Aerial Surveys for Protected Species in the Jacksonville OPAREA: 2015 Annual Progress Report

Submitted to:

Naval Facilities Engineering Command Atlantic under Contract Nos. N62470-10-D-3011, Task Orders 49 and 58 and N62470-15-8006, Task Order 05 issued to HDR, Inc.

Prepared by

Erin Cummings, Ryan McAlarney, William McLellan, and D. Ann Pabst

Department of Biology and Marine Biology
University of North Carolina Wilmington
601 S. College Road
Wilmington, NC 28403

Submitted by:

Virginia Beach, VA

February 2016

Suggested Citation:

Cummings E., R. McAlarney, W. McLellan, and D.A. Pabst. 2016. *Aerial Surveys for Protected Species in the Jacksonville OPAREA: 2015 Annual Progress Report.* Prepared for U.S. Fleet Forces Command. Submitted to Naval Facilities Engineering Command Atlantic, Norfolk, Virginia, under Contract Nos. N62470-10-3011, Task Orders 49 and 58 and N62470-15-8006, Task Order 05, issued to HDR, Inc., Virginia Beach, Virginia. 12 February 2016.

Cover Photo Credit:

Rough-toothed dolphin (*Steno bredanensis*). Photo collected by the University of North Carolina Wilmington under NOAA Scientific Permit # 16473.

This project is funded by US Fleet Forces Command and managed by Naval Facilities Engineering Command Atlantic as part of the US Navy's marine species monitoring program.

Table of Contents

Acronyms and Abbreviations v
1. Introduction 1
2. Summary of Jacksonville Aerial Surveys 1
3. Methods 2
3.1 Survey Design and Logistics 2
4. Results 5
4.1 Marine Mammal Sightings 10
4.2 Dolphins 13
4.2.1 Bottlenose Dolphin (*Tursiops truncatus*) 15
4.2.2 Atlantic Spotted Dolphin (*Stenella frontalis*) 15
4.2.3 Risso's Dolphin (*Grampus griseus*) 17
4.2.4 Rough-toothed Dolphin (*Steno bredanensis*) 19
4.3 Whales 21
4.3.1 Short-finned Pilot Whale (*Globicephala macrorhynchus*) 21
4.4 Sea Turtles 23
4.4.1 Loggerhead Sea Turtle (*Caretta caretta*) 25
4.4.2 Leatherback Sea Turtle (*Dermochelys coriacea*) 29
4.5 Fish 31
4.5.1 Pelagic Bony Fishes (*Osteichthyes)* 31
4.5.2 Cartilaginous Fishes *(Chondrichthyes)* 33
4.6 Vessel Sightings 34
4.6.1 Commercial Vessels 34
4.6.2 Military 36
4.6.3 Other Vessels 38
5. Acknowledgements 41
6. Literature Cited 41

Appendices

A Aerial Daily Sheet

B Event Codes and Species List

C Notes on Sighting Summary Sheets

D Sighting Summary Sheets

Figures

Figure 1. Tracklines 1-10 that compose the Jacksonville, Florida survey site and the EWS survey lines. Gray box highlights additional survey tracklines. Black dots indicate EWS off shore extensions that were added this reporting period. 4

Figure 2a. Total distance surveyed per Beaufort sea state from January 2015 to December 2015 during aerial surveys in the Jacksonville, Florida survey area. 6

Figure 2b. Effort by Beaufort sea state for each day from January 2015 to December 2015 during aerial surveys in the Jacksonville, Florida survey area. 6

Figure 2c. Distance-weighted average BSS for each month from January 2015 to December 2015 during aerial surveys in the Jacksonville, Florida survey area.. 7

Figure 3a. Number of cetacean sightings per BSS from January 2015 to December 2015 during aerial surveys in the Jacksonville, Florida survey area. 7

Figure 3b. Cetacean sightings per 1,000 km flown by BSS from January 2015 to December 2015 during aerial surveys in the Jacksonville, Florida survey area. 8

Figure 3c. Cetacean sightings per 1,000 km surveyed and the average BSS per month from January 2015 to December 2015 during aerial surveys in the Jacksonville, Florida survey area. 8

Figure 4a. Sighting distances by BSS for 108 of 121 on effort cetacean sightings from January 2015 to December 2015 during aerial surveys in the Jacksonville, Florida survey area. 9

Figure 4b. Average sighting distances by BSS for 108 of 121 on effort cetacean sightings from January 2015 to December 2015 during aerial surveys in the Jacksonville, Florida survey area. Error bars denote standard deviation for each category. 9

Figure 5. All cetacean sightings during aerial surveys conducted in Jacksonville, Florida survey area from January 2015 to December 2015. 12

Figure 6. Atlantic spotted dolphin (*Stenella frontalis*) sightings. White outline denotes off-effort sighting; symbol size indicates group size. 14

Figure 7. Bottlenose dolphin (*Tursiops truncatus*)sightings; symbol size indicates group size ... 16

Figure 8. Risso's dolphin (*Grampus griseus*) sightings. White outline denotes off effort sighting 18

Figure 9. Rough-toothed dolphin (*Steno bredanensis*) sighting. 20

Figure 10. Short-finned pilot whale (*Globicephala macrorhynchus*) sightings. 22

Figure 11a. Total numbers of sea turtle sightings by Beaufort Sea State in the Jacksonville, Florida survey area from January 2015 to December 2015. 23
Figure 11b. Sea turtle sightings per 1000 km flown by BSS in the Jacksonville, Florida survey area from January 2015 to December 2015. 24
Figure 11c. Sea turtle sightings per 1000 km surveyed and the distance-weighted average BSS per month in the Jacksonville, Florida survey area from January 2015 to December 2015.....24
Figure 12. Loggerhead sea turtle (*Caretta caretta*) sightings. 28
Figure 13. Leatherback sea turtle (*Dermochelys coriacea*) sightings. 30
Figure 14. Pelagic fish sightings. 32
Figure 15. Commercial vessel sightings. 35
Figure 16. Military vessel sightings. 37
Figure 17. Other vessel sightings. 40

Tables

Table 1. Coordinates for trackline end points for the Jacksonville, Florida survey area. 3
Table 2. Tracklines, km flown, and Hobbs hours during aerial surveys of the Jacksonville, Florida survey area from January 2015 to December 2015. Trackline numbers are listed in the order in which they were flown. 5
Table 3. Total numbers of sightings and individuals for each species by month from January 2015 to December 2015 for the Jacksonville, Florida survey area. 11
Table 4. Atlantic spotted dolphin *(Stenella frontalis)*sightings in the Jacksonville, Florida survey area from January 2015 to December 2015. Asterisk denotes off-effort sighting.....15
Table 5. Bottlenose dolphin (*Tursiops truncatus*) sightings in the Jacksonville, Florida survey area from January 2015 to December 2015. 135
Table 6. Risso's dolphin (*Grampus griseus*) sightings in the Jacksonville, Florida survey area from January 2015 to December 2015. Asterisk denotes off effort sighting. 177
Table 7. Rough-toothed dolphin (*Steno bredanensis*) sighting in the Jacksonville, Florida survey area from January 2015 to December 2015. 19
Table 8. Short-finned pilot whale (*Globicephala macrorhynchus*) sightings in the Jacksonville, Florida survey area from January 2015 to December 2015. 21
Table 9. Loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey area from January 2015 to December 2015. 25
Table 10. Leatherback sea turtle (*Dermochelys coriacea*) sightings in the Jacksonville, Florida survey area from January 2015 to December 2015. 29
Table 11. Ocean sunfish (*Mola mola*) sightings in the Jacksonville, Florida survey area from January 2015 to December 2015. 31
Table 12. Manta ray (*Manta birostris*) sightings in the Jacksonville, Florida survey area from January 2015 to December 2015. 33

Table 13. Unidentified Chondrichthyan fish sightings in the Jacksonville, Florida survey area from January 2015 to December 2015. 33
Table 14. Commercial vessel sightings in the Jacksonville, Florida survey area from January 2015 to December 2015. 34
Table 15. Military vessel sightings in the Jacksonville, Florida survey area from January 2015 to December 2015. 36
Table 16. Other vessel sightings in the Jacksonville, Florida, survey area from January 2015 to December 2015. 38

Acronyms and Abbreviations

BSS	Beaufort sea state
EPIRB	emergency positioning-indicating radio beacon
EWS	Early Warning System
FWC	Florida Fish and Wildlife Conservation Commission
km	kilometer(s)
m	meter(s)
R/V	Research Vessel
SD	standard deviation
U.S.	United States

This page intentionally left blank.

1. Introduction

This report forms part of a multi-institutional monitoring project intended to provide information on the species composition, population identity, density and baseline behavior of marine mammals and sea turtles present in United States (U.S.) Navy range complexes along the U.S. Atlantic Coast. This program began in 2007, with baseline aerial and vessel surveys and a passive acoustic monitoring program in Onslow Bay, North Carolina, and has since expanded to include study areas off Jacksonville, Florida, and Cape Hatteras, North Carolina. In Onslow Bay, six years of monitoring yielded a comprehensive picture of the density, distribution and abundance of marine mammals and sea turtles and provided new insights into residency patterns among pelagic delphinid cetaceans in this region (Read *et al.* 2014). More than six years of monitoring in Jacksonville has provided similar information on the density and distribution of marine mammals and sea turtles in this area. In Cape Hatteras, almost five years of surveys have provided preliminary information on the complex patterns of distribution and diversity of the marine mammals and sea turtles in this highly productive area. The current report builds on this past body of work and describes monitoring activities that occurred at the Jacksonville, Florida site from January through December 2015. Updated statistical analysis of data from this project can be found in Paxton, 2016.

2. Summary of Jacksonville Aerial Surveys

This document is an annual progress report to the U.S. Navy on aerial surveys conducted in the offshore waters of Jacksonville, Florida, between January 2015 and December 2015. The goal was to survey the entire site (10 tracklines) twice per calendar month, which was achieved in August and October, when 20 tracklines were flown each month. During the months of July, September, November and December, no surveys were conducted due to limited pilot availability or unfavorable weather conditions. A total of 62 tracklines covering 4393 kilometers (km), including extended offshore lines (see Methods below) was surveyed across four months.

A total of 39 sightings of 508 cetaceans was recorded while on effort in the study area. Four species of cetaceans were observed while on effort, including Atlantic spotted dolphin (*Stenella frontalis*; 17 sightings of 320 individuals), bottlenose dolphin (*Tursiops truncatus*; 17 sightings of 143 individuals), rough-toothed dolphin (*Steno bredanensis*; one sighting of 35 individuals) and short-finned pilot whale (*Globicephala macrorhynchus;* one sighting of one individual). During three sightings (totaling nine individuals), dolphin species identity could not be established with certainty (i.e., “unidentified delphinids”). Two off-effort sightings were recorded. These included one sighting of Risso’s dolphin (*Grampus griseus*; six individuals) at the east end between tracklines, and one sighting of Atlantic spotted dolphins (45 individuals) while breaking track for a different sighting. These off-effort sightings are included in species sighting maps and tables but are excluded from all other calculations.

A total of 161 sea turtles was recorded during the study period. Of these individual sea turtle sightings, 133 were identified as loggerheads (*Caretta caretta*), 16 as leatherbacks

(*Dermochelys coriacea*) and 12 as "unidentified sea turtles." Sea turtles were detected during each day of survey effort except for 20 August when only offshore lines were flown.

As has been demonstrated in earlier reports and in other aerial survey studies, sightings decrease dramatically as the Beaufort sea state (BSS) increases (e.g., Gómez de Segura *et al.* 2006, DeMaster et al. 2001, McAlarney *et al.* 2013). Effort-corrected cetacean and sea turtle sightings were higher in BSS of 1 and 2 than in BSS $\geq$ 3 during this survey period.

In addition to cetaceans and sea turtles, other pelagic marine vertebrates including ocean sunfish and multiple species of sharks and rays were observed. Military, commercial, and recreational vessel traffic was also recorded inside the survey area.

All historical data from this project is made publically available through the Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations (OBIS-SEAMAP).

3. Methods

3.1 Survey Design and Logistics

The University of North Carolina Wilmington provided experienced aerial observers and contracted Orion Aviation (Siler City, North Carolina) to provide appropriate planes and certified pilots. Surveys were conducted using National Oceanic and Atmospheric Administration–Southeast Regional Minimum Aircraft and Crew Provisions Guidelines (NOAA SER 2013), which require that aircraft are Code of Federal Regulations Part 135 certified and that pilots have demonstrated experience working below 305 meters (m) in support of biological observational studies. Surveys were flown in a Cessna 337 Skymaster, at 305 m altitude and 185 km/hour speed, with a pilot, co-pilot and two observers. Each observer wore a Nomex® fire-retardant suit, a Switlik® inflatable life jacket and a personal emergency position-indicating radio beacon (EPIRB), and additional safety equipment. An inflatable life raft, plane EPIRB and satellite phone were also onboard at all times. A detailed description of survey methods is included in the annual report for Cape Hatteras survey area (McAlarney *et al*. 2016).

The Jacksonville survey area consists of ten 86-km long tracklines spaced 7.4 km apart covering 5,727 square kilometers. As discussed at the 2015 Marine Species Monitoring Program Atlantic Technical Review Meeting (March 30-21 2015 Virginia Beach, VA), there was interest in better understanding the habitat usage of pelagic cetaceans found beyond the eastern portion of the Jacksonville survey area. Thus, additional lines were added this year that extended 43.6 km from each of the eastern endpoints, covering an additional 2,903 square kilometers (**Table 1, Figure 1**). Effort on these additional tracklines is include in our analysis. These tracklines are labeled "1-10 Off" in the sighting tables and are also added to the species sightings maps with a slight gap displayed between the two areas. This new area was surveyed on two days, one day in April and one in August.

This survey area is located offshore of the primary calving grounds for the endangered North Atlantic right whale (*Eubalaena glacialis*), which is located off the coast of the southeastern United States (reviewed in Waring *et al*. 2015, but see Foley *et al*. 2011). Aerial Early Warning

System (EWS) surveys have been conducted in northern Florida and southern Georgia for the past 18 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 survey area provided additional coverage, both of the surrounding geographic region and during the months preceding and following the EWS surveys. In past years, this effort has resulted in a number of additional right whale sightings. No right whales were sighted in 2015.

Table 1. Coordinates for trackline end points for the Jacksonville, Florida survey area.

Transect Line	Western Waypoint		Eastern Waypoint		Offshore Eastern Waypoint	
Line	Latitude (N)	Longitude (W)	Latitude (N)	Longitude (W)	Latitude (N)	Longitude (W)
1	29.965011	-80.700000	29.965011	-79.801416	29.965011	-79.348467
2	30.031263	-80.700000	30.031263	-79.801416	30.031264	-79.348467
3	30.099694	-80.700000	30.099694	-79.801416	30.099694	-79.348467
4	30.165763	-80.700000	30.165763	-79.801416	30.165764	-79.348467
5	30.232227	-80.700000	30.232227	-79.801416	30.232228	-79.348467
6	30.299477	-80.700000	30.299477	-79.801416	30.299477	-79.348467
7	30.365152	-80.700000	30.365152	-79.801416	30.365153	-79.348467
8	30.432797	-80.700000	30.432797	-79.801416	30.432797	-79.348467
9	30.198866	-80.700000	30.198866	-79.801416	30.498867	-79.348467
10	30.566233	-80.700000	30.566233	-79.801416	30.566233	-79.348467

Safety and communication protocols for transiting through the EWS areas were established in January 2009 when our JAX USWTR offshore survey effort began. The JAX USWTR offshore survey team reviewed protocols 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 1,000-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 JAX USWTR offshore survey area and the eastern margin of the EWS surveys (**Figure 1**). We have maintained these safety and communication protocols throughout the reporting period.

All aerial surveys were based out of the local Fixed-base Operator in Fernandina Beach, Florida. Prior to an aerial survey, pilots with Orion Aviation would contact SeaLord at Fleet Area Control and Surveillance Facility, Jacksonville to get event codes for passage out of and into U.S. territorial waters.

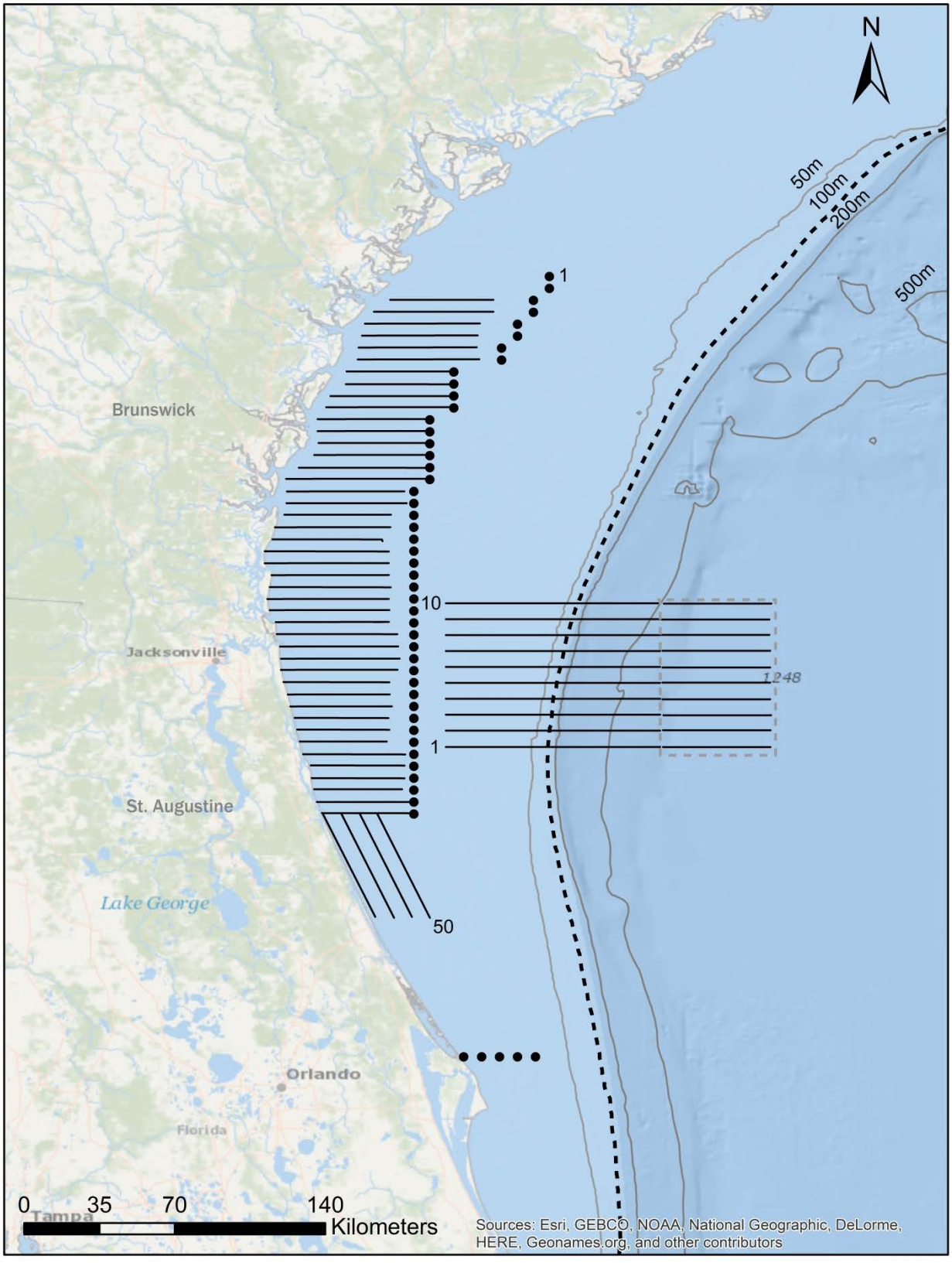

Figure 1. Tracklines 1-10 that compose the Jacksonville, Florida survey site and the EWS survey lines (1-50). Gray box highlights additional survey tracklines. Black dots indicate EWS off shore extensions that were added this reporting period.

4. Results

A total of 62 tracklines comprising 4393 km was surveyed during the 12-month reporting period from January 2015 through December 2015 (**Table 2**).

Table 2. Tracklines, km flown and Hobbs hours during aerial surveys of the Jacksonville, Florida survey area in 2015. Trackline numbers are listed in the order in which they were flown.

