Aerial Surveys for Protected Marine Species in the Jacksonville OPAREA: 2017 Annual Progress Report

Submitted to:

Naval Facilities Engineering Command Atlantic under Contract No. N62470-15-D-8006, Task Orders 05, 29, and 48, issued to HDR, Inc.

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April 2018

Suggested Citation:

Cummings E., R. McAlarney, W. McLellan, and D.A. Pabst. 2018. *Aerial Surveys for Protected Marine Species in the Jacksonville OPAREA: 2017 Annual Progress Report..* Prepared for U.S. Fleet Forces Command. Submitted to Naval Facilities Engineering Command Atlantic, Norfolk, Virginia, under Contract No. N62470-15-D-8006 Task Orders 05, 29 and 48, issued to HDR, Inc., Virginia Beach, Virginia. April 2018.

Cover Photo Credit:

Kogiid whale (*Kogia* sp.). Photograph collected by the University of North Carolina Wilmington under National Oceanic and Atmospheric Administration Scientific Permit #16473.

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Acronyms and Abbreviations

BSS	Beaufort sea state
EWS	Early Warning System
km	kilometer(s)
m	meter(s)
U.S.	United States
USWTR	Undersea Warfare Training Range

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1. Introduction

This report represents one facet of a collaborative 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. The program began in 2007, with baseline aerial and vessel surveys, as well as a passive acoustic monitoring component in Onslow Bay, North Carolina, and has since expanded to include study sites offshore of Jacksonville, Florida; Cape Hatteras, North Carolina; and Norfolk, Virginia. In Onslow Bay, four 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). Nearly nine years of monitoring in Jacksonville has provided similar novel information on the density and distribution of marine mammals and sea turtles in this area. In Cape Hatteras, over six years of dedicated survey effort has provided preliminary information on the complex distribution patterns and high species diversity of the marine mammals and sea turtles within this exceptionally productive site. In 2015, to serve the operational needs of the Atlantic Fleet Training and Testing program, survey effort was extended north into Virginia, creating the Norfolk Canyon survey area. Three years of surveys at this site have provided preliminary information on the distribution and diversity of cetaceans and sea turtles. The current report builds on this past body of work and describes aerial survey monitoring activities that occurred in the Jacksonville (JAX) OPAREA in 2017.

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, from January through December 2017. Survey effort was conducted on a quarterly basis to continue baseline monitoring of species occurrence and distribution patterns established during the previous 9 years. Two consecutive survey days were planned seasonally with flights covering the primary Undersea Warfare Training Range (USWTR) survey area as well as offshore trackline extensions.

A total of 72 tracklines (36 primary USWTR tracklines and 36 offshore extensions) covering 4656.35 kilometers (km) was completed during 2017.

A total of 46 on-effort sightings of 679 individual cetaceans was recorded while on-effort within the study area. The sightings were comprised of nine cetacean species including the bottlenose dolphin (*Tursiops truncatus*; 17 sightings, *n*=212), Atlantic spotted dolphin (*Stenella frontalis*; 14 sightings, *n*=336), rough-toothed dolphin (*Steno bredanensis*; 1 sighting, *n*=36), Risso's dolphin (*Grampus griseus*; 1 sighting, *n*=19), pantropical spotted dolphin (*Stenella attenuata*; 1 sighting, *n*=2), short-finned pilot whale (*Globicephala macrorhynchus*; 6 sightings, *n*=44), minke whale (*Balaenoptera acutorostrata;* 2 sightings, *n*=3), pygmy or dwarf sperm whale (*Kogia* sp.; one sighting, *n*=2), and sperm whale (*Physeter macrocephalus*; a single individual). During two sightings (totaling 24 individuals), dolphin species identity could not be established with certainty (i.e., "unidentified delphinids"). Three off-effort sightings were recorded. These included one sighting of short-finned pilot whales (*n*=3), one sighting of bottlenose dolphins (*n*=18), and one

sighting of Atlantic spotted dolphins (*n*=15). These three off-effort sightings are included in species sighting maps and tables but are excluded from all other calculations.

A total of 97 sea turtles observations was recorded during the study period. Of these individual sea turtle sightings, 93 were identified as loggerheads (*Caretta caretta*), and four as leatherbacks (*Dermochelys coriacea*). Sea turtles were detected during every day of survey effort.

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. 2014). 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 (*Mola mola*) and multiple species of sharks and rays were also observed. Military, commercial, and recreational vessel traffic was also encountered within the survey area.

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 airplanes and certified pilots. Surveys were conducted using National Oceanic and Atmospheric Administration–Southeast Regional Minimum Aircraft and Crew Provisions Guidelines (2013), which require that aircraft are Code of Federal Regulations § 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 one pilot, one co-pilot, and two observers. Each observer wore a Nomex® fire-retardant suit, a Switlik® inflatable life jacket, a personal emergency position-indicating radio beacon, and additional safety equipment. An inflatable life raft, plane emergency position-indicating radio beacon, and satellite telephone were also onboard at all times.

The Jacksonville survey area consists of ten 86-km tracklines spaced 7.4 km apart covering 5,727 square kilometers. As discussed at the 2015 Marine Species Monitoring Program Atlantic Technical Review Meeting (30–31 March 2015, Virginia Beach, Virginia), there was interest in better understanding the habitat usage of pelagic cetaceans found beyond the eastern portion of the Jacksonville survey area. Thus, the original tracklines were extended by approximately 44km to the east in 2015, covering an additional 2,903 square kilometers (**Table 1, Figure 1**). Effort conducted on these additional tracklines is included in our analyses. These tracklines are labeled “1–10 Off” in the sighting tables and are also added to the species sightings maps. Equal survey effort was completed quarterly for both the original and extended tracklines.

This survey area is located offshore of the primary calving grounds for the endangered North Atlantic right whale (*Eubalaena glacialis*), 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 two decades to warn

Table 1. Coordinates for trackline end points for the Jacksonville 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

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 resulted in a number of additional right whale sightings. However, 2017 proved to be an atypical year for North Atlantic right whales, with few animals appearing in their normal nearshore calving habitat. There were no right whales encountered during quarterly surveys or transits to and from the site.

Safety and communication protocols for transiting through the EWS areas were established in January 2009 when JAX offshore survey effort began. The survey team reviewed protocols with researchers from the Florida Fish and Wildlife Conservation Commissionm 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 survey area and the eastern margin of the EWS surveys (**Figure 1**).

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.

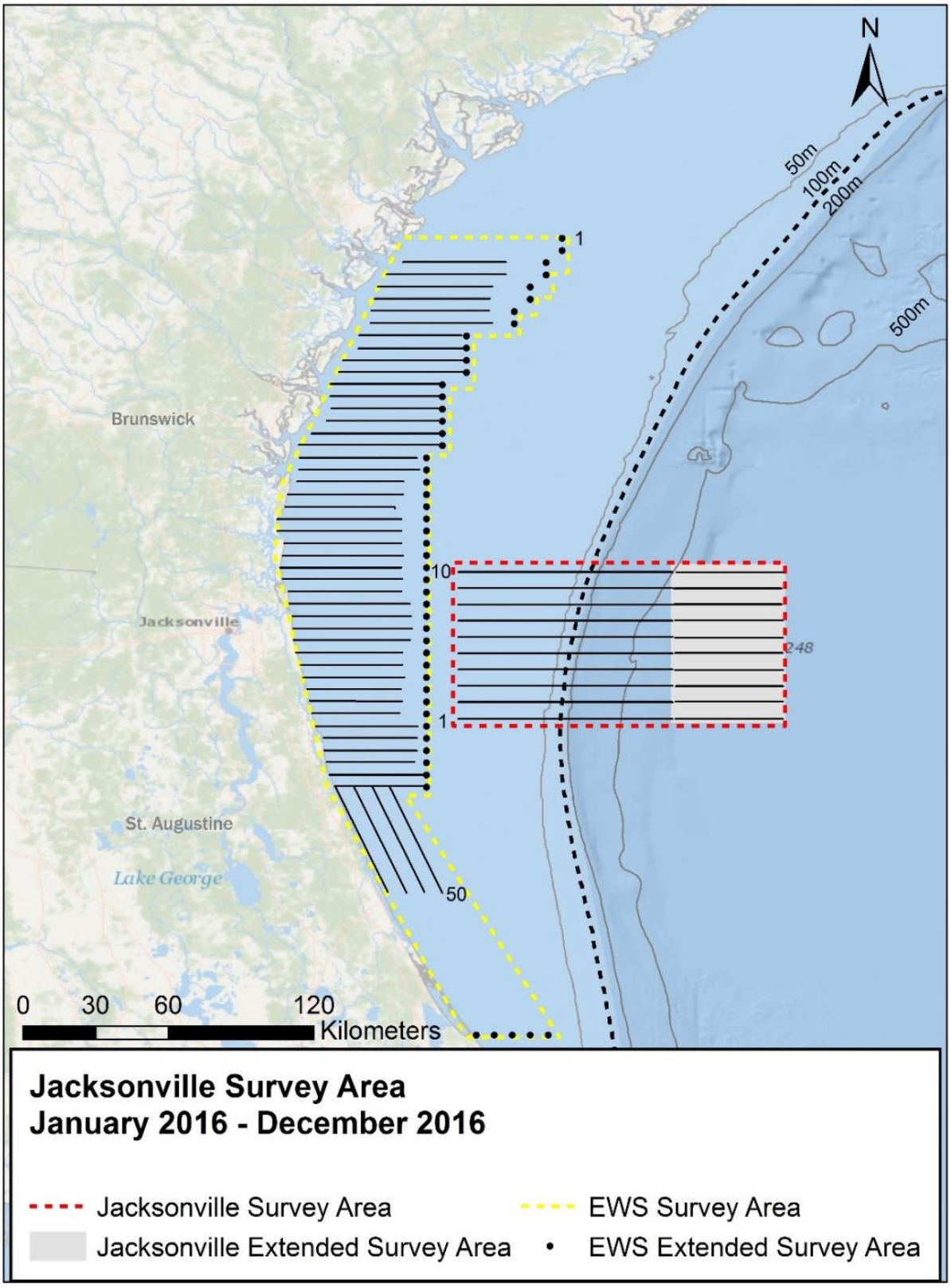

Figure 1. Jacksonville survey area and aerial tracklines for 2017.

4. Results

A total of 72 tracklines (36 within the original survey box and 36 extending into the offshore area) representing 4,656km was surveyed during quarterly effort conducted in 2017 (**Table 2**).

Table 2. Tracklines, km flown, and Hobbs hours during aerial surveys of the Jacksonville survey area from in December 2017. Tracklines are listed in the order in which they were flown.

Date	Tracklines Flown AM	Tracklines Flown PM	Total km Flown	Hobbs Hours
1-Feb-2017	1 to 10 off	7 to 10	777.00	7.5
2-Feb-2017	1 to 6	N/A	515.30	4.5
9-May-2017	1 to 10 off	7 to 10	788.20	7.5
10-May-2017	1 to 6	N/A	516.70	4.0
11-Jul-2017	1 to 8 off	9 and 10 off, 7 to 10	771.45	7.7
12-Jul-2017	1 to 6	N/A	515.15	4.2
8-Nov-2017	10 to 8, 10 to 8 off	1 and 2, 1 and 2 off	772.55	6.8
7 Days	**72 tracklines**		**4656.35**	**42.2**

An average BSS value was calculated for 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 5. Survey conditions ranged from BSS 1 to 4, with the majority of the surveys flown in BSS 2 (52 percent) (**Figures 2a–c**). Cetacean sighting rates dropped off dramatically at BSS greater than 2 (**Figures 3a–c**).

The mean sighting distance for all cetacean sightings was 0.84 km, with 80 percent of sightings occurring within 1.2 km of the trackline (**Figure 4a**). The mean sighting distances for BSS 1 and 2 were very similar (0.84 and 0.88km respectively); this distance dropped to 0.69 km as BSS rose (**Figure 4b**). Average sighting distances were calculated after removing a single outlier (2.18 km from trackline), which was in excess of three standard deviations from the mean.

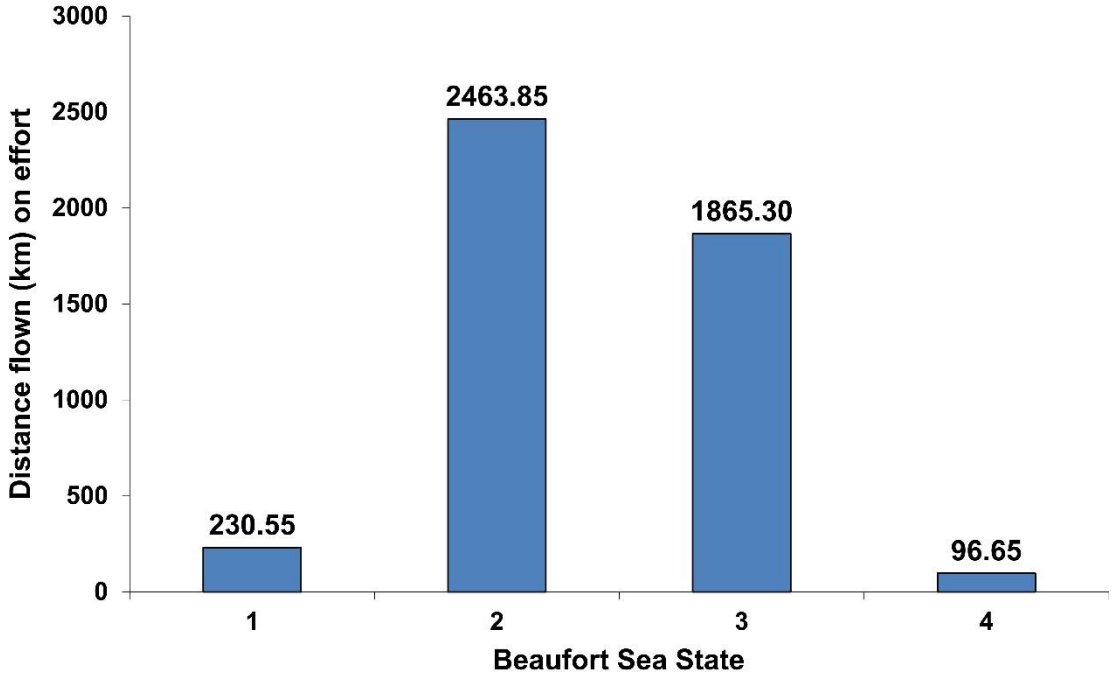

Figure 2a. Total distance surveyed per BSS category during aerial surveys in the Jacksonville survey area in 2017.

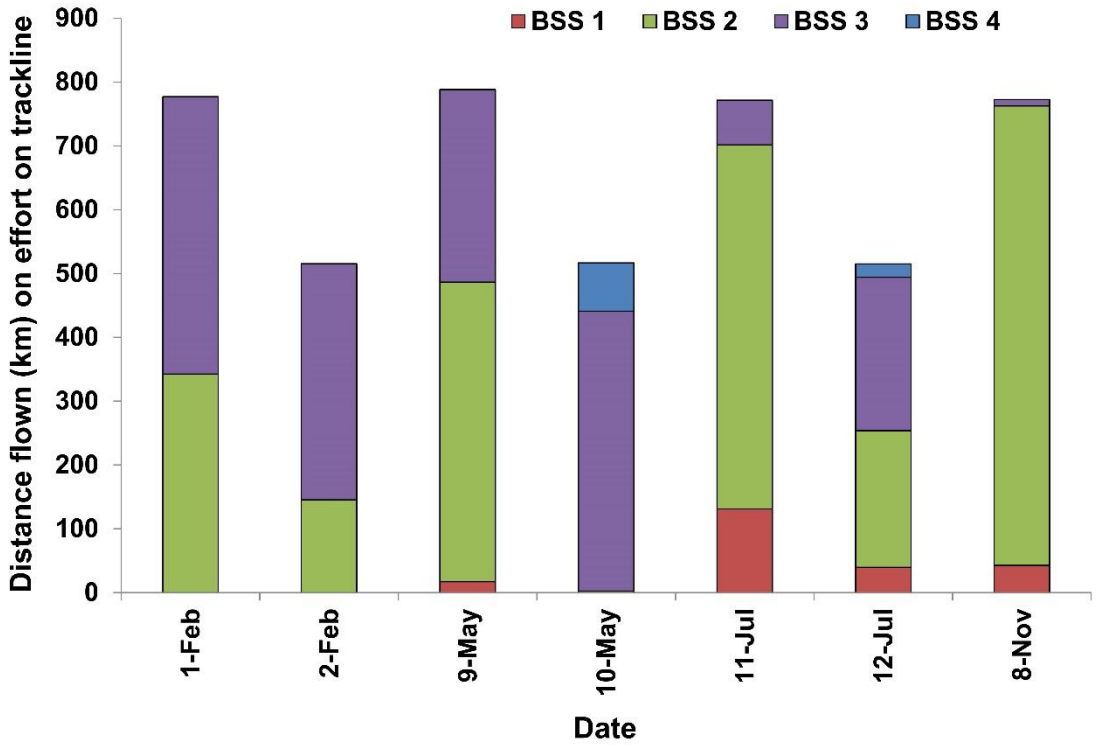

Figure 2b. Effort by BSS for each day during aerial surveys in the Jacksonville survey area in 2017.

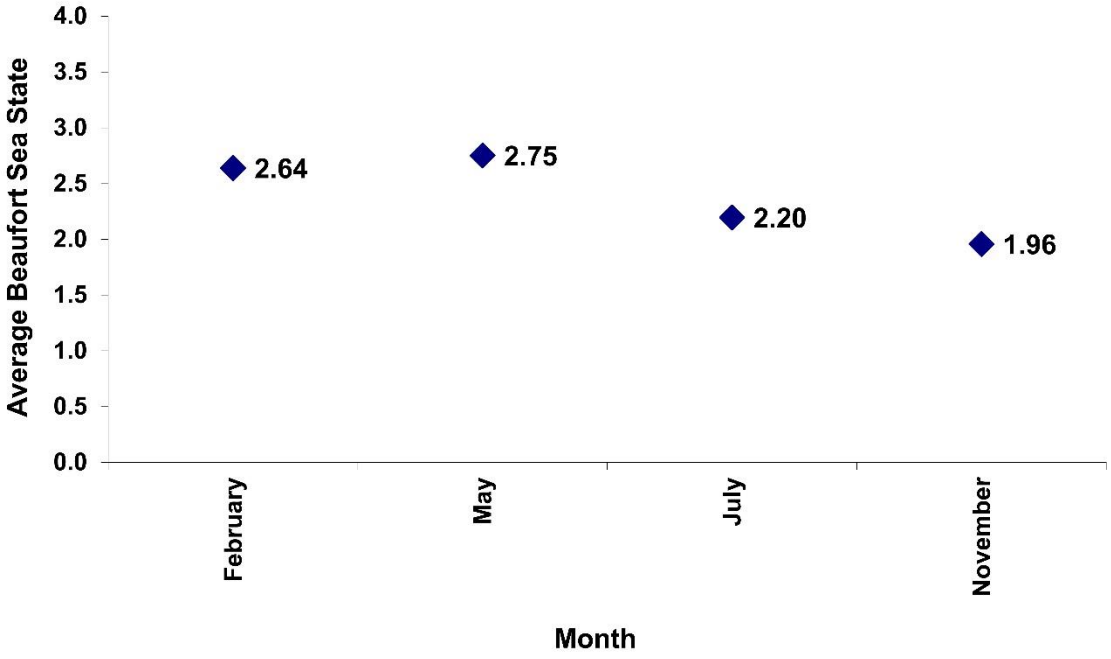

Figure 2c. Distance-weighted average BSS of quarterly effort during aerial surveys in the Jacksonville survey area in 2017.

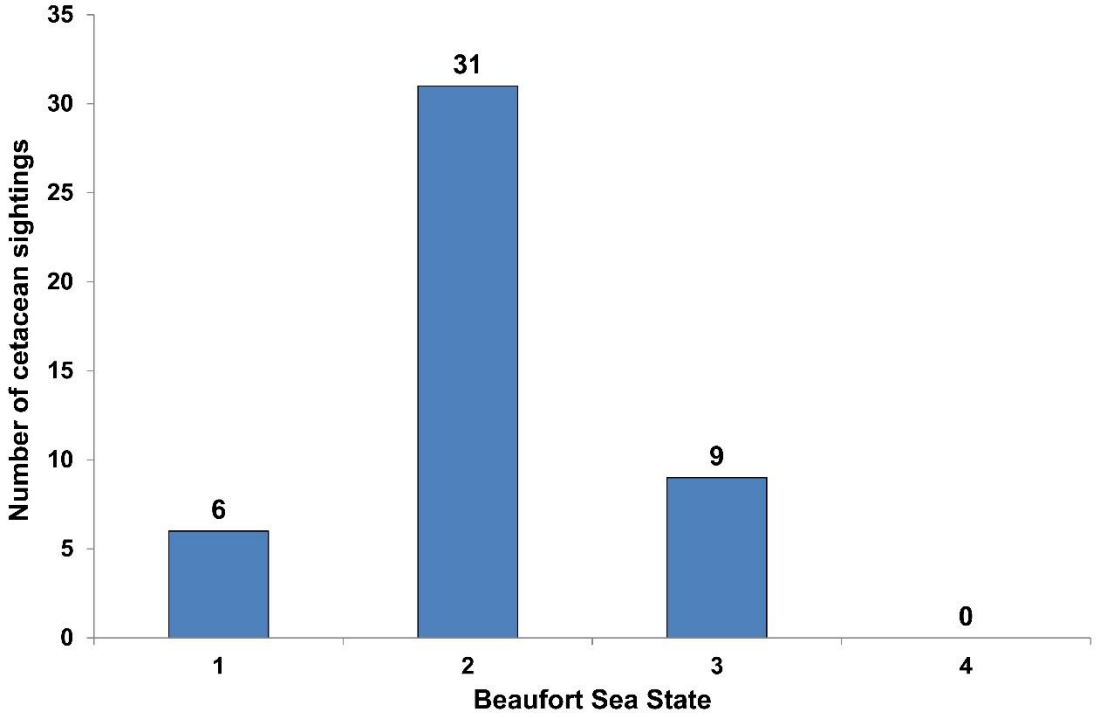

Figure 3a. Number of cetacean sightings per BSS category during aerial surveys in the Jacksonville survey area in 2017.

