

Aerial Survey Baseline Monitoring in the Continental Shelf Region of the VACAPES OPAREA: 2016-2017 Final Project Report

Submitted to:

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



Prepared by:

Sarah D. Mallette¹, Ryan J. McAlarney²,
Gwen G. Lockhart³, Erin W. Cummings²,
D. Ann Pabst², William A. McLellan², and
Susan G. Barco¹

¹ Virginia Aquarium & Marine Science Center
Foundation

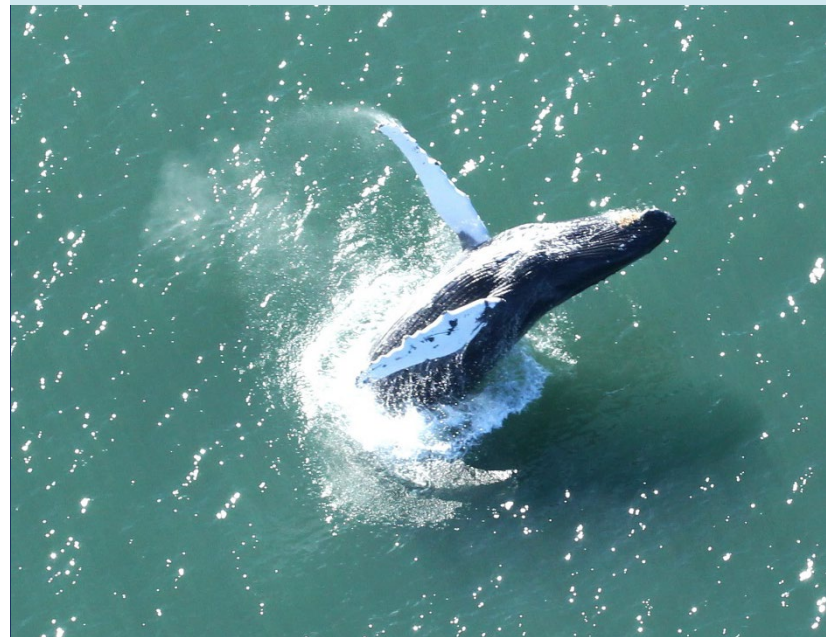
² Department of Biology and Marine Biology
University of North Carolina Wilmington

³ Navy Facilities Engineering Command
Atlantic

Submitted by:



Virginia Beach, VA



October 2017

Suggested Citation:

Mallette, S.D., R.J. McAlarney, G.G. Lockhart, E.W. Cummings, D.A. Pabst, W.A. McLellan, and S.G. Barco. 2017. *Aerial Survey Baseline Monitoring in the Continental Shelf Region of the VACAPES OPAREA: 2016-2017 Final Project 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 Order 05, issued to HDR, Inc., Virginia Beach, Virginia. October 2017.

Cover Photo Credit:

Humpback whale (*Megaptera novaeangliae*). Photo by Sarah Mallette, Virginia Aquarium & Marine Science Museum collected under NOAA Scientific Permit # 16473 issued to University of North Carolina Wilmington.

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

Table of Contents

Acronyms and Abbreviations	v
1. Introduction.....	1
2. Summary of Coastal Virginia Aerial Surveys.....	1
3. Methods.....	4
3.1 SURVEY DESIGN AND LOGISTICS.....	4
4. Results.....	6
4.1 MARINE MAMMAL SIGHTINGS.....	11
4.2 DOLPHINS.....	15
4.2.1 Bottlenose dolphin (<i>Tursiops truncatus</i>).....	15
4.2.2 Atlantic spotted dolphin (<i>Stenella frontalis</i>).....	17
4.2.3 Short-beaked common dolphin (<i>Delphinus delphis</i>).....	19
4.3 BALEEN WHALES.....	21
4.3.1 North Atlantic right whale (<i>Eubalaena glacialis</i>).....	21
4.3.2 Humpback whale (<i>Megaptera novaeangliae</i>).....	23
4.3.3 Fin whale (<i>Balaenoptera physalus</i>).....	25
4.3.4 Unidentified balaenopterid.....	27
4.4 SEA TURTLES	28
4.4.1 Loggerhead sea turtle (<i>Caretta caretta</i>).....	28
4.4.2 Leatherback sea turtle (<i>Dermochelys coriacea</i>).....	28
4.5 OTHER MARINE VERTEBRATE SIGHTINGS.....	33
4.5.1 Cartilaginous fish sightings (Chondrichthyes).....	33
4.5.2 Other fishes	33
4.6 VESSEL SIGHTINGS.....	35
4.6.1 Commercial.....	35
4.6.2 Military Vessels	36
4.6.3 Other Vessels	37
5. Acknowledgements	39
6. Literature Cited	39

Appendices

- A Aerial Survey Data Sheet
- B Event Codes and Species List
- C Notes on Sighting Summary Sheets
- D Individual Sightings Tables

Figures

Figure 1. Survey tracklines and realized effort in the VACAPES survey area during 2016 and 2017.....	3
Figure 2a. Total on-effort distance surveyed per Beaufort Sea State between January 2016 through June 2017 during aerial surveys in the Coastal VACAPES survey area.	8
Figure 2b. Effort by Beaufort Sea State for each day between January 2016 through June 2017 during aerial surveys in the Coastal VACAPES survey area.....	8
Figure 2c. Distance-weighted mean BSS for each month between January 2016 through June 2017 during aerial surveys in the Coastal VACAPES survey area.....	9
Figure 3a. Number of cetacean sightings per BSS between January 2016 through June 2017 during aerial surveys in the Coastal VACAPES survey area.	10
Figure 3b. Cetacean sightings per 1,000 km flown by BSS between January 2016 through June 2017 during aerial surveys in the Coastal VACAPES survey area.....	10
Figure 3c. Cetacean sightings per 1,000 km surveyed and the average BSS per month from between January 2016 through June 2017 during aerial surveys in the Coastal VACAPES survey area.....	11
Figure 5. All cetacean sightings during aerial surveys conducted in the Coastal VACAPES survey area between January 2016 through June 2017 (N=159).....	14
Figure 6. Bottlenose dolphin (<i>Tursiops truncatus</i>) sightings in the Coastal VACAPES survey area between January 2016 through June 2017 (N=163). Symbol size indicates group size. White outlines denote off-effort sightings. Group of 600 individuals denoted by a yellow star.....	16
Figure 7. Atlantic spotted dolphin (<i>Stenella frontalis</i>) sightings in the coastal VACAPES survey area between January 2016 through June 2017 (N=3). Symbol size indicates group size. White outline denotes an off-effort sighting.....	18
Figure 8. Short-beaked common dolphin (<i>Delphinus delphis</i>) sightings in the coastal VACAPES survey area between January 2016 through June 2017 (N=10). Symbol size indicates group size.	20
Figure 9. North Atlantic right whale (<i>Eubalaena glacialis</i>) sightings in the coastal VACAPES survey area from between January 2016 through June 2017 (N=2).....	22
Figure 10. Humpback whale (<i>Megaptera novaeangliae</i>) sightings in the coastal VACAPES survey area between January 2016 through June 2017 (N=20). Symbol size indicates group size. White outlines denote off-effort sightings.	24
Figure 11. Images of a pair of humpback whales (<i>Megaptera novaeangliae</i>) on 10 December 2016 bubble net feeding in the coastal VACAPES survey area. Fin whale (<i>Balaenoptera physalus</i>)	25
Figure 12. Fin whale (<i>Balaenoptera physalus</i>) sighting in the coastal VACAPES survey area during February 2016.	26

Figure 13. Unidentified balaenopterid whale sighting in the coastal VACAPES survey area during March 2016. White outline denotes an off-effort sighting.....	27
Figure 14. Loggerhead sea turtle (<i>Caretta caretta</i>) sightings in the coastal VACAPES survey area between January 2016 through June 2017 (N=509). Off-effort sightings are included.....	30
Figure 15. Leatherback sea turtle (<i>Dermochelys coriacea</i>) sightings in the coastal VACAPES survey area between January 2016 through June 2017 (N=13). Off-effort sightings are included.	31
Figure 16a. Total numbers of sea turtles sightings by BSS in the coastal VACAPES survey area between January 2016 through June 2017.	32
Figure 16b. Sea turtle sightings per 1,000 km flown by BSS in the coastal VACAPES survey area between January 2016 through June 2017.	32
Figure 16c. Sea turtle sightings per 1,000 km surveyed and the average BSS per month in the coastal VACAPES survey area between January 2016 through June 2017.....	33
Figure 17. (Manta ray (<i>Manta birostris</i>), cownose ray (<i>Rhinoptera bonasus</i>), ocean sunfish (<i>Mola mola</i>), cobia (<i>Rachycentron canadum</i>), and shark sightings in the coastal VACAPES survey area between January 2016 through June 2017 (N=99).....	34
Figure 18. Commercial vessel sightings in the coastal VACAPES survey area between January 2016 through June 2017 (N=563).	36
Figure 19. Military vessel sightings in the coastal VACAPES survey area between January 2016 through June 2017 (N=129).	37
Figure 20. Other vessel sightings in the coastal VACAPES survey area between January 2016 through June 2017 (N=293).	38

Tables

Table 1. Trackline end points for the VACAPES survey area for both the <i>Overlap</i> and <i>No-overlap</i> survey designs.....	2
Table 2. Tracklines, km flown, and Hobbs hours (engine-on time) during aerial surveys of the Coastal VACAPES survey area from January 2016 through June 2017. Trackline numbers are listed in the order in which they were flown.....	7
Table 3. Total numbers of on-effort sightings and individuals for each species by month from January 2016 through June 2017 during aerial surveys in the Coastal VACAPES survey area.....	13
Table 4. Total numbers of on-effort sightings and individuals for each sea turtle species by month from January 2016 through June 2017 for the coastal VACAPES survey area.....	29

Acronyms and Abbreviations

BSS	Beaufort Sea State
CREEM	Centre for Research into Ecological and Environmental Modeling
GPS	Global Positioning System
km	kilometer(s)
m	meter(s)
NARW	North Atlantic right whale
NAVFAC	Naval Facilities Engineering Command
OPAREA	Operating Area
SD	standard deviation
UNCW	University of North Carolina Wilmington
U.S.	United States
UTC	Coordinated Universal Time
VACAPES	Virginia Capes
VAQF	Virginia Aquarium & Marine Science Center Foundation, Inc.
VA WEA	Virginia Wind Energy Area

This page intentionally left blank.

1. Introduction

The Virginia Aquarium & Marine Science Center Foundation, Inc. (VAQF) is tasked to conduct aerial surveys for the continental shelf region off the mouth of the Chesapeake Bay within the Virginia Capes Operating Area (VACAPES OPAREA) to provide marine species monitoring services. The current survey will complement existing United States (U.S.) Navy marine species monitoring efforts (Aerial Survey Baseline Monitoring- Atlantic Fleet Training and Testing) and will support environmental planning and regulatory compliance along the East Coast of the United States.

VAQF in collaboration with University of North Carolina Wilmington (UNCW) conducted line-transect aerial surveys during 18 months (January 2016 through June 2017) of Navy-funded aerial survey efforts over the continental shelf off the coast of Virginia Beach, Virginia. Surveys were flown each month during this period. The data collected for this project contribute to regional mid-Atlantic ocean planning efforts and complement existing Navy monitoring projects. Additionally, the results of these efforts contribute baseline protected species occurrence data, including species distribution; abundance; density estimates; and seasonal habitat usage.

The survey site includes an approximately 6,500-square-kilometer area off the coast of Virginia extending from the southern portion of the eastern shore of Virginia to the North Carolina/Virginia state border. The aerial survey design was established based upon advisements from the Centre for Research into Ecological and Environmental Modelling (CREEM) at the University of St. Andrews and objectives identified by the U.S. Navy. VAQF conducted fixed-wing aerial line-transect surveys, using previously established distance-sampling protocols, to document the occurrence of marine mammals and sea turtles. VAQF worked closely with the UNCW to maintain consistency among the safety, flight, and data-reporting protocols for Hatteras/Onslow/JAX baseline monitoring projects (McAlarney et al. 2013, 2014; Cummings et al. 2015). The current report describes monitoring activities that occurred between January 2016 and June 2017.

2. Summary of Coastal Virginia Aerial Surveys

This document is an annual progress report to the U.S. Department of the Navy on aerial surveys conducted along the continental shelf off the coast of Virginia Beach, Virginia, from January 2016 through June 2017, hereafter referred to as the reporting period. During this period, a total of 30 survey days (18 survey days in 2016 and 12 in 2017) were allotted to VAQF to conduct surveys of the continental shelf region off the mouth of the Chesapeake Bay within the VACAPES OPAREA. Twenty-nine survey days were successfully flown, while the remaining flight was attempted but not conducted due to low cloud ceilings.

Two survey designs were established relative to the existing Norfolk Canyon offshore survey area to calibrate for survey origin difference and integrate data between sites. These were (1) *Overlap*: the eastern ends of all transect lines overlapped 10 kilometers (km) with the western ends of the offshore lines (**Table 1, Figure 1**), and (2) *No Overlap (truncated)*: transect lines did not overlap with the offshore transect lines (**Table 1, Figure 1**; i.e., the eastern end of the coastal lines terminated at the longitude of the western end of the UNCW lines).

Table 1. Trackline end points for the VACAPES survey area for both the *Overlap* and *No-overlap* survey designs.