Date	Tracklines Flown AM	Tracklines Flown PM	Total km Flown	Hobbs Hours
2-Mar-2015	Attempted, Fog			1.1
3-Mar-2015	5 to 8	1 & 2, 9 & 10	652.45	7.2
4-Mar-2015	10 & 9	N/A	158.05	3.0
15-Apr-2015	10 to 5 Offshore	1 to 4 Offshore, 1 & 4	602.80	6.1
19-Aug-2015	10 to 5	1 to 4	846.30	6.6
20-Aug-2015	10 to 1 offshore	N/A	429.10	4.0
14-Oct-2015	5 to 10	1 to 4	854.00	6.2
15-Oct-2015	5 to 10	4 to 1	850.30	7.1
7 days	**62 tracklines**		**4393 km**	**41.3 hrs**

An average BSS value was calculated each survey month to compare conditions across time, weighted by the distance flown at each BSS. Survey effort was terminated when BSS values persisted above 4. Survey conditions ranged from BSS 1 to 5, with the majority of the surveys flown in BSS 3 (45 percent) (**Figures 2a-c**). Cetacean sighting rates dropped off dramatically at BSS greater than 3 (**Figures 3a-c**). The higher than typical sighting rates per km flown in BSS >3 could be the result of a number of factors including increased cetacean density on some of those days, different mixes of species, changes in behavior with BSS, random effects of small numbers, or increased survey time spent in these conditions this year (**Figures 3a-c**).

The mean sighting distance for all cetacean sightings was 0.79 km, with over 91 percent of sightings occurring within 1.2 km of the trackline (**Figure 4a**). The mean sighting distance varied less than 0.14 km across the BSS values recorded (**Figure 4b**). Average sighting distances were calculated after removing a single outlier (2.62 km from trackline), which was in excess of three standard deviations from the mean.

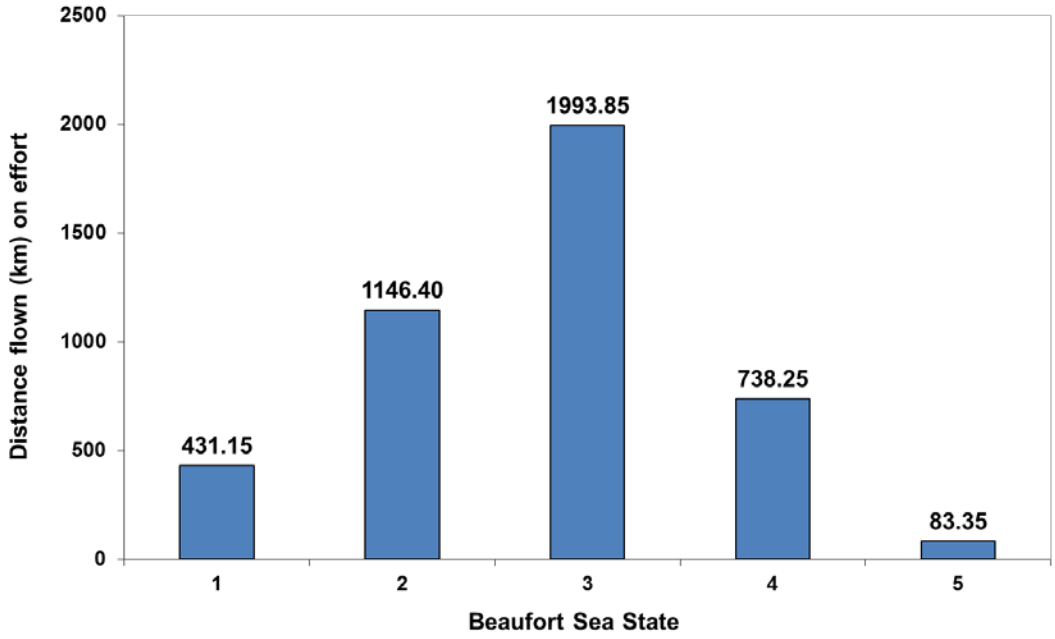

Figure 2a. Total distance surveyed per Beaufort sea state category during aerial surveys in the Jacksonville, Florida survey area in 2015.

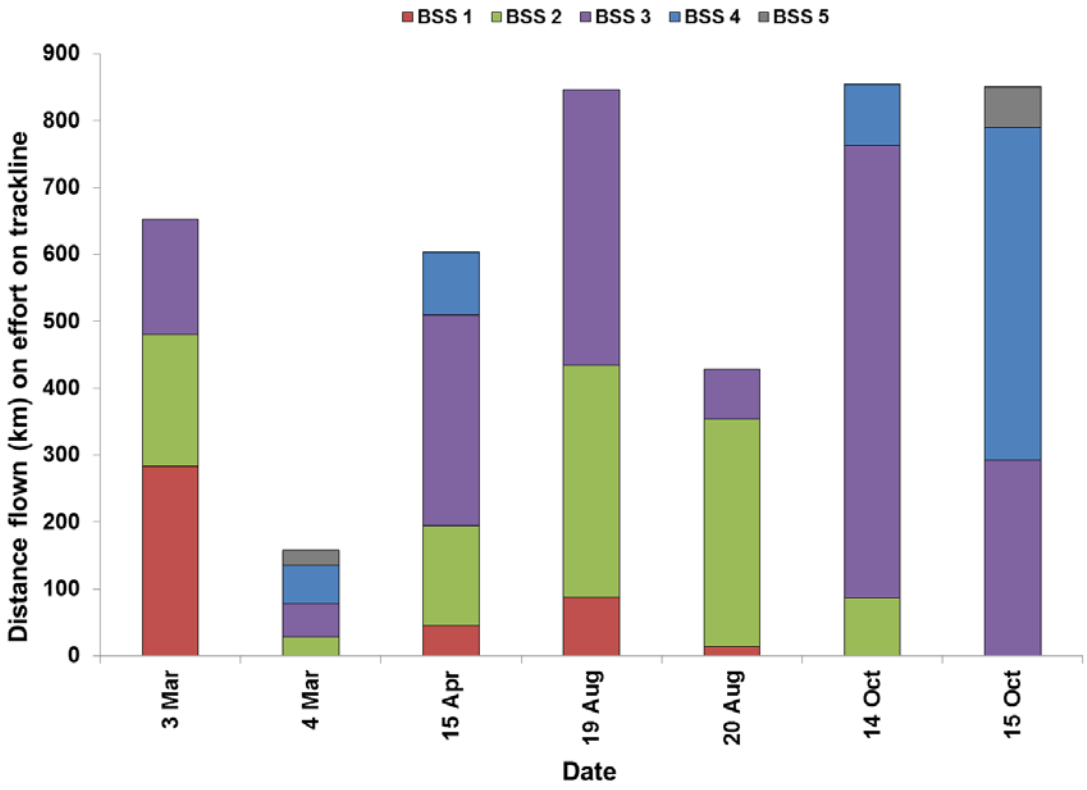

Figure 2b. Effort by Beaufort sea state during aerial surveys in the Jacksonville, Florida survey area in 2015.

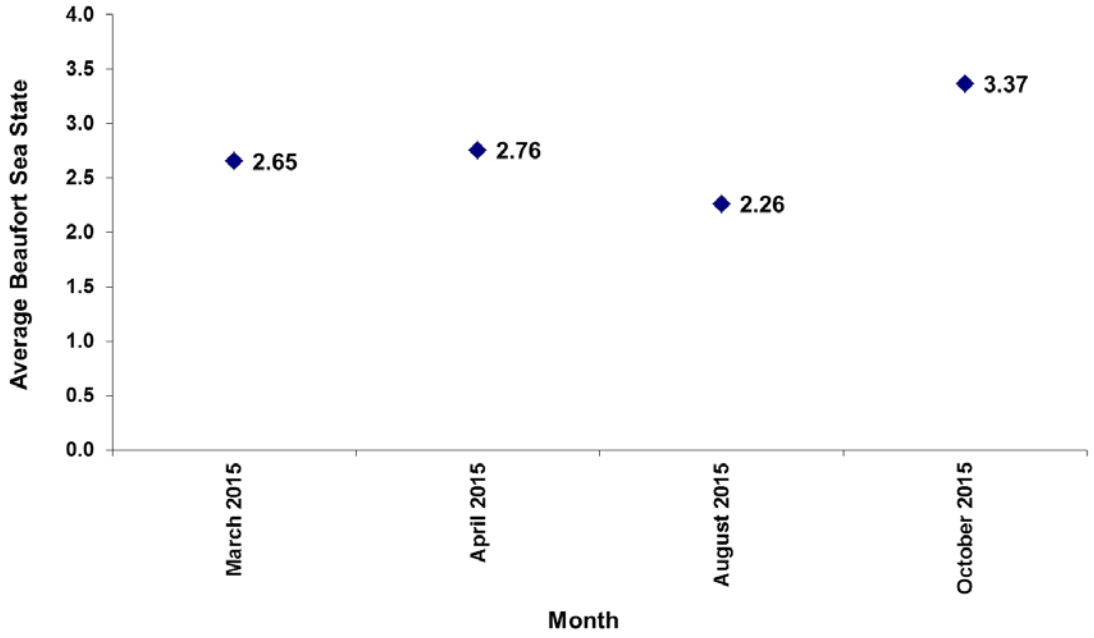

Figure 2c. Distance-weighted average BSS for each month during aerial surveys in the Jacksonville, Florida survey area in 2015.

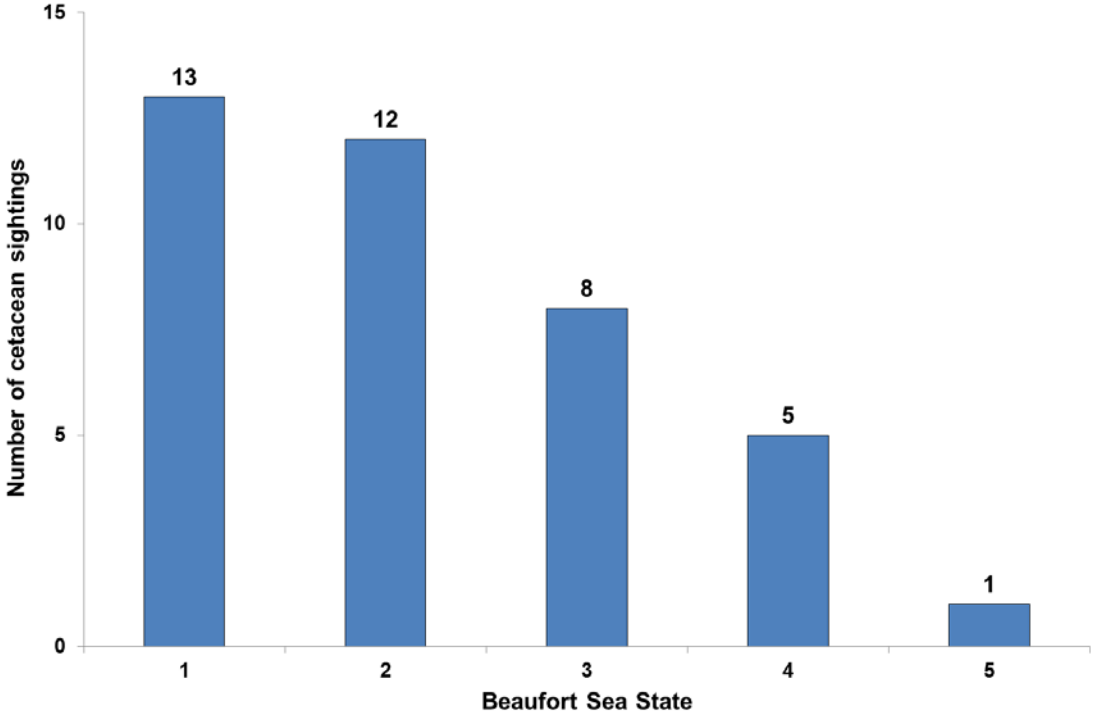

Figure 3a. Number of cetacean sightings per BSS category during aerial surveys in the Jacksonville, Florida survey area in 2015.

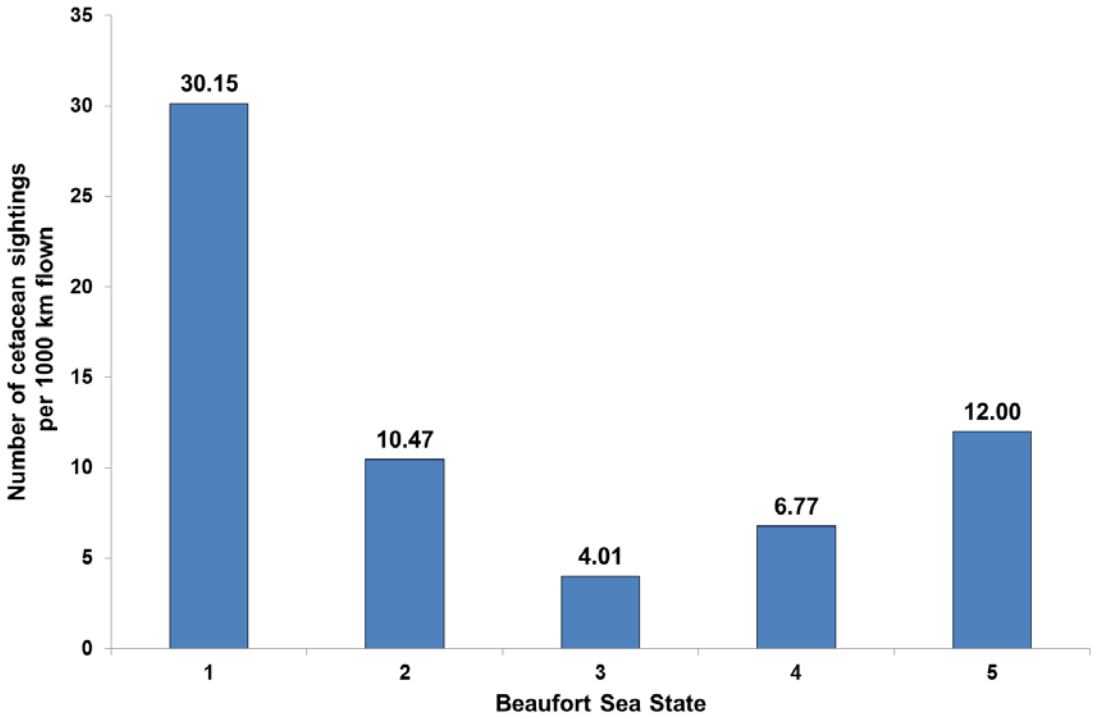

Figure 3b. Cetacean sightings per 1,000 km flown by BSS category fduring aerial surveys in the Jacksonville, Florida survey area in 2015.

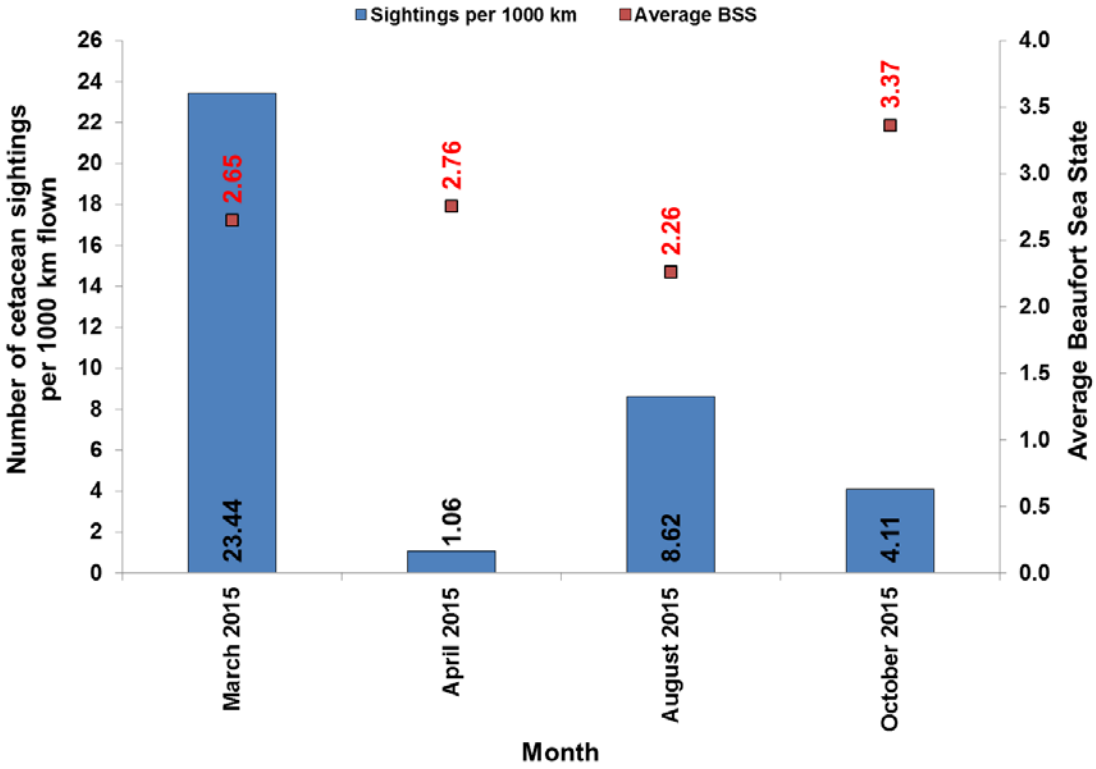

Figure 3c. Cetacean sightings per 1,000 km surveyed and the average BSS per month during aerial surveys in the Jacksonville, Florida survey area in 2015.

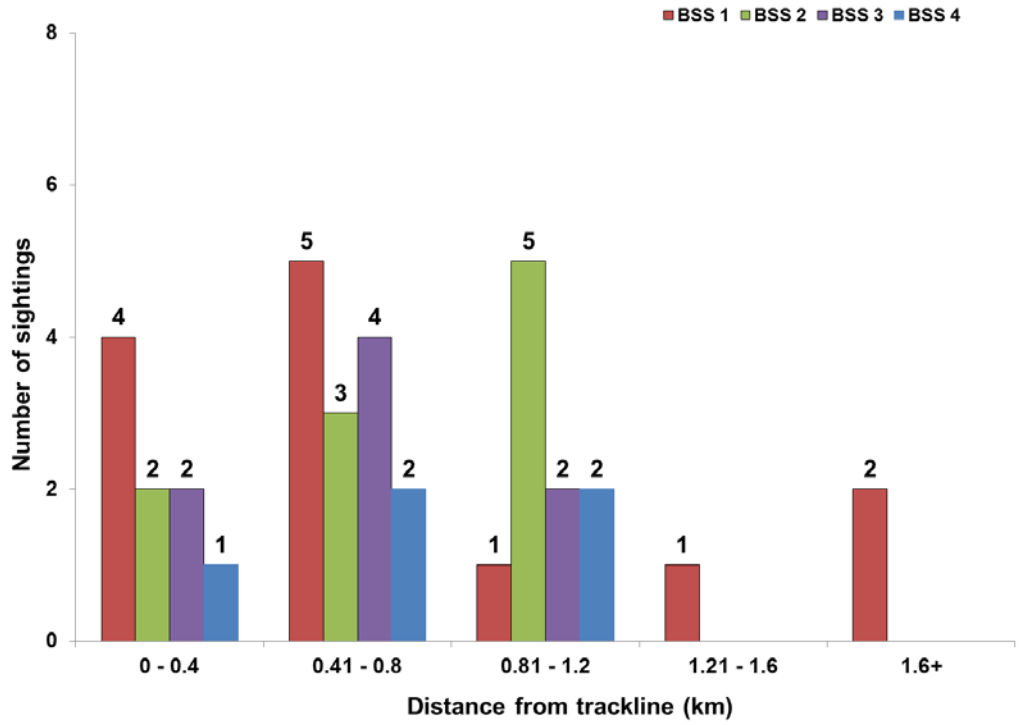

Figure 4a. Sighting distances by BSS for 36 of 39 on-effort cetacean sightings during aerial surveys in the Jacksonville, Florida survey area in 2015.

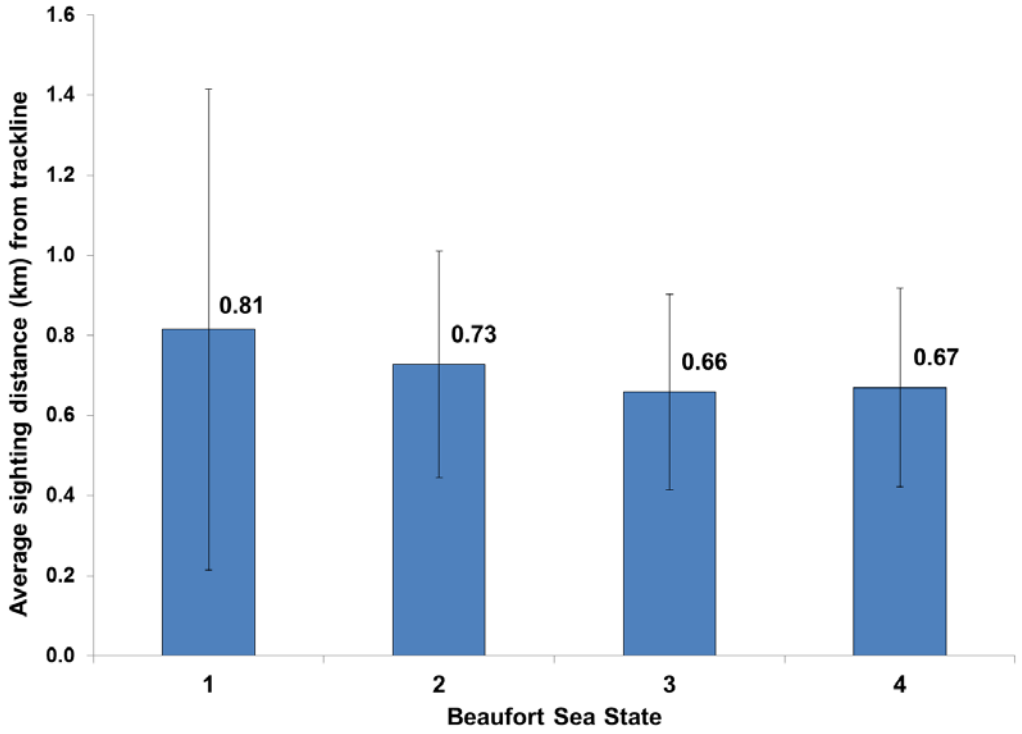

Figure 4b. Average sighting distances by BSS for 36 of 39 on-effort cetacean sightings during aerial surveys in the Jacksonville, Florida survey area in 2015. Error bars denote standard deviation for each category.

