si ion of Sighting 46 Lat: s ID: Uniform grey bound used for Species ID Frame numbers: m Trackline: on of Sighting 47 Lat: nveled: <u>1.</u>	ng in Degrees:	90 Sighting Beaufort Sea St Long: Low/High/Best): :le 676-77, 8682-83, 8 03 Spacer	<pre>cue: Body tate: 3 -80.076377 5 / 10 / 8 690, 8700-01 :: 8704 -80.072746</pre>
On/Off Effort: On Observer: Erin Actual Time and Posit Time: 14:42 WP#: Species: <i>Tursiops truncatus</i> Features used in Species Representative images u Photographer: Ryan Calculated distance from Final Time and Position Time: 14:52 WP#: Calculated Distance Tra	Trackline: Observer si ion of Sighting 46 Lat: s ID: Uniform grey bound used for Species ID Frame numbers: m Trackline: on of Sighting 47 Lat: nveled: <u>1.</u>	ng in Degrees:	90 Sighting Beaufort Sea St Long: Low/High/Best): :le 676-77, 8682-83, 8 03 Spacer	<pre>cue: Body tate: 3 -80.076377 5 / 10 / 8 690, 8700-01 :: 8704 -80.072746</pre>

We	dnesday	, April 18	3, 2012 <mark>S</mark>	ight	ing # 3				
Initial sighting	on Trac	k		Ū	C				
Time: 15:21	WP#:	51	Lat:		30.166573		Long:	-80.40	2430
Vertical Angle:	2	Horizo	ntal Bea	ring	in Degrees:	90	Sighting	Cue:	Body
On/Off Effort:	On	]	Frackline	:	4	Beau	fort Sea Sta	ate:	2
Observer: Ry	/an	(	Observer	· side	: Right				
Actual Time an	d Positi	on of Si	ighting						
Time: 15:23	WP#:	52	Lat:		30.173850		Long:	-80.40	1034
Species:Stenella fr	ontalis				Numbers (L	.ow/E	High/Best):	35 /	60 / 50
Features used in	Species	ID: Alte	ernating li	ght ai	nd dark pattern	n dowr	n body, white	tip to r	ostrum
Spotting across ani	mals bod	у.							
Representative in	nages u	sed for	Species 1	ID:		87	11 & 8740		
Photographer:	Ryan	Frame	e numbe	rs:	8705 to 875	57	_ Spacer:	8	3758
Calculated distar	nce from	n Trackl	ine:		0.82 km				
Final Time and	Positio	n of Sig	hting						
Time: 15:27	WP#:	53	Lat:		30.176140		Long:	-80.40	8881
Calculated Dista	nce Trav	veled:		0.80	km				
Behavior and A	ddition	al Com	ments						
Lots of splashing ar	nd circling	g, jumpin	g followe	d by f	ast travel. Grou	up hea	ding southea	ast.	

	eanesaay	, April 18	3, 2012 Sig	hting # 1			
Initial sighting	on Trac	k					
Time: <u>9:32</u>	WP#:	9	Lat:	30.032204	Lo	ong:	-80.263339
Vertical Angle:	2	Horizon	ntal Bearin	g in Degrees:		Sighting	Cue: Spla
On/Off Effort:	On	Т	rackline:	2	Beaufo	rt Sea St	ate: <u>3</u>
Observer: E	rin	0	Observer si	de: Right			
Actual Time an	d Positi	on of Si	ghting				
Time: 9:34			• •	30.032347	Lo	ong:	-80.262068
Species:Tursiops t	runcatus			Numbers (	Low/Hig	gh/Best):	25 / 32 / 2
Features used in	Species	ID: Rob	ust body app	pearance, unifor	m grey co	loration	
Representative in						769	
Photographer:					31	Spacer	8782
Calculated distant	nce from	n Trackli	ine:	0.12 km			
Final Time and	Positio	n of Sig	hting				
Time: 9:41	WP#:	11	Lat:	30.034963	Lo	ong:	-80.258055
Calculated Dista	ince Trav	veled:	0.4	18 km			
Behavior and A	ddition	al Com	ments				
Splashing at the su	rface. Mu	ultiple aro	ups of 4-5 st	retched out in a	line. Afte	r initial sig	hting of a sp
				1			
Initial sighting	on Trac	k		hting # 2			
Initial sighting Time: 11:31	on Trac WP#:	2 <b>k</b> 31	Lat:	30.299254		<u> </u>	-80.366984
Initial sighting Time: <u>11:31</u> Vertical Angle:	on Trac WP#: 3	k <u>31</u> Horizon	Lat: ntal Bearin	30.299254 g in Degrees:	90	Sighting	Cue: Bo
Initial sighting Time: <u>11:31</u> Vertical Angle: _ On/Off Effort: _	on Trac WP#: <u>3</u> On	e <b>k</b> <u>31</u> Horizon T	Lat: ntal Bearin Trackline: _	30.299254 g in Degrees: 6	90	<u> </u>	Cue: Bo
Initial sighting Time: <u>11:31</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>E</u>	on Trac WP#: <u>3</u> On Erin	e <b>k</b> <u>31</u> Horizon T C	Lat: ntal Bearin Trackline: Observer sig	30.299254 g in Degrees: 6	90	Sighting	Cue: Bo
Initial sighting Time: <u>11:31</u> Vertical Angle: On/Off Effort: <u></u> Observer: <u>E</u> Actual Time an	on Trac WP#: <u>3</u> On rin	e <b>k</b> <u>31</u> Horizon T C	Lat: ntal Bearin Trackline: Observer sig	30.299254 g in Degrees: 6	90	Sighting	Cue: Bo
Initial sightingTime:11:31Vertical Angle:]On/Off Effort:_Observer:EActual Time anTime:11:33	on Trac WP#: <u>3</u> On crin d Positi WP#:	e <b>k</b> <u>31</u> Horizon T C	Lat: ntal Bearin Trackline: Observer sig	30.299254 g in Degrees: 6 de: Right 30.310782	90 Beaufo	Sighting ort Sea St	Cue: <u>Bo</u> ate: <u>2</u> -80.369910
Initial sighting Time: <u>11:31</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time an Time: <u>11:33</u> Species: Stenella fi	on Trac WP#: <u>3</u> On trin d Positi WP#: rontalis	k <u>31</u> Horizon T C ion of Si <u>32</u>	Lat:	<u>30.299254</u> g in Degrees: <u>6</u> de: <u>Right</u> <u>30.310782</u> Numbers (1	90 Beaufo Low/Hig	Sighting ort Sea Sta ong: gh/Best):	Cue: <u>Bo</u> ate: <u>2</u> -80.369910
Initial sighting Time: <u>11:31</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time an Time: <u>11:33</u> Species: Stenella fr Features used in	on Trac WP#: <u>3</u> On Erin d Positi WP#: Species	k <u>31</u> Horizon T C ion of Si <u>32</u> ID: <u>Alte</u>	Lat:	<u>30.299254</u> g in Degrees: <u>6</u> de: <u>Right</u> <u>30.310782</u> Numbers (1	90 Beaufo Low/Hig	Sighting ort Sea Sta ong: gh/Best):	Cue: <u>Bo</u> ate: <u>2</u> -80.369910 16/22/2
Initial sighting Time: 11:31 Vertical Angle: 0n/Off Effort: 0 Observer: E Actual Time an Time: 11:33 Species: Stenella fr Features used in across animals. Wh	on Trac WP#: <u>3</u> On irin d Positi WP#: rontalis Species ite tip to	k <u>31</u> Horizon T C on of Si <u>32</u> ID: <u>Alte</u> rostrum.	Lat:	30.299254 g in Degrees: 6 de: <u>Right</u> 30.310782 Numbers (2 and dark colora	90 Beaufo Low/Hig tion on bo	Sighting ort Sea Sta ong: gh/Best): ody with v	Cue: <u>Bo</u> ate: <u>2</u> -80.369910 16/22/2
Initial sighting Time: 11:31 Vertical Angle: 0n/Off Effort: 0 Observer: E Actual Time an Time: 11:33 Species: Stenella fr Features used in across animals. Wh Representative in	on Trac WP#: <u>3</u> On trin on <b>d Positi</b> WP#: Species ite tip to mages u	k <u>31</u> Horizon T C on of Si <u>32</u> ID: <u>Alte</u> rostrum. sed for S	Lat:	<u>30.299254</u> g in Degrees: <u>6</u> de: <u>Right</u> <u>30.310782</u> Numbers ( and dark colora	90 Beaufo Low/Hig tion on bo	Sighting ort Sea Sta ong: gh/Best): ody with v	Cue: <u>Bo</u> ate: <u>2</u> -80.369910 <u>16/22/</u> ariable spott
Initial sighting Time: <u>11:31</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time an Time: <u>11:33</u> Species: <i>Stenella fr</i> Features used in across animals. Wh Representative in Photographer: <u></u>	on Trac WP#: <u>3</u> On Erin d Positi WP#: Species ite tip to p mages u Erin	k <u>31</u> Horizon T C on of Si <u>32</u> ID: <u>Alte</u> rostrum. sed for S Frame	Lat:	30.299254 g in Degrees: 6 de: <u>Right</u> 30.310782 Numbers (1 and dark colora 8783 - 88	90 Beaufo Low/Hig tion on bo	Sighting ort Sea Sta ong: gh/Best): ody with v	Cue: <u>Bo</u> ate: <u>2</u> -80.369910 <u>16/22/</u> ariable spott
Initial sighting Time: <u>11:31</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time an Time: <u>11:33</u> Species: <i>Stenella fr</i> Features used in <u>across animals. Wh</u> Representative in Photographer: <u>0</u> Calculated distan	on Trac WP#: <u>3</u> On Erin <b>d Positi</b> WP#: Species ite tip to p mages u Erin nce from	k <u>31</u> Horizon T C on of Si <u>32</u> iD: <u>Alte</u> rostrum. sed for S Frame n Trackli	Lat:	<u>30.299254</u> g in Degrees: <u>6</u> de: <u>Right</u> <u>30.310782</u> Numbers ( and dark colora	90 Beaufo Low/Hig tion on bo	Sighting ort Sea Sta ong: gh/Best): ody with v	Cue: <u>Bo</u> ate: <u>2</u> -80.369910 <u>16/22/</u> ariable spott
Initial sighting Time: <u>11:31</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time an Time: <u>11:33</u> Species: <i>Stenella fi</i> Features used in across animals. Wh Representative in Photographer: <u>Calculated distan</u> Final Time and	on Trac WP#: <u>3</u> On erin <b>d Positi</b> WP#: rontalis Species ite tip to p mages u Erin nce from	k <u>31</u> Horizon T C <b>ion of Si</b> <u>32</u> ID: <u>Alte</u> rostrum. sed for S France n Tracklin <b>n of Sig</b>	Lat:	<u>30.299254</u> g in Degrees: <u>6</u> de: <u>Right</u> <u>30.310782</u> Numbers (1 and dark colora <u>8783 - 88</u> <u>1.31 km</u>	90 Beaufo Low/Hig tion on bo 8785 03	Sighting ort Sea Sta ong: gh/Best): ody with v 5 & 8793 Spacer:	Cue: <u>Bo</u> ate: <u>2</u> -80.369910 <u>16 / 22 / 2</u> ariable spott : <u>8803</u>
Initial sighting Time: 11:31 Vertical Angle: 0n/Off Effort: 0 Observer: E Actual Time an Time: 11:33 Species: Stenella fr Features used in across animals. Wh Representative in Photographer: 0 Calculated distant Final Time and Time: 11:37	on Trac WP#: <u>3</u> On irin on <b>d Positi</b> WP#: vontalis Species ite tip to the mages u Erin nce from <b>Positio</b> WP#:	k <u>31</u> Horizon T C on of Si <u>32</u> 1D: <u>Alte</u> rostrum. sed for S Frame n Trackli n of Sig <u>33</u>	Lat:	30.299254 g in Degrees: 6 de: Right 30.310782 Numbers (1 and dark colora and dark colora 1.31 km 30.305201	90 Beaufo Low/Hig tion on bo 8785 03	Sighting ort Sea Sta ong: gh/Best): ody with v	Cue: <u>Bo</u> ate: <u>2</u> -80.369910 <u>16/22/</u> ariable spott
Initial sighting Time: <u>11:31</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time an Time: <u>11:33</u> Species: <i>Stenella fi</i> Features used in <u>across animals. Wh</u> Representative in Photographer: <u>0</u> Calculated distant Final Time and Time: <u>11:37</u> Calculated Distant	on Trac WP#: <u>3</u> On erin <b>d Positi</b> WP#: rontalis Species ite tip to mages u Erin nce from <b>Positio</b> WP#:	k 31 Horizon T C on of Si 32 ID: Alter rostrum. sed for S France Tracklin n of Sig 33 veled:	Lat:	<u>30.299254</u> g in Degrees: <u>6</u> de: <u>Right</u> <u>30.310782</u> Numbers (1 and dark colora <u>8783 - 88</u> <u>1.31 km</u>	90 Beaufo Low/Hig tion on bo 8785 03	Sighting ort Sea Sta ong: gh/Best): ody with v 5 & 8793 Spacer:	Cue: <u>Bo</u> ate: <u>2</u> -80.369910 <u>16 / 22 / 2</u> ariable spott : <u>8803</u>
Initial sighting Time: <u>11:31</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time an Time: <u>11:33</u> Species: <i>Stenella fr</i> Features used in across animals. Wh Representative in Photographer: <u>0</u> Calculated distant Final Time and Time: <u>11:37</u> Calculated Distant Behavior and A	on Trac WP#: <u>3</u> On erin d Positi WP#: Species ite tip to mages u Erin nce from <b>Positio</b> WP#: unce Trav	k 31 Horizon T C on of Si 32 ID: Alte rostrum. sed for S Frame n Trackli n of Sig 33 veled:	Lat:	30.299254 g in Degrees: 6 de: Right 30.310782 Numbers (1 and dark colora and dark colora 1.31 km 30.305201	90 Beaufo Low/Hig tion on bo 8785 03	Sighting ort Sea Sta ong: gh/Best): ody with v 5 & 8793 Spacer:	Cue: <u>Bo</u> ate: <u>2</u> -80.369910 <u>16 / 22 / 3</u> ariable spott : <u>8803</u>
Initial sighting Time: <u>11:31</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time an Time: <u>11:33</u> Species: <i>Stenella fi</i> Features used in <u>across animals. Wh</u> Representative in Photographer: <u>0</u> Calculated distant Final Time and Time: <u>11:37</u> Calculated Distant	on Trac WP#: <u>3</u> On erin d Positi WP#: Species ite tip to mages u Erin nce from <b>Positio</b> WP#: unce Trav	k 31 Horizon T C on of Si 32 ID: Alte rostrum. sed for S Frame n Trackli n of Sig 33 veled:	Lat:	30.299254 g in Degrees: 6 de: Right 30.310782 Numbers (1 and dark colora and dark colora 1.31 km 30.305201	90 Beaufo Low/Hig tion on bo 8785 03	Sighting ort Sea Sta ong: gh/Best): ody with v 5 & 8793 Spacer:	Cue: <u>Bo</u> ate: <u>2</u> -80.369910 <u>16 / 22 / 3</u> ariable spott : <u>8803</u>
Initial sighting Time: <u>11:31</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time an Time: <u>11:33</u> Species: <i>Stenella fr</i> Features used in across animals. Wh Representative in Photographer: <u>0</u> Calculated distant Final Time and Time: <u>11:37</u> Calculated Distant Behavior and A	on Trac WP#: <u>3</u> On erin d Positi WP#: Species ite tip to mages u Erin nce from <b>Positio</b> WP#: unce Trav	k 31 Horizon T C on of Si 32 ID: Alte rostrum. sed for S Frame n Trackli n of Sig 33 veled:	Lat:	30.299254 g in Degrees: 6 de: Right 30.310782 Numbers (1 and dark colora and dark colora 1.31 km 30.305201	90 Beaufo Low/Hig tion on bo 8785 03	Sighting ort Sea Sta ong: gh/Best): ody with v 5 & 8793 Spacer:	Cue: <u>Bo</u> ate: <u>2</u> -80.369910 <u>16 / 22 / 2</u> ariable spott : <u>8803</u>
Initial sighting Time: <u>11:31</u> Vertical Angle: <u>0</u> On/Off Effort: <u>0</u> Observer: <u>E</u> Actual Time an Time: <u>11:33</u> Species: <i>Stenella fr</i> Features used in across animals. Wh Representative in Photographer: <u>0</u> Calculated distant Final Time and Time: <u>11:37</u> Calculated Distant Behavior and A	on Trac WP#: <u>3</u> On erin d Positi WP#: Species ite tip to mages u Erin nce from <b>Positio</b> WP#: unce Trav	k 31 Horizon T C on of Si 32 ID: Alte rostrum. sed for S Frame n Trackli n of Sig 33 veled:	Lat:	30.299254 g in Degrees: 6 de: Right 30.310782 Numbers (1 and dark colora and dark colora 1.31 km 30.305201	90 Beaufo Low/Hig tion on bo 8785 03	Sighting ort Sea Sta ong: gh/Best): ody with v 5 & 8793 Spacer:	Cue: <u>Bo</u> ate: <u>2</u> -80.369910 <u>16 / 22 / 2</u> ariable spott : <u>8803</u>

Т	hursday,	April 19,	2012 S	ighti	ng# 3				
Initial sighting of	on Track	K		C	C				
Time: 14:54	WP#:	62	Lat:	1	0.567918	L	ong:	-80.51	5678
Vertical Angle:	2	Horizon	tal Bea	ring i	n Degrees:	90	Sighting	g Cue:	Body
On/Off Effort:	On	Tı	ackline	:	2	Beauf	ort Sea S	tate:	10
Observer: E	rin	0	bserver	side:	Right				
Actual Time and	d Positio	on of Sig	hting						
Time: 14:56	WP#: _	63	Lat:	3	0.573341	L	ong:	-80.520	)768
Species:Stenella fr					Numbers (L		gh/Best):	34 /	40/38
Features used in	Species 1	D: Alter	nating lie	ght an	d dark colorat	ion alor	ng body wi	th varia	ble
spotting across indi	viduals. V	Vhite tip t	o rostrui	m.					
Representative in	nages us	ed for S	pecies l	[D:	4	699, 47	00, 8810, 8	821	
Photographer:	Erin	Frame	number	rs: 46	98-4700 & 880	04-8832	Spacer	r: 8	3833
Calculated distar	ice from	Tracklir	ne:	C	).71 km				
Final Time and	Position	of Sigh	ting						
Time: 14:59	WP#:	64	Lat:		30.569479	L	ong:	-80.52	1251
Calculated Dista	nce Trav	eled:		0.43 k	m				
Behavior and A	dditiona	l Comn	nents						
Large group traveli	ng below t	the surfac	e.						

We	dnesday	/, May 16,	2012 Sigl	nting $\#$ 1				
Initial sighting of	on Trac	:k	C	C				
Time: 8:55	WP#:	5	Lat:	30.566904		Long:	-80.22	9653
Vertical Angle:	2	Horizon	tal Bearing	g in Degrees:	90	Sightin	g Cue:	Splash
On/Off Effort:	On	T	rackline:	10	Beau	fort Sea S	State:	2
Observer: Ry	an	0	bserver sid	le: Left				
Actual Time and	d Positi	on of Sig	ghting					
Time: 8:57	WP#:	6	Lat:	30.570136	]	Long:	-80.23	0107
Species:Stenella fro				Numbers (				/ 40 / 37
Features used in				um, light blaze	to dorsa	al fin, spott	ting patte	ern
observed inside ligh						7 0 22		
Representative in			-	1 to 24		7 & 23	~~	25
Photographer: Calculated distan			numbers:	0.36 km	r	_ Space	er:	23
				0.30 km				
Final Time and		-	•	20 5 60 4 4 4			00.07	1221
Time: <u>9:02</u> Calculated Distar		<u>7</u>	Lat:	30.569444 1 km		Long:	-80.23	3321
					-			
Behavior and A								
Moderate sized gro								
with other member	s of the <u>c</u>	group. Sub	o groups of 6	-7 animals apar	rt from r	nain group	o. Group	spent
lots of time submer	ged with	infrequen	it surfacings.					
We Initial sighting o			, 2012 Sigł	nting # 2				
Time: 9:46	WP#:		Lat:	30.431462	1	Long:	-80.63	4551
Vertical Angle:	2		tal Bearing	g in Degrees:		U	ng Cue:	Body
On/Off Effort:	On		rackline:			fort Sea S	-	3
Observer: Ry	'an	0	bserver sid	le: Left				
Actual Time and	d Positi	on of Sig	ghting					
Time: 9:48			0	30 430951	1	long.	-80.63	5714
Species:Stenella fro				Numbers (				/8/7
Features used in		ID: Whit	e tip to rostr	,		- /	·	
	1		•			·		
Representative in	nages u	sed for S	pecies ID:			37		
Photographer:	Erin	Frame	numbers:	26 to 38	8	Space	er:	39
Calculated distan	ce from	n Trackli	ne:	0.13 km				
Final Time and	Positio	n of Sigh	nting					
Time: 9:56	WP#:	-	Lat:	30.437549	]	Long:	-80.65	1385
Calculated Dista				7 km		0		
Behavior and A								
Small dense group i				elly un swimmi	na Gro	uns hehav	ior was o	lusive
staying below the s					ng. 010	aps bendy	101 100 005 0	
staying sclow the s			and encount					

We	dnesday	/, May 16	6, 2012 <mark>S</mark>	ight	ting # 3				
Initial sighting o	n Trac	k		Ū	C				
Time: 10:01	WP#:	19	Lat:		30.434139		Long:	-80.44	45756
Vertical Angle:	2	Horizo	ntal Bea	ring	in Degrees:	100	Sighting	g Cue:	Spalsh
On/Off Effort:	On	]	Frackline	:	3	Beau	fort Sea S	tate:	8
Observer: Er	in	(	Observer	side	e: Right				
Actual Time and	l Positi	on of S	ighting						
Time: 10:08	WP#:	20	Lat:		30.419954		Long:	-80.44	14755
Species:Stenella fro	ontalis		_		Numbers (L	.ow/F	High/Best):	14	/ 16 / 15
Features used in S	Species	ID: Wh	ite rostrun	n tip,	alternating ligh	nt and	dark colorat	tion alo	ng body
highly spotted acros	ss body.								
Representative in	nages u	sed for	Species I	D:		4	7,65 &68		
Photographer:	Erin	Fram	e number	rs: _	40 to 70		_ Space	r:	71
Calculated distan	ce from	n Trackl	ine:		1.58 km				
Final Time and	Positio	n of Sig	hting						
Time: 10:14	WP#:	21	Lat:		30.423226		Long:	-80.4	54834
Calculated Distar	nce Tra	veled:		1.03	km				
Behavior and A	ddition	al Com	ments						
One group of nine p	lus a sub	group c	of five to size	x ani	mals. Groups m	noving	gquickly at t	he surfa	ace.

	Thursday	, May 17, 2	2012 Sigl	hting # 1		
Initial sighting	on Trac	k	-	-		
Time: <u>9:05</u>	WP#:	5	Lat:	30.231632	Long:	-80.465393
Vertical Angle:	1	Horizonta	al Bearing	g in Degrees:	90 Sighting	Cue: Body
On/Off Effort:		Tra	ckline:	5	Beaufort Sea St	ate: <u>1</u>
Observer:	Erin	Ob	server sic	de: Right	_	
Actual Time ar	nd Positi	on of Sigh	iting			
Time: 9:08	WP#:	6	Lat:	30.226719	Long:	-80.469996
Species:Stenella f					.ow/High/Best):	
		ID: Alterna	ating light	and dark pattern	down the body, w	hite tip on
rostrum. Spotting.			-			-
Representative					5, 18, 25, 30, 43, 48	
Photographer:					Spacer	: 70
Calculated dista				0.70 km		
Final Time and		U	U			
Time: 9:20		7			Long:	-80.474462
Calculated Dista	ance Trav	veled:	1.3	5 km		
Behavior and A	Addition	al Comme	ents			
Slow travel at the s	surface, reg	gular surfaci	ng. Some	deeper dives. Sub	ogroup of 4	
Initial sighting Time: <u>10:11</u> Vertical Angle: On/Off Effort: <u></u> Observer: <u>F</u> Actual Time an	on Trac WP#: 2 On Iyan	k <u>21</u> Horizonta Tra Ob	Lat: al Bearing ckline: server sid		Long: 90 Sighting Beaufort Sea St	Cue: Body
		0	0			
		0	0		Long:	
Species:Stenella	rontalis	22	Lat:	Numbers (L	.ow/High/Best):	22/29/28
Species:Stenella Features used in	rontalis	22	Lat:	Numbers (L		22/29/28
Species:Stenella Features used in rostrum. Spotting	rontalis Species	22 ID: <u>Alterna</u>	Lat:	Numbers (L and dark colorat	ow/High/Best): ion down body, wh	22/29/28
Species:Stenellat Features used in rostrum. Spotting Representative	rontalis Species mages u	22 ID: <u>Alterna</u> sed for Sp	Lat:	Numbers (L and dark colorat	ow/High/Best): ion down body, wh	22/29/28 hite tip on
Species: Stenella i Features used ir rostrum. Spotting Representative i Photographer:	rontalis Species mages us Ryan	22 ID: Alterna sed for Sp Frame n	Lat:	Numbers (L and dark colorat	ow/High/Best): ion down body, wh	22/29/28 hite tip on
Species: Stenella i Features used in rostrum. Spotting Representative i Photographer: _ Calculated dista	rontalis Species mages us Ryan nce from	22 ID: <u>Alterna</u> sed for Sp Frame n Trackline	Lat: ating light ecies ID: umbers: e:	Numbers (L and dark colorat	ow/High/Best): ion down body, wh	22/29/28 hite tip on
Species: Stenella i Features used in rostrum. Spotting Representative i Photographer: Calculated dista Final Time and	irontalis Species mages u: Ryan nce from	22 ID: <u>Alterna</u> Sed for Sp Frame n Trackline <b>n of Sight</b>	Lat: ating light ecies ID: umbers: e: ing	Numbers (L and dark colorat 71 to 107 0.90 km	ow/High/Best): ion down body, wł 79, 97 Spacer	22/29/28 nite tip on . 108
Species: Stenella i Features used in rostrum. Spotting Representative i Photographer: _ Calculated dista Final Time and Time:10:19	irontalis Species mages us Ryan nce from <b>I Position</b> WP#:	22 ID: <u>Alterna</u> sed for Sp Frame n Trackline <b>n of Sight</b> 23	Lat: ecies ID: umbers: e: ing Lat:	Numbers (L and dark colorati 71 to 107 0.90 km 30.356256	ow/High/Best): ion down body, wh	22/29/28 hite tip on . 108
Species: Stenella i Features used in rostrum. Spotting Representative i Photographer: Calculated dista Final Time and Time:10:19 Calculated Dista	irontalis Species mages us Ryan nce from <b>I Position</b> WP#: ance Trav	22 ID: <u>Alterna</u> sed for Sp Frame n Trackline <b>n of Sight</b> 23 veled:	Lat: ecies ID: umbers: j e: ing Lat: 0.5	Numbers (L and dark colorat 71 to 107 0.90 km	ow/High/Best): ion down body, wł 79, 97 Spacer	22/29/28 hite tip on . 108
Species: Stenella i Features used in rostrum. Spotting Representative i Photographer: Calculated dista Final Time and Time:10:19 Calculated Dista Behavior and A	irontalis Species mages us <u>Ryan</u> nce from <b>I Position</b> WP#: ance Trav	22 ID: Alterna sed for Sp Frame n Trackline n of Sight 23 veled: al Commo	Lat: ecies ID: umbers: e: ing Lat: 0.5 ents	Numbers (L and dark colorat 71 to 107 0.90 km 30.356256 66 km	ow/High/Best): ion down body, wh 79, 97 Spacer	22/29/28 nite tip on . 108 -80.587949
Species: Stenella i Features used in rostrum. Spotting Representative i Photographer: Calculated dista Final Time and Time:10:19 Calculated Dista Behavior and A	irontalis Species mages us <u>Ryan</u> nce from <b>I Position</b> WP#: ance Trav	22 ID: Alterna sed for Sp Frame n Trackline n of Sight 23 veled: al Commo	Lat: ecies ID: umbers: e: ing Lat: 0.5 ents	Numbers (L and dark colorat 71 to 107 0.90 km 30.356256 66 km	ow/High/Best): ion down body, wh 79, 97 Spacer	22/29/28 hite tip on . 108

Thursday, May 17, 2012 Sighting $\#$ 3
Initial sighting on Track
Time: 10:37 WP#: 27 Lat: 30.363616 Long: -79.977440
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Blow
On/Off Effort: On Trackline: 7 Beaufort Sea State: 3
Observer: Ryan Observer side: Right
Actual Time and Position of Sighting
Time:         10:38         WP#:         28         Lat:         30.358238         Long:         -79.981219
Species:Globicephala macrorhynchus       Numbers (Low/High/Best): 2/2/2
Features used in Species ID: Dark grey to black robust body with a blunt head
Representative images used for Species ID:NA
Photographer: <u>Ryan</u> Frame numbers: <u>NA</u> Spacer: <u>NA</u>
Calculated distance from Trackline: 0.70 km
Final Time and Position of Sighting
Time:         10:51         WP#:         29         Lat:         30.354204         Long:         -79.970525
Calculated Distance Traveled: 1.12 km
Behavior and Additional Comments
No photos, assumed last location.
Thursday, May 17, 2012 Sighting # 4 Initial sighting on Track Time: 10:59 WP#: 32 Lat: <u>30.406022</u> Long: <u>-79.784975</u>
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Blow
On/Off Effort: Off Trackline: 6 & 7 Beaufort Sea State: 3
Observer: Ryan Observer side: Right
Actual Time and Position of Sighting
Time:         11:00         WP#:         33         Lat:         30.399736         Long:         -79.790061
Species: <i>Globicephala macrorhynchus</i> Numbers (Low/High/Best): 2/2/2
Features used in Species ID: Dark grey to black robust body with a blunt head
Representative images used for Species ID:
Representative images used for Species ID:
Representative images used for Species ID:       113         Photographer:       Ryan       Frame numbers:       109 - 121       Spacer:       122         Calculated distance from Trackline:       0.85 km       0.85 km       100 - 121       100 - 121
Representative images used for Species ID:       113         Photographer:       Ryan       Frame numbers:       109 - 121       Spacer:       122         Calculated distance from Trackline:       0.85 km       0.85 km         Final Time and Position of Sighting       113
Representative images used for Species ID:       113         Photographer:       Ryan       Frame numbers:       109 - 121       Spacer:       122         Calculated distance from Trackline:       0.85 km       0.85 km         Final Time and Position of Sighting       113
Representative images used for Species ID:       113         Photographer:       Ryan       Frame numbers:       109 - 121       Spacer:       122         Calculated distance from Trackline:       0.85 km       0.85 km       109 - 121       Spacer:       122         Final Time and Position of Sighting       109 - 121       Long:       -79.787567         Calculated Distance Traveled:       1.08 km       1.08 km       1.08 km
Representative images used for Species ID:       113         Photographer:       Ryan       Frame numbers:       109 - 121       Spacer:       122         Calculated distance from Trackline:       0.85 km       0.85 km       100 - 121       Spacer:       122         Final Time and Position of Sighting       100 - 121       Spacer:       122       122         Time:       WP#:       34       Lat:       30.390251       Long:       -79.787567

Thurs	sday, May 17	7, 2012 Sigl	nting # 5		
Initial sighting on T	<b>`rack</b>	C	C		
Time: 14:54 W	P#: 58	Lat:	30.166547	Long:	-80.465703
Vertical Angle: 2	Horizo	ntal Bearing	g in Degrees:	100 Sighting	
On/Off Effort: On				Beaufort Sea S	
Observer: Erin	(	Observer sid	le: Left		
Actual Time and Po	osition of Si	ghting			
Time: 14:55 W	P#: 59	Lat:	30.185141	Long:	-80.468611
Species:Stenella fronta	lis		Numbers (L	ow/High/Best):	25 / 40 / 30
Features used in Spe	cies ID: <u>Alte</u>	rnating light	and dark pattern	down body, whit	e tip on rostrum
spotting					
Representative image		-		143, 147	
Photographer: Ryar		e numbers:	134 to 156	5 Space	r: 157
Calculated distance f	from Trackl	ine:	2.09 km		
Final Time and Pos	ition of Sig	hting			
Time: 15:02 W	P#: 60	Lat:	30.189904	Long:	-80.468297
Calculated Distance	Traveled:	0.5	3 km		
Behavior and Addit	tional Com	ments			
Lots of small groups spa	ced out, some	e groups milli	ng on the surface	e and some traveli	ing fast.
- · · ·			Ē		
	sday, May 17	7, 2012 Sigl	nting $\#$ 6		
Initial sighting on T		•			
	P#: <u>67</u>			_	-79.859117
Vertical Angle: <u>3</u>					
On/Off Effort: On		Trackline:		Beaufort Sea S	tate:2
Observer: Ryan	(	Jbserver sic	le: Right		
Actual Time and Po		0 0			
Time: 15:24 W	P#: 68	Lat:		Long:	
Species:Tursiops trunce			、 、	ow/High/Best):	18 / 22 / 20
Features used in Spe	cies ID: <u>Unit</u>	form grey boo	dies		
Denne contestino inco c	an una d fan (	Succion ID.	171	170 100 106 10	2 104
Representative image		-		<u>, 179, 180, 186, 19</u>	
Photographer: <u>Ryar</u> Calculated distance f		e numbers:	158 to 198	B Space	r: 199
			1.32 km		
Final Time and Pos	U	0			
	P#: 69	Lat:	30.103957	Long:	-79.853351
Calculated Distance			6 km		
Behavior and Addit	tional Com	ments			
2 Groups, milling in a ve	ry tight group	almost on to	op of each other.		