Transect	West End		East End (no overlap)		East End (overlap)	
	Latitude (°N)	Longitude (°W)	Latitude (°N)	Longitude (°W)	Latitude (°N)	Longitude (°W)
0	36.55054	-75.84462	36.55343	-75.15952	36.55352	-75.05009
1	36.60995	-75.86152	36.61296	-75.15965	36.61305	-75.05013
2	36.66928	-75.88874	36.67249	-75.15977	36.67258	-75.05017
3	36.72761	-75.91646	36.73103	-75.15989	36.73113	-75.05021
4	36.78727	-75.93766	36.79086	-75.16002	36.79095	-75.05024
5	36.84616	-75.95269	36.84987	-75.16014	36.84997	-75.05028
6	36.90554	-75.96906	36.90938	-75.16026	36.90948	-75.05032
7	36.96382	-75.97857	36.96774	-75.16038	36.96784	-75.05036
8	37.02638	-75.95745	37.03013	-75.16052	37.03023	-75.05040
9	37.08526	-75.93570	37.08885	-75.16064	37.08894	-75.05044
10	37.14611	-75.85745	37.14911	-75.16077	37.14920	-75.05048
11	37.20508	-75.79796	37.20766	-75.16089	37.20776	-75.05052
12	37.26437	-75.78844	37.26688	-75.16102	37.26698	-75.05056
13	37.32400	-75.72454	37.32611	-75.16066	37.32621	-75.05060

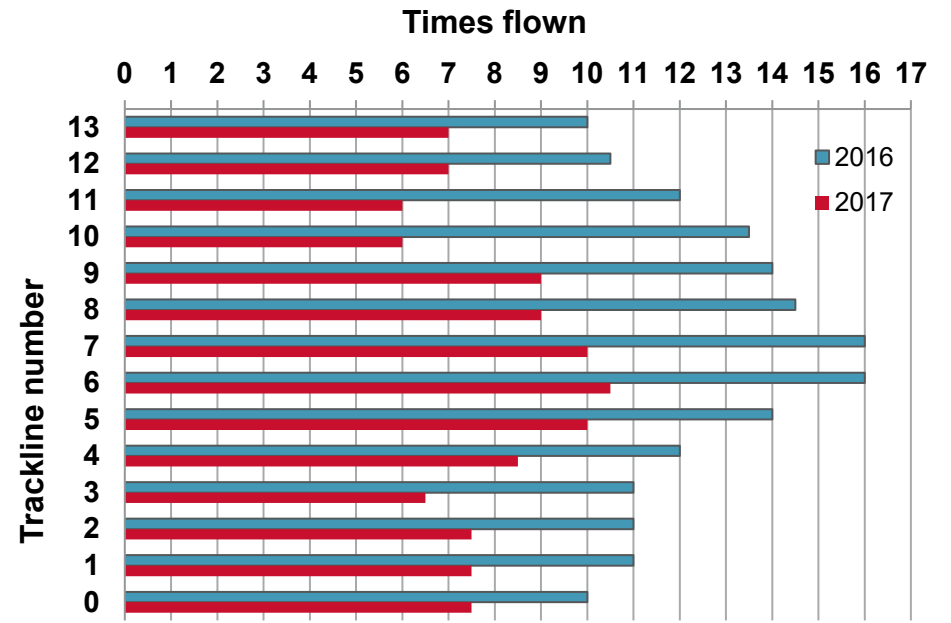
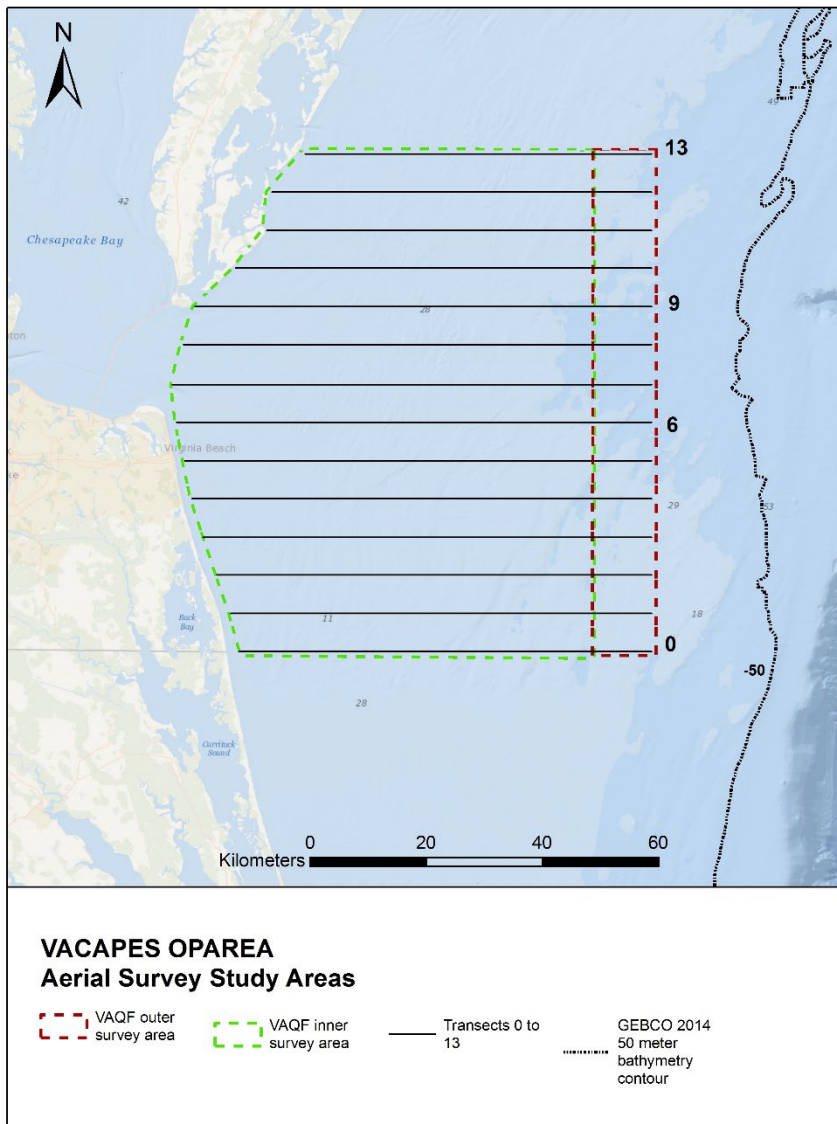


Figure 1. Survey tracklines and realized effort in the VACAPES survey area in 2016 (blue bars) and 2017 (red bars).

Survey effort occurred in each month of 2016 and in each of the six months surveyed between January and June 2017. Single days of effort occurred during May through November of 2016 and in May of 2017, while one and a half to two survey days were achieved in each of the remaining months. One hundred and seventy-five and half transect lines (11,923 km) over 18 days was covered in 2016, while 135 transect lines (7,597.0 km) over 11 survey days was covered in 2017. These surveys resulted in a total of 310.5 transect lines covered over 29 survey days between Jan 2016 and June 2017. Funds were expended during June surveys. Ninety-four percent of survey effort was conducted in Beaufort Sea State [BSS] 1–3.

A total of 159 sightings of 2,529 cetaceans was detected while on-effort during the 29 days of aerial surveys. Six species of cetaceans were photo-documented, including bottlenose dolphin (*Tursiops truncatus*; 137 sightings of 2,022 individuals), Atlantic spotted dolphin (*Stenella frontalis*; 2 sightings of 155 individuals), short-beaked common dolphin (*Delphinus delphis*; 9 sightings of 338 individuals), North Atlantic right whale (*Eubalaena glacialis*; 2 sightings of 2 individuals), humpback whale (*Megaptera novaeangliae*, 6 sightings of 7 individuals), and fin whale (*Balaenoptera physalus*, 1 sighting of 2 individuals).

Forty-two off-effort cetacean sightings were also recorded, including 13 sightings of humpback whales (15 individuals), one sighting of Atlantic spotted dolphins (125 individuals), one sighting of short-beaked common dolphin (18 individuals) and 26 sightings of bottlenose dolphins (128 individuals). There was one sighting (1 individual) where the baleen whale species identity could not be established with 100 percent certainty, and this sighting was recorded as an “unidentified balaenopterid.” These off-effort sightings were included in species sighting maps and tables, but were excluded from all other analyses.

Six hundred and forty-six sightings of 689 sea turtles were recorded during the survey period, of which 502 were identified as loggerhead (*Caretta caretta*; 538 individuals) and 11 sightings as leatherback (*Dermochelys coriacea*; 12 individuals) sea turtles. Species identification could not be established for 133 detections of 139 individual turtles, and these were listed as “unidentified sea turtle.” Sea turtles were detected during 6 of the 12 months surveyed, with the highest numbers of sightings in June.

In addition to cetaceans and sea turtles, other species observed included a variety of fishes, including manta rays (*Manta birostris*), cownose rays (*Rhinoptera bonasus*), ocean sunfish (*Mola mola*), unidentified sharks, and cobia (*Rachycentron canadum*). Commercial, military, and recreational vessels also were encountered in the survey area.

3. Methods

3.1 Survey Design and Logistics

Aerial survey effort was initiated in the continental shelf region off the mouth of the Chesapeake Bay within the VACAPES OPAREA in January 2016 and concluded in June 2017. As this is controlled airspace, pilots coordinate airspace the morning of planned survey flights to avoid interacting with any active areas and activities. The central portion of the survey area was generally given preference. In some instances, coverage off the mouth of the Chesapeake Bay was provided to support vessel surveys being conducted by HDR, Inc., while other times the central portion of the survey area was covered due to restricted airspaces to the north and south.

VAQF coordinated with UNCW's flight team as necessary to avoid airspace conflicts and to pair VAQS and UNCW flights when possible. Flights maintained consistency for general flight and safety guidelines. Survey flights typically originated from the Fixed-base Operator in Norfolk, Virginia. Aerial survey, data collection and management protocols were consistent with ongoing surveys being conducted under the Navy's marine species monitoring program in the offshore VACAPES and Jacksonville areas. Aerial surveys were conducted in high-wing, twin-engine, Cessna 337 aircraft, which were maintained under Title 14 of the Code of Federal Regulations § 135. Each plane was equipped with electronic positioning equipment and safety gear required for carrying out aerial surveys. Two pilots were used for each flight. Both pilots met requirements specified in 14 Code of Federal Regulations § 135, and met or exceeded all NOAA offshore flight safety requirements. The survey team included two observers and a coordinator. Surveys were flown only in safe operating conditions according to NOAA Aircraft Operations Center standards and under visual flight rules. Aerial surveys for endangered species were conducted under National Marine Fisheries Service Scientific Research Permit 16473, held by Dr. D. Ann Pabst at UNCW, and for non-listed marine mammal species under Scientific Research General Authorization 17325 issued to VAQF.

Surveys were flown at an altitude of 305 meters (1,000 feet) and operational airspeeds of approximately 185 kilometers per hour (100 knots). Two observers, one positioned on each side of the aircraft, conducted the surveys. The plane was equipped with a Global Positioning System (GPS) receiver to permit precise track-line fidelity. Each observer had an independent GPS unit to record precise times and geographic positions of all marine mammal and sea turtle sightings. All times were recorded in local time, either Eastern Standard or Eastern Daylight as appropriate for the date of the survey.

Environmental parameters including visibility, BSS, cloud cover, and glare were collected at regular intervals throughout the survey period and at each time an event was recorded. When a cetacean sighting occurred, the initial location on the track-line was recorded and the plane broke from the track-line. The sighting cue(s) and the vertical and horizontal angles of the initial sighting relative to the observer's vantage point in the plane were recorded at the time of the sighting. When the plane was directly over the animals' location, species identification, reliability of species identification, and group size (minimum, maximum, and best estimate) were recorded. Observers also recorded perpendicular angle from the transect line of all sea turtles, other marine vertebrates, and vessels, although the survey did not break track for these sightings.

Additionally, track was not broken when bottlenose dolphins were observed in the nearshore waters within 20 nautical miles (37 km) of shore, although standard sighting data were documented. This approach was established to maximize efficiency of survey effort in areas where the spatial distribution and relative abundance of coastal bottlenose dolphins has previously been established ([Engelhaupt et al. 2016](#), Barco et al. 1999; Torres et al. 2003; Torres et al. 2005).

If a sighting occurred while transiting to or from the survey area or between transect lines it was recorded as an "off effort" sighting. Any cetaceans the survey team encountered while investigating a separate sighting cue also were considered off effort. If two species were seen associated with the same sighting cue, the first was documented as on effort and the secondary sighting was considered off effort.

4. Results

A total of 310.5 transect lines totaling 19,520.2 km were surveyed from January 2016 to June 2017 (**Table 2**). Thirty survey days were attempted, although due to a low cloud ceiling no surveys were conducted on June 15, 2017. Conditions during the 29 survey days ranged from BSS 1 to 4 with approximately 94 percent of effort in BSS 3 or lower [BSS 1: 4,677.5 km (24 percent), BSS 2: 8,306.4 km (43 percent), BSS 3: 5,439.2 km (27.9 percent), BSS 4: 1067.7 km (5.5 percent)] (**Figures 2a and b**). An average BSS value, weighted by distance flown, was calculated for each month as a way to compare conditions across time (**Figure 2c**).

Table 2. Tracklines, km flown, and Hobbs hours (engine-on time) during aerial surveys of the Coastal VACAPES survey area between January 2016 and June 2017. Trackline numbers are listed in the order in which they were flown.

Date	Transect lines Flown AM	Transect lines Flown PM	Total km Flown	Hobbs Hours
2016				
29 Jan 2016	6 to 11	1 to 3	245.0	5.5
30 Jan 2016	10 to 7	5 to 4	535.1	
2 Feb 2016	0 to 5	6 to 11	786.5	10.6
22 Feb 2016	12, 9	11, 10, 8 to 1	744.3	
17 Mar 2016	13 to 12	11 to 4	772.0	13.6
18 Mar 2016	6 to 9	10 to 11, 3 to 0	744.2	
20 Apr 2016	0 to 5	6 to 13	893.1	9.9
21 Apr 2016		5 to 10	414.0	
10 May 2016	6 to 9	10 to 13	575.0	5.0
27 Jun 2016	0 to 3	4 to 7, half of 8 & 12, 13	748.2	6.0
14 Jul 2016	13 to 8	7 to 0	881.6	7.1
8 Aug 2016	12 to 13, 11 to 6	5 to 0	891.6	6.5
13 Sep 2016	0 to 5	6, 7, half of 10 & 11, 12, 13	688.6	5.2
21 Oct 2016	0 to 5	6, 7, 13, 12	740.2	5.6
7 Nov 2016	10 to 5		460.8	3.0
10 Dec 2016	13 to 8	7 to 4	632.7	
21 Dec 2016	0 to 5	6 to 9	774.7	14.8
22 Dec 2016	13 to 8		411.0	
18 Days	175.5 Transect lines		11,923.2	92.8
2017				
11 Jan 2017	5 to 6, 0 to 2	8 to 9	602.15	10.2
12 Jan 2017	13 to 7, 4		572.51	
21 Feb 2017	5 to 8	9 to 13, 5	722.05	10.3
24 Feb 2017		0 to 7	534.30	
26 Mar 2017	13 to 8	0 to 6	743.55	10.2
27 Mar 2017	9 to 0		618.30	
13 Apr 2017	13 to 12, 7 to 6	5 to 0	737.137468	8
14 Apr 2017	9 to 4		422.38	
31 May 2017	13 to 8	7 to 0	756.18	12.3
01 Jun 2017	0 to 5	6 to 13	897.49	
*15 Jun 2017			0	10.2
22 Jun 2017	0 to 7	8 to 13	990.97	
12 Days	135.0 Transect lines		7,597.0	61.2
Total (Jan 2016 – June 2017)				
30 days	310.5 Total Transect lines		19,520.2	154

*Asterisks indicates a survey day that was attempted but due to a low cloud ceiling, flights were canceled.