4.1 Marine Mammal Sightings

A total of 39 sightings of 508 individual cetaceans, representing four species, was recorded while on effort during aerial surveys in 2015 (**Table 3, Figure 5**). There was also one off-effort sighting of Risso's dolphins, and one off-effort sighting of Atlantic spotted dolphins. Information on data sheets, event codes, sighting summary sheets, and details of each sighting are provided in **Appendices A through D.**

Table 3. Total numbers of sightings and individuals for each species by month for the Jacksonville, Florida survey area in 2015.

Species	Numbers of:	Month												Total
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
CETACEANS														
Stenella frontalis	Sightings			8					6		3			17
	Individuals			176					104		40			320
Tursiops truncatus	Sightings			8	1				5		3			17
	Individuals			108	1				14		20			143
Steno bredanensis	Sightings			1										1
	Individuals			35										35
Globicephala macrorhynchus	Sightings				1									1
	Individuals				1									1
Unidentified delphinid	Sightings			2							1			3
	Individuals			7							2			9
	Total sightings			19	2				11		7			39
	Total individuals			**326**	**2**				**118**		**62**			**508**
SEA TURTLES														
Caretta caretta	Sightings			55	3				16		19			93
	Individuals			89	4				21		19			133
Dermochelys coriacea	Sightings			4					7		4			15
	Individuals			4					8		4			16
Unidentified sea turtle	Sightings			7					1		3			11
	Individuals			8					1		3			12
	Total sightings			66	3				24		26			119
	Total individuals			**101**	**4**				**30**		**26**			**161**

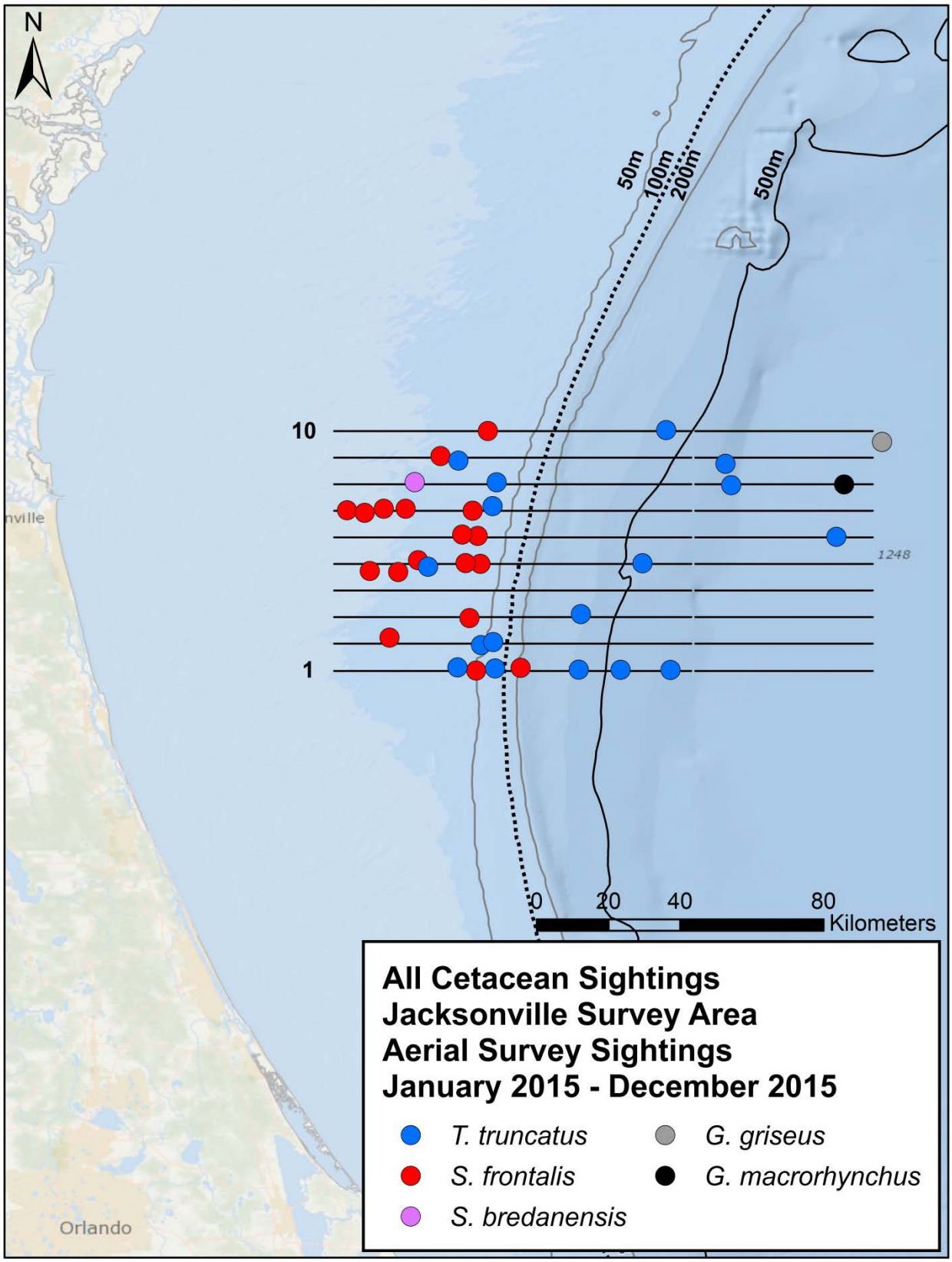

Figure 5. All cetacean sightings during aerial surveys conducted in Jacksonville, Florida survey area in 2015.

4.2 Dolphins

4.2.1 Atlantic Spotted Dolphin (*Stenella frontalis*)

The Atlantic spotted dolphin was sighted 17 times on effort for a total of 320 individuals, and was numerically the most abundant species encountered in the survey area. Spotted dolphins were seen in every month surveyed, except April (**Table 4**). Group size ranged from 2 to 125 (mean=18.8, standard deviation [SD]=29.2). This species was encountered predominantly in shallow waters over the continental shelf (**Figure 6**). One off-effort sighting of 45 individuals also occurred. 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 inshore of the 200-m isobath, and a less spotted, smaller form that occurs farther offshore and around island archipelagoes (Perrin *et al.* 1987, 1994). It is likely, based upon the features observed, that the Atlantic spotted dolphins seen during the present study belong to the continental shelf form.

Table 4. Atlantic spotted dolphin (*Stenella frontalis*) sightings in the Jacksonville, Florida survey area in 2015. Asterisk denotes off-effort sightings.

Date	Time	Way Point	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Off Effort (*)
3-Mar-2015	9:42:30	10	30.215316	-80.610281	5	1	3	100°	8	
3-Mar-2015	9:52:39	13	30.212644	-80.539177		1	3	90°	45	*
3-Mar-2015	10:11:04	21	30.233133	-80.332780	5	1	3	90°	3	
3-Mar-2015	10:48:34	39	30.303015	-80.339554	6	2	1	90°	4	
3-Mar-2015	10:54:08	43	30.306612	-80.378407	6	2	3	90°	12	
3-Mar-2015	11:09:25	58	30.367546	-80.667475	7	1	1	90°	15	
3-Mar-2015	11:18:44	63	30.361153	-80.623340	7	1	2	90°	2	
3-Mar-2015	11:28:13	75	30.366366	-80.352072	7	2	3	90°	7	
3-Mar-2015	15:28:45	141	30.048278	-80.560713	2	1	4	60°	125	
19-Aug-2015	11:23:55	12	30.503505	-80.432803	9	3	2	45°	40	
19-Aug-2015	12:22:27	27	30.371381	-80.520530	7	3	2	90°	13	
19-Aug-2015	12:27:33	31	30.371241	-80.575412	7	3	3	90°	30	
19-Aug-2015	13:25:24	46	30.234862	-80.370061	5	2	2	90°	4	
19-Aug-2015	13:35:45	50	30.242278	-80.489346	5	2	3	100°	2	
19-Aug-2015	15:32:58	62	29.965471	-80.343378	1	2	1	90°	15	
14-Oct-2015	11:36:23	21	30.566381	-80.314095	10	3	1	90°	20	
15-Oct-2015	14:34:33	44	30.097256	-80.360174	3	4	2	60°	10	
15-Oct-2015	15:56:35	62	29.972184	-80.231829	1	4	1	60°	10	

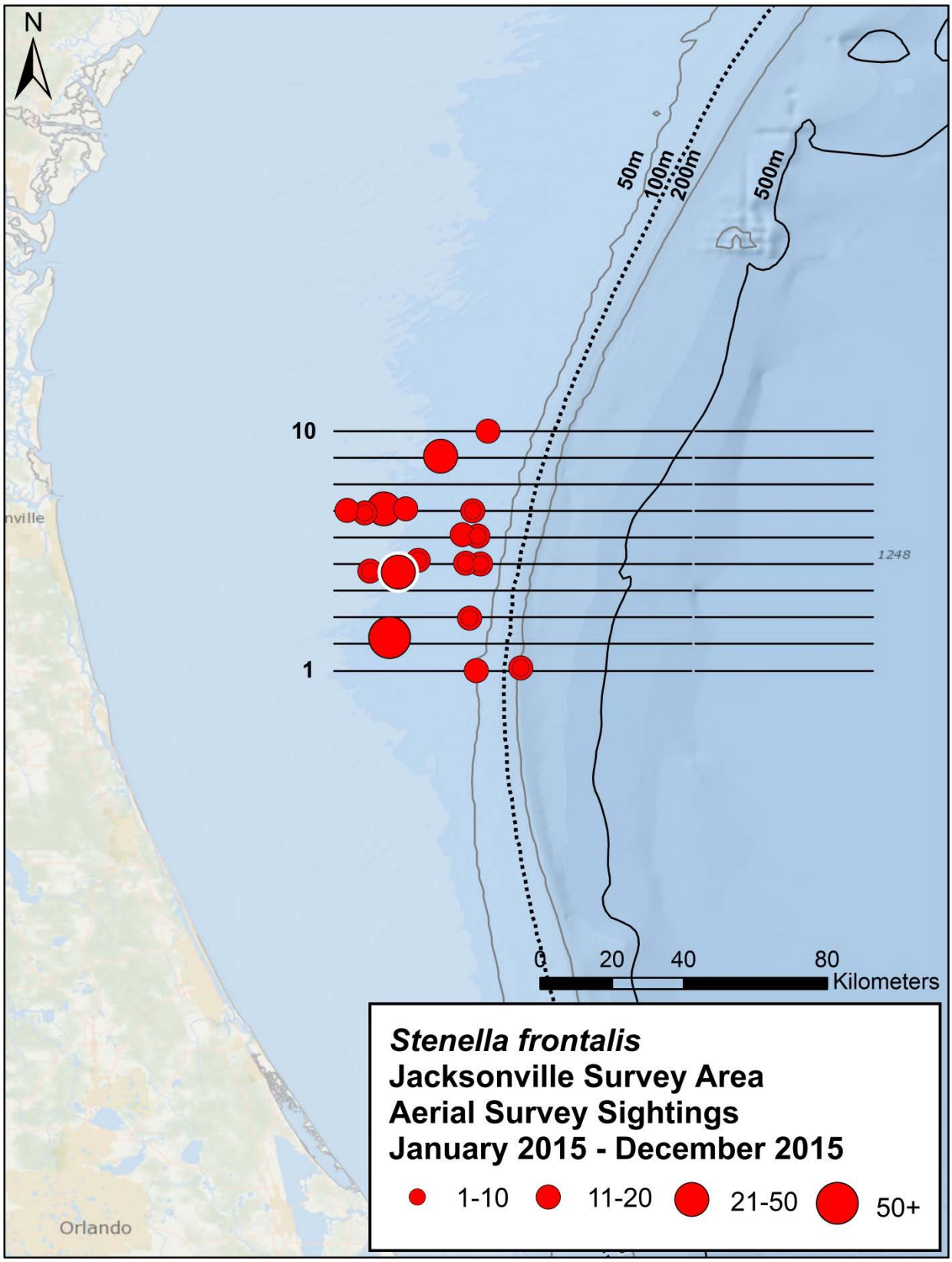

Figure 6. Atlantic spotted dolphin (*Stenella frontalis*) sightings in the Jacksonville, Florida survey area in 2015. White outline denotes off-effort sighting; symbol size indicates group size.

4.2.2 Bottlenose Dolphin (*Tursiops truncatus*)

Bottlenose dolphins were encountered 17 times for a total of 143 individuals (**Table 5**). This species was encountered during all months surveyed. While group size ranged from 1 to 50 (mean=8.4, SD=11.8), 82 percent of sightings contained 10 or fewer individuals. Based upon 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 core study area, and in the extended offshore area, and there was no obvious relationship between group size and bathymetry (**Figure 7**).

Table 5. Bottlenose dolphin *(Tursiops truncatus)* sightings in the Jacksonville, Florida survey area in 2015.

Date	Time	Way Point	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Off Effort (*)
3-Mar-2015	9:57:47	16	30.225882	-80.463992	5	1	1	110°	3	
3-Mar-2015	10:25:49	29	30.234768	-79.926286	5	2	3	60°	10	
3-Mar-2015	11:39:25	79	30.377677	-80.302332	7	2	1	90°	18	
3-Mar-2015	12:13:51	93	30.437663	-80.291961	8	1	1	90°	1	
3-Mar-2015	14:43:25	115	29.973329	-80.390214	1	1	3	70°	2	
3-Mar-2015	15:01:07	123	29.967105	-79.855580	1	3	4	60°	50	
3-Mar-2015	15:21:11	133	30.029533	-80.331354	2	1	4	70°	9	
3-Mar-2015	16:00:06	149	30.491922	-80.388036	9	1	2	60°	15	
15-Apr-2015	11:07:40	18	30.300883	-79.439419	6 Off	3	2	90°	1	
19-Aug-2015	15:36:32	66	29.970685	-80.295960	1	2	2	90°	5	
19-Aug-2015	15:51:28	70	29.967375	-79.981131	1	1	1	90°	2	
19-Aug-2015	16:14:20	77	30.037111	-80.300876	2	1	2	90°	4	
20-Aug-2015	9:42:47	11	30.484154	-79.717845	9 Off	2	2	60°	1	
20-Aug-2015	9:59:02	17	30.430419	-79.703479	8 Off	2	2	90°	2	
15-Oct-2015	11:21:13	23	30.568659	-79.866691	10	4	2	60°	2	
15-Oct-2015	14:19:19	40	30.107201	-80.080733	3	4	2	60°	8	
15-Oct-2015	15:47:14	58	29.967883	-80.086198	1	4	3	90°	10	

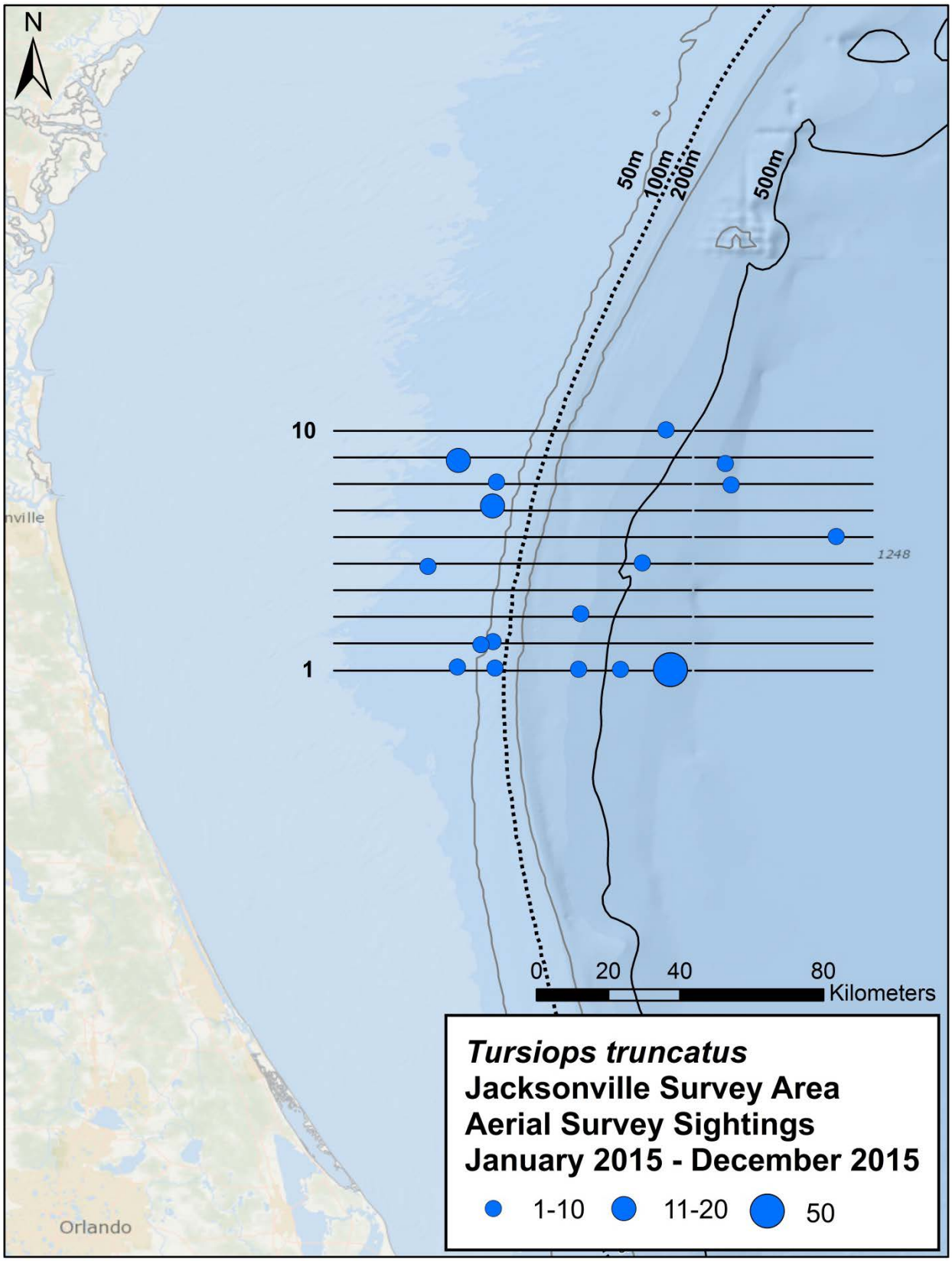

Figure 7. Bottlenose dolphin (*Tursiops truncatus*) sightings in the Jacksonville, Florida survey area in 2015; symbol size indicates group size.

4.2.3 Risso's Dolphin (*Grampus griseus*)

A single off-effort sighting of six individuals of this species occurred in August in the deep waters just east of the extended offshore tracklines (**Table 6**, **Figure 8**). 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.* 2015).

Table 6. Risso's dolphin (*Grampus griseus*) sightings in the Jacksonville, Florida survey area in 2015. Asterisk denotes off effort sighting.