	Thursday	/, May 1	7, 2012 S	ligh	ting # 7				
Initial sighting	on Trac	k		-	-				
Time: 16:21	WP#:	82	Lat:		29.971333	L	ong:	-79.79	3833
Vertical Angle:	3	Horizo	ntal Bea	ring	in Degrees:	100	Sighting	g Cue:	Body
On/Off Effort:	Off	-	Frackline	e: 🚺	1 & 2	Beaufo	ort Sea S	tate:	1
Observer: F	lyan	(	Observei	sid	e: Right				
Actual Time ar	nd Positi	on of S	ighting						
Time: 16:22	WP#:	83	Lat:		29.971244	L	ong:	-79.79	5325
Species: Globicep									
Features used in	Species	ID: Lar	ge uniforr	n gre	ey to black anima	ls with	lighter col	ored su	spenders
and a blunt head									
Representative i	mages u	sed for	Species	ID:	200, 21	1, 213,	214, 221, 2	225, 239	)
Photographer:	Ryan	Fram	e numbe	rs:	200 to 248		Space	:	249
Calculated dista	nce from	ı Trackl	ine:		0.14 km				
Final Time and	l Positio	n of Sig	hting						
Time: 16:27	WP#:	84	Lat:		29.978218	L	ong:	-79.78	9998
Calculated Dista	ance Tra	veled:		0.93	3 km				
Behavior and A	Addition	al Com	ments						
Regular surfacing.	Traveling	just belo	w the surf	ace.	Coming up from	a deep	er dive.		

Friday, July 6, 2012 Sighting $\#$ 1
Initial sighting on Track
Time: 9:29 WP#: 7 Lat: 30.502612 Long: -79.994580
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 9 Beaufort Sea State: 3
Observer: Ryan Observer side: Right
Actual Time and Position of Sighting
Time: 9:32 WP#: 8 Lat: 30.504503 Long: -79.998388
Species: Grampus griseus Numbers (Low/High/Best): 12/20/17
Features used in Species ID: Grey bodied animals with blunt head with a cleft in the middle. Body
appears white due to scarring
Representative images used for Species ID: 12, 18, 29
Photographer:         Ryan         Frame numbers:         1 to 30         Spacer:         31
Calculated distance from Trackline: 0.42 km
Final Time and Position of Sighting
Time: 9:36 WP#: 9 Lat: 30.511965 Long: -79.997398
Calculated Distance Traveled: 0.84 km
Behavior and Additional Comments
Tight group staying just below the surface while traveling.
Friday, July 6, 2012 Sighting $\#$ 2
Friday, July 6, 2012 Sighting # 2 Initial sighting on Track
6 6
Initial sighting on Track
Initial sighting on Track           Time: 14:05         WP#: 42         Lat: 30.100675         Long: -80.199794
Initial sighting on Track         Time:       14:05       WP#:       42       Lat:       30.100675       Long:       -80.199794         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body
Initial sighting on TrackTime:14:05WP#:42Lat:30.100675Long:-80.199794Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:3Beaufort Sea State:3Observer:RyanObserver side:Right
Initial sighting on Track         Time:       14:05       WP#:       42       Lat:       30.100675       Long:       -80.199794         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       3       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right
Initial sighting on TrackTime:14:05WP#:42Lat:30.100675Long:-80.199794Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:3Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:08WP#:43Lat:30.100361Long:-80.196561
Initial sighting on TrackTime:14:05WP#:42Lat:30.100675Long:-80.199794Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:3Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingImage: State:30.100361Long:-80.196561Species:Tursiops truncatusNumbers (Low/High/Best):7/7/7
Initial sighting on TrackTime:14:05WP#:42Lat:30.100675Long:-80.199794Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:3Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:08WP#:43Lat:30.100361Long:-80.196561
Initial sighting on TrackTime:14:05WP#:42Lat:30.100675Long:-80.199794Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:3Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingImage: State:30.100361Long:-80.196561Species:Tursiops truncatusNumbers (Low/High/Best):7/7/7
Initial sighting on Track         Time:       14:05       WP#:       42       Lat:       30.100675       Long:       -80.199794         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       3       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right       Actual Time and Position of Sighting         Time:       14:08       WP#:       43       Lat:       30.100361       Long:       -80.196561         Species:       Tursiops truncatus       Numbers (Low/High/Best):       7/7/7         Features used in Species ID:       Uniform grey animals.
Initial sighting on Track         Time:       14:05       WP#:       42       Lat:       30.100675       Long:       -80.199794         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       3       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right       -         Actual Time and Position of Sighting       Time:       14:08       WP#:       43       Lat:       30.100361       Long:       -80.196561         Species: Tursiops truncatus       Numbers (Low/High/Best):       7/7/7         Features used in Species ID:       Uniform grey animals.       -         Representative images used for Species ID:       34, 37, 38
Initial sighting on Track         Time:       14:05       WP#:       42       Lat:       30.100675       Long:       -80.199794         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       3       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right       Actual Time and Position of Sighting         Time:       14:08       WP#:       43       Lat:       30.100361       Long:       -80.196561         Species:       Tursiops truncatus       Numbers (Low/High/Best):       7/7/7         Features used in Species ID:       Uniform grey animals.       34, 37, 38         Photographer:       Ryan       Frame numbers:       32 to 42       Spacer:       43         Calculated distance from Trackline:       0.31 km       0.31 km       0.31 km       0.31 km
Initial sighting on Track         Time:       14:05       WP#:       42       Lat:       30.100675       Long:       -80.199794         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       3       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right       Actual Time and Position of Sighting         Time:       14:08       WP#:       43       Lat:       30.100361       Long:       -80.196561         Species:       Tursiops truncatus       Numbers (Low/High/Best):       7/7/7         Features used in Species ID:       Uniform grey animals.
Initial sighting on TrackTime:14:05WP#:42Lat:30.100675Long:-80.199794Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:3Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:08WP#:43Lat:30.100361Long:-80.196561Species:Tursiops truncatusNumbers (Low/High/Best):7/7/7Features used in Species ID:Uniform grey animals.Representative images used for Species ID:34, 37, 38Photographer:RyanFrame numbers:32 to 42Spacer:43Calculated distance from Trackline:0.31 kmFinal Time and Position of SightingTime:14:14WP#:44Lat:30.108641Long:-80.190848
Initial sighting on Track         Time:       14:05       WP#:       42       Lat:       30.100675       Long:       -80.199794         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       3       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right       Actual Time and Position of Sighting         Time:       14:08       WP#:       43       Lat:       30.100361       Long:       -80.196561         Species:       Turisiops truncatus       Numbers (Low/High/Best):       7 / 7 / 7         Features used in Species ID:       Uniform grey animals.
Initial sighting on TrackTime:14:05WP#:42Lat:30.100675Long:-80.199794Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:3Beaufort Sea State:3Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:08WP#:43Lat:30.100361Long:-80.196561Species:Tursiops truncatusNumbers (Low/High/Best):7/7/7Features used in Species ID:Uniform grey animals
Initial sighting on Track         Time:       14:05       WP#:       42       Lat:       30.100675       Long:       -80.199794         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       3       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right       Actual Time and Position of Sighting         Time:       14:08       WP#:       43       Lat:       30.100361       Long:       -80.196561         Species:       Turisiops truncatus       Numbers (Low/High/Best):       7 / 7 / 7         Features used in Species ID:       Uniform grey animals.

Friday, July 6, 2012 Sighting $\#$ 3
Initial sighting on Track
Time:         14:23         WP#:         49         Lat:         30.099839         Long:         -80.492303
Vertical Angle: <u>3</u> Horizontal Bearing in Degrees: <u>90</u> Sighting Cue: <u>Splash</u>
On/Off Effort: On Trackline: 3 Beaufort Sea State: 2
Observer:         Ryan         Observer side:         Right
Actual Time and Position of Sighting
Time: 14:25 WP#: 50 Lat: 30.105186 Long: -80.481128
Species: Stenella frontalis Numbers (Low/High/Best): 25 / 35 /30
Features used in Species ID: Grey bodied animals with white spotting.
Representative images used for Species ID: 58, 63, 65, 70, 71, 73, 76
Photographer:         Ryan         Frame numbers:         44 to 82         Spacer:         83
Calculated distance from Trackline: 1.23 km
Final Time and Position of Sighting
Time:         14:30         WP#:         51         Lat:         30.110019         Long:         -80.480511
Calculated Distance Traveled: 0.54 km
Behavior and Additional Comments
One group with multiple individuals spaced out a good distance, traveling fast.
Friday, July 6, 2012 Sighting # 4
Initial sighting on Track
Initial sighting on Track           Time:         14:35         WP#:         53         Lat:         30.097992         Long:         -80.632411
Initial sighting on Track         Time:       14:35       WP#:       53       Lat:       30.097992       Long:       -80.632411         Vertical Angle:       3       Horizontal Bearing in Degrees:       60       Sighting Cue:       Splash
Initial sighting on TrackTime:14:35WP#:53Lat:30.097992Long:-80.632411Vertical Angle:3Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:3Beaufort Sea State:2
Initial sighting on TrackTime:14:35WP#:53Lat:30.097992Long:-80.632411Vertical Angle:3Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:3Beaufort Sea State:2Observer:RyanObserver side:Right
Initial sighting on Track         Time:       14:35       WP#:       53       Lat:       30.097992       Long:       -80.632411         Vertical Angle:       3       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       Image: State stat
Initial sighting on TrackTime:14:35WP#:53Lat:30.097992Long:-80.632411Vertical Angle:3Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:3Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:37WP#:54Lat:30.096958Long:-80.625291
Initial sighting on TrackTime:14:35WP#:53Lat:30.097992Long:-80.632411Vertical Angle:3Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:3Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:37WP#:54Lat:30.096958Long:-80.625291Species:Stenella frontalisNumbers (Low/High/Best):8 / 15 / 12
Initial sighting on TrackTime:14:35WP#:53Lat:30.097992Long:-80.632411Vertical Angle:3Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:3Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:37WP#:54Lat:30.096958Long:-80.625291
Initial sighting on Track         Time:       14:35       WP#:       53       Lat:       30.097992       Long:       -80.632411         Vertical Angle:       3       Horizontal Bearing in Degrees:       60       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       3       Beaufort Sea State:       2         Observer:       Ryan       Observer side:       Right       2         Actual Time and Position of Sighting       Time:       14:37       WP#:       54       Lat:       30.096958       Long:       -80.625291         Species:       Stenella frontalis       Numbers (Low/High/Best):       8 / 15 / 12         Features used in Species ID:       Grey bodied animals with white spotting
Initial sighting on Track         Time:       14:35       WP#:       53       Lat:       30.097992       Long:       -80.632411         Vertical Angle:       3       Horizontal Bearing in Degrees:       60       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       3       Beaufort Sea State:       2         Observer:       Ryan       Observer side:       Right       4       4       4         Actual Time and Position of Sighting       Time:       14:37       WP#:       54       Lat:       30.096958       Long:       -80.625291         Species: Stenella frontalis       Numbers (Low/High/Best):       8 / 15 / 12         Features used in Species ID:       Grey bodied animals with white spotting         Representative images used for Species ID:       94, 97, 101
Initial sighting on TrackTime:14:35WP#:53Lat:30.097992Long:-80.632411Vertical Angle:3Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:3Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:37WP#:54Lat:30.096958Long:-80.625291Species:Stenella frontalisNumbers (Low/High/Best):8 / 15 / 12Features used in Species ID:Grey bodied animals with white spottingRepresentative images used for Species ID:94, 97, 101Photographer:RyanFrame numbers:84 to 106Spacer:107
Initial sighting on Track         Time:       14:35       WP#:       53       Lat:       30.097992       Long:       -80.632411         Vertical Angle:       3       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:       14:37       WP#:       54       Lat:       30.096958       Long:       -80.625291         Species:       Stenella frontalis       Numbers (Low/High/Best):       8/15/12         Features used in Species ID:       Grey bodied animals with white spotting         Representative images used for Species ID:       94, 97, 101         Photographer:       Ryan       Frame numbers:       84 to 106       Spacer:       107         Calculated distance from Trackline:       0.69 km       0.69 km       107
Initial sighting on Track         Time:       14:35       WP#:       53       Lat:       30.097992       Long:       -80.632411         Vertical Angle:       3       Horizontal Bearing in Degrees:       60       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       3       Beaufort Sea State:       2         Observer:       Ryan       Observer side:       Right       4       4         Actual Time and Position of Sighting       Time:       14:37       WP#:       54       Lat:       30.096958       Long:       -80.625291         Species:       Stenella frontalis       Numbers (Low/High/Best):       8 / 15 / 12         Features used in Species ID:       Grey bodied animals with white spotting         Provementative images used for Species ID:         94, 97, 101       Photographer:       Ryan       Frame numbers:       84 to 106       Spacer:       107         Calculated distance from Trackline:       0.69 km         Final Time and Position of Sighting
Initial sighting on TrackTime:14:35WP#:53Lat:30.097992Long:-80.632411Vertical Angle:3Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:3Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:37WP#:54Lat:30.096958Long:-80.625291Species:Stenella frontalisNumbers (Low/High/Best):8 / 15 / 12Features used in Species ID:Grey bodied animals with white spottingRepresentative images used for Species ID:94, 97, 101Photographer:RyanFrame numbers:84 to 106Spacer:107Calculated distance from Trackline:0.69 kmFinal Time and Position of SightingTime:14:42WP#:55Lat:30.106012Long:-80.623462
Initial sighting on Track         Time:       14:35       WP#:       53       Lat:       30.097992       Long:       -80.632411         Vertical Angle:       3       Horizontal Bearing in Degrees:       60       Sighting Cue:       Splash         On/Off Effort:       On       Trackline:       3       Beaufort Sea State:       2         Observer:       Ryan       Observer side:       Right       2         Actual Time and Position of Sighting       Time:       14:37       WP#:       54       Lat:       30.096958       Long:       -80.625291         Species:Stenella frontalis       Numbers (Low/High/Best):       8 / 15 / 12         Features used in Species ID:       Grey bodied animals with white spotting
Initial sighting on TrackTime:14:35WP#:53Lat:30.097992Long:-80.632411Vertical Angle:3Horizontal Bearing in Degrees:60Sighting Cue:SplashOn/Off Effort:OnTrackline:3Beaufort Sea State:2Observer:RyanObserver side:RightActual Time and Position of SightingTime:14:37WP#:54Lat:30.096958Long:-80.625291Species:Stenella frontalisNumbers (Low/High/Best):8 / 15 / 12Features used in Species ID:Grey bodied animals with white spottingRepresentative images used for Species ID:94, 97, 101Photographer:RyanFrame numbers:84 to 106Spacer:107Calculated distance from Trackline:0.69 kmFinal Time and Position of SightingTime:14:42WP#:55Lat:30.106012Long:-80.623462
Initial sighting on Track         Time:       14:35       WP#:       53       Lat:       30.097992       Long:       -80.632411         Vertical Angle:       3       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:       14:37       WP#:       54       Lat:       30.096958       Long:       -80.625291         Species:Stenella frontalis       Numbers (Low/High/Best):       8 / 15 / 12         Features used in Species ID:       Grey bodied animals with white spotting         Representative images used for Species ID:       94, 97, 101         Photographer:       Ryan       Frame numbers:       84 to 106       Spacer:       107         Calculated distance from Trackline:       0.69 km       107       Calculated Distance Traveled:       1.02 km         Behavior and Additional Comments       1.02 km       1.02 km       1.02 km
Initial sighting on Track         Time:       14:35       WP#:       53       Lat:       30.097992       Long:      80.632411         Vertical Angle:       3       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:       14:37       WP#:       54       Lat:       30.096958       Long:      80.625291         Species:       Stenella frontalis       Numbers (Low/High/Best):       8 / 15 / 12         Features used in Species ID:       Grey bodied animals with white spotting         Representative images used for Species ID:       94, 97, 101         Photographer:       Ryan       Frame numbers:       84 to 106       Spacer:       107         Calculated distance from Trackline:       0.69 km       Initial stance       -80.623462         Calculated Distance Traveled:       1.02 km       Eng:       -80.623462         Behavior and Additional Comments       1.02 km       Initial Stance       -80.623462

Friday, July 6, 201	<sup>2</sup> Sighting # 5	
Initial sighting on Track		
	at: <u>30.034973</u>	Long:
Vertical Angle: 2 Horizontal H		_ 0 0
		aufort Sea State: 2
Observer: Ryan Obser	ver side: Right	
Actual Time and Position of Sightin	ıg	
Time: <u>14:49</u> WP#: <u>60</u> La		Long:80.680810
Species:Steno bredanensis	Numbers (Low	
Features used in Species ID: Dark grey	to brown, long rostrum wit	h white jaw.
	ID 110.12	0 100 105 144 155
Representative images used for Speci Photographer: Ryan Frame num		8, 129, 135, 144, 155 Spacer: 181
Calculated distance from Trackline:		Spacer:181
		L
Final Time and Position of Sighting		
	at: <u>30.025235</u>	Long: -80.679278
Calculated Distance Traveled:		
Behavior and Additional Comment		
Milling around, circling, belly flashing, some	e animals in a tight group ju	mping.
Friday, July 6, 201 Initial sighting on Track	<sup>2</sup> Sighting # 6	
Time: 15:17 WP#: 67 La	at: 30.032283	Long: -80.072312
Vertical Angle: 3 Horizontal H		Sighting Cue: Splash
· · · · · · · · · · · · · · · · · · ·		aufort Sea State: 3
Observer: Ryan Obser	ver side: Right	
Actual Time and Position of Sightin	ıg	
Time: 15:20 WP#: 68 La		Long: -80.080207
Species: Grampus griseus	Numbers (Low	8
Features used in Species ID: Robust gr		
appear white due to scarring.		
Representative images used for Speci	es ID: 192,	194, 203, 220, 227
Photographer: <u>Ryan</u> Frame num	102+- 220	Spacer: 229
		Spacer:229
Calculated distance from Trackline:	0.83 km	Space1229
Calculated distance from Trackline: _ Final Time and Position of Sighting	0.83 km	Spacer
=	0.83 km	Long: -80.073897
Final Time and Position of Sighting Time: <u>15;26</u> WP#: <u>69</u> La	0.83 km	
Final Time and Position of Sighting Time: <u>15;26</u> WP#: <u>69</u> La Calculated Distance Traveled:	0.83 km 	
Final Time and Position of Sighting Time: <u>15;26</u> WP#: <u>69</u> La Calculated Distance Traveled: Behavior and Additional Comment	0.83 km 	
Final Time and Position of Sighting	0.83 km 	
Final Time and Position of Sighting Time: <u>15;26</u> WP#: <u>69</u> La Calculated Distance Traveled: Behavior and Additional Comment	0.83 km 	

	Frida	ay, July	6, 2012 Si	ight	ting # 7				
Initial sighting o	on Trac	k		Ū	C				
Time: 15;52	WP#:	73	Lat:		29.966045	I	.ong:	-80.31	8246
Vertical Angle:	1	Horizo	ntal Bear	ring	in Degrees:	90	Sighting	Cue:	Body
On/Off Effort:	On	- -	<b>Frackline</b> :	:	1	Beauf	fort Sea St	ate:	3
Observer: Ry	an	(	Observer	side	Right				
Actual Time and	d Positi	on of S	ighting						
Time: 15:54	WP#:	74	Lat:		29.970666	I	.ong:	-80.32	1597
Species: Tursiops tr	uncatus				Numbers (Lo	ow/H	igh/Best):	6	/6/6
Features used in	Species	ID: Uni	form grey a	anim	als.				
Representative in	nages u	sed for	Species II	D: _		234, 2	41, 248, 264	ŀ	
Photographer:	Ryan	Fram	e number	s:	230 to 268		Spacer	:	269
Calculated distan	ce from	n Trackl	ine:		0.61 km				
Final Time and	Positio	n of Sig	hting						
Time: 16:04	WP#:	75	Lat:		29.965686	I	long:	-80.31	1166
Calculated Distar	nce Trav	veled:		1.15	km				
Behavior and A	ddition	al Com	ments						
Staying in a tight gr	oup just	below th	e surface.						

Saturday, July 7, 2012 Sighting $\#$ 1
Initial sighting on Track
Time:         10:44         WP#:         14         Lat:         30.166448         Long:         -80.365756
Vertical Angle: <u>1</u> Horizontal Bearing in Degrees: <u>60</u> Sighting Cue: <u>Body</u>
On/Off Effort: On Trackline: 4 Beaufort Sea State: 3
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time: 10;45 WP#: 15 Lat: 30.164944 Long: -80.367496
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best): <u>8/8/8</u>
Features used in Species ID: Uniform grey animals.
Representative images used for Species ID: 3, 6, 7, 13
Photographer:         Erin         Frame numbers:         1 to 16         Spacer:         17           Calculated distance from Trackline:         0.24 km         0.24 km         17
Final Time and Position of Sighting
Time:         10:48         WP#:         16         Lat:         30.172508         Long:         -80.365015
Calculated Distance Traveled: 0.87 km
Behavior and Additional Comments
Group of four at the surface upon initial observation. Slow travel with regular surfacings, staying close
to the surface between breaths.
Saturday, July 7, 2012 Sighting # 2
Saturday, July 7, 2012 Sighting # 2 Initial sighting on Track
Time: 10:54 WP#: 20 Lat: 30.165131 Long: -80.565466
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 4 Beaufort Sea State: 2
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time:         10:54         WP#:         21         Lat:         30.165538         Long:         -80.562010           Species:Stenella frontalis         Numbers (Low/High/Best):         2/2/2
Features used in Species ID: Grey bodied animals with white spotting.
reatures about in species ins. drey boared animals with write spotting.
Representative images used for Species ID: 19-21
Photographer: Erin Frame numbers: 18 to 23 Spacer: 24
Calculated distance from Trackline: 0.34 km
Final Time and Position of Sighting
Time:         10:59         WP#:         22         Lat:         30.162868         Long:         -80.570643
Calculated Distance Traveled: 0.88 km
Behavior and Additional Comments
Mom/ Calf pair traveling fast along the trackline. Traveling just subsurface with few surfacings.

Saturday, July 7, 2012 Sighting $\#$ 3
Initial sighting on Track
Time: <u>11:15</u> WP#: <u>28</u> Lat: <u>30.233144</u> Long: <u>-80.386308</u>
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 5 Beaufort Sea State: 2
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time: 11:15 WP#: 29 Lat: 30.227034 Long: -80.388729
Species: Stenella frontalis Numbers (Low/High/Best): 8/8/8
Features used in Species ID: Grey bodied animals with white spotting.
Representative images used for Species ID: 28, 31, 33, 34, 38
Photographer:         Erin         Frame numbers:         25 to 42         Spacer:         43
Calculated distance from Trackline: 0.72 km
Final Time and Position of Sighting
Time: 11:24 WP#: 30 Lat: 30.225214 Long: -80.399151
Calculated Distance Traveled: 1.02 km
Behavior and Additional Comments
Widely spaced in a horizontal line, staying close to the surface with definite direction of travel, moving
at a moderate pace. Calf present.
Saturday, July 7, 2012 Sighting # 4
Initial sighting on Track
Time:         12:05         WP#:         40         Lat:         30.300245         Long:         -80.649433
Vertical Angle: <u>3</u> Horizontal Bearing in Degrees: <u>60</u> Sighting Cue: <u>Body</u>
On/Off Effort: On Trackline: 6 Beaufort Sea State: 2
Observer: Erin Observer side: Right
Actual Time and Position of Sighting
Time:         12:08         WP#:         41         Lat:         30.305426         Long:         -80.649478
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best): 2/3/3
Features used in Species ID: Uniform grey animals
Representative images used for Species ID: 44, 47, 53
Representative images used for Species ID:44, 47, 53Photographer:ErinFrame numbers:44 to 54Spacer:55
Calculated distance from Trackline: 0.58 km
Final Time and Position of Sighting
Time:         12:10         WP#:         42         Lat:         30.301761         Long:         -80.642364
Calculated Distance Traveled: 0.80 km
Behavior and Additional Comments
Animals swimming in Trichodesmium bloom.

	Saturda	y, July 7, 2012	Sigh	ting # 5		
Initial sighting (	on Trac	k	U	C		
Time: 13:40	WP#:	48 La		30.368092	Long:	-80.551645
Vertical Angle:			earing	in Degrees:	U	ng Cue: Body
On/Off Effort:		Trackli	0	U U	Beaufort Sea	•
Observer: Ry		Observ	ver side	e: Left		
Actual Time an	d Positi	on of Sightin	σ			
Time: 13:42	WP#:	-	-	30.370784	Long	-80.559474
Species:Tursiops ti	-		•		ow/High/Best	
Features used in		ID. Uniform a	ev anin		20 W/ IIIgii/ Dest	)
i cutures used in	species	<u> </u>				
Representative in	nages us	sed for Specie	s ID:		59, 62	
Photographer:				56 to 63	Space	er: 64
Calculated distar				0.81 km	- 1	
Final Time and	Positior	n of Sighting				
Time: 13:44		50 La	•	30.372170	Long:	-80.549738
Calculated Dista	-		0.95		Long	
Behavior and A					-	
Up at the surface th						
op at the surface th	enuiving	out of view.				
	Saturda	ıy, July 7, 2012	Sigh	ting # 6		
Initial sighting (			~-8	8		
Time: 14:00		55 La	:	30.366070	Long:	-79.973995
Vertical Angle:			earing		_	ng Cue: Body
On/Off Effort:			-	7	Beaufort Sea	
Observer: Ry				e: Left		
Actual Time and	d Positi					
Time: 14:02		0	0	20 2720/17	Long	-79.963499
Species: Tursiops tr					Long Low/High/Best	
Features used in		ID. Uniform a	ev anin	· · · ·	•	). //0/0
i cutures used in	species	ID: official g	cy unin		pedancies.	
Representative in	nages us	sed for Specie	s ID:		65, 68	
Photographer:	-	Frame num		65 to 70	Space	er: 71
Calculated distar				1.21 km	· · · <b>I</b> · · · ·	
Final Time and	Position	n of Sighting				
Time: 14:05	WP#:		•	30.373806	Long:	-79.953938
Calculated Dista	-		0.94		Long	, , , , , , , , , , , , , , , , , , , ,
					-	
Behavior and A			i			
Multiple groups spr	ead acros	s a large area.				