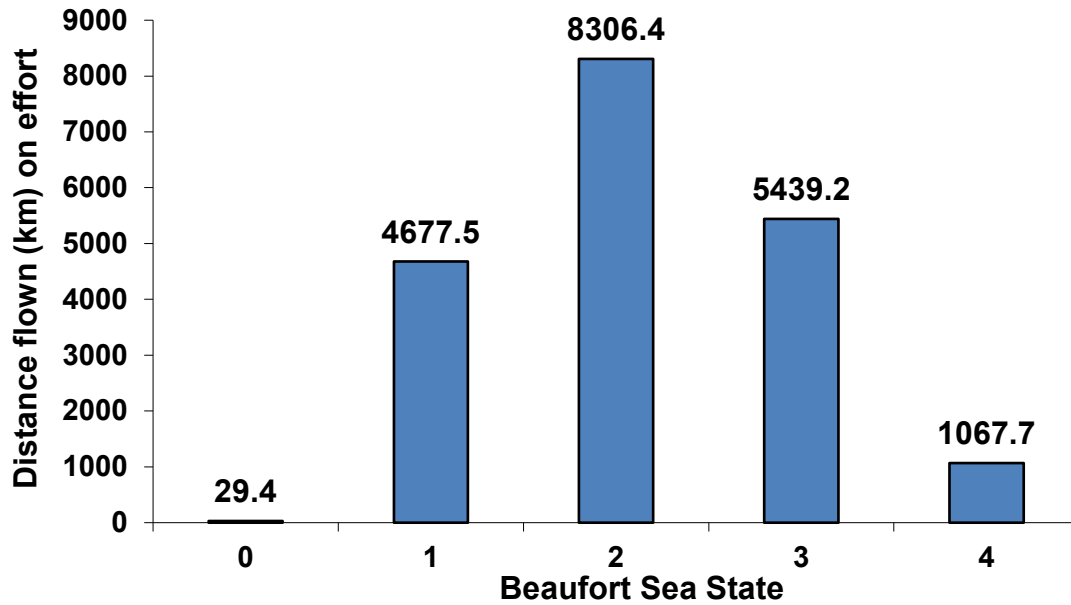


Figure 2a. Total on-effort distance surveyed per Beaufort Sea State during aerial surveys in the Coastal VACAPES survey area between January 2016 and June 2017.

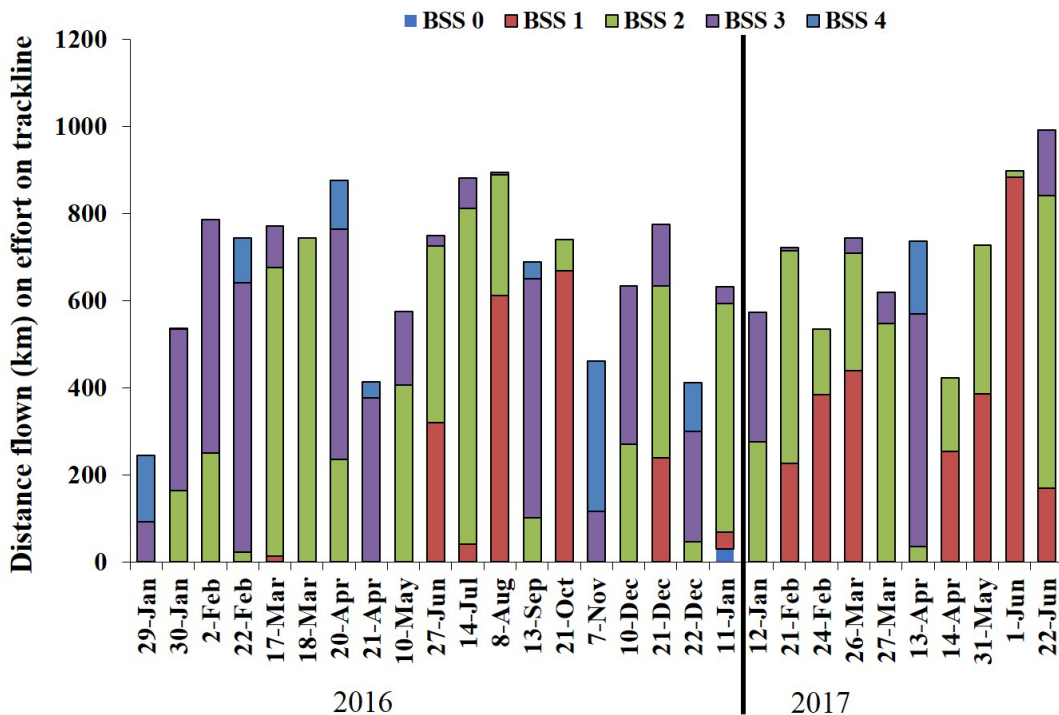


Figure 2b. Effort by Beaufort Sea State for each day during aerial surveys in the Coastal VACAPES survey area between January 2016 and June 2017. Vertical bar distinguishes between 2016 and 2017 survey years.

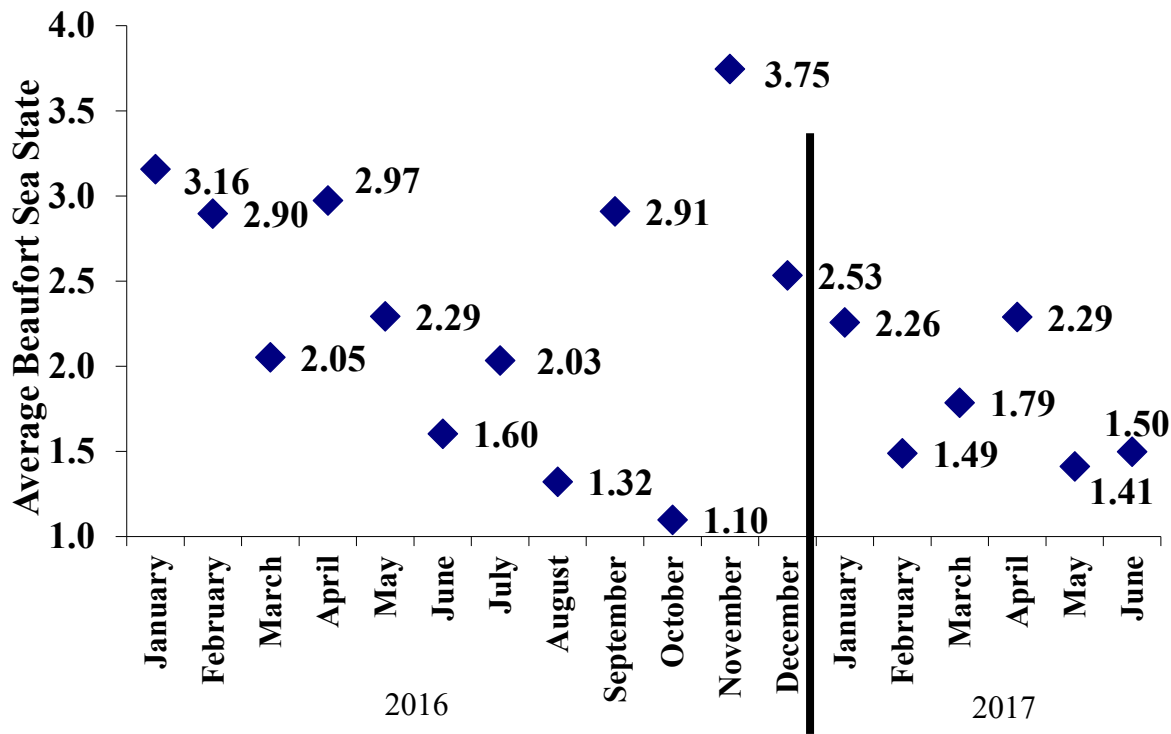


Figure 2c. Distance-weighted mean BSS for each month during aerial surveys in the Coastal VACAPES survey area between January 2016 and June 2017. Vertical bar distinguishes between 2016 and 2017 survey years.

All cetacean sightings occurred in BSS of 3 or lower (**Figure 3a**). Cetacean sighting rates decreased in BSS higher than 2, with 10.3 sightings/1,000 km in BSS 1, 11.0 sightings/1,000 km in BSS 2, 3.7 sightings/1,000 km in BSS 3, and 0.00 sightings/1,000 km in BSS 4 (**Figure 3b**). Other aerial surveys demonstrated that the rate of cetacean sightings is negatively affected by an increase in the BSS (e.g., Buckland et al. 2001; DeMaster et al. 2001; Gómez de Segura et al. 2006; McAlarney *et al.* 2014; Cummings *et al.* 2016; Mallette *et al.* 2016). Sighting rates per month ranged from 1.72 sightings to 31.00. In 2016, the sighting rate was highest in March (23 percent of sightings) with 47 sightings recorded over 1,515.1 km and twenty transect lines (**Figure 3c**). Forty-four of these sightings were bottlenose dolphin and included an estimated 467 individuals.

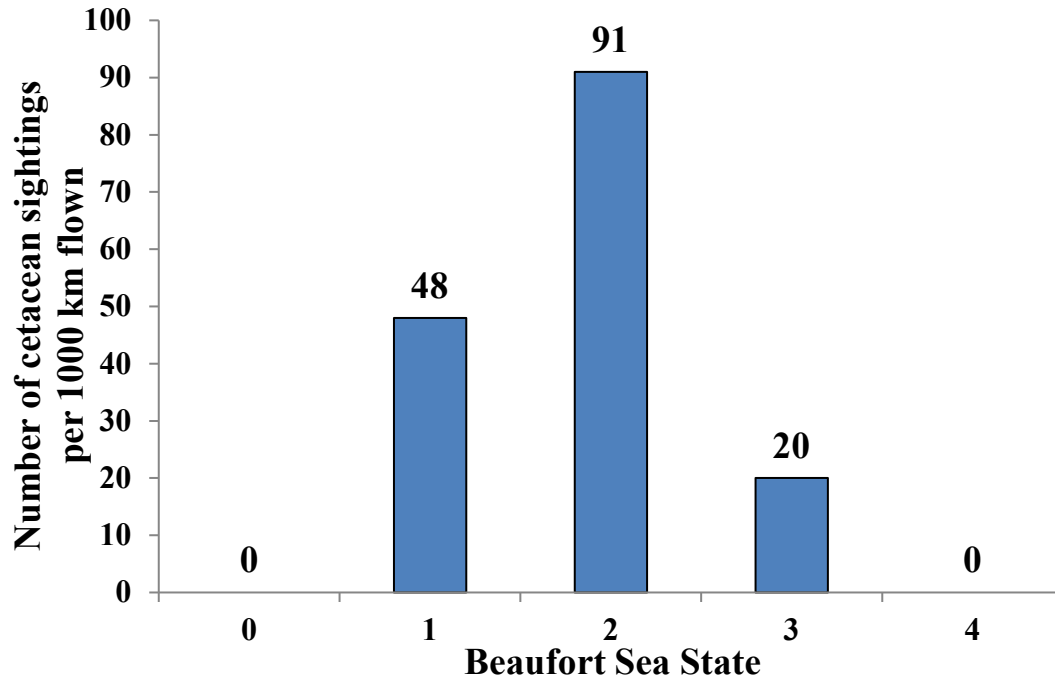


Figure 3a. Number of cetacean sightings per BSS during aerial surveys in the Coastal VACAPES survey area between January 2016 and June 2017.

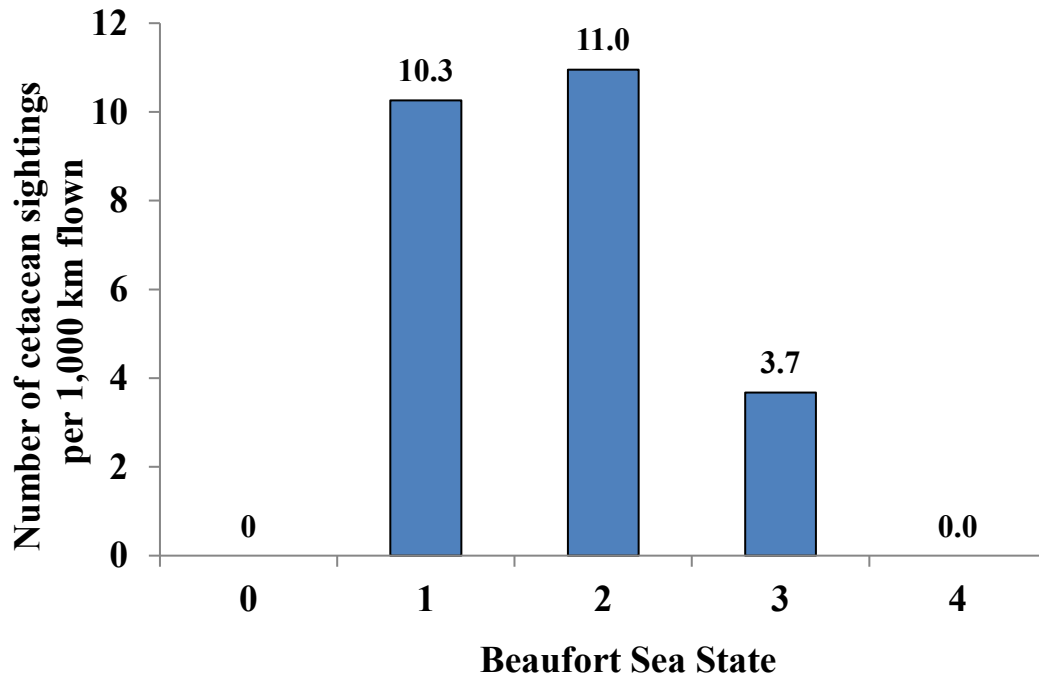


Figure 3b. Cetacean sightings per 1,000 km flown by BSS during aerial surveys in the Coastal VACAPES survey area between January 2016 and June 2017.