Date	Time	Way Point	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Off Effort (*)
20-Aug-2015	9:27:00	6	30.539016	-79.325077		3	2	90°	6	*

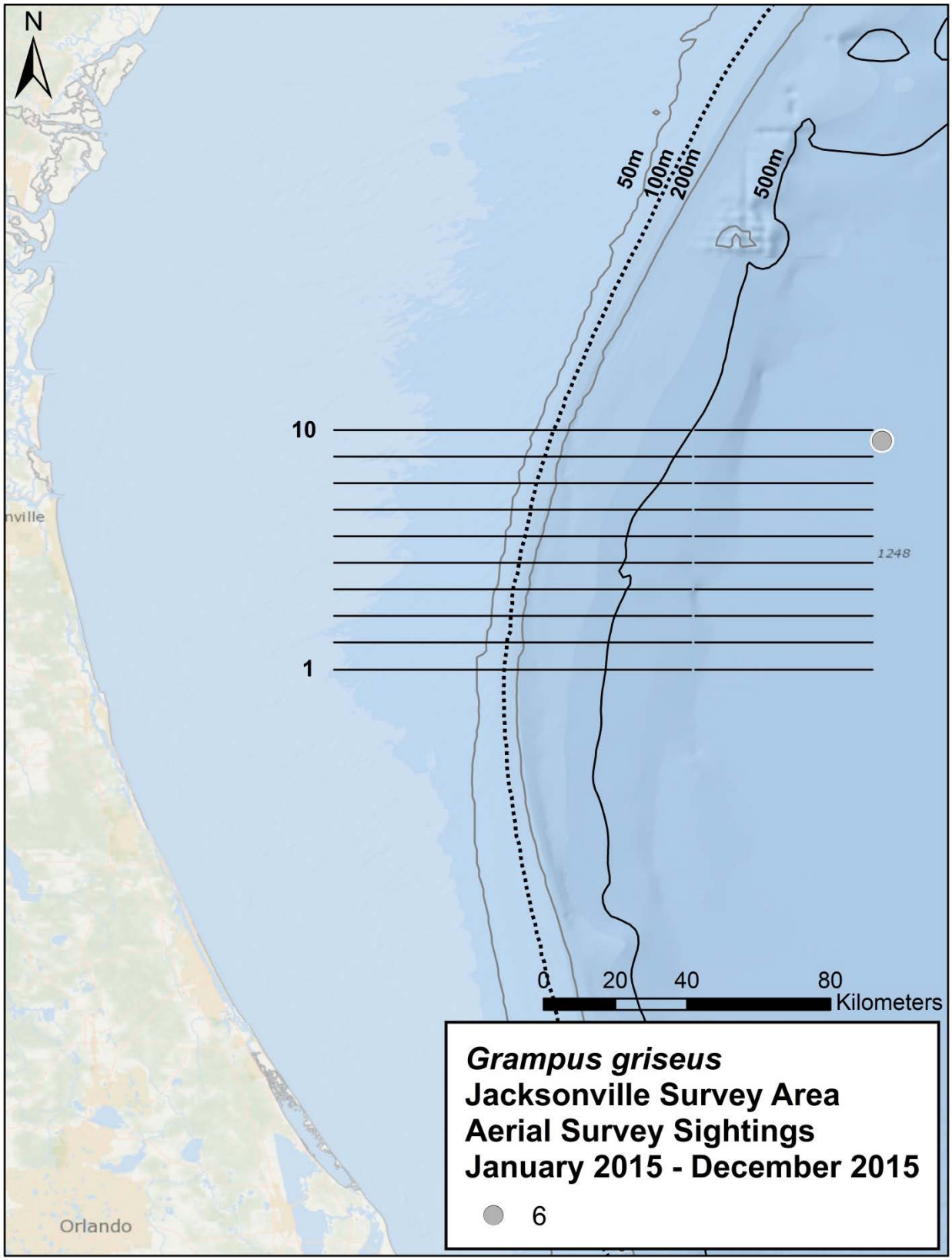

Figure 8. Risso's dolphin (*Grampus griseus*) sightings in the Jacksonville, Florida survey area in 2015. White outline denotes off-effort sighting.

4.2.4 Rough-toothed Dolphin (*Steno bredanensis*)

A single sighting of rough-toothed dolphins occurred in March for a total of 35 individuals (**Table 7**). As in past years, this sighting occurred in continental shelf waters inshore of the 100-m isobath (**Figure 9**).

Table 7. Rough-toothed dolphin (*Steno bredanensis*) sighting in the Jacksonville, Florida survey in 2015.

Date	Time	Way Point	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Off Effort (*)
3-Mar-2015	12:25:49	100	30.438016	-80.497697	8	1	2	90°	35	

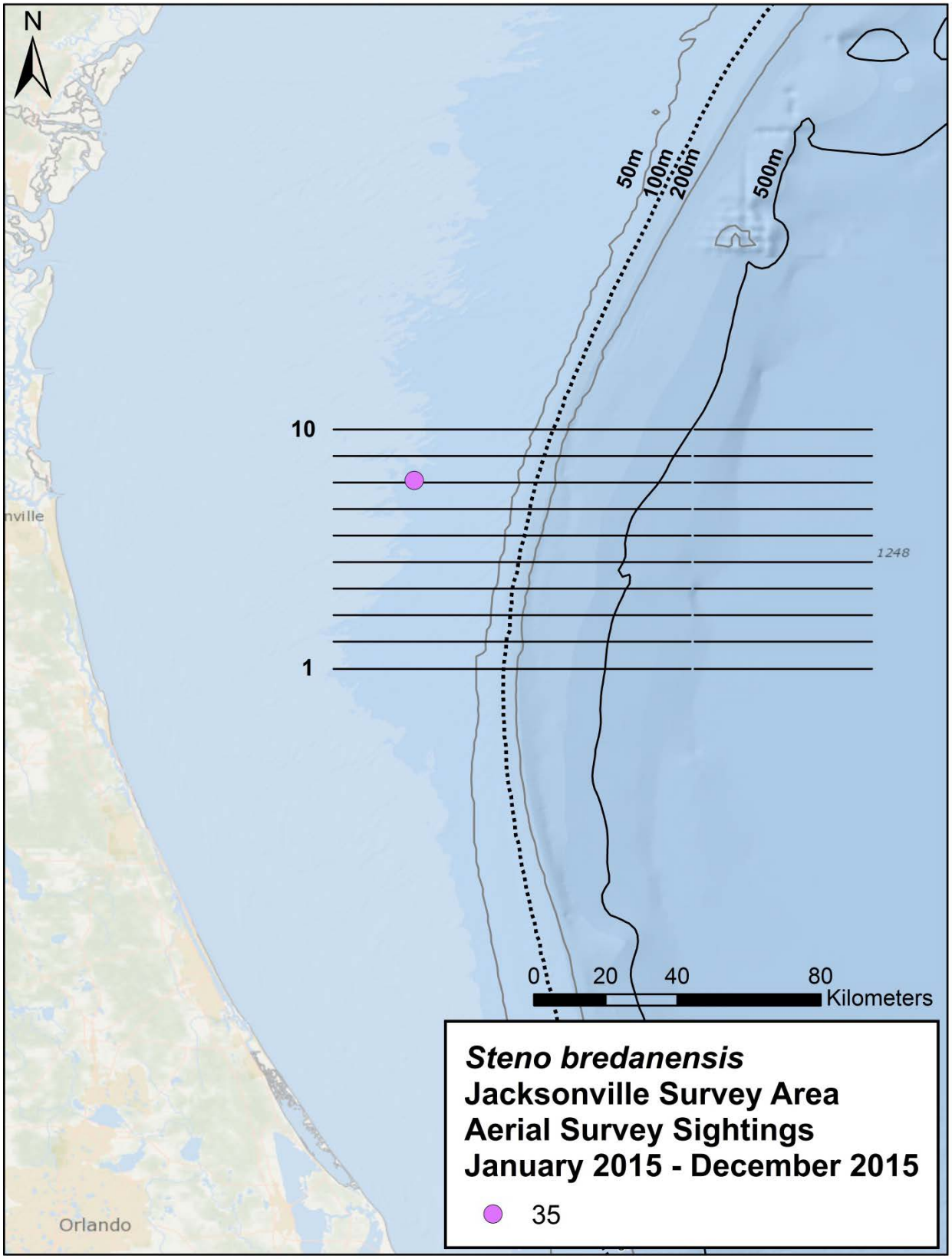

Figure 9. Rough-toothed dolphin (*Steno bredanensis*) sighting in the Jacksonville, Florida survey in 2015.

4.3 Whales

4.3.1 Short-finned Pilot Whale (*Globicephala macrorhynchus*)

A single sighting of a single individual of this species occurred in April in the deep waters of the extended offshore tracklines added this year (**Table 8**). This single sighting continues the trend of short-finned pilot whale sightings being observed farther east than in past years (**Figure 10**).

Table 8. Short-finned pilot whale (*Globicephala macrorhynchus*) sighting in the Jacksonville, Florida survey area in 2015.

Date	Time	Way Point	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Off Effort (*)
15-Apr-2015	10:20:35	10	30.432388	-79.420303	8 Off	3	2	110°	1	

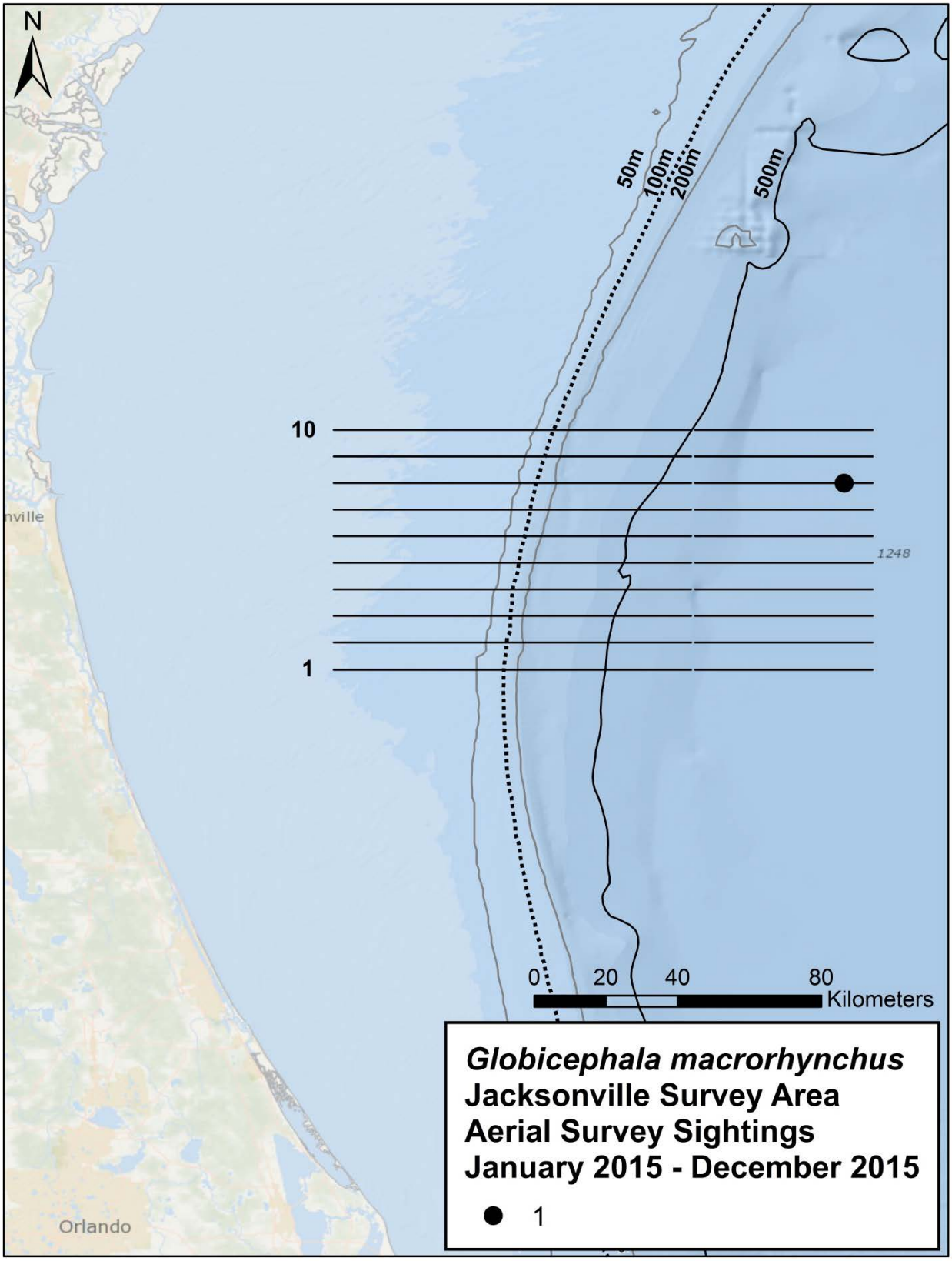

Figure 10. Short-finned pilot whale (*Globicephala macrorhynchus*) sighting in the Jacksonville, Florida survey area in 2015.

4.4 Sea Turtles

A total of 161 sea turtles were observed during the reporting period (**Tables 9 and 10**). Sighting rates were negatively correlated with BSS (**Figure 11a and 11b**). Sea turtles were observed almost every day of survey effort with the highest sighting rates occurring in March (**Figure 11c**). Observation rates ranged from a low of 2.13/1,000 km flown in April to a high of 124.61/1,000 km in March (**Figure 11c**). Loggerhead sea turtles (*Caretta caretta*) constituted the majority of sea turtles sighted (82.6 percent), followed by leatherback sea turtles (*Dermochelys coriacea*) (9.9 percent). Turtles labeled as unidentified (7.5 percent of sightings) were typically either of small size, submerged, or too far away for the observers to make an accurate identification to species.

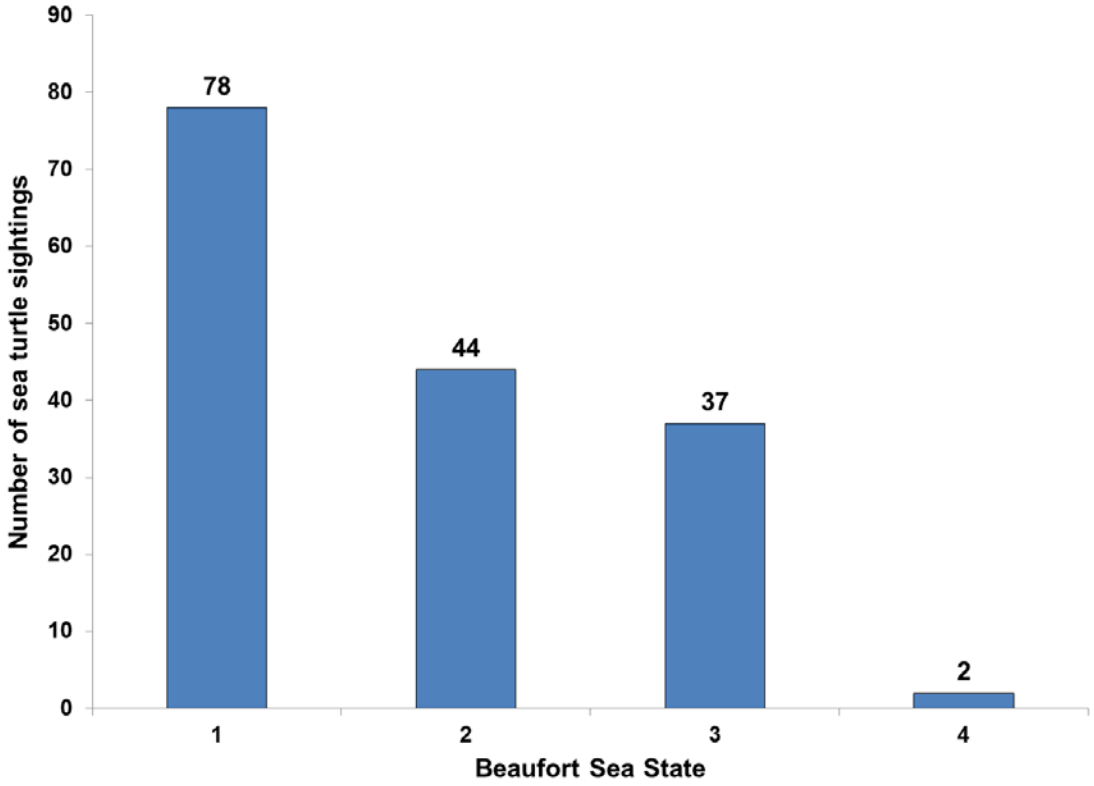

Figure 11a. Total numbers of sea turtle sightings by Beaufort Sea State in the Jacksonville, Florida survey area in 2015.

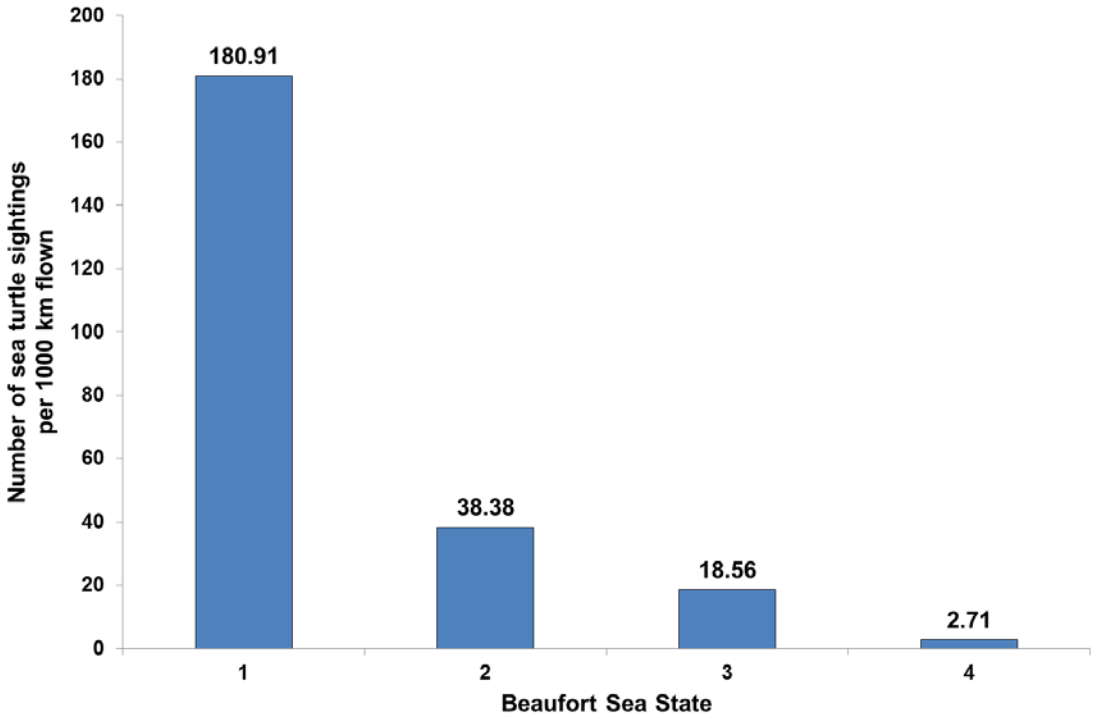

Figure 11b. Sea turtle sightings per 1000 km flown by BSS in the Jacksonville, Florida survey area in 2015.

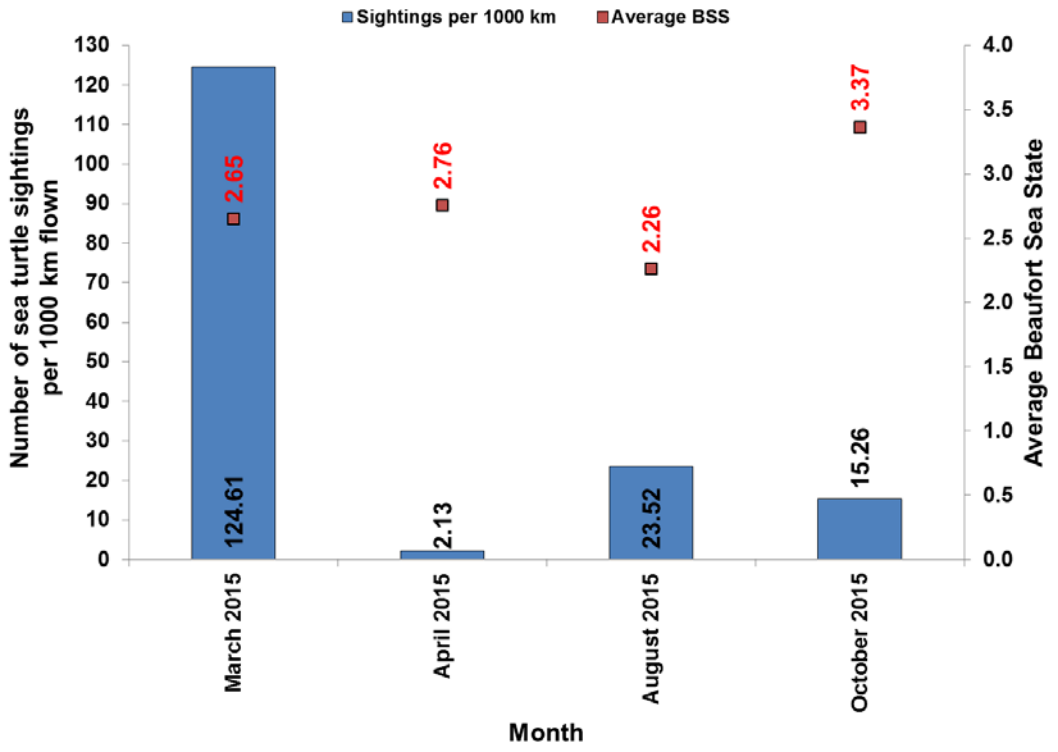

Figure 11c. Sea turtle sightings per 1000 km surveyed and the distance-weighted average BSS per month in the Jacksonville, Florida survey in 2015.