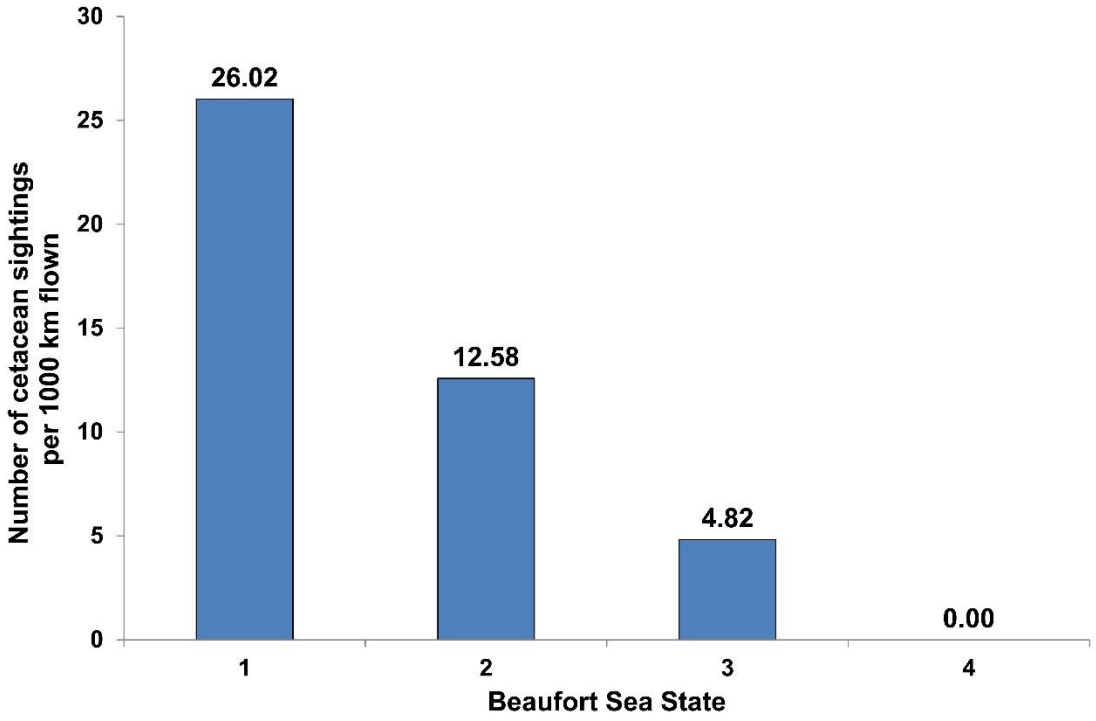

Figure 3b. Cetacean sightings per 1,000 km flown by BSS category during aerial surveys in the Jacksonville survey area in 2017.

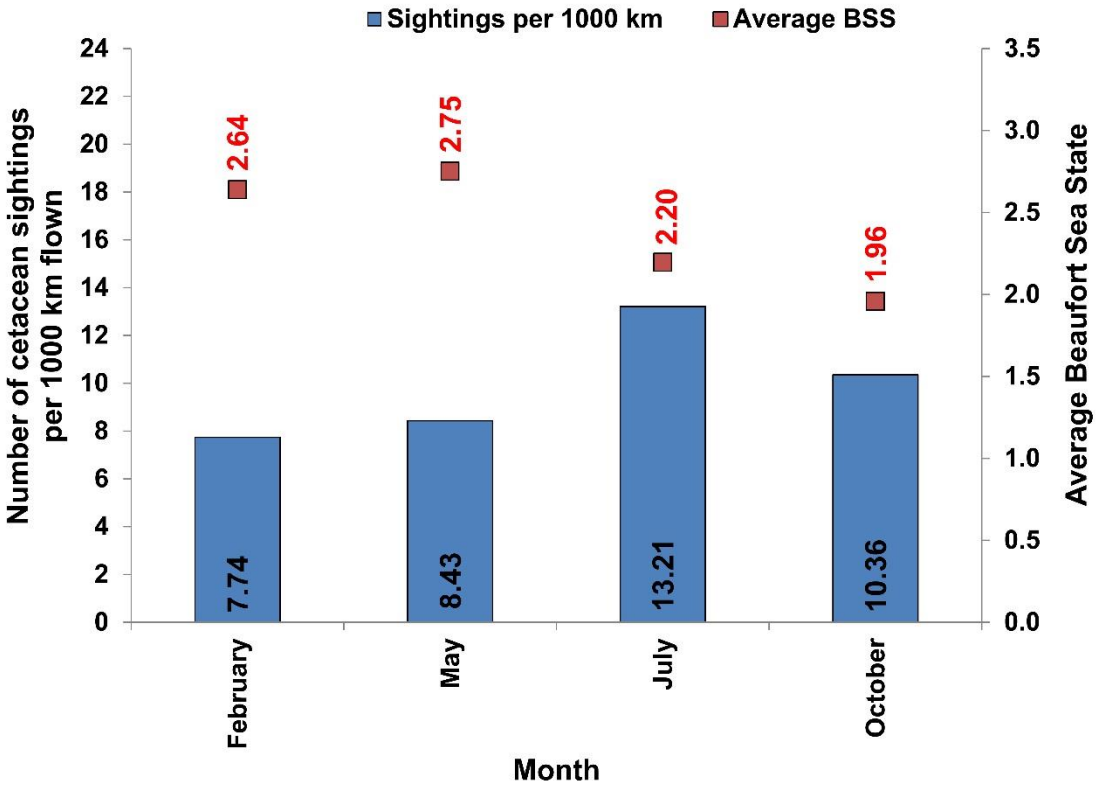

Figure 3c. Cetacean sightings per 1,000 km surveyed and the average BSS per month during aerial surveys in the Jacksonville survey area in 2017.

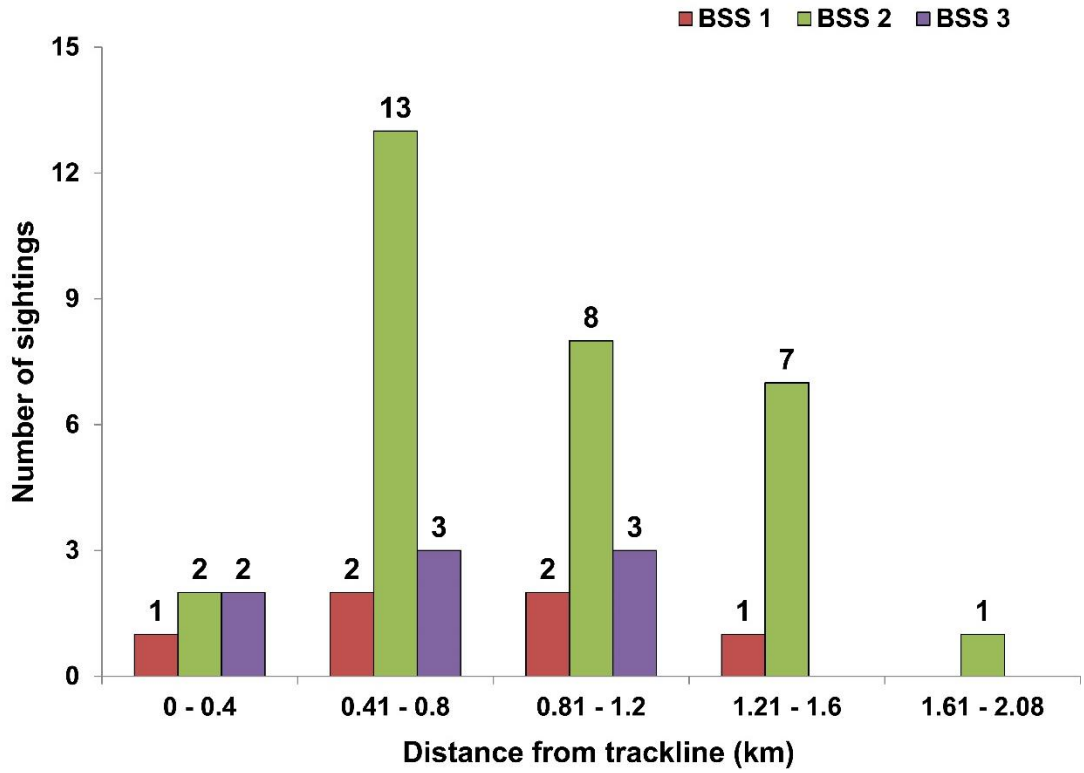

Figure 4a. Sighting distances by BSS category for 45 of 46 on-effort cetacean sightings during aerial surveys in the Jacksonville survey area in 2017.

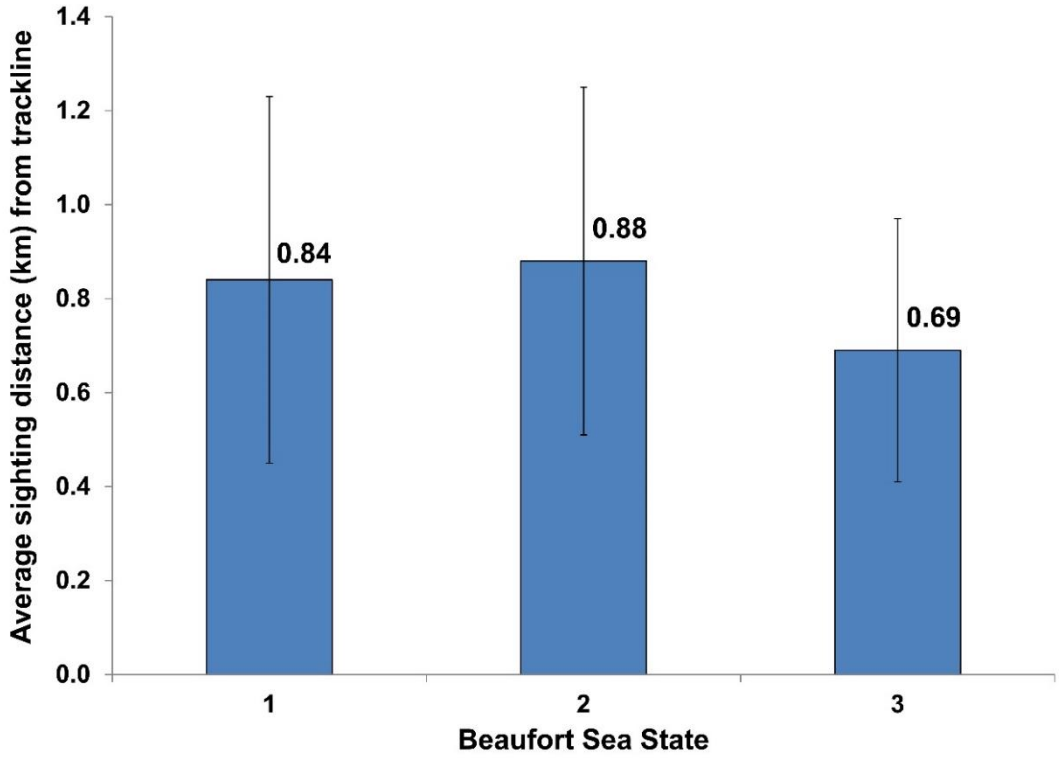

Figure 4b. Average sighting distances by BSS for 45 of 46 on-effort cetacean sightings during aerial surveys in the Jacksonville survey area in 2017. Error bars denote standard deviation for each category.

4.1 Marine Mammal Sightings

A total of 46 sightings of 679 individual cetaceans, representing nine species, was recorded while on-effort during the reporting period (**Table 3, Figure 5**). There were also three off-effort sightings—one each for bottlenose dolphins, Atlantic spotted dolphins, and short-finned pilot whales. 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 during quarterly flights for the Jacksonville survey area in 2017.

		2017												Total
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Tursiops truncatus	Sightings	-	3	-	-	3	-	9	-	-	-	2	-	17
	# of individuals	-	16	-	-	40	-	96	-	-	-	60	-	212
Stenella frontalis	Sightings	-	4	-	-	2	-	3	-	-	-	5	-	14
	# of individuals	-	161	-	-	55	-	49	-	-	-	71	-	336
Steno bredanensis	Sightings	-		-	-		-	1	-	-	-		-	1
	# of individuals	-		-	-		-	36	-	-	-		-	36
Grampus griseus	Sightings	-		-	-		-	1	-	-	-		-	1
	# of individuals	-		-	-		-	19	-	-	-		-	19
Stenella attenuata	Sightings	-		-	-		-	1	-	-	-		-	1
	# of sightings	-		-	-		-	2	-	-	-		-	2
Globicephala macrorhynchus	Sightings	-		-	-	5	-	1	-	-	-		-	6
	# of individuals	-		-	-	27	-	17	-	-	-		-	44
Balaenoptera acutorostrata	Sightings	-	2	-	-		-		-	-	-		-	2
	# of individuals	-	3	-	-		-		-	-	-		-	3
Kogia sp.	Sightings	-		-	-		-	1	-	-	-		-	1
	# of individuals	-		-	-		-	2	-	-	-		-	2
Physeter macrocephalus	Sightings	-		-	-	1	-		-	-	-		-	1
	# of individuals	-		-	-	1	-		-	-	-		-	1
Unidentified delphinid	Sightings	-	1	-	-		-		-	-	-	1	-	2
	# of individuals	-	18	-	-		-		-	-	-	6	-	24
	Total sightings		**10**			**14**		**17**				**8**		**46**
	Total individuals		**198**			**159**		**221**				**137**		**679**
Caretta caretta	Sightings	-	14	-	-	12	-	34	-	-	-	14	-	74
	# of individuals	-	17	-	-	12	-	48	-	-	-	16	-	93
Dermochelys coriacea	Sightings	-	1	-	-	1	-		-	-	-	2	-	4
	# of individuals	-	1	-	-	1	-		-	-	-	2	-	4
	Total sightings		**15**			**13**		**34**				**16**		**78**
	Total individuals		**18**			**13**		**48**				**18**		**97**

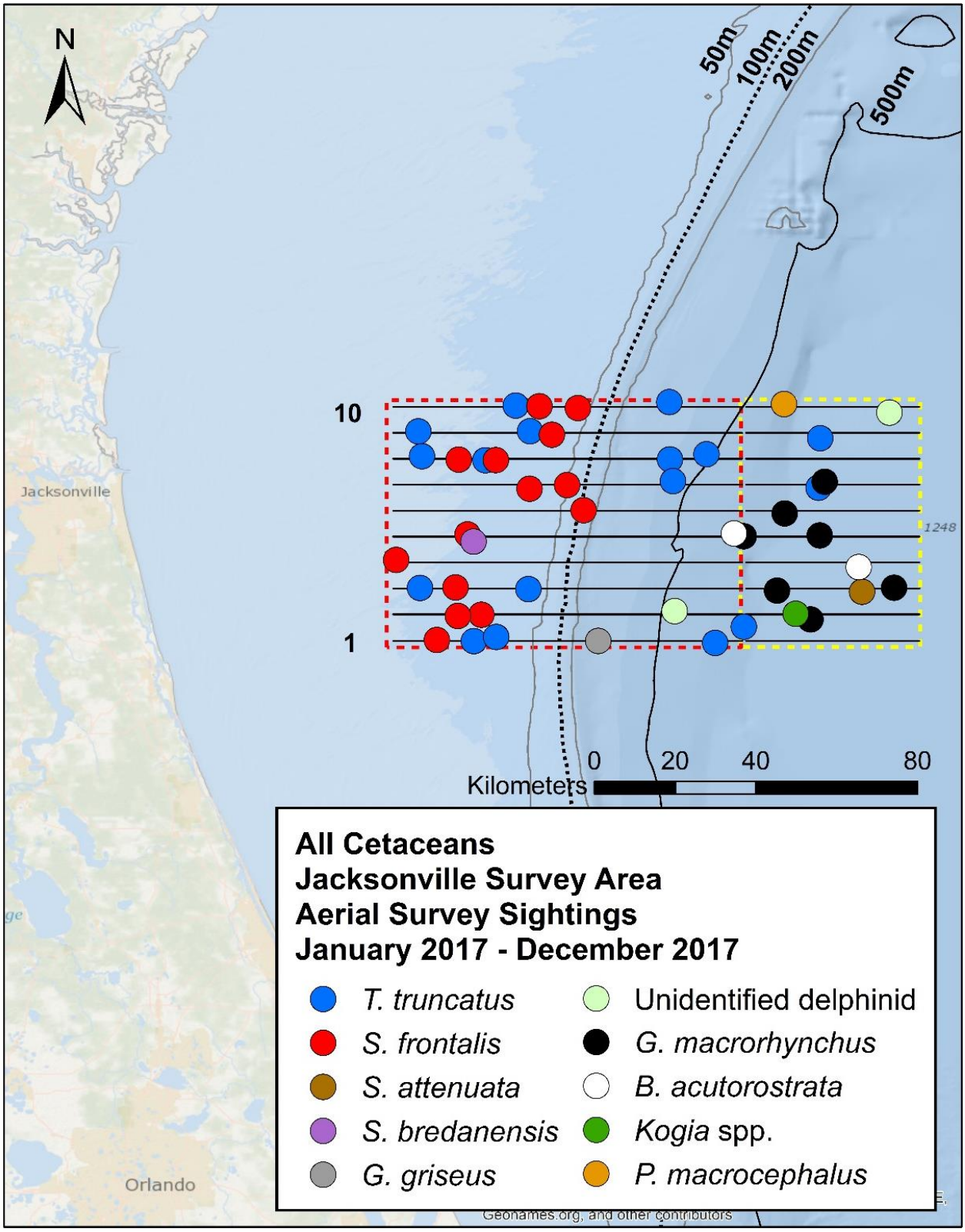

Figure 5. All cetacean sightings during aerial surveys conducted in the Jacksonville survey area in 2017.

4.2 Dolphins

4.2.1 Bottlenose Dolphin (*Tursiops truncatus*)

Bottlenose dolphins were encountered 17 times on-effort (*n*=212) and were the most abundant species encountered in the survey area (**Table 4**). This species was observed during each of our seven survey days. While group size ranged from 3 to 55 (mean=12.5, standard deviation=12.4), 70 percent of sightings were of 15 or fewer individuals. One off-effort sighting of 18 individuals was also documented. 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 6**).

Table 4. Bottlenose dolphin *(Tursiops truncatus)* sightings in the Jacksonville survey area in 2017. Asterisk denotes off-effort sightings.

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Off Effort (*)
1-Feb-2017	15:34:12	46	30.428749	80.463202	8	2	2	90°	3	
1-Feb-2017	15:59:52	55	30.503222	80.348341	9	2	2	90°	3	
2-Feb-2017	9:21:19	4	29.974803	80.435557	1	2	1	100°	10	
9-May-2017	11:56:08	46	30.485271	79.603381	9 Off	2	3	90°	20	
9-May-2017	16:17:52	79	30.569312	80.385470	10	3	2	90°	8	
10-May-2017	9:13:17	3	29.959322	79.873262	1	3	1	90°	12	
10-May-2017	9:30:37	9	30.000904	79.799624		4	2	90°	18	*
11-Jul-2017	12:03:40	29	30.357826	79.607529	7 Off	2	2	90°	6	
11-Jul-2017	15:08:48	45	30.375002	79.981605	7	1	2	90°	16	
11-Jul-2017	15:21:55	51	30.444171	79.895421	8	2	2	90°	13	
11-Jul-2017	15:28:39	55	30.430740	79.989338	8	1	1	90°	20	
11-Jul-2017	15:54:45	63	30.438865	80.625874	8	2	1	60°	12	
11-Jul-2017	16:06:45	69	30.502896	80.635671	9	1	1	90°	3	
12-Jul-2017	9:12:42	4	29.963865	80.492895	1	2	1	100°	4	
12-Jul-2017	10:16:08	24	30.100636	80.631347	3	2	1	90°	5	
12-Jul-2017	10:26:52	31	30.097384	80.352616	3	1	1	90°	17	
8-Nov-2017	9:46:04	6	30.567587	80.324503	10	2	2	90°	5	
8-Nov-2017	10:00:56	10	30.578202	79.990816	10	2	3	70°	55	

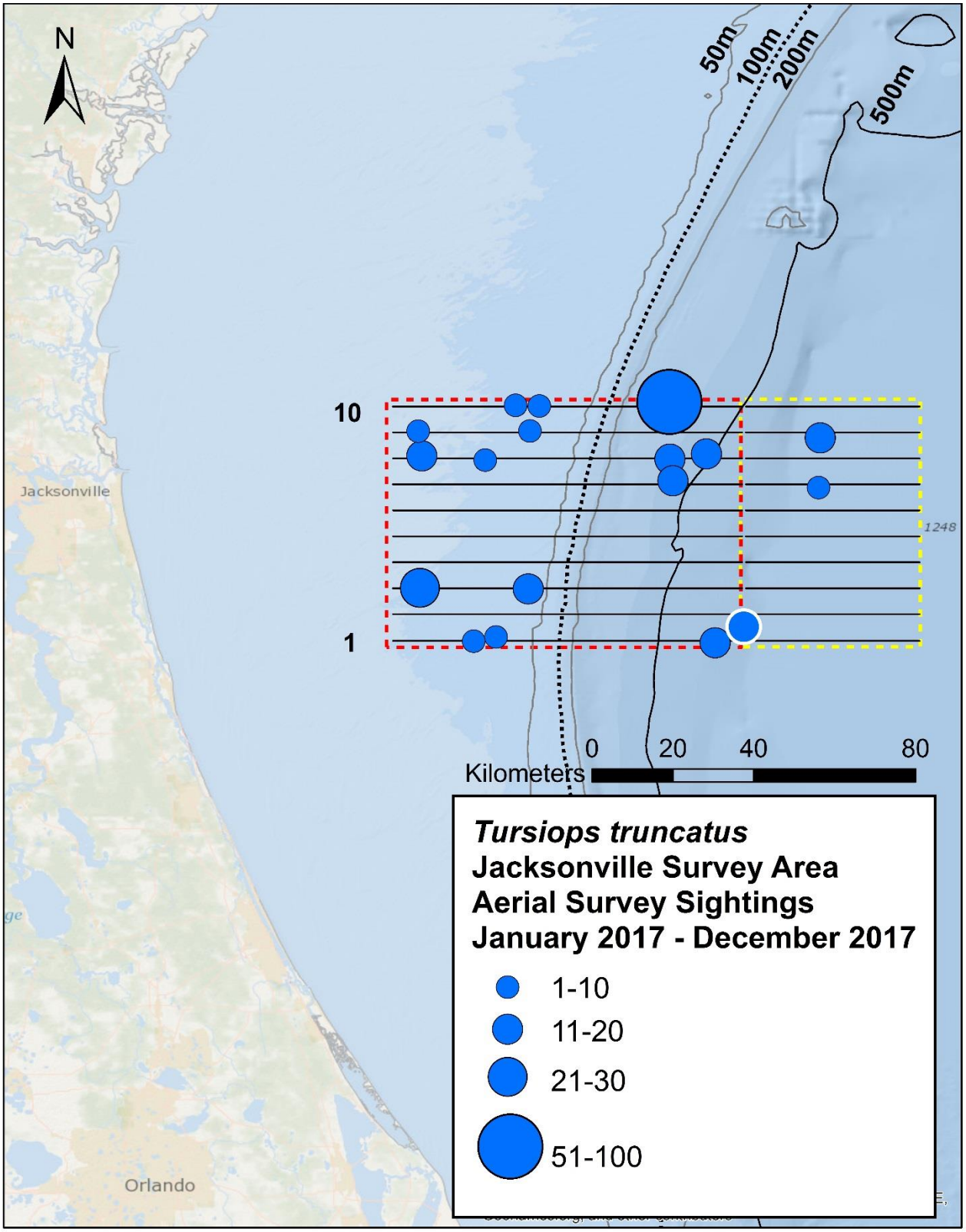

Figure 6. Bottlenose dolphin (*Tursiops truncatus*) sightings; symbol size indicates group size. White outline denotes off-effort sighting.