Saturday, July 7, 2012 Sighting $\# 7$
Initial sighting on Track
Time: <u>14:15</u> WP#: <u>61</u> Lat: <u>30.434673</u> Long: <u>-79.907477</u>
Vertical Angle:         3         Horizontal Bearing in Degrees:         110         Sighting Cue:         Splash
On/Off Effort: On Trackline: 8 Beaufort Sea State: 2
Observer: Ryan Observer side: Left
Actual Time and Position of Sighting
Time: 14:17 WP#: 62 Lat: 30.424355 Long: -79.903836
Species:Grampus griseus         Numbers (Low/High/Best):         12 / 16 / 14
Features used in Species ID: Grey animals with blunt head with a cleft present. Bodies appear
white due to scarring.
Representative images used for Species ID: 73, 74, 80
Photographer:       Erin       Frame numbers:       72 to 86       Spacer:       87         Calculated distance from Trackline:       1.20 km
Final Time and Position of Sighting
Time: <u>14:25</u> WP#: <u>63</u> Lat: <u>30.432743</u> Long: <u>-79.898833</u>
Calculated Distance Traveled: 1.05 km
Behavior and Additional Comments
Two groups of four close together, a third group of ~five joined after initial observation.
Saturday, July 7, 2012 Sighting # 8         Initial sighting on Track         Time:       14:27       WP#:       65       Lat:       30.434168       Long:       -79.941997         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:         14:28         WP#:         66         Lat:         30.434672         Long:         -79.932294
Species: Tursiops truncatus Numbers (Low/High/Best): 2/2/2
Features used in Species ID: Uniform grey animals with white peduncles.
Demonstrations in a second franchise ID:
Representative images used for Species ID: 89
Photographer:         Erin         Frame numbers:         88 to 90         Spacer:         91
Photographer:       Erin       Frame numbers:       88 to 90       Spacer:       91         Calculated distance from Trackline:       0.93 km
Photographer:       Erin       Frame numbers:       88 to 90       Spacer:       91         Calculated distance from Trackline:       0.93 km       0.93 km       0.93 km         Final Time and Position of Sighting       0.93 km       0.93 km       0.93 km
Photographer:       Erin       Frame numbers:       88 to 90       Spacer:       91         Calculated distance from Trackline:       0.93 km       0.93 km       0.93 km         Final Time and Position of Sighting       Time:       14:31       WP#:       67       Lat:       30.437604       Long:       -79.930588
Photographer:       Erin       Frame numbers:       88 to 90       Spacer:       91         Calculated distance from Trackline:       0.93 km       0.93 km       0.93 km         Final Time and Position of Sighting       0.93 km       0.93 km       0.93 km
Photographer:       Erin       Frame numbers:       88 to 90       Spacer:       91         Calculated distance from Trackline:       0.93 km       0.93 km       0.93 km         Final Time and Position of Sighting       Time:       14:31       WP#:       67       Lat:       30.437604       Long:       -79.930588
Photographer:       Erin       Frame numbers:       88 to 90       Spacer:       91         Calculated distance from Trackline:       0.93 km         Final Time and Position of Sighting         Time:       14:31       WP#:       67       Lat:       30.437604       Long:       -79.930588         Calculated Distance Traveled:       0.36 km       0.36 km       0.36 km       0.36 km
Photographer:       Erin       Frame numbers:       88 to 90       Spacer:       91         Calculated distance from Trackline:       0.93 km       0.93 km       0.93 km       0.93 km         Final Time and Position of Sighting       Time:       14:31       WP#:       67       Lat:       30.437604       Long:       -79.930588         Calculated Distance Traveled:       0.36 km       0.36 km       0.36 km       0.36 km       0.36 km

Saturday, July 7, 2012 Sighting $\#$ 9							
Initial sighting o	on Trac	k					
Time: 14:44	WP#:	69	Lat:	30.432911	Long:	-80.403440	
Vertical Angle:	1	Horizo	ontal Bear	ring in Degrees:	90 Sighting	Cue: Body	
On/Off Effort:	On	,	Trackline	: 8	Beaufort Sea S		
Observer: E	rin		Observer	side: Right			
Actual Time and	d Positi	ion of S	ighting				
Time: 14:52	WP#:	70	Lat:	30.438204	Long:	-80.411598	
Species:Stenella fro				Numbers (I		30 / 40 / 38	
Features used in	Species	ID: Gre	ey animals v	with white spotting	- · ·		
Representative ir	nages u	sed for	Species I	D:	99, 107, 108		
Photographer:	Erin	Fram	e number	's: 92 to 108	<u>S</u> Space	: 109	
Photographer: Calculated distan					Space	: 109	
0 1	ice fron	n Track	line:		Space	:: <u>109</u>	
Calculated distan	nce from Positio	n Track <b>n of Sig</b>	line: ghting	0.98 km		:: <u>109</u> -80.413344	
Calculated distan	nce from <b>Positio</b> WP#:	n Track <b>n of Sig</b> 71	line: g <b>hting</b> Lat:	0.98 km 30.431493			
Calculated distan Final Time and Time: <u>14:53</u>	nce from Positio WP#: nce Tra	n Track <b>n of Sig</b> 71 veled: _	line: ghting Lat: _	0.98 km 30.431493			
Calculated distan Final Time and Time: <u>14:53</u> Calculated Distan	nce from Positio WP#: nce Tra ddition	n Track n of Sig 71 veled: _ al Com	line: ghting Lat: ments	0.98 km 30.431493 0.76 km	Long:	-80.413344	
Calculated distan Final Time and Time: <u>14:53</u> Calculated Distan Behavior and A	nce from Positio WP#: nce Tra ddition	n Track n of Sig 71 veled: _ al Com	line: ghting Lat: ments	0.98 km 30.431493 0.76 km	Long:	-80.413344	
Calculated distan Final Time and Time: <u>14:53</u> Calculated Distan Behavior and A	nce from Positio WP#: nce Tra ddition	n Track n of Sig 71 veled: _ al Com	line: ghting Lat: ments	0.98 km 30.431493 0.76 km	Long:	-80.413344	

Saturday, September 22, 2012 Sighting $\#$ 1
Initial sighting on Track
Time: 9:11 WP#: 06 Lat: 30.23054 Long: -80.489852
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 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: 9:13 WP#: 07 Lat: 30.22339 Long: -80.494131
Species: Stenella frontalis Numbers (Low/High/Best): 25 / 27 / 26
Features used in Species ID: White tip to rostrum, spotting pattern across body.
Representative images used for Species ID:6
Photographer:    Erin    Frame numbers:    1 to 6    Spacer:    7
Calculated distance from Trackline: 0.91 km
Final Time and Position of Sighting
Time:         9:20         WP#:         08         Lat:         30.23028         Long:         -80.483510
Calculated Distance Traveled: 1.27 km
Behavior and Additional Comments
2 subgroups ~ 10 animals in the first and 15 in the second. Densely packed with a few animals on their
own, both groups densely packed spending extended time below the surface making them difficult to
photograph.
Saturday, September 22, 2012 Sighting # 2
Initial sighting on Track
Time:     9:23     WP#:     12     Lat:     30.22966     Long:     -80.410632       Vertical Angle     2     Harizantal Bearing in Degraces     60     Sighting Cuast     Back
Vertical Angle:2Horizontal Bearing in Degrees:60Sighting Cue:BodyOn/Off Effort:OnTrackline:5Beaufort Sea State:2
On/Off Effort:       On       Trackline:       5       Beaufort Sea State:       2         Observer:       Ryan       Observer side:       Left
Actual Time and Position of Sighting
Time:         9:25         WP#:         13         Lat:         30.23645         Long:         -80.410724
Species: <i>Tursiops truncatus</i> Numbers (Low/High/Best): <u>11/13/12</u>
Features used in Species ID: Robust body appearance, broad based dorsal fin. Uniform grey coloration.
Representative images used for Species ID: 17 & 24
Photographer: Erin Frame numbers: 8 - 26 Spacer: 27
Calculated distance from Trackline: 0.76 km
Final Time and Position of Sighting
Time:         9:34         WP#:         14         Lat:         30.23324         Long:         -80.417244
Calculated Distance Traveled: 0.72 km
Behavior and Additional Comments
Diffuse group traveling at the surface - some splashing possibly tail slapping. Single group with a few
Diffuse group traveling at the surface - some splashing possibly tail slapping. Single group with a few outliers. Calves present.

Saturda	ay, Septe	mber 22, 2012	Sigh	ting # 3		
Initial sighting (	on Trac	k	-	-		
Time: 10:32	WP#:	26 La	t:	30.36304	Long:	-80.474359
Vertical Angle:	3	Horizontal B	earing	in Degrees:	90 Sighting	g Cue: Splash
On/Off Effort:	On	Trackli	ine:	7	Beaufort Sea S	State: 2
Observer: E	rin	Observ	ver side	e: Right		
Actual Time and	d Positio	on of Sightin	g			
Time: 10:39	WP#:	27 La	t:	30.35368	Long:	-80.46541
Species:Stenella fr					.ow/High/Best)	
Features used in	Species	ID: White rost	rum tip,	, spotting patter	n across body on	larger individuals.
Representative in					28 & 35	
Photographer:			bers: _	28 to 36	Space	r:37
Calculated distar	nce from	Trackline:		1.35 km		
Final Time and						
Time: 10:44	WP#:	La	t:	30.35116	Long:	-80.47153
Calculated Dista	nce Trav	veled:	0.65	km	_	
Behavior and A	dditiona	al Comments	1			
Two groups of anim	nals and a	few outliers. Ca	alf prese	ent.		
	-		a. 1			
		mber 22, 2012	Sigh	$t_{1}ng # 4$		
Initial sighting o			_			
	-	32 La			_	-79.987997
Vertical Angle:						
On/Off Effort:				7	Beaufort Sea S	state: 3
Observer: Ry				e: Left		
Actual Time and		-	-			
Time: 11:03		33 La	t:			
Species:Grampus	-				.ow/High/Best)	
Features used in	-					nter of melon
Body coloration var				falcate dorsal fi		
Representative in	-	-			43	10
Photographer:		Frame num	bers: _	38 to 47	Space	r: 48
Calculated distar	ice from	I rackline:		0.54 km		
Final Time and	Positior	n of Sighting				
Time: 11:09	WP#:		t:	30.36183	Long:	-79.99911
Calculated Dista	nce Trav	veled:	1.08	km		
Behavior and A	dditiona	al Comments	1			
A few single animal	s plus two	o groups of 2-3.	Animal	s very spread ou	ut, diving from the	e surface frequently

Saturday, September 22, 2012 Sighting $\#$ 5
Initial sighting on Track
Time: 11:32 WP#: 40 Lat: 30.43536 Long: -80.371983
Vertical Angle: 2 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:         11:32         WP#:         41         Lat:         30.43090         Long:         -80.365577
Species:Tursiops truncatus     Numbers (Low/High/Best): 9/12/11
Features used in Species ID: Uniform grey coloration, robust body appearance.
Representative images used for Species ID: 53 & 54
Photographer: Erin Frame numbers: 49 to 55 Spacer: 56
Calculated distance from Trackline: 0.78 km
Final Time and Position of Sighting
Time:         11:36         WP#:         42         Lat:         30.42538         Long:         -80.367358
Calculated Distance Traveled: 0.64 km
Behavior and Additional Comments
Single dense group hanging at the surface - no direction of travel initially (milling)
Group dove and not relocated after circling them 3 times.
Gloup dove and not relocated after circling them 5 times.
Saturday, September 22, 2012 Sighting $\#$ 6
Initial sighting on Track
Time:         12:20         WP#:         54         Lat:         30.56595         Long:         -80.186632
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 10 Beaufort Sea State: 2
Observer: Ryan Observer side: Left
Actual Time and Position of Sighting
Time:     12:21     WP#:     55     Lat:     30.56152     Long:     -80.192404       Special/Standle frontelie     Numbers (Low/High/Best)     24 (20 (20 (20 (20 (20 (20 (20 (20 (20 (20
Species:Stenella frontalis       Numbers (Low/High/Best):       24 / 28 / 26         Features used in Species ID:       White tip to rostrum, spotting pattern across bodies of larger
reatures used in species in, while up to restrain, specting pattern across boules of larger
individuals.
individuals. Representative images used for Species ID: 58 & 59
individuals.         Representative images used for Species ID:         58 & 59         Photographer:       Erin         Frame numbers:       57 to 71         Spacer:       72
individuals.         Representative images used for Species ID:         58 & 59         Photographer:       Erin         Frame numbers:       57 to 71         Spacer:       72         Calculated distance from Trackline:       0.74 km
individuals.         Representative images used for Species ID:         58 & 59         Photographer:       Erin         Frame numbers:       57 to 71         Spacer:       72         Calculated distance from Trackline:       0.74 km         Final Time and Position of Sighting
individuals.         Representative images used for Species ID:         58 & 59         Photographer:       Erin         Frame numbers:       57 to 71         Spacer:       72         Calculated distance from Trackline:       0.74 km         Final Time and Position of Sighting         Time:       12:27         WP#:       56         Lat:       30.56304         Long:       -80.192404
individuals.         Representative images used for Species ID:       58 & 59         Photographer:       Erin       Frame numbers:       57 to 71       Spacer:       72         Calculated distance from Trackline:       0.74 km       0.74 km       72         Final Time and Position of Sighting       76       12:27       WP#:       56       Lat:       30.56304       Long:       -80.192404         Calculated Distance Traveled:       0.17 km       0.17 km       0.17 km       0.17 km
individuals.         Representative images used for Species ID:         Speci
individuals.         Representative images used for Species ID:       58 & 59         Photographer:       Erin       Frame numbers:       57 to 71       Spacer:       72         Calculated distance from Trackline:       0.74 km         Final Time and Position of Sighting         Time:       12:27       WP#:       56       Lat:       30.56304       Long:       -80.192404         Calculated Distance Traveled:       0.17 km       Behavior and Additional Comments       Hanging at surface upon initial observations, then group showed rapid acceleration for short period
individuals.         Representative images used for Species ID:         Spacer:         Photographer:         Erin         Frame numbers:         57 to 71         Spacer:         72         Calculated distance from Trackline:         0.74 km         Final Time and Position of Sighting         Time:       12:27         WP#:       56         Lat:       30.56304         Long:       -80.192404         Calculated Distance Traveled:       0.17 km         Behavior and Additional Comments

Saturday, Se	ptember 22, 2	012 Sigh	ting $\#$ 7		
Initial sighting on Tr	ack	e	C		
0 0		Lat:	30.09923	Long:	-80.009916
Vertical Angle: 2	Horizonta	l Bearing	g in Degrees:	90 Sighti	ng Cue: Spalsh
On/Off Effort: On			3	Beaufort Sea	-
Observer: Erin	Obs	server sid	e: Right		
Actual Time and Pos	ition of Sigh	ting			
	0	Lat:	30.10817	Long:	-80.009283
Species: Tursiops truncat				Low/High/Bes	
Features used in Spec		n grey colo			
Representative images				73 & 75	
Photographer: Erin			73 to 82	Space	er: 83
Calculated distance fr	om Trackline	:	1.00 km		
Final Time and Posit	tion of Sighti	ng			
Time: 15:00 WP	#: 72	Lat:	30.10809	Long:	-80.008155
Calculated Distance T	raveled:	0.1	l km		
Behavior and Additi	onal Comme	nts			
Pair of animals seen first t	hen additional	four joinec	1.		
	eptember 22, 2	012 Sigh	iting # 8		
Initial sighting on Tr		<b>T</b> .			
	#: 74		30.10171		-80.055867
Vertical Angle: 1					ng Cue: Body
On/Off Effort: On		ckline:		Beaufort Sea	State: 2
Observer: Erin			e: Right		
Actual Time and Pos	U	0			
Time: 15:03 WP		Lat:			
Species:Tursiops truncat			``	Low/High/Bes	/
Features used in Spec	tes ID: <u>Uniforr</u>	n grey colo	pration, robust k	pody appearance	2
D					
Representative images	-		0.4 0.1	87, 88 & 89	
Photographer: <u>Erin</u> Calculated distance fro		-	84 - 91 1.25 km	Spac	cer: 92
			1.23 KIII		
Final Time and Posit	0	•			
		Lat:	30.10998	Long:	-80.051413
Calculated Distance T	raveled:	0.40	) km		
Behavior and Additi	onal Comme	nts			
Animals traveling predom	ninantly subsurf	ace.			

Saturday, September 22, 2012 Sighting # 9							
Initial sighting o	on Trac	k		0 0			
Time: 15:56	WP#:	88	Lat:	29.964	87	Long:	-79.96208
Vertical Angle:	1	Horizo	ntal Bear	ing in Deg	rees: 90	0 Sighting	Cue: Body
On/Off Effort:	On	,	Frackline:	2	Be	aufort Sea St	ate: 1
Observer: Er	Observer: Erin Observer side: Right						
Actual Time and	d Positi	ion of S	ighting				
Time: 15:57	WP#:	89	Lat:	29.9648	37	Long:	-79.965453
Species: Tursiops tr	uncatus			Numb	ers (Low	/High/Best):	8/8/8
Features used in	Species	ID: Un	iform grey o	coloration, ro	bust body	/ appearance	
Representative in	nages u	sed for	Species II	D:		95	
Photographer:	Erin	Fram	e numbers	s:9	3 - 99	Spacer	: 100
Calculated distan	ce fron	n Track	ine:	0.32 km	l		
Final Time and	Positio	n of Sig	ghting				
Time: 16:02	WP#:	90	Lat:	29.967	96	Long:	-79.959296
Calculated Distar	nce Tra	veled:	(	).69 km			
Behavior and A	ddition	al Com	ments				
Four pairs of animal	s distrib	uted well	apart from	one anothe	r. Each pa	ir would surface	e quickly then
dive back below the	e surface	out of sig	ght.				

Sunday, September 23, 2012 Sighting $\#$ 1
Initial sighting on Track
Time: 10:37 WP#: 11 Lat: 30.364971 Long: -79.959244
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 7 Beaufort Sea State: 3
Observer: Ryan Observer side: Left
Actual Time and Position of Sighting
Time: 10:40 WP#: 12 Lat: 30.365325 Long: -79.960759
Species:Unidentified Delphinid         Numbers (Low/High/Best):         2/2/2
Features used in Species ID: NA
Representative images used for Species ID:NA
Photographer: Ryan Frame numbers: NA Spacer: NA
Calculated distance from Trackline: 0.15 km
Final Time and Position of Sighting
Time: 10:50 WP#: 13 Lat: 30.365326 Long: -79.970036
Calculated Distance Traveled: 0.89 km
Behavior and Additional Comments
Pair of animals, no photos.
Sunday Contember 22, 2012 Sighting # 2
Sunday, September 23, 2012 Sighting # 2
Initial sighting on Track
Time: 12:05 WP#: 24 Lat: 30.231380 Long: -80.700927
Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:5Beaufort Sea State:3
Observer: Ryan Observer side: Right
Actual Time and Position of Sighting
Time:         12:10         WP#:         25         Lat:         30.233932         Long:         -80.702387
Species: Stenella frontalis Numbers (Low/High/Best): 8/12/10
Features used in Species ID: <u>Alternating light and dark pattern down body and spotting, white</u> tip on rostrum
Representative images used for Species ID: 119, 122, 126
Photographer: Ryan Frame numbers: 110 to 136 Spacer: 137
Calculated distance from Trackline: 0.32 km
Final Time and Position of Sighting
Time: 12:23 WP#: 26 Lat: 30.238178 Long: -80.697993
Calculated Distance Traveled: 0.63 km
Calculated Distance Traveled: 0.63 km Behavior and Additional Comments
Calculated Distance Traveled: 0.63 km

Tuesday, September 4, 2012 Sighting $\#$ 1
Initial sighting on Track
Time: 8:50 WP#: 4 Lat: 29.968608 Long: -80.289670
Vertical Angle: <u>3</u> Horizontal Bearing in Degrees: <u>100</u> Sighting Cue: <u>Body</u>
On/Off Effort: On Trackline: 1 Beaufort Sea State: 3
Observer: Erin Observer side: Left
Actual Time and Position of Sighting
Time: 8:54 WP#: 5 Lat: 29.967288 Long: 80.295223
Species: Steno bredanensis Numbers (Low/High/Best): 20 / 35 / 28
Features used in Species ID: Cone shaped head with small melon, larger pectoral fins, triangular
shaped dorsal fin.
Representative images used for Species ID: 27, 39
Photographer:         Ryan         Frame numbers:         1 to 44         Spacer:         45
Calculated distance from Trackline: 0.55 km
Final Time and Position of Sighting
Time: 9:03 WP#: 6 Lat: 29.965913 Long: -80.294987
Calculated Distance Traveled: 0.15 km
Behavior and Additional Comments
Densely packed group on the surface, dove when plane passed overhead, evasive. Only a few animals
would come to the surface at a time.
Tuesday, September 4, 2012 Sighting $\#$ 2
Tuesday, September 4, 2012 Sighting # 2 Initial sighting on Track
6 6
Initial sighting on Track
Initial sighting on Track           Time:         9:22         WP#:         11         Lat:         30.034665         Long:         -79.899919
Initial sighting on TrackTime:9:22WP#:11Lat:30.034665Long:-79.899919Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:Body
Initial sighting on TrackTime:9:22WP#:11Lat:30.034665Long:-79.899919Vertical Angle:2Horizontal Bearing in Degrees:90Sighting Cue:BodyOn/Off Effort:OnTrackline:2Beaufort Sea State:3Observer:RyanObserver side:Right
Initial sighting on Track         Time:       9:22       WP#:       11       Lat:       30.034665       Long:       -79.899919         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       2       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right
Initial sighting on Track         Time:       9:22       WP#:       11       Lat:       30.034665       Long:       -79.899919         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       2       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right         Actual Time and Position of Sighting         Time:       NA       WP#:       NA
Initial sighting on Track         Time:       9:22       WP#:       11       Lat:       30.034665       Long:       -79.899919         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       2       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right         Actual Time and Position of Sighting         Time:       NA       Lat:       NA       Long:       NA         Species:Unidentified Delphinid       Numbers (Low/High/Best):       2/2/2
Initial sighting on Track         Time:       9:22       WP#:       11       Lat:       30.034665       Long:       -79.899919         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       2       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right         Actual Time and Position of Sighting         Time:       NA       WP#:       NA
Initial sighting on Track         Time:       9:22       WP#:       11       Lat:       30.034665       Long:       -79.899919         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       2       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right         Actual Time and Position of Sighting         Time:       NA       Lat:       NA       Long:       NA         Species:Unidentified Delphinid       Numbers (Low/High/Best):       2/2/2
Initial sighting on Track         Time:       9:22       WP#:       11       Lat:       30.034665       Long:       -79.899919         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       2       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right         Actual Time and Position of Sighting         Time:       NA       Lat:       NA       Long:       NA         Species:       Unidentified Delphinid       Numbers (Low/High/Best):       2/2/2         Features used in Species ID:       NA
Initial sighting on Track         Time:       9:22       WP#:       11       Lat:       30.034665       Long:       -79.899919         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       2       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right         Actual Time and Position of Sighting         Time:       NA       WP#:       NA         Species:       Unidentified Delphinid       Numbers (Low/High/Best):       2/2/2         Features used in Species ID:       NA         Representative images used for Species ID:       No photos
Initial sighting on Track         Time:       9:22       WP#:       11       Lat:       30.034665       Long:       -79.899919         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       2       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right       Actual Time and Position of Sighting         Time:       NA       WP#:       NA       Lat:       NA       Long:       NA         Species:       Unidentified Delphinid       Numbers (Low/High/Best):       2/2/2       2/2/2         Features used in Species ID:       NA       Spacer:       NA         Representative images used for Species ID:       No photos       Photographer:       Ryan       Frame numbers:       NA       Spacer:       NA         Calculated distance from Trackline:       NA       NA       Spacer:       NA
Initial sighting on Track         Time:       9:22       WP#:       11       Lat:       30.034665       Long:       -79.899919         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       2       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right         Actual Time and Position of Sighting         Time:       NA       Lat:       NA       Long:       NA         Species:       Unidentified Delphinid       Numbers (Low/High/Best):       2/2/2         Features used in Species ID:       NA         Representative images used for Species ID:       No photos         Photographer:       Ryan       Frame numbers:       NA         Calculated distance from Trackline:       NA       Spacer:       NA         Final Time and Position of Sighting       Image:       NA       Spacer:       NA
Initial sighting on Track         Time:       9:22       WP#:       11       Lat:       30.034665       Long:       -79.899919         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       2       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right       Actual Time and Position of Sighting         Time:       NA       WP#:       NA       Lat:       NA       Long:       NA         Species:       Unidentified Delphinid       Numbers (Low/High/Best):       2/2/2       Petatures used in Species ID:       NA         Representative images used for Species ID:       NA       Spacer:       NA         Photographer:       Ryan       Frame numbers:       NA       Spacer:       NA         Calculated distance from Trackline:       NA       Spacer:       NA       Calculated distance from Trackline:       NA         Final Time and Position of Sighting       Time:       9:28       WP#:       12       Lat:       30.040575       Long:       -79.896119
Initial sighting on Track         Time:       9:22       WP#:       11       Lat:       30.034665       Long:       -79.899919         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       2       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right       Actual Time and Position of Sighting         Time:       NA       WP#:       NA       Lat:       NA       Long:       NA         Species:Unidentified Delphinid       Numbers (Low/High/Best):       2/2/2       Peatures used in Species ID:       NA         Representative images used for Species ID:       No photos       No photos         Photographer:       Ryan       Frame numbers:       NA       Spacer:       NA         Final Time and Position of Sighting         Time:       9:28       WP#:       12       Lat:       30.040575       Long:       -79.896119         Calculated Distance Traveled:
Initial sighting on Track         Time:       9:22       WP#:       11       Lat:       30.034665       Long:       -79.899919         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       2       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right         Actual Time and Position of Sighting         Time:       NA       WP#:       NA         Species:       Unidentified Delphinid       Numbers (Low/High/Best):       2/2/2         Features used in Species ID:       NA       Space:       NA         Representative images used for Species ID:       No photos       No photos         Photographer:       Ryan       Frame numbers:       NA       Spacer:       NA         Calculated distance from Trackline:       NA       Spacer:       NA       Calculated Distance Traveled:       NA         Time:       9:28       WP#:       12       Lat:       30.040575       Long:       -79.896119         Calculated Distance Traveled:       NA       Behavior and Additional Comments       NA       Spacer:       Spacer:       Spacer:       Sp
Initial sighting on Track         Time:       9:22       WP#:       11       Lat:       30.034665       Long:       -79.899919         Vertical Angle:       2       Horizontal Bearing in Degrees:       90       Sighting Cue:       Body         On/Off Effort:       On       Trackline:       2       Beaufort Sea State:       3         Observer:       Ryan       Observer side:       Right       Actual Time and Position of Sighting         Time:       NA       WP#:       NA       Lat:       NA       Long:       NA         Species:Unidentified Delphinid       Numbers (Low/High/Best):       2/2/2       Peatures used in Species ID:       NA         Representative images used for Species ID:       No photos       No photos         Photographer:       Ryan       Frame numbers:       NA       Spacer:       NA         Final Time and Position of Sighting         Time:       9:28       WP#:       12       Lat:       30.040575       Long:       -79.896119         Calculated Distance Traveled:

Su	nday, Nov	ember 4, 202	2 Sigh	ting # 3		
Initial sighting						
Time: <u>10:10</u>				30.100644	Long:	
Vertical Angle:						
On/Off Effort:				3	Beaufort Sea S	tate: <u>3</u>
Observer:	<u>rin</u>	Obse	rver sid	e: Left	_	
Actual Time ar		0	•			
Time: 10:12	-	20 L	at:	30.101503	U	-80.060750
Species:Tursiops					Low/High/Best):	5/5/5
Features used in	Species	ID: Uniform	grey, rob	ust animals.		
D		1 C	ID.		46, 54	
Representative i Photographer:						r. 62
Calculated dista					Space	
				0.27		
Final Time and		-	-	20 107060	T	00.062020
Time: <u>10:18</u>				30.107968	Long:	-80.062028
Calculated Dista				) KIII	-	
Behavior and A						
Rolling around in p	bairs, head	ing in differen	t directio	ons.		
Su	ndav. Nov	vember 4, 20 <sup>-</sup>	12 Sigh	ting # 4		
Initial sighting			21811			
Time: 13:28			at:	30.570174	Long:	-80.186847
Vertical Angle:	-				_ •	
On/Off Effort:			-	10	Beaufort Sea S	
Observer:	Erin	Obse	rver sid	e: Left		
Actual Time ar	nd Positi	on of Sighti	ng			
Time: 13:30		0	0	30.563090	Long:	-80.196563
Species:Tursiops	-				Low/High/Best):	
Features used in		ID: No photo	)S	, , , , , , , , , , , , , , , , , , ,	6 /	
	-					
Representative i	mages us	sed for Spec	ies ID:		NA	
Photographer:	Ryan	Frame nur	nbers:	NA	Space	r: NA
Calculated dista	nce from	Trackline:		1.22 km		
Final Time and	l Positior	n of Sighting	g			
Time: 13:44	WP#:	38 L	at:	30.578326	Long:	-80.200129
Calculated Dista	ance Trav	veled:	1.73	3 km		
Behavior and A	Addition	al Commen	ts			
				e current line a	uickly with long pe	riods out of siaht
			5		,	

below the surface.
Initial sighting of	iuy, 1101	ember 4,	, 2012 S1g	shting # 5		
Initial sighting of	n Tracl	K	-	-		
Time: 13:52	WP#:	41	Lat:	30.567729	Long:	-79.861466
Vertical Angle:	1	Horizon	ntal Bearin	ng in Degrees:	90 Sighting	
On/Off Effort:	On	T	rackline:	10	Beaufort Sea St	ate:4
Observer: Eri	n	0	bserver si	ide: Left		
Actual Time and	Positio	on of Sig	ghting			
Time: 13:54	WP#:	42	Lat:	30.563003	Long:	-79.859421
Species: Tursiops tru	Incatus			Numbers (L	ow/High/Best):	2/2/2
Features used in S	Species	ID: Unifo	orm grey, ro	obust animals.		
Representative im					63	
Photographer:					Spacer	: 67
Calculated distance	ce from	Trackli	ne:	0.56 km		
Final Time and I	Position	of Sigh	nting			
Time: 13:58	WP#:	43	Lat:	30.573507	Long:	-79.862835
Calculated Distan	ce Trav	eled:	1.	21 km		
Behavior and Ad	lditiona	l Comn	nents			
Traveling, with subse				er below the surface	e.	
<u>.</u>		5 1				
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			Lat:	30.498636	Long:	-80.694708
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Time: <u>14:31</u> Vertical Angle: On/Off Effort:	WP#: 3 On	k 51 Horizon Ti	Lat: ntal Bearin rackline:	30.498636 ng in Degrees:	90 Sighting	Cue: Body
Time: <u>14:31</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u>	WP#: 3 On an	K 51 Horizon Ti O	Lat:	30.498636 ng in Degrees:9	90 Sighting	Cue: Body
Time: <u>14:31</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> Actual Time and	WP#:	k <u>51</u> Horizon Tr O <b>on of Si</b> ş	Lat:	30.498636 ng in Degrees:9	90 Sighting Beaufort Sea St	Cue: Body cate: 3
Time: <u>14:31</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> Actual Time and Time: <u>14:32</u>	WP#: On Positic WP#:	k <u>51</u> Horizon Tr O <b>on of Si</b> ş	Lat:	30.498636 ng in Degrees: 9 ide:Right 30.503127	90 Sighting Beaufort Sea St Long:	Cue: Body cate: 3
Time: <u>14:31</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> Actual Time and Time: <u>14:32</u> Species: <i>Stenella fro</i>	WP#: On Positic WP#: ntalis	k 51 Horizon Tr O <b>on of Sig</b> 52	Lat:	30.498636 ng in Degrees:9 ide:Right 30.503127 Numbers (La	90 Sighting Beaufort Sea St Long: ow/High/Best):	Cue: Body cate: 3 -80.694210 _25 / 30 / 28
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Time: <u>14:31</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> <b>Actual Time and</b> Time: <u>14:32</u> Species: <i>Stenella fro</i> Features used in S Representative im	WP#:	k 51 Horizon Tr O on of Sig 52 ID: Grey red for S	Lat:	30.498636 ng in Degrees:9 ide:Right 30.503127 Numbers (Lot th spotting and a v	90 Sighting Beaufort Sea St Long: ow/High/Best): white tip to their re	Cue: <u>Body</u> ate: <u>3</u> -80.694210 <u>25 / 30 / 28</u> ostrum.
Time: <u>14:31</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> Actual Time and Time: <u>14:32</u> Species: <i>Stenella fro</i> Features used in S Representative im Photographer: <u>F</u>	WP#: On Positic WP#: ntalis Species ages us Ryan	k 51 Horizon Tr O on of Sig 52 ID: Grey red for S Frame	Lat:	30.498636 ng in Degrees:9 ide:Right 30.503127 Numbers (Lot th spotting and a v	90 Sighting Beaufort Sea St Long: ow/High/Best): white tip to their ro 72, 79, 83, 99, 132	Cue: <u>Body</u> ate: <u>3</u> -80.694210 <u>25 / 30 / 28</u> ostrum.
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Time: <u>14:31</u> Vertical Angle: <u></u> On/Off Effort: <u></u> Observer: <u>Rya</u> <b>Actual Time and</b> Time: <u>14:32</u> Species: <i>Stenella fro</i> Features used in S Representative im Photographer: <u>F</u> Calculated distance <b>Final Time and I</b> Time: <u>14:38</u>	WP#:	k 51 Horizon Tr O on of Sig 52 ID: Grey Hor S Frame Tracklin of Sigh 53	Lat:	<u>30.498636</u> ng in Degrees:9 ide:Right <u>30.503127</u> Numbers (La th spotting and a v : 68 to 133 0.50 km <u>30.508343</u>	90 Sighting Beaufort Sea St Long: ow/High/Best): white tip to their ro 72, 79, 83, 99, 132	Cue: <u>Body</u> ate: <u>3</u> -80.694210 <u>25 / 30 / 28</u> ostrum.
Time: 14:31 Vertical Angle: On/Off Effort: Observer:Rya Actual Time and Time: 14:32 Species: <i>Stenella fro</i> Features used in S Representative im Photographer:F Calculated distance Final Time and I Time:14:38 Calculated Distance	WP#: On Position WP#: mages use Ryan ce from WP#: Ce Trav	k 51 Horizon Ti O on of Sig 52 ID: Grey Hor S Frame Tracklin of Sigh 53 reled:	Lat:	30.498636 ng in Degrees:9 ide:Right 30.503127 Numbers (La th spotting and a v : 68 to 133 0.50 km	90 Sighting Beaufort Sea St Long: ow/High/Best): white tip to their re 72, 79, 83, 99, 132 Spacer	Cue: Body ate: 3 -80.694210 25 / 30 / 28 ostrum. 2 134
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Time: 14:31 Vertical Angle: On/Off Effort: Observer:Rya Actual Time and Time: 14:32 Species: <i>Stenella fro</i> Features used in S Representative im Photographer:F Calculated distance Final Time and I Time:14:38 Calculated Distance	WP#:	k 51 Horizon Tr O on of Sig 52 ID: Grey red for S Frame Tracklin of Sigh 53 reled: I Comm	Lat:	30.498636 ng in Degrees:9 ide:Right 30.503127 Numbers (Luth spotting and a value) : 68 to 133 0.50 km 30.508343 60 km	90 Sighting Beaufort Sea St  ow/High/Best): white tip to their re 72, 79, 83, 99, 132 Spacer  Long:	Cue: <u>Body</u> ate: <u>3</u> -80.694210 <u>25 / 30 / 28</u> ostrum. 2 : <u>134</u> -80.695659

Sunday, November 4, 2012 Sighting $\#$ 7						
Initial sighting or	n Track	C	C			
Time: 15:01	WP#: 58	Lat:	30.433611	Long:	-79.938619	
Vertical Angle:	2 Horiz	contal Bearin	g in Degrees:	60 Sighting	Cue: Body	
On/Off Effort:	On	Trackline:	8	Beaufort Sea Sta	ate: 3	
Observer: Rya	n	Observer si	de: Right			
Actual Time and Position of Sighting						
Time: 15:02	WP#: 59	Lat:	30.433770	Long:	-79.937191	
Species: Grampus griseus Numbers (Low/High/Best): 7/10/8						
Features used in S	pecies ID: G	rey animals wit	th white scarring,	blunt heads with cl	eft in center.	
Representative im	ages used fo	r Species ID:		135, 140, 148, 155		
Photographer: R	yan Frai	ne numbers:	135 to 156	5 Spacer:	157	
Calculated distance	e from Trac	kline:	0.14 km			
Final Time and P	osition of S	ighting				
Time: 15:12	WP#: 60	Lat:	30.431680	Long:	-79.940824	
Calculated Distan	ce Traveled:	0.4	42 km			
Behavior and Additional Comments						
Traveling close together, deep diving and changing course.						