4.4.1 Loggerhead Sea Turtle (*Caretta caretta*)

A total of 133 loggerhead sea turtles was observed (**Table 9**). This species was encountered on every day of survey effort except 20 August 2015. No loggerheads were encountered on the extended offshore tracklines. 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**).

Table 9. Loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey area in 2015.

Date	Time	Way Point	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #
3-Mar-2015	9:40:33	8	30.230277	-80.645553	5	1	2	45°	1
3-Mar-2015	9:55:57	9	30.229989	-80.481705	5	1	2	90°	1
3-Mar-2015	10:06:59	19	30.230966	-80.380624	5	1	1	90°	1
3-Mar-2015	10:13:12	16	30.230934	-80.296958	5	2	1	90°	1
3-Mar-2015	10:14:35	18	30.230859	-80.244440	5	1	1	90°	1
3-Mar-2015	10:15:29	19	30.230990	-80.212050	5	1	1	90°	3
3-Mar-2015	10:40:28	27	30.302322	-80.073164	6	2	2	90°	1
3-Mar-2015	10:44:59	32	30.302460	-80.243096	6	1	2	90°	3
3-Mar-2015	10:58:59	36	30.303887	-80.454444	6	1	2	90°	2
3-Mar-2015	11:00:26	37	30.302445	-80.509652	6	1	2	90°	4
3-Mar-2015	11:00:39	47	30.302310	-80.518319	6	1	3	90°	1
3-Mar-2015	11:01:40	48	30.302071	-80.555858	6	1	1	80°	1
3-Mar-2015	11:03:09	50	30.301958	-80.611717	6	1	2	90°	1
3-Mar-2015	11:03:54	51	30.301913	-80.639986	6	1	2	90°	1
3-Mar-2015	11:04:30	52	30.301818	-80.662939	6	1	2	90°	2
3-Mar-2015	11:04:34	40	30.301864	-80.665097	6	1	1	90°	1
3-Mar-2015	11:04:57	53	30.301827	-80.679756	6	1	2	90°	1
3-Mar-2015	11:05:08	54	30.301821	-80.686564	6	1	3	90°	1
3-Mar-2015	11:20:21	66	30.363580	-80.588692	7	1	1	90°	1
3-Mar-2015	11:20:50	47	30.363452	-80.570833	7	1	1	90°	3
3-Mar-2015	11:21:33	68	30.363540	-80.545279	7	1	1	90°	1
3-Mar-2015	11:23:11	48	30.363813	-80.485331	7	1	2	90°	4
3-Mar-2015	11:24:43	69	30.363631	-80.427064	7	1	2	90°	2
3-Mar-2015	11:26:12	72	30.363683	-80.371619	7	2	2	90°	1
3-Mar-2015	11:26:20	73	30.363712	-80.366611	7	2	1	45°	1
3-Mar-2015	11:47:29	82	30.361494	-80.200496	7	2	1	90°	1
3-Mar-2015	11:48:16	83	30.363364	-80.171018	7	2	1	90°	1
3-Mar-2015	12:07:48	89	30.435658	-80.101860	8	1	1	90°	1

Date	Time	Way Point	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #
3-Mar-2015	12:10:27	60	30.435730	-80.202843	8	2	1	45°	1
3-Mar-2015	12:12:12	61	30.435856	-80.269867	8	2	3	90°	2
3-Mar-2015	12:21:42	65	30.435704	-80.432338	8	1	1	90°	5
3-Mar-2015	12:22:28	96	30.435551	-80.461295	8	1	1	90°	1
3-Mar-2015	12:22:58	97	30.435485	-80.479778	8	1	1	90°	1
3-Mar-2015	12:23:10	66	30.435503	-80.487524	8	1	2	90°	2
3-Mar-2015	12:23:14	98	30.435478	-80.490371	8	1	3	90°	1
3-Mar-2015	12:33:01	103	30.435829	-80.572807	8	1	3	90°	1
3-Mar-2015	12:33:09	69	30.435751	-80.578502	8	1	1	90°	6
3-Mar-2015	14:31:37	108	29.964020	-80.668233	1	1	1	95°	1
3-Mar-2015	14:34:14	74	29.963098	-80.572099	1	1	2	90°	2
3-Mar-2015	14:34:36	110	29.963109	-80.557743	1	1	2	75°	1
3-Mar-2015	14:36:10	75	29.963107	-80.498739	1	1	1	90°	1
3-Mar-2015	14:36:18	113	29.963151	-80.493770	1	1	3	90°	1
3-Mar-2015	14:47:00	119	29.963707	-80.317503	1	2	3	90°	3
3-Mar-2015	15:18:51	85	30.034248	-80.281454	2	1	1	90°	2
3-Mar-2015	15:19:23	86	30.034157	-80.301503	2	1	1	45°	2
3-Mar-2015	15:20:00	131	30.034192	-80.324164	2	1	2	80°	1
3-Mar-2015	15:48:56	146	30.497164	-80.585829	9	1	1	90°	1
3-Mar-2015	15:50:18	147	30.497091	-80.533541	9	1	2	90°	1
3-Mar-2015	16:03:29	152	30.497492	-80.306466	9	1	1	80°	1
3-Mar-2015	16:05:39	154	30.497330	-80.226989	9	3	2	80°	1
3-Mar-2015	16:39:45	104	30.568959	-80.568710	10	2	2	90°	2
3-Mar-2015	16:41:19	105	30.568809	-80.626996	10	2	1	90°	3
4-Mar-2015	14:23:42	5	30.564488	-80.498675	10	3	2	90°	1
4-Mar-2015	15:18:18	14	30.501851	-80.457898	9	3	2	90°	1
4-Mar-2015	15:21:51	17	30.501445	-80.584446	9	2	1	90°	1
15-Apr-2015	13:19:58	27	29.965661	-80.639169	1	1	3	90°	1
15-Apr-2015	13:23:08	29	29.965893	-80.520735	1	2	2	90°	2
15-Apr-2015	15:00:16	48	30.166110	-80.340887	4	1	3	90°	1
19-Aug-2015	10:46:06	3	30.567131	-80.471693	10	3	3	90°	1
19-Aug-2015	10:55:34	5	30.567300	-80.109931	10	3	3	90°	1
19-Aug-2015	11:32:43	13	30.498430	-80.687340	9	3	1	90°	1
19-Aug-2015	11:41:50	17	30.433852	-80.464202	8	3	1	90°	1
19-Aug-2015	12:09:55	24	30.365328	-80.098170	7	3	1	90°	1
19-Aug-2015	12:12:13	21	30.365318	-80.186322	7	2	1	60°	1
19-Aug-2015	12:33:14	27	30.364581	-80.680741	7	3	1	90°	1

Date	Time	Way Point	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #
19-Aug-2015	12:43:48	38	30.300876	-80.550109	6	3	2	90°	1
19-Aug-2015	12:44:36	39	30.300845	-80.518398	6	3	3	90°	1
19-Aug-2015	13:41:37	39	30.231380	-80.607261	5	2	2	90°	1
19-Aug-2015	15:18:30	57	29.966421	-80.654735	1	2	3	90°	3
19-Aug-2015	15:18:33	44	29.966396	-80.653371	1	2	2	90°	2
19-Aug-2015	15:19:25	58	29.966361	-80.619649	1	2	2	90°	1
19-Aug-2015	15:23:11	59	29.966711	-80.474694	1	2	2	90°	2
19-Aug-2015	15:23:25	46	29.966722	-80.466172	1	2	2	90°	2
19-Aug-2015	16:37:28	87	30.101965	-80.441277	3	3	1	90°	1
14-Oct-2015	9:48:56	8	30.299387	-80.368916	6	3	2	90°	1
14-Oct-2015	10:40:36	14	30.432863	-80.290939	8	3	2	90°	1
14-Oct-2015	10:57:51	17	30.499979	-80.562759	9	3	2	110°	1
14-Oct-2015	11:15:36	14	30.499789	-79.916952	9	3	1	90°	1
14-Oct-2015	11:25:03	20	30.566016	-79.938555	10	3	2	90°	1
14-Oct-2015	11:47:09	23	30.566420	-80.412504	10	3	1	90°	1
14-Oct-2015	14:12:12	30	29.966515	-80.485069	1	3	1	90°	1
14-Oct-2015	14:52:52	32	30.031897	-80.555359	2	3	1	90°	1
14-Oct-2015	15:07:58	42	30.101155	-80.380399	3	2	3	90°	1
14-Oct-2015	15:44:51	48	30.165577	-80.468403	4	3	2	110°	1
15-Oct-2015	9:48:17	6	30.299010	-80.575253	6	4	2	90°	1
15-Oct-2015	13:45:09	23	30.166857	-80.615360	4	3	2	60°	1
15-Oct-2015	13:51:24	34	30.167012	-80.393868	4	3	2	90°	1
15-Oct-2015	14:53:48	34	30.099322	-80.604542	3	3	1	90°	1
15-Oct-2015	15:16:10	53	30.032525	-80.456706	2	3	2	90°	1
15-Oct-2015	16:07:00	47	29.965213	-80.432263	1	3	2	90°	1
15-Oct-2015	16:09:18	48	29.965111	-80.521841	1	3	2	90°	1
15-Oct-2015	16:11:24	67	29.964700	-80.601663	1	3	2	110°	1
15-Oct-2015	16:13:07	49	29.965044	-80.667849	1	3	1	90°	1

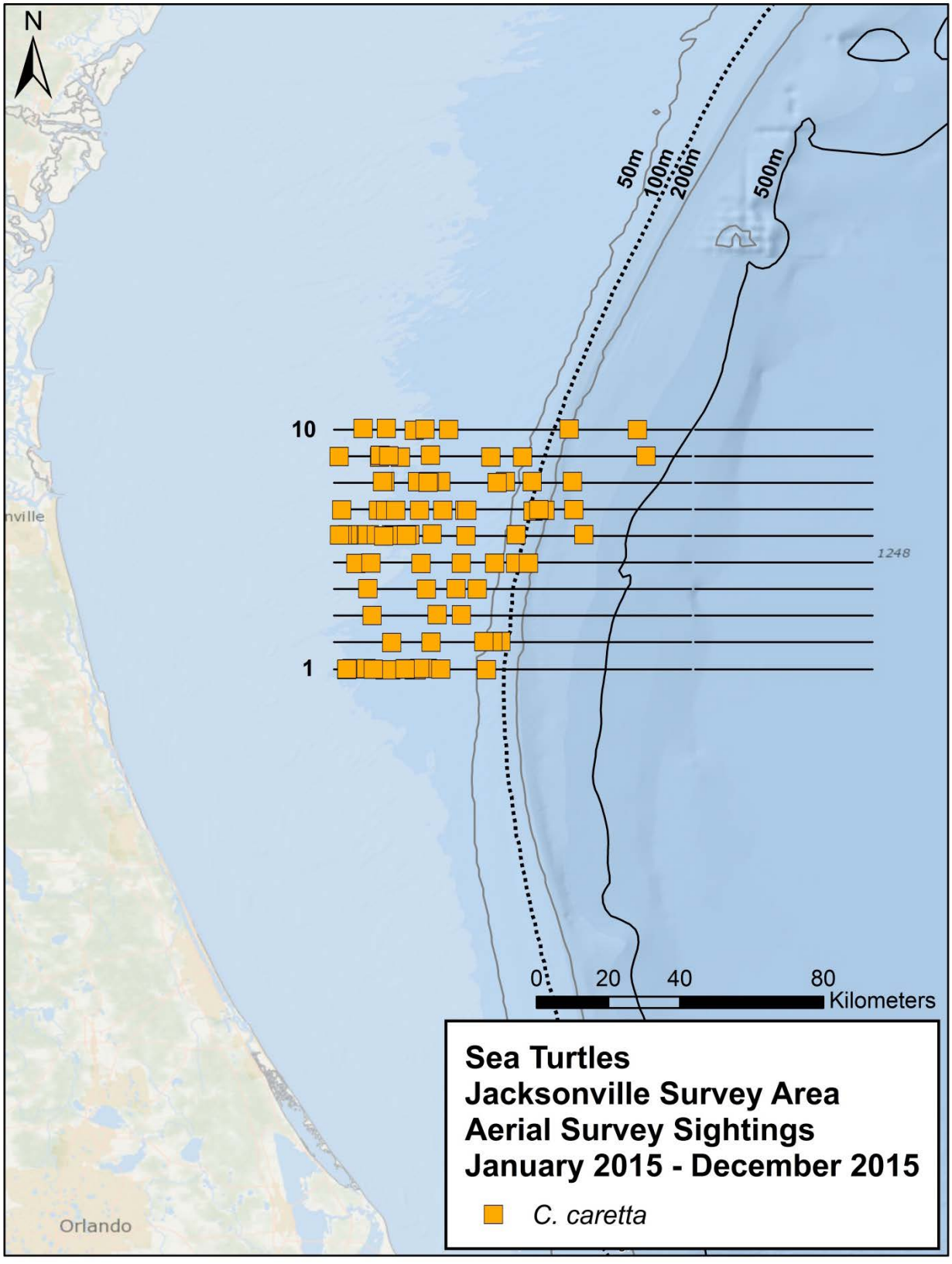

Figure 12. Loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville, Florida survey area in 2015.

4.4.2 Leatherback Sea Turtle (*Dermochelys coriacea*)

A total of 16 leatherback sea turtles was recorded inshore of the 100-m shelf break (**Table 10**, **Figure 13**). This species was observed in three of the four months surveyed (absent in April). Leatherbacks were predominantly recorded in the shallower waters over the continental shelf, although a small number of individuals occurred beyond the shelf break

Table 10. Leatherback sea turtle (*Dermochelys coriacea*) sightings in the Jacksonville, Florida survey area in 2015.

Date	Time	Way Point	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #
3-Mar-2015	11:17:13	62	30.362614	-80.631196	7	1	2	90°	1
3-Mar-2015	11:23:46	49	30.363871	-80.463968	7	1	1	45°	1
3-Mar-2015	11:31:49	52	30.365302	-80.310837	7	1	2	90°	1
3-Mar-2015	12:18:49	64	30.435946	-80.325132	8	1	1	90°	1
19-Aug-2015	11:47:06	18	30.433906	-80.262261	8	3	1	90°	1
19-Aug-2015	12:11:06	20	30.365181	-80.143700	7	2	1	90°	1
19-Aug-2015	12:11:28	25	30.365201	-80.157591	7	3	2	90°	1
19-Aug-2015	12:52:31	41	30.301049	-80.212866	6	2	2	90°	2
19-Aug-2015	16:23:01	61	30.031322	-80.509559	2	2	1	90°	1
19-Aug-2015	16:33:09	86	30.099802	-80.609108	3	3	1	90°	1
19-Aug-2015	17:08:31	70	30.165352	-80.288713	4	2	2	90°	1
14-Oct-2015	9:18:54	3	30.233726	-80.228947	5	3	2	90°	1
14-Oct-2015	14:53:27	33	30.031575	-80.576652	2	3	2	100°	1
14-Oct-2015	15:48:24	43	30.165336	-80.601423	4	2	3	90°	1
15-Oct-2015	13:52:42	35	30.167110	-80.347674	4	3	2	90°	1

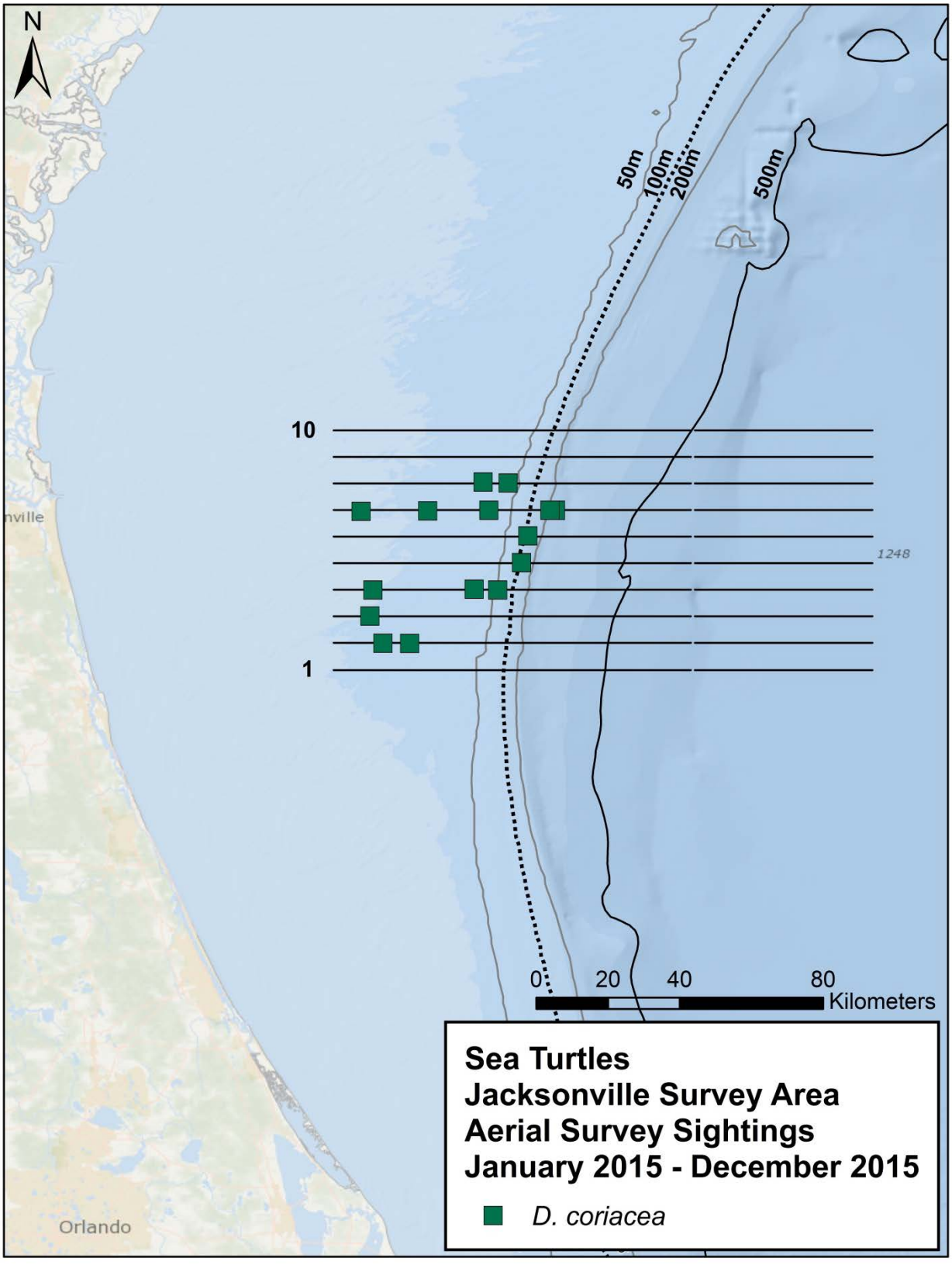

Figure 13. Leatherback sea turtle (*Dermochelys coriacea*) sightings in the Jacksonville, Florida survey area in 2015.

4.5 Fish

4.5.1 Pelagic Bony Fishes (*Osteichthyes)*

Two ocean sunfish (*Mola mola*) were recorded over the continental shelf in March (**Table 11, Figure 14**).

Table 11. Ocean sunfish (*Mola mola*) sightings in the Jacksonville, Florida survey in the Jacksonville, Florida survey area in 2015.