4.2.2 Atlantic Spotted Dolphin (*Stenella frontalis*)

The Atlantic spotted dolphin was sighted 14 times on-effort (*n*=336) (**Table 5**). Group size ranged from 4 to 75 individuals (mean=24, standard deviation=19.8). In each of the seven survey days, spotted dolphins were observed predominantly in shallow waters over the continental shelf (**Figure 7**). The one off-effort sighting (*n*=15) also occurred inshore. 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 5. Atlantic spotted dolphin (*Stenella frontalis*) sightings in the Jacksonville survey area in 2017. Asterisk denotes off-effort sightings.

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Off Effort (*)
1-Feb-2017	14:50:26	36	30.355466	80.349652	7	2	2	90°	48	
1-Feb-2017	16:36:09	64	30.562845	80.225762	10	2	2	90°	22	
2-Feb-2017	10:21:34	19	30.101763	80.540000	3	2	1	90°	16	
2-Feb-2017	11:36:53	37	30.238162	80.509190	5	2	2	90°	75	
9-May-2017	15:14:22	66	30.429150	80.436419	8	3	2	100°	40	
10-May-2017	10:00:15	15	30.028675	80.533765	2	3	1	90°	15	
10-May-2017	10:00:15	15	30.028675	80.533765		3	1	90°	15	*
11-Jul-2017	16:17:29	75	30.493976	80.292565	9	2	2	90°	12	
12-Jul-2017	11:13:56	41	30.172754	80.692506	4	1	2	90°	4	
12-Jul-2017	12:05:34	57	30.300050	80.210934	6	3	1	90°	33	
8-Nov-2017	9:46:04	6	30.567587	80.324503	10	2	2	90°	30	
8-Nov-2017	11:18:11	26	30.430557	80.531969	8	2	4	90°	5	
8-Nov-2017	12:33:28	39	30.364778	80.253486	7	2	1	90°	11	
8-Nov-2017	15:18:49	49	29.966990	80.588102	1	2	4	150°	19	
8-Nov-2017	16:43:30	67	30.031849	80.473445	2	2	2	150°	6	

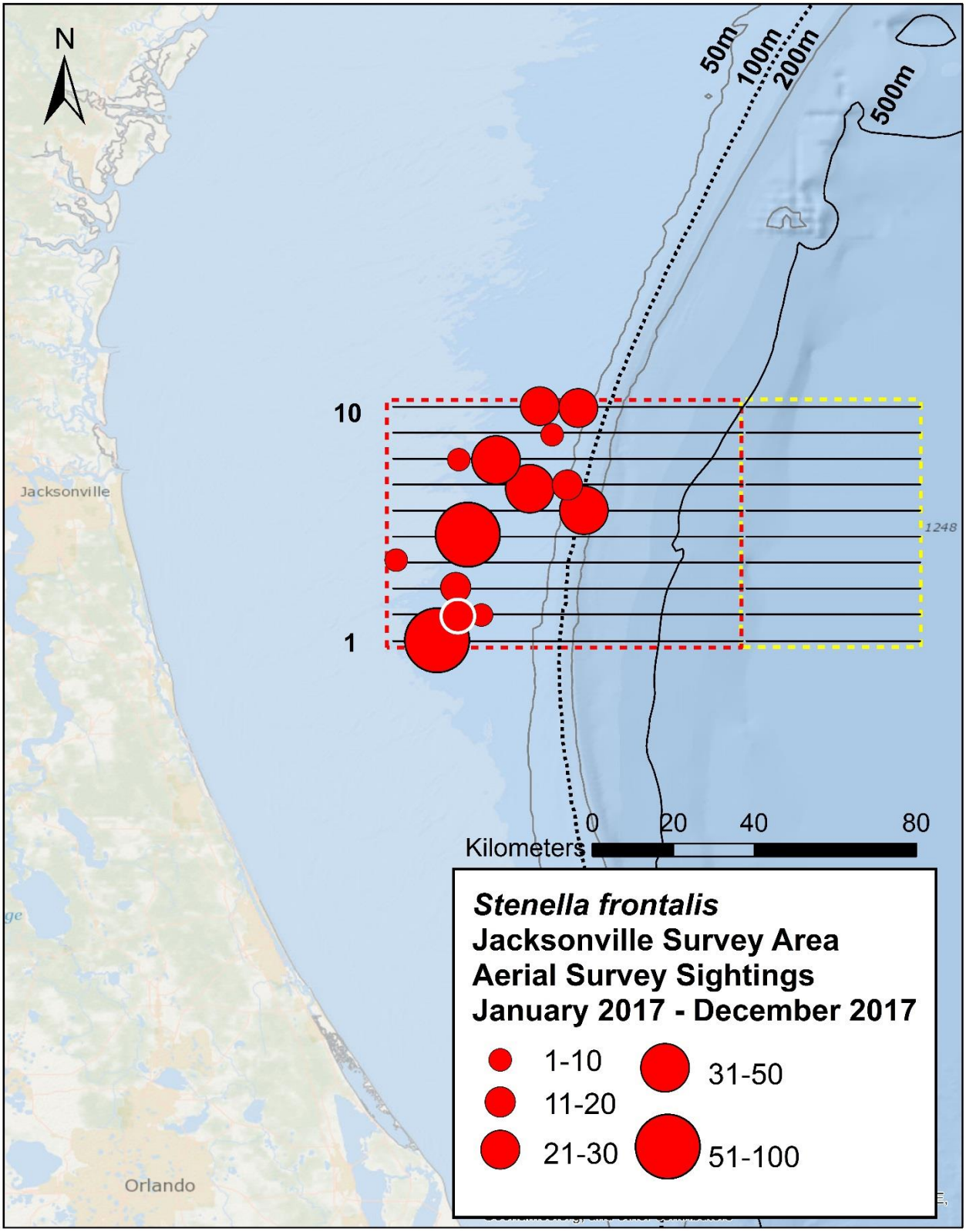

Figure 7. Atlantic spotted dolphin (*Stenella frontalis*) sightings; symbol size indicates group size. White outline denotes off-effort sighting.

4.2.3 Rough-toothed Dolphin (*Steno bredanensis*)

A single sighting of rough-toothed dolphins (*Steno bredanensis*) (*n*=36) occurred in July over the inshore waters of the USWTR range (**Table 6**, **Figure 8**). Rough-toothed dolphins have been observed infrequently and in groups of under 50 individuals since surveys began in this area in 2009. To date, all sightings have been confined to waters inside the 100-m isobath.

Table 6. Rough-toothed dolphin (*Steno bredanensis*) sightings in the Jacksonville survey area in 2017.

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Off Effort (*)
12-Jul-2017	11:26:04	49	30.219728	80.493599	5	1	2	90°	36	

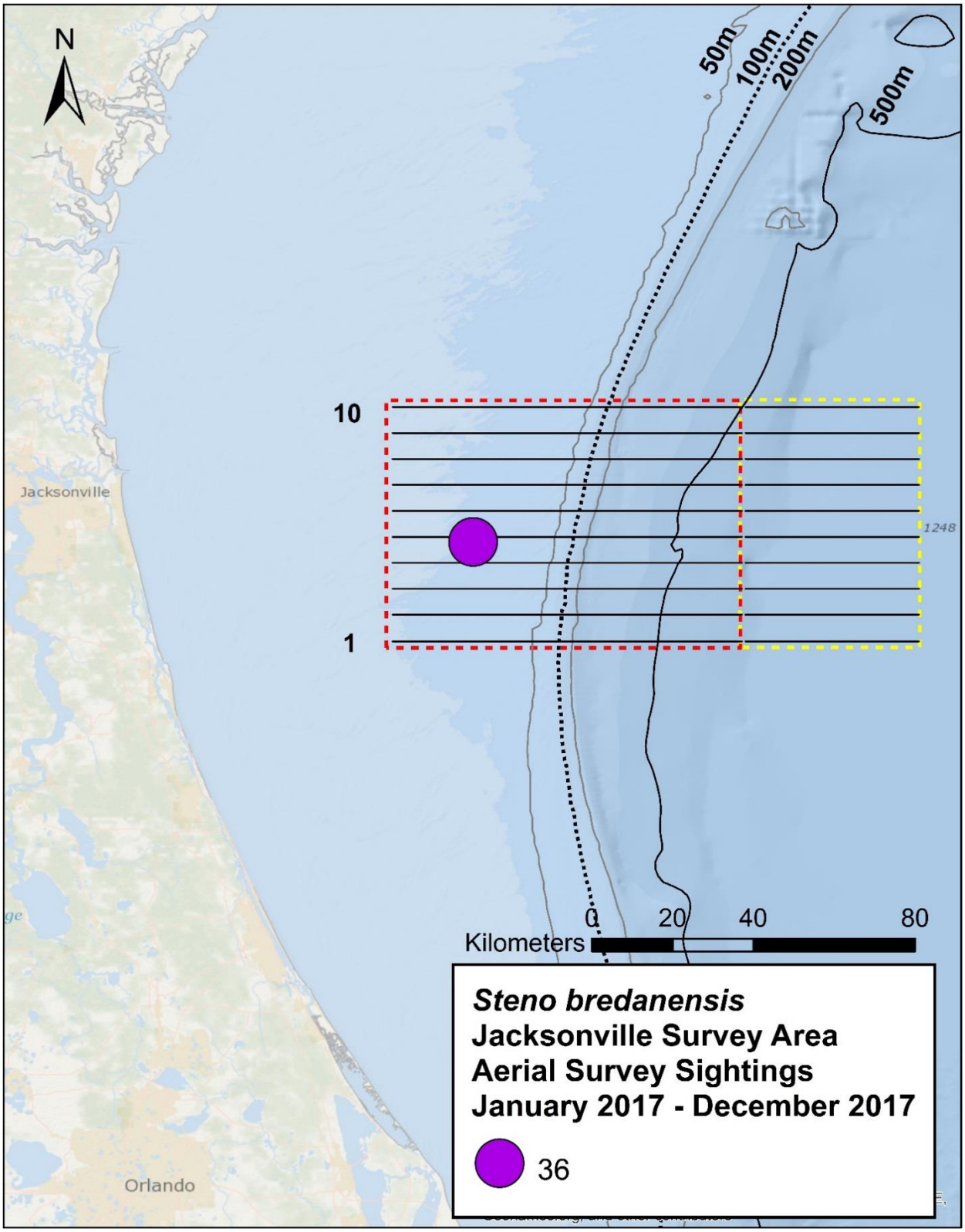

Figure 8. Rough-toothed dolphin (*Steno bredanensis*) sighting.

4.2.4 Risso's Dolphin (*Grampus griseus*)

A single sighting of Risso's dolphins (*Grampus griseus*) (*n*=19) occurred in July east of the 200 m isobath (**Table 7**, **Figure 9**). 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 7. Risso's dolphin (*Grampus griseus*) sightings in the Jacksonville survey area in 2017.

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Off Effort (*)
12-Jul-2017	9:28:26	11	29.964265	80.173488	1	3	2	90	19	

.

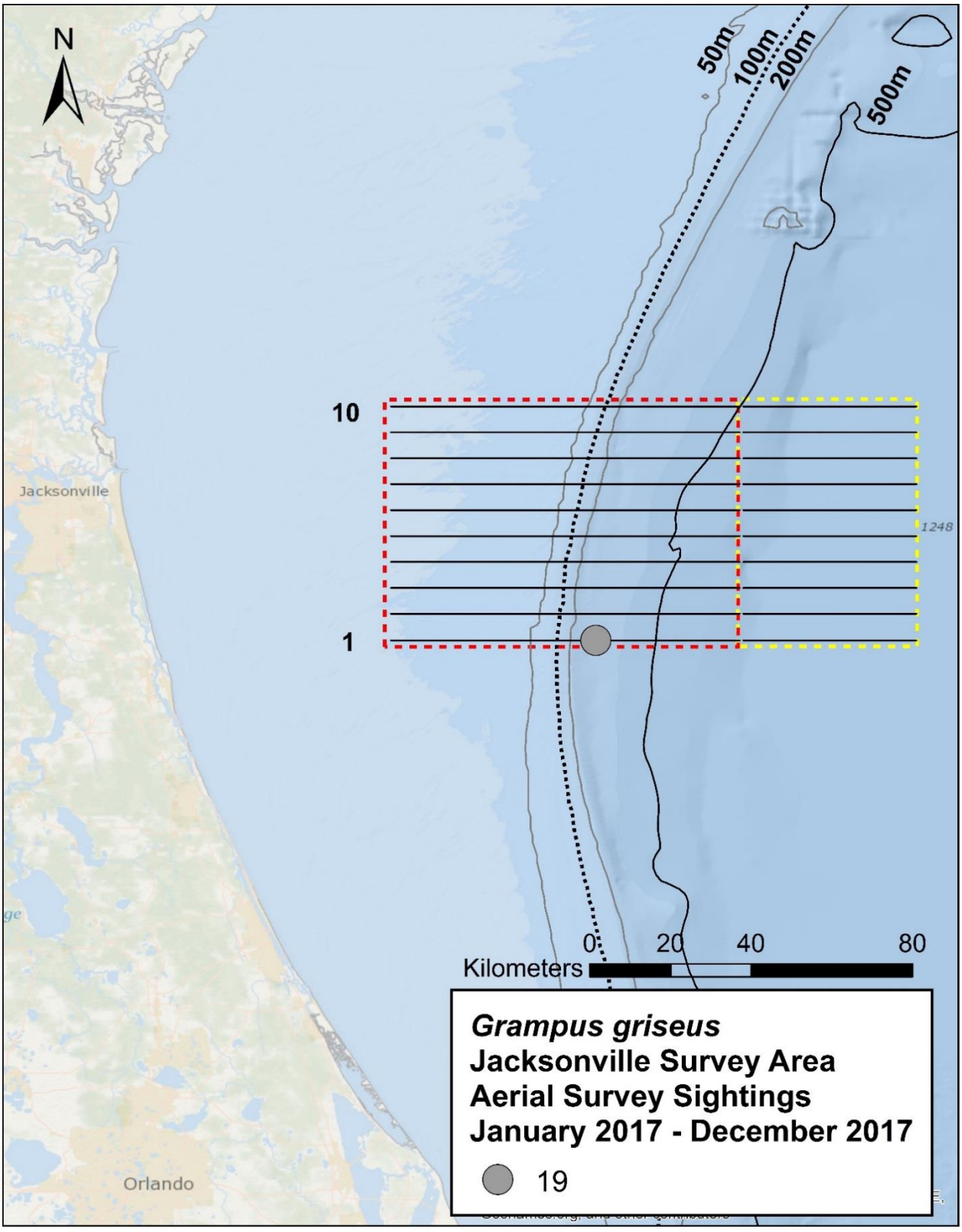

Figure 9. Risso's dolphin (*Grampus griseus*) sighting.

4.2.5 Pantropical Spotted Dolphin (*Stenella attenuata*)

A pair of pantropical spotted dolphins were encountered in the offshore portion of the range this July (**Table 8, Figure 10**). The only previous sighting of this species occurred in September of 2013 (*n*=25) and was observed within the USWTR survey area.

Table 8. Pantropical Spotted dolphin (*Stenella attenuata*) sightings in the Jacksonville survey area in 2017.

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Off Effort (*)
11-Jul-2017	10:56:07	12	30.090687	79.495777	3 Off	2	2	100°	2	

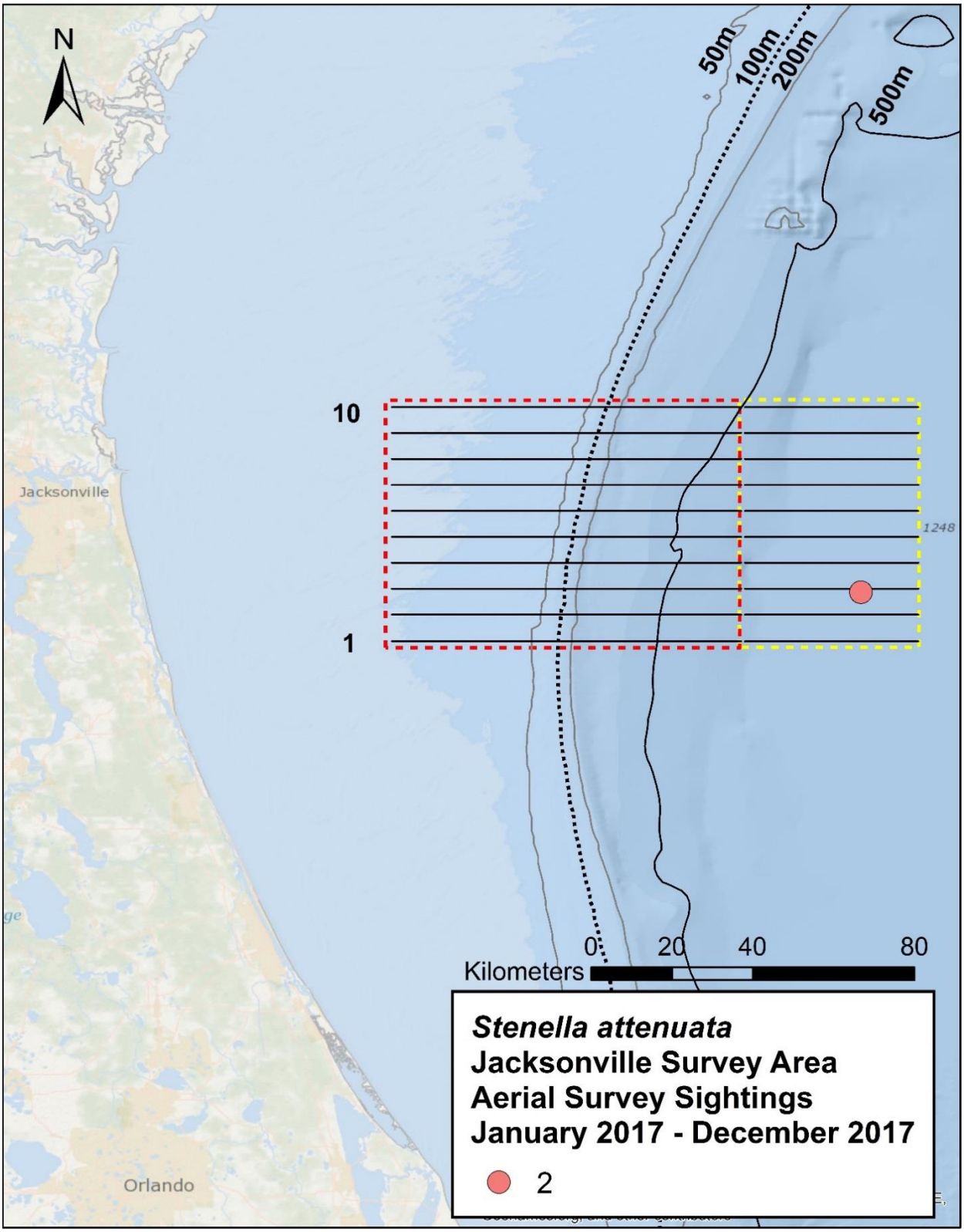

Figure 10. Pantropical spotted dolphin (*Stenella attenuata*) sighting.