### The Sighting Summary Sheet

The Sighting Summary, adapted from the Sighting Data Sheet used in the field, integrates data gathered in the field with results from lab analyses to provide a full summary of each marine mammal sighting (note – this sheet only deals with marine mammal sightings). A Sighting Summary is to be completed for all sightings, including sightings made while off-effort during transits between survey legs, as well as sighting cues that never led to a sighting that was 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-heading 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*" is used. If the animal could be ID'd as a cetacean only, then "unidentified cetacean" is used. 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" is used.

**Criteria used to identify species:** Which species specific diagnostic features were used in classifying a sighting to species (see information on diagnosis of 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 is used, in that only animals roughly half the size of the associated larger animal (the presumed mother) are designated as calves.

**Calculated Distance from Track Line:** The distances between the break track waypoint (2.0) and the initial position of each sighting (2.4) is calculated using the online software 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 are rounded to 0.1 km.

**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. If taking a shot of the interior of the plane, put the camera focus setting on "manual", take the picture, then immediately set it back to "automatic".

### **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 to the presence of the plane.

January 23, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Stenella frontalis	1	4	2	9
Stenella frontalis	1	75	2	10
Tursiops truncatus	1	85	2	5
Tursiops truncatus	1	30	3	7
Tursiops truncatus	1	5	3	9
Tursiops truncatus	1	1	2	10
Caretta caretta	18	26	2 to 3	-
Dermochelys coriacea	1	1	2	9
Unidentified Sea Turtle	5	9	2 to 3	÷ .
Rhincodon typus	1	1	2	5
Unidentified Chondrichthyes	1	1	2	8



# January 24, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Stenella frontalis	1	4	2	8
Tursiops truncatus	1	10	2	1
Tursiops truncatus	1	10	3	2
Tursiops truncatus	1	1	2	6
Tursiops truncatus	1	8	2	6
Tursiops truncatus	1	1	2	7
Tursiops truncatus	1	1	2	7
Tursiops truncatus	1	20	3	7
Caretta caretta	14	21	2 to 3	-
Unidentified Sea Turtle	9	11	2 to 3	-
Mola mola	1	1	2	9
Manta birostris	3	3	2 to 3	-
Unidentified Chondrichthyes	9	11	2 to 3	-



# January 25, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Grampus griseus	1	5	2	7
Megaptera novaeangliae	1	1	2	5
Stenella frontalis	1	15	3	7
Stenella frontalis	1	52	2	8
Tursiops truncatus	1	7	2	5
Tursiops truncatus	1	4	3	5
Tursiops truncatus	1	2	2	7
Caretta caretta	3	4	2	-
Unidentified Sea Turtle	2	3	2	8
Mola mola	1	1	2	8
Manta birostris	3	4	2	-
Rhinoptera bonasus	1	200	2	7
Unidentified Chondrichthyes	4	5	2 to 3	-



# March 29, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Stenella frontalis	1	3	2	2
Stenella frontalis	1	13	2	2
Stenella frontalis	1	44	2	3
Stenella frontalis	1	6	2	3
Tursiops truncatus	1	8	2	1
Tursiops truncatus	1	4	2	2
Caretta caretta	24	37	2 to 3	-



# April 18, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Stenella frontalis	1	50	2	4
Tursiops truncatus	1	3	3	1
Tursiops truncatus	1	8	2	3
Caretta caretta	7	7	2 to 4	-
Manta birostris	1	1	4	7



# April 19, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Stenella frontalis	1	20	2	6
Stenella frontalis	1	38	2	10
Tursiops truncatus	1	28	3	2
Caretta caretta	12	17	2 to 3	-
Dermochelys coriacea	3	3	2	-
Unidentified Chondrichthyes	2	2	2 to 3	-



May 16, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Stenella frontalis	1	7	3	8
Stenella frontalis	1	15	3	8
Stenella frontalis	1	37	2	10
Caretta caretta	15	18	2 to 3	-
Unidentified Sea Turtle	2	2	2	5
Unidentified Chondrichthyes	1	1	2	2



# May 17, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Globicephala macrorhynchus	1	2	3	7
Globicephala macrorhynchus	1	2	3	off effort
Globicephala macrorhynchus	1	8	1	off effort
Stenella fronatlis	1	30	2	4
Stenella fronatlis	1	14	2	5
Stenella fronatlis	1	28	1	7
Tursiops truncatus	1	20	2	3
Caretta caretta	22	31	1 to 2	-
Dermochelys coriacea	4	4	1	-
Unidentified Sea Turtle	2	2	1	-
Unidentified Chondrichthyes	5	6	1 to 2	-



# July 6, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Grampus griseus	1	18	3	2
Grampus griseus	1	17	3	9
Stenella frontalis	1	30	2	3
Stenella frontalis	1	12	2	3
Steno bredanensis	1	35	2	2
Tursiops truncatus	1	6	3	1
Tursiops truncatus	1	7	3	3
Caretta caretta	18	25	2 to 3	-
Dermochelys coriacea	2	2	2 to 3	-
Unidentified Sea Turtle	1	1	2	5
Unidentified Chondrichthyes	1	1	3	6



July 7, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Grampus griseus	1	14	2	8
Stenella frontalis	1	2	2	4
Stenella frontalis	1	8	2	5
Stenella frontalis	1	38	2	8
Tursiops truncatus	1	8	3	4
Tursiops truncatus	1	3	2	6
Tursiops truncatus	1	2	2	7
Tursiops truncatus	1	8	2	7
Tursiops truncatus	1	2	2	8
Caretta caretta	28	50	1	-
Dermochelys coriacea	5	5	1 to 2	
Manta birostris	2	3	2 to 3	-
Unidentified Chondrichthyes	4	4	2 to 3	-



## September 22, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Grampus griseus	1	13	3	7
Stenella frontalis	1	26	2	5
Stenella frontalis	1	22	2	7
Stenella frontalis	1	26	2	10
Tursiops truncatus	1	8	2	1
Tursiops truncatus	1	6	2	3
Tursiops truncatus	1	12	2	3
Tursiops truncatus	1	12	2	5
Tursiops truncatus	1	11	2	8
Caretta caretta	19	24	1 to 3	-
Dermochelys coriacea	1	1	2	8
Manta birostris	2	5	1	5
Unidentified Chondrichthyes	1	1	2	1



# September 23, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Grampus griseus	1	8	3	8
Stenella frontalis	1	28	3	9
Steno bredanensis	1	28	3	1
Tursiops truncatus	1	5	3	3
Tursiops truncatus	1	3	3	10
Tursiops truncatus	1	2	4	10
Unidentified delphinid	1	2	3	2
Caretta caretta	9	10	3 to 4	-
Dermochelys coriacea	1	1	4	8
Manta birostris	1	1	3	1
Unidentified Chondrichthyes	3	3	3 to 4	-



## November 4, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Grampus griseus	1	8	3	8
Stenella frontalis	1	28	3	9
Steno bredanensis	1	28	3	1
Tursiops truncatus	1	5	3	3
Tursiops truncatus	1	3	3	10
Tursiops truncatus	1	2	4	10
Unidentified delphinid	1	2	3	2
Caretta caretta	7	8	3	-
Manta birostris	1	1	3	1
Unidentified Chondrichthyes	2	2	3	-



## November 5, 2012



Species	Number of Sightings	Number of Individuals	Beaufort Sea State	Line Number
Caretta caretta	2	2	3 to 4	-
Dermochelys coriacea	1	1	4	8
Unidentified Chondrichthyes	1	1	4	8



## PROTECTED SPECIES MONITORING IN THE JACKSONVILLE OPAREA OFF JACKSONVILLE, FLORIDA JANUARY 2012 - DECEMBER 2012



Andrew Read Heather Foley Lynne Hodge Zach Swaim

Duke University Marine Laboratory 135 Duke Marine Lab Road Beaufort, NC 28516

Submitted to: The Department of the Navy Norfolk, VA Jacksonville Vessel Surveys

## Methodology

## Study Area

The study area within the Jacksonville OPAREA (JAX) is approximately 5728 km<sup>2</sup>, surrounding the approximately 1700 km<sup>2</sup> proposed USWTR site. The survey area straddles the continental shelf break, including some of the Blake Plateau, and includes both shelf and pelagic waters (Figure 1).



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

### **Vessel Survey Data Collection**

### Visual Surveys

Vessel survey effort in the Jacksonville study area during 2012 focused on questions of residency and population structure of cetaceans. Visual surveys were conducted at a speed of approximately 10 knots primarily from the R/V *Starbuck*, a 7 m rigid hull inflatable, and the R/V *Stellwagen* (Figures 2a and b). The F/V *Wahoo II*, the F/V *Madame Butterfly* and the F/V *Jodie Lynn* were used on occasions when the R/V *Starbuck* and the R/V *Stellwagen* were unavailable. Observations were made from the rigid hull inflatable or from the vessel's flying bridge 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. The location, species and behavior of each cetacean group were recorded. If turtles were encountered, the location and species were

recorded. Environmental conditions (weather, sea state, depth and sea surface temperature) were recorded at each sighting and whenever sighting conditions changed. Sighting and environmental data were recorded using an iPad tablet and linked GPS unit. In addition, use of the survey area by individual cetaceans was examined using photo-identification and biopsy techniques. We also use photographs to confirm species identification at each sighting and to



*Figure 2*. Vessel survey platforms, the R/V *Starbuck* (a), and the R/V *Stellwagen* (b).

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. Remote biopsy sampling methods were employed to collect small skin and blubber samples using a variety of 27 kg – 68 kg pull crossbows, depending on the species and sampling distance. Biopsy samples were obtained with a specialized 2.5 cm stainless biopsy tip attached to a modified bolt, typically fired from the bow of the survey vessel.

### Passive Acoustic Monitoring

To collect time-series of acoustic data in the Jacksonville survey area, autonomous Highfrequency Acoustic Recording Packages (HARPs; Wiggins and Hildebrand 2007) were utilized. The HARP moored data-logging system includes a 16-bit A/D converter, a hydrophone suspended approximately 12 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 allows detection of both odontocete and mysticete whale vocalizations, and sample rates are high enough to capture the echolocation clicks of most odontocete species.

The HARP deployed at Site A on 24 January 2012 in 91 m at 30.28501° N, 80.22142° W (Table 1, Figure 3) was unable to be recovered and has now been abandoned. A retrieval trip was made on 23 August 2012, but there was no response from the acoustic releases despite several attempts

to communicate at various distances around the drop site. The most likely explanation for this lack in communication is that the acoustic release batteries were dead; although it is possible a component of the mooring failed and released the instrument early. Another trip was made on 5 February 2013 to search for this HARP. A Hummingbird 998c side-scan sonar was used to search the area and screen shots were taken of possible targets. The images were passed on to two experts, neither of whom were convinced the images showed the presence of the HARP. Because there are no other communication systems on the HARP, a decision was made to cease recovery efforts.

	Deployment	Retrieval			Depth			Amount
Site	Date	Date	Latitude	Longitude	(m)	Sampling Rate	Duty Cycle	of data
1A	30-Mar-09	16-Sep-09	30.27710	-80.21580	80	200 kHz	5-min on/10-min off	0.8 TB
1B	30-Mar-09	16-Sep-09	30.25820	-80.42820	40	200 kHz	5-min on/10-min off	2 TB
2A	16-Sep-09	21-Feb-10	30.28050	-80.21600	80	200 kHz	5-min on/10-min off	1.3TB
2B	23-Sep-09	21-Feb-10	30.25800	-80.42800	40	200 kHz	5-min on/10-min off	0.0 TB
3A	21-Feb-10	26-Aug-10	30.28110	-80.21530	90	200 kHz	5-min on/10-min off	2.0 TB
4B	9-Mar-10	26-Aug-10	30.25920	-80.42570	40	200 kHz	5-min on/10-min off	2.0 TB
5A	26-Aug-10	1-Feb-11	30.26819	-80.20894	90	200 kHz	5-min on/10-min off	2.0 TB
5B	26-Aug-10	1-Feb-11	30.25708	-80.43269	35	200 kHz	5-min on/10-min off	2.0 TB
6A	1-Feb-11	14-Jul-11	30.27818	-80.22085	91	200 kHz	5-min on/10-min off	2.0 TB
6B	2-Feb-11	14-Jul-11	30.25768	-80.42782	37	200 kHz	5-min on/10-min off	2.0 TB
7A	24-Jan-12		30.28480	-80.22110	77	200 kHz	Continuous	

Table 1. HARP deployments in the Jacksonville survey area.



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

### Data Analysis

Vessel survey effort and sighting data were compiled and mapped using *ArcGIS* 10.1 to illustrate the location of effort and sightings within the study area. All vessel sighting data collected from January 2012 through December 2012 have been posted on the data repository OBIS-SEAMAP (http://seamap.env.duke.edu/).

### Acoustic Analysis

### 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). New compression code was implemented starting in July 2010 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 using a *MATLAB*-based acoustic program called Triton (Hildebrand Lab at Scripps Institution of Oceanography, CA) to create 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 following methods are a summary of Debich *et al.* (2013). See Appendix A for a more detailed description of analysis methods. Members of the Scripps Whale Acoustics Lab manually scanned the data from the August 2010 – July 2011 HARP deployments at Sites A and

B (Figure 3, Table 1) for marine mammal vocalizations and anthropogenic sounds (sonar, explosions, and shipping) using LTSAs. As a first pass for data analysis, segments of data that did not allow for further analysis due to disk malfunctions or strumming noise were identified (Table 2). For effective analysis of marine mammal and anthropogenic sounds, the usable data were divided into three frequency bands ((1) low frequencies, between 10 - 1000 Hz, (2) mid frequencies, between 500 - 5000 Hz, and (3) high frequencies, between 1 - 100 kHz). The resulting LTSAs had resolutions of 5 s in time and 1 Hz in frequency (for the data decimated by a factor of 100: 10-1000 Hz band), 5 s in time and 10 Hz in frequency (for the data decimated by a factor of 20: 500-5000 Hz band), and 5 s in time and 100 Hz in frequency (for the data not decimated: 1-100 kHz). Each LTSA was analyzed for the sounds of an appropriate subset of species or sources. Blue, fin, sei, Bryde's, and North Atlantic right whale and a subset of minke sounds were classified as low frequency; humpback, minke, shipping, explosions, and midfrequency active sonar were classified as mid-frequency; and the remaining odontocete and sonar sounds were considered high-frequency. Low- and mid-frequency sounds were analyzed in hourly bins; high-frequency vocalizations were analyzed in one-minute bins. Vocalizations were assigned to species when possible.

Deployment	Gaps In Data for High- Frequency Analysis	Too Much Noise for High-Frequency Analysis	Gaps in Data for Mid- and Low-Frequency Analysis
JAX 05A	11/23/2010 22:48 – 11/24/2010 8:09		
		9/1/2010 23:49 – 9/3/2010 5:49	
JAX 05B		9/17/2010 20:17 – 9/21/2010 17:17	entire
		9/30/2010 18:30 – 10/1/2010 12:30	deployment
		11/12/2010 17:15 – 11/15/2010 11:15	
JAX 06A	2/12/2011 7:02 – 2/22/2011 5:16		2/12/2011 9:16 – end
JAX 06B	2/9/2011 7:00 - 2/12/2011 5:02		2/2/2011 14:20 - 2/12/2011 5:02

Table 2. Time periods when acoustic data were not available or amenable to analysis.

## Data Storage

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

### Results

### Vessel Survey Effort

Ten vessel surveys were conducted in 2012, totaling 937.4 km, or 58.6 hours, of survey effort (Table 3, Figure 4). Vessel surveys were conducted in Beaufort Sea States (BSS) 1 to 4, with most effort (82.2 %) performed in BSS 2 to 3 and 14.9 % in optimal (BSS 1) sighting conditions (Figure 5).

*Table 3.* Dates, kilometers, and hours surveyed during vessel surveys in the Jacksonville survey area, January 2012 – December 2012.

Date	Distance Surveyed (km)	Survey Time
7-Jan-12	55.6	4:54
8-Jan-12	148.2	9:36
9-Jan-12	75.4	5:18
24-Jan-12	111.3	6:36
25-Jan-12	111.0	6:54
30-Mar-12	131.0	7:18
3-Apr-12	111.0	6:24
19-Apr-12	72.1	4:48
23-Aug-12	80.2	3:36
24-Aug-12	41.6	3:12



*Figure 4*. Survey effort during vessel surveys in the Jacksonville survey area, January 2012 – December 2012.



*Figure 5*. Total distance surveyed by Beaufort Sea State during vessel surveys in the Jacksonville survey area, January 2012 – December 2012.

### Marine Mammal and Sea Turtle Sightings

Forty-one cetacean sightings were recorded during vessel surveys. Two species were encountered: Atlantic spotted dolphins (*Stenella frontalis*; n = 14) and bottlenose dolphins (*Tursiops truncatus*; n = 23). In addition, unidentified delphinids were recorded on four occasions (Tables 4 and 5). No mixed species groups were observed. Sightings per unit effort was highest in a BSS 1, with no sightings observed in BSS 4 (Figure 6). Forty-nine sea turtles were observed in the study area during 2012 (Table 6). Loggerhead sea turtles (*Caretta caretta*, n = 41) were most frequently recorded, followed by leatherbacks (*Dermochelys coriacea*; n = 4) and Kemp's ridley sea turtles (*Lepidochelys kempii*; n = 1). In addition, three unidentified sea turtles were recorded (Tables 6 and 7).

*Table 4*. Cetacean sightings from vessel surveys in the Jacksonville survey area, January 2012 – December 2012.

$ \begin{array}{c c c c c c c c c c c c c c c c c c c $					Depth	Temp		Group	Biopsy	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $				9		, ,	*		-	Images
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	07-Jan-12								0	0
$\begin{array}{c c c c c c c c c c c c c c c c c c c $							, , , , , , , , , , , , , , , , , , ,			98
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$							<u>^</u>			0
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	07-Jan-12	14:46	30.535050	-80.487540	35.6	20.7	T. truncatus		0	21
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	08-Jan-12	8:27	30.302510	-80.692110	34.1	24.0	T. truncatus		0	0
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	08-Jan-12	10:04	30.129170	-80.598160	39.4	23.4	T. truncatus	2	0	2
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	08-Jan-12	11:02	30.090920	-80.562920	42.5	23.1	T. truncatus	1	1	40
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	08-Jan-12	12:05	30.082710	-80.551950	43.6	22.8	T. truncatus	2	1	39
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	08-Jan-12	13:02	30.049128	-80.539590	39.6	22.2	T. truncatus	5	0	2
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	08-Jan-12	13:51	30.043610	-80.481190	no data	no data	T. truncatus	2	2	22
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	08-Jan-12	14:22	30.043800	-80.425060	no data	no data	T. truncatus	2	0	0
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	08-Jan-12	16:06	30.213870	-80.374605	36.4	22.3	S. frontalis	6	3	99
08-Jan-12   17:19   30.439300   -80.718710   39.3   22.3   Unid. delphinid   2   0   0     09-Jan-12   8:51   30.552327   -80.405027   38.7   22.2   T. truncatus   2   0   1     09-Jan-12   9:55   30.568610   -80.298770   41.5   23.1   S. frontalis   35   4   80     09-Jan-12   11:56   30.568020   -80.443080   36.3   21.4   T. truncatus   2   1   34     09-Jan-12   13:05   30.558680   -80.698080   no data   no data   T. truncatus   2   0   0     24-Jan-12   10:30   30.046740   -80.625285   38.7   22.1   T. truncatus   9   2   28     24-Jan-12   12:27   30.035810   -80.279440   64.9   23.2   T. truncatus   9   1   24     24-Jan-12   14:41   30.044770   -80.012910   304.8   25.0   T. truncatus   9   1   24	08-Jan-12	16:57	30.257300	-80.459550	39.0	24.4	T. truncatus	7	0	3
09-Jan-12   8:51   30.552327   -80.405027   38.7   22.2   T. truncatus   2   0   1     09-Jan-12   9:55   30.568610   -80.298770   41.5   23.1   S. frontalis   35   4   80     09-Jan-12   11:56   30.568020   -80.443080   36.3   21.4   T. truncatus   2   1   34     09-Jan-12   13:05   30.558680   -80.698080   no data   no data   T. truncatus   2   1   34     09-Jan-12   10:30   30.046740   -80.625285   38.7   22.1   T. truncatus   20   0   0     24-Jan-12   10:30   30.046740   -80.625285   38.7   22.1   T. truncatus   9   2   28     24-Jan-12   12:27   30.035810   -80.279440   64.9   23.2   T. truncatus   9   1   22     25-Jan-12   10:35   30.391806   -80.390716   41.2   23.2   T. truncatus   4   1   27	08-Jan-12	17:18	30.314706	-80.549449	38.9	22.9	Unid. delphinid		0	0
09-Jan-12 9:55 30.568610 -80.298770 41.5 23.1 S. frontalis 35 4 80   09-Jan-12 11:56 30.568020 -80.443080 36.3 21.4 T. truncatus 2 1 34   09-Jan-12 13:05 30.558680 -80.698080 no data no data T. truncatus 20 0 0   24-Jan-12 10:30 30.046740 -80.625285 38.7 22.1 T. truncatus 1 0 0   24-Jan-12 12:27 30.035810 -80.279440 64.9 23.2 T. truncatus 9 2 26   24-Jan-12 14:41 30.044770 -80.012910 304.8 25.0 T. truncatus 9 1 22   25-Jan-12 10:35 30.391806 -80.390716 41.2 23.2 T. truncatus 4 1 27   25-Jan-12 10:35 30.278380 -80.307960 47.5 23.6 T. truncatus 8 2 40   30-Mar-12 10:16 29.962724 -80.681119 36.5 23.1	08-Jan-12	17:19	30.439300	-80.718710	39.3	22.3	Unid. delphinid	2	0	0
09-Jan-12 11:56 30.568020 -80.443080 36.3 21.4 T. truncatus 2 1 34   09-Jan-12 13:05 30.558680 -80.698080 no data no data T. truncatus 20 0 0   24-Jan-12 10:30 30.046740 -80.625285 38.7 22.1 T. truncatus 1 0 0   24-Jan-12 12:27 30.035810 -80.279440 64.9 23.2 T. truncatus 9 2 28   24-Jan-12 14:41 30.044770 -80.012910 304.8 25.0 T. truncatus 9 1 24   25-Jan-12 10:35 30.391806 -80.390716 41.2 23.2 T. truncatus 4 1 27   25-Jan-12 10:35 30.391806 -80.390716 41.2 23.2 T. truncatus 4 1 27   25-Jan-12 11:50 30.361248 -80.320116 42.7 23.7 S. frontalis 25 2 11   25-Jan-12 15:08 30.278380 -80.307960 47.5 23.	09-Jan-12	8:51	30.552327	-80.405027	38.7	22.2	T. truncatus	2	0	1
09-Jan-12   13:05   30.558680   -80.698080   no data   no data   T. truncatus   20   0   0     24-Jan-12   10:30   30.046740   -80.625285   38.7   22.1   T. truncatus   1   0   0     24-Jan-12   12:27   30.035810   -80.279440   64.9   23.2   T. truncatus   9   2   28     24-Jan-12   14:41   30.044770   -80.012910   304.8   25.0   T. truncatus   9   1   24     25-Jan-12   10:35   30.391806   -80.390716   41.2   23.2   T. truncatus   9   1   24     25-Jan-12   10:35   30.391806   -80.390716   41.2   23.2   T. truncatus   4   1   27     25-Jan-12   11:50   30.361248   -80.320116   42.7   23.7   S. frontalis   25   2   11     25-Jan-12   15:08   30.278380   -80.307960   47.5   23.6   T. truncatus   8   2   40	09-Jan-12	9:55	30.568610	-80.298770	41.5	23.1	S. frontalis	35	4	80
24-Jan-12 10:30 30.046740 -80.625285 38.7 22.1 T. truncatus 1 0 0   24-Jan-12 12:27 30.035810 -80.279440 64.9 23.2 T. truncatus 9 2 28   24-Jan-12 14:41 30.044770 -80.012910 304.8 25.0 T. truncatus 9 1 22   25-Jan-12 10:35 30.391806 -80.390716 41.2 23.2 T. truncatus 4 1 27   25-Jan-12 10:35 30.361248 -80.320116 42.7 23.7 S. frontalis 25 2 11   25-Jan-12 15:08 30.278380 -80.307960 47.5 23.6 T. truncatus 8 2 40   30-Mar-12 10:16 29.962724 -80.681119 36.5 23.1 S. frontalis 1 0 0   30-Mar-12 10:16 29.980474 -80.527658 40.0 23.0 T. truncatus 2 1 20   03-Apr-12 10:18 30.584986 -80.787704 29.8 23.7	09-Jan-12	11:56	30.568020	-80.443080	36.3	21.4	T. truncatus	2	1	34
24-Jan-12 12:27 30.035810 -80.279440 64.9 23.2 T. truncatus 9 2 28   24-Jan-12 14:41 30.044770 -80.012910 304.8 25.0 T. truncatus 9 1 24   25-Jan-12 10:35 30.391806 -80.390716 41.2 23.2 T. truncatus 9 1 24   25-Jan-12 10:35 30.391806 -80.390716 41.2 23.2 T. truncatus 4 1 27   25-Jan-12 11:50 30.361248 -80.320116 42.7 23.7 S. frontalis 25 2 11   25-Jan-12 15:08 30.278380 -80.307960 47.5 23.6 T. truncatus 8 2 40   30-Mar-12 10:16 29.962724 -80.681119 36.5 23.1 S. frontalis 1 0 0   30-Mar-12 11:21 29.980474 -80.527658 40.0 23.0 T. truncatus 2 1 20   03-Apr-12 10:18 30.584986 -80.787704 29.8 23.7	09-Jan-12	13:05	30.558680	-80.698080	no data	no data	T. truncatus	20	0	0
24-Jan-12 14:41 30.044770 -80.012910 304.8 25.0 T. truncatus 9 1 24   25-Jan-12 10:35 30.391806 -80.390716 41.2 23.2 T. truncatus 4 1 27   25-Jan-12 11:50 30.361248 -80.320116 42.7 23.7 S. frontalis 25 2 11   25-Jan-12 15:08 30.278380 -80.307960 47.5 23.6 T. truncatus 8 2 40   30-Mar-12 10:16 29.962724 -80.681119 36.5 23.1 S. frontalis 1 0 0   30-Mar-12 10:16 29.980474 -80.527658 40.0 23.0 T. truncatus 2 1 20   03-Apr-12 10:18 30.584986 -80.787704 29.8 23.7 S. frontalis 7 2 13   03-Apr-12 10:45 30.574974 -80.746964 41.7 24.8 S. frontalis 2 0 4	24-Jan-12	10:30	30.046740	-80.625285	38.7	22.1	T. truncatus	1	0	0
25-Jan-12 10:35 30.391806 -80.390716 41.2 23.2 T. truncatus 4 1 27   25-Jan-12 11:50 30.361248 -80.320116 42.7 23.7 S. frontalis 25 2 11   25-Jan-12 15:08 30.278380 -80.307960 47.5 23.6 T. truncatus 8 2 40   30-Mar-12 10:16 29.962724 -80.681119 36.5 23.1 S. frontalis 1 0 0   30-Mar-12 11:21 29.980474 -80.527658 40.0 23.0 T. truncatus 2 1 20   03-Apr-12 10:18 30.584986 -80.787704 29.8 23.7 S. frontalis 7 2 13   03-Apr-12 10:45 30.574974 -80.746964 41.7 24.8 S. frontalis 2 0 4	24-Jan-12	12:27	30.035810	-80.279440	64.9	23.2	T. truncatus	9	2	28
25-Jan-1211:5030.361248-80.32011642.723.7S. frontalis2521125-Jan-1215:0830.278380-80.30796047.523.6T. truncatus824030-Mar-1210:1629.962724-80.68111936.523.1S. frontalis10030-Mar-1211:2129.980474-80.52765840.023.0T. truncatus212003-Apr-1210:1830.584986-80.78770429.823.7S. frontalis721303-Apr-1210:4530.574974-80.74696441.724.8S. frontalis204	24-Jan-12	14:41	30.044770	-80.012910	304.8	25.0	T. truncatus	9	1	24
25-Jan-1211:5030.361248-80.32011642.723.7S. frontalis2521125-Jan-1215:0830.278380-80.30796047.523.6T. truncatus824030-Mar-1210:1629.962724-80.68111936.523.1S. frontalis10030-Mar-1211:2129.980474-80.52765840.023.0T. truncatus212003-Apr-1210:1830.584986-80.78770429.823.7S. frontalis721303-Apr-1210:4530.574974-80.74696441.724.8S. frontalis204	25-Jan-12	10:35	30.391806	-80.390716	41.2	23.2	T. truncatus	4	1	27
25-Jan-12 15:08 30.278380 -80.307960 47.5 23.6 T. truncatus 8 2 40   30-Mar-12 10:16 29.962724 -80.681119 36.5 23.1 S. frontalis 1 0 0   30-Mar-12 11:21 29.980474 -80.527658 40.0 23.0 T. truncatus 2 1 20   03-Apr-12 10:18 30.584986 -80.787704 29.8 23.7 S. frontalis 7 2 13   03-Apr-12 10:45 30.574974 -80.746964 41.7 24.8 S. frontalis 2 0 4	25-Jan-12				42.7	23.7		25	2	113
30-Mar-12   11:21   29.980474   -80.527658   40.0   23.0   T. truncatus   2   1   20     03-Apr-12   10:18   30.584986   -80.787704   29.8   23.7   S. frontalis   7   2   13     03-Apr-12   10:45   30.574974   -80.746964   41.7   24.8   S. frontalis   2   0   4	25-Jan-12	15:08	30.278380	-80.307960	47.5	23.6	T. truncatus	8	2	40
30-Mar-12 11:21 29.980474 -80.527658 40.0 23.0 T. truncatus 2 1 20   03-Apr-12 10:18 30.584986 -80.787704 29.8 23.7 S. frontalis 7 2 13   03-Apr-12 10:45 30.574974 -80.746964 41.7 24.8 S. frontalis 2 0 4	30-Mar-12	10:16	29.962724	-80.681119	36.5	23.1	S. frontalis	1	0	0
03-Apr-12 10:45 30.574974 -80.746964 41.7 24.8 S. frontalis 2 0 4	30-Mar-12			-80.527658			Ň	2	1	20
03-Apr-12 10:45 30.574974 -80.746964 41.7 24.8 S. frontalis 2 0 4	03-Apr-12	10:18	30.584986	-80,787704	29.8		S. frontalis	7	2	133
	<b>^</b>						v			4
103 101 1211101100.001100.00000000000000000	<b>^</b>			-80.728924	31.2	23.0	S. frontalis	15	1	11
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Date	Time	Latitude	Longitude	Depth (m)	Temp (C <sup>o</sup> )	Species	Group Size	Biopsy Samples	Images
24-Aug-12	11:48	30.2284	-80.69776	no data	no data	T. truncatus	2	0	13
24-Aug-12	12:45	30.24054	-80.59054	35.8	27.4	S. frontalis	3	0	0
24-Aug-12	13:03	30.24542	-80.58164	35.6	27.5	T. truncatus	1	0	0

*Table 4 cont.* Cetacean sightings from vessel surveys in the Jacksonville survey area, January 2012 – December 2012.