Date	Time	Way Point	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #
3-Mar-2015	10:43:50	31	30.302401	-80.199463	6	1	2	90°	1
3-Mar-2015	11:03:51	39	30.301975	-80.637699	6	1	1	90°	1

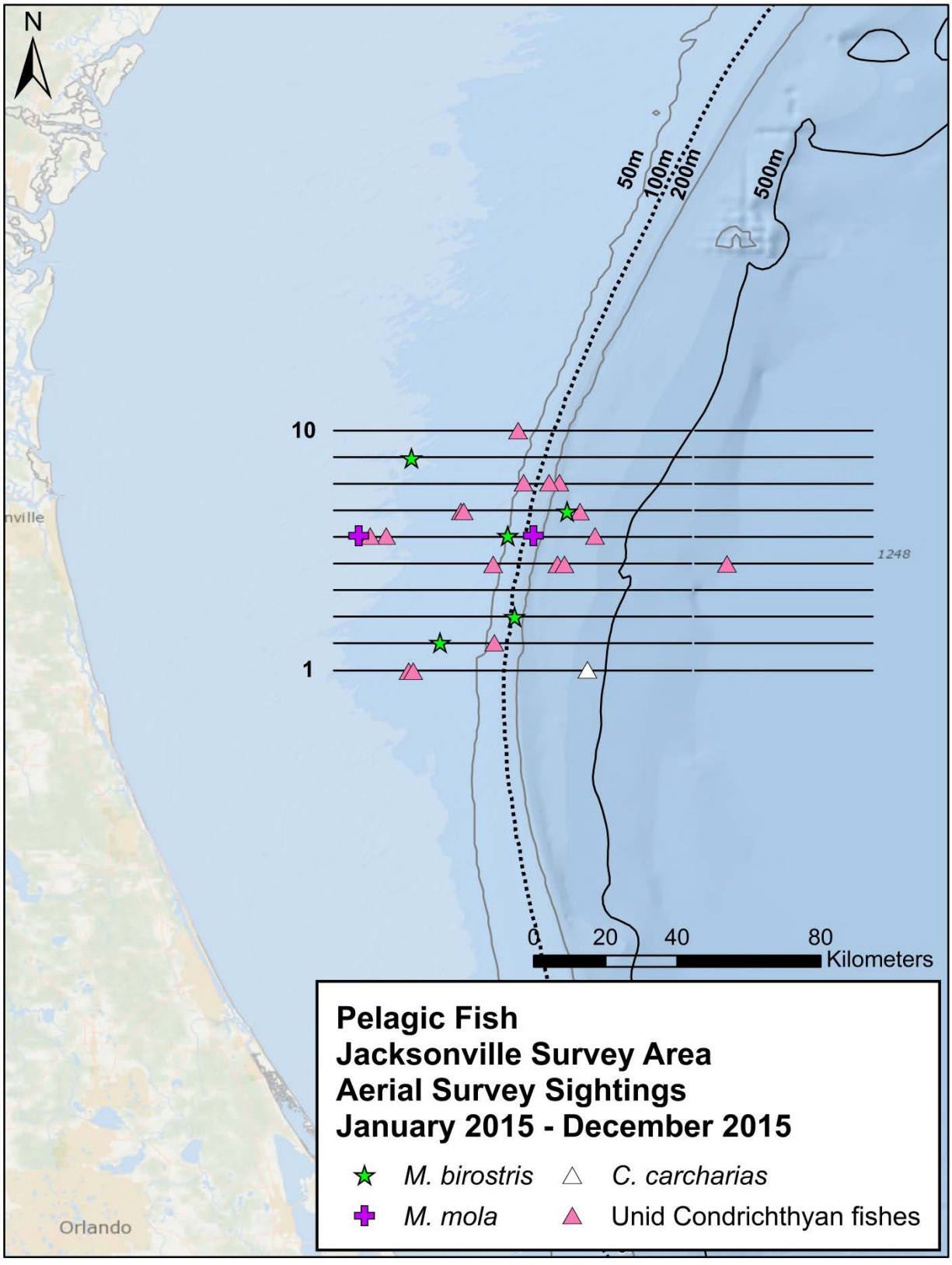

Figure 14. Pelagic fish sightings in the Jacksonville, Florida survey area in 2015.

4.5.2 Cartilaginous Fishes *(Chondrichthyes)*

Seven manta rays (*Manta birostris*) were observed throughout the survey site, with 86 percent of individuals occurring in March (**Table 12**). Twenty-one sharks were also recorded during the reporting period; six of these could be identified as hammerheads based on head shape but, since none of these sightings could be identified to species they are listed here as unidentified chondrichthyan fishes. One single individual shark was identified as a great white (**Table 13**). Sharks were seen throughout the study period with no discernable spatial or temporal trends (**Figure 14**).

Table 12. Manta ray (*Manta birostris*) sightings in the Jacksonville, Florida survey in 2015.

Date	Time	Way Point	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #
3-Mar-2015	10:45:33	37	30.302377	-80.264126	6	2	2	90°	1
3-Mar-2015	11:49:44	55	30.363555	-80.114882	7	1	2	90°	1
3-Mar-2015	15:24:23	89	30.034219	-80.433746	2	1	2	60°	3
3-Mar-2015	15:51:02	96	30.497020	-80.505549	9	2	2	90°	1
19-Aug-2015	16:42:27	89	30.099056	-80.246893	3	2	2	90°	1

Table 13. Unidentified *Chondrichthyan* fish sightings in the Jacksonville, Florida survey area in 2015.

Date	Time	Way Point	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Comments
3-Mar-2015	10:13:06	24	30.230994	-80.300675	5	1	2	90°	1	Shark
3-Mar-2015	10:17:33	25	30.230911	-80.139112	5	1	2	90°	1	Shark
3-Mar-2015	10:18:02	26	30.230968	-80.121847	5	1	2	80°	1	Shark
3-Mar-2015	10:39:42	26	30.302318	-80.044977	6	2	1	90°	1	Hammerhead shark
3-Mar-2015	11:02:00	38	30.302081	-80.568820	6	1	2	60°	1	Shark
3-Mar-2015	11:03:05	49	30.301955	-80.609080	6	1	2	90°	1	Shark
3-Mar-2015	11:25:56	70	30.363703	-80.381736	7	2	2	90°	1	Shark
3-Mar-2015	11:26:08	71	30.363684	-80.374374	7	2	1	60°	1	Shark
3-Mar-2015	11:50:35	84	30.363569	-80.082951	7	2	2	90°	1	Shark
3-Mar-2015	12:08:39	90	30.435720	-80.134326	8	1	2	90°	1	Shark
3-Mar-2015	12:09:20	59	30.435759	-80.160197	8	2	2	90°	2	Hammerhead shark
3-Mar-2015	12:11:00	91	30.435633	-80.224115	8	1	2	45°	3	Shark
3-Mar-2015	14:35:48	111	29.963174	-80.512805	1	1	2	90°	1	Hammerhead shark

3-Mar-2015	14:36:06	112	29.963172	-80.501386	1	1	2	90°	1	Hammerhead shark
3-Mar-2015	15:19:17	130	30.034184	-80.297747	2	1	2	80°	1	Hammerhead shark
15-Apr-2015	11:27:03	21	30.232020	-79.714011	5 Off	3	1	90°	1	Large shark
14-Oct-2015	14:23:11	33	29.966581	-80.064060	1	3	2	100°	1	Great white shark
15-Oct-2015	11:36:40	29	30.566326	-80.238083	10	3	1	90°	1	Shark

4.6 Vessel Sightings

4.6.1 Commercial Vessels

A total of nine commercial vessels (e.g., tugs, barges, tankers, car carriers, and cargo vessels) were observed in the study site (**Table 14**, **Figure 15**).

Table 14. Commercial vessel sightings in the Jacksonville, Florida survey area in 2015.

Date	Time	Way Point	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Comments
15-Apr-2015	9:38:47	3	30.566650	-79.579725	10 Off	3	3	90°	2	Tug and Barge
15-Apr-2015	14:19:18	34	30.100237	-79.644803	3 Off	3	3	45°	1	Tanker
19-Aug-2015	12:56:19	42	30.300893	-80.067291	6	2	2	30°	1	Car carrier
19-Aug-2015	15:20:04	45	29.966327	-80.595334	1	2	4	45°	2	Tug and Barge
19-Aug-2015	16:27:12	83	30.029839	-80.671297	2	3	2	90°	2	Cargo vessel
15-Oct-2015	11:09:37	19	30.500170	-80.013112	9	4	4	60°	1	Cargo vessel

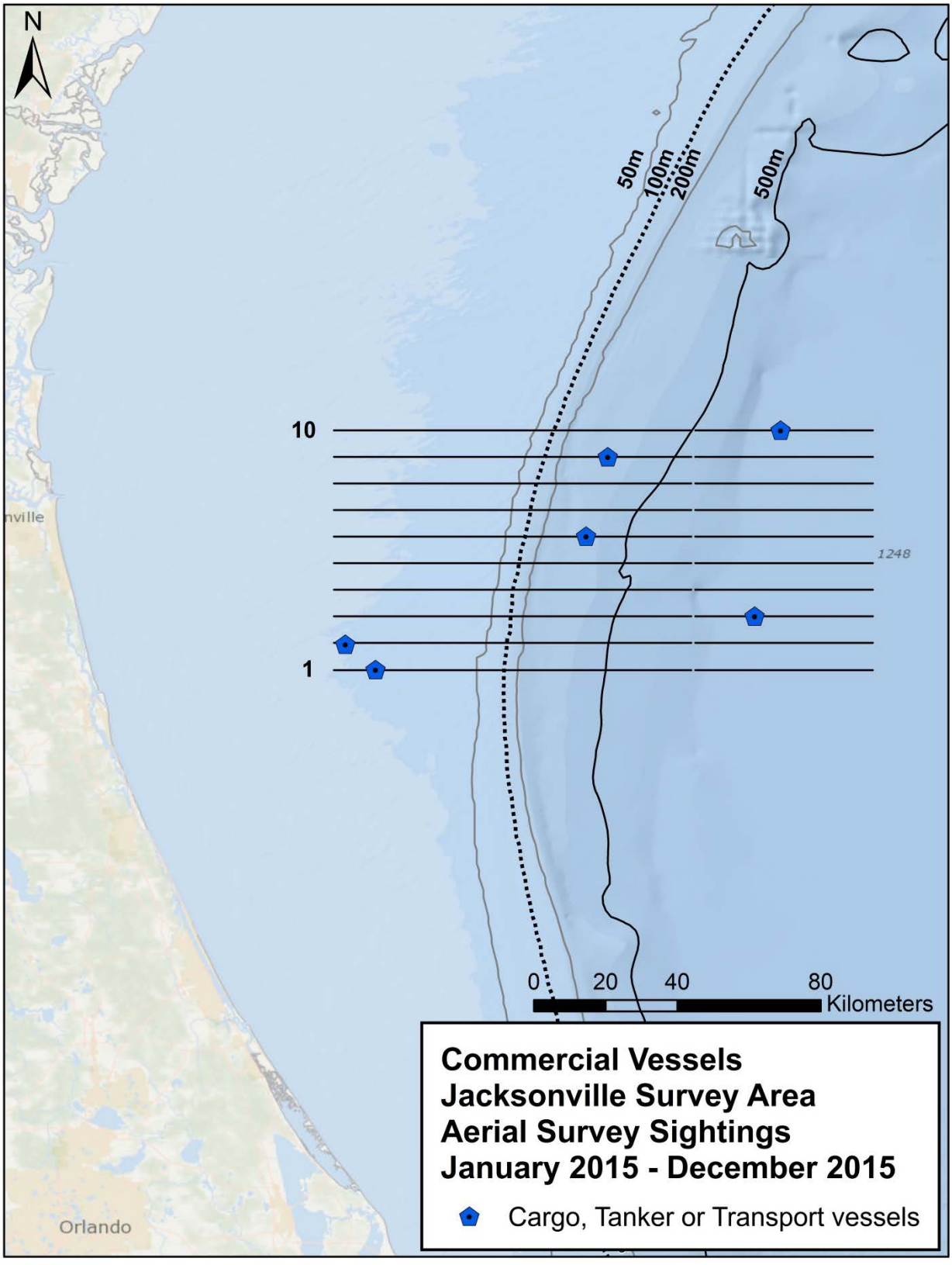

Figure 15. Commercial vessel sightings in the Jacksonville, Florida survey area in 2015.

4.6.2 Military

Two U.S. military vessels were observed during the reporting period (**Table 15**, **Figure 16**).

Table 15. Military vessel sightings in the Jacksonville, Florida survey area in 2015.

Date	Time	Way Point	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Comments
14-Oct-2015	10:18:19	8	30.366673	-80.037772	7	3	2	45°	1	Military vessel
15-Oct-2015	9:08:41	3	30.233525	-80.350090	5	4	3	60°	1	Military vessel

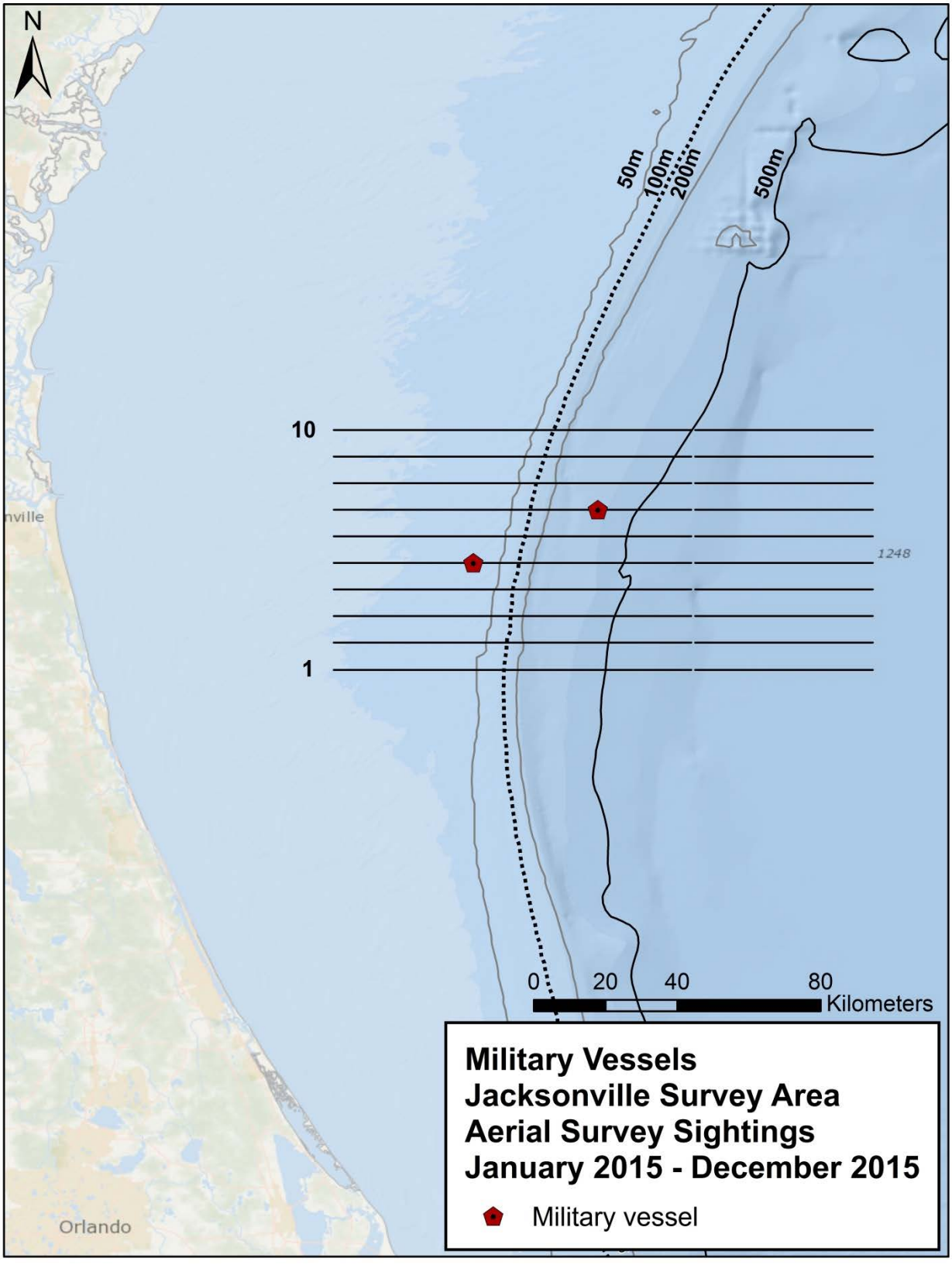

Figure 16. Military vessel sightings in the Jacksonville, Florida survey area in 2015.

4.6.3 Other Vessels

A total of 25 other vessels, classified as recreational fishing vessels or yachts, were recorded in the survey area (**Table 16**, **Figure 17**).

Table 16. Other vessel sightings in the Jacksonville, Florida, survey area in 2015.

Date	Time	Way Point	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Comments
3-Mar-2015	10:21:38	21	30.230588	-79.994073	5	2	3	45°	1	Recreational fishing vessel
3-Mar-2015	10:43:12	30	30.302428	-80.175918	6	1	1	45°	1	Recreational fishing vessel
3-Mar-2015	10:43:13	35	30.302379	-80.176532	6	2	2	90°	1	Yacht
3-Mar-2015	10:45:25	36	30.302392	-80.259315	6	2	1	90°	1	Recreational fishing vessel
3-Mar-2015	11:20:57	67	30.363481	-80.566768	7	1	2	90°	1	Recreational fishing vessel
3-Mar-2015	14:46:49	78	29.963767	-80.324741	1	1	2	45°	1	Recreational fishing vessel
3-Mar-2015	14:47:46	120	29.963502	-80.288584	1	2	2	90°	1	Recreational fishing vessel
3-Mar-2015	15:25:40	136	30.033986	-80.481170	2	1	4	80°	2	Recreational fishing vessel
3-Mar-2015	15:25:42	90	30.034054	-80.482639	2	1	3	45°	1	Recreational fishing vessel
3-Mar-2015	15:26:03	137	30.034000	-80.495450	2	1	3	85°	1	Recreational fishing vessel
3-Mar-2015	15:26:37	138	30.033940	-80.516199	2	1	4	90°	1	Recreational fishing vessel
3-Mar-2015	15:26:59	139	30.033912	-80.529475	2	1	4	60°	1	Recreational fishing vessel
3-Mar-2015	16:30:58	102	30.569372	-80.239658	10	3	1	90°	1	Recreational fishing vessel
4-Mar-2015	15:18:51	15	30.501750	-80.477157	9	3	4	90°	1	Recreational fishing vessel
19-Aug-2015	11:26:31	12	30.504309	-80.454827	9	3	2	45°	1	Recreational fishing vessel
19-Aug-2015	16:22:05	81	30.030553	-80.472803	2	2	2	90°	1	Recreational fishing vessel
19-Aug-2015	16:26:32	62	30.030066	-80.645343	2	2	1	60°	1	Recreational fishing vessel
14-Oct-2015	10:38:25	13	30.432746	-80.210407	8	3	1	90°	1	Recreational fishing vessel
14-Oct-2015	10:57:24	13	30.500071	-80.579461	9	3	2	90°	1	Recreational fishing vessel
14-Oct-2015	11:45:19	23	30.569784	-80.340874	10	3	2	90°	1	Recreational fishing vessel

Date	Time	Way Point	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Comments
14-Oct-2015	14:51:58	38	30.031334	-80.520395	2	3	3	90°	1	Recreational fishing vessel
15-Oct-2015	10:08:44	10	30.366746	-80.218437	7	4	2	90°	1	Recreational fishing vessel
15-Oct-2015	15:01:38	37	30.032155	-80.602674	2	3	3	45°	1	Recreational fishing vessel
15-Oct-2015	16:02:56	65	29.963036	-80.278331	1	4	3	90°	1	Recreational fishing vessel

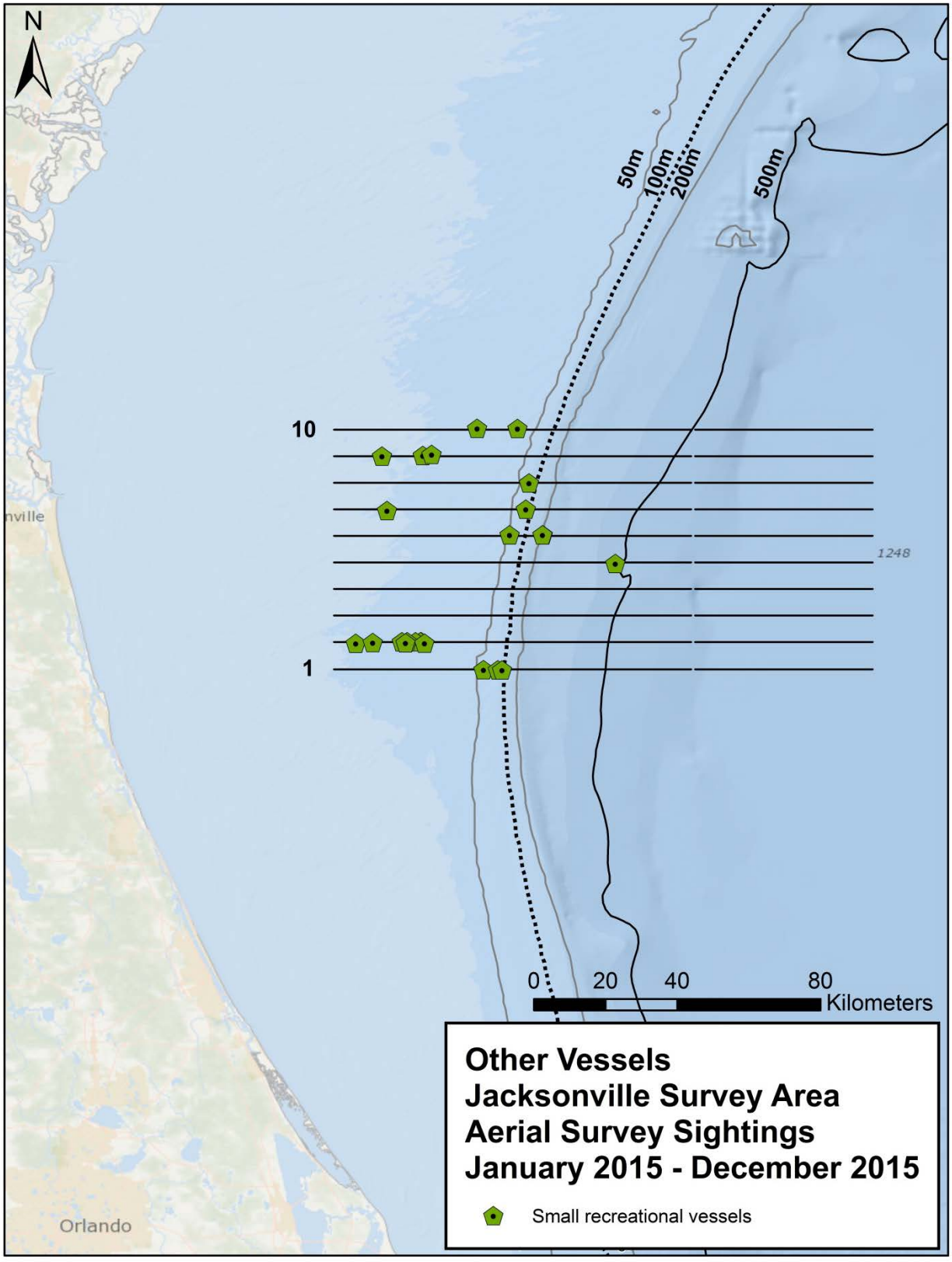

Figure 17. Other vessel sightings in the Jacksonville, Florida survey area in 2015.