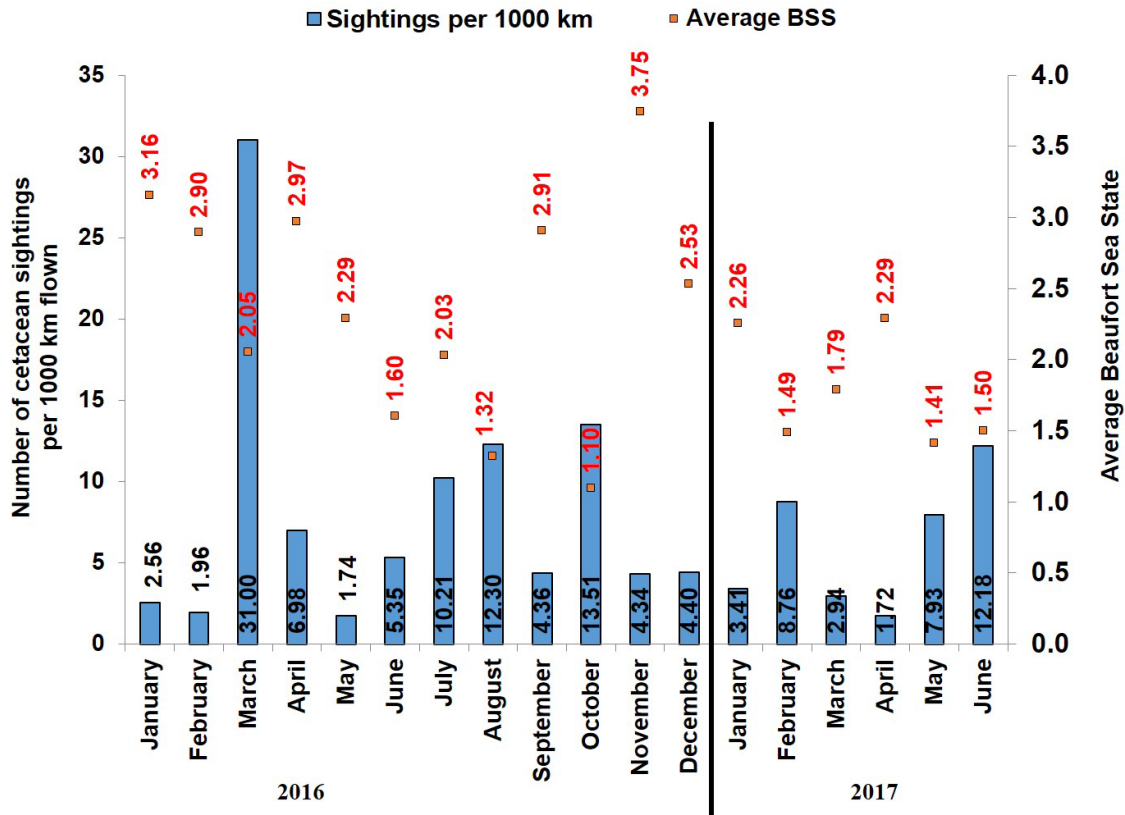


Figure 3c. Cetacean sightings per 1,000 km surveyed and the average BSS per month during aerial surveys in the Coastal VACAPES survey area between January 2016 and June 2017. Vertical bar distinguishes between 2016 and 2017 survey years.

4.1 Marine Mammal Sightings

A total of 109 sightings of 1,848 individual cetaceans representing six species was observed while on effort in 2016. In 2017, a total of 50 sightings of 681 individual cetaceans representing three species, in addition to one unidentified delphinid (whose species identification could not be confirmed with 100% certainty; unidentified delphinid) was observed while on-effort. Between January 2016 and June 2017, a total of 159 sightings of an estimated 2,529 cetaceans were documented in the VACAPES survey area (Table 3, Figure 5).

Summary information by species is below. Two endangered species, North Atlantic right whale (NARW) and fin whale, were encountered in the Coastal VACAPES survey area in 2016, although neither species was observed during the 2017 surveys. The most frequently documented baleen whale, while on-effort was the humpback whale (6 sightings of 7 individuals), followed by the NARW (2 sightings of 2 individuals), and fin whale (1 sighting of 2 individuals). There was also a high number of off-effort sightings of humpback whales (13 sightings of 15 individuals) and most of which were concentrated near the southern entrance to the Chesapeake Bay. While off effort, there were sightings of four cetacean species and one unidentified baleen whale (unidentified balaenopterid).

Bottlenose dolphin were the most commonly encountered delphinid (137 sightings of 2,022 individuals), followed by short-beaked common dolphin (9 sightings of 338), and Atlantic spotted dolphin (2 sightings of 155 individuals). Atlantic spotted dolphin was the only delphinid species that was documented during the 2016 surveys but was not encountered during the 2016 surveys.

The total number of individuals listed represents the best estimate of group size. Summary information on individual sightings can be reviewed in **Appendices A, B, and C**. Individual sightings are summarized in **Appendix D**.

Table 3. Total numbers of on-effort sightings and individuals for each species by month during aerial surveys in the Coastal VACAPES survey area in 2016 and 2017.

Species		2016												2017						Totals
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
<i>Tursiops truncatus</i>	Sightings		1	44	9		3	9	11	3	10	2	7		7	2	2	5	22	137
	# of individuals		6	467	101		16	111	91	608	207	20	46		61	80	11	41	156	2022
<i>Stenella frontalis</i>	Sightings					1	1													2
	# of individuals					125	30													155
<i>Delphinus delphis</i>	Sightings	1		2										2	2	2				9
	# of individuals	5		9										115	185	24				338
<i>Balaenoptera physalus</i>	Sightings		1																	1
	# of individuals		2																	2
<i>Megaptera novaeangliae</i>	Sightings			1									1	2	2					6
	# of individuals			1									1	2	3					7
<i>Eubalaena glacialis</i>	Sightings	1	1																	2
	# of individuals	1	1																	2
Unidentified Delphinid	Sightings																	1	1	2
	# of individuals																	1	2	3
Total	Sightings	2	3	47	9	1	4	9	11	3	10	2	8	4	11	4	2	6	23	159
	Total individuals	6	9	477	101	125	46	111	91	608	207	20	47	117	249	104	11	42	158	2,529

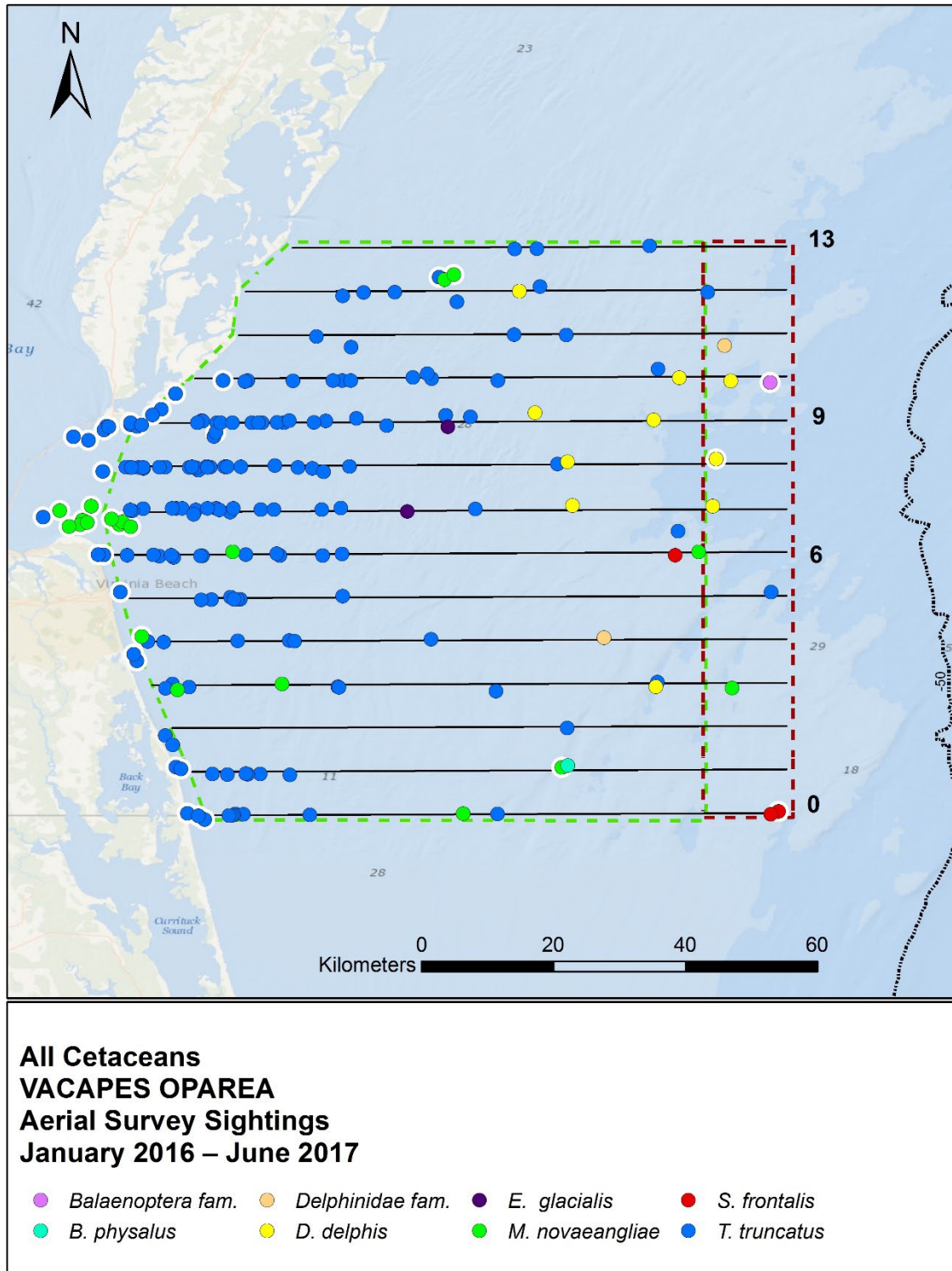


Figure 5. All cetacean sightings (N=159) during aerial surveys during aerial surveys in the Coastal VACAPES survey area between January 2016 and June 2017.

4.2 Dolphins

4.2.1 Bottlenose dolphin (*Tursiops truncatus*)

Bottlenose dolphins were the most commonly observed cetacean species in both years surveys were conducted, with 137 on-effort sightings totaling 2,022 individuals (**Appendix D, Figure 6**). Bottlenose dolphins were observed in 11 of the 12 months across the reporting period. January was the only month during which this species was not observed. Group size ranged from 1 to 600 individuals (mean=14.8, SD=53.1). The group of 600 individual dolphins was observed in September 2016, and the size of this group is uncommon (Malette et al. 2017). Excluding that sightings, the largest group size was 125 individuals and the mean was 10.5 (SD=17.0). In addition, on 26 occasions (128 individuals), bottlenose dolphins were observed while transiting between transect lines or between the airport and survey area and thus were considered off-effort (also included in **Appendix D, Figure 6**).

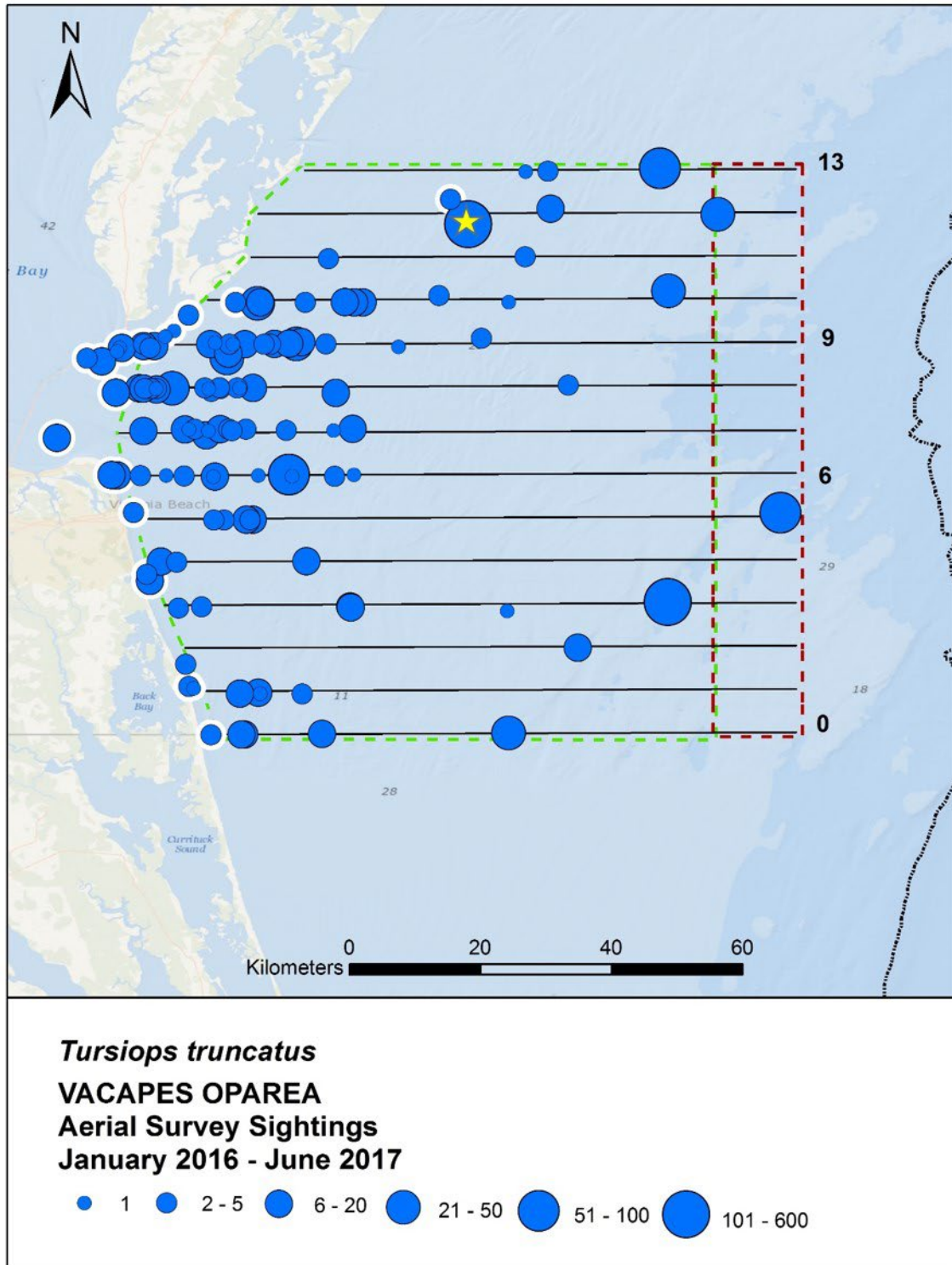


Figure 6. Bottlenose dolphin (*Tursiops truncatus*) sightings in the Coastal VACAPES survey area between January 2016 and June 2017 (N=163). Symbol size indicates group size. White outlines denote off-effort sightings. Group of 600 individuals denoted by a yellow star.