4.3 Whales

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

All six on-effort sightings of short-finned pilot whales (*Globicephala macrorhynchus*) occurred in the offshore extension of the range (**Figure 11**). One off-effort sighting occurred between the eastern ends of two USWTR survey tracklines (**Table 9**). The expansion of the survey area farther offshore has allowed continued understanding of this species habitat use; pilot whale sightings have only occurred farther offshore since 2011, despite consistent coverage of the entire survey area.

Table 9. Short-finned pilot whale (*Globicephala macrorhynchus*) sightings in the Jacksonville survey area in 2017. Asterisk denotes off-effort sighting.

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Off Effort (*)
9-May-2017	9:44:39	7	30.019788	79.628150	2 Off	2	1	90°	4	
9-May-2017	10:01:33	13	30.093847	79.714132	3 Off	2	2	90°	1	
9-May-2017	10:39:30	21	30.233258	79.799679			1	90°	3	*
9-May-2017	10:47:03	25	30.235394	79.604733	5 Off	2	1	90°	12	
9-May-2017	11:09:09	32	30.292144	79.694624	6 Off	2	1	90°	3	
9-May-2017	11:25:40	38	30.373306	79.591869	7 Off	2	2	90°	7	
11-Jul-2017	11:05:21	16	30.101075	79.413508	3 Off	2	2	90°	17	

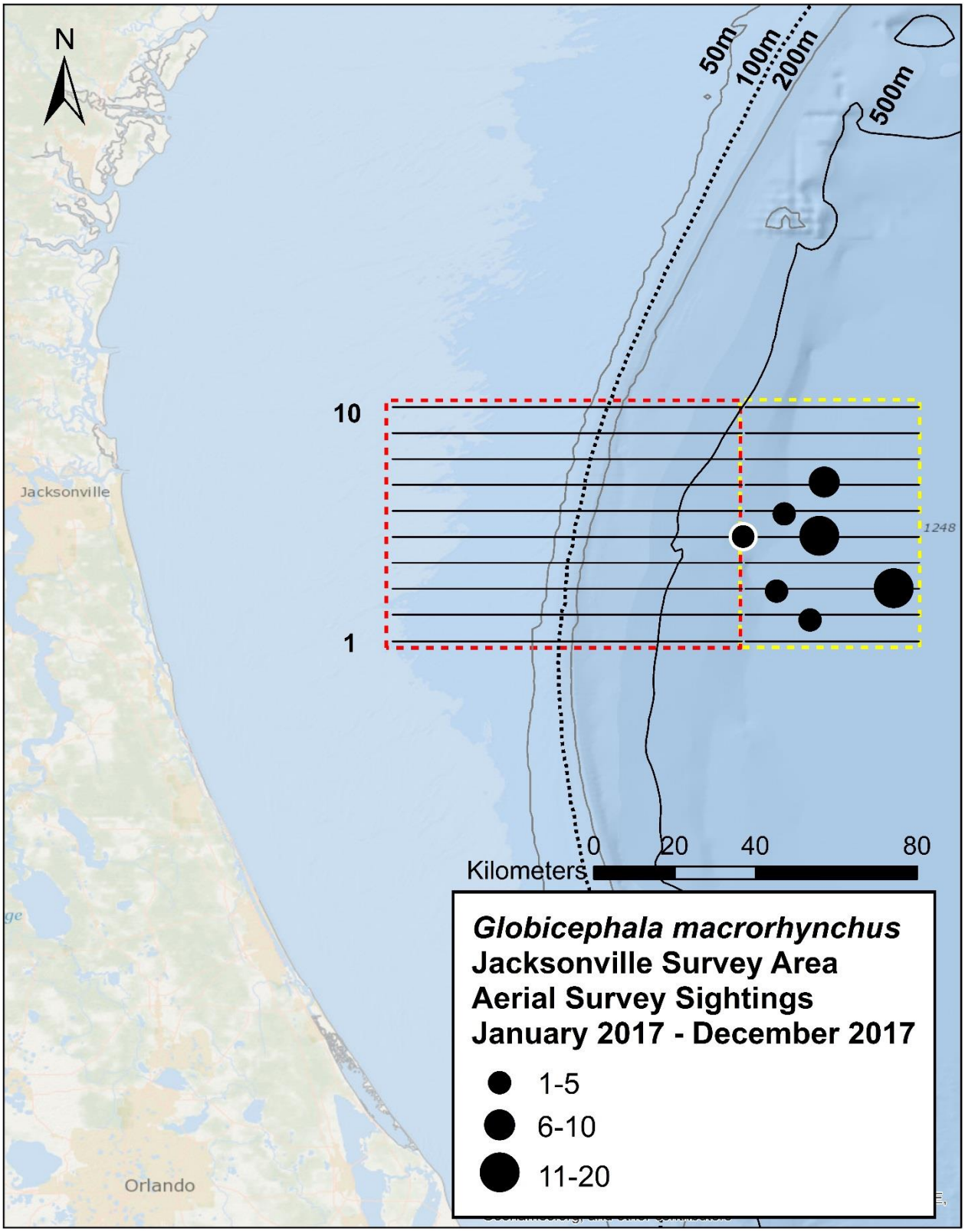

Figure 11. Short-finned pilot whale (*Globicephala macrorhynchus*) sightings. White outline denotes off-effort sighting.

4.3.2 Minke Whale (Balaenoptera acutorostrata)

Minke whales (*Balaenoptera acutorostrata*) were observed within the original USWTR survey area and its offshore extension (**Table 10, Figure 12**). Both sightings were recorded during winter surveys and included a mother-calf pair. This pattern is similar to previous sightings in this area from 2009 to 2011. There has been a six-year gap since the last sighting in the survey area.

Table 10. Minke whale (*Balaenoptera acutorostrata*) sightings in the Jacksonville survey area in 2017.

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Off Effort (*)
1-Feb-2017	10:36:32	10	30.153988	79.504374	4 Off	3	1	90°	1	
2-Feb-2017	12:00:58	42	30.240533	79.824773	5	3	1	90°	2	

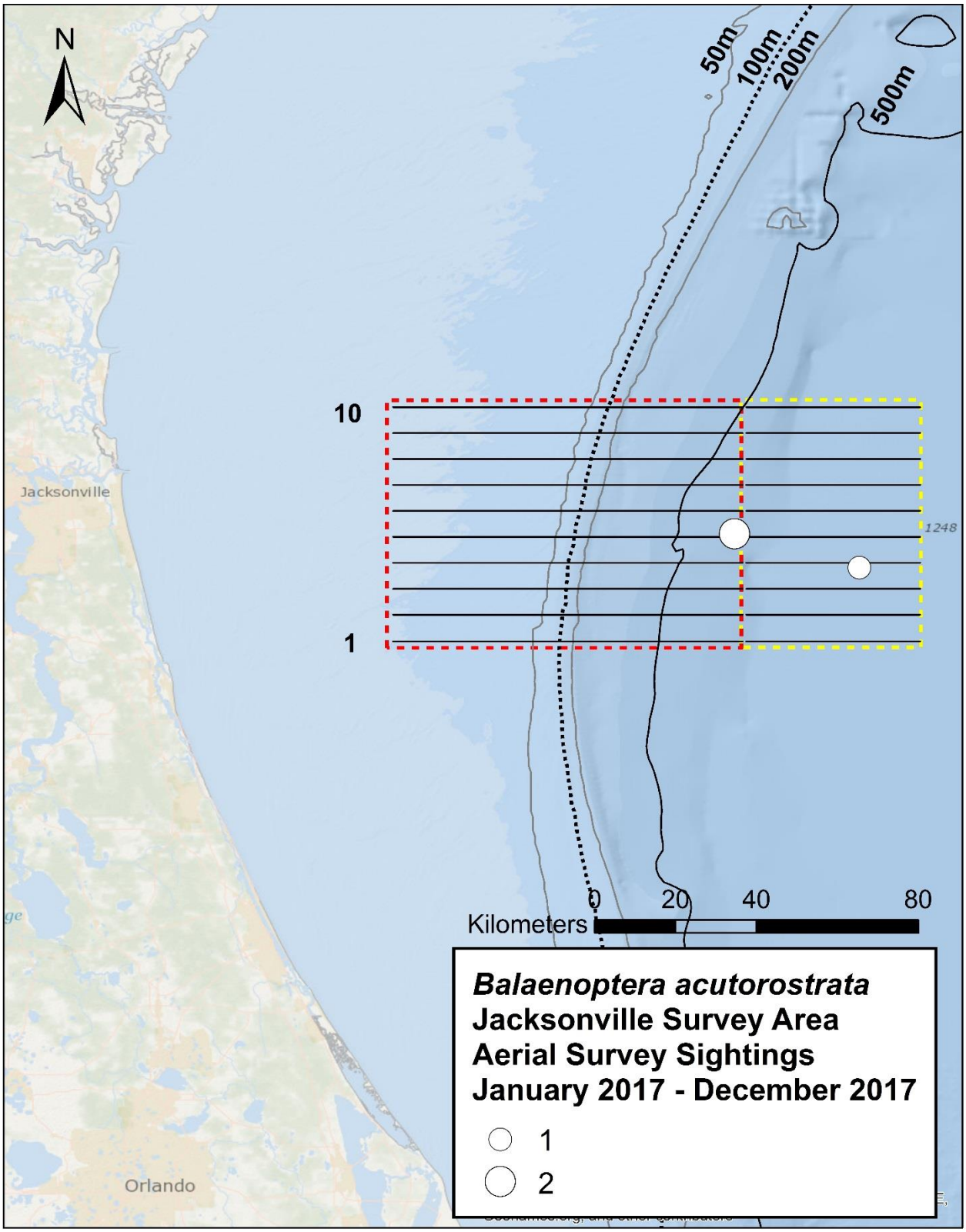

Figure 12. Minke whale (*Balaenoptera acutorostrata*) sightings.

4.3.3 Kogiid Whale (*Kogia* sp.)

The cryptic nature of kogiid whales (*Kogia* spp.) makes them difficult to detect as sea (reviewed in Staudinger et al. 2014). In 2009, a single kogiid whale was observed within the USWTR survey area. This year, a pair of whales was recorded in the offshore extension of the survey area (**Table 11, Figure 13**). Differences in the external pigmentation of the false gill slit make it possible to distinguish dwarf (*Kogia sima*) and pygmy (*K. breviceps*) sperm whales (Keenan-Bateman et al. 2016). Because this pigmentation pattern is usually not observable from the air, we identify these species to the genus level. Vocalizations collected and identified from high-frequency acoustic recording packages suggests that these species may be present in this area in greater numbers than suggested by visual observations (Hodge et al. in press).

Table 11. Kogiid whale (*Kogia* sp.) sightings in the Jacksonville survey area in 2017.

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Off Effort (*)
11-Jul-2017	10:33:15	6	30.034146	79.666446	2 Off	2	1	90°	2	

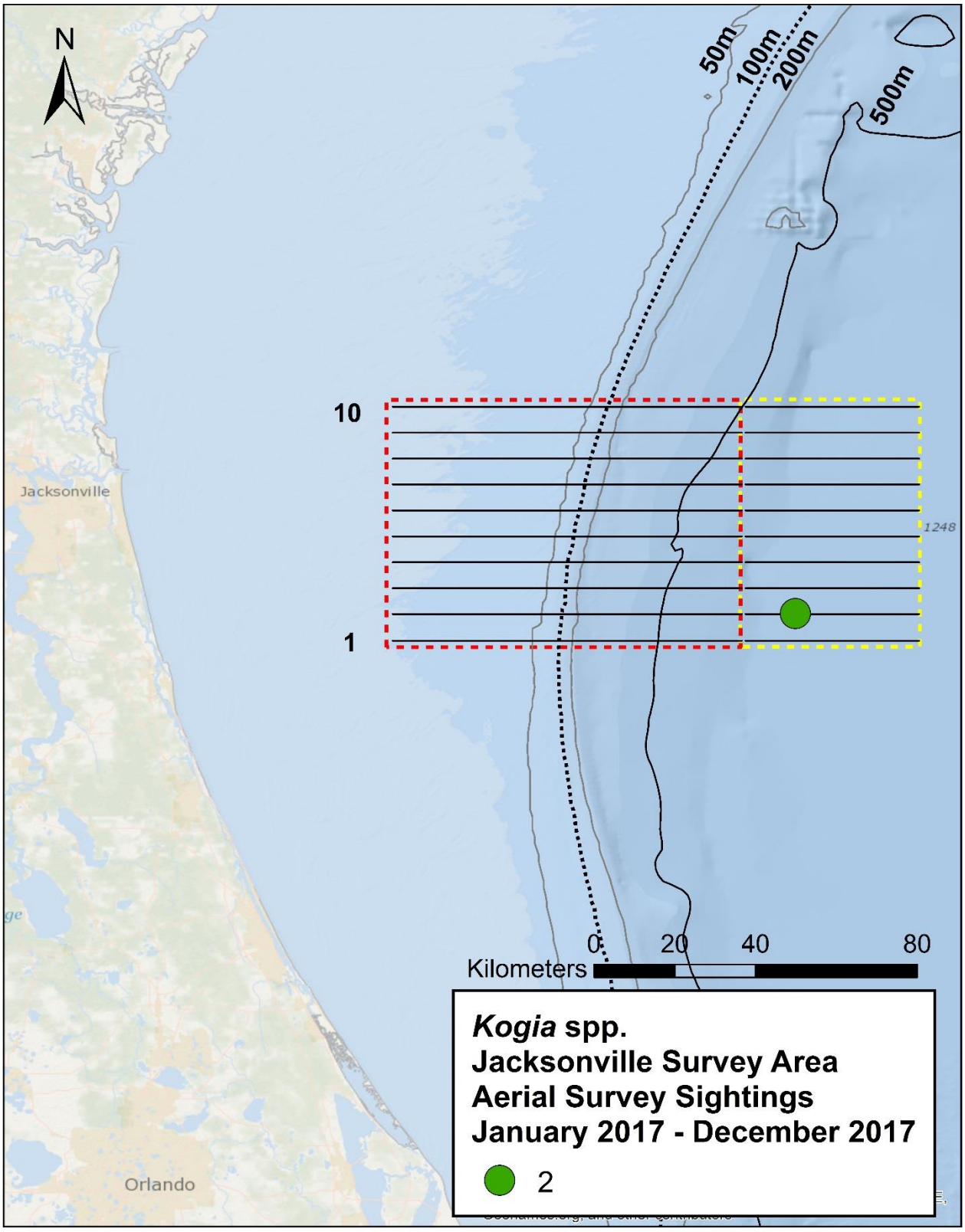

Figure 13. Kogiid whale (*Kogia* spp.) sighting.

4.3.4 Sperm Whale (Physeter macrocephalus)

This year's sighting of a lone sperm whale (*Physeter macrocephalus*) in the offshore extension of the range marks the third time this species has been observed since effort began in 2009 (**Table 12, Figure 14**). Both previous sightings occurred inside the USWTR survey box just offshore of the 100 m isobath.

Table 12. Sperm whale (*Physeter macrocephalus*) sightings in the Jacksonville survey area in 2017.

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Off Effort (*)
9-May-2017	12:18:54	52	30.573200	79.696373	10 Off	2	3	60°	1	

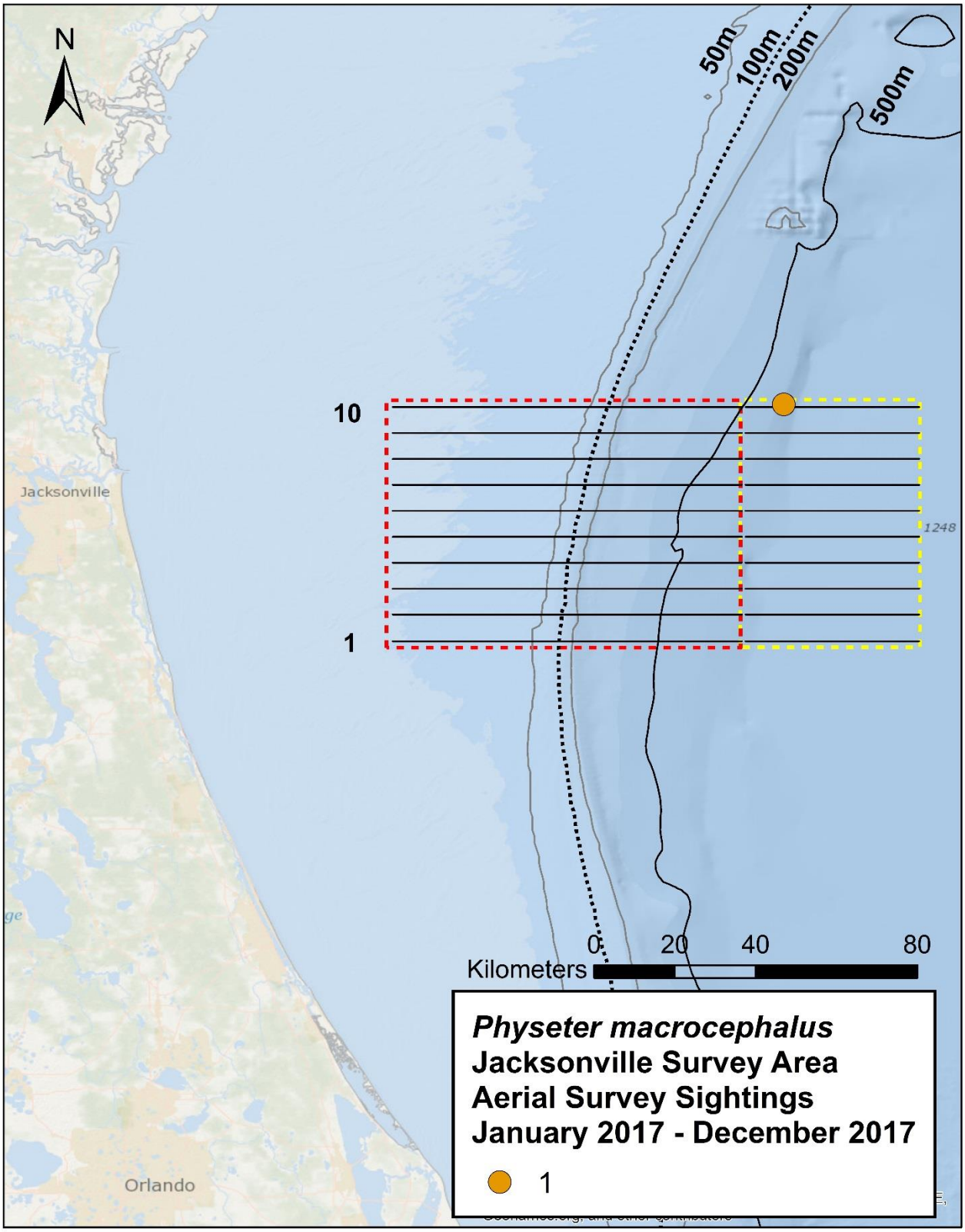

Figure 14. Sperm whale (*Physeter macrocephalus*) sighting.

4.4 Sea Turtles

A total of 97 sea turtles was observed during the reporting period (see **Tables 13 and 14, Figures 16 and 17** in **Sections 4.4.1 and 4.4.2**, respectively). Sightings occurred in lower sea states (BSS<3) with effort-corrected sighting rates inversely proportional to BSS (**Figures 15a and 15b**). Sea turtles were observed every day of survey effort with the highest sighting rates in July (**Figure 15c**). Observation rates ranged from a low of 10/1,000 km flown during our spring surveys to a high of 37.3/1,000 km in the summer (**Figure 15c**). Loggerhead sea turtles (*Caretta caretta*) constituted the vast majority of sea turtles sighted (95 percent) followed by leatherback sea turtles (*Dermochelys coriacea*) (5 percent).

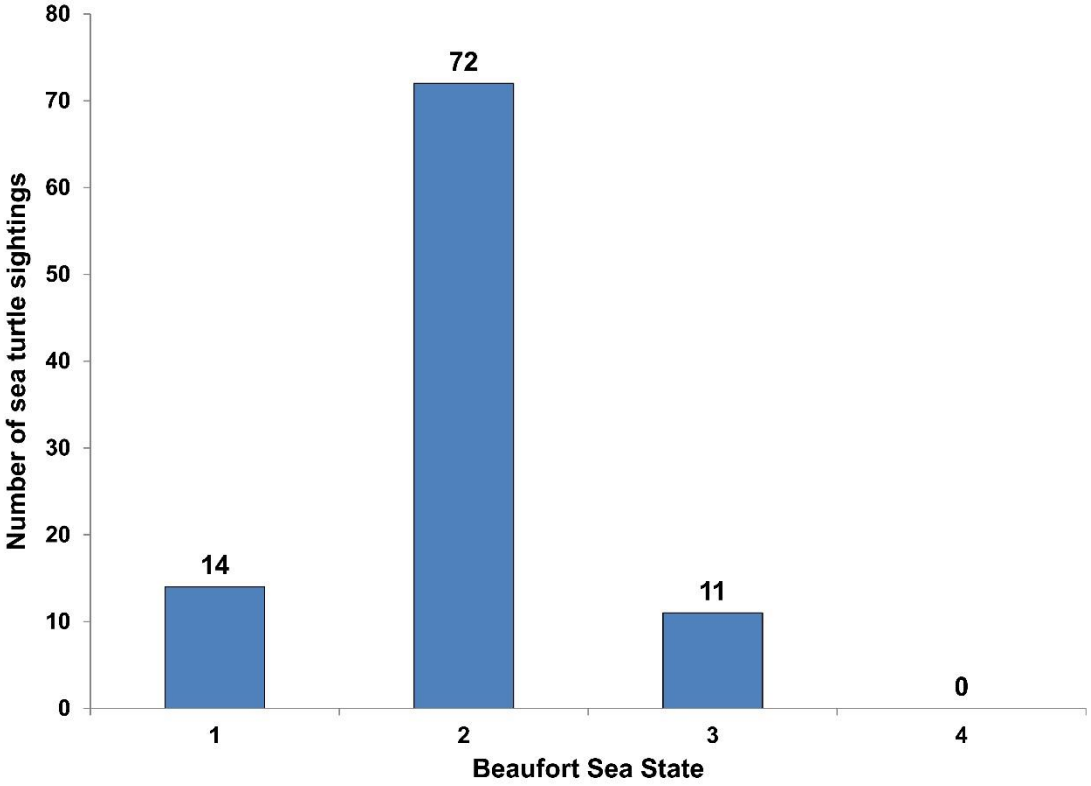

Figure 15a. Number of sea turtle sightings by Beaufort sea state category in the Jacksonville survey area in 2017.