*Table 5*. Number of cetacean sightings and mean group size for each species observed during Year 1 (July 2009 – June 2010), Year 2 (July 2010 – December 2011), and Year 3 (January 2012 – December 2012) of vessel surveys in the Jacksonville survey area.

		Sightings		
Species	Year 1	Year 2	Year 3	Mean Group Size
Globicephala macrorhynchus	3	0	0	33.3±18.0
Grampus griseus	2	0	0	21.5±19.1
Stenella frontalis	24	17	14	9.49±10.1
Tursiops truncatus	15	10	23	5.19±4.9
Unid. delphinid	12	1	4	1.88±0.8
Total:	56	28	41	



*Figure 6*. Number of cetacean sightings, corrected for kilometers on effort, observed in each Beaufort Sea State for vessel surveys in the Jacksonville survey area, January 2012 – December 2012.

				Depth	Temp		Group
Date	Time	Latitude	Longitude	(m)	$(\mathbf{C}^{0})$	Species	Size
7-Jan-12	14:26	30.52881	-80.52291	34.7	20.5	C. caretta	1
7-Jan-12	14:56	30.53563	-80.48869	no data	20.7	Unid. sea turtle	1
7-Jan-12	16:46	30.51769	-80.63006	no data	no data	C. caretta	1
8-Jan-12	10:10	30.12728	-80.59263	36.4	22.3	C. caretta	1
8-Jan-12	10:28	30.13513	-80.59181	36.4	22.3	D. coriacea	1
8-Jan-12	11:10	30.08998	-80.56569	39.0	24.4	C. caretta	1
8-Jan-12	13:43	30.04635	-80.50339	no data	no data	C. caretta	1
8-Jan-12	13:46	30.04716	-80.49131	no data	no data	C. caretta	1
8-Jan-12	13:52	30.04313	-80.48047	39.4	23.4	C. caretta	1
8-Jan-12	14:22	30.04378	-80.42519	42.5	23.1	C. caretta	1
8-Jan-12	15:03	30.06384	-80.32413	no data	no data	C. caretta	1
8-Jan-12	15:52	30.18344	-80.32745	46.9	22.7	C. caretta	1
8-Jan-12	16:00	30.20237	-80.35318	43.8	22.9	C. caretta	1
9-Jan-12	10:56	30.55439	-80.30574	no data	no data	C. caretta	1
9-Jan-12	11:44	30.56025	-80.41771	no data	no data	C. caretta	1
9-Jan-12	13:01	30.55874	-80.67901	no data	no data	C. caretta	1
24-Jan-12	11:29	30.04120	-80.43899	42.7	23.1	C. caretta	1
25-Jan-12	10:24	30.37499	-80.42109	39.3	23.1	C. caretta	1
25-Jan-12	13:06	30.37451	-80.27050	48.0	23.4	C. caretta	1
30-Mar-12	12:41	30.08129	-80.34201	44.3	23.9	C. caretta	1
30-Mar-12	15:45	30.22590	-80.33625	44.9	24.4	C. caretta	1
30-Mar-12	16:11	30.19662	-80.42101	42.1	24.8	C. caretta	1
30-Mar-12	16:23	30.18517	-80.44653	40.0	24.8	C. caretta	1
30-Mar-12	16:41	30.08891	-80.77534	31.0	23.8	D. coriacea	1
3-Apr-12	11:26	30.56961	-80.68411	27.6	23.0	C. caretta	1
3-Apr-12	11:33	30.56991	-80.66811	30.0	23.0	D. coriacea	1
3-Apr-12	12:11	30.59251	-80.56103	31.8	23.1	C. caretta	1
3-Apr-12	13:33	30.58566	-80.40822	38.7	24.1	C. caretta	1
3-Apr-12	13:38	30.58131	-80.38930	38.5	24.2	C. caretta	3
3-Apr-12	13:54	30.56496	-80.32273	40.5	24.8	C. caretta	1
3-Apr-12	13:57	30.56408	-80.31120	42.0	24.8	C. caretta	1
3-Apr-12	14:06	30.54881	-80.29303	42.5	24.8	C. caretta	1
3-Apr-12	14:07	30.54684	-80.29203	42.5	24.8	C. caretta	1
3-Apr-12	14:12	30.53233	-80.27777	42.7	24.8	D. coriacea	1

*Table 6*. Sea turtle sightings from vessel surveys in the Jacksonville survey area, January 2012 – December 2012.

Date	Time	Latitude	Longitude	Depth (m)	Temp (C <sup>o</sup> )	Species	Group Size
3-Apr-12	14:37	30.51631	-80.32857	41.7	24.9	Unid. sea turtle	1
3-Apr-12	15:12	30.52234	-80.33443	41.2	25.2	C. caretta	1
3-Apr-12	15:14	30.52274	-80.34369	40.6	25.4	C. caretta	1
3-Apr-12	15:20	30.52077	-80.36923	40.0	25.6	C. caretta	1
3-Apr-12	15:45	30.50381	-80.45624	37.9	25.6	C. caretta	1
3-Apr-12	16:25	30.46851	-80.53420	36.5	25.6	C. caretta	1
3-Apr-12	16:34	30.46036	-80.57900	36.8	25.7	C. caretta	1
3-Apr-12	16:44	30.44787	-80.63764	36.1	25.6	Unid. sea turtle	1
19-Apr-12	12:13	30.49084	-80.62481	31.1	23.3	C. caretta	1
19-Apr-12	12:17	30.48970	-80.63243	31.1	23.3	C. caretta	1
23-Aug-12	13:39	30.56676	-80.69705	no data	no data	L. kempii	1
24-Aug-12	12:17	30.22151	-80.66546	35.5	27.3	C. caretta	1
24-Aug-12	12:35	30.23511	-80.61733	35.0	27.4	C. caretta	1
24-Aug-12	13:05	30.24702	-80.58249	36.0	27.5	C. caretta	2
24-Aug-12	17:46	30.27985	-80.62569	33.8	27.5	C. caretta	1

*Table 6 cont*. Sea turtle sightings from vessel surveys in the Jacksonville survey area, January 2012 - December 2012.

*Table 7.* Number of sea turtle sightings and mean group size for each species observed during Year 1 (July 2009 – June 2010), Year 2 (July 2010 – December 2011), and Year 3 (January 2012 – December 2012) of vessel surveys in the Jacksonville survey area.

		Sightings		
Species	Year 1	Year 2	Year 3	Mean Group Size
Caretta caretta	49	23	41	1.0±0.2
Dermochelys coriacea	5	7	4	1.0±0.0
Lepidochelys kempii	1	0	1	1.0±0.0
Unid. sea turtle	3	8	3	1.0±0.0
Total:	58	38	49	
### Distributions and Habitat Associations of Cetaceans and Sea Turtles

The distribution of marine mammals and sea turtles in the Jacksonville study area is presented in Figures 7 through 11. Similar to observations made in previous years, Atlantic spotted dolphins were largely restricted to the relatively shallow shelf waters (Figure 8), whereas bottlenose dolphins were encountered throughout the survey area with one group detected in deeper offshore waters (Figure 9). All sea turtles were observed in relatively shallow waters over the continental shelf (Figure 11).



*Figure 7*. Distribution of all cetacean sightings made during vessel surveys in the Jacksonville survey area, January 2012 – December 2012.



*Figure 8.* Distribution of Atlantic spotted dolphin sightings indicating group size made during vessel surveys in the Jacksonville survey area, January 2012 – December 2012.



*Figure 9*. Distribution of bottlenose dolphin sightings indicating group size made during vessel surveys in the Jacksonville survey area, January 2012 – December 2012.



*Figure 10.* Distribution of unidentified delphinid sightings indicating group size made during vessel surveys in the Jacksonville survey area, January 2012 – December 2012.



*Figure 11*. Distribution of sea turtle sightings made during vessel surveys in the Jacksonville survey area, January 2012 – December 2012.

### Seasonality of Effort and Sightings

Due to unfavorable weather conditions, no survey effort was conducted in several months of the reporting period. It is, therefore, difficult 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 surveys (Figures 12 and 13).



*Figure 12.* Number of cetacean sightings by month and effort (km surveyed) for vessel surveys conducted in the Jacksonville survey area, January 2012 – December 2012.



*Figure 13*. Number of sea turtle sightings by month and effort (kilometers surveyed) for vessel surveys conducted in the Jacksonville survey area, January 2012 – December 2012.

### **Biopsy Sampling**

A total of 31 biopsy samples were collected in the Jacksonville survey area during 2012 from Atlantic spotted dolphins (n = 19) and bottlenose dolphins (n = 12)(Table 8, Figure 14). Skin samples will be analyzed for sex and population structure in the coming months. Voucher specimens of these samples are archived with the Southeast Fisheries Science Center in Lafayette, LA.

Date	Time	Latitude	Longitude	Species	Sample #
7-Jan-12	12:36	30.50247	-80.65608	Stenella frontalis	ZTS-12-001
8-Jan-12	11:39	30.09573	-80.56193	Tursiops truncatus	ZTS-12-002
8-Jan-12	12:14	30.08455	-80.55126	Tursiops truncatus	ZTS-12-003
8-Jan-12	13:58	30.03923	-80.48430	Tursiops truncatus	ZTS-12-004
8-Jan-12	14:02	30.03811	-80.48276	Tursiops truncatus	ZTS-12-005
8-Jan-12	16:24	30.21226	-80.38031	Stenella frontalis	ZTS-12-006
8-Jan-12	16:32	30.21042	-80.38461	Stenella frontalis	ZTS-12-007
8-Jan-12	16:35	30.21232	-80.38584	Stenella frontalis	ZTS-12-008
9-Jan-12	9:59	30.56845	-80.29752	Stenella frontalis	HJF-12-001
9-Jan-12	10:14	30.56838	-80.30261	Stenella frontalis	HJF-12-002
9-Jan-12	10:20	30.56763	-80.30446	Stenella frontalis	HJF-12-003
9-Jan-12	10:48	30.55512	-80.30578	Stenella frontalis	HJF-12-004
9-Jan-12	12:07	30.56538	-80.44226	Tursiops truncatus	ZTS-12-009
24-Jan-12	12:35	30.03811	-80.28133	Tursiops truncatus	ZTS-12-010
24-Jan-12	12:44	30.04162	-80.28565	Tursiops truncatus	ZTS-12-011
24-Jan-12	15:09	30.06070	-80.00417	Tursiops truncatus	HJF-12-005
25-Jan-12	10:40	30.38851	-80.39202	Tursiops truncatus	ZTS-12-012
25-Jan-12	11:52	30.35957	-80.31598	Stenella frontalis	ZTS-12-013
25-Jan-12	11:59	30.35317	-80.32049	Stenella frontalis	ZTS-12-014
25-Jan-12	15:14	30.27371	-80.30949	Tursiops truncatus	DMW-12-001
25-Jan-12	15:28	30.25899	-80.31058	Tursiops truncatus	DMW-12-002
30-Mar-12	11:27	29.98758	-80.52506	Tursiops truncatus	ZTS-12-020
3-Apr-12	10:24	30.58428	-80.77390	Stenella frontalis	ZTS-12-021
3-Apr-12	10:27	30.58594	-80.77408	Stenella frontalis	ZTS-12-022
3-Apr-12	11:05	30.57251	-80.73276	Stenella frontalis	HJF-12-006
3-Apr-12	13:11	30.59342	-80.44105	Stenella frontalis	HJF-12-007
3-Apr-12	13:16	30.59335	-80.44049	Stenella frontalis	HJF-12-008
3-Apr-12	14:46	30.51811	-80.32497	Stenella frontalis	ZTS-12-023
3-Apr-12	14:51	30.52029	-80.32563	Stenella frontalis	ZTS-12-024
3-Apr-12	16:02	30.48547	-80.50648	Stenella frontalis	HJF-12-009
3-Apr-12	16:09	30.48160	-80.50565	Stenella frontalis	HJF-12-010

*Table 8.* Biopsy samples collected in the Jacksonville survey area, January 2012 – December 2012.



*Figure 14*. Locations of biopsy sample collections in the Jacksonville survey area, January 2012 – December 2012.

Photographic Effort

Approximately 949 digital images were taken for species confirmation and individual identification during 2012 vessel surveys. Images of newly identified dolphins were added to existing catalogs (Table 9); photo-identification analysis is now complete for all images taken through December 2012. Photo-identification catalogues for *Tursiops truncatus* and *Stenella frontalis* currently consist of 41 and 60 individuals, respectively. Two individual spotted dolphins have been resighted within the Jacksonville survey area (Figure 15). 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. No resightings of marked individuals were observed in 2012. The photo-identification catalogs of bottlenose dolphins and Atlantic spotted dolphins from Onslow Bay, NC and Jacksonville, FL were also compared; this analysis is complete, but no matches were identified between the two study areas. Future efforts include developing a short-finned pilot whale (*Globicephala macrorhynchus*) catalog for the Jacksonville survey area and comparing those individuals with the short-finned pilot whale catalogs from Onslow Bay and Cape Hatteras.

Table 9. Number of images taken and catalog size per species during vessel surveys in the
Jacksonville survey area for Year 1 (July 2009 – June 2010), Year 2 (July 2010 – December
2011), and Year 3 (January 2012 – December 2012).

	Year 1		Yea	ar 2	Year 3		
Species	Images	Catalog Size	Images	Catalog Size	Images	Catalog Size	Matches
G. macrorhynchus	1368	0	0	0	0	0	0
G. griseus	405	1	0	1	0	1	0
S. frontalis	781	0	1267	41	633	60	2
T. truncatus	779	0	332	21	316	41	0



Figure 15. Locations of matched Stenella frontalis dolphins within the Jacksonville survey area.

#### Passive Acoustic Monitoring

#### HARP Analysis

The following is a summary of the analysis performed by Debich *et al.* (2013) at Scripps Institution of Oceanography. The full analysis report is found in Appendix A.

Underwater ambient noise during the August 2010 - July 2011 deployments at Sites A and B is shown in Figure 16. Tables 10 and 11 summarize the detected and identified marine mammal vocalizations for these deployments at Site A and at Site B, respectively. Figures 17 - 23 show the daily occurrence patterns for the different marine mammal groups (classified to species when possible). Figure 24 shows the occurrence of sonar.

Fin whale 20 Hz calls were detected at Site A in mid- to late January (Figure 17). Fin whale 40 Hz calls were not detected at either site, nor were there any 20 Hz calls at Site B.

Humpback whales were only detected at Site B (Figure 18). Only a few detections were made, likely because the migratory path of western North Atlantic humpbacks does not include the southeast US coastline, as they migrate from feeding areas in the Gulf of Maine (Katona & Beard 1990, Smith *et al.* 1999) to breeding areas in the Caribbean (Katona & Beard 1990, Stevick *et al.* 1998).

Minke whale slow-down/speed-up pulse trains were detected at both sites, with detections starting in December 2010 and continuing through the end of January 2011 at Site A and detections only in June 2011 at Site B (Figure 19). Minke whale regular pulse trains were only

recorded at Site A in mid-January 2011 (Figure 19). The general occurrence of minke whale pulse trains in the winter months is similar to previous findings. Pulse trains were only found at Site A previously. The June detection of a pulse train at Site B is a new finding in regard to season and site.

Downsweep calls similar to those ascribed to sei whales by Baumgartner *et al.* (2008) were detected at Site A, with detections occurring in November and December (Figure 20). No downsweep calls were detected at Site B.

The "5-pulse" call was detected late October through early December at Site A (Figure 21). No 5-pulse calls were recorded at Site B. The 5-pulse call is presumed to be produced by a mysticete due to its character, prevalence, and intensity.

Detected odontocete vocalizations included clicks and whistles (Figures 22-23). Most of these detections were assigned to the unidentified odontocete category, with clicks being divided into five main groups based on spectral patterns. Only a few detections were assigned to Risso's dolphins. Overall rates of unidentified odontocete detections were higher at Site A than B (Figure 22). Risso's dolphins were only detected at Site A, from the end of August until the end of November as well as the middle of January and beginning of March (Figure 23). A nighttime diel pattern is suggested from these detections. A greater number of Risso's click detections were observed during the August 2010 – July 2011 data sets than in previous data sets.



*Figure 16.* Monthly averages of ambient noise at Site A (top) and Site B (bottom) for August 2010 – July 2011 (for usable data).

*Table 10.* Summary of detections of marine mammal vocalizations at Site A. \*For mysticetes, total duration of vocalizations (hours) and percent of recording duration are based on data analyzed in hourly bins; for odontocetes, total duration of vocalizations (hours) and percent of recording duration are based on data analyzed in minute bins.

Species	Call type	Total duration of vocalizations (hours)*	Percent of recording duration*	Days with vocalizations	Percent of recording days
Fin whale	20 Hz	39	0.25	6	0.90
Humpback whale	song or non- song (unspecified)	0	0	0	0
Minke whale	pulse train (slow-down, speed-up)	105	0.67	14	2.11
Minke whale	pulse train (regular)	2	0.01	1	0.15
Possible sei whale	downsweep	7	0.04	2	0.30
Possible mysticete	5-pulse sound	120	0.76	24	3.62
Unidentified odontocete	clicks, whistles	1524.1	58.69	302	45.55
Risso's dolphin	clicks	16.07	0.62	21	3.17

*Table 11.* Summary of detections of marine mammal vocalizations at Site B. \*For mysticetes, total duration of vocalizations (hours) and percent of recording duration are based on data analyzed in hourly bins; for odontocetes, total duration of vocalizations (hours) and percent of recording duration are based on data analyzed in minute bins.

Species	Call type	Total duration of vocalizations (hours)*	Percent of recording duration*	Days with vocalizations	Percent of recording days
Fin whale	20 Hz	0	0	0	0
Humpback whale	song or non-song (unspecified)	1	0.01	1	0.15
Minke whale	pulse train (slow- down, speed-up)	1	0.01	1	0.15
Minke whale	pulse train (regular)	0	0	0	0
Possible sei whale	downsweep	0	0	0	0
Possible mysticete	5-pulse sound	0	0	0	0
Unidentified odontocete	clicks, whistles	655.35	24.13	287	43.29
Risso's dolphin	clicks	0	0	0	0



*Figure 17.* Fin whale detections (black bars) in hourly bins for the August 2010 – July 2011 Site A and B deployments. Note there were no detections at Site B. Dark gray shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil). Lighter shading indicates recording/analysis effort (detailed in Tables 1 and 2).



*Figure 18.* Humpback whale detections (black bars) in hourly bins for the August 2010 – July 2011 Site A and B deployments. Note there were no detections at Site A. Dark gray shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil). Lighter shading indicates recording/analysis effort (detailed in Tables 1-2).



*Figure 19.* Minke whale slow-down/speed-up pulse train detections (black bars) and regular pulse train (pink bars) in hourly bins for the August 2010 – July 2011 Site A and B deployments. Note there were no regular pulse trains detected at Site B. Dark gray shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil). Lighter shading indicates recording/analysis effort (detailed in Tables 1-2).



*Figure 20.* Hourly bins of downsweep detections (black bars) that may be produced by sei whales (Baumgartner *et al.* 2008) for the August 2010 – July 2011 Site A and B deployments. Note there were no detections at Site B. Dark gray shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil). Lighter shading indicates recording/analysis effort (detailed in Tables 1-2).



*Figure 21.* Hourly bins of 5-pulse call detections (black bars) that are likely produced by a mysticete for the August 2010 – July 2011 Site A and B deployments. Note there were no detections at Site B. Dark gray shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil). Lighter shading indicates recording/analysis effort (detailed in Tables 1-2).



*Figure 22.* Unidentified odontocete vocalization detections (black bars) in minute bins for the August 2010 – July 2011 Site A and B deployments. Dark gray shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil). Lighter shading indicates recording/analysis effort (detailed in Tables 1-2).



*Figure 23.* Risso's dolphin click detections (black bars) in minute bins for the August 2010 – July 2011 Site A and B deployments. Note there were no detections at Site B. Dark gray shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil). Lighter shading indicates recording/analysis effort (detailed in Tables 1-2).



*Figure 24.* Mid-frequency active sonar (black bars) detected in hourly bins during the August 2010 – July 2011 Site A and B deployments. Dark gray shading indicates periods of darkness, determined from the U.S. Naval Observatory (http://aa.usno.navy.mil). Lighter shading indicates recording/analysis effort (detailed in Tables 1-2).

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# Passive Acoustic Monitoring for Marine Mammals in the Jacksonville Range Complex 2010-2011

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Photo by Amanda J. Debich

# MPL TECHNICAL MEMORANDUM # 541

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# **Executive Summary**

Passive acoustic monitoring was conducted at two sites in the US Navy's Jacksonville Range Complex during August 2010 – July 2011. These sites are located 50 and 61 nm east of the Florida coastline on the shelf and shelf break at water depths of 40 m – 90 m. Acoustic data collected at these sites provide information on the presence of marine mammals and anthropogenic sound sources. High-frequency Acoustic Recording Packages (HARPs) documented sounds between 10 Hz and 100 kHz with recording cycles of 5 minutes every 15 minutes. The data were divided into three frequency bands and data analysis was conducted with analyst scans of long-term spectral averages and spectrograms.

Four mysticete whale species were recorded: fin, minke, sei, and humpback. No blue whale, North Atlantic right whale, or Bryde's whale calls detected. A new call, designated the "5-pulse" was detected and is presumed to be produced by a mysticete whale due to its character, prevalence and intensity. Site A has more hours with calling mysticete whales than site B. However, humpback whale calls were detected only at site B, though these detections were few.

The largest number of odontocete detections were attributed to unidentified odontocetes, thought to be primarily bottlenose and Atlantic spotted dolphins. Unidentified odontocetes were detected throughout the year. Overall numbers of detections were higher at site A than site B. There was a diel acoustic activity pattern with greater numbers of echolocation clicks produced at night, likely due to nighttime foraging. Risso's dolphin echolocation clicks were only detected at site A and only occurred August through March. Five click types, yet to be associated to an odontocete species, were characterized and their seasonal and diel occurrence described.

Ship noise was the most common anthropogenic sound at both sites A and B. Both sites had Mid-Frequency Active (MFA) sonar events throughout the period of data collection. At site A, a total of 2,437 MFA sonar pings were detected with a maximum peak-to-peak received level of 173 dB re 1  $\mu$ Pa. Similarly, a total of 2,496 MFA sonar pings were detected at site B, reaching a maximum peak-to-peak level of 166 dB re 1  $\mu$ Pa. Echosounder pings with a variety of primary frequencies (4 – 80 kHz) were found at both sites A and B. Explosions were recorded at both sites, though were more prevalent at site B. A low-frequency tone, referred to as the 130 Hz tone, was recorded at site A. High noise levels, possibly caused by instrument strumming and fluid flow at the sensor, occurred intermittently at both sites and likely decreased the detection range for low-frequency sounds.

# **Project Background**

The US Navy's Jacksonville Range Complex (JAX) is located within the South Atlantic Bight that extends from Cape Hatteras, North Carolina to the Florida Straits. The sea floor is relatively smooth and features a broad continental shelf, with an inner zone of less than 200 m water depth, and an outer zone extending to water depths of 2000 m. A diverse array of marine mammals are found in this region, including mysticete whales, dolphins and other toothed whales, and manatees.

In April 2009, an acoustic monitoring effort was initiated within the boundaries of JAX with support from the Atlantic Fleet under contract to Duke University. The goal of this effort was to characterize the vocalizations of marine mammal species present in the area, to determine their year-round seasonal presence, and to evaluate the potential for impact from Naval operations. This report documents the analysis of two High-frequency Acoustic Recording Packages (HARPs) that have been deployed within JAX during the time period August 2010 – July 2011. The JAX-B HARP site is 50 miles east of the Florida coastline and the JAX-A HARP site is approximately 11 nm further offshore (Figure 1).



Figure 1. Locations of High-frequency Acoustic Recording Packages (yellow pins) at sites A and B in the Jacksonville Range Complex. The red bar represents 10 nm.

## Methods

### **High Frequency Acoustic Recording Packages**

High-frequency Acoustic Recording Packages (HARPs) were used to detect marine mammal species, anthropogenic noise, and ambient noise in the JAX Range Complex. HARPs record underwater sounds from 10 Hz to 100 kHz with approximately 110 days of continuous data storage. Recording a broad frequency range of 10 Hz - 100 kHz is required to detect both baleen whale (mysticetes), and toothed whale (odontocetes) species. The HARP sensor and mooring package are described in Wiggins and Hildebrand (2007). For the JAX range deployments, the HARP electronics package was located near the seafloor with the hydrophone suspended 10 m above. Each HARP is calibrated in the laboratory to provide a quantitative analysis of the received sound field. Representative data loggers and hydrophones are calibrated at the Navy's TRANSDEC facility to verify the laboratory calibrations.

### **Data Collected to Date**

Acoustic data have been collected at two sites since April 2009 (Table 1). The two sites are designated site A (30° 16.6 N, 80° 13.0 W, depth 80-90 m) and site B (30° 15.5 N, 80° 25.7 W, depth 40 m). Site A was placed at the shelf break, site B was on the shelf, approximately 11 nm apart.

Deployment Designation	Site A Recording Period	Site B Recording Period	
JAX 01	4/2/2009-5/25/2009	4/2/2009-9/5/2009	
JAX 02	9/16/2009-12/27/2009		
JAX 03	2/22/2010-7/30/2010		
JAX 04		3/9/2010-8/19/2010	
JAX 05	8/26/2010-1/25/2011	8/27/2010-2/1/2011	
JAX 06	2/1/2011-7/14/2011	2/2/2011-7/14/2011	

Table 1. JAX HARP data sets. Periods of acoustic data analyzed in this report are shown in bold.

### **Data Analysis**

To assess the quality of the acoustic data, frequency spectra were calculated for all the data (over oneyear at each of the two instruments) using a time average of 5 seconds and frequency bins of 1 Hz. These data, called Long-Term Spectral Averages (LTSA) were examined both for characteristics of ambient noise and also as a means to discover marine mammal and anthropogenic sounds. As a first pass for data analysis, segments of data that did not allow for further analysis due to disk malfunctions or strumming noise were identified (Table 2). Table 2. Periods when acoustic data were not available or amenable to analysis.

Deployment Name	Gaps In Data for High- Frequency Analysis	Too Much Noise for High-Frequency Analysis	Gaps in Data for Mid- and Low- Frequency Analysis
JAX 05A	11/23/2010 22:48 - 11/24/2010 8:09		
JAX 05B		9/1/2010 23:49 – 9/3/2010 5:49 9/17/2010 20:17 – 9/21/2010 17:17 9/30/2010 18:30 – 10/1/2010 12:30 11/12/2010 17:15 – 11/15/2010 11:15	entire deployment
JAX 06A	2/12/2011 7:02 – 2/22/2011 5:16		2/12/2011 9:16 – end
JAX 06B	2/9/2011 7:00 – 2/12/2011 5:02		2/2/2011 14:20 – 2/12 5:02

The presence of acoustic signals from multiple marine mammal species was analyzed, along with the presence of anthropogenic noise such as sonar, explosions, and shipping. All data were analyzed by visually scanning LTSAs in appropriate frequency bands. When a sound of interest was identified in the LTSA, the waveform or spectrogram at the time of interest was examined to further classify particular sounds to species or source. Acoustic classification was carried out either by comparison to species-specific spectral characteristics or by analysis of the time and frequency character of individual sounds.

To document the data analysis process, we describe the major classes of marine mammal calls and anthropogenic sounds in the JAX region, and the procedures used to test for their presence in the HARP data. For effective analysis, the data were divided into three frequency bands and each band was analyzed for the sounds of an appropriate subset of species or sources. The three frequency bands are as follows: (1) low frequencies, between 10 - 1000 Hz, (2) mid frequencies, between 500 - 5000 Hz, and (3) high frequencies, between 1 - 100 kHz. Blue, fin, sei, Bryde's, and North Atlantic right whale and a subset of minke sounds were classified as low frequency; humpback, minke, shipping, explosions, and mid-frequency active sonar were classified as mid-frequency; while the remaining odontocete and sonar sounds were considered high-frequency. We describe the calls and procedures separately for each frequency band.

### **Low Frequency Marine Mammals**

For the low frequency data analysis, the 200 kHz sampled raw-data were decimated by a factor of 100 for an effective bandwidth of 1 kHz. Long-term spectral averages (LTSAs) of these data were created using a time average of 5 seconds and frequency bins of 1 Hz. The presence of each call type was determined in hourly bins. A subset of each call type was measured for start and end frequencies and duration (**Table 3**).

Table 3. Low-frequency whale calls in JAX data. Mean values (± one standard deviation) are presented. Calls for the 5-pulse were separated by a minimum of 24 hours to obtain calls from multiple animals. Other call types occurred in clusters and therefore measurements may represent an individual animal more than once.

Species/Call	Call Type	Start Frequency (Hz)	End Frequency (Hz)	Duration (s)
Fin whale	20 Hz pulse (n=30)	27.2 ± 2.0	16.4 ± 0.6	1.6 ± 0.3
	50 Hz pulse (n=2)	56.5 ± 2.1	54.5 ± 2.1	64.5 ± 14.8
Minke whale	150 Hz speed-up/ slow-down (n=18)	166.2 ± 5.0	163.6 ± 5.2	36.6 ± 7.9
Sei whale	Downsweep (n=23)	120.8 ± 14.6	46.2 ± 4.4	1.5 ± 0.2
5-pulse	5-pulse (n=30)	178.5 ± 22.3	185.9 ± 22.2	2.7 ± 0.5

Whale calls for which low frequency effort was expended include: blue whale A, B and arch calls, fin whale 20 and 40 Hz pulses, Bryde's whale Be7 and Be9 calls, North Atlantic right whale upcall, in addition to sei whale calls, and the "5- pulse" call type of unknown origin (presumably baleen whale). The same LTSA and spectrogram parameters were used to detect all call types. For spectrogram scrolling, the LTSA frequency was set to display between 1-500 Hz. To observe individual calls, spectrogram parameters were typically set to 120 seconds by 200 Hz. The FFT was generally set between 1500 and 2000 data points (yielding about 1 Hz frequency resolution), with an 85-95% overlap of data in the input time series. **Table 3** presents measurements of frequency and duration for each recorded call type.

#### **Blue Whales**

Several different calls were used to test for the presence of blue whales. Detection effort included call types A, B, and arch from Mellinger and Clark (2003) (Figure **2**). The A call is a constant 18-19 Hz tone lasting approximately 8 seconds while the B call is an 18-15 Hz downsweep lasting approximately 11 seconds. Individual A and B calls are readily detected in an LTSA, owing to their long duration. The third call, the arch call, starts at a frequency of 56 Hz, ascends to a peak frequency of 69 Hz, then descends to 35 Hz over a period of 6.3 seconds (Figure **3**). Manual scanning of the LTSA was the primary means to search for blue whale calls, however, no blue whale calls of any type were detected in the JAX data.



Figure 2. Blue whale A and B calls from Mellinger and Clark (2003).



Figure 3. Blue whale arch calls from Mellinger and Clark (2003).
### **Fin Whales**

Fin whales produce a variety of calls, most are less than 100 Hz, short in duration, and frequencymodulated. The best known fin whale call is the 20 Hz pulse, downswept at 30 - 15 Hz (Figure 4). These pulses occur at regular intervals as song (Thompson *et al.* 1992), and at irregular intervals as countercalling between multiple animals (McDonald *et al.* 1995). In this report we indicate the presence of 20 Hz pulses, but do not categorize them as either song or irregular interval calls. Watkins (1981) and Širović *et al.* (2012) also report a fin whale 40 Hz pulse which sweeps down in frequency from 75 to 40 Hz (Figure 5). While there was logging effort for these calls, however, no 40 Hz pulses were detected in the JAX acoustic data.





Figure 4. Fin whale 20 Hz pulse, created in regular pattern or song. Site A on January 24, 2011.

Figure 5. Fin whale 40 Hz pulse, from Bering Sea HARP data.