4.2.2 Atlantic spotted dolphin (*Stenella frontalis*)

Two sightings totaling 155 Atlantic spotted dolphins were recorded while on effort in the VACAPES survey area. Group sizes were 30 and 125 (mean=77.5, SD=67.2) (**Appendix D, Figure 7**). One additional off-effort sighting of 125 dolphins was documented inside the survey area. All sightings occurred in May and June of 2016 and there were no sightings documented in 2017. Two distinct ecotypes of the Atlantic spotted dolphin occur in the western North Atlantic: a heavily spotted, larger form that typically occurs on the continental shelf and is most often encountered around the 200-m isobath or in shallower water, and a less spotted and smaller form that occurs farther offshore and around islands (Perrin et al. 1987, 1994). Young spotted dolphins are typically less spotted and become more spotted with maturity, therefore it was difficult to discern from the images collected during each sighting which ecotype was present within the survey area.

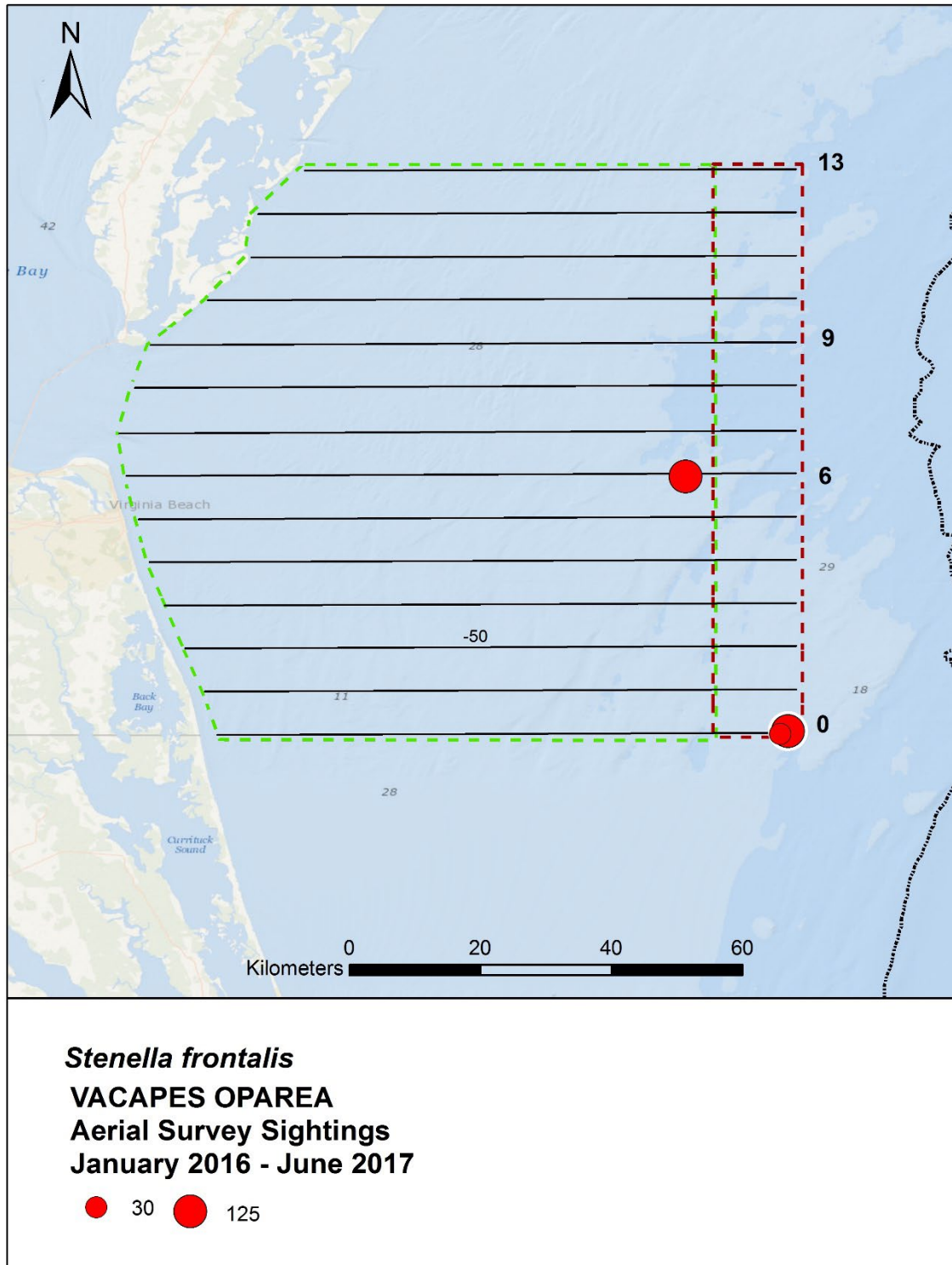


Figure 7. Atlantic spotted dolphin (*Stenella frontalis*) sightings in the coastal VACAPES survey area between January 2016 and June 2017 (N=3). Symbol size indicates group size. White outline denotes an off-effort sighting.

4.2.3 Short-beaked common dolphin (*Delphinus delphis*)

Nine sightings totaling 338 individuals (mean=37.6 SD=16.0) of short-beaked common dolphins were recorded while on effort. Short-beaked common dolphins were documented in two months (January and March) in 2016 and three months (January through March) in 2017 (**Appendix D, Figure 8**). The best estimate of group size ranged from four to 150 individuals. There was one off effort sighting of 18 individuals in March of 2017.

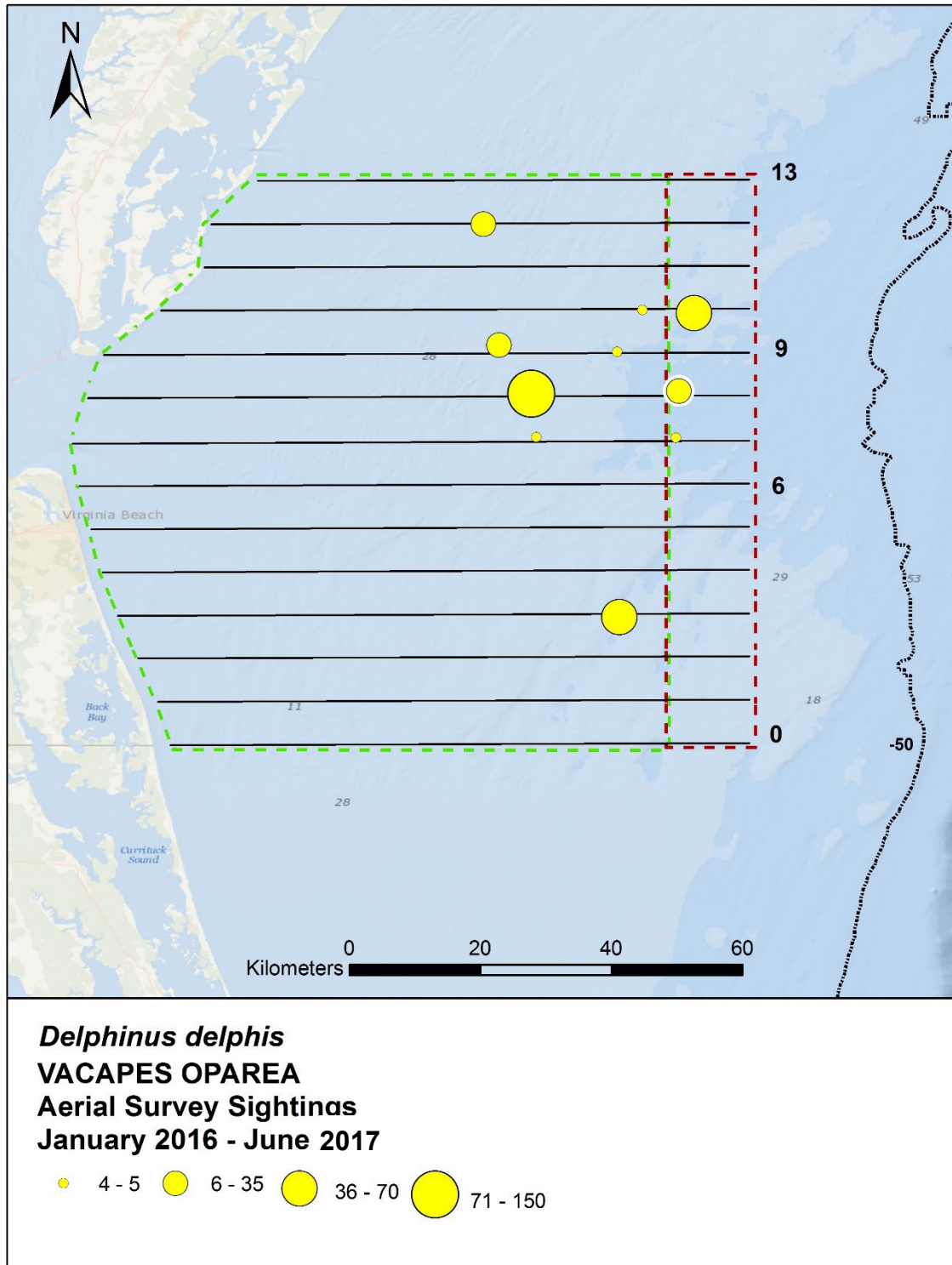


Figure 8. Short-beaked common dolphin (*Delphinus delphis*) sightings in the coastal VACAPES survey area between January 2016 and June 2017 (N=10). Symbol size indicates group size.

4.3 Baleen whales

4.3.1 North Atlantic right whale (*Eubalaena glacialis*)

Two sightings of individual North Atlantic right whales (NARW) were recorded during January and February surveys in 2016 (**Appendix D, Figure 9**). The survey team photo documented each NARW to assess for signs of active injury or entanglement and to collect images for individual identification. Images were contributed to the New England Aquarium for the purpose of stock assessment, and to gain additional information on individuals, seasonal use, and behavior of NARWs utilizing ocean waters off the coast of Virginia.

On 30 January 2016, a single animal was observed swimming east along a consistent heading with its mouth open and exhibiting behavior consistent with feeding. There were no signs of active entanglement and the whale appeared to be in good body condition. This whale has not yet been matched to the North Atlantic Right Whale Catalog. On 2 February 2016, another single animal was observed (#4095) with its mouth open swimming subsurface exhibiting behavior consistent with feeding. This whale also appeared to be in good body condition. Sighting histories compiled from the North Atlantic Right Whale Catalog and curated by the New England Aquarium, indicate this whale was first documented in 2010 and 2011 in the Great South Channel, with subsequent sightings near Jeffrey's Ledge (2011), and Cape Cod Bay (2012). The last updated sighting was in 2016 off of VA. Sex and age are unknown for this individual. There were no NARW sightings recorded in 2017.

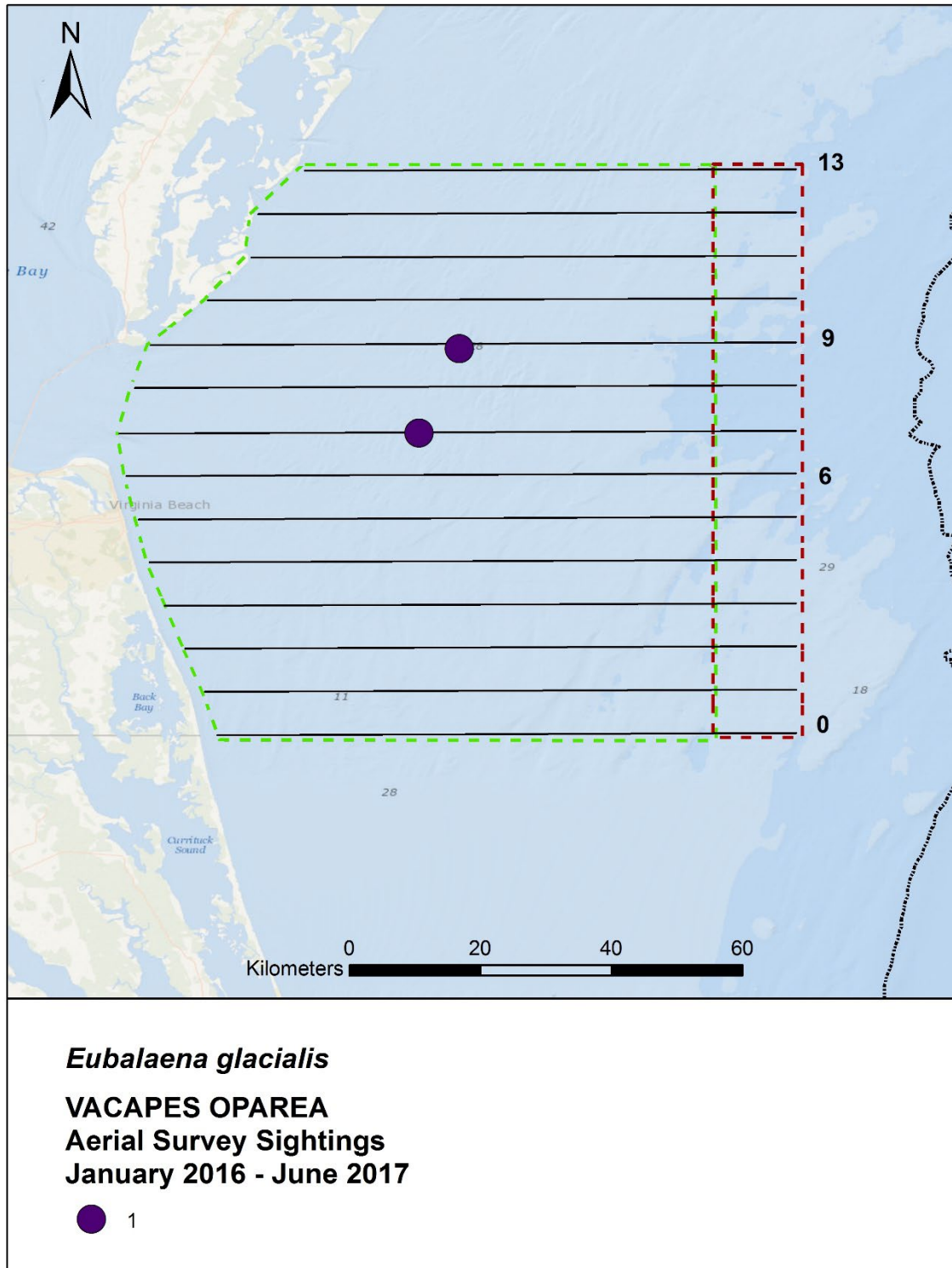


Figure 9. North Atlantic right whale (*Eubalaena glacialis*) sightings in the coastal VACAPES survey area between January 2016 and June 2017 (N=2).