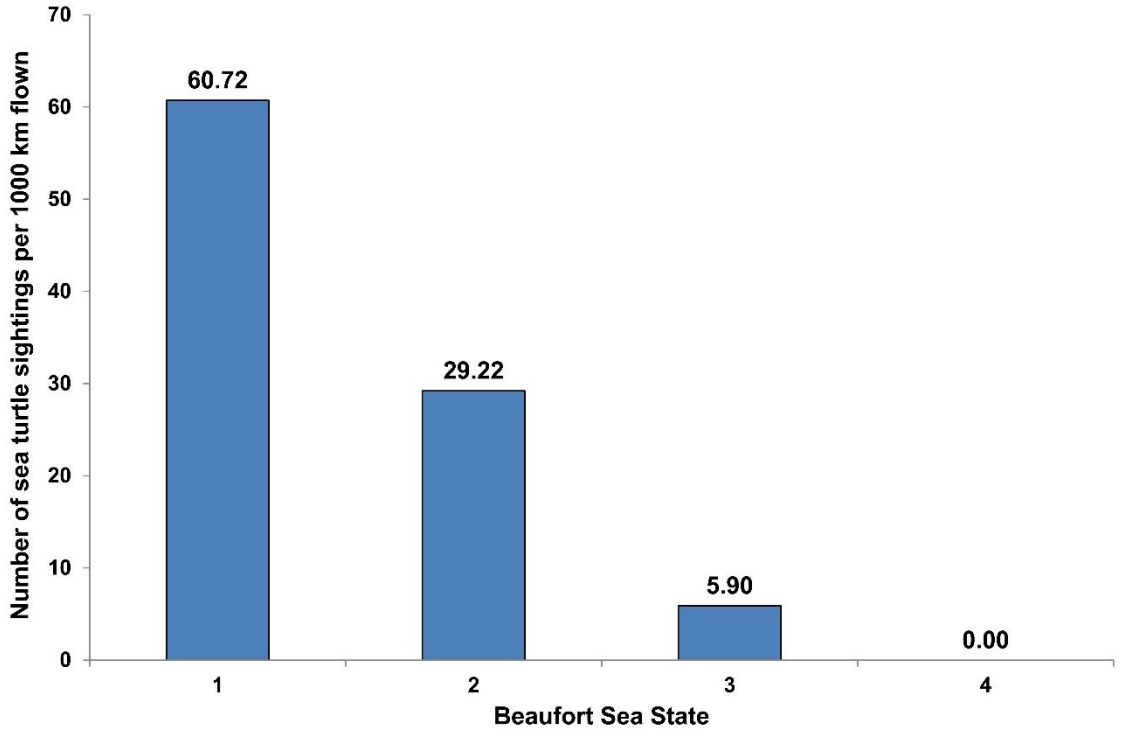

Figure 15b. Sea turtle sightings per 1,000 km flown by BSS category in the Jacksonville survey area in 2017.

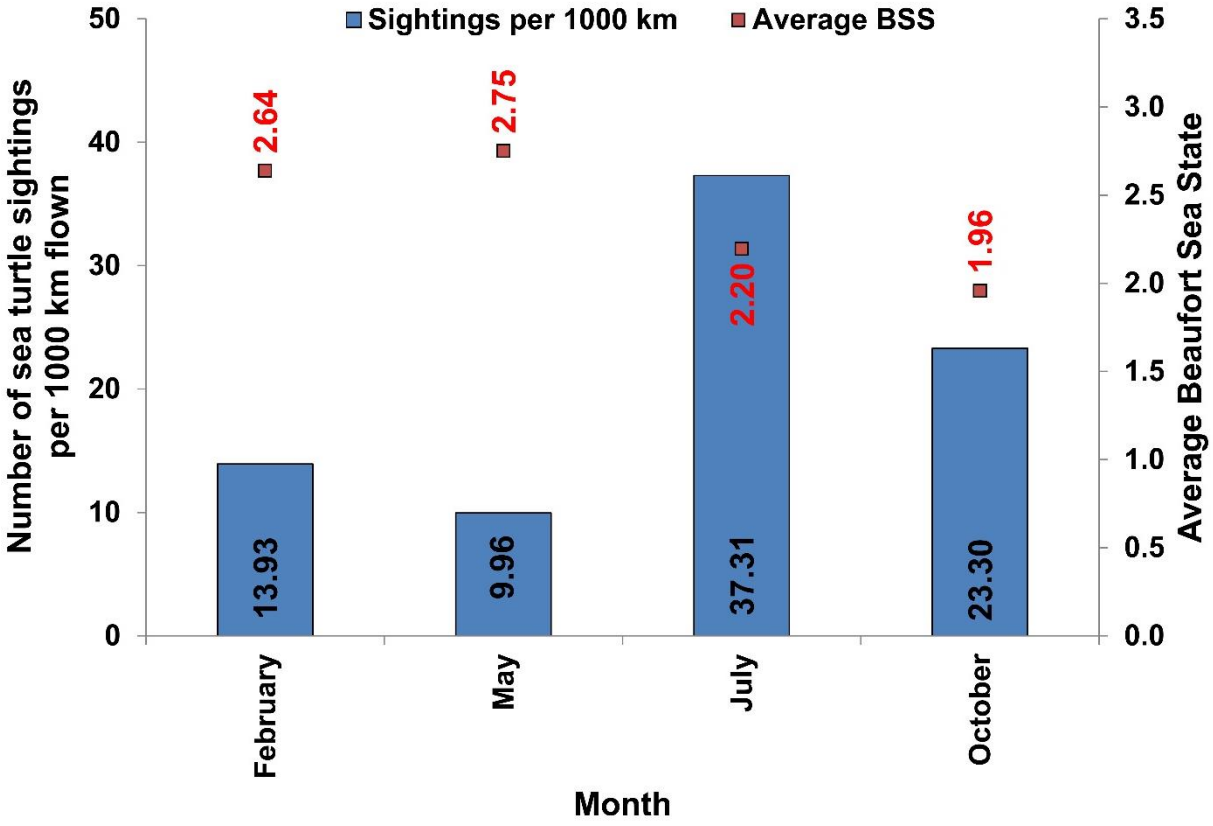

Figure 15c. Sea turtle sightings per 1,000 km surveyed and the distance-weighted average BSS per month in the Jacksonville survey area in 2017.

4.4.1 Loggerhead Sea Turtle (*Caretta caretta*)

A total of 93 loggerhead sea turtles (*Caretta caretta*) was observed (**Table 13**). This species was encountered every day of survey effort and were predominantly recorded in the shallower waters over the continental shelf. A small number of individuals occurred beyond the shelf break (*n*= 9) but these sightings do not apprea to have a seasonal component (**Figure 16**).

Table 13. Loggerhead sea turtle (*Caretta caretta*) sightings in the Jacksonville survey area in 2017.

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #
1-Feb-2017	14:43:23	33	30.366436	80.582522	7	2	1	90°	1
1-Feb-2017	14:43:29	34	30.366418	80.578686	7	2	1	90°	1
1-Feb-2017	14:44:57	34	30.366727	80.524838	7	2	2	90°	1
1-Feb-2017	15:27:26	44	30.432692	80.261879	8	2	2	90°	1
1-Feb-2017	15:36:45	43	30.434325	80.482343	8	2	2	90°	2
1-Feb-2017	15:46:02	51	30.498898	80.676501	9	2	1	90°	1
1-Feb-2017	15:48:07	52	30.499750	80.599812	9	2	2	90°	1
1-Feb-2017	16:29:41	52	30.566514	80.216993	10	2	1	90°	1
2-Feb-2017	9:28:26	5	29.966152	80.369417	1	2	2	90°	1
2-Feb-2017	9:29:27	8	29.966622	80.331125	1	2	2	90°	1
2-Feb-2017	10:18:55	17	30.100620	80.608142	3	2	2	90°	2
2-Feb-2017	10:27:12	17	30.100559	80.488121	3	2	3	90°	1
2-Feb-2017	11:32:08	33	30.232983	80.619459	5	2	1	90°	2
2-Feb-2017	12:35:58	47	30.299614	80.341727	6	3	1	60°	1
9-May-2017	9:18:00	3	29.965106	79.776140	1 Off	2	2	90°	1
9-May-2017	10:25:37	14	30.159534	79.585343	4 Off	2	2	90°	1
9-May-2017	10:31:03	18	30.164132	79.770770	4 Off	2	2	90°	1
9-May-2017	10:49:50	20	30.226623	79.551421	5 Off	2	1	90°	1
9-May-2017	14:34:08	59	30.375420	80.537209	7	3	2	90°	1
9-May-2017	15:25:01	54	30.433941	80.638382	8	3	2	90°	1
9-May-2017	16:28:22	65	30.565947	80.519356	10	3	2	90°	1
10-May-2017	10:05:00	18	30.030636	80.699888	2	3	2	90°	1
10-May-2017	10:10:49	13	30.101054	80.571481	3	3	2	100°	1
10-May-2017	10:50:44	25	30.164771	80.422137	4	3	2	90°	1
10-May-2017	10:56:54	19	30.165558	80.647740	4	3	1	90°	1
10-May-2017	11:47:48	27	30.298659	80.561699	6	3	2	90°	1
11-Jul-2017	11:22:12	21	30.167381	79.690531	4 Off	2	1	90°	1
11-Jul-2017	14:46:47	28	30.362882	80.644714	7	1	2	90°	1
11-Jul-2017	14:47:03	39	30.362992	80.635190	7	1	1	90°	2
11-Jul-2017	14:48:55	29	30.363228	80.569260	7	1	2	90°	1
11-Jul-2017	14:49:04	40	30.363313	80.563410	7	1	2	90°	2
11-Jul-2017	14:51:01	30	30.363228	80.493528	7	1	2	90°	1
11-Jul-2017	14:56:57	42	30.363484	80.279119	7	2	1	90°	1
11-Jul-2017	15:41:38	42	30.436413	80.390942	8	2	2	90°	1

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #
11-Jul-2017	15:42:14	43	30.436175	80.414278	8	2	2	90°	3
11-Jul-2017	16:07:53	52	30.498916	80.599862	9	2	2	90°	1
11-Jul-2017	16:09:32	72	30.496834	80.542304	9	2	1	90°	2
11-Jul-2017	16:10:55	53	30.496985	80.494004	9	2	2	90°	1
11-Jul-2017	16:13:25	54	30.496887	80.407913	9	2	2	90°	2
11-Jul-2017	16:13:39	73	30.496876	80.399903	9	2	2	90°	2
11-Jul-2017	16:21:04	58	30.496220	80.264431	9	2	2	90°	2
11-Jul-2017	17:09:31	88	30.570090	80.350883	10	2	1	90°	1
11-Jul-2017	17:10:43	69	30.570189	80.404036	10	1	2	90°	1
11-Jul-2017	17:12:07	89	30.569535	80.466114	10	2	2	100°	1
12-Jul-2017	9:03:15	3	29.964052	80.668319	1	2	1	90°	2
12-Jul-2017	9:04:46	4	29.962949	80.614012	1	2	1	90°	2
12-Jul-2017	9:06:47	5	29.963120	80.540496	1	2	1	90°	2
12-Jul-2017	9:18:36	7	29.963598	80.418526	1	2	2	90°	2
12-Jul-2017	9:18:47	8	29.963562	80.412865	1	2	1	90°	1
12-Jul-2017	10:07:04	19	30.034540	80.571649	2	2	2	90°	1
12-Jul-2017	10:08:38	20	30.034374	80.631701	2	2	2	90°	1
12-Jul-2017	10:19:24	19	30.098035	80.592619	3	2	1	90°	2
12-Jul-2017	10:21:28	28	30.098108	80.518233	3	2	3	90°	1
12-Jul-2017	11:05:14	26	30.168058	80.489432	4	2	1	60°	1
12-Jul-2017	11:06:18	38	30.167970	80.530716	4	1	3	90°	1
12-Jul-2017	11:07:41	39	30.167785	80.584021	4	1	3	90°	1
12-Jul-2017	11:20:50	32	30.229513	80.654318	5	2	2	90°	1
12-Jul-2017	11:24:41	47	30.230008	80.519960	5	1	2	90°	1
12-Jul-2017	11:35:46	52	30.230186	80.342778	5	1	3	90°	2
12-Jul-2017	12:16:18	61	30.303211	80.363380	6	2	2	90°	1
8-Nov-2017	9:37:13	3	30.567722	80.477682	10	2	2	90°	1
8-Nov-2017	9:41:09	4	30.567696	80.336849	10	2	2	90°	1
8-Nov-2017	10:19:56	15	30.567574	79.482950	10 off	2	3	60°	1
8-Nov-2017	10:30:52	18	30.497994	79.482366	9 off	2	3	90°	1
8-Nov-2017	11:02:33	15	30.498099	80.566743	9	2	2	90°	1
8-Nov-2017	11:11:26	24	30.434116	80.607067	8	2	2	70°	2
8-Nov-2017	11:27:28	20	30.434490	80.394198	8	2	2	90°	1
8-Nov-2017	11:28:00	30	30.434546	80.375166	8	2	1	60°	1
8-Nov-2017	12:34:16	33	30.366308	80.278927	7	2	1	90°	1
8-Nov-2017	12:39:28	34	30.364818	80.487737	7	2	2	90°	1
8-Nov-2017	12:42:16	42	30.364790	80.612545	7	2	3	90°	2
8-Nov-2017	15:13:16	47	29.965532	80.675161	1	2	1	80°	1
8-Nov-2017	15:36:46	53	29.966090	80.129082	1	2	2	90°	1
8-Nov-2017	15:44:45	55	29.965776	79.834084	1	2	3	90°	1

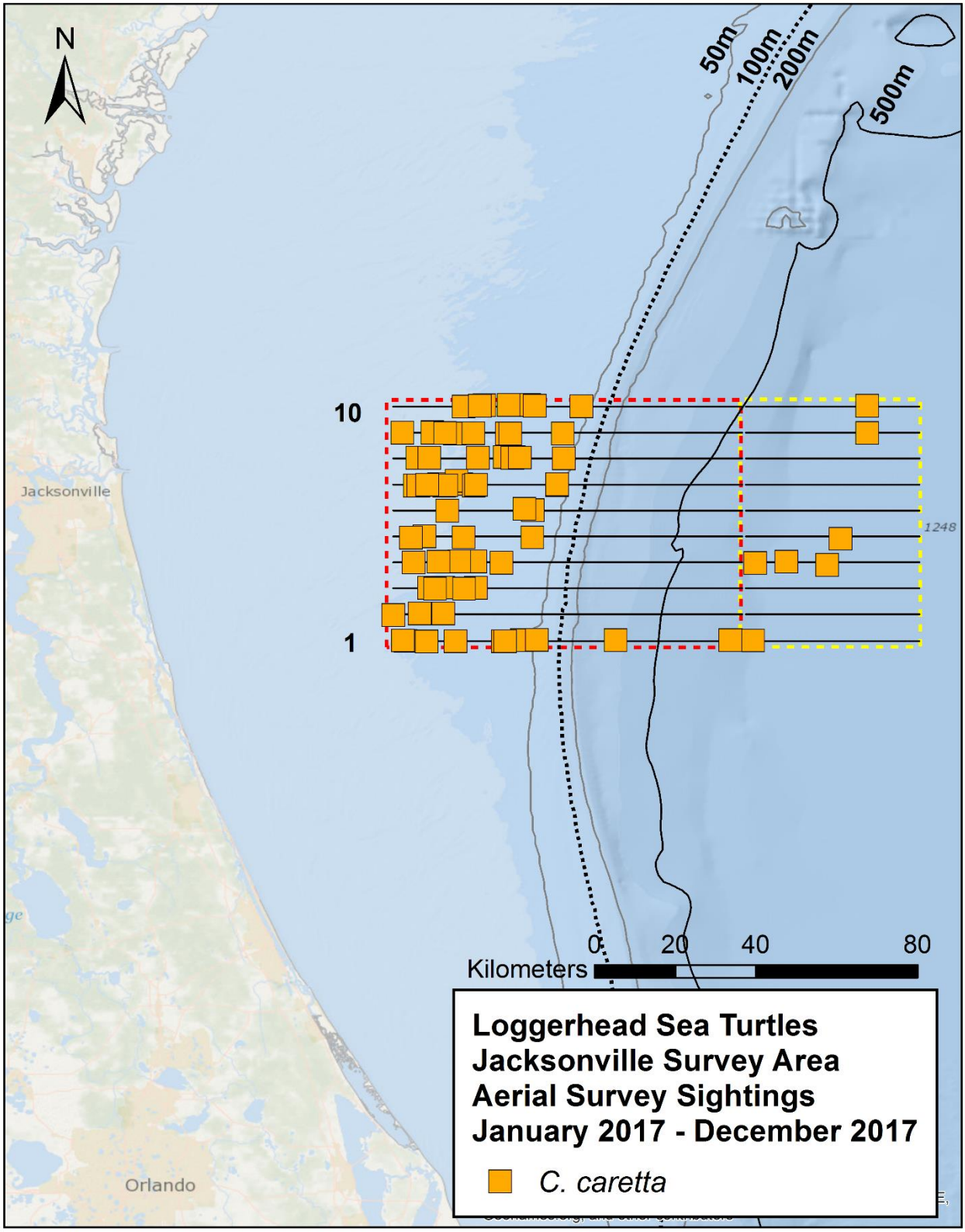

Figure 16. Loggerhead sea turtle (*Caretta caretta*) sightings.

4.4.2 Leatherback Sea Turtle (*Dermochelys coriacea*)

A total of four leatherback sea turtles (*Dermochelys coriacea*) was recorded (**Table 14, Figure 17**). This species was observed in three of the four months surveyed. Leatherback sea turtles were predominantly recorded in the shallower waters over the continental shelf, although one occurred beyond the 200 m isobath.

Table 14. Leatherback sea turtle (*Dermochelys coriacea*) sightings in the Jacksonville survey area in 2017.

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #
1-Feb-2017	15:02:00	40	30.366635	80.144608	7	3	2	90°	1
10-May-2017	11:46:11	26	30.299442	80.502556	6	3	1	90°	1
8-Nov-2017	11:25:58	29	30.434369	80.448439	8	2	1	80°	1
8-Nov-2017	15:26:37	42	29.966295	80.486250	1	1	1	90°	1

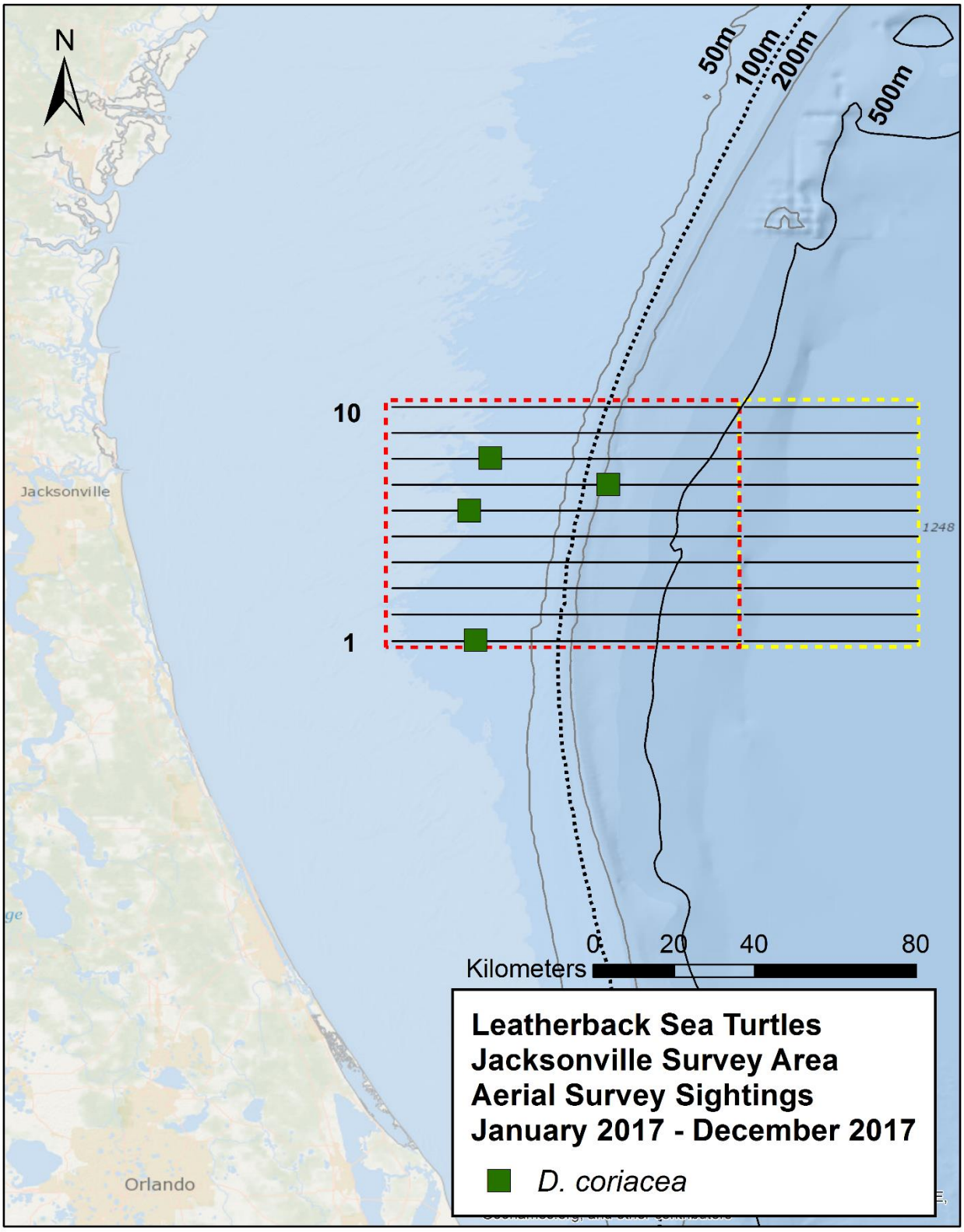

Figure 17. Leatherback sea turtle (*Dermochelys coriacea*) sightings.