### **Minke Whales**

Minke whales in the North Atlantic produce long pulse trains. Mellinger *et al.* (2000) describe minke whale pulse sequences as speed-up and slow-down pulse trains (increasing and decreasing pulse rate), centered around 150 Hz (Figure **6**). Another type of pulse train centered around 50 Hz (50 Hz pulse) has also recently been found in the North Atlantic (Figure **7**).



Figure 6. Minke whale speed-up/slow-down pulse train. Site A on February 10, 2011.



Figure 7. Minke whale 50 Hz pulses. Site A on January 17, 2011.

### **Bryde's Whales**

Bryde's whales inhabit tropical and subtropical waters worldwide (Omura 1959, Wade & Gerrodette 1993), and the JAX region is considered their northerly range limit. The Be7 call is one of several call types in the Bryde's whale repertoire, first described in the Southern Caribbean (Oleson *et al.* 2003). The Be7 call has a fundamental frequency of 44 Hz and ranges in duration between 0.8 and 2.5 seconds with an average intercall interval of 2.8 minutes (Figure **8**). The Be9 call type, described for the Gulf of Mexico (Sirovic *et al.* 2013), is a downswept pulse ranging from 143 to 85 Hz, with each pulse approximately 0.7 seconds long (Figure **9**). Neither Bryde's whale call type was detected in the JAX data.



Figure 8. Spectrogram of Bryde's whale Be7 call type, from Oleson et al. (2003).



Figure 9. Bryde's whale Be9 call type from Sirovic et al. (2013).

### Sei Whale

Sei whales are found primarily in temperate waters and undergo annual migrations between lower latitude winter breeding grounds and higher latitude summer feeding grounds (Mizroch *et al.* 1984, Perry *et al.* 1999). While several sounds have been attributed to sei whales, we report on a low frequency downsweep call similar to those Baumgartner reports as sei whale calls (Baumgartner *et al.* 2008). These calls typically sweep from a starting frequency around 100 Hz to an ending frequency around 40 Hz (Figure **10**).



Figure 10. Downsweep calls believed to be from Sei whales. Site A on December 26, 2010.

### North Atlantic Right Whale

The North Atlantic right whale is a critically endangered whale found in the Western North Atlantic. Several call types that have been described for the North Atlantic right whale including the scream, gunshot, blow, upcall, warble, and downcall (Parks & Tyack 2005). For low-frequency analysis, we examined the data for upcalls, which are approximately 1 second in duration and range between 80 Hz and 3 kHz (Figure 11). No right whale upcalls were detected.



Figure 11. Right whale upcall call from Parks and Tyack (2005).

### **Five pulse calls**

One call type that has not been described previously, 5 pulse (Figure 12), was recorded commonly at site A. While we do not know which species is responsible for the production of this call, its frequency and temporal characteristics, as well as relatively loud levels, leads us to believe they were likely produced by a baleen whale and thus we included it in this analysis.



Figure 12. LTSA (top) of a band of 5 pulse calls and a spectrogram (bottom) of a single 5 pulse call (750-point FFT, 98% overlap) recorded on 26 August 2010 at site A.

### **Mid-Frequency Marine Mammals**

For mid-frequency data analysis, the raw 200 kHz HARP data were decimated by a factor of 20 for an effective bandwidth of 5 kHz. The LTSAs for mid-frequency data analysis are created using a time average of 5 seconds, and a frequency bin size of 10 Hz. The presence or absence of each call type was determined in hourly bins.

Mid-frequency sounds monitored in this report include: humpback whale, minke whale speed-up/slowdown pulses, North Atlantic right whale gunshot calls, and killer whale whistles. LTSA search parameters used to search for each sound are given in Table 4.

	LTSA Search Parameters	
<u>Species</u>	Plot Length (Hr)	Frequency Range (Hz)
N Atlantic Right Whale (gunshot calls)	0.75	1000-5000
Killer Whale (whistles)	3.0	0-5000

### Table 4. Mid-frequency data analysis search parameters.

## **Humpback Whale**

Humpback whales song is categorized by the repetition of units, phrases and themes as defined by Payne and McVay (1971). Non-song vocalizations such as social sounds and feeding sounds consist of individual units that can last from 0.15 to 2.5 seconds (Dunlop *et al.* 2007, Stimpert *et al.* 2011). Most humpback whale vocalizations have acoustic energy between 100-3000 Hz (Figure **13**). For this report we detected humpback calls (both song and non-song) using the generalized power-law algorithm (Helble *et al.* 2012), and then used a trained analyst to verify the accuracy of the detected signals.



Figure 13. Humpback whale calls recorded at site A on April 13, 2011.

## North Atlantic Right Whale

North Atlantic right whale gunshot calls are high intensity (~196 dB pp re 1  $\mu$ Pa) and broadband (20 Hz – 20 kHz) (Parks *et al.* 2005) and were therefore included in mid-frequency analysis. Gunshot calls exhibit an initial signal followed by prolonged reverberation (Figure **14**). Although these calls are capable of being detected at a several miles range, no right whale gunshot calls were detected in the JAX data.



Figure 14. North Atlantic Right whale gunshot call from Parks et al, 2005.

# **Killer Whale**

Killer whales are a cosmopolitan species, though little is known about killer whales off the east coast of the United States (Gormley 2000). Few sightings of killer whales have ocurred on the shelf (Katona *et al.* 1988). Acoustic parameters from known Western Atlantic killer whale calls were used to search for killer whale calls (Figure **15**). Neither killer whale whistles, calls nor clicks were detected in the JAX data.



Figure 15. Killer whale vocalizations from Steiner et al. (1979).

### **High-Frequency Marine Mammals**

For the high frequency data analysis, spectra were calculated for the full effective bandwidth of 100 kHz. The LTSAs were created using a time average of 5 seconds and a frequency bin size of 100 Hz. The presence of call types was determined in one-minute bins.

### **Unidentified Dolphin**

Delphinid sounds can be categorized as either: (1) echolocation clicks, (2) buzz pulses, or (3) whistles. Dolphin echolocation clicks are broadband impulses with the majority of energy between 20 and 80 kHz. Buzz pulses are rapidly repeated clicks that have a creak or buzz-like sound quality; they are in approximately the same frequency band as the echolocation clicks. Dolphin whistles are tonal calls predominantly between 5 and 25 kHz that vary in their degree of frequency modulation as well as duration. These signals are easily detectable in an LTSA as well as the spectrogram (Figure 16). Only some delphinid sounds are distinguishable by species based on the character of their clicks, buzz pulses or whistles (Roch *et al.* 2011, Roch *et al.* 2007).



Figure 16. LTSA (top) and spectrogram (bottom) of odontocete echolocation clicks and whistles.

### **Risso's Dolphin**

Risso's dolphin echolocation clicks can be identified to species by their distinctive banding patterns in the LTSA (Figure 17). Risso's dolphin echolocation clicks in southern California are known to have energy peaks at 22, 26, 30, and 39 kHz (Soldevilla *et al.* 2008). Our analysis found Risso's dolphin energy peaks at 23, 26, 35, 44 kHz (Figure **18**), similar to that reported for the JAX area (Soldevilla et al. 2011).



Figure 17. Risso's dolphin click bout in LTSA (above) and spectrogram (below). A distinctive banding pattern is seen in the LTSA.



Figure 18. Risso's dolphin echolocation click mean spectra. Arrows show locate spectral peaks.

#### **Echolocation Click Types**

An analysis was conducted to describe echolocation clicks from unidentified odontocetes (UO). Click type (CT) mean spectra from HARP recordings in the Gulf of Mexico, analyzed and defined by Kait Frasier, and off the coast of North Carolina, analyzed and defined by Lynne Williams, were used as templates. These previous analyses were combined and provided thirteen distinct mean click spectra. All click types had dominant energy above 20 kHz. They differed in the prominence of spectral peaks below 20 kHz, and in the slope and onset of the lower frequency bound in their main spectral energy band. A custom software routine displayed mean click templates and overlaid novel spectra of manually detected acoustic encounters in JAX. A trained analyst determined, based on spectral content, whether an acoustic encounter remained UO or was classified as a CT. Based on a complete analysis of all deployments reported here, five CT (Figure **19**) were identified at least ten times within one deployment and will be described below. CT were then assigned names based on the frequency at which their spectra reached 50% of maximum energy (e.g CT25 = 25 kHz for the 50% energy level).



Figure 19. Echolocation click types (CT) that occurred in JAX recordings repeatedly. Numerical values (e.g. CT25 = 25 kHz) refers to low end of 50% energy bandwidth.

CT 25 (Figure **20**) reaches its 50% maximum energy at approximately 25 kHz and has a peak frequency of about 33 kHz. It has a smaller peak at 15 kHz with troughs at 12 and 20 kHz (Figure **21**).



Figure 20. CT25 in the LTSA (above) and spectrogram (below).



Figure 21. Mean Spectra of clicks for CT25. Example encounter (black line), template for CT (blue line; from G of Mex and/or North Carolina), noise floor (dotted line). Arrows are spectral peaks or troughs.

CT 26 (Figure **22**) reaches its 50% maximum energy at approximately 26 kHz and has a peak frequency of about 35 kHz. It has a smaller peak at 18 kHz with troughs at 15 and 21 kHz (Figure **23**).



Figure 22. CT26 in the LTSA (above) and spectrogram (below).



Figure 23. Mean Spectra of clicks for CT26. Example (black line), template (blue line), and noise floor (dotted line). Arrows are spectral peaks or troughs.

CT 27 (Figure **24**) reaches its 50% maximum energy at approximately 27 kHz and has a peak frequency of about 35 kHz. It has a smaller peak at 16 kHz ranging with troughs at 11 and 20 kHz (Figure **25**).



Figure 24. CT27 in the LTSA (above) and spectrogram (below).



Figure 25. Mean spectra of CT27. Example (black line), template (blue line), and noise floor (dotted line). Arrows are spectral peaks or troughs.

CT 30 (Figure **26**) reaches its 50% maximum energy at approximately 30 kHz and has a peak frequency of about 37 kHz. It has a smaller peak at 16 kHz with troughs at 12 and 22 kHz (Figure **27**).



Figure 26. CT30 in the LTSA (above) and spectrogram (below).



Figure 27. Mean Spectra of CT30. Example (black line), template (blue line), and noise floor (dotted line). Arrows are spectral peaks or troughs.

CT 32 (Figure 28) reaches its 50% maximum energy at approximately 32 kHz and has a peak frequency of about 39 kHz. It has a smaller peak at 17 kHz with troughs at 15 and 22 kHz (Figure 29). Clicks with high received level (Figure **30**) show a peak between 4-6 kHz (Figure **31**). This low peak becomes apparent in LTSAs but a high pass filter cuts it out in the mean spectra.



Figure 28. CT32 in the LTS A (above) and spectrogram (below).



Figure 29. Mean Spectra of CT32. Example (black line), template (blue line), and noise floor (dotted line). Arrows are spectral peaks or troughs.



Figure 30. CT32 (emphasizing 4-6 peak) in the LTSA (above) and spectrogram (below).



Figure 31. Mean Spectra of CT32. Example (black line), template (blue line), and noise floor (dotted line). Arrows are spectral peaks or troughs.

## **Sperm Whale**

Sperm whales produce echolocation clicks in the frequency range 5 – 20 kHz. Care must be taken not to misclassify impulsive anthropogenic sounds that maintain a similar frequency to sperm whales. No definitive sperm whale encounters were found in the JAX data. Similar findings were reported by Soldevilla et al. (2011).

### Anthropogenic Sounds

### **Broadband Ship Noise**

Broadband ship noise occurs when a ship passes relatively close to the HARP. Ship noise can occur for many hours at a time, but broadband ship noise typically lasts from 10 minutes up to 3 hours. Ship noise has a characteristic interference pattern in the LTSA. Combination of direct paths and surface reflected paths produce constructive and destructive interference (bright and dark bands) in the spectrogram that vary by frequency and distance between the ship and the HARP (Figure **32**). This noise can extend to well above 10 kHz, though typically falls off above a few kHz.



Figure 32. Broadband ship noise in the LTSA (above) and spectrogram (below).

## Mid-Frequency Active Sonar

Many types of active sonar are used in the Jacksonville Range Complex. Their frequencies span 1 kHz to over 50 kHz and include short duration pings, frequency modulated (FM) sweeps and short and long duration continuous wave (CW) tones. One common type of sonar used in JAX is mid-frequency active (MFA) sonar. Sounds from MFA sonar vary in frequency and duration and can be used in a combination of FM sweeps and CW tones; however, many of these are between 2 and 5 kHz and are generically known as '3.5 kHz' sonar. We describe the process for identifying MFA sonar and how pings from these events were analyzed, including counts and distributions of sonar levels.

The first step in analyzing MFA sonar was conducted by an analyst scanning for periods of sonar activity. Start and end times of MFA sonar events from LTSAs were noted to provide target periods for automatic

detections. Full bandwidth (10Hz - 100kHz) data were used to calculate the spectra for the LTSAs with 100 Hz frequency bin-width and 5 s time bin width. These spectra were arranged sequentially to provide a long-term spectrogram so that hours of data can be easily displayed for analysis. Individual MFA sonar pings typically span 1 - 3 s, but are intense enough to show up as 'pulses' in LTSA plots (Figure **33**). LTSA display parameters used by the analyst were 1 or 2 hour window length, and 2 - 5 kHz bandwidth.



Figure 33. Mid-frequency active (MFA) sonar event. (Top) Long-Term Spectral Average of 45 minutes of data. (Bottom) Spectrogram of with multiple sonar pings.

A custom developed software routine was used to detect sonar pings and calculate peak-to-peak (PP) received sound pressure levels. For this detector, a sonar ping is defined as the presence of sonar within a 5 s window and may contain multiple individual pings (Figure 33. The detector calculates the average spectral level across the frequency band from 2.4 to 4.5 kHz for each 5 s window. This provides a long-term time series of the average received levels in that frequency band. Minimum values were noted for each 15 time bins, and used as a measure of background noise level over the sonar event period. Spectral bins that contained system noise (disk writing) were eliminated. Each of the remaining average spectral bins was compared to the background minimum levels. If levels were more than 3 dB above the background, then a detection time was noted. These detection times were used to index to the original time series to calculate PP levels. Received PP levels were calculated by differencing the maximum and minimum amplitude of the time series in the 5 s window. The raw time series amplitudes are in units of analog-to-digital converter (ADC) counts. These units were corrected to  $\mu$ Pa by using the HARP calibrated transfer function for this frequency band. The HARP response is not flat over the 2.4 – 4.5 kHz band, and the value at 3.3 kHz was used to approximate the entire band. The transfer function value

for site 5A was 83.1 dB re  $\mu$ Pa<sup>2</sup>/counts<sup>2</sup> while the transfer function value for site 6A was 82.3 dB re  $\mu$ Pa<sup>2</sup>/counts<sup>2</sup>. The transfer function value used for site 5B was 62.8 dB re  $\mu$ Pa<sup>2</sup>/counts<sup>2</sup>. There were no MFA ping events in site 6B. For sonar pings less than this 3.3 kHz, the levels are overestimated up to about 5 dB and for higher frequency sonar the levels are underestimated up to about 4 dB.

### Echosounder

Echosounder pings were detected in a variety of frequencies (8-80 kHz); they are easily identified as lines in the LTSA (Figure **34**).



Figure 34. Echosounder in the LTSA (above) and spectrogram (below).

# **Explosions**

Explosive sounds logged in the HARP data include military explosions, shots from sub-seafloor exploration, and seal bombs used by the fishing industry. An explosion appears as a vertical spike in the LTSA, and when expanded in the spectrogram has a sharp onset with a reverberant decay (Figure 35). These sounds have peak bandwidth as low as 10 Hz and often extend up to 2000 Hz or higher, lasting for several seconds including the reverberation.



Figure 35. Five explosions are seen in the LTSA (arrow above) and one is expanded in the spectrogram (below). Site A on April 8, 2011.

# Results

This report summarizes analysis of acoustic data collected from August 2010 - July 2011 at two sites in the Jacksonville Range Complex. We discuss ambient noise as well as the seasonal occurrence and relative abundance of marine mammal species and anthropogenic sounds.

# **Ambient Noise**

Underwater ambient noise at sites A and B has spectral shapes with higher levels at low frequencies (Figure 36), owing to the presence of ship noise with secondary contributions from local wind and waves (Hildebrand 2009). An additional component of noise in the JAX data was due to mooring strum and fluid motion near the hydrophone sensor. These instrumental noise sources may have contributed to ambient noise levels at both sites that varied by as much as 20 dB at low frequency between monthly averages (Figure **36**). The months of February and March 2011 had very high noise levels at Site B.

Periods with high ambient noise at low frequency will result in lowered detection range for mysticetes calls. We attempted to quantify when high noise levels impacted the ability to detect low frequency calls (Appendix).



Figure 36. Monthly averages of ambient noise at site A (above) and site B (below) for the period August 2010 – July 2011. Legend gives color-coding by date.

# Mysticetes

Four species of mysticete whales were recorded between August 2010 and July 2011 at sites A and B: fin, minke, sei, and humpback. In addition, the 5-pulse sound was detected, which we believe to be produced by a mysticete whale. No known blue or Bryde's whales sounds were detected at either site, nor were North Atlantic right whale upcalls or gunshot calls.

Site A was frequented by calling mysticete whales more often than site B. Fin, minke, and sei whale calls were all detected during more hours at site A, although this may be partially due to the higher ambient noise levels at site B during certain seasons, decreasing call detection ranges (Figure **36**).

# **Fin Whales**

Fin whale 20 Hz calls were detected at site A in late January and early February (Figure **37**). Fin whale 40 Hz calls were not detected at either site, nor were there any 20 Hz calls at site B.



Figure 37. Weekly fin whale 20 Hz call presence at site A between August 2010 and February 2011. The area shaded in gray represents the section of data that were missing or corrupt. The light gray dots represent weekly recording effort.

# **Minke Whales**

Two minke whale call types were recorded. 50 Hz pulses were recorded at site A, while no 50 Hz pulses were recorded at site B (Figure **38**). Minke whale pulse trains were recorded at both sites (Figure **39**).



Figure 38. Occurrence of minke whale 50 Hz pulses at site A. Effort as described in Figure 37



Figure 39. Weekly occurrence of minke speed-up/slow-down whale pulse trains at 150 Hz at site A (top) and site B (bottom). Effort as described in Figure 37

### Sei Whales

Downsweep calls reported as being from sei whales were detected at site A, with detections occurring in November and December (Figure 40). No downsweep calls were detected at site B.



Figure 40. Weekly occurrence of downsweep calls in site A. Effort as described in Figure 37

### **5-Pulse Call**

The 5-pulse call was detected late-October through early December in site A (Figure **41**). No 5-pulse calls were recorded at site B.



Figure 41. Weekly occurrence of 5-pulse calls at site A. Effort as described in Figure 37

### **Humpback Whales**

Humpback whales were only detected on site B (Figure 42). The detections were few, likely owing to the fact that the migratory path of western North Atlantic humpbacks generally does not include the southeast US coastline as they migrate from their high-latitude feeding areas off the northeast coast of the US to the Barents Sea (Katona & Beard 1990, Smith *et al.* 1999) to a common breeding area in the West Indies to mate and calve (Katona & Beard 1990, Stevick *et al.* 1998).



Figure 42. Weekly presence of all humpback whale calls (black bars) at site B between February and July 2011. No humpback calls were recorded at site A. Effort as described in Figure 37

## **Odontocetes**

Clicks from Risso's dolphin and five click types that are not yet associated to a species were detected at sites A and B. Neither killer whale nor sperm whale sounds were detected at either site.

## **Unidentified Odontocete**

The greatest number of odontocete click and whistle detections were attributed to the category unidentified odontocete (UO). Overall rates of UO detections were higher at site A than B (Figure 43). There was a distinct diel acoustic activity at site A, likely due to nighttime foraging. Nighttime clicking is more common at site B as well, but the diel pattern is not as distinct as at site A.



Figure 43. Odontocete echolocation clicks in one-minute bins (blue) and weekly presence (black) at site A (left) and site B (right) between August 2010 and July 2011. Top: all echolocation clicks of all species, Bottom: UO after all others were extracted. Red shading indicates data gaps. Gray shading is nighttime.

### **Risso's Dolphin**

Risso's dolphin echolocation clicks were only detected at site A (Figure 44). Clicks were detected from the end of August until the end of November with two additional click segments: one in the middle of January and another at the beginning of March. A nighttime diel pattern is suggested.



Figure 44. Risso's dolphin echolocation clicks in one-minute bins (blue) and weekly presence (black) at site A between August 2010 and July 2011. No Risso's dolphin were detected at site B. Red shading indicates data gaps. Gray shading is nighttime.

Click Type 25 was detected intermittently between the end of August and the beginning of June with most of the clicks occurring at night (Figure 45). Out of the five specified click types, CT25 was the least prevalent click type.



Figure 45. CT25 echolocation clicks in one-minute bins (blue) and weekly presence (black) at site A (left) and site B (right) between August 2010 and July 2011. Red shading indicates data gaps. Gray shading is nighttime.

Click Type 26 was the most prevalent of the five click types detected in the JAX data set. This click type appeared throughout the duration for site A, but only occurred between the beginning of October and the middle of April at site B. A nighttime diel pattern is suggested at site A, but not at site B (Figure 46).



Figure 46. CT26 echolocation clicks in one-minute bins (blue) and weekly (black) at site A (left) and site B (right) between August 2010 and July 2011. Red shading indicates data gaps. Gray shading is nighttime.

Click Type 27 encounters were detected throughout the entire time period at site A, but were only present at site B during the end of September and the end of November. More clicks appear to be present at night at site A (Figure 47).



Figure 47. CT27 echolocation clicks in one-minute bins (blue) and weekly presence (black) at site A (left) and site B (right) between August 2010 and July 2011. Red shading indicates data gaps. Gray shading is nighttime.

Click Type 30 was present during both day and night, but were more prevalent during the night. At site A, clicks occurred from late August to the end of December and then reoccurred at the beginning of March through the end of June (Figure 48). At site B, clicks were only present from the beginning of October to the beginning of February, with one occurrence in the middle of June. This pattern could be due to seasonal preference or based on excessive noise and the ability to identify a definitive click type.



Figure 48. CT30 echolocation clicks in one-minute bins and weekly presence at site A (left) and site B (right) between August 2010 and July 2011. Red shading indicates data gaps. Gray shading is nighttime.

Click Type 32 was detected from the end of August until the end of May. Site B had very few acoustic encounters. There was one encounter at the end of September, while the other encounters occurred from the end of November until the end of January. No specific diel pattern was seen (Figure 49).



Figure 49. CT32 echolocation clicks in one-minute bins and weekly presence at site A (left) and site B (right) between August 2010 and July 2011. Red shading indicates data gaps. Gray shading is nighttime.

# Anthropogenic Sounds

### **Broadband Ship Noise**

Ship noise was common at sites A and B (Figure 50). Daily presence of ship noise had no temporal patterns (Appendix).



Figure 50. Broadband ship noise weekly hours at site A (top) and B (bottom) between August 2010 and July 2011. Effort markings are as described in Figure 35.

### **Mid-Frequency Active Sonar**

Both sites A and B had MFA sonar events throughout the period August 2010 - July 2011 (Figure 51). At site A, a total of 2,437 MFA sonar pings were detected, ranging from 100 to 173 dB pp re 1 µPa; the maximum value is the clipping level of the HARP and the minimum value is a threshold limit based on the analysis methods used. 2,496 pings were detected at site B. Mid-October had the largest number of pings per week detected at both sites while some weeks did not have any sonar detections. Distribution of ping levels from site A shows a peak around 124 dB pp re 1 µPa and is long-tailed to higher levels while site B shows a peak around 134 dB pp re 1 µPa (Figure 52). Cumulative distribution of ping levels shows that half of the pings detected are above 125 dB pp re 1 µPa in both sites (Figure 53).



Figure 51. Mid-Frequency Active (MFA) sonar presence in weekly bins at site A (left panel) and site B (right panel) between August 2010 and July 2011.



Figure 52. Distribution of MFA sonar pings by received level at site A (left) and site B (right) in 2 dB bins. Peak number of pings is 124 dB pp re 1  $\mu$ Pa for site A and 134 dB pp re 1  $\mu$ Pa for site B. Minimum level is 110 dB pp re 1  $\mu$ Pa and is related to the detection threshold. Maximum level is 173dB pp re 1  $\mu$ Pa for site A and 166 dB pp re 1  $\mu$ Pa for site B, set by the clipping level of the HARP.



Figure 53. Cumulative distribution for the number of MFA sonar pings detected at a given received level or higher, at site A (left) and site B (right) in 2 dB bins.

#### Echosounders

Echosounder pings with a variety of primary frequencies (8 – 80 kHz) were found at both sites A and B (Figure 54). More echosounders were present at site A than site B, perhaps related to the greater depth at site A. Echosounder pings at both sites A and B occurred during similar times of the month. Pings were detected from the end of August to the middle of March and reoccurring at the beginning of April until the beginning of July. For site B, the pings occurred mostly at night while site A pings occurred more during the day.



Figure 54. Echosounder pings in one-minute bins (blue) and weekly echosounder presence (black) at site A (left) and site B (right) between August 2010 and July 2011.

### Explosions



Few explosions were recorded at either site (Figure 55). A peak in explosions was recorded in early July 2011 at site B.

Figure 55. Weekly hours with explosions at sites A (top) and B (bottom) between August 2010 and July 2011. Effort markings are as described in Figure 37.

## 130-Hz Tone

The 130-Hz tone was detected at site A, with peaks in detections mid- to late November and mid-December (Figure 56). The tone was produced exclusively at night (Appendix). This tone was not detected at site B.



Figure 56. Weekly hours with 130-Hz tone detections at site A. Effort markings are as described in Figure 37.

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# Appendix



Fin whale – 20 Hz calls in hourly bins at site A. No calls were detected at site B.



Minke whale – 50 Hz pulses in hourly bins at site A. No calls were detected at site B.



Minke whale – Speed-up/slow down pulse trains in hourly bins at sites A (left) and B (right).



Sei whale – Downsweeps in hourly bins at site A. No calls were detected at site B.



Humpback whale – Song and non-song calls detected in hourly bins at site B. No calls were detected at site A.



Unknown whale – 5-pulse calls in hourly bins at site A. No calls were detected at site B.



Low-frequency noise causing call masking – Occurrence in hourly bins at sites A (left) and B (right).



Broadband shipping – Occurrence in hourly bins at sites A (left panel) and B (right panel).



Mid-frequency active sonar – Occurrence in hourly bins at sites A (left panel) and B (right panel).



Explosions – Occurrence in hourly bins at sites A (left panel) and B (right panel).



130-Hz tone – Sounds recorded in hourly bins at site A.

# Analysis of the UNCW and Duke University aerial and shipboard surveys of the

# Jacksonville USWTR for the period January 2009 to December 2012

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# ABSTRACT

This report describes the analysis of data collected during aerial and shipboard surveys of the Jacksonville USWTR, undertaken by Duke University and the University of North Carolina at Wilmington, for the period January 2009 to November 2012. The aim of the analysis was to estimate monthly abundance of the marine mammals in the region of interest using density surface modelling methods. These estimates should be considered as minimum values because no account was taken of imperfect detection on the trackline or of animals that were below the surface and, hence, unavailable for detection. Detection functions were generated for the species groups dolphins, medium-sized cetaceans (*Grampus griseus, Globicephala* and kogiids), large cetaceans and turtles. There were sufficient detections to generate spatio-temporal abundance estimates (uncorrected for availability bias or perception bias) for *Stenella sp.* dolphins, bottlenose dolphins (*Tursiops truncatus*), medium-sized cetaceans, loggerhead turtles (*Caretta caretta*) and leatherback turtles (*Dermochelys coriacea*). Only a mean, minimum surface could be estimated for large whales.

Predicted, minimum, monthly abundance estimates of *Stenella* sp. dolphins for the time period of interest varied between 80 (95% confidence interval: 10 - 280) and 10400 animals (5300 - 25400). Predicted abundance estimates for bottlenose dolphins varied between 980 (240 - 2900) and 6500 (3300 - 15400). Predicted minimum abundance of medium-sized cetaceans varied between 5 (0 - 30) and 50 (0 - 210). Predicted monthly abundance of leatherback turtles varied between 1 (0 - 7) and 99 (39 - 160). Predicted abundance of loggerhead turtles varied between 540 (200 - 2640) and 2930 (1220 - 12420). The mean minimum surface abundance of large whales was less than one (0 - 2).

# **INTRODUCTION**

The Jacksonville USWTR aerial and shipboard surveys for 2009 – 2012 were carried out by the University of North Carolina at Wilmington (UNCW) and Duke University, respectively. The aim of these surveys was to collect data to estimate density and abundance of marine animals in the Jacksonville USWTR region, which is off the east coast of Florida in the Atlantic (Fig. 1). Maps of estimated density were obtained using density surface modelling techniques and abundances were obtained from these maps. These techniques allowed density to vary both spatially and temporally through the explanatory variables included in the models and since data had been collected throughout the year, effects of seasonal abundance changes could be investigated.

# SURVEY METHODS

#### Region of interest

The Jacksonville USWTR core region of interest (hereafter "inner" region) is shown in Figure 1 with an outer survey zone (hereafter "outer") also shown. The area of the inner region is 1681km<sup>2</sup> and the area of the outer region (excluding inner) is 5028km<sup>2</sup>. Abundance estimates were obtained for both the inner USWTR region and the outer region separately.

# Survey effort

Ten parallel transect lines were aligned east-west across the region and both aerial and ship surveys used these transect lines (Fig. 1). Aerial surveys were conducted more or less monthly from January 2009 and generally all transect lines were covered several times during the month. Ship surveys started in July 2009 and were conducted monthly, weather permitting, until March 2011. Between one and four transect lines were surveyed during each month.

Figure 1. Jacksonville survey region with depth (m) indicated by colours. Each grid cell has dimensions 1/30 degree of latitude and 1/30 of a degree of longitude. Grey lines indicate midpoint of effort segments from all surveys. The boundaries of the outer and inner survey areas are shown by solid lines



#### Aerial search protocol

The plane flew at a height of 305m above sea level. Two observers (one on either side of the plane) searched for marine animals and when an animal was detected, they recorded vertical and horizontal angle to the sighting, species and group size. When a whale or dolphin was detected, search effort was stopped and the plane left the transect line to investigate the sighting in order to confirm species and group size. The search effort was resumed along the transect line after leaving the sighting. Environmental conditions were also recorded.

Estimates of perpendicular distance from the transect line to the sighting were obtained either by reference to direct estimates of distance by observers, trigonometry from the declination angle of the plane to the observed animals or for cetaceans by trigonometry from the position of the plane at first observation of the animals and subsequent location directly above the animals.

#### Shipboard search protocol

On detecting animals, observers recorded the species, group size, sighting angle and radial distance to the group as well as environmental conditions. Estimates of perpendicular distance were obtained from the sighting angle and radial distance.

#### STATISTICAL METHODS

The aim of the analysis was to estimate a density map for each species/taxa using the count method of Hedley *et al.* (2004, 1999). However, the numbers of sightings of some taxa were too few to estimate a density surface so

instead a uniform surface was assumed – this was equivalent to undertaking a conventional line transect sampling analysis (Buckland *et al.* 2001).

For each taxa, the probability of detection associated with each sighting (assuming certain detection on the trackline) was estimated and this probability was then used to estimate abundance in small segments of the trackline. These estimated densities formed the response variable in a generalized additive model (GAM) with location, habitat and temporal variables as potential explanatory variables. After model selection, the chosen models were used to estimate density for the region of interest and abundance was obtained by numerically integrating under the predicted density surface. Note that the resulting abundances are relative (rather than absolute) because they do not take into account imperfect detection on the transect line or the availability of animals at the surface.