4.3.2 Humpback whale (*Megaptera novaeangliae*)

Humpback whales were the most commonly sighted baleen whale, both on-effort (6 sightings of 7 individuals) and while off-effort (13 sightings of 15 individuals). Most of the off-effort sightings were concentrated near the southern entrance to the Chesapeake Bay near or within the shipping channels.

During 2016, individual humpback whales were observed on-effort in the coastal VACAPES survey area on two occasions (**Appendix D, Figure 10**), while five additional sightings totaling six individuals were observed while off effort; most of these sightings occurred at the mouth of the Chesapeake Bay near Cape Henry. Sightings occurred in February, March, and December. Since the humpback whale has been the focus of ongoing photo-identification work in the region, all efforts were made to document features on the animals that could aid in identifying individuals, although identifying individual whales was not possible on each occasion. On 18 March 2016, a single animal was observed swimming subsurface, surfacing frequently and remaining close to the initial point of sighting. On 10 December 2016, a single whale was observed off effort near Cape Henry on the way to the transect line. That same day, along transect line 12, a single animal was observed traveling and diving frequently. While the survey team waited for the animal to resurface, a pair of humpback whales was observed and was recorded as an off effort sighting. After multiple surfacings, a bubble net formed and two whales emerged in the proximity of the bubble net (**Figure 11**). Three unique individuals were photo-documented during this sighting. On 21 December 2016, two humpback whales were recorded. The pilot observed a whale breaching off Cape Henry and the survey team documented the whale breaching over 20 times during the sighting. On transit back to the airport at the end of the survey day, another humpback whale was observed off Cape Henry and photo-documented. This whale appeared to make relatively deep dives and was fluking occasionally, although no fluke images were captured due to glare.

On 11 January 2017, five sightings of five individual humpback whales were documented. The first was a single individual, conducting shallow dives and surfacing every 4 to 7 minutes. This whale surfaced with ventral grooves engorged and was lunge feeding. The next single humpback sighting was observed fluke slapping and rolling at the surface. The whale surfaced approximately every 4 minutes and respired twice during each surfacing. The subsequent single sighting was an individual that surfaced every 2 to 5 minutes. This animal did not stay at the surface for long. Along the transit back to the airport two other, unassociated individual whales were sighted near the Duke University Research vessel, so the survey team circled briefly for images of the research vessel and whales before continuing transit back to the airport. On 12 January 2017, three sightings, each of an individual humpback whale, were documented, and all were documented off effort. The whales were north of Cape Henry and recorded while transiting back to the airport. Multiple blows were observed and these whales did not appear to be associated. The wind picked up making it difficult to remain over the whales for images.

On 21 February 2017, one sighting of two individual humpback whales were documented, both individuals were documented off effort and located off the coast of Cape Henry. The pair was observed traveling and diving during which time they spent only a short duration of time at the surface. On 24 February 2014, a total of three sightings, representing four individual humpback whales were sighted and one of these was off effort. The first sighting included two whales and although in a similar general proximity, they did not appear associated. Gannets were observed funneling out of the sky and diving into the water in the proximity where the whales were observed. One of the whales had white along the dorsal fin while the other whale did not have a distinct dorsal fin. Both exhibited inconsistent surfacing intervals, shallow dives and subsurface travel. The second sighting was a humpback whale on the east end of a transect line off the mouth of the Chesapeake Bay. This whale was transiting east and was not relocated after the second surfacing for photographs.

While transiting back to the airport a single off effort humpback whale was recorded but no photographs were collected.

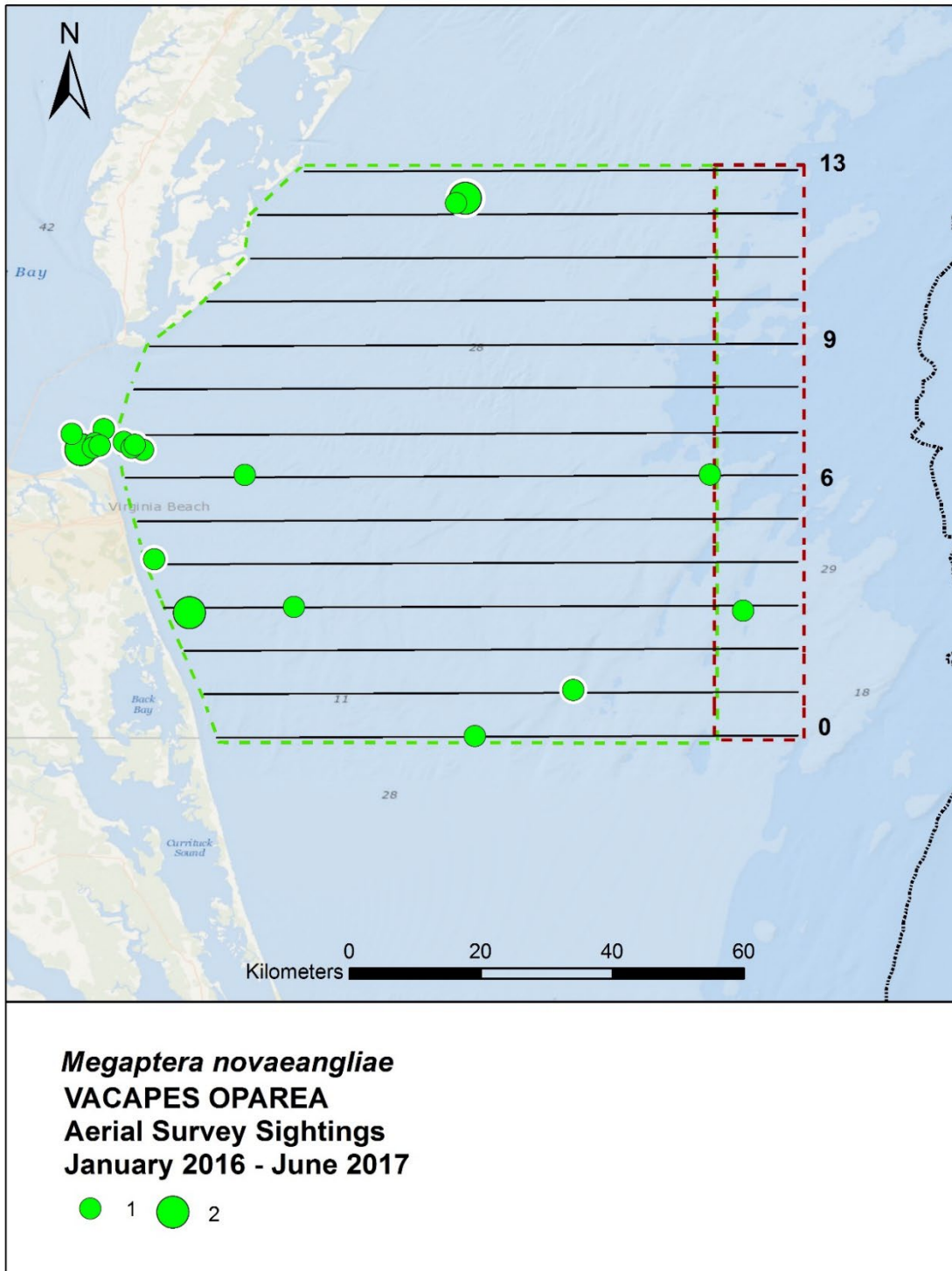


Figure 10. Humpback whale (*Megaptera novaeangliae*) sightings in the coastal VACAPES survey area between January 2016 and June 2017 (N=6). Symbol size indicates group size. White outlines denote off-effort sightings.



Figure 11. Images of a pair of humpback whales (*Megaptera novaeangliae*) on 10 December 2016 bubble net feeding in the coastal VACAPES survey area.

4.3.3 Fin whale (*Balaenoptera physalus*)

On 2 February 2016, one sighting of two fin whales was recorded while off-effort (**Appendix D, Figure 12**). One of the individuals was remarkably smaller (approximately 2/3 the length of the large whale), and the pair traveled in close proximity to each other when at the surface. One of the individuals was documented defecating, and the other rolled on the surface before diving out of sight. There were no sightings of fin whales in 2017.

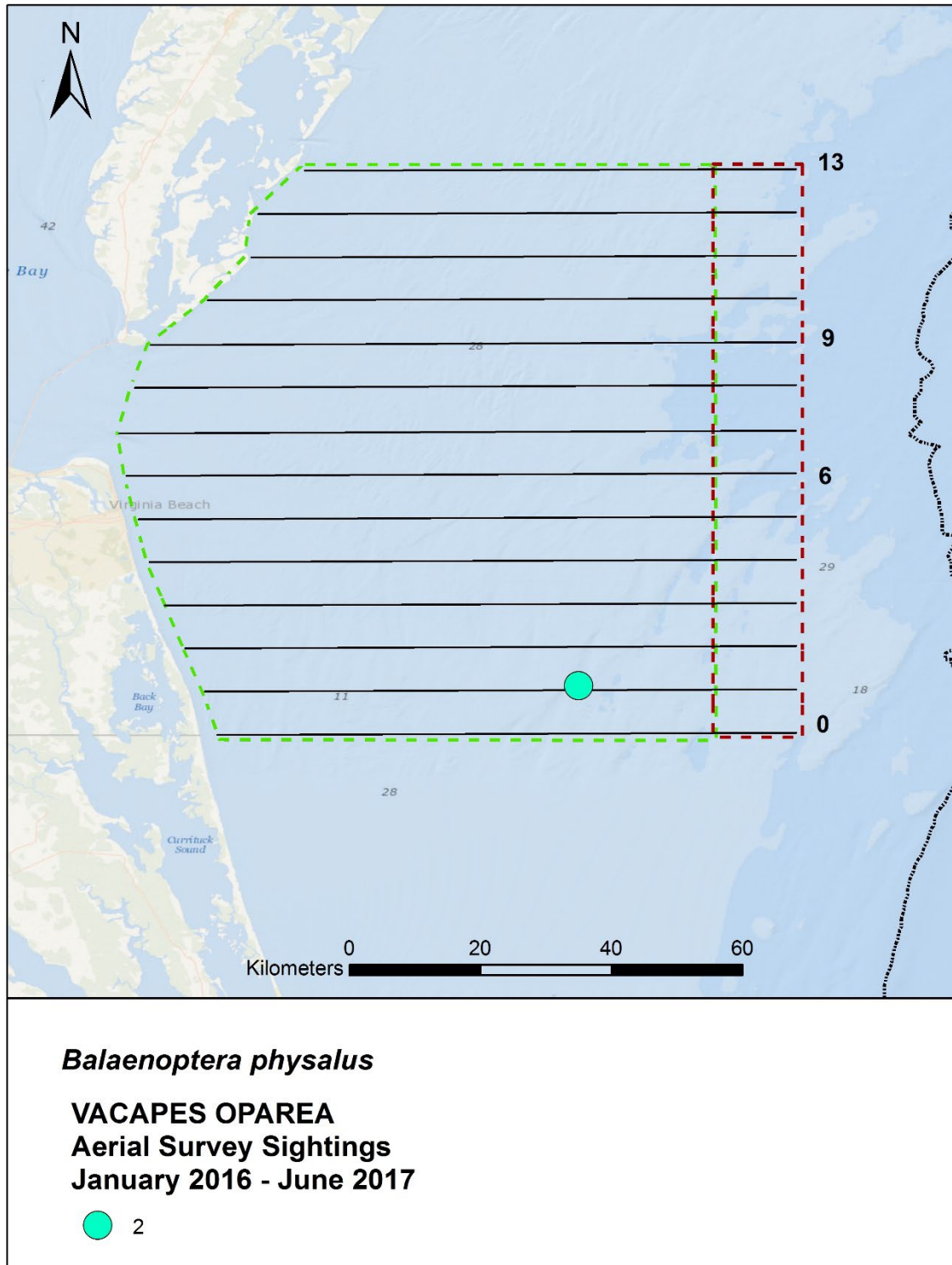


Figure 12. Fin whale (*Balaenoptera physalus*) sighting in the coastal VACAPES survey area during February 2016 (N=1).

4.3.4 Unidentified balaenopterid

On 18 March 2016, an unidentified balaenopterid whale was observed off-effort while transiting between the eastern ends of the transect lines (**Appendix D, Figure 13**). This whale was small and fast moving. The whale could not be relocated to confirm species identity, and no images were captured.