4.5 Fish

4.5.1 Pelagic Bony Fishes (Osteichthyes)

Four ocean sunfish (*Mola mola*) were recorded this year, one inshore of the 100m isobath and three beyond 500 m. (**Table 15, Figure 18**).

Table 15. Ocean sunfish (*Mola mola*) sightings in the Jacksonville survey area in 2017.

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #
1-Feb-2017	16:14:30	49	30.500246	79.825579	9	2	1	90°	2
8-Nov-2017	15:27:53	52	29.966046	80.446342	1	2	3	110°	1
8-Nov-2017	15:41:53	54	29.966100	79.939986	1	2	3	70°	1

4.5.2 Cartilaginous Fishes (Chondrichthyes)

Two manta rays (*Manta birostris*) and seven sharks were recorded during the reporting period (**Tabel 16**). One shark was identified to species as a great white (*Carcharodon carcharias*) and four could be identified as hammerheads. Sharks were observed throughout the study period with no discernable spatial or temporal trends (**Figure 18**).

Table 16. Cartilaginous fish sightings in the Jacksonville survey area in 2017.

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Comments
1-Feb-2017	16:15:12	60	30.500420	79.798396	9	2	1	90°	1	Hammerhead
2-Feb-2017	11:21:28	27	30.170427	80.628455	4	2	3	90°	1	Great white
2-Feb-2017	11:33:30	34	30.233152	80.566698	5	2	2	90°	1	Shark
9-May-2017	14:43:08	60	30.361182	80.202478	7	3	1	90°	1	Manta ray
9-May-2017	15:10:36	50	30.428412	80.331955	8	3	2	90°	1	Manta ray
11-Jul-2017	15:47:02	45	30.436047	80.598311	8	1	2	90°	1	Shark
12-Jul-2017	11:06:35	27	30.167937	80.541683	4	2	2	90°	1	Hammerhead
8-Nov-2017	11:35:27	31	30.434572	80.110498	8	2	2	90°	1	Hammerhead
8-Nov-2017	12:25:52	29	30.365205	80.187540	7	2	1	90°	1	Hammerhead

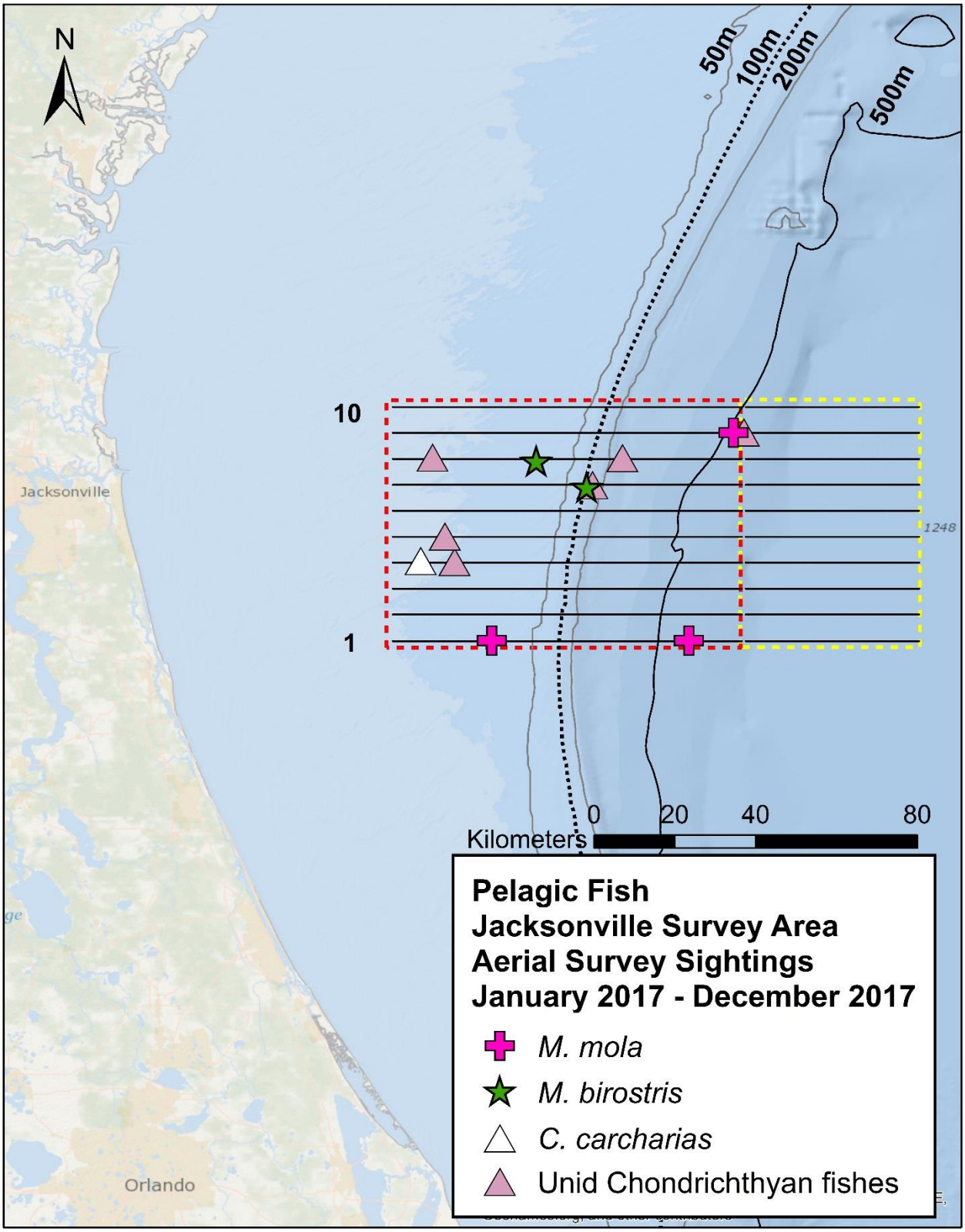

Figure 18. Pelagic fish sightings.

4.6 Vessel Sightings

4.6.1 Commercial Vessels

A total of 10 commercial vessels (e.g., tugs, barges, tankers, commercial fishing, and cargo vessels) was observed in the study site (**Table 17, Figure 19**).

Table 17. Commercial vessel sightings in the Jacksonville survey area in 2017.

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Comments
2-Feb-2017	9:27:11	7	29.965859	80.415766	1	2	1	90°	1	Cargo vessel
2-Feb-2017	9:29:06	6	29.966470	80.344265	1	2	1	90°	1	Cargo vessel
2-Feb-2017	12:39:23	39	30.299453	80.482584	6	3	3	45°	1	Shrimp boat
9-May-2017	14:31:25	44	30.364900	80.638356	7	2	1	90°	2	Tug + barge
9-May-2017	14:48:46	47	30.359747	79.986995	7	3	3	45°	1	Cargo vessel
9-May-2017	15:09:55	64	30.429022	80.306424	8	3	4	90°	1	Tanker
9-May-2017	15:51:39	75	30.502242	79.964797	9	3	3	60°	1	Cargo vessel
11-Jul-2017	15:43:36	59	30.436457	80.467175	8	2	3	45°	1	Tug + barge
11-Jul-2017	16:21:12	78	30.496183	80.260280	9	2	4	60°	1	Cargo vessel
12-Jul-2017	11:39:08	36	30.230223	80.225138	5	4	4	90°	1	Cargo vessel

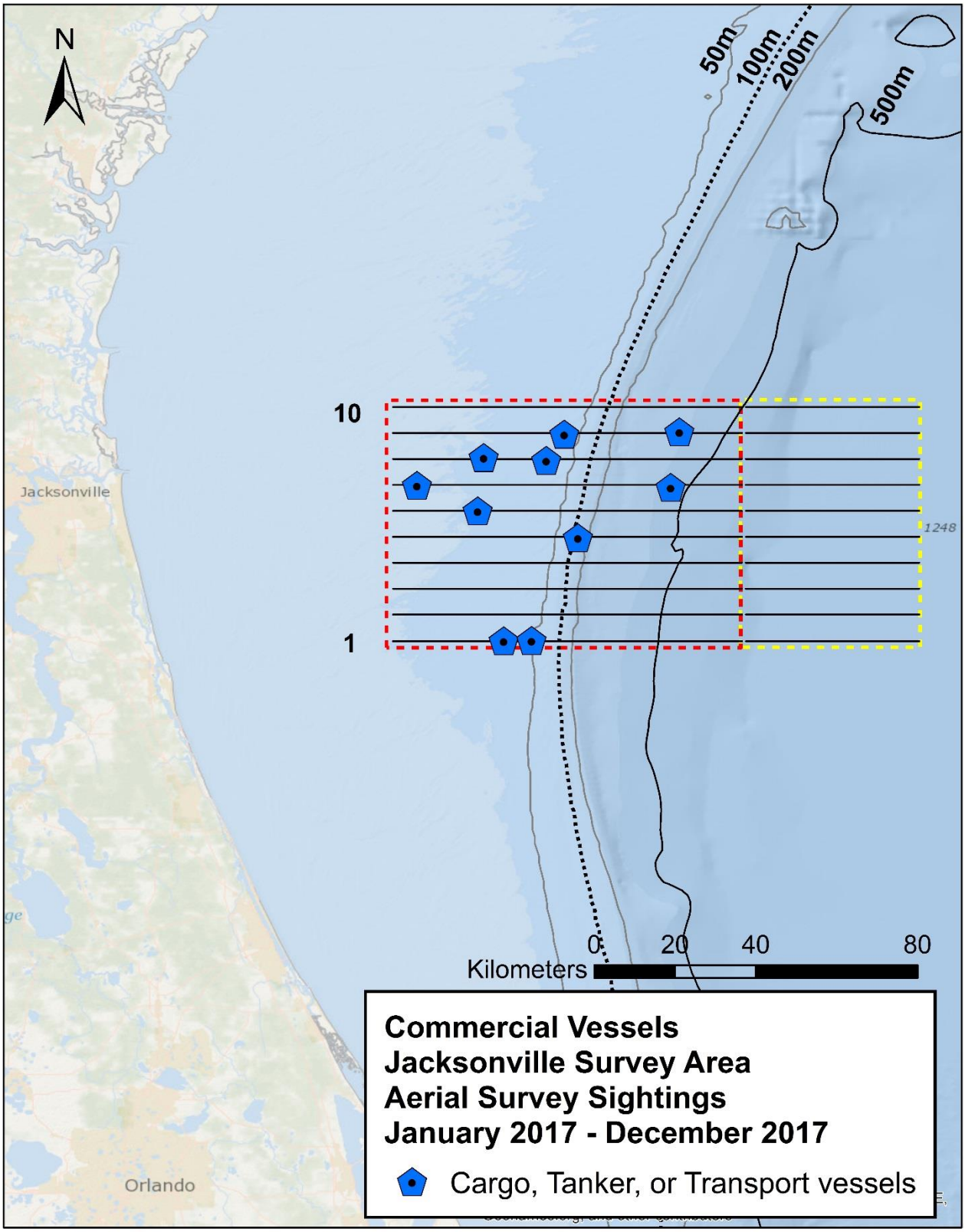

Figure 19. Commercial vessel sightings.

4.6.2 Military

Two U.S. military vessels were observed during the reporting period (**Table 18**, **Figure 20**).

Table 18. Military vessel sightings in the Jacksonville survey area in 2017.

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Comments
2-Feb-2017	11:33:45	35	30.233201	80.557499	5	2	1	60°	1	Military vessel
9-May-2017	14:33:56	45	30.372834	80.544367	7	3	2	60°	1	Military vessel

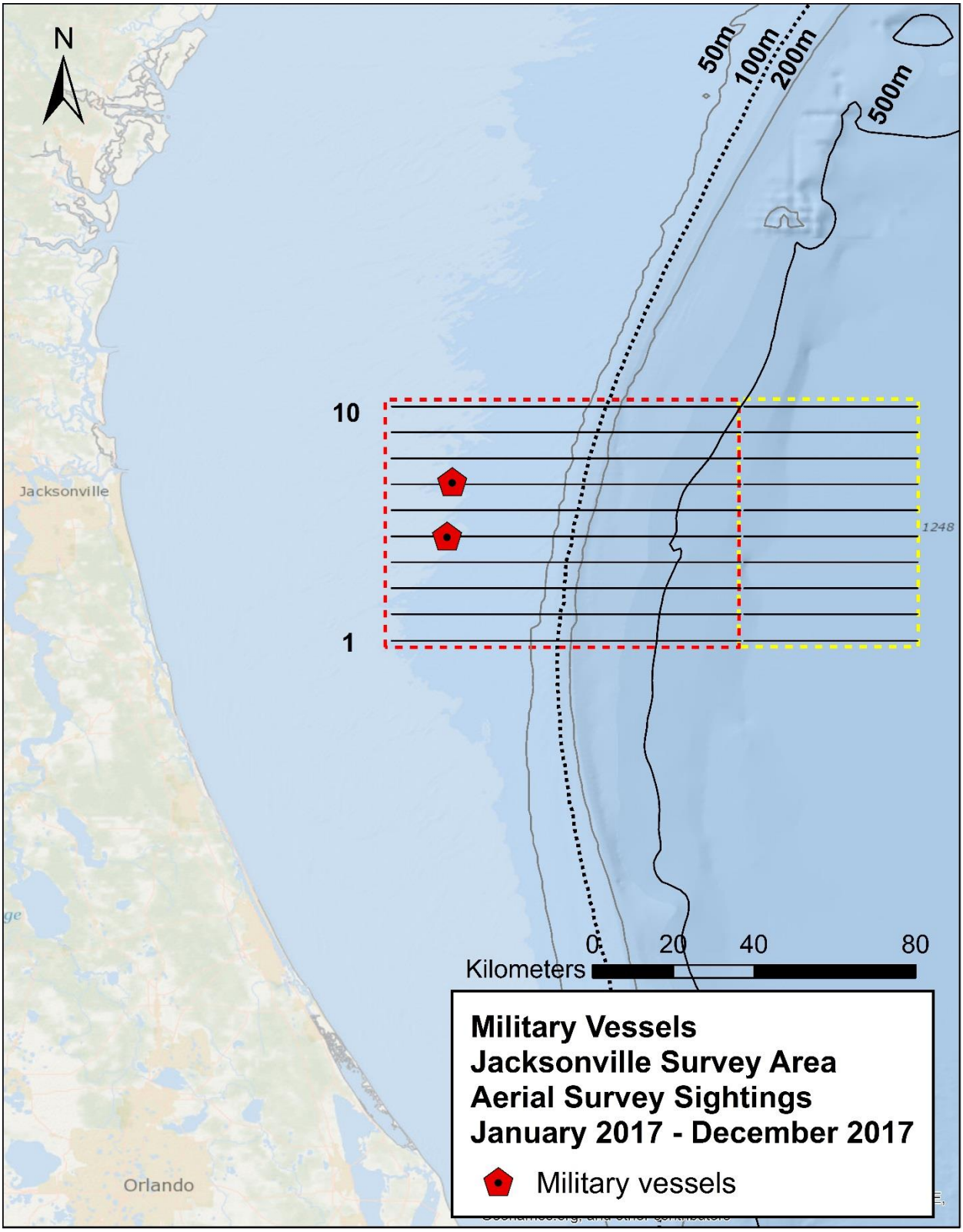

Figure 20. Military vessel sightings.

4.6.3 Other Vessels

Thirty-eight other vessels, classified as recreational fishing vessels or yachts, were recorded in the survey area (**Table 19, Figure 21**).

Table 19. Other vessel sightings in the Jacksonville survey area in 2017. (Rec. F/V = recreational fishing vessel)

Date	Time	Waypoint	Latitude (N)	Longitude (W)	Track Number	BSS	Angle Out	Degree Forward	Best #	Comments
1-Feb-2017	15:48:30	53	30.499767	80.586333	9	2	2	90°	1	Rec. F/V
1-Feb-2017	15:50:03	46	30.499783	80.529659	9	2	2	45°	2	Rec. F/V
2-Feb-2017	9:29:41	7	29.966667	80.322098	1	2	1	90°	2	Rec. F/V
2-Feb-2017	9:30:42	9	29.966463	80.283897	1	2	1	45°	2	Rec. F/V
2-Feb-2017	10:01:58	11	30.031491	80.304715	2	3	2	60°	1	Rec. F/V
2-Feb-2017	10:06:37	14	30.031584	80.457438	2	2	2	45°	1	Rec. F/V
2-Feb-2017	10:32:01	19	30.101377	80.307307	3	3	2	60°	2	Rec. F/V
2-Feb-2017	10:33:25	23	30.100919	80.254584	3	3	1	90°	1	Rec. F/V
2-Feb-2017	10:35:31	24	30.101265	80.175865	3	3	2	45°	1	Rec. F/V
2-Feb-2017	11:15:53	25	30.165565	80.506109	4	2	1	90°	1	Rec. F/V
2-Feb-2017	11:44:13	34	30.233507	80.336108	5	3	3	60°	1	Rec. F/V
9-May-2017	9:38:10	5	30.022595	79.472777	2 Off	2	1	45°	1	Yacht
9-May-2017	10:50:39	21	30.225751	79.521214	5 Off	2	2	60°	1	Yacht
9-May-2017	14:43:34	46	30.361604	80.185311	7	3	2	45°	1	Rec. F/V
9-May-2017	15:07:22	63	30.431543	80.210566	8	3	2	90°	1	Rec. F/V
9-May-2017	15:33:58	58	30.499497	80.631403	9	3	2	60°	2	Rec. F/V
9-May-2017	15:34:43	74	30.499446	80.603562	9	3	2	90°	2	Rec. F/V
9-May-2017	16:09:13	62	30.567937	80.183410	10	3	1	60°	1	Rec. F/V
10-May-2017	9:55:35	13	30.031373	80.542011	2	3	2	90°	1	Rec. F/V
10-May-2017	10:46:31	18	30.167480	80.271091	4	3	3	90°	3	Rec. F/V
10-May-2017	11:12:37	22	30.233635	80.244386	5	3	1	90°	1	Rec. F/V
10-May-2017	11:37:28	30	30.300882	80.185765	6	3	1	90°	1	Rec. F/V
11-Jul-2017	16:13:52	55	30.496845	80.392605	9	2	2	60°	1	Rec. F/V
12-Jul-2017	10:20:20	27	30.098098	80.559233	3	2	3	90°	1	Rec. F/V
8-Nov-2017	10:49:20	21	30.498515	80.104727	9	2	2	60°	1	Rec. F/V
8-Nov-2017	12:27:02	30	30.365278	80.227110	7	2	2	60°	2	Rec. F/V
8-Nov-2017	15:14:22	39	29.965611	80.639255	1	1	2	60°	1	Rec. F/V
8-Nov-2017	15:36:08	44	29.966088	80.151920	1	2	2	60°	1	Rec. F/V
8-Nov-2017	16:40:36	53	30.031815	80.445448	2	2	2	60°	1	Yacht

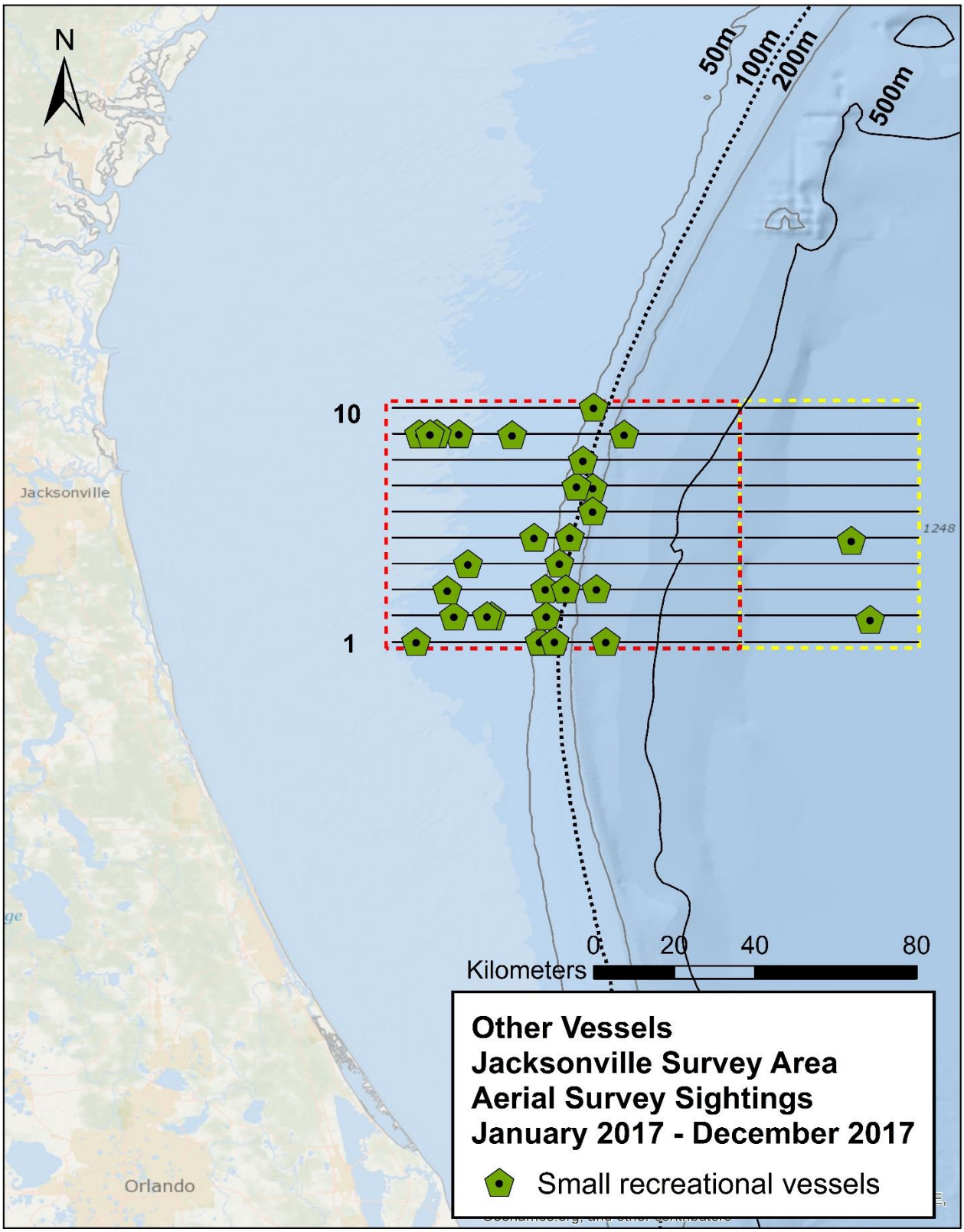

Figure 21. Other vessel sightings.