#### Estimation of detection probabilities

In conventional line transect sampling, the probability of detection depends only on the perpendicular distance of the sighting to the transect (y) and at zero perpendicular distance the probability of detection is assumed to be one (denoted by g(0)=1). Both a hazard-rate  $(1-\exp(-y/\sigma)^{-b})$  and a half-normal  $(\exp(-y^2/2\sigma^2))$  form were considered as suitable forms for the detection functions ( $\sigma$  is the scale parameter) the most appropriate form for the relevant data (Buckland *et al.* 2001). The effects of covariates, other than perpendicular distance, were incorporated into the detection function model by setting the scale parameter in the model to be an exponential function of the covariates (Marques 2001). Thus, the probability of detection becomes a multivariate function, g(y, v), representing the probability of detection at perpendicular distance y and covariates v ( $v = v_1,...,v_Q$  where Q is the number of covariates). The scale term,  $\sigma$ , has the form:

$$\sigma_{k} = \exp\left(\beta_{0} + \sum_{q=1}^{Q} (\beta_{q} \boldsymbol{v}_{kq})\right)$$

and  $\beta_0$  and  $\beta_q$  (q=1,...,Q) are parameters to be estimated. With this formulation, it is assumed that the covariates affect the rate at which detection probability decreases as a function of distance, but not the shape of the detection function. The covariates considered for inclusion into the aerial detection function were Beaufort sea state (BSS), group size, cloud cover, visibility, glare and species. All but the latter variable were treated as continuous variables. The covariates considered for inclusion into the ship detection function were Beaufort sea state (BSS), group size, weather and species. All but the latter variable were treated as continuous variables. A forward, stepwise selection procedure was used to decide which covariates to include in the model, with a minimum Akaike's Information Criterion (AIC) inclusion criterion. All model selection was performed using a set of customised functions (mrds v.2.0.6, Laake et al. 2013) within the statistical programming package *R* (*R* Developmental Core Team, 2002). This facilitated estimation of variance within *R* (see below).

Some of the data from Jacksonville was supplemented by additional survey data from the UNCW right whale surveys to increase sample sizes for detection function fitting. Despite this, there was a paucity of sightings for individual species and so data were amalgamated across species into groups with presumed similar detectabilities. For aerial detections, four groups were identified; all dolphin species (except Risso's dolphin), medium-sized cetaceans (Risso's dolphins, pilot whales and kogiids), large whales and turtles. For ship detections, two groups were identified; dolphins (did not include Risso's dolphins as none were seen) and turtles.

#### Estimation of density surfaces

The 'count model' of Hedley *et al.* (2004) was implemented to model the trend in spatial distribution of the different species. The response variable for this model is the estimated number of individuals in a small segment *i* of trackline,  $\hat{N}_i$ , calculated using an estimator similar to the Horvitz-Thompson estimator (Horvitz and Thompson 1952), as follows:

$$\hat{N}_{i} = \sum_{j=1}^{n_{i}} \frac{s_{ij}}{\int_{o}^{v} \hat{g}(y, v_{ij}) \pi(y) dy}, \qquad i = 1, \dots, T,$$

where for segment i,  $\int_{0}^{v} \hat{g}(y, v_{ij}) \pi(y) dy$  is the estimated probability of detection of the *j*th detected group,  $n_i$  is the number of detected groups in the segment and  $s_{ij}$  is the size of the *j*th group. The total number of transect segments is denoted by *T*. By assumption,  $\pi(y)$ , the probability density function of actual (not necessarily observed) perpendicular distances is uniform up to the truncation distance; this is satisfied by locating transects randomly or with a random start point.

Having obtained the estimated number of individuals in each segment, the density in segment *i*,  $\hat{D}_i$ , was estimated from  $\hat{N}_i / a_i$  where  $a_i$  is the area of segment *i*. Segment area was calculated as the length of the segment multiplied by twice the truncation distance (which was decided when modelling the detection function). The realised transect lines were divided up into distinct segments based on when vessels had gone on or off effort and whether there was a change in environmental characteristics. A target segment length of 10km for the aerial survey was chosen as an appropriate compromise between maximising the ratio of non-zero to zero segments, maintaining environmental resolution and giving some measure of spatial independence, although some segments were much smaller if there had been a break in effort or change in environmental conditions. Due to the different sizes of each segment, the segment area was included as an offset (a term with a regression coefficient of one) in the subsequent model.

The main aim was to fit a model with which to predict abundance and data from both the aerial and ship surveys were combined; a covariate called *Platform* differentiated between aerial and ship segments. The environmental covariates considered for inclusion in the abundance models were longitude (Lon) and latitude (Lat), depth (Depth) and sea surface temperature (SST). Day of the year (Dayofyear) was fitted as a cyclic cubic spline so the smooth function for *Dayofyear* would have the same values at the start and end of the range of data values. Depths were obtained from the ETOPO1 one minute resolution relief data available from NOAA (http://www.ngdc.noaa.gov/mgg/global/global.html). Depths were associated with effort segments by finding the closest point in the bathymetry data to the midpoint of the effort segments using great circle distances. SST was obtained from NOAA Optimum Interpolation 1/4 Degree Daily Sea Surface Temperature data obtained High Resolution Radiometer from the Advanced Very (AVHRR) available from ftp://eclipse.ncdc.noaa.gov/pub/OI-daily-v2/NetCDF/ as described in part in Reynolds et al. 2007 and allocated to the appropriate segment by great circle distance and appropriate date.

Unsurprisingly, *SST* was strongly related to *Dayofyear* (Figure 2) and *Lon* and *Lat* were correlated *Depth*, thus, the inclusion of only one of these correlated variables in the final models should not be interpreted as necessarily precluding the influence of others.



There were a large proportion of segments where no animals were detected and so, after some preliminary analysis, it was decided that the most appropriate (but nevertheless not ideal) modelling process should be a two stage process; first modelling the presence-absence of animals in segments followed by modelling the density in non-zero segments (i.e. segments where animals were detected). The two resulting surfaces were then multiplied together to obtain estimated density. Generalized cross validation implemented in the *mgcv* package (v. 1.7-13. Wood 2006) in *R* (v. 2.15.0) was used for covariate selection in both GAMs augmented with diagnostic plots, using the principles described in Wood (2001). Taking into account the low percentage of segments containing sightings, a maximum of 4 degrees of freedom (5 knots) was allowed in the selection of 1D smooths, (with the exception of year that was allowed 3 knots as there were only 4 years) and 6 knots were allowed for *Lon* and *Lat*. Some 2D and 3D smooths were also considered and were allowed a composite number of knots. Thus, the initial model considered for the presence-absence (quasibinomial) model was:

Platform + s(KmEW, KmNorth, Year, k=15) + s(Dayofyear, k=5, Year) + s(SST, k=5) + s(Depth, Year, k=8)

where k indicates the number of knots. In the *Dayofyear* term, *Year* was treated as a factor reflecting the fluctuating commencement of the spring plankton bloom. Backwards model selection was used to select the final model.

The initial model for the non-zero density component (assuming a Gamma error structure with a log link) was similar the above except that the *s*(*Dayofyear*, k=5, *Year*) was not included – the number of segments with sightings was small compared to the total number of segments and in the variance estimation process (see later) the full range of dates was not

necessarily generated in each iteration and these would be required for prediction if s(Dayofyear, k=5, Year) was included in the model.

#### Prediction

The selected models were used to predict density of marine animals in the inner and outer regions separately using a 2 minute resolution prediction grid. Animal abundance was estimated by numerically integrating under this predicted density surface. If survey platform was included in the model, abundance was predicted using *Platform* equal to "ship" as this was felt to reflect the best detection on the transect line (i.e. g(0) from the ship was felt to be closer to one than the aerial g(0)) with the exception of leatherback turtles where the reverse was felt to be more likely (i.e. aerial  $g(0) > \sinh p g(0)$ ).

#### Variance estimation

Variance was estimated by repeating (1000 times) the entire abundance estimation process on samples, drawn from the data, to obtain a distribution of abundance estimates. Samples were obtained by sampling transects, at random and with replacement, such that the selected effort reflected the effort in the original sample. Confidence intervals were obtained from the distribution of abundance estimates using the 2.5% and 97.5% percentiles to obtain the lower and upper limits, respectively, thus excluding the most extreme values.

#### Explanatory models

To explore the habitat preferences of specific taxa (bottlenose dolphins, *Stenella sp.* dolphins, leatherback turtles and loggerhead turtles) a separate set of models were fitted to the presence-absence data but excluding the covariates latitude and longitude. To reduce spatial correlation between segments, models were fitted to a subset of data, choosing segments that were far enough apart such that the estimated presence-absences were independent. The distance at which independence between segments occurred was investigated by plotting the variograms of the model residuals (where distance between segments was based on time rather than location) separately for the aerial and ship platforms. Once the time over which data points became independent was identified, these times were converted into distances given the speed of the platform. Then, based on the distance that suggested independent data points, a sequential sample of segments was taken to generate a new data set with which to explore habitat preferences.

A simplified model of the form

Platform + s(SST, k=5) + s(Depth, Year, k=8)

was fitted to the data initially and backwards model selection was performed as before.

In the case of leatherback and loggerhead turtles, a final test was performed after model selection on the presence-only component of the analysis to see if there was any evidence that turtles were missed in regions/times of high cetacean density. The adjusted sightings density for all cetaceans was introduced as a potential linear term into the final chosen model to see if turtle probability of presence decreased when cetacean numbers were high.

#### RESULTS

# Summary of search effort and number of sightings

The aerial surveys realised 63600 km of search effort and the ship surveys realised 2413 km of search effort. The breakdown of effort by month is given in Table 1.

 Table 1. Realized monthly effort (km) in the Jacksonville survey area.

Month	2009		2010		2011		2012	
	Aerial	Boat	Aerial	Boat	Aerial	Boat	Aerial	Boat
January	888	0	881	207	1692	138	1658	0
February	1706	0	2536	0	1268	0	0	0
March	431	0	1680	139	0	205	559	0
April	0	0	2047	0	1541	0	1710	0

May	0	0	811	145	1330	0	1606	0
June	1683	0	3011	309	1029	0	0	0
July	1708	166	1024	225	1690	0	1692	0
August	1696	256	1696	36	1680	0	0	0
September	3309	210	1643	0	1363	0	1279	0
October	822	137	1534	171	847	0	0	0
November	1688	0	860	0	0	0	1334	0
December	1816	0	1846	69	0	0	0	0

#### Aerial survey sightings

There were 521 sightings of groups of smaller dolphins within the truncation distance of 1400 m; these consisted of 250 groups of bottlenose dolphins, 217 of spotted dolphins (*Stenella frontalis*; plus one unidentified *Stenella sp.*), five of rough-toothed dolphins (*Steno bredanensis*) and 48 unidentified delphinids. Eighty percent of dolphin sightings were of animals in groups of fewer than 20, however, a group of 100 spotted dolphins was detected in January, 2009.

Sixty-four medium-sized cetacean groups were detected within the truncation distance (50 Risso's dolphins, 12 pilot whales and 2 sightings of kogiids).

Eleven groups of baleen whale were detected; minke (8 groups), unidentified baleen whale (1), North Atlantic right whale (1) and humpback (1). An additional 5 sightings, from the UNCW right whale aerial surveys, were included to increase the sample size in the large whale group.

Turtles were the most numerous taxa detected (2107 groups within the truncation distance) with loggerhead turtles the most detected species of turtle (1657 groups). The other turtle species detected were leatherback (95 groups) and Kemp's ridley (3 groups) along with 352 groups of turtles that were detected but the species could not be identified. The majority (80%) of turtle detections were of single animals but groups of up to eight turtles were detected. The distribution of calculated perpendicular distances shows distinct grouping reflecting the recorded values for the "angle down" bins (Figure 3) and does not conform to the expected shape which would confirm the assumption of monotonically declining detection probability with increasing distance. The reasons for the unusual distribution are not known and worthy of further investigation but it may have been caused in part by rounding of distances; a substantial number of sightings had a perpendicular distance around 210m and 370m. Due to this odd distribution, the data were left truncated at 100m (i.e. all sightings with a perpendicular distances) and then right truncated at 500m and the distances binned into 200m bins. Unknown turtles were allocated on a pro-rata basis to the 3 known categories based on their proportions to each other. Fitting the Kemp's ridley turtles proved difficult so they were omitted form the data.

Figure 3. Histograms of actual perpendicular distances of aerial turtle sightings prior to truncation.



Shipboard survey sightings

Sixty-one groups of dolphins were detected made up of spotted (36), bottlenose (24) and one group of unidentified delphinid. The majority of dolphins were in groups of between one and ten animals. The maximum group size was 55 spotted dolphins recorded in October, 2010.

Sixty-six groups of turtles were detected within the truncation distance, made up of loggerhead (56) and leatherback (10) turtles. A group of two loggerhead turtles was detected otherwise all other sightings of turtles were of single animals.

Only one medium-sized cetacean group (a Risso's dolphin group) and no large cetaceans were detected during the ship surveys.

#### **Detection functions**

The (scaled) histograms of perpendicular distances (after truncation) and the fitted detection functions are shown in Figures 4 & 5 with details provided in Table 2. Perpendicular distances were binned into intervals for model fitting and to avoid a long tail in the detection function (Buckland *et al.* 2001), typically between 5 -10% of the longest distances were truncated.

Table 2. Summary of detection function models; number of detected groups (n) within the given truncation distances, detection function (DF) form (half normal HN or hazard rate HR), covariates added in addition to perpendicular distance and detection probability within the truncation distance.

Species	Platform	п	Truncation distance (m)	DF form	Additional Covariates	Detection probability (se)
Delahia	Aerial	521	1400	HN	Visibility	0.508 (0.018)
Dolphin	Ship	61	250	HR	BSS + Weather	0.201 (0.091)

						<i>y</i> 1
Turtles	Aerial	2104	400*	HN	BSS + Group Size	0.886 (0.0431)
Turties	Ship	66	80	HN	-	0.583 (0.059)
Medium	Aerial	50	1200	HN	-	0.626 (0.073)
cetaceans	Ship	1	1000	Strip	-	1 (0)
Large	Aerial	15	1200	HN	-	0.645 (0.126)
whales	Ship	0	-	-	-	-

\*with left truncation at 100 m.

*Figure 4. Aerial detections: fitted detection functions overlaid onto scaled perpendicular distance distributions (data binned into 200 m distance intervals); a., dolphins, b. turtles, c. medium-sized cetaceans and d. large whales. The points are individual detections.* 



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Figure 5. Ship detections: fitted detection functions overlaid onto scaled perpendicular distance distributions; a. dolphins (data binned into 50m sections), b. turtles (data binned into 20m sections).



#### Density surface models for abundance

The aerial search effort was divided into 6452 segments with a mean length 9.39km (SE=0.03km). The ship effort was divided into 600 segments with a mean length of 4.02km (SE=0.14km). Summaries of the fitted models are given in Table 3. Predicted density surfaces for the last month of survey data (November 2012) are given for each of the species.

Table 3. Summary of density surface models used for abundance estimation: selected model (where s(var) indicates a smooth function of var) and percentage of deviance explained by the model. The total number of segments was 7052 and n is the number of segments containing detections.

Species	Presence-absence model	Non-zero presence model			
	Selected model	Explained deviance %	п	Selected model	Explained deviance %
Stenella sp.	Platform + s(Lon, Lat, Year, k=15) + s(Dayofyear, k=4,Year)+s(SST,k=5) + s(Depth, Year, k=6)	21.9	259	Platform + s(Lon, k=5) + s(Depth, Year, k=2)	26.3
Bottlenose dolphins	s(Lon, Lat, k=12) + s(Dayofyear, k=4, Year) + $s(SST, k=5) + s(Depth, k=5) + s(Year, k=3)$	5.5	274	Platform + s(Lon, k=6) + s(Lat, k=6) + SST	23.6
Medium-sized cetaceans	Platform + $s(Lon, Lat, Year, k = 15) + s(SST, k=5) + s(Depth, Year, k=8)$	18.5	50	SST + Year	19.3
Loggerhead turtles	Platform +s(Lon, Lat, Year, k=15) +s(Dayofyear, k=5, Year) + s(SST, k=5) + s(Depth,k=5)	24.4	1272	Platform + s(Lon, Lat, k=12) + s(SST, k=5) + s(Depth, k=5) + s(Year, k=3)	18.0
Leatherback turtles	Platform + s(Lon, Lat, Year, k=15) + s(Dayofyear, k=4,Year) + s(SST,k=5) + s(Depth, Year, k=6)	19.9	92	s(Lon, k=5) + s(SST, k=5) + s(Year, k=3)	28.9

Figure 6. Predicted minimum abundance of Stenella sp. dolphins. Black indicates abundance estimates for the whole region and red and blue represents the abundance estimates for the inner and outer areas, respectively. Dashed lines represent the upper and lower 95% confidence bounds for the abundance estimates for the whole region. a. estimates assuming assuming a ship platform, b estimates assuming an aerial platform.



#### Stenella sp. dolphins

No obvious seasonal pattern of abundance was apparent (Figure 6) although two peaks in abundance are noticeable for every year except 2012. There were estimated to be substantially more *Stenella* dolphins in 2013 then at the beginning of 2009. *Stenella sp.* dolphins appear to avoid the deeper waters offshore (Figure 7). Predictions were made both assuming a ship platform and an aircraft platform. *Stenella* dolphins are generally more detectable from boats than from the air (Figure 6).

Figure 7. Predicted minimum abundance of Stenella sp. dolphins in November 2012. Colours indicate the density of surface animals per  $km^2$ . Grey points indicate the midpoints of effort segments and the red circles indicate the location of detections. The size of the red circle is proportional to the adjusted density of observed animals per  $km^2$ .



Longitude

Figure 8. Predicted minimum abundance of bottlenose dolphins. Black indicates abundance estimates for the whole region and red and blue represent the abundance estimates for the inner and outer areas respectively. Dashed line is the 95% confidence interval for the total region.



Bottlenose dolphins

As in the case of *Stenella sp.* there was no consistent pattern of seasonality in estimated minimum abundance except elevated numbers in the early part of the year (Figure 8). The distribution of bottlenose dolphins was heterogenous in space with most animals in deeper water (Figure 9).

Figure 9. Predicted minimum abundance of bottlenose dolphins in November 2012. Colours indicate the density of surface animals per  $km^2$ . Grey point indicate the midpoints of effort segments and the area of the red circles is proportional to the adjusted observed density of animals per  $km^2$ .



Figure 10. Predicted abundance of medium-sized cetaceans (Risso's dolphins, long-finned pilot whales and kogiids). Black indicates abundance estimates for the whole region and red and blue represent the abundance estimates for the inner and outer areas respectively. Only the upper bound of the confidence interval for the total area is shown (dashed line), the lower bound is consistently zero.



Medium-sized cetacenas (Risso's dolphins, pilot whales and kogiids)

Medium-sized cetacean groups were only detected in 50 segments out of 7052 and so initially a simpler model was fitted - no *Dayofyear/Year* interaction was included. The final model is given in Table 3 and the time series of predicted abundances are shown in Figure 10. Predicted numbers are persistently highest in the late summer and early autumn. Animals were seen in deeper water (Figure 11).

Figure 11. Predicted minimum abundance of medium-sized cetaceans in November 2012. Colours indicate the density of surface animals per  $km^2$ . Grey point indicate the midpoints of effort segments and the area of the red circles is proportional to the adjusted density of animals per  $km^2$ .



Large whales

Large whales were detected in only 10 segments and so no attempt was made to fit models to these data. The estimated abundance was less than one in both the inner and outer regions (C.I. whole area: 0 - 2)

Figure 12. Predicted minimum abundance of loggerhead turtles. Black indicates abundance estimates for the whole region and red and blue represent the abundance estimates for the inner and outer areas, respectively. Dashed line is the 95% confidence interval for the total region.



Loggerhead turtles

Loggerhead turtles were found in a relatively large proportion of effort segments (16%) compared to the other species but density was still modelled as a two stage process. The final selected models are given in Table 3. The abundance estimates have very high uncertainty (Figure 12) caused, in part, by high uncertainty in the spatial model. High abundances are never predicted for the eastern part of the survey region (Figure 13). Although there appears to be a steady decline in numbers, it is not yet significant although *Year* does appear in the final models. There was no evidence that whale densities influenced the probability of presence of loggerhead turtles.





Figure 14. Predicted abundance of leatherback turtles. Black indicates abundance estimates for the whole region and red and blue represent the abundance estimates for the inner and outer areas respectively. Only the upper bound of the confidence interval for the total area is shown (dashed line), the lower bound is consistently zero.



#### Leatherback turtles

No terms were excluded from the initial model for presence-absence (Table 3). The non-zero density data were described by *Lon, Lat* and *Year*. The estimated abundance showed evidence of seasonality with the majority of leatherback turtles normally appearing in late summer and early autumn. Leatherbacks are mainly predicted in shallower waters. There was evidence (lower gcv score) that the detected probability of presence declined with greater adjusted numbers of sighted cetaceans.

Figure 15. Predicted minimum abundance of leatherback turtles in November 2012. Colours indicate the density of surface animals per  $km^2$ . Grey point indicate the midpoints of effort segments and the area of the red circles is proportional to the adjusted density of observed animals per  $km^2$ .



Longitude

Table 4. Explanatory models for presence-absence based on independent segments.

Таха	Model	n	Explained deviance
Stenella sp.	Platform + s(SST, k=5) + s(Depth, k=4) + Year	115	47.1%
Tursiops truncatus	s(Dayofyear, k=5) + s(SST, k=5) + s(Depth, k=5) + s(Year, k=3)	173	42.4%
Caretta caretta	Depth + Year	86	32.2%

Figure 16. Responses of Stenella sp. to a. Depth and b. SST. N.B. Response of SST is rescaled and has a small range compared to Depth.



#### Explanatory density surface models

In the case of *Stenella* sp. aerial segments were conservatively interpreted apparently independent at a huge distance of 553 km whereas there was no clear evidence for correlations in adjacent ship segments. The data should really correlated over the same distances in both surveys. This discrepancy was probably due to the irregular nature of the relevant ship variogram and so 553 km distance was used. After reduction of the original data set there were only 115 datums. The final explanatory model is given in Table 4 and shown in Figure 16. The bimodal distribution for *Stenella* may show a seasonal entry into the Jacksonville waters. Note that despite the presence of SST in the final model by far the most variation in probability of presence is associated with depth.

Similarly in the case of *Tursiops truncatus*, aerial segments were conservatively interpreted to be independent at a distance of approximately 369 km whereas the distance at which ship segments were unclear, so 369 km was taken as the point of independence. After reduction of the original data set there were only 173 datums. The final explanatory model is given in Table 4 and shown in Figure 17. Variation in presence is dominated by depth with a low probability of animals greater than 550 m. There is also a suggestion of an inshore and offshore preference also shown in the density surface (Figure 9). The response to SST suggests seasonality in the appearance of the animals in Jacksonville waters although this is not shown in the time series of abundance (Figure 8). In comparison to *Depth* the effect is slight.



Figure 17. Probability of presence of Tursiops truncatus with respect to the various predictors. All figures on the same log(p/(1-p)) scale. a. SST, b. Depth

In the case of *Caretta caretta*, the variogram was conservatively interpreted to be independent at 733 km. This gave a new data set of size of 86. A declining linear (on the logit scale, not illustrated) response to depth was found.

In the case of *Dermochelys coriacea* the variogram was conservatively interpreted to be independent at 733 km. This gave a new data set of size of 86. However this data set contained no leatherback turtle presences so an explanatory model for leatherback turtle presence was not pursued.

# DISCUSSION

Detection functions could be readily fitted to the estimated perpendicular distances although further consideration should be given to the distribution of turtle distances.

The abundance estimates should be regarded as a minimum because they do not take into account perception bias on the trackline (i.e. not all animals may be detected by the observers) and availability bias (i.e. not all animals may be at the surface to be detected). In the case of turtles, the random allocation of unidentified turtles to species probably lessened the bias associated with the estimates, at the cost of making the models less precise.

The density surface models have indicated both spatial and temporal fluctuations for all of the species under consideration with some taxa (e.g. *Stenella sp.*, medium-sized cetaceans and leatherback turtles) showing a consistent seasonal pattern. Increased abundance of turtles at lower water temperatures may be an artefact of a tendency of turtles to surface more at lower temperatures (Hochscheid *et al.* 2010). Temperature was measured at a greater spatial (1/4 degree) and temporal (1 day) resolution than in previous reports on this data.

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The method of identifying independent points here somewhat conservative so some Depth was an important explanatory variable in the models and suggests that both *Stenella* dolphins and loggerhead turtles preferred the shallower waters. Bottlenose dolphins may have distinct inshore and offshore distribution. It is however clear from the density surfaces that leatherback turtles are also avoiding deeper waters.

For all species except leatherback turtles prediction was made assuming a ship survey. However no such surveys have been undertaken since 2011 rendering more recent predictions problematic. In the case of *Stenella* sp. the patterns of abundance are different for 2012 compared to previous years. This may be due to the lack of ship-based calibration.

There was evidence that the probability of presence of (observed) leatherback turtles declined when the adjusted density of cetaceans increased. This could reflect a difference in preferred habitat or aversive behaviour on the part of one or both parties but could also reflect observers concentrating on cetaceans in regions of high cetacean density at the cost of missing leatherbacks. However such an effect would be expected to influence both species of turtle.

#### Recommendations for the future

Assuming the Jacksonville survey work is on-going, issues of potential interest in the future work might include:

- 1. Investigation of the strange pattern of reported distances for turtles during the aerial surveys.
- 2. Investigation of whether dolphins are being attracted to the ship before detection.
- 3. Investigation of reliable methods for estimating g(0) without double-observer survey. Options include cue-based methods and use of appropriate availability correction methods based on data on availability patterns for each species.
- 4. Further elucidation of the environmental drivers of cetacean density in the area of interest, perhaps by the use of additional variables.
- 5. Records of water opaqueness may be a useful explanatory variable to include in the detection functions for turtles.

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# Passive Acoustic Monitoring for Marine Mammals in the Jacksonville Range Complex 2010-2011

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Photo by Amanda J. Debich

## MPL TECHNICAL MEMORANDUM # 541

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## **Executive Summary**

Passive acoustic monitoring was conducted at two sites in the US Navy's Jacksonville Range Complex during August 2010 – July 2011. These sites are located 50 and 61 nm east of the Florida coastline on the shelf and shelf break at water depths of 40 m – 90 m. Acoustic data collected at these sites provide information on the presence of marine mammals and anthropogenic sound sources. High-frequency Acoustic Recording Packages (HARPs) documented sounds between 10 Hz and 100 kHz with recording cycles of 5 minutes every 15 minutes. The data were divided into three frequency bands and data analysis was conducted with analyst scans of long-term spectral averages and spectrograms.

Four mysticete whale species were recorded: fin, minke, sei, and humpback. No blue whale, North Atlantic right whale, or Bryde's whale calls detected. A new call, designated the "5-pulse" was detected and is presumed to be produced by a mysticete whale due to its character, prevalence and intensity. Site A has more hours with calling mysticete whales than site B. However, humpback whale calls were detected only at site B, though these detections were few.

The largest number of odontocete detections were attributed to unidentified odontocetes, thought to be primarily bottlenose and Atlantic spotted dolphins. Unidentified odontocetes were detected throughout the year. Overall numbers of detections were higher at site A than site B. There was a diel acoustic activity pattern with greater numbers of echolocation clicks produced at night, likely due to nighttime foraging. Risso's dolphin echolocation clicks were only detected at site A and only occurred August through March. Five click types, yet to be associated to an odontocete species, were characterized and their seasonal and diel occurrence described.

Ship noise was the most common anthropogenic sound at both sites A and B. Both sites had Mid-Frequency Active (MFA) sonar events throughout the period of data collection. At site A, a total of 2,437 MFA sonar pings were detected with a maximum peak-to-peak received level of 173 dB re 1  $\mu$ Pa. Similarly, a total of 2,496 MFA sonar pings were detected at site B, reaching a maximum peak-to-peak level of 166 dB re 1  $\mu$ Pa. Echosounder pings with a variety of primary frequencies (4 – 80 kHz) were found at both sites A and B. Explosions were recorded at both sites, though were more prevalent at site B. A low-frequency tone, referred to as the 130 Hz tone, was recorded at site A. High noise levels, possibly caused by instrument strumming and fluid flow at the sensor, occurred intermittently at both sites and likely decreased the detection range for low-frequency sounds.

## **Project Background**

The US Navy's Jacksonville Range Complex (JAX) is located within the South Atlantic Bight that extends from Cape Hatteras, North Carolina to the Florida Straits. The sea floor is relatively smooth and features a broad continental shelf, with an inner zone of less than 200 m water depth, and an outer zone extending to water depths of 2000 m. A diverse array of marine mammals are found in this region, including mysticete whales, dolphins and other toothed whales, and manatees.

In April 2009, an acoustic monitoring effort was initiated within the boundaries of JAX with support from the Atlantic Fleet under contract to Duke University. The goal of this effort was to characterize the vocalizations of marine mammal species present in the area, to determine their year-round seasonal presence, and to evaluate the potential for impact from Naval operations. This report documents the analysis of two High-frequency Acoustic Recording Packages (HARPs) that have been deployed within JAX during the time period August 2010 – July 2011. The JAX-B HARP site is 50 miles east of the Florida coastline and the JAX-A HARP site is approximately 11 nm further offshore (Figure 1).



Figure 1. Locations of High-frequency Acoustic Recording Packages (yellow pins) at sites A and B in the Jacksonville Range Complex. The red bar represents 10 nm.

## Methods

## **High Frequency Acoustic Recording Packages**

High-frequency Acoustic Recording Packages (HARPs) were used to detect marine mammal species, anthropogenic noise, and ambient noise in the JAX Range Complex. HARPs record underwater sounds from 10 Hz to 100 kHz with approximately 110 days of continuous data storage. Recording a broad frequency range of 10 Hz - 100 kHz is required to detect both baleen whale (mysticetes), and toothed whale (odontocetes) species. The HARP sensor and mooring package are described in Wiggins and Hildebrand (2007). For the JAX range deployments, the HARP electronics package was located near the seafloor with the hydrophone suspended 10 m above. Each HARP is calibrated in the laboratory to provide a quantitative analysis of the received sound field. Representative data loggers and hydrophones are calibrated at the Navy's TRANSDEC facility to verify the laboratory calibrations.

#### Data Collected to Date

Acoustic data have been collected at two sites since April 2009 (Table 1). The two sites are designated site A (30° 16.6 N, 80° 13.0 W, depth 80-90 m) and site B (30° 15.5 N, 80° 25.7 W, depth 40 m). Site A was placed at the shelf break, site B was on the shelf, approximately 11 nm apart.

Deployment Designation	Site A Recording Period	Site B Recording Period	
JAX 01	4/2/2009-5/25/2009	4/2/2009-9/5/2009	
JAX 02	9/16/2009-12/27/2009		
JAX 03	2/22/2010-7/30/2010		
JAX 04		3/9/2010-8/19/2010	
JAX 05	8/26/2010-1/25/2011	8/27/2010-2/1/2011	
JAX 06	2/1/2011-7/14/2011	2/2/2011-7/14/2011	

Table 1. JAX HARP data sets. Periods of acoustic data analyzed in this report are shown in bold.

## **Data Analysis**

To assess the quality of the acoustic data, frequency spectra were calculated for all the data (over oneyear at each of the two instruments) using a time average of 5 seconds and frequency bins of 1 Hz. These data, called Long-Term Spectral Averages (LTSA) were examined both for characteristics of ambient noise and also as a means to discover marine mammal and anthropogenic sounds. As a first pass for data analysis, segments of data that did not allow for further analysis due to disk malfunctions or strumming noise were identified (Table 2). Table 2. Periods when acoustic data were not available or amenable to analysis.