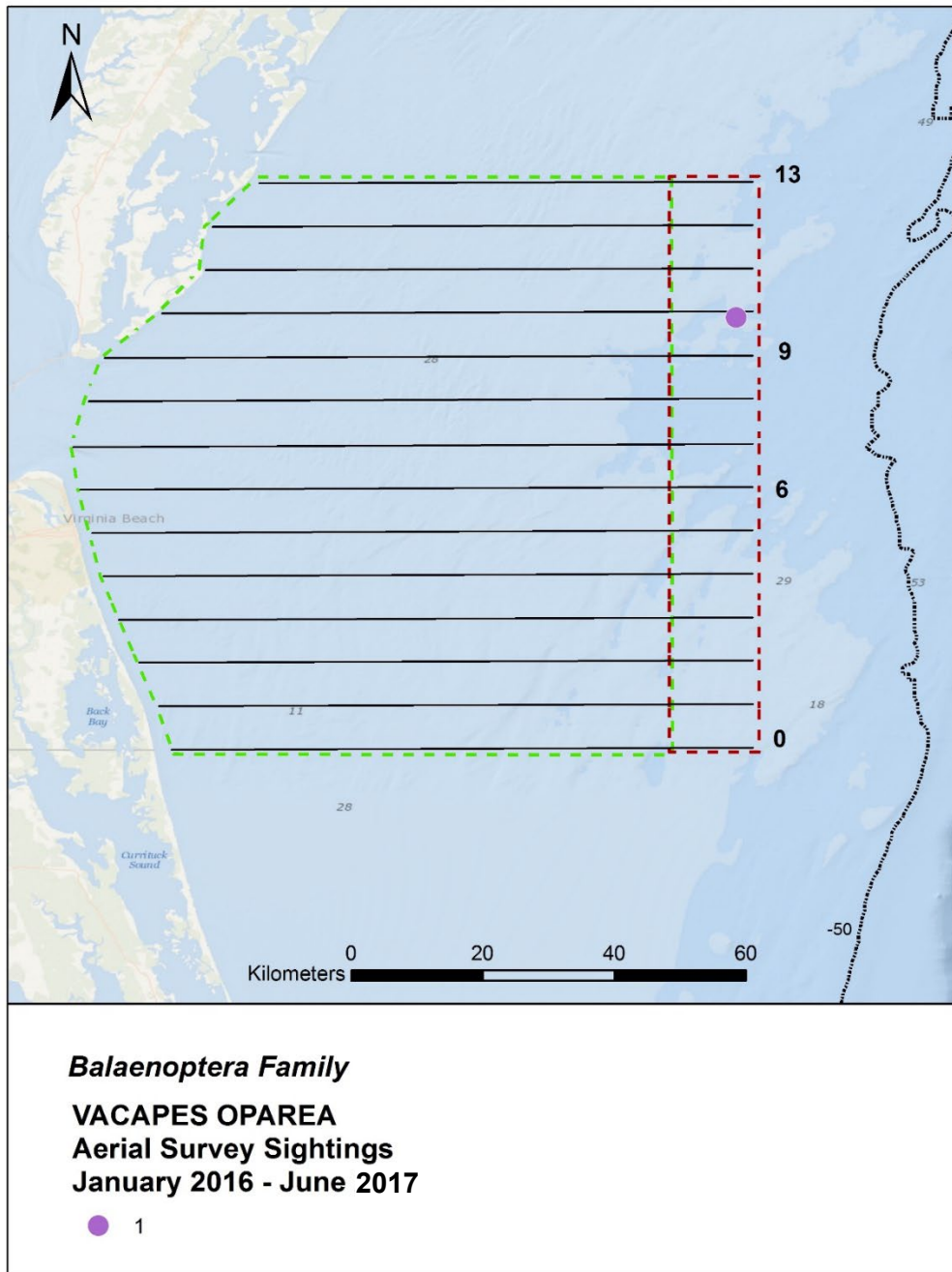


Figure 13. Unidentified balaenopterid whale (N=1) sighting in the coastal VACAPES survey area during March 2016. White outline denotes an off-effort sighting.

4.4 Sea Turtles

Six-hundred and forty-six sightings of 689 sea turtles were recorded on-effort during the reporting period, of which, 502 sightings were of loggerheads (*Caretta caretta*; 538 individuals), 11 sightings of 12 leatherbacks (*Dermochelys coriacea*; 12 individuals), and the remainder unidentified hard shell turtles (**Tables 4, Appendix D and Figures 14 and 15**). Sighting rates were inversely related to BSS; sightings declined rapidly as BSS increased (**Figures 16a-b**). Sea turtles were recorded in 6 months of 2016, May through October and two months in 2017 (May and June). The highest number of sightings occurred in June in both years of survey effort (**Figure 16c**). Loggerhead sea turtles represented the majority (78 percent) of total sightings and total numbers of individual sea turtles. The other sea turtle species identified in during the reporting period was the leatherback sea turtle (2.0 percent of total sea turtles sighted). For the remaining 10 percent of sightings, species identification could not be made with 100 percent certainty, when turtles were swimming subsurface, small, or diving, and therefore were recorded as “unidentified sea turtles.” All turtles were sighted during summer and fall months with no sightings when water temperature was cooler in spring and winter months.

4.4.1 Loggerhead sea turtle (*Caretta caretta*)

Five hundred and two sightings of loggerhead sea turtles (538 individuals) occurred while on-effort during the 2016 and 2017 aerial surveys (**Appendix D, Figure 14**). There were also seven off-effort sightings for a total of 7 individuals. Sightings were recorded throughout the coastal VACAPES survey area and occurred in summer and fall months (May –October). Sixty-eight percent of loggerhead sea turtle sightings occurred in June. On 22 occasions during June surveys, two to three turtles were observed in close proximity to another and the total number of individuals in that sighting are reported in **Appendix D**.

4.4.2 Leatherback sea turtle (*Dermochelys coriacea*)

Eleven sightings totaling 12 leatherback sea turtles were recorded on-effort during the 2016 and 2017 aerial surveys. In 2016 there were two sightings of two individuals recorded off-effort. Sightings occurred during four months of 2016 (June through August, and October) and one month of 2017 (May). All sightings occurred east of the central portion of the survey area (**Appendix D, Figure 15**).

Table 4. Total numbers of on-effort sightings and individuals for each sea turtle species during aerial surveys in the Coastal VACAPES survey area between January 2016 and June 2017. Only survey months which sea turtles were encountered are included in the table.

		2016						2017		
		May	Jun	Jul	Aug	Sep	Oct	May	Jun	Totals
<i>Caretta caretta</i>	Sightings	2	148	27	61	7	38	21	198	502
	# of individuals	2	176	27	61	8	39	21	204	538
<i>Dermochelys coriacea</i>	Sightings		3	1	2		4	1		11
	# of individuals		4	1	2		4	1		12
Unidentified sea turtle	Sightings				32		6	6	89	133
	# of individuals				32		6	6	95	139
Total	Sightings	2	151	28	95	7	48	28	287	646
	Total individuals	2	181	28	95	8	48	28	299	689

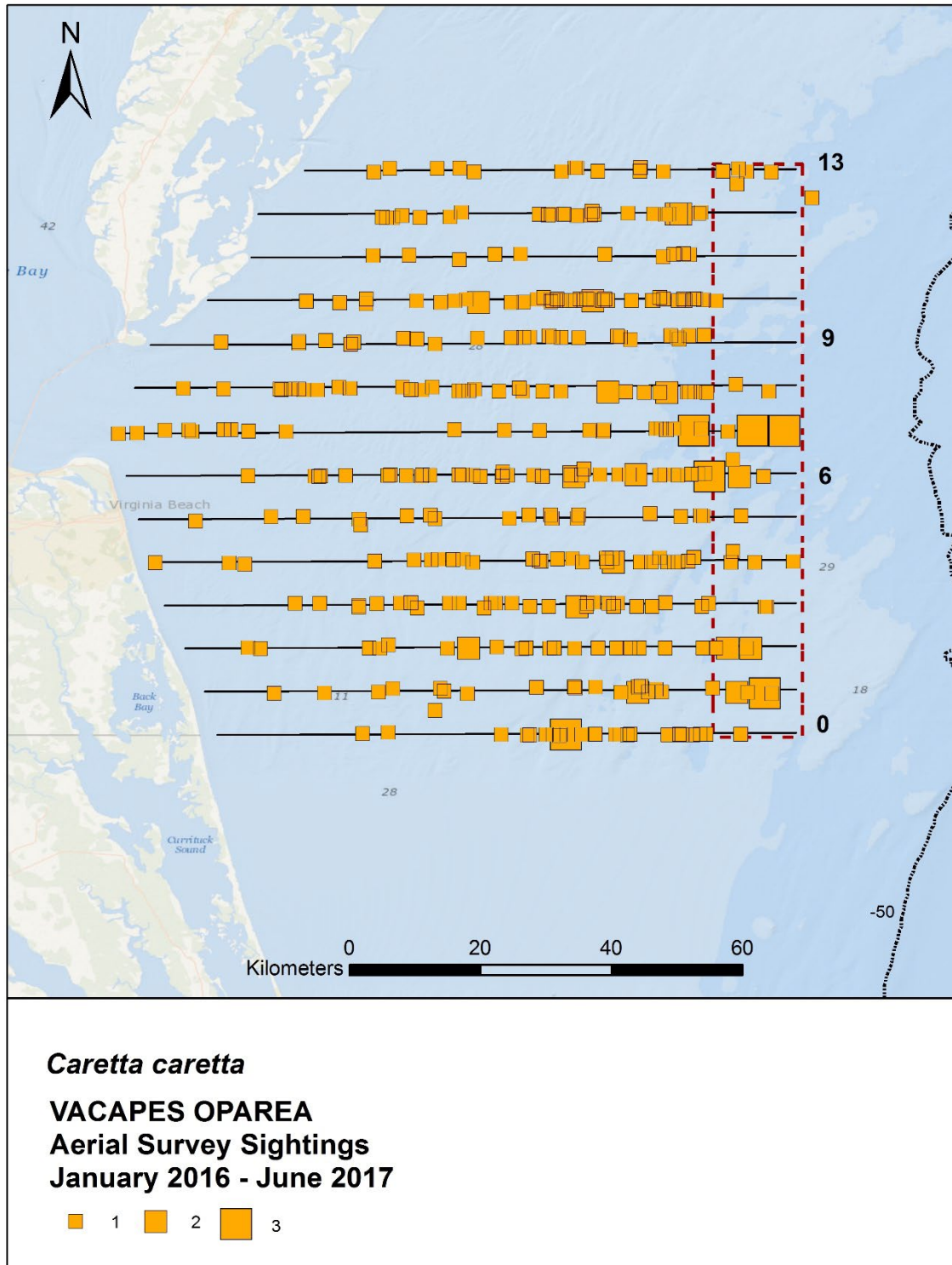


Figure 14. Loggerhead sea turtle (*Caretta caretta*) sightings in the coastal VACAPES survey area between January 2016 and June 2017 (N=509). Off-effort sightings are included.

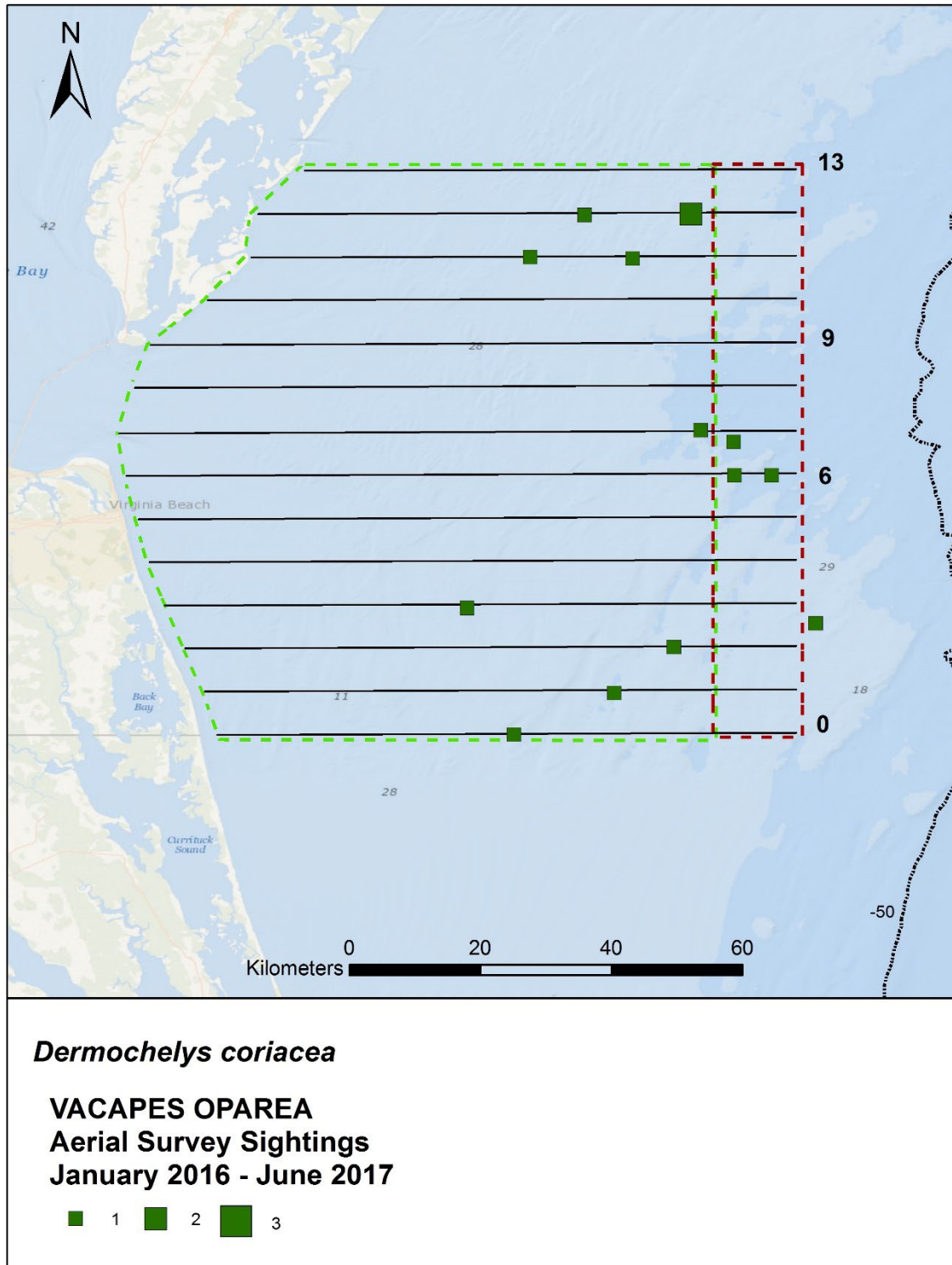


Figure 15. Leatherback sea turtle (*Dermochelys coriacea*) sightings in the coastal VACAPES survey area in 2016 and 2017 (N=13). Off-effort sightings are included.