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, Dave Huddle, John Esties, and Bob Stickle, for excellent flying and a high level of professionalism. We thank U.S. Fleet Forces Command and Joel Bell (NAVFAC Atlantic) for their continued support of this work. Surveys are conducted under National Oceanic and Atmospheric Administration Scientific Permit Nos. 16473 and 20527, held by the University of North Carolina Wilmington, and National Oceanic and Atmospheric Administration General Authorization Letters of Confirmation Nos. 16185 and 19903 held by Duke University.

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A

Aerial Survey Data Sheet

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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

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B

Event Codes and Species List

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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

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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

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Wednesday, February 1, 2017 Sighting # 1

Initial sighting on Track

Time: 10:21 WP#: 9 Lat: 30.159114 Long: -79.526355
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 4 Off Beaufort Sea State: 3
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 10:36 WP#: 10 Lat: 30.153988 Long: -79.504374
Species: *Balaenoptera acutorostrata* Numbers (Low/High/Best): 1 / 1 / 1
Features used in Species ID: Long fusiform shape, smaller body size, white stripe on pectoral fins

Representative images used for Species ID: NA
Photographer: Erin Frame numbers: NA Spacer: NA
Calculated distance from Trackline: 2.18 km

Final Time and Position of Sighting

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

Behavior and Additional Comments

Animal was not relocated after the initial observation. Animal appear to be a sub-adult based on its size

Wednesday, February 1, 2017 Sighting # 2

Initial sighting on Track

Time: 12:08 WP#: 25 Lat: 30.556617 Long: -79.430659
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 10 Off Beaufort Sea State: 3
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 12:18 WP#: 26 Lat: 30.550979 Long: -79.425583
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 15 / 20 / 18
Features used in Species ID: Small bodied dolphins surfacing for breaths, tail movements up and down.

Representative images used for Species ID: NA
Photographer: Erin Frame numbers: NA Spacer: NA
Calculated distance from Trackline: 0.79 km

Final Time and Position of Sighting

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

Behavior and Additional Comments

Assumed location of animal taken, group not resighted after initial observation. Tight group of animals with no direction of travel apparent.

Wednesday, February 1, 2017 Sighting # 3

Initial sighting on Track

Time: 14:49 WP#: 35 Lat: 30.366776 Long: -80.350509
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 7 Beaufort Sea State: 2
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 14:50 WP#: 36 Lat: 30.355466 Long: -80.349652
Species: *Stenella frontalis* Numbers (Low/High/Best): 46 / 48 / 48
Features used in Species ID: White tip to rostrum, heavy spotting pattern across body, alternating light and dark pattern.
Representative images used for Species ID: 6879, 6889, 6897
Photographer: Erin Frame numbers: 6867 - 6908 Spacer: 6909
Calculated distance from Trackline: 1.26 km

Final Time and Position of Sighting

Time: 14:55 WP#: 37 Lat: 30.361492 Long: -80.355038
Calculated Distance Traveled: 0.73 km

Behavior and Additional Comments

Three or more groups splashin at the surface, some running, then scattered into pairs.

Wednesday, February 1, 2017 Sighting # 4

Initial sighting on Track

Time: 15:33 WP#: 45 Lat: 30.432951 Long: -80.465147
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 8 Beaufort Sea State: 2
Observer: Ryan Observer side: Left

Actual Time and Position of Sighting

Time: 15:34 WP#: 46 Lat: 30.428749 Long: -80.463202
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3 / 3 / 3
Features used in Species ID: Robust body appearance, uniform gray body coloration.
Representative images used for Species ID: 6914, 6927
Photographer: Erin Frame numbers: 6910 - 6929 Spacer: 6930-31
Calculated distance from Trackline: 0.50 km

Final Time and Position of Sighting

Time: 15:35 WP#: 47 Lat: 30.430205 Long: -80.459934
Calculated Distance Traveled: 0.35 km

Behavior and Additional Comments

A pair and a lone individual traveling slowly.

Wednesday, February 1, 2017 Sighting # 5

Initial sighting on Track

Time: 15:55 WP#: 54 Lat: 30.500375 Long: -80.341349
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 9 Beaufort Sea State: 2
Observer: Ryan Observer side: Left

Actual Time and Position of Sighting

Time: 15:59 WP#: 55 Lat: 30.503222 Long: -80.349341
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3 / 3 / 3
Features used in Species ID: Robust body, uniform gray coloration.

Representative images used for Species ID: 6934
Photographer: Erin Frame numbers: 6932 - 6946 Spacer: 6947
Calculated distance from Trackline: 0.83 km

Final Time and Position of Sighting

Time: 16:00 WP#: 56 Lat: 30.4999606 Long: -80.329260
Calculated Distance Traveled: 1.96 km

Behavior and Additional Comments

A group of three animals close together, lots of subsurface travel.

Wednesday, February 1, 2017 Sighting # 6

Initial sighting on Track

Time: 16:30 WP#: 63 Lat: 30.562193 Long: -80.237272
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 10 Beaufort Sea State: 2
Observer: Ryan Observer side: Left

Actual Time and Position of Sighting

Time: 16:36 WP#: 64 Lat: 30.562845 Long: -80.225762
Species: *Stenella frontalis* Numbers (Low/High/Best): 20 / 25 / 22
Features used in Species ID: Heavily spotted animals, white tips to the rostrum.

Representative images used for Species ID: 6948, 6953, 6998
Photographer: Erin Frame numbers: 6948 - 7002 Spacer: 7003
Calculated distance from Trackline: 1.51 km

Final Time and Position of Sighting

Time: 16:36 WP#: 65 Lat: 30.564269 Long: -80.221669
Calculated Distance Traveled: 0.42 km

Behavior and Additional Comments

Two groups.

Thursday, February 2, 2017 Sighting # 1

Initial sighting on Track

Time: 9:16 WP#: 3 Lat: 29.966350 Long: -80.427340
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
On/Off Effort: On Trackline: 1 Beaufort Sea State: 2
Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:21 WP#: 4 Lat: 29.974803 Long: -80.435557
Species: *Tursiops truncatus* Numbers (Low/High/Best): 9 / 12 / 10
Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 7006, 7010
Photographer: Ryan Frame numbers: 7004 - 7016 Spacer: 7017
Calculated distance from Trackline: 1.23 km

Final Time and Position of Sighting

Time: 9;26 WP#: 5 Lat: 29.969710 Long: -80.434734
Calculated Distance Traveled: 0.57 km

Behavior and Additional Comments

Scattered in a wide area

Thursday, February 2, 2017 Sighting # 2

Initial sighting on Track

Time: 10:20 WP#: 18 Lat: 30.100760 Long: -80.534817
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 3 Beaufort Sea State: 2
Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 10:21 WP#: 19 Lat: 30.101763 Long: -80.540000
Species: *Stenella frontalis* Numbers (Low/High/Best): 13 / 18 / 16
Features used in Species ID: Alternating light and dark pattern down body, spotting, white tip on rostrum

Representative images used for Species ID: 7035, 7054
Photographer: Ryan Frame numbers: 7018 - 7054 Spacer: 7055
Calculated distance from Trackline: 0.51 km

Final Time and Position of Sighting

Time: 10:24 WP#: 20 Lat: 30.103522 Long: -80.542578
Calculated Distance Traveled: 0.32 km

Behavior and Additional Comments

Tight group, dispersed when we flew over, slow travel

Thursday, February 2, 2017 Sighting # 3

Initial sighting on Track

Time: 11:35 WP#: 36 Lat: 30.233361 Long: -80.508865
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: Left

Actual Time and Position of Sighting

Time: 11:36 WP#: 37 Lat: 30.238162 Long: -80.509190
Species: *Stenella frontalis* Numbers (Low/High/Best): 60 / 90 / 75
Features used in Species ID: Alternating light and dark pattern down body, spotting, white tip on rostrum
Representative images used for Species ID: 7144
Photographer: Ryan Frame numbers: 7141 - 7181 Spacer: 7182
Calculated distance from Trackline: 0.53 km

Final Time and Position of Sighting

Time: 11:39 WP#: 38 Lat: 30.240731 Long: -80.502873
Calculated Distance Traveled: 0.67 km

Behavior and Additional Comments

Multiple groups, fast travel

Thursday, February 2, 2017 Sighting # 4

Initial sighting on Track

Time: 11:57 WP#: 41 Lat: 30.233078 Long: -79.823415
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 5 Beaufort Sea State: 3
Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 12:00 WP#: 42 Lat: 30.240533 Long: -79.824773
Species: *Balaenoptera acutorostrata* Numbers (Low/High/Best): 2 / 2 / 2
Features used in Species ID: Black body, white across pectorals
Representative images used for Species ID: 7302, 7347, 7393
Photographer: Ryan Frame numbers: 7183 - 7415 Spacer: 7416
Calculated distance from Trackline: 0.84 km

Final Time and Position of Sighting

Time: 12:15 WP#: 43 Lat: 30.253487 Long: -79.805127
Calculated Distance Traveled: 2.37 km

Behavior and Additional Comments

Mom/calf were swimming together with calf in echelon position most of the time. Mom would dive a little deeper and calf would come to the surface to take a breath.

Tuesday, May 9, 2017 Sighting # 1

Initial sighting on Track

Time: 9:43 WP#: 6 Lat: 30.028020 Long: -79.629867
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 2 off Beaufort Sea State: 2
Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:44 WP#: 7 Lat: 30.019788 Long: -79.628150
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 4 / 4 / 4
Features used in Species ID: Dark body, blunt head, short pectorals

Representative images used for Species ID: 327, 330
Photographer: Ryan Frame numbers: 320 - 336 Spacer: 337
Calculated distance from Trackline: 0.93 km

Final Time and Position of Sighting

Time: 9:49 WP#: 8 Lat: 30.023156 Long: -79.607030
Calculated Distance Traveled: 2.07 km

Behavior and Additional Comments

Slow subsurface travel north, spread out. Final position not accurate due to loss of satellite reception

Tuesday, May 9, 2017 Sighting # 2

Initial sighting on Track

Time: 9:59 WP#: 12 Lat: 30.099245 Long: -79.718496
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 3 off Beaufort Sea State: 2
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 10:01 WP#: 13 Lat: 30.093847 Long: -79.714132
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 1 / 1 / 1
Features used in Species ID: Dark body, blunt head, short pectorals

Representative images used for Species ID: 343
Photographer: Ryan Frame numbers: 338 - 346 Spacer: 347
Calculated distance from Trackline: 0.73 km

Final Time and Position of Sighting

Time: 10:02 WP#: 14 Lat: 30.094325 Long: -79.719218
Calculated Distance Traveled: 0.49 km

Behavior and Additional Comments

Slow travel on the surface and subsurface

Tuesday, May 9, 2017 Sighting # 3

Initial sighting on Track

Time: 10:34 WP#: 20 Lat: 30.229416 Long: -79.804532
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: Off Trackline: Beaufort Sea State: 2
Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 10:39 WP#: 21 Lat: 30.233258 Long: -79.799679
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 3 / 3 / 3
Features used in Species ID: Dark body, blunt head, short pectorals

Representative images used for Species ID: 348
Photographer: Ryan Frame numbers: 348 - 358 Spacer: 359
Calculated distance from Trackline: 0.63 km

Final Time and Position of Sighting

Time: 10:40 WP#: 22 Lat: 30.233273 Long: -79.804778
Calculated Distance Traveled: 0.49 km

Behavior and Additional Comments

Tuesday, May 9, 2017 Sighting # 4

Initial sighting on Track

Time: 10:45 WP#: 24 Lat: 30.229083 Long: -79.605404
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 5 off Beaufort Sea State: 2
Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 10:47 WP#: 25 Lat: 30.235394 Long: -79.604733
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 10 / 15 / 12
Features used in Species ID: Dark body, blunt head, short pectorals

Representative images used for Species ID: 360, 367
Photographer: Ryan Frame numbers: 360 - 372 Spacer: 373
Calculated distance from Trackline: 0.70 km

Final Time and Position of Sighting

Time: 10:47 WP#: 26 Lat: 30.231830 Long: -79.605552
Calculated Distance Traveled: 0.40 km

Behavior and Additional Comments

Slow travel, spread out

Tuesday, May 9, 2017 Sighting # 5

Initial sighting on Track

Time: 11:07 WP#: 31 Lat: 30.293915 Long: -79.703225
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 6 off Beaufort Sea State: 2
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 11:09 WP#: 32 Lat: 30.292144 Long: -79.694624
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 3 / 3 / 3
Features used in Species ID: Dark body, blunt head, short pectorals

Representative images used for Species ID: 376
Photographer: Ryan Frame numbers: 374 - 380 Spacer: 381
Calculated distance from Trackline: 0.85 km

Final Time and Position of Sighting

Time: 11:10 WP#: 33 Lat: 30.296773 Long: -79.700256
Calculated Distance Traveled: 0.75 km

Behavior and Additional Comments

Spread out, traveling

Tuesday, May 9, 2017 Sighting # 6

Initial sighting on Track

Time: 11:21 WP#: 37 Lat: 30.362338 Long: -79.588483
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 7 off Beaufort Sea State: 2
Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 11:25 WP#: 38 Lat: 30.373306 Long: -79.591869
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 7 / 7 / 7
Features used in Species ID: Dark body, blunt head, short pectorals

Representative images used for Species ID: 383, 386
Photographer: Ryan Frame numbers: 382 - 388 Spacer: 389
Calculated distance from Trackline: 1.26 km

Final Time and Position of Sighting

Time: 11:26 WP#: 39 Lat: 30.382733 Long: -79.590292
Calculated Distance Traveled: 1.06 km

Behavior and Additional Comments

2 groups, spread out

Tuesday, May 9, 2017 Sighting # 7

Initial sighting on Track

Time: 11:55 WP#: 45 Lat: 30.494435 Long: -79.598486
Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 9 off Beaufort Sea State: 2
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 11:56 WP#: 46 Lat: 30.485271 Long: -79.603381
Species: *Tursiops truncatus* Numbers (Low/High/Best): 18 / 25 / 20
Features used in Species ID: Uniform gray, robust, white peduncle

Representative images used for Species ID: 391, 409
Photographer: Ryan Frame numbers: 390 - 420 Spacer: 421
Calculated distance from Trackline: 1.12 km

Final Time and Position of Sighting

Time: 11:58 WP#: 47 Lat: 30.485641 Long: -79.600863
Calculated Distance Traveled: 0.25 km

Behavior and Additional Comments

Slow travel south just below the surface

Tuesday, May 9, 2017 Sighting # 8

Initial sighting on Track

Time: 12:18 WP#: 51 Lat: 30.561560 Long: -79.689358
Vertical Angle: 3 Horizontal Bearing in Degrees: 60 Sighting Cue: Splash
On/Off Effort: On Trackline: 10 off Beaufort Sea State: 2
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 12:18 WP#: 52 Lat: 30.573200 Long: -79.696373
Species: *Physeter macrocephalus* Numbers (Low/High/Best): 1 / 1 / 1
Features used in Species ID: Robust, blunt melon, forward blow

Representative images used for Species ID: 422, 424
Photographer: Ryan Frame numbers: 422 - 428 Spacer: 429
Calculated distance from Trackline: 1.46 km

Final Time and Position of Sighting

Time: 12:22 WP#: 53 Lat: 30.575052 Long: -79.693868
Calculated Distance Traveled: 0.32 km

Behavior and Additional Comments

Slow surface travel, subadult

Tuesday, May 9, 2017 Sighting # 9

Initial sighting on Track

Time: 15:13 WP#: 65 Lat: 30.433354 Long: -80.441756
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
On/Off Effort: On Trackline: 8 Beaufort Sea State: 3
Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 15:14 WP#: 66 Lat: 30.429150 Long: -80.436419
Species: *Stenella frontalis* Numbers (Low/High/Best): 30 / 50 / 40
Features used in Species ID: Alternating light and dark pattern down body, spotting

Representative images used for Species ID: 445
Photographer: Ryan Frame numbers: 430 - 453 Spacer: 454
Calculated distance from Trackline: 0.70 km

Final Time and Position of Sighting

Time: 15:17 WP#: 67 Lat: 30.425470 Long: -80.431447
Calculated Distance Traveled: 0.63 km

Behavior and Additional Comments

2 groups milling or traveling slowly

Tuesday, May 9, 2017 Sighting # 10

Initial sighting on Track

Time: 15:28 WP#: 70 Lat: 30.472982 Long: -80.705305
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: Off Trackline: Beaufort Sea State: 3
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 15:29 WP#: 71 Lat: 30.468059 Long: -80.699252
Species: *Stenella frontalis* Numbers (Low/High/Best): 12 / 20 / 15
Features used in Species ID: Alternating light and dark pattern down body, spotting

Representative images used for Species ID: 465
Photographer: Ryan Frame numbers: 455 - 467 Spacer: 468
Calculated distance from Trackline: 0.80 km

Final Time and Position of Sighting

Time: 15:31 WP#: 72 Lat: 30.472859 Long: -80.700854
Calculated Distance Traveled: 0.60 km

Behavior and Additional Comments

Slow travel

Tuesday, May 9, 2017 Sighting # 11

Initial sighting on Track

Time: 16:14 WP#: 78 Lat: 30.564725 Long: -80.394908
Vertical Angle: 2 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: 16:17 WP#: 79 Lat: 30.569312 Long: -80.385470
Species: *Tursiops truncatus* Numbers (Low/High/Best): 8 / 8 / 8
Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 473, 482, 486
Photographer: Ryan Frame numbers: 469 - 491 Spacer: 492
Calculated distance from Trackline: 1.04 km

Final Time and Position of Sighting

Time: 16:23 WP#: 80 Lat: 30.574146 Long: -80.397734
Calculated Distance Traveled: 1.29 km

Behavior and Additional Comments

2 groups traveling and messing with a loggerhead turtle

Wednesday, May 10, 2017 Sighting # 1

Initial sighting on Track

Time: 9:12 WP#: 2 Lat: 29.965646 Long: -79.880441
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 1 Beaufort Sea State: 3
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 9:13 WP#: 3 Lat: 29.959322 Long: -79.873262
Species: *Tursiops truncatus* Numbers (Low/High/Best): 12 / 12 / 12
Features used in Species ID: Uniform gray, robust, white peduncles

Representative images used for Species ID: 8847
Photographer: Erin Frame numbers: 8844 - 8852 Spacer: 8853
Calculated distance from Trackline: 0.99 km

Final Time and Position of Sighting

Time: 9:23 WP#: 4 Lat: 29.959598 Long: -79.893125
Calculated Distance Traveled: 1.91 km

Behavior and Additional Comments

Traveling, hard to photograph, more animals as circled

Wednesday, May 10, 2017 Sighting # 2

Initial sighting on Track

Time: 9:27 WP#: 8 Lat: 30.003094 Long: -79.790790
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: Off Trackline: Beaufort Sea State: 4
Observer: Ryan Observer side: Left

Actual Time and Position of Sighting

Time: 9:30 WP#: 9 Lat: 30.000904 Long: -79.799624
Species: *Tursiops truncatus* Numbers (Low/High/Best): 18 / 20 / 18
Features used in Species ID: Uniform gray, robust, white peduncles

Representative images used for Species ID: 8865, 8870
Photographer: Erin Frame numbers: 8854 - 8876 Spacer: 8877
Calculated distance from Trackline: 0.88 km

Final Time and Position of Sighting

Time: 9:32 WP#: 10 Lat: 30.001049 Long: -79.789788
Calculated Distance Traveled: 0.95 km

Behavior and Additional Comments

Travel, few groups

Wednesday, May 10, 2017 Sighting # 3

Initial sighting on Track

Time: 9:56 WP#: 14 Lat: 30.026363 Long: -80.530780
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 2 Beaufort Sea State: 3
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 10:00 WP#: 15 Lat: 30.028675 Long: -80.533765
Species: *Stenella frontalis* Numbers (Low/High/Best): 15 / 16 / 15
Features used in Species ID: Alternating light and dark down body, spotting

Representative images used for Species ID: 8890, 8898
Photographer: Erin Frame numbers: 8878 - 8907 Spacer: 8908
Calculated distance from Trackline: 0.39 km

Final Time and Position of Sighting

Time: 10:00 WP#: 15 Lat: 30.028675 Long: -80.533765
Calculated Distance Traveled: N/A