5. Acknowledgements

For collaborative efforts, we thank our colleagues at Duke University Marine Lab (Kim Urian, Andy Read, Heather Foley, Zach Swaim, Jennifer Dunn, and Lynne Hodge) and St. Andrews University (Charles Paxton and Len Thomas). We thank Ed Coffman, owner and operator of Orion Aviation, and his highly skilled pilots: Rich Waterman, Stan Huddle, Rocky Walker, John Esties, and Bob Stickle, for excellent flying and a high level of professionalism. We thank Joel Bell for his support of this work. Surveys are conducted under National Oceanic and Atmospheric Administration Scientific Permit No. 16473, held by the University of North Carolina Wilmington, and National Oceanic and Atmospheric Administration General Authorization Letters of Confirmation No. 16185 held by Duke University.

6. Literature Cited

DeMaster, D.P., L.F. Lowry, K.J. Frost, and R.A. Bengtson. 2001. The effect of sea state on estimates of abundance for beluga whales (*Delphinapterus leucas*) in Norton Sound, Alaska. Fishery Bulletin 99:197-201.

Foley, H.J., R.C. Holt, R.E. Hardee, P.B. Nilsson, K.A. Jackson, A.J. Read, D.A. Pabst, and W.A. McLellan. 2011. Observations of a western North Atlantic right whale (*Eubalaena glacialis*) birth offshore of the protected southeast U.S. critical habitat. *Marine Mammal Science* 27:E234-E240.

Gómez de Segura, A., E.A. Crespo, S.N. Pedraza, P.S. Hammond., and J.A. Raga. 2006. Abundance of small cetaceans in waters of the central Spanish Mediterranean. *Marine Biology* 150:149-160.

McAlarney, R.J., E.W. Cummings, D.A. Pabst, and W.A. McLellan. 2014. *Protected Species Monitoring in the Jacksonville OPAREA Jacksonville, Florida, January 2013 - December 2013*. In: *Annual Report 2013*. Submitted to The Department of the Navy, Norfolk, Virginia.

Perrin, W.F., D.K. Caldwell, and M.C. Caldwell. 1994. Atlantic spotted dolphin *Stenella frontalis* (G. Cuvier, 1829). Pages 173-190 in S.H. Ridgway and R. Harrison (eds). *Handbook of Marine Mammals. Volume 5: The First Book of Dolphins*. Academic Press, San Diego, California.

Perrin, W.F., E.D. Mitchell, J.G. Mead, D.K. Caldwell, M.C. Caldwell, P.J.H. van Bree, and W.H. Dawbin. 1987. Revision of the spotted dolphins, *Stenella* sp. *Marine Mammal Science* 3(2):99-170.

Read, A.J., Barco, S.B., Bell, J., Borchers, D.L., Burt, M.L., Cummings, E.W., Dunn, J., Fougeres, E.M., Hazen, L., Williams Hodge, L.E., Laura, A.M., McAlarney, R.J., Nilsson, P., Pabst, D.A., Paxton, C.G.M., Schneider, S.Z., Urian, K.W., Waples, D.M. and W.A. McLellan. 2014. Occurrence, distribution and abundance of cetaceans in Onslow Bay, North Carolina, USA. *Journal of Cetacean Research and Management.*14:23-35.

Torres, L.G., P.E. Rosel, C. D'Agrosa, and A.J. Read. 2003. Improving management of overlapping bottlenose dolphin ecotypes through spatial analysis and genetics. *Marine Mammal Science* 19(3):502-514.

Waring, G.T., E. Josephson, K. Maze-Foley, and P.E. Rosel, editors. 2015. *Draft U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2014*. NOAA Technical Memorandum NMFS-NEFSC-231. National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, Massachusetts.

A

Aerial Daily Sheet

This page intentionally left blank.

Appendix A

AERIAL SURVEY DATA SHEET

Date:_____ **Observer Side:**_____ **GPS#:**_____ **Page**__ **of**___

Pilot/Co-Pilot_____ **Observers Left/Right:**_____ **Hobbs:**_____

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

This page intentionally left blank.

B

Event Codes and Species List

This page intentionally left blank.

Codes for Variables on USWTR Aerial Survey Data Sheet

Date: Month, Day, Year

Track#: opportunistic track line=99

Event:

1.1 = On effort/on track
1.2 = Off effort

3.1 = Change in environmental conditions

10.0 = Opportunistic sighting(s)
PF = Preflight
XB = Cross Beach
WU = Wheels Up
WD = Wheels Down
TE = Transit Leg on Effort

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

2.4 = Sighting of marine mammal (real location)
2.41 = Location of Sighting Cue, No Animals sighted
2.42 = Break from sighting

2.7 = Sighting of sea turtle (real location)
2.8 = Sighting of large vessel (Military, commercial, etc.)
2.9 = Unidentified sighting, requires comments

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.

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

C

Notes on Sighting Summary Sheets

This page intentionally left blank.

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.

D

Sighting Summary Sheets

This page intentionally left blank.

Tuesday, March 3, 2015 Sighting # 1

Initial sighting on Track

Time: 9:41 WP#: 9 Lat: 30.230471 Long: -80.602410
Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: Splash
On/Off Effort: On Trackline: 5 Beaufort Sea State: 1
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 9:42 WP#: 10 Lat: 30.215316 Long: -80.610281
Species: *Stenella frontalis* Numbers (Low/High/Best): 5 / 7 / 8
Features used in Species ID: Alternating light and dark pattern down body, spotting

Representative images used for Species ID: 8755, 8770
Photographer: Erin Frame numbers: 8749 - 8780 Spacer: 8781
Calculated distance from Trackline: 1.85 km

Final Time and Position of Sighting

Time: 9:49 WP#: 11 Lat: 30.215608 Long: -80.601861
Calculated Distance Traveled: 0.81 km

Behavior and Additional Comments

Two loose groups traveling subsurface, possible one large mola with remoras separate from dolphins

Tuesday, March 3, 2015 Sighting # 2

Initial sighting on Track

Time: 9:51 WP#: 12 Lat: 30.224161 Long: -80.545821
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: Off Trackline: Beaufort Sea State: 1
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 9:52 WP#: 13 Lat: 30.212644 Long: -80.539177
Species: *Stenella frontalis* Numbers (Low/High/Best): 30 / 50 / 45
Features used in Species ID: Alternating light and dark pattern down body, spotting

Representative images used for Species ID: 8785, 8792, 8799
Photographer: Erin Frame numbers: 8782 - 8804 Spacer: 8805
Calculated distance from Trackline: 1.43 km

Final Time and Position of Sighting

Time: N/A WP#: N/A Lat: N/A Long: N/A
Calculated Distance Traveled: N/A

Behavior and Additional Comments

Tuesday, March 3, 2015 Sighting # 3

Initial sighting on Track

Time: 9:56 WP#: 15 Lat: 30.230292 Long: -80.458573
Vertical Angle: 1 Horizontal Bearing in Degrees: 110 Sighting Cue: Splash
On/Off Effort: On Trackline: 5 Beaufort Sea State: 1
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 9:57 WP#: 16 Lat: 30.225882 Long: -80.463992
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3 / 3 / 3
Features used in Species ID: Uniform gray

Representative images used for Species ID: 8806
Photographer: Erin Frame numbers: 8806 and 8807 Spacer: 8808
Calculated distance from Trackline: 0.72 km

Final Time and Position of Sighting

Time: 10:04 WP#: 17 Lat: 30.232959 Long: -80.452266
Calculated Distance Traveled: 1.37 km

Behavior and Additional Comments

Avoidance, not staying at surface, difficult to photograph

Tuesday, March 3, 2015 Sighting # 4

Initial sighting on Track

Time: 10:08 WP#: 20 Lat: 30.230980 Long: -80.340729
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 5 Beaufort Sea State: 1
Observer: Sarah Observer side: Left

Actual Time and Position of Sighting

Time: 10:11 WP#: 21 Lat: 30.233133 Long: -80.332780
Species: *Stenella frontalis* Numbers (Low/High/Best): 2 / 3 / 3
Features used in Species ID: Alternating light and dark pattern down body, spotting

Representative images used for Species ID: 8821, 8823
Photographer: Erin Frame numbers: 8809 - 8824 Spacer: 8825
Calculated distance from Trackline: 0.80 km

Final Time and Position of Sighting

Time: 10:12 WP#: 22 Lat: 30.236830 Long: -80.336832
Calculated Distance Traveled: 0.57 km

Behavior and Additional Comments

2 together, one swimming below the other, 1 swimming apart

Tuesday, March 3, 2015 Sighting # 5

Initial sighting on Track

Time: 10:23 WP#: 28 Lat: 30.229643 Long: -79.920032
Vertical Angle: 3 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
On/Off Effort: On Trackline: 5 Beaufort Sea State: 2
Observer: Sarah Observer side: Left

Actual Time and Position of Sighting

Time: 10:25 WP#: 29 Lat: 30.234768 Long: -79.926286
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8 / 12 / 10
Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 8828
Photographer: Erin Frame numbers: 8826 - 8836 Spacer: 8837
Calculated distance from Trackline: 0.83 km

Final Time and Position of Sighting

Time: 10:26 WP#: 30 Lat: 30.238900 Long: -79.928416
Calculated Distance Traveled: 0.50 km

Behavior and Additional Comments

1 dense group; slow travel, regular surfacing

Tuesday, March 3, 2015 Sighting # 6

Initial sighting on Track

Time: 10:47 WP#: 38 Lat: 30.308454 Long: -80.342782
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 6 Beaufort Sea State: 2
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 10:48 WP#: 39 Lat: 30.303015 Long: -80.339554
Species: *Stenella frontalis* Numbers (Low/High/Best): 4 / 4 / 4
Features used in Species ID: Alternating light and dark pattern down body, spotting

Representative images used for Species ID: 8847
Photographer: Erin Frame numbers: 8838 - 8866 Spacer: 8867
Calculated distance from Trackline: 0.68 km

Final Time and Position of Sighting

Time: 10:51 WP#: 40 Lat: 30.301394 Long: -80.339681
Calculated Distance Traveled: 0.18 km

Behavior and Additional Comments

Subsurface travel, swimming parallel to each other, 2 groups

Tuesday, March 3, 2015 Sighting # 7

Initial sighting on Track

Time: 10:52 WP#: 42 Lat: 30.303497 Long: -80.388785
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 6 Beaufort Sea State: 2
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 10:54 WP#: 43 Lat: 30.306612 Long: -80.378407
Species: *Stenella frontalis* Numbers (Low/High/Best): 10 / 15 / 12
Features used in Species ID: Alternating light and dark pattern down body, spotting

Representative images used for Species ID: 8875, 8882
Photographer: Erin Frame numbers: 8868 - 8888 Spacer: 8889
Calculated distance from Trackline: 1.06 km

Final Time and Position of Sighting

Time: 10:56 WP#: 44 Lat: 30.313591 Long: -80.382089
Calculated Distance Traveled: 0.85 km

Behavior and Additional Comments

3 groups, 1 group - 4, 2 group - 3, 3 group - 3

Tuesday, March 3, 2015 Sighting # 8

Initial sighting on Track

Time: 11:08 WP#: 57 Lat: 30.363221 Long: -80.678187
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 6 Beaufort Sea State: 1
Observer: Sarah Observer side: Left

Actual Time and Position of Sighting

Time: 11:09 WP#: 58 Lat: 30.367546 Long: -80.667475
Species: *Stenella frontalis* Numbers (Low/High/Best): 10 / 20 / 15
Features used in Species ID: Alternating light and dark pattern down body, spotting

Representative images used for Species ID: 8895, 8897
Photographer: Erin Frame numbers: 8890 - 8905 Spacer: 8906
Calculated distance from Trackline: 1.14 km

Final Time and Position of Sighting

Time: 11:12 WP#: 59 Lat: 30.376073 Long: -80.674654
Calculated Distance Traveled: 1.17 km

Behavior and Additional Comments

1 group of 10, multiple groups, few small groups with singles

Tuesday, March 3, 2015 Sighting # 9

Initial sighting on Track

Time: 11:14 WP#: 61 Lat: 30.364324 Long: -80.623458
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 7 Beaufort Sea State: 2
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 11:18 WP#: 63 Lat: 30.361153 Long: -80.623340
Species: *Stenella frontalis* Numbers (Low/High/Best): 2 / 2 / 2
Features used in Species ID: Alternating light and dark coloration down body, spotting

Representative images used for Species ID: 8910, 8913
Photographer: Erin Frame numbers: 8907 - 8914 Spacer: 8915
Calculated distance from Trackline: 0.35 km

Final Time and Position of Sighting

Time: 11:18 WP#: 64 Lat: 30.357772 Long: -80.629964
Calculated Distance Traveled: 0.74 km

Behavior and Additional Comments

slow travel

Tuesday, March 3, 2015 Sighting # 10

Initial sighting on Track

Time: 11:26 WP#: 74 Lat: 30.363803 Long: -80.349394
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 7 Beaufort Sea State: 2
Observer: Sarah Observer side: Left

Actual Time and Position of Sighting

Time: 11:28 WP#: 75 Lat: 30.366366 Long: -80.352072
Species: *Stenella frontalis* Numbers (Low/High/Best): 6 / 8 / 7
Features used in Species ID: Alternating light and dark pattern down body, spotting

Representative images used for Species ID: 8922
Photographer: Erin Frame numbers: 8916 - 8926 Spacer: 8927
Calculated distance from Trackline: 0.38 km

Final Time and Position of Sighting

Time: 11:30 WP#: 76 Lat: 30.369423 Long: -80.356298
Calculated Distance Traveled: 0.59 km

Behavior and Additional Comments

Travel

Tuesday, March 3, 2015 Sighting # 11

Initial sighting on Track

Time: 11:32 WP#: 78 Lat: 30.364110 Long: -80.279954
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 7 Beaufort Sea State: 2
Observer: Sarah Observer side: Left

Actual Time and Position of Sighting

Time: 11:39 WP#: 79 Lat: 30.377677 Long: -80.302332
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8 / 20 / 18
Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 8930
Photographer: Erin Frame numbers: 8928 - 8946 Spacer: 8947
Calculated distance from Trackline: 2.62 km

Final Time and Position of Sighting

Time: 11:43 WP#: 80 Lat: 30.382204 Long: -80.303561
Calculated Distance Traveled: 0.52 km

Behavior and Additional Comments

Tail slap when broke track, 2 groups, evasive staying below surface

Tuesday, March 3, 2015 Sighting # 12

Initial sighting on Track

Time: 12:12 WP#: 92 Lat: 30.435768 Long: -80.291176
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 8 Beaufort Sea State: 1
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 12:13 WP#: 93 Lat: 30.437663 Long: -80.291961
Species: *Tursiops truncatus* Numbers (Low/High/Best): 1 / 1 / 1
Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 8949
Photographer: Erin Frame numbers: 8948 - 8951 Spacer: 8952
Calculated distance from Trackline: 0.22 km

Final Time and Position of Sighting

Time: 12:17 WP#: 94 Lat: 30.449295 Long: -80.286336
Calculated Distance Traveled: 1.40 km

Behavior and Additional Comments

Single animal swimming subsurface, surfacing regularly

Tuesday, March 3, 2015 Sighting # 13

Initial sighting on Track

Time: 12:23 WP#: 99 Lat: 30.435530 Long: -80.497985
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 8 Beaufort Sea State: 1
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 12:25 WP#: 100 Lat: 30.438016 Long: -80.497697
Species: *Steno bredanensis* Numbers (Low/High/Best): 25 / 40 / 35
Features used in Species ID: dark, robust, narrow body, long rostrum, white lining opening to mouth
Representative images used for Species ID: 8960, 8961, 8965, 8978, 8992
Photographer: Erin Frame numbers: 8953 - 8999 Spacer: 9000
Calculated distance from Trackline: 0.28 km

Final Time and Position of Sighting

Time: 12:31 WP#: 101 Lat: 30.434508 Long: -80.498904
Calculated Distance Traveled: 0.41 km

Behavior and Additional Comments

Large group swimming closely, within large group animals traveling in denser aliquot of 5ish

Tuesday, March 3, 2015 Sighting # 14

Initial sighting on Track

Time: 14:38 WP#: 114 Lat: 29.963369 Long: -80.396174
Vertical Angle: 3 Horizontal Bearing in Degrees: 70 Sighting Cue: Body
On/Off Effort: On Trackline: 1 Beaufort Sea State:
Observer: Sarah Observer side: Left

Actual Time and Position of Sighting

Time: 14:43 WP#: 115 Lat: 29.973329 Long: -80.390214
Species: *Tursiops truncatus* Numbers (Low/High/Best): 1 / 2 / 2
Features used in Species ID: Uniform gray, robust
Representative images used for Species ID: 9015, 9016
Photographer: Erin Frame numbers: 9001 - 9019 Spacer: 9020
Calculated distance from Trackline: 1.25 km

Final Time and Position of Sighting

Time: 14:45 WP#: 116 Lat: 29.967684 Long: -80.378177
Calculated Distance Traveled: 1.32 km

Behavior and Additional Comments

Animals not swimming together, surfacing regularly

Tuesday, March 3, 2015 Sighting # 15

Initial sighting on Track

Time: 14:59 WP#: 122 Lat: 29.963413 Long: -79.849831
Vertical Angle: 4 Horizontal Bearing in Degrees: 60 Sighting Cue: Splash
On/Off Effort: On Trackline: 1 Beaufort Sea State: 3
Observer: Sarah Observer side: Left

Actual Time and Position of Sighting

Time: 15:01 WP#: 123 Lat: 29.967105 Long: -79.855580
Species: *Tursiops truncatus* Numbers (Low/High/Best): 40 / 60 / 50
Features used in Species ID: Uniform gray robust

Representative images used for Species ID: 9028, 9038
Photographer: Erin Frame numbers: 9021 - 9043 Spacer: 9044
Calculated distance from Trackline: 0.69 km

Final Time and Position of Sighting

Time: 15:02 WP#: 124 Lat: 29.965612 Long: -79.841882
Calculated Distance Traveled: 1.33 km

Behavior and Additional Comments

Travel

Tuesday, March 3, 2015 Sighting # 16

Initial sighting on Track

Time: 15:20 WP#: 132 Lat: 30.034242 Long: -80.332687
Vertical Angle: 4 Horizontal Bearing in Degrees: 70 Sighting Cue: Body
On/Off Effort: On Trackline: 2 Beaufort Sea State: 1
Observer: Sarah Observer side: Left

Actual Time and Position of Sighting

Time: 15:21 WP#: 133 Lat: 30.029533 Long: -80.331354
Species: *Tursiops truncatus* Numbers (Low/High/Best): 9 / 9 / 9
Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 9047
Photographer: Erin Frame numbers: 9045 - 9048 Spacer: 9049
Calculated distance from Trackline: 0.54 km

Final Time and Position of Sighting

Time: 15:21 WP#: 134 Lat: 30.032441 Long: -80.325222
Calculated Distance Traveled: 0.67 km

Behavior and Additional Comments

Travel

Tuesday, March 3, 2015 Sighting # 17

Initial sighting on Track

Time: 15:27 WP#: 140 Lat: 30.033951 Long: -80.546950
Vertical Angle: 4 Horizontal Bearing in Degrees: 60 Sighting Cue: Splash
On/Off Effort: On Trackline: 2 Beaufort Sea State: 1
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 15:28 WP#: 141 Lat: 30.048278 Long: -80.560713
Species: *Stenella frontalis* Numbers (Low/High/Best): 100 / 150 / 125
Features used in Species ID: Alternating light and dark pattern down body, spotting