Deployment Name	Gaps In Data for High- Frequency Analysis	Too Much Noise for High-Frequency Analysis	Gaps in Data for Mid- and Low- Frequency Analysis
JAX 05A	11/23/2010 22:48 - 11/24/2010 8:09		
JAX 05B		9/1/2010 23:49 – 9/3/2010 5:49 9/17/2010 20:17 – 9/21/2010 17:17 9/30/2010 18:30 – 10/1/2010 12:30 11/12/2010 17:15 – 11/15/2010 11:15	entire deployment
JAX 06A	2/12/2011 7:02 – 2/22/2011 5:16		2/12/2011 9:16 – end
JAX 06B	2/9/2011 7:00 – 2/12/2011 5:02		2/2/2011 14:20 – 2/12 5:02

The presence of acoustic signals from multiple marine mammal species was analyzed, along with the presence of anthropogenic noise such as sonar, explosions, and shipping. All data were analyzed by visually scanning LTSAs in appropriate frequency bands. When a sound of interest was identified in the LTSA, the waveform or spectrogram at the time of interest was examined to further classify particular sounds to species or source. Acoustic classification was carried out either by comparison to species-specific spectral characteristics or by analysis of the time and frequency character of individual sounds.

To document the data analysis process, we describe the major classes of marine mammal calls and anthropogenic sounds in the JAX region, and the procedures used to test for their presence in the HARP data. For effective analysis, the data were divided into three frequency bands and each band was analyzed for the sounds of an appropriate subset of species or sources. The three frequency bands are as follows: (1) low frequencies, between 10 - 1000 Hz, (2) mid frequencies, between 500 - 5000 Hz, and (3) high frequencies, between 1 - 100 kHz. Blue, fin, sei, Bryde's, and North Atlantic right whale and a subset of minke sounds were classified as low frequency; humpback, minke, shipping, explosions, and mid-frequency active sonar were classified as mid-frequency; while the remaining odontocete and sonar sounds were considered high-frequency. We describe the calls and procedures separately for each frequency band.

#### **Low Frequency Marine Mammals**

For the low frequency data analysis, the 200 kHz sampled raw-data were decimated by a factor of 100 for an effective bandwidth of 1 kHz. Long-term spectral averages (LTSAs) of these data were created using a time average of 5 seconds and frequency bins of 1 Hz. The presence of each call type was determined in hourly bins. A subset of each call type was measured for start and end frequencies and duration (**Table 3**).

Table 3. Low-frequency whale calls in JAX data. Mean values (± one standard deviation) are presented. Calls for the 5-pulse were separated by a minimum of 24 hours to obtain calls from multiple animals. Other call types occurred in clusters and therefore measurements may represent an individual animal more than once.

Species/Call	Call Type	Start Frequency (Hz)	End Frequency (Hz)	Duration (s)
Fin whale	20 Hz pulse <i>(n=30)</i>	27.2 ± 2.0	$16.4 \pm 0.6$	1.6 ± 0.3
	50 Hz pulse <i>(n=2)</i>	56.5 ± 2.1	54.5 ± 2.1	64.5 ± 14.8
Minke whale	150 Hz speed-up/ slow-down (n=18)	166.2 ± 5.0	163.6 ± 5.2	36.6 ± 7.9
Sei whale	Downsweep (n=23)	120.8 ± 14.6	46.2 ± 4.4	1.5 ± 0.2
5-pulse	5-pulse (n=30)	178.5 ± 22.3	185.9 ± 22.2	2.7 ± 0.5

Whale calls for which low frequency effort was expended include: blue whale A, B and arch calls, fin whale 20 and 40 Hz pulses, Bryde's whale Be7 and Be9 calls, North Atlantic right whale upcall, in addition to sei whale calls, and the "5- pulse" call type of unknown origin (presumably baleen whale). The same LTSA and spectrogram parameters were used to detect all call types. For spectrogram scrolling, the LTSA frequency was set to display between 1-500 Hz. To observe individual calls, spectrogram parameters were typically set to 120 seconds by 200 Hz. The FFT was generally set between 1500 and 2000 data points (yielding about 1 Hz frequency resolution), with an 85-95% overlap of data in the input time series. **Table 3** presents measurements of frequency and duration for each recorded call type.

#### **Blue Whales**

Several different calls were used to test for the presence of blue whales. Detection effort included call types A, B, and arch from Mellinger and Clark (2003) (Figure 2). The A call is a constant 18-19 Hz tone lasting approximately 8 seconds while the B call is an 18-15 Hz downsweep lasting approximately 11 seconds. Individual A and B calls are readily detected in an LTSA, owing to their long duration. The third call, the arch call, starts at a frequency of 56 Hz, ascends to a peak frequency of 69 Hz, then descends to 35 Hz over a period of 6.3 seconds (Figure 3). Manual scanning of the LTSA was the primary means to search for blue whale calls, however, no blue whale calls of any type were detected in the JAX data.



Figure 2. Blue whale A and B calls from Mellinger and Clark (2003).



Figure 3. Blue whale arch calls from Mellinger and Clark (2003).

#### **Fin Whales**

Fin whales produce a variety of calls, most are less than 100 Hz, short in duration, and frequencymodulated. The best known fin whale call is the 20 Hz pulse, downswept at 30 - 15 Hz (Figure 4). These pulses occur at regular intervals as song (Thompson *et al.* 1992), and at irregular intervals as countercalling between multiple animals (McDonald *et al.* 1995). In this report we indicate the presence of 20 Hz pulses, but do not categorize them as either song or irregular interval calls. Watkins (1981) and Širović *et al.* (2012) also report a fin whale 40 Hz pulse which sweeps down in frequency from 75 to 40 Hz (Figure 5). While there was logging effort for these calls, however, no 40 Hz pulses were detected in the JAX acoustic data.





Figure 4. Fin whale 20 Hz pulse, created in regular pattern or song. Site A on January 24, 2011.

Figure 5. Fin whale 40 Hz pulse, from Bering Sea HARP data.

#### **Minke Whales**

Minke whales in the North Atlantic produce long pulse trains. Mellinger *et al.* (2000) describe minke whale pulse sequences as speed-up and slow-down pulse trains (increasing and decreasing pulse rate), centered around 150 Hz (Figure **6**). Another type of pulse train centered around 50 Hz (50 Hz pulse) has also recently been found in the North Atlantic (Figure **7**).



Figure 6. Minke whale speed-up/slow-down pulse train. Site A on February 10, 2011.



Figure 7. Minke whale 50 Hz pulses. Site A on January 17, 2011.

#### **Bryde's Whales**

Bryde's whales inhabit tropical and subtropical waters worldwide (Omura 1959, Wade & Gerrodette 1993), and the JAX region is considered their northerly range limit. The Be7 call is one of several call types in the Bryde's whale repertoire, first described in the Southern Caribbean (Oleson *et al.* 2003). The Be7 call has a fundamental frequency of 44 Hz and ranges in duration between 0.8 and 2.5 seconds with an average intercall interval of 2.8 minutes (Figure **8**). The Be9 call type, described for the Gulf of Mexico (Sirovic *et al.* 2013), is a downswept pulse ranging from 143 to 85 Hz, with each pulse approximately 0.7 seconds long (Figure **9**). Neither Bryde's whale call type was detected in the JAX data.



Figure 8. Spectrogram of Bryde's whale Be7 call type, from Oleson et al. (2003).



Figure 9. Bryde's whale Be9 call type from Sirovic et al. (2013).

#### Sei Whale

Sei whales are found primarily in temperate waters and undergo annual migrations between lower latitude winter breeding grounds and higher latitude summer feeding grounds (Mizroch *et al.* 1984, Perry *et al.* 1999). While several sounds have been attributed to sei whales, we report on a low frequency downsweep call similar to those Baumgartner reports as sei whale calls (Baumgartner *et al.* 2008). These calls typically sweep from a starting frequency around 100 Hz to an ending frequency around 40 Hz (Figure **10**).



Figure 10. Downsweep calls believed to be from Sei whales. Site A on December 26, 2010.

#### North Atlantic Right Whale

The North Atlantic right whale is a critically endangered whale found in the Western North Atlantic. Several call types that have been described for the North Atlantic right whale including the scream, gunshot, blow, upcall, warble, and downcall (Parks & Tyack 2005). For low-frequency analysis, we examined the data for upcalls, which are approximately 1 second in duration and range between 80 Hz and 3 kHz (Figure 11). No right whale upcalls were detected.



Figure 11. Right whale upcall call from Parks and Tyack (2005).

#### **Five pulse calls**

One call type that has not been described previously, 5 pulse (Figure 12), was recorded commonly at site A. While we do not know which species is responsible for the production of this call, its frequency and temporal characteristics, as well as relatively loud levels, leads us to believe they were likely produced by a baleen whale and thus we included it in this analysis.



Figure 12. LTSA (top) of a band of 5 pulse calls and a spectrogram (bottom) of a single 5 pulse call (750-point FFT, 98% overlap) recorded on 26 August 2010 at site A.

#### **Mid-Frequency Marine Mammals**

For mid-frequency data analysis, the raw 200 kHz HARP data were decimated by a factor of 20 for an effective bandwidth of 5 kHz. The LTSAs for mid-frequency data analysis are created using a time average of 5 seconds, and a frequency bin size of 10 Hz. The presence or absence of each call type was determined in hourly bins.

Mid-frequency sounds monitored in this report include: humpback whale, minke whale speed-up/slowdown pulses, North Atlantic right whale gunshot calls, and killer whale whistles. LTSA search parameters used to search for each sound are given in Table 4.

	LTSA Search Parameters	
<u>Species</u>	Plot Length (Hr)	Frequency Range (Hz)
N Atlantic Right Whale (gunshot calls)	0.75	1000-5000
Killer Whale (whistles)	3.0	0-5000

#### Table 4. Mid-frequency data analysis search parameters.

#### **Humpback Whale**

Humpback whales song is categorized by the repetition of units, phrases and themes as defined by Payne and McVay (1971). Non-song vocalizations such as social sounds and feeding sounds consist of individual units that can last from 0.15 to 2.5 seconds (Dunlop *et al.* 2007, Stimpert *et al.* 2011). Most humpback whale vocalizations have acoustic energy between 100-3000 Hz (Figure **13**). For this report we detected humpback calls (both song and non-song) using the generalized power-law algorithm (Helble *et al.* 2012), and then used a trained analyst to verify the accuracy of the detected signals.



Figure 13. Humpback whale calls recorded at site A on April 13, 2011.

#### North Atlantic Right Whale

North Atlantic right whale gunshot calls are high intensity (~196 dB pp re 1  $\mu$ Pa) and broadband (20 Hz – 20 kHz) (Parks *et al.* 2005) and were therefore included in mid-frequency analysis. Gunshot calls exhibit an initial signal followed by prolonged reverberation (Figure **14**). Although these calls are capable of being detected at a several miles range, no right whale gunshot calls were detected in the JAX data.



Figure 14. North Atlantic Right whale gunshot call from Parks et al, 2005.

## **Killer Whale**

Killer whales are a cosmopolitan species, though little is known about killer whales off the east coast of the United States (Gormley 2000). Few sightings of killer whales have ocurred on the shelf (Katona *et al.* 1988). Acoustic parameters from known Western Atlantic killer whale calls were used to search for killer whale calls (Figure **15**). Neither killer whale whistles, calls nor clicks were detected in the JAX data.



Figure 15. Killer whale vocalizations from Steiner et al. (1979).

#### **High-Frequency Marine Mammals**

For the high frequency data analysis, spectra were calculated for the full effective bandwidth of 100 kHz. The LTSAs were created using a time average of 5 seconds and a frequency bin size of 100 Hz. The presence of call types was determined in one-minute bins.

#### **Unidentified Dolphin**

Delphinid sounds can be categorized as either: (1) echolocation clicks, (2) buzz pulses, or (3) whistles. Dolphin echolocation clicks are broadband impulses with the majority of energy between 20 and 80 kHz. Buzz pulses are rapidly repeated clicks that have a creak or buzz-like sound quality; they are in approximately the same frequency band as the echolocation clicks. Dolphin whistles are tonal calls predominantly between 5 and 25 kHz that vary in their degree of frequency modulation as well as duration. These signals are easily detectable in an LTSA as well as the spectrogram (Figure 16). Only some delphinid sounds are distinguishable by species based on the character of their clicks, buzz pulses or whistles (Roch *et al.* 2011, Roch *et al.* 2007).



Figure 16. LTSA (top) and spectrogram (bottom) of odontocete echolocation clicks and whistles.

#### **Risso's Dolphin**

Risso's dolphin echolocation clicks can be identified to species by their distinctive banding patterns in the LTSA (Figure 17). Risso's dolphin echolocation clicks in southern California are known to have energy peaks at 22, 26, 30, and 39 kHz (Soldevilla *et al.* 2008). Our analysis found Risso's dolphin energy peaks at 23, 26, 35, 44 kHz (Figure **18**), similar to that reported for the JAX area (Soldevilla et al. 2011).



Figure 17. Risso's dolphin click bout in LTSA (above) and spectrogram (below). A distinctive banding pattern is seen in the LTSA.



Figure 18. Risso's dolphin echolocation click mean spectra. Arrows show locate spectral peaks.

#### **Echolocation Click Types**

An analysis was conducted to describe echolocation clicks from unidentified odontocetes (UO). Click type (CT) mean spectra from HARP recordings in the Gulf of Mexico, analyzed and defined by Kait Frasier, and off the coast of North Carolina, analyzed and defined by Lynne Williams, were used as templates. These previous analyses were combined and provided thirteen distinct mean click spectra. All click types had dominant energy above 20 kHz. They differed in the prominence of spectral peaks below 20 kHz, and in the slope and onset of the lower frequency bound in their main spectral energy band. A custom software routine displayed mean click templates and overlaid novel spectra of manually detected acoustic encounters in JAX. A trained analyst determined, based on spectral content, whether an acoustic encounter remained UO or was classified as a CT. Based on a complete analysis of all deployments reported here, five CT (Figure **19**) were identified at least ten times within one deployment and will be described below. CT were then assigned names based on the frequency at which their spectra reached 50% of maximum energy (e.g CT25 = 25 kHz for the 50% energy level).



Figure 19. Echolocation click types (CT) that occurred in JAX recordings repeatedly. Numerical values (e.g. CT25 = 25 kHz) refers to low end of 50% energy bandwidth.

CT 25 (Figure **20**) reaches its 50% maximum energy at approximately 25 kHz and has a peak frequency of about 33 kHz. It has a smaller peak at 15 kHz with troughs at 12 and 20 kHz (Figure **21**).



Figure 20. CT25 in the LTSA (above) and spectrogram (below).



Figure 21. Mean Spectra of clicks for CT25. Example encounter (black line), template for CT (blue line; from G of Mex and/or North Carolina), noise floor (dotted line). Arrows are spectral peaks or troughs.

CT 26 (Figure **22**) reaches its 50% maximum energy at approximately 26 kHz and has a peak frequency of about 35 kHz. It has a smaller peak at 18 kHz with troughs at 15 and 21 kHz (Figure **23**).



Figure 22. CT26 in the LTSA (above) and spectrogram (below).



Figure 23. Mean Spectra of clicks for CT26. Example (black line), template (blue line), and noise floor (dotted line). Arrows are spectral peaks or troughs.

CT 27 (Figure **24**) reaches its 50% maximum energy at approximately 27 kHz and has a peak frequency of about 35 kHz. It has a smaller peak at 16 kHz ranging with troughs at 11 and 20 kHz (Figure **25**).



Figure 24. CT27 in the LTSA (above) and spectrogram (below).



Figure 25. Mean spectra of CT27. Example (black line), template (blue line), and noise floor (dotted line). Arrows are spectral peaks or troughs.

CT 30 (Figure **26**) reaches its 50% maximum energy at approximately 30 kHz and has a peak frequency of about 37 kHz. It has a smaller peak at 16 kHz with troughs at 12 and 22 kHz (Figure **27**).



Figure 26. CT30 in the LTSA (above) and spectrogram (below).



Figure 27. Mean Spectra of CT30. Example (black line), template (blue line), and noise floor (dotted line). Arrows are spectral peaks or troughs.

CT 32 (Figure 28) reaches its 50% maximum energy at approximately 32 kHz and has a peak frequency of about 39 kHz. It has a smaller peak at 17 kHz with troughs at 15 and 22 kHz (Figure 29). Clicks with high received level (Figure **30**) show a peak between 4-6 kHz (Figure **31**). This low peak becomes apparent in LTSAs but a high pass filter cuts it out in the mean spectra.



Figure 28. CT32 in the LTS A (above) and spectrogram (below).



Figure 29. Mean Spectra of CT32. Example (black line), template (blue line), and noise floor (dotted line). Arrows are spectral peaks or troughs.



Figure 30. CT32 (emphasizing 4-6 peak) in the LTSA (above) and spectrogram (below).



Figure 31. Mean Spectra of CT32. Example (black line), template (blue line), and noise floor (dotted line). Arrows are spectral peaks or troughs.

#### **Sperm Whale**

Sperm whales produce echolocation clicks in the frequency range 5 – 20 kHz. Care must be taken not to misclassify impulsive anthropogenic sounds that maintain a similar frequency to sperm whales. No definitive sperm whale encounters were found in the JAX data. Similar findings were reported by Soldevilla et al. (2011).

#### Anthropogenic Sounds

#### **Broadband Ship Noise**

Broadband ship noise occurs when a ship passes relatively close to the HARP. Ship noise can occur for many hours at a time, but broadband ship noise typically lasts from 10 minutes up to 3 hours. Ship noise has a characteristic interference pattern in the LTSA. Combination of direct paths and surface reflected paths produce constructive and destructive interference (bright and dark bands) in the spectrogram that vary by frequency and distance between the ship and the HARP (Figure **32**). This noise can extend to well above 10 kHz, though typically falls off above a few kHz.



Figure 32. Broadband ship noise in the LTSA (above) and spectrogram (below).

#### Mid-Frequency Active Sonar

Many types of active sonar are used in the Jacksonville Range Complex. Their frequencies span 1 kHz to over 50 kHz and include short duration pings, frequency modulated (FM) sweeps and short and long duration continuous wave (CW) tones. One common type of sonar used in JAX is mid-frequency active (MFA) sonar. Sounds from MFA sonar vary in frequency and duration and can be used in a combination of FM sweeps and CW tones; however, many of these are between 2 and 5 kHz and are generically known as '3.5 kHz' sonar. We describe the process for identifying MFA sonar and how pings from these events were analyzed, including counts and distributions of sonar levels.

The first step in analyzing MFA sonar was conducted by an analyst scanning for periods of sonar activity. Start and end times of MFA sonar events from LTSAs were noted to provide target periods for automatic

detections. Full bandwidth (10Hz - 100kHz) data were used to calculate the spectra for the LTSAs with 100 Hz frequency bin-width and 5 s time bin width. These spectra were arranged sequentially to provide a long-term spectrogram so that hours of data can be easily displayed for analysis. Individual MFA sonar pings typically span 1 - 3 s, but are intense enough to show up as 'pulses' in LTSA plots (Figure **33**). LTSA display parameters used by the analyst were 1 or 2 hour window length, and 2 - 5 kHz bandwidth.



Figure 33. Mid-frequency active (MFA) sonar event. (Top) Long-Term Spectral Average of 45 minutes of data. (Bottom) Spectrogram of with multiple sonar pings.

A custom developed software routine was used to detect sonar pings and calculate peak-to-peak (PP) received sound pressure levels. For this detector, a sonar ping is defined as the presence of sonar within a 5 s window and may contain multiple individual pings (Figure 33. The detector calculates the average spectral level across the frequency band from 2.4 to 4.5 kHz for each 5 s window. This provides a long-term time series of the average received levels in that frequency band. Minimum values were noted for each 15 time bins, and used as a measure of background noise level over the sonar event period. Spectral bins that contained system noise (disk writing) were eliminated. Each of the remaining average spectral bins was compared to the background minimum levels. If levels were more than 3 dB above the background, then a detection time was noted. These detection times were used to index to the original time series to calculate PP levels. Received PP levels were calculated by differencing the maximum and minimum amplitude of the time series in the 5 s window. The raw time series amplitudes are in units of analog-to-digital converter (ADC) counts. These units were corrected to  $\mu$ Pa by using the HARP calibrated transfer function for this frequency band. The HARP response is not flat over the 2.4 – 4.5 kHz band, and the value at 3.3 kHz was used to approximate the entire band. The transfer function value

for site 5A was 83.1 dB re  $\mu$ Pa<sup>2</sup>/counts<sup>2</sup> while the transfer function value for site 6A was 82.3 dB re  $\mu$ Pa<sup>2</sup>/counts<sup>2</sup>. The transfer function value used for site 5B was 62.8 dB re  $\mu$ Pa<sup>2</sup>/counts<sup>2</sup>. There were no MFA ping events in site 6B. For sonar pings less than this 3.3 kHz, the levels are overestimated up to about 5 dB and for higher frequency sonar the levels are underestimated up to about 4 dB.

#### Echosounder

Echosounder pings were detected in a variety of frequencies (8-80 kHz); they are easily identified as lines in the LTSA (Figure **34**).



Figure 34. Echosounder in the LTSA (above) and spectrogram (below).

## **Explosions**

Explosive sounds logged in the HARP data include military explosions, shots from sub-seafloor exploration, and seal bombs used by the fishing industry. An explosion appears as a vertical spike in the LTSA, and when expanded in the spectrogram has a sharp onset with a reverberant decay (Figure 35). These sounds have peak bandwidth as low as 10 Hz and often extend up to 2000 Hz or higher, lasting for several seconds including the reverberation.



Figure 35. Five explosions are seen in the LTSA (arrow above) and one is expanded in the spectrogram (below). Site A on April 8, 2011.

## Results

This report summarizes analysis of acoustic data collected from August 2010 - July 2011 at two sites in the Jacksonville Range Complex. We discuss ambient noise as well as the seasonal occurrence and relative abundance of marine mammal species and anthropogenic sounds.

## **Ambient Noise**

Underwater ambient noise at sites A and B has spectral shapes with higher levels at low frequencies (Figure 36), owing to the presence of ship noise with secondary contributions from local wind and waves (Hildebrand 2009). An additional component of noise in the JAX data was due to mooring strum and fluid motion near the hydrophone sensor. These instrumental noise sources may have contributed to ambient noise levels at both sites that varied by as much as 20 dB at low frequency between monthly averages (Figure **36**). The months of February and March 2011 had very high noise levels at Site B.

Periods with high ambient noise at low frequency will result in lowered detection range for mysticetes calls. We attempted to quantify when high noise levels impacted the ability to detect low frequency calls (Appendix).



Figure 36. Monthly averages of ambient noise at site A (above) and site B (below) for the period August 2010 – July 2011. Legend gives color-coding by date.

## Mysticetes

Four species of mysticete whales were recorded between August 2010 and July 2011 at sites A and B: fin, minke, sei, and humpback. In addition, the 5-pulse sound was detected, which we believe to be produced by a mysticete whale. No known blue or Bryde's whales sounds were detected at either site, nor were North Atlantic right whale upcalls or gunshot calls.

Site A was frequented by calling mysticete whales more often than site B. Fin, minke, and sei whale calls were all detected during more hours at site A, although this may be partially due to the higher ambient noise levels at site B during certain seasons, decreasing call detection ranges (Figure **36**).

## **Fin Whales**

Fin whale 20 Hz calls were detected at site A in late January and early February (Figure **37**). Fin whale 40 Hz calls were not detected at either site, nor were there any 20 Hz calls at site B.



Figure 37. Weekly fin whale 20 Hz call presence at site A between August 2010 and February 2011. The area shaded in gray represents the section of data that were missing or corrupt. The light gray dots represent weekly recording effort.

## **Minke Whales**

Two minke whale call types were recorded. 50 Hz pulses were recorded at site A, while no 50 Hz pulses were recorded at site B (Figure **38**). Minke whale pulse trains were recorded at both sites (Figure **39**).



Figure 38. Occurrence of minke whale 50 Hz pulses at site A. Effort as described in Figure 37



Figure 39. Weekly occurrence of minke speed-up/slow-down whale pulse trains at 150 Hz at site A (top) and site B (bottom). Effort as described in Figure 37

#### Sei Whales

Downsweep calls reported as being from sei whales were detected at site A, with detections occurring in November and December (Figure 40). No downsweep calls were detected at site B.



Figure 40. Weekly occurrence of downsweep calls in site A. Effort as described in Figure 37

#### **5-Pulse Call**

The 5-pulse call was detected late-October through early December in site A (Figure **41**). No 5-pulse calls were recorded at site B.



Figure 41. Weekly occurrence of 5-pulse calls at site A. Effort as described in Figure 37

#### **Humpback Whales**

Humpback whales were only detected on site B (Figure 42). The detections were few, likely owing to the fact that the migratory path of western North Atlantic humpbacks generally does not include the southeast US coastline as they migrate from their high-latitude feeding areas off the northeast coast of the US to the Barents Sea (Katona & Beard 1990, Smith *et al.* 1999) to a common breeding area in the West Indies to mate and calve (Katona & Beard 1990, Stevick *et al.* 1998).



Figure 42. Weekly presence of all humpback whale calls (black bars) at site B between February and July 2011. No humpback calls were recorded at site A. Effort as described in Figure 37

#### **Odontocetes**

Clicks from Risso's dolphin and five click types that are not yet associated to a species were detected at sites A and B. Neither killer whale nor sperm whale sounds were detected at either site.

#### **Unidentified Odontocete**

The greatest number of odontocete click and whistle detections were attributed to the category unidentified odontocete (UO). Overall rates of UO detections were higher at site A than B (Figure 43). There was a distinct diel acoustic activity at site A, likely due to nighttime foraging. Nighttime clicking is more common at site B as well, but the diel pattern is not as distinct as at site A.



Figure 43. Odontocete echolocation clicks in one-minute bins (blue) and weekly presence (black) at site A (left) and site B (right) between August 2010 and July 2011. Top: all echolocation clicks of all species, Bottom: UO after all others were extracted. Red shading indicates data gaps. Gray shading is nighttime.

#### **Risso's Dolphin**

Risso's dolphin echolocation clicks were only detected at site A (Figure 44). Clicks were detected from the end of August until the end of November with two additional click segments: one in the middle of January and another at the beginning of March. A nighttime diel pattern is suggested.



Figure 44. Risso's dolphin echolocation clicks in one-minute bins (blue) and weekly presence (black) at site A between August 2010 and July 2011. No Risso's dolphin were detected at site B. Red shading indicates data gaps. Gray shading is nighttime.

Click Type 25 was detected intermittently between the end of August and the beginning of June with most of the clicks occurring at night (Figure 45). Out of the five specified click types, CT25 was the least prevalent click type.



Figure 45. CT25 echolocation clicks in one-minute bins (blue) and weekly presence (black) at site A (left) and site B (right) between August 2010 and July 2011. Red shading indicates data gaps. Gray shading is nighttime.
Click Type 26 was the most prevalent of the five click types detected in the JAX data set. This click type appeared throughout the duration for site A, but only occurred between the beginning of October and the middle of April at site B. A nighttime diel pattern is suggested at site A, but not at site B (Figure 46).



Figure 46. CT26 echolocation clicks in one-minute bins (blue) and weekly (black) at site A (left) and site B (right) between August 2010 and July 2011. Red shading indicates data gaps. Gray shading is nighttime.

Click Type 27 encounters were detected throughout the entire time period at site A, but were only present at site B during the end of September and the end of November. More clicks appear to be present at night at site A (Figure 47).



Figure 47. CT27 echolocation clicks in one-minute bins (blue) and weekly presence (black) at site A (left) and site B (right) between August 2010 and July 2011. Red shading indicates data gaps. Gray shading is nighttime.

Click Type 30 was present during both day and night, but were more prevalent during the night. At site A, clicks occurred from late August to the end of December and then reoccurred at the beginning of March through the end of June (Figure 48). At site B, clicks were only present from the beginning of October to the beginning of February, with one occurrence in the middle of June. This pattern could be due to seasonal preference or based on excessive noise and the ability to identify a definitive click type.



Figure 48. CT30 echolocation clicks in one-minute bins and weekly presence at site A (left) and site B (right) between August 2010 and July 2011. Red shading indicates data gaps. Gray shading is nighttime.

Click Type 32 was detected from the end of August until the end of May. Site B had very few acoustic encounters. There was one encounter at the end of September, while the other encounters occurred from the end of November until the end of January. No specific diel pattern was seen (Figure 49).



Figure 49. CT32 echolocation clicks in one-minute bins and weekly presence at site A (left) and site B (right) between August 2010 and July 2011. Red shading indicates data gaps. Gray shading is nighttime.

## Anthropogenic Sounds

#### **Broadband Ship Noise**

Ship noise was common at sites A and B (Figure 50). Daily presence of ship noise had no temporal patterns (Appendix).



Figure 50. Broadband ship noise weekly hours at site A (top) and B (bottom) between August 2010 and July 2011. Effort markings are as described in Figure 35.

#### **Mid-Frequency Active Sonar**

Both sites A and B had MFA sonar events throughout the period August 2010 - July 2011 (Figure 51). At site A, a total of 2,437 MFA sonar pings were detected, ranging from 100 to 173 dB pp re 1 µPa; the maximum value is the clipping level of the HARP and the minimum value is a threshold limit based on the analysis methods used. 2,496 pings were detected at site B. Mid-October had the largest number of pings per week detected at both sites while some weeks did not have any sonar detections. Distribution of ping levels from site A shows a peak around 124 dB pp re 1 µPa and is long-tailed to higher levels while site B shows a peak around 134 dB pp re 1 µPa (Figure 52). Cumulative distribution of ping levels shows that half of the pings detected are above 125 dB pp re 1 µPa in both sites (Figure 53).



Figure 51. Mid-Frequency Active (MFA) sonar presence in weekly bins at site A (left panel) and site B (right panel) between August 2010 and July 2011.



Figure 52. Distribution of MFA sonar pings by received level at site A (left) and site B (right) in 2 dB bins. Peak number of pings is 124 dB pp re 1  $\mu$ Pa for site A and 134 dB pp re 1  $\mu$ Pa for site B. Minimum level is 110 dB pp re 1  $\mu$ Pa and is related to the detection threshold. Maximum level is 173dB pp re 1  $\mu$ Pa for site A and 166 dB pp re 1  $\mu$ Pa for site B, set by the clipping level of the HARP.



Figure 53. Cumulative distribution for the number of MFA sonar pings detected at a given received level or higher, at site A (left) and site B (right) in 2 dB bins.

#### Echosounders

Echosounder pings with a variety of primary frequencies (8 – 80 kHz) were found at both sites A and B (Figure 54). More echosounders were present at site A than site B, perhaps related to the greater depth at site A. Echosounder pings at both sites A and B occurred during similar times of the month. Pings were detected from the end of August to the middle of March and reoccurring at the beginning of April until the beginning of July. For site B, the pings occurred mostly at night while site A pings occurred more during the day.



Figure 54. Echosounder pings in one-minute bins (blue) and weekly echosounder presence (black) at site A (left) and site B (right) between August 2010 and July 2011.

#### Explosions



Few explosions were recorded at either site (Figure 55). A peak in explosions was recorded in early July 2011 at site B.

Figure 55. Weekly hours with explosions at sites A (top) and B (bottom) between August 2010 and July 2011. Effort markings are as described in Figure 37.

#### 130-Hz Tone

The 130-Hz tone was detected at site A, with peaks in detections mid- to late November and mid-December (Figure 56). The tone was produced exclusively at night (Appendix). This tone was not detected at site B.



Figure 56. Weekly hours with 130-Hz tone detections at site A. Effort markings are as described in Figure 37.

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# Appendix



Fin whale – 20 Hz calls in hourly bins at site A. No calls were detected at site B.



Minke whale – 50 Hz pulses in hourly bins at site A. No calls were detected at site B.



Minke whale – Speed-up/slow down pulse trains in hourly bins at sites A (left) and B (right).



Sei whale – Downsweeps in hourly bins at site A. No calls were detected at site B.



Humpback whale – Song and non-song calls detected in hourly bins at site B. No calls were detected at site A.



Unknown whale – 5-pulse calls in hourly bins at site A. No calls were detected at site B.



Low-frequency noise causing call masking – Occurrence in hourly bins at sites A (left) and B (right).



Broadband shipping – Occurrence in hourly bins at sites A (left panel) and B (right panel).



Mid-frequency active sonar – Occurrence in hourly bins at sites A (left panel) and B (right panel).



Explosions – Occurrence in hourly bins at sites A (left panel) and B (right panel).



130-Hz tone – Sounds recorded in hourly bins at site A.