Behavior and Additional Comments

2 groups, traveling, no accurate final time and position

Tuesday, July 11, 2017 Sighting # 1

Initial sighting on Track

Time: 10:31 WP#: 5 Lat: 30.034116 Long: -79.671675
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 2 off Beaufort Sea State: 2
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 10:33 WP#: 6 Lat: 30.034146 Long: -79.666446
Species: *Unidentified Kogia* Numbers (Low/High/Best): 2 / 2 / 2
Features used in Species ID: No rostrum, point to melon

Representative images used for Species ID: 3491, 3508, 3531, 3547, 3551, 3557, 3594, 3598
Photographer: Ryan Frame numbers: 3455 - 3648 Spacer: 3649
Calculated distance from Trackline: 0.50 km

Final Time and Position of Sighting

Time: 10:39 WP#: 7 Lat: 30.038992 Long: -79.663325
Calculated Distance Traveled: 0.62 km

Behavior and Additional Comments

Logging at the surface then subsurface travel, multiple surfacings

Tuesday, July 11, 2017 Sighting # 2

Initial sighting on Track

Time: 10:55 WP#: 11 Lat: 30.098707 Long: -79.487820
Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Splash
On/Off Effort: On Trackline: 3 off Beaufort Sea State: 2
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 10:56 WP#: 12 Lat: 30.090687 Long: -79.495777
Species: *Stenella attenuata* Numbers (Low/High/Best): 2 / 2 / 2
Features used in Species ID: Thin, long rostrum with white tip, white around eye

Representative images used for Species ID: 3669, 3671, 3674, 3677, 3678, 3679, 3697
Photographer: Ryan Frame numbers: 3650 - 3703 Spacer: 3705
Calculated distance from Trackline: 1.18 km

Final Time and Position of Sighting

Time: 11:01 WP#: 13 Lat: 30.089423 Long: -79.492375
Calculated Distance Traveled: 0.36 km

Behavior and Additional Comments

Subsurface travel, quick surfacing

Tuesday, July 11, 2017 Sighting # 3

Initial sighting on Track

Time: 11:04 WP#: 15 Lat: 30.098908 Long: -79.414262
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 3 off Beaufort Sea State: 2
Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 11:05 WP#: 16 Lat: 30.101075 Long: -79.413508
Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 15 / 20 / 17
Features used in Species ID: Dark body, blunt melon, short pectorals

Representative images used for Species ID: 3718
Photographer: Ryan Frame numbers: 3706 - 3737 Spacer: 3738
Calculated distance from Trackline: 0.25 km

Final Time and Position of Sighting

Time: 11:06 WP#: 17 Lat: 30.101384 Long: -79.412452
Calculated Distance Traveled: 0.11 km

Behavior and Additional Comments

Slow travel

Tuesday, July 11, 2017 Sighting # 4

Initial sighting on Track

Time: 12:02 WP#: 28 Lat: 30.362778 Long: -79.605114
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 7 off Beaufort Sea State: 2
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 12:03 WP#: 29 Lat: 30.357826 Long: -79.607529
Species: *Tursiops truncatus* Numbers (Low/High/Best): 6 / 6 / 6
Features used in Species ID: Robust, uniform gray, white peduncles

Representative images used for Species ID: 3759, 3788, 3803
Photographer: Ryan Frame numbers: 3739 - 3804 Spacer: 3805
Calculated distance from Trackline: 0.60 km

Final Time and Position of Sighting

Time: 12:05 WP#: 30 Lat: 30.361558 Long: -79.611826
Calculated Distance Traveled: 0.59 km

Behavior and Additional Comments

Logging just below the surface, white peduncles

Tuesday, July 11, 2017 Sighting # 5

Initial sighting on Track

Time: 15:05 WP#: 44 Lat: 30.363256 Long: -79.983776
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 7 Beaufort Sea State: 1
Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 15:08 WP#: 45 Lat: 30.375002 Long: -79.981605
Species: *Tursiops truncatus* Numbers (Low/High/Best): 12 / 20 / 16
Features used in Species ID: Robust, uniform gray, white peduncles

Representative images used for Species ID: 3833
Photographer: Ryan Frame numbers: 3806 - 3852 Spacer: 3853
Calculated distance from Trackline: 1.32 km

Final Time and Position of Sighting

Time: 15:09 WP#: 46 Lat: 30.370876 Long: -79.986732
Calculated Distance Traveled: 0.67 km

Behavior and Additional Comments

2 groups milling and circling

Tuesday, July 11, 2017 Sighting # 6

Initial sighting on Track

Time: 15:20 WP#: 50 Lat: 30.436004 Long: -79.894861
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 8 Beaufort Sea State: 2
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 15:21 WP#: 51 Lat: 30.444171 Long: -79.895421
Species: *Tursiops truncatus* Numbers (Low/High/Best): 10 / 20 / 13
Features used in Species ID: Uniform gray, robust, white peduncles

Representative images used for Species ID: 3870, 3876
Photographer: Ryan Frame numbers: 3854 - 3898 Spacer: 3899
Calculated distance from Trackline: 0.91 km

Final Time and Position of Sighting

Time: 15:23 WP#: 52 Lat: 30.439612 Long: -79.896083
Calculated Distance Traveled: 0.51 km

Behavior and Additional Comments

milling, cicling

Tuesday, July 11, 2017 Sighting # 7

Initial sighting on Track

Time: 15:27 WP#: 54 Lat: 30.435864 Long: -79.988301
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: Left

Actual Time and Position of Sighting

Time: 15:58 WP#: 55 Lat: 30.430740 Long: -79.989338
Species: *Tursiops truncatus* Numbers (Low/High/Best): 15 / 30 / 20
Features used in Species ID: Uniform gray, robust, white peduncles

Representative images used for Species ID: 3900, 3902, 3907
Photographer: Ryan Frame numbers: 3900 - 3934 Spacer: 3935
Calculated distance from Trackline: 0.58 km

Final Time and Position of Sighting

Time: 15:30 WP#: 56 Lat: 30.429704 Long: -79.983967
Calculated Distance Traveled: 0.53 km

Behavior and Additional Comments

Spread out, traveling different directions

Tuesday, July 11, 2017 Sighting # 8

Initial sighting on Track

Time: 15:52 WP#: 62 Lat: 30.437367 Long: -80.633695
Vertical Angle: 1 Horizontal Bearing in Degrees: 60 Sighting Cue: Splash
On/Off Effort: On Trackline: 8 Beaufort Sea State: 2
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 15:54 WP#: 63 Lat: 30.438865 Long: -80.625874
Species: *Tursiops truncatus* Numbers (Low/High/Best): 10 / 18 / 12
Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 3943, 3947
Photographer: Ryan Frame numbers: 3936 - 3949 Spacer: 3950
Calculated distance from Trackline: 0.77 km

Final Time and Position of Sighting

Time: 15:57 WP#: 64 Lat: 30.437843 Long: -80.630966
Calculated Distance Traveled: 0.50 km

Behavior and Additional Comments

Traveling, jumping, calf present

Tuesday, July 11, 2017 Sighting # 9

Initial sighting on Track

Time: 16:03 WP#: 68 Lat: 30.496537 Long: -80.633376
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 9 Beaufort Sea State: 1
Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 16:06 WP#: 69 Lat: 30.502896 Long: -80.635671
Species: *Tursiops truncatus* Numbers (Low/High/Best): 3 / 3 / 3
Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 3951, 3956
Photographer: Ryan Frame numbers: 3951 - 3958 Spacer: 3959
Calculated distance from Trackline: 0.74 km

Final Time and Position of Sighting

Time: 16:06 WP#: 70 Lat: 30.503025 Long: -80.631594
Calculated Distance Traveled: 0.39 km

Behavior and Additional Comments

Traveling subsurface

Tuesday, July 11, 2017 Sighting # 10

Initial sighting on Track

Time: 16:16 WP#: 74 Lat: 30.497034 Long: -80.286609
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 9 Beaufort Sea State: 2
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 16:17 WP#: 75 Lat: 30.493976 Long: -80.292565
Species: *Stenella frontalis* Numbers (Low/High/Best): 10 / 18 / 12
Features used in Species ID: Alternating light and dark down body, spotting

Representative images used for Species ID: 3964, 3994, 3996
Photographer: Ryan Frame numbers: 3960 - 3997 Spacer: 3998
Calculated distance from Trackline: 0.66 km

Final Time and Position of Sighting

Time: 16:19 WP#: 76 Lat: 30.497273 Long: -80.287538
Calculated Distance Traveled: 0.61 km

Behavior and Additional Comments

2 groups, slow travel

Wednesday, July 12, 2017 Sighting # 1

Initial sighting on Track

Time: 9:08 WP#: 3 Lat: 29.963215 Long: -80.486917
Vertical Angle: 1 Horizontal Bearing in Degrees: 100 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: 9:12 WP#: 4 Lat: 29.963865 Long: -80.492895
Species: *Tursiops truncatus* Numbers (Low/High/Best): 4 / 4 / 4
Features used in Species ID: Robust body appearance, gray coloration

Representative images used for Species ID: 4001, 4014, 4016
Photographer: Erin Frame numbers: 3999 - 4019 Spacer: 4020
Calculated distance from Trackline: 0.58 km

Final Time and Position of Sighting

Time: 9:16 WP#: 5 Lat: 29.963247 Long: -80.4964
Calculated Distance Traveled: 0.34 km

Behavior and Additional Comments

Single pair initially observed followed by a second pair, heading west.

Wednesday, July 12, 2017 Sighting # 2

Initial sighting on Track

Time: 9:25 WP#: 10 Lat: 29.963518 Long: -80.171184
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 1 Beaufort Sea State: 3
Observer: Ryan Observer side: Left

Actual Time and Position of Sighting

Time: 9:28 WP#: 11 Lat: 29.964265 Long: -80.173488
Species: *Grampus griseus* Numbers (Low/High/Best): 18 / 20 / 19
Features used in Species ID: Melon comes to rounded point with cleft in center, tall falcate dorsal fin, scarring across animals body.
Representative images used for Species ID:
Photographer: Erin Frame numbers: 4021 - 4053 Spacer: 4054
Calculated distance from Trackline: 0.23 km

Final Time and Position of Sighting

Time: 9:33 WP#: 12 Lat: 29.974219 Long: -80.17301
Calculated Distance Traveled: 1.10 km

Behavior and Additional Comments

Single line of animals traveling slowly subsurface, group then broke into two smaller groups.

Wednesday, July 12, 2017 Sighting # 3

Initial sighting on Track

Time: 10:14 WP#: 23 Lat: 30.097976 Long: -80.631198
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 3 Beaufort Sea State: 2
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 10:16 WP#: 24 Lat: 30.100636 Long: -80.631347
Species: *Tursiops truncatus* Numbers (Low/High/Best): 5 / 5 / 5
Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 4057
Photographer: Erin Frame numbers: 4055 - 4067 Spacer: 4068
Calculated distance from Trackline: 0.30 km

Final Time and Position of Sighting

Time: 10:18 WP#: 25 Lat: 30.096737 Long: -80.633346
Calculated Distance Traveled: 0.47 km

Behavior and Additional Comments

At the surface then dove, avoidance

Wednesday, July 12, 2017 Sighting # 4

Initial sighting on Track

Time: 10:26 WP#: 30 Lat: 30.098426 Long: -80.349906
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 3 Beaufort Sea State: 1
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 10:26 WP#: 31 Lat: 30.097384 Long: -80.352616
Species: *Tursiops truncatus* Numbers (Low/High/Best): 16 / 18 / 17
Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 4071, 4073, 4094
Photographer: Erin Frame numbers: 4069 - 4099 Spacer: 4100
Calculated distance from Trackline: 0.29 km

Final Time and Position of Sighting

Time: 10:28 WP#: 32 Lat: 30.092688 Long: -80.352348
Calculated Distance Traveled: 0.52 km

Behavior and Additional Comments

Body length spacing, slow travel at the surface

Wednesday, July 12, 2017 Sighting # 5

Initial sighting on Track

Time: 11:10 WP#: 40 Lat: 30.166839 Long: -80.68641
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 4 Beaufort Sea State: 1
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 11:13 WP#: 41 Lat: 30.172754 Long: -80.692506
Species: *Stenella frontalis* Numbers (Low/High/Best): 3 / 4 / 4
Features used in Species ID: Spotting across animals body.

Representative images used for Species ID: 4102
Photographer: Erin Frame numbers: 4101 - 4104 Spacer: 4105
Calculated distance from Trackline: 0.89 km

Final Time and Position of Sighting

Time: 11:15 WP#: 42 Lat: 30.171235 Long: -80.691525
Calculated Distance Traveled: 0.19 km

Behavior and Additional Comments

Small animals, reluctant to surface making photographing difficult.

Wednesday, July 12, 2017 Sighting # 6

Initial sighting on Track

Time: 11:25 WP#: 48 Lat: 30.230263 Long: -80.490955
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
On/Off Effort: On Trackline: 5 Beaufort Sea State: 1
Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 11:26 WP#: 49 Lat: 30.219728 Long: -80.493599
Species: *Steno bredanensis* Numbers (Low/High/Best): 30 / 40 / 36
Features used in Species ID: No crease from melon to rostrum, triangular dorsal fin, broad pectoral fins, white coloration to lower jaw.

Representative images used for Species ID: 4116, 4117, 4122, 4144, 4145
Photographer: Erin Frame numbers: 4106 - 4154 Spacer: 4155
Calculated distance from Trackline: 1.2 km

Final Time and Position of Sighting

Time: 11:31 WP#: 50 Lat: 30.222749 Long: -80.496156
Calculated Distance Traveled: 0.42 km

Behavior and Additional Comments

Five groups of animals with 5-8 individuals in each, side to side and belly swimming, animals feeding shark observed within animals.

Wednesday, July 12, 2017 Sighting # 7

Initial sighting on Track

Time: 12:04 WP#: 56 Lat: 30.303238 Long: -80.215861
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 6 Beaufort Sea State: 3
Observer: Ryan Observer side: Left

Actual Time and Position of Sighting

Time: 12:05 WP#: 57 Lat: 30.30005 Long: -80.210934
Species: *Stenella frontalis* Numbers (Low/High/Best): 30 / 35 / 33
Features used in Species ID: Alternating light and dark coloration down animals body.

Representative images used for Species ID: 4156
Photographer: Erin Frame numbers: 4156 - 4158 Spacer: 4159
Calculated distance from Trackline: 0.59 km

Final Time and Position of Sighting

Time: 12:11 WP#: 58 Lat: 30.300065 Long: -80.216706
Calculated Distance Traveled: 0.55 km

Behavior and Additional Comments

Bad glare, disperse groups in pairs or singles a couple of body lengths apart. Slow travel

Wednesday, November 8, 2017 Sighting # 1

Initial sighting on Track

Time: 9:41 WP#: 5 Lat: 30.567773 Long: -80.314488
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body UW
On/Off Effort: On Trackline: 10 Beaufort Sea State: 2
Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 9:46 WP#: 6 Lat: 30.567587 Long: -80.324503
Species: *Tursiops truncatus* Numbers (Low/High/Best): 5 / 6 / 5
Features used in Species ID: Robust gray body with light colored peduncle

Representative images used for Species ID: 6259, 6260, 6261, 6294
Photographer: Ryan Frame numbers: 6238 - 6303 Spacer: 6303
Calculated distance from Trackline: 0.96 km

Final Time and Position of Sighting

Time: 9:50 WP#: 7 Lat: 30.564381 Long: -80.323850
Calculated Distance Traveled: 0.36 km

Behavior and Additional Comments

One animal observed swimming rapidly underwater. Single animal joined up with a larger group that appeared to be feeding on a large bait ball. There were sharks and spotted dolphins associated with the feeding event.

Wednesday, November 8, 2017 Sighting # 2

Initial sighting on Track

Time: 9:41 WP#: 5 Lat: 30.567773 Long: -80.314488
Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body UW
On/Off Effort: On Trackline: 10 Beaufort Sea State: 2
Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 9:46 WP#: 6 Lat: 30.567587 Long: -80.324503
Species: *Stenella frontalis* Numbers (Low/High/Best): 25 / 35 / 30
Features used in Species ID: Small sleek body with obvious spots.

Representative images used for Species ID: 6253, 6294
Photographer: Ryan Frame numbers: 6238 - 6303 Spacer: 6303
Calculated distance from Trackline: 0.96 km

Final Time and Position of Sighting

Time: 9:50 WP#: 7 Lat: 30.564381 Long: -80.323850
Calculated Distance Traveled: 0.36 km

Behavior and Additional Comments

Animals were associated with a mixed species feeding event that included Tursiops and large sharks.

Wednesday, November 8, 2017 Sighting # 3

Initial sighting on Track

Time: 9:59 WP#: 9 Lat: 30.567795 Long: -79.997473
Vertical Angle: 3 Horizontal Bearing in Degrees: 70 Sighting Cue: Body
On/Off Effort: On Trackline: 10 Beaufort Sea State: 2
Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 10:00 WP#: 10 Lat: 30.578202 Long: -79.990816
Species: *Tursiops truncatus* Numbers (Low/High/Best): 40 / 50 / 55
Features used in Species ID: Robust gray body with light colored peduncle

Representative images used for Species ID: 6308, 6316, 6324
Photographer: Ryan Frame numbers: 6304 - 6337 Spacer: 6337
Calculated distance from Trackline: 1.32 km

Final Time and Position of Sighting

Time: 10:06 WP#: 11 Lat: 30.578009 Long: -79.999504
Calculated Distance Traveled: 0.83 km

Behavior and Additional Comments

Two groups spread out; fast travel

Wednesday, November 8, 2017 Sighting # 4

Initial sighting on Track

Time: 11:13 WP#: 25 Lat: 30.434087 Long: -80.530186
Vertical Angle: 4 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 8 Beaufort Sea State: 2
Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 11:18 WP#: 26 Lat: 30.430557 Long: -80.531969
Species: *Stenella frontalis* Numbers (Low/High/Best): 3 / 6 / 5
Features used in Species ID: Small sleek body with obvious spots.

Representative images used for Species ID: 6344, 6355, 6363
Photographer: Ryan Frame numbers: 6338 - 6368 Spacer: 6368
Calculated distance from Trackline: 0.43 km

Final Time and Position of Sighting

Time: 11:23 WP#: 27 Lat: 30.440648 Long: -80.530510
Calculated Distance Traveled: 1.13 km

Behavior and Additional Comments

Small group of animals traveling fast through Sargassum and individuals splitting off from group.

Wednesday, November 8, 2017 Sighting # 5

Initial sighting on Track

Time: 12:28 WP#: 38 Lat: 30.365191 Long: -80.261354
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 7 Beaufort Sea State: 2
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 12:33 WP#: 39 Lat: 30.364778 Long: -80.253486
Species: *Stenella frontalis* Numbers (Low/High/Best): 10 / 12 / 11
Features used in Species ID: Sleek gray body with spots

Representative images used for Species ID: 6381, 6382
Photographer: Ryan Frame numbers: 6369 - 6391 Spacer: 6391
Calculated distance from Trackline: 0.76 km

Final Time and Position of Sighting

Time: 12:33 WP#: 40 Lat: 30.365240 Long: -80.254921
Calculated Distance Traveled: 0.15 km

Behavior and Additional Comments

One small group traveling fast.

Wednesday, November 8, 2017 Sighting # 6

Initial sighting on Track

Time: 15:16 WP#: 48 Lat: 29.967512 Long: -80.570971
Vertical Angle: 4 Horizontal Bearing in Degrees: 150 Sighting Cue: Blow
On/Off Effort: On Trackline: 1 Beaufort Sea State: 2
Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 15:18 WP#: 49 Lat: 29.966990 Long: -80.588102
Species: *Stenella frontalis* Numbers (Low/High/Best): 18 / 20 / 19
Features used in Species ID: Small sleek body with obvious spots.

Representative images used for Species ID: 6398, 6441, 6447, 6456
Photographer: Ryan Frame numbers: 6392 - 6466 Spacer: 6466
Calculated distance from Trackline: 1.65 km

Final Time and Position of Sighting

Time: 15:23 WP#: 50 Lat: 29.973422 Long: -80.583797
Calculated Distance Traveled: 0.83 km

Behavior and Additional Comments

One group traveling slowly and socializing.

Wednesday, November 8, 2017 Sighting # 7

Initial sighting on Track

Time: 16:18 WP#: 62 Lat: 30.031866 Long: -79.984604
Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
On/Off Effort: On Trackline: 2 Beaufort Sea State: 2
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 16:26 WP#: 63 Lat: 30.041152 Long: -79.977101
Species: *Unidentified Delphinid* Numbers (Low/High/Best): 6 / 5 / 6
Features used in Species ID: NA

Representative images used for Species ID: NA
Photographer: Ryan Frame numbers: NA Spacer: NA
Calculated distance from Trackline: 1.26 km

Final Time and Position of Sighting

Time: 16:26 WP#: 64 Lat: 30.040856 Long: -79.975628
Calculated Distance Traveled: 0.15 km

Behavior and Additional Comments

Located animals swimming sub surface, but then unable to relocate for photos and species ID.

Wednesday, November 8, 2017 Sighting # 8

Initial sighting on Track

Time: 16:41 WP#: 66 Lat: 30.031604 Long: -80.481542
Vertical Angle: 2 Horizontal Bearing in Degrees: 150 Sighting Cue: Body
On/Off Effort: On Trackline: 2 Beaufort Sea State: 2
Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 16:43 WP#: 67 Lat: 30.031849 Long: -80.473445
Species: *Stenella frontalis* Numbers (Low/High/Best): 5 / 6 / 7
Features used in Species ID: Small sleek body with obvious spots.

Representative images used for Species ID: 6491, 6507, 6519
Photographer: Ryan Frame numbers: 6469 - 6523 Spacer: 6523
Calculated distance from Trackline: 0.78 km

Final Time and Position of Sighting

Time: 16:45 WP#: 68 Lat: 30.031182 Long: -80.477300
Calculated Distance Traveled: 0.38 km

Behavior and Additional Comments

One group traveling slowly.