Representative images used for Species ID: 9053, 9054, 9060
Photographer: Erin Frame numbers: 9050 - 9101 Spacer: 9102
Calculated distance from Trackline: 2.07 km

Final Time and Position of Sighting

Time: 15:31 WP#: 142 Lat: 30.050478 Long: -80.558504
Calculated Distance Traveled: 0.32 km

Behavior and Additional Comments

Large dense group charging bait ball, feeding

Tuesday, March 3, 2015 Sighting # 18

Initial sighting on Track

Time: 15:54 WP#: 148 Lat: 30.497248 Long: -80.388089
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
On/Off Effort: On Trackline: 9 Beaufort Sea State: 1
Observer: Sarah Observer side: Left

Actual Time and Position of Sighting

Time: 16:00 WP#: 149 Lat: 30.491922 Long: -80.388036
Species: *Tursiops truncatus* Numbers (Low/High/Best): 10 / 20 / 15
Features used in Species ID: Uniform gray, robus

Representative images used for Species ID: 9126
Photographer: Erin Frame numbers: 9103 - 9128 Spacer: 9129
Calculated distance from Trackline: 0.59 km

Final Time and Position of Sighting

Time: 16:01 WP#: 150 Lat: 30.495740 Long: -80.386223
Calculated Distance Traveled: 0.46 km

Behavior and Additional Comments

Scattered loose group

Wednesday, March 4, 2015 Sighting # 1

Initial sighting on Track

Time: 14:46 WP#: 11 Lat: 30.501483 Long: -79.845248
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 9 Beaufort Sea State: 5
Observer: Sarah Observer side: Right

Actual Time and Position of Sighting

Time: N/A WP#: N/A Lat: N/A Long: N/A
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 5 / 8 / 6
Features used in Species ID: Larger than a dolphin

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: 15:00 WP#: 12 Lat: 30.497637 Long: -79.830833
Calculated Distance Traveled: N/A

Behavior and Additional Comments

No resight, larger than a dolphin, different coloration

Wednesday, March 4, 2015 Sighting # 2

Initial sighting on Track

Time: 15:24 WP#: 18 Lat: 30.501146 Long: -80.673273
Vertical Angle: 2 Horizontal Bearing in Degrees: 110 Sighting Cue: Body
On/Off Effort: On Trackline: 9 Beaufort Sea State: 2
Observer: Sarah Observer side: Right

Actual Time and Position of Sighting

Time: N/A WP#: N/A Lat: 30.501146 Long: -80.673273
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 1 / 1 / 1
Features used in Species ID: N/A

Representative images used for Species ID: N/A
Photographer: N/A Frame numbers: N/A Spacer: N/A
Calculated distance from Trackline: N/A

Final Time and Position of Sighting

Time: 14:31 WP#: 19 Lat: 30.495343 Long: -80.672631
Calculated Distance Traveled: N/A

Behavior and Additional Comments

No resight

Wednesday, April 15, 2015 Sighting # 1

Initial sighting on Track

Time: 10:14 WP#: 9 Lat: 30.433149 Long: -79.429627
Vertical Angle: 2 Horizontal Bearing in Degrees: 110 Sighting Cue: Breach
On/Off Effort: On Trackline: 8 off Beaufort Sea State: 3
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 10:20 WP#: 10 Lat: 30.432388 Long: -79.420303
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 1 / 1 / 1
Features used in Species ID:

Representative images used for Species ID: NA
Photographer: Erin Frame numbers: NA Spacer: NA
Calculated distance from Trackline: 0.90 km

Final Time and Position of Sighting

Time: 10:28 WP#: 11 Lat: 30.431200 Long: -79.421191
Calculated Distance Traveled: 0.16 km

Behavior and Additional Comments

Animal breached once at initial sighting, not relocated or photographed

Wednesday, April 15, 2015 Sighting # 2

Initial sighting on Track

Time: 11:00 WP#: 19 Lat: 30.299932 Long: -79.432744
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 6 off Beaufort Sea State: 3
Observer: Ryan Observer side: Left

Actual Time and Position of Sighting

Time: 11:07 WP#: 18 Lat: 30.300883 Long: -79.439419
Species: *Tursiops truncatus* 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: 0.65 km

Final Time and Position of Sighting

Time: 11:10 WP#: 19 Lat: 30.308441 Long: -79.423813
Calculated Distance Traveled: 1.72 km

Behavior and Additional Comments

Uniform grey coloration, pair of animals not relocated

Wednesday, August 19, 2015 Sighting # 1

Initial sighting on Track

Time: 11:22 WP#: 11 Lat: 30.498995 Long: -80.427856
Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: Splash
On/Off Effort: On Trackline: 9 Beaufort Sea State: 3
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 11:23 WP#: 12 Lat: 30.503505 Long: -80.432803
Species: *Stenella frontalis* Numbers (Low/High/Best): 40 / 45 / 40
Features used in Species ID: Heavy spotting pattern on animals body, narrow blaze to dorsal fin white tip to the rostrum.
Representative images used for Species ID: 2571, 2579
Photographer: Erin Frame numbers: 2570 - 2586 Spacer: 2587
Calculated distance from Trackline: 0.69 km

Final Time and Position of Sighting

Time: 11:25 WP#: 13 Lat: 30.508902 Long: -80.436018
Calculated Distance Traveled: 0.67 km

Behavior and Additional Comments

Dense group of animals active at the surface - splashing

Wednesday, August 19, 2015 Sighting # 2

Initial sighting on Track

Time: 12:21 WP#: 26 Lat: 30.365103 Long: -80.523228
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 8 Beaufort Sea State: 3
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 12:22 WP#: 27 Lat: 30.371381 Long: -80.52053
Species: *Stenella frontalis* Numbers (Low/High/Best): 12 / 15 / 13
Features used in Species ID: Heavy spotting pattern on animals body, narrow blaze to dorsal fin
Representative images used for Species ID: 2603, 2605, 2606
Photographer: Erin Frame numbers: 2588 - 2611 Spacer: 2612
Calculated distance from Trackline: 0.74 km

Final Time and Position of Sighting

Time: 12:24 WP#: 28 Lat: 30.374872 Long: -80.523888
Calculated Distance Traveled: 0.50 km

Behavior and Additional Comments

Slow travel with regular low surfacings, disperse groups of 2-3 animals.

Wednesday, August 19, 2015 Sighting # 3

Initial sighting on Track

Time: 13:21 WP#: 45 Lat: 30.231777 Long: -80.377822
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 8 Beaufort Sea State: 3
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 13:25 WP#: 46 Lat: 30.234862 Long: -80.370061
Species: *Stenella frontalis* Numbers (Low/High/Best): 30 / 30 / 30
Features used in Species ID: Heavy spotting pattern on animals body, narrow blaze to dorsal fin

Representative images used for Species ID: 2628, 2630
Photographer: Erin Frame numbers: 2613 - 2633 Spacer: 2634
Calculated distance from Trackline: 0.98 km

Final Time and Position of Sighting

Time: 13:30 WP#: 47 Lat: 30.245821 Long: -80.367160
Calculated Distance Traveled: 0.47 km

Behavior and Additional Comments

Spread out line of animals, traveling just below the surface at a moderate speed.
Single animals well spaced away from the larger group.

Wednesday, August 19, 2015 Sighting # 4

Initial sighting on Track

Time: 13:34 WP#: 49 Lat: 30.231665 Long: -80.488877
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: 13:35 WP#: 50 Lat: 30.242278 Long: -80.489346
Species: *Stenella frontalis* Numbers (Low/High/Best): 4 / 4 / 4
Features used in Species ID: Alternating light and dark body coloration to body because of heavy spotting, white tip to rostrum.

Representative images used for Species ID: 2641
Photographer: Erin Frame numbers: 2635 - 2642 Spacer: 2643
Calculated distance from Trackline: 0.82 km

Final Time and Position of Sighting

Time: 13:38 WP#: 51 Lat: 30.245745 Long: -80.482010
Calculated Distance Traveled: 1.25 km

Behavior and Additional Comments

Glare made circling for photos difficult, only one animal upon circling.

Wednesday, August 19, 2015 Sighting # 5

Initial sighting on Track

Time: 13:34 WP#: 49 Lat: 30.231665 Long: -80.488877
Vertical Angle: 3 Horizontal Bearing in Degrees: 100 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: 13:35 WP#: 50 Lat: 30.242278 Long: -80.489346
Species: *Stenella frontalis* Numbers (Low/High/Best): 2 / 2 / 2
Features used in Species ID: Heavy spotting on animals body, white tip to animals rostrums.

Representative images used for Species ID: 2644, 2651
Photographer: Erin Frame numbers: 2643 - 2651 Spacer: 2652
Calculated distance from Trackline: 1.18 km

Final Time and Position of Sighting

Time: 13:38 WP#: 51 Lat: 30.245745 Long: -80.482010
Calculated Distance Traveled: 0.80 km

Behavior and Additional Comments

Pair of animals, only one observed when circling.

Wednesday, August 19, 2015 Sighting # 6

Initial sighting on Track

Time: 15:26 WP#: 61 Lat: 29.966768 Long: -80.339688
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 1 Beaufort Sea State: 2
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 15:32 WP#: 62 Lat: 29.965471 Long: -80.343378
Species: *Stenella frontalis* Numbers (Low/High/Best): 12 / 17 / 15
Features used in Species ID: Alternating light and dark body coloration because of spotting thin blaze up to the dorsal fin, white tip to the rostrum.

Representative images used for Species ID: 2654, 2660, 2666, 2670
Photographer: Erin Frame numbers: 2653 - 2673 Spacer: 2674
Calculated distance from Trackline: 0.38 km

Final Time and Position of Sighting

Time: 15:33 WP#: 63 Lat: 29.966954 Long: -80.339950
Calculated Distance Traveled: 0.37 km

Behavior and Additional Comments

Wednesday, August 19, 2015 Sighting # 7

Initial sighting on Track

Time: 15:34 WP#: 65 Lat: 29.965422 Long: -80.293182
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 1 Beaufort Sea State: 2
Observer: Ryan Observer side: Left

Actual Time and Position of Sighting

Time: 15:36 WP#: 66 Lat: 29.970685 Long: -80.295960
Species: *Tursiops truncatus* Numbers (Low/High/Best): 5 / 5 / 5
Features used in Species ID: Robust body appearance, uniform grey coloration.

Representative images used for Species ID: 2681
Photographer: Erin Frame numbers: 2694 - 2686 Spacer: 2687
Calculated distance from Trackline: 0.64 km

Final Time and Position of Sighting

Time: 15:41 WP#: 67 Lat: 29.962961 Long: -80.288935
Calculated Distance Traveled: 1.09 km

Behavior and Additional Comments

Dense group traveling at the surface.

Wednesday, August 19, 2015 Sighting # 8

Initial sighting on Track

Time: 15:50 WP#: 69 Lat: 29.966800 Long: -79.978362
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 1 Beaufort Sea State: 1
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 15:51 WP#: 70 Lat: 29.967375 Long: -79.981131
Species: *Tursiops truncatus* Numbers (Low/High/Best): 2 / 2 / 2
Features used in Species ID: Robust body appearance, light grey coloration with a lighter blaze to dorsal fin, white coloration to animals peduncle.
Representative images used for Species ID: 2690, 2701, 2706
Photographer: Erin Frame numbers: 2688 - 2707 Spacer: 2708
Calculated distance from Trackline: 0.27 km

Final Time and Position of Sighting

Time: 15:53 WP#: 71 Lat: 29.965078 Long: -79.978245
Calculated Distance Traveled: 0.38 km

Behavior and Additional Comments

Well disperse group.

Wednesday, August 19, 2015 Sighting # 9

Initial sighting on Track

Time: 16:13 WP#: 76 Lat: 30.032484 Long: -80.300823
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 1 Beaufort Sea State: 2
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 16:14 WP#: 77 Lat: 30.037111 Long: -80.300876
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4 / 4 / 4
Features used in Species ID: Robust body appearance, white peduncles on some of the animals.

Representative images used for Species ID: 2717, 2721, 2723
Photographer: Erin Frame numbers: 2709 - 2728 Spacer: 2729
Calculated distance from Trackline: 0.51 km

Final Time and Position of Sighting

Time: 16:17 WP#: 78 Lat: 30.038128 Long: -80.300788
Calculated Distance Traveled: 0.11 km

Behavior and Additional Comments

Thursday, August 20, 2015 Sighting # 1

Initial sighting on Track

Time: 9:25 WP#: 5 Lat: 30.541759 Long: -79.317460
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: Off Trackline: 10 - 9 off Beaufort Sea State: 3
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 9:27 WP#: 6 Lat: 30.539016 Long: -79.325077
Species: *Grampus griseus* Numbers (Low/High/Best): 6 / 6 / 6
Features used in Species ID: Gray with white scaring, blunt melon with cleft in middle

Representative images used for Species ID: 2736, 2746, 2750, 2755, 2761
Photographer: Ryan Frame numbers: 2730 - 2771 Spacer: 2772
Calculated distance from Trackline: 0.79 km

Final Time and Position of Sighting

Time: 9:29 WP#: 7 Lat: 30.543435 Long: -79.327232
Calculated Distance Traveled: 0.53 km

Behavior and Additional Comments

Traveling slow subsurface, not surfacing very often, swimming belly up

Thursday, August 20, 2015 Sighting # 2

Initial sighting on Track

Time: 9:41 WP#: 10 Lat: 30.492156 Long: -79.719327
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Splash
On/Off Effort: On Trackline: 9 off Beaufort Sea State: 2
Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:42 WP#: 11 Lat: 30.484154 Long: -79.717845
Species: *Tursiops truncatus* Numbers (Low/High/Best): 1 / 1 / 1
Features used in Species ID: Robust, uniform dark gray, white peduncle

Representative images used for Species ID: 2775, 2776, 2777, 2782
Photographer: Ryan Frame numbers: 2773 - 2785 Spacer: 2782
Calculated distance from Trackline: 0.90 km

Final Time and Position of Sighting

Time: 9:45 WP#: 12 Lat: 30.488868 Long: -79.719434
Calculated Distance Traveled: 0.55 km

Behavior and Additional Comments

Traveling, white peduncle, good ID behind Dfin

Thursday, August 20, 2015 Sighting # 3

Initial sighting on Track

Time: 9:53 WP#: 6 Lat: 30.426947 Long: -79.702044
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 8 off Beaufort Sea State: 2
Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:59 WP#: 17 Lat: 30.430419 Long: -79.703479
Species: *Tursiops truncatus* Numbers (Low/High/Best): 2 / 2 / 2
Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 2787, 2788
Photographer: Ryan Frame numbers: 2786 - 2792 Spacer: 2793
Calculated distance from Trackline: 0.41 km

Final Time and Position of Sighting

Time: 10:00 WP#: 18 Lat: 30.434022 Long: -79.706697
Calculated Distance Traveled: 0.51 km

Behavior and Additional Comments

Fast travel south, paralleling the sargassum

Wednesday, October 14, 2015 Sighting # 1

Initial sighting on Track

Time: 11:35 WP#: 20 Lat: 30.566454 Long: -80.316775
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 10 Beaufort Sea State: 3
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 11:36 WP#: 11 Lat: 30.566381 Long: -80.314095
Species: *Stenella frontalis* Numbers (Low/High/Best): 15 / 25 / 20
Features used in Species ID: Alternating light and dark pattern down body, spotting

Representative images used for Species ID: 3872, 3873, 3878, 3881, 3883
Photographer: Ryan Frame numbers: 3861 - 3890 Spacer: 3891
Calculated distance from Trackline: 0.26 km

Final Time and Position of Sighting

Time: N/A WP#: N/A Lat: N/A Long: N/A
Calculated Distance Traveled: N/A

Behavior and Additional Comments

Traveling slowly on surface until we flew over and then dove, spread out, fast travel
Lost GPS signal on 2.42

Thursday, October 15, 2015 Sighting # 1

Initial sighting on Track

Time: 11:19 WP#: 22 Lat: 30.565217 Long: -79.870425
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
On/Off Effort: On Trackline: 10 Beaufort Sea State: 4
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 11:21 WP#: 23 Lat: 30.568659 Long: -79.866691
Species: *Tursiops truncatus* Numbers (Low/High/Best): 2 / 2 / 2
Features used in Species ID: Robust body, uniform grey coloration

Representative images used for Species ID: 3901, 3902, 3907
Photographer: Erin Frame numbers: 3982 - 3909 Spacer: 3910
Calculated distance from Trackline: 0.52 km

Final Time and Position of Sighting

Time: 11:23 WP#: 24 Lat: 30.562398 Long: -79.870191
Calculated Distance Traveled: 0.77 km

Behavior and Additional Comments

Pair of animals, slow travel

Thursday, October 15, 2015 Sighting # 2

Initial sighting on Track

Time: 14:18 WP#: 39 Lat: 30.099660 Long: -80.078974
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
On/Off Effort: On Trackline: 3 Beaufort Sea State: 4
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 14:19 WP#: 40 Lat: 30.107201 Long: -80.080733
Species: *Tursiops truncatus* Numbers (Low/High/Best): 7 / 8 / 8
Features used in Species ID: Robust body, uniform grey coloration.

Representative images used for Species ID: 3920
Photographer: Erin Frame numbers: 3911 - 3928 Spacer: 3929
Calculated distance from Trackline: 0.86 km

Final Time and Position of Sighting

Time: 14:23 WP#: 41 Lat: 30.107435 Long: -80.071078
Calculated Distance Traveled: 0.92 km

Behavior and Additional Comments

Within a bodies length of one another.

Thursday, October 15, 2015 Sighting # 3

Initial sighting on Track

Time: 14:31 WP#: 43 Lat: 30.099713 Long: -80.353750
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
On/Off Effort: On Trackline: 3 Beaufort Sea State: 4
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 14:34 WP#: 44 Lat: 30.097256 Long: -80.360174
Species: *Stenella frontalis* Numbers (Low/High/Best): 10 / 10 / 10
Features used in Species ID: No photos collected

Representative images used for Species ID: NA
Photographer: Erin Frame numbers: NA Spacer: NA
Calculated distance from Trackline: 0.68 km

Final Time and Position of Sighting

Time: 14:44 WP#: 45 Lat: 30.092394 Long: -80.356441
Calculated Distance Traveled: 0.65 km

Behavior and Additional Comments

Issue with camera so no images collected. Animals with alternating light and dark coloration.

Thursday, October 15, 2015 Sighting # 4

Initial sighting on Track

Time: 15:01 WP#: 49 Lat: 30.032328 Long: -80.591429
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 2 Beaufort Sea State: 3
Observer: Ryan Observer side: Left

Actual Time and Position of Sighting

Time: 15:11 WP#: 50 Lat: 30.031325 Long: -80.587854
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 2 / 2 / 2
Features used in Species ID: No photos collected.

Representative images used for Species ID: NA
Photographer: Erin Frame numbers: NA Spacer: NA
Calculated distance from Trackline: 0.36 km

Final Time and Position of Sighting

Time: 15:12 WP#: 51 Lat: 30.031691 Long: -80.585715
Calculated Distance Traveled: 0.21 km

Behavior and Additional Comments

Unable to relocate animals - no photos collected

Thursday, October 15, 2015 Sighting # 5

Initial sighting on Track

Time: 15:44 WP#: 57 Lat: 29.965072 Long: -80.087665
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 1 Beaufort Sea State: 4
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 15:47 WP#: 58 Lat: 29.967883 Long: -80.086198
Species: *Tursiops truncatus* Numbers (Low/High/Best): 10 / 10 / 10
Features used in Species ID: Robust body coloration, uniform grey coloration, white peduncle

Representative images used for Species ID: 3940, 3941, 3942
Photographer: Erin Frame numbers: 3930 - 3945 Spacer: 3946
Calculated distance from Trackline: 0.34 km

Final Time and Position of Sighting

Time: 15:50 WP#: 59 Lat: 29.968489 Long: -80.083478
Calculated Distance Traveled: 0.27 km

Behavior and Additional Comments

Animals close together traveling sub-surface - spread out more as sighting continued.

Thursday, October 15, 2015 Sighting # 6

Initial sighting on Track

Time: 15:55 WP#: 61 Lat: 29.965177 Long: -80.237420
Vertical Angle: 1 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
On/Off Effort: On Trackline: 1 Beaufort Sea State: 4
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 15:56 WP#: 62 Lat: 29.972184 Long: -80.231829
Species: *Stenella frontalis* Numbers (Low/High/Best): 10 / 10 / 10
Features used in Species ID: Alternating light and dark coloration, white tips to rostrums.

Representative images used for Species ID: 3949, 3955, 3960
Photographer: Erin Frame numbers: 3947 - 3966 Spacer: 3967
Calculated distance from Trackline: 0.95 km

Final Time and Position of Sighting

Time: 16:01 WP#: 63 Lat: 29.957300 Long: -80.228854
Calculated Distance Traveled: 1.68 km

Behavior and Additional Comments

Group staying sub-surface

This page intentionally left blank.