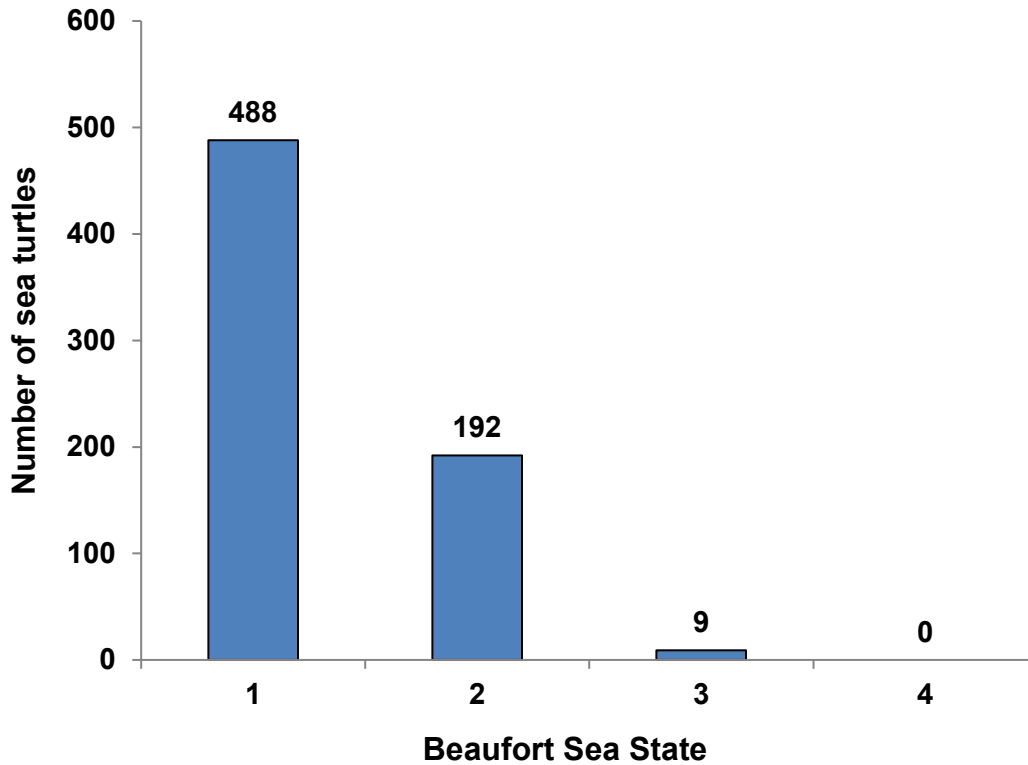


Figure 16a. Total numbers of sea turtle sightings by BSS in the coastal VACAPES survey area between January 2016 and June 2017.

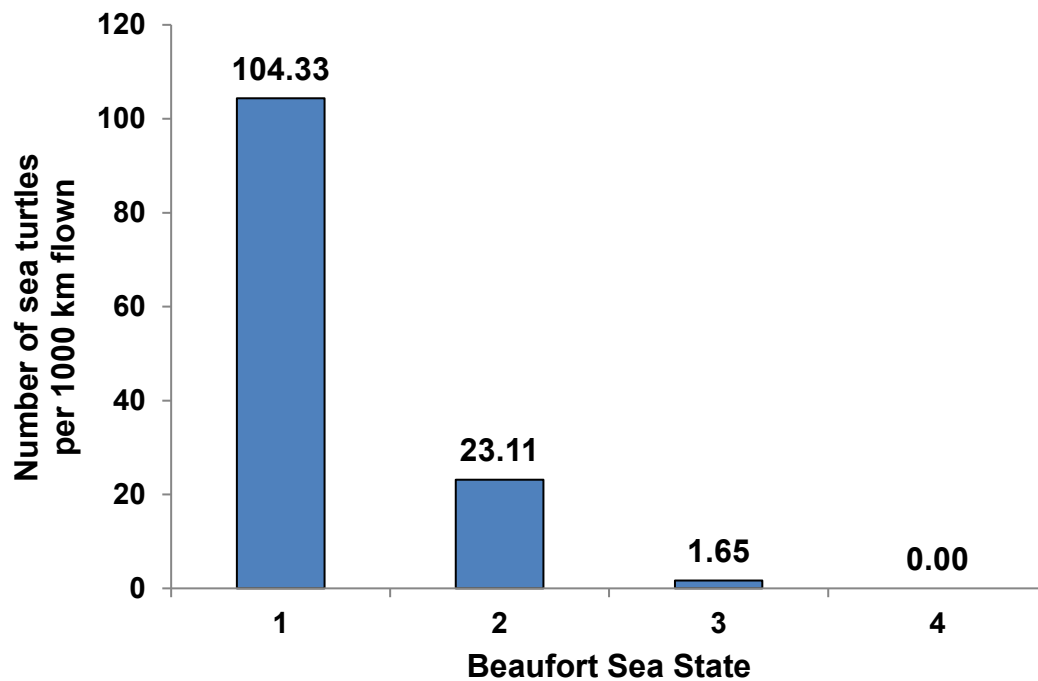


Figure 16b. Sea turtle sightings per 1,000 km flown by BSS in the coastal VACAPES survey area between January 2016 and June 2017.

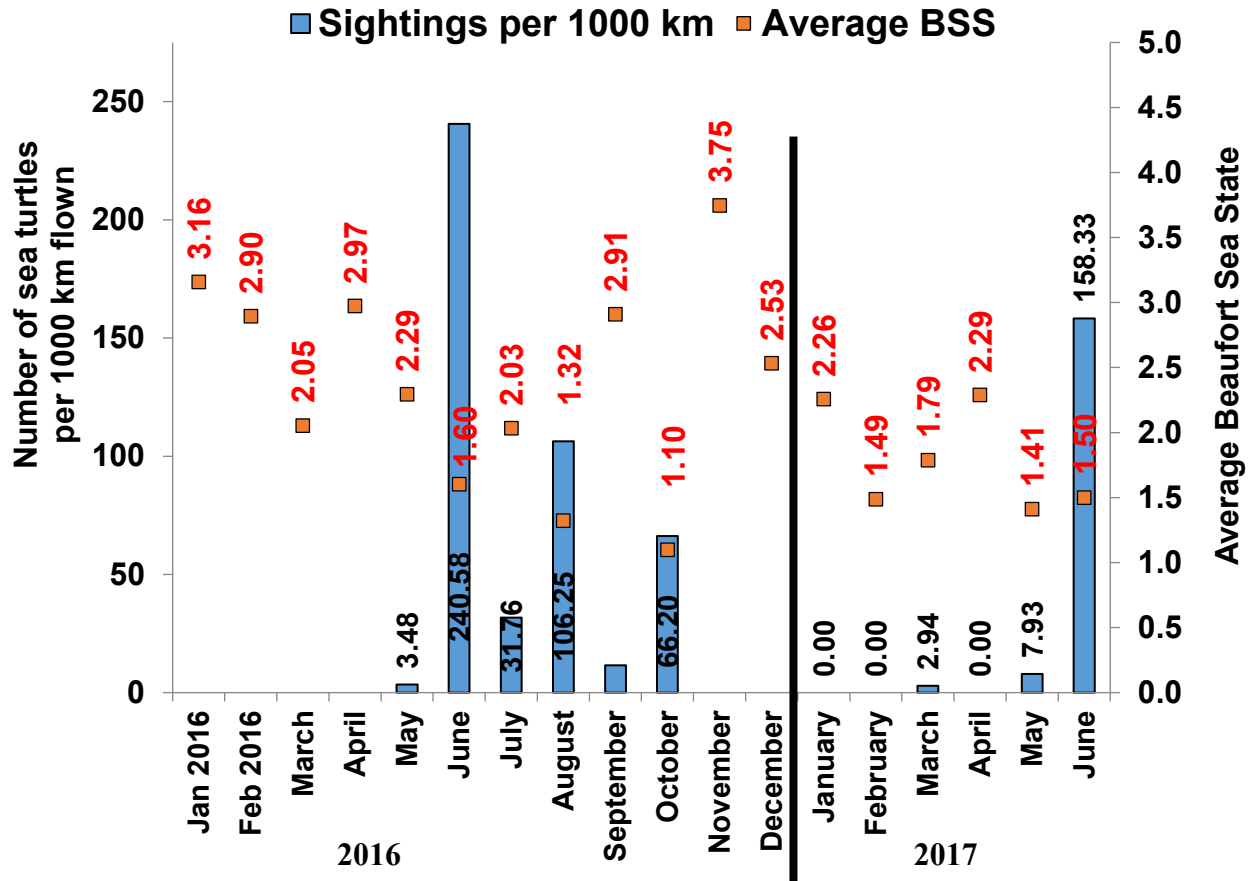


Figure 16c. Sea turtle sightings per 1,000 km surveyed and the average BSS per month in the coastal VACAPES survey area between January 2016 and June 2017. Vertical line demarcates 2016 and 2017.

4.5 Other Marine Vertebrate Sightings

4.5.1 Cartilaginous fish sightings (Chondrichthyes)

Forty-nine sightings of unidentified sharks, totaling 105 individuals, were recorded during the reporting period (**Appendix D**). Seven of the 78 sharks recorded as unidentified could be identified as hammerhead sharks (*Sphyrna* sp.) based on head shape, but since none of these sightings could be identified to species they were recorded as unidentified sharks. Two species of rays were identified, including three sightings of single manta rays (**Appendix D**) and 62 sightings totaling over 3,727 cownose rays (**Appendix D**). All sightings are represented in **Figure 17**.

4.5.2 Other fishes

Five ocean sunfish and two cobia were recorded (**Appendix D, Figure 16**). Two cobia were observed underneath a loggerhead sea turtle. The survey team circled to determine species of sea turtle and confirm species of animal beneath the turtle. Virginia Aquarium fisheries staff confirmed the fish species as cobia from the images collected during the sighting.

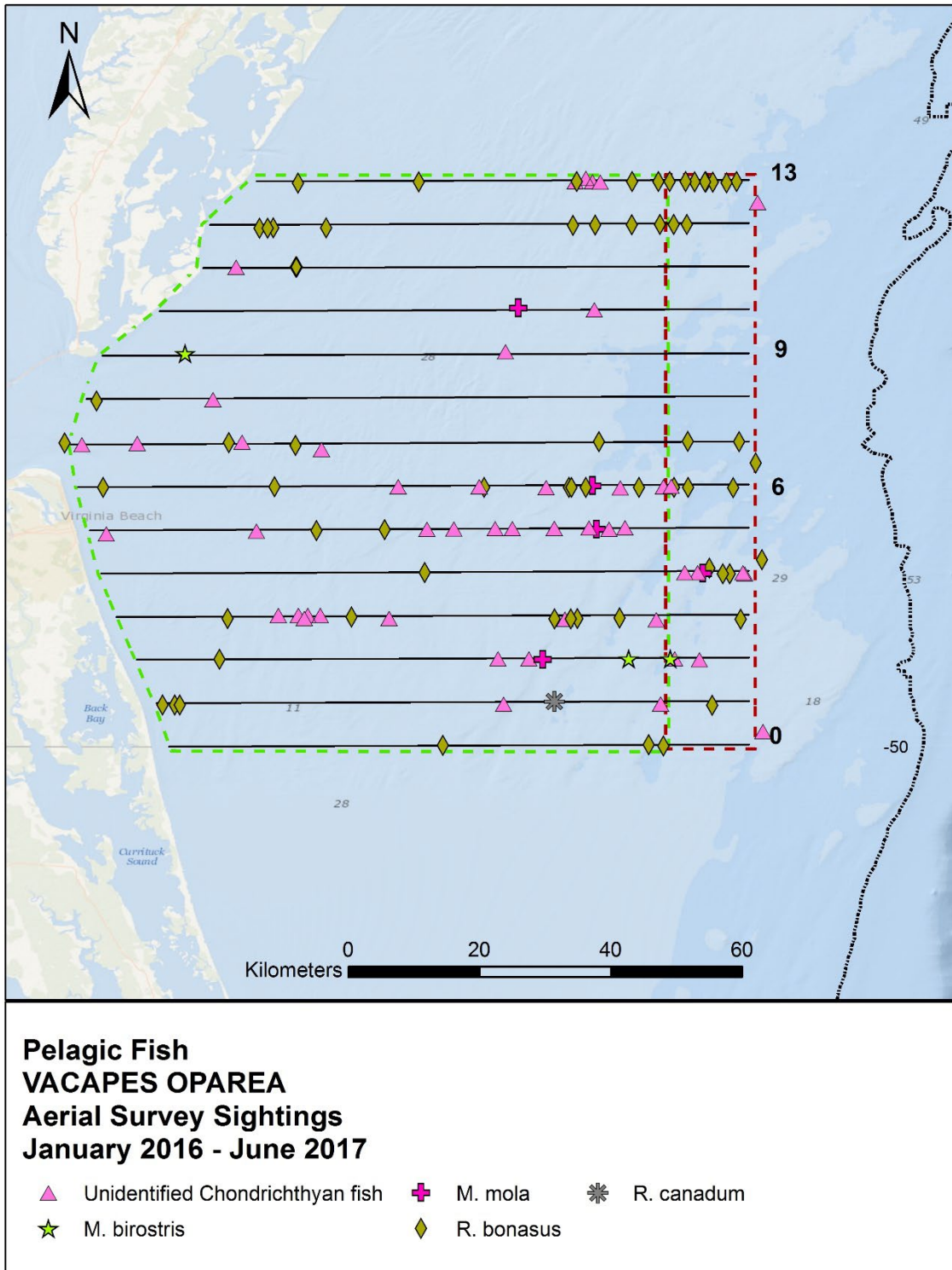


Figure 17. (Manta ray (*Manta birostris*), cownose ray (*Rhinoptera bonasus*), ocean sunfish (*Mola mola*), cobia (*Rachycentron canadum*), and shark sightings in the coastal VACAPES survey area between January 2016 and June 2017 (N=99).

4.6 Vessel Sightings

4.6.1 Commercial

A total of 607 commercial vessels (e.g., tug and barge, cargo vessel, car carrier vessels) was observed in the survey area between January 2016 and June 2017 (**Appendix D, Figure 18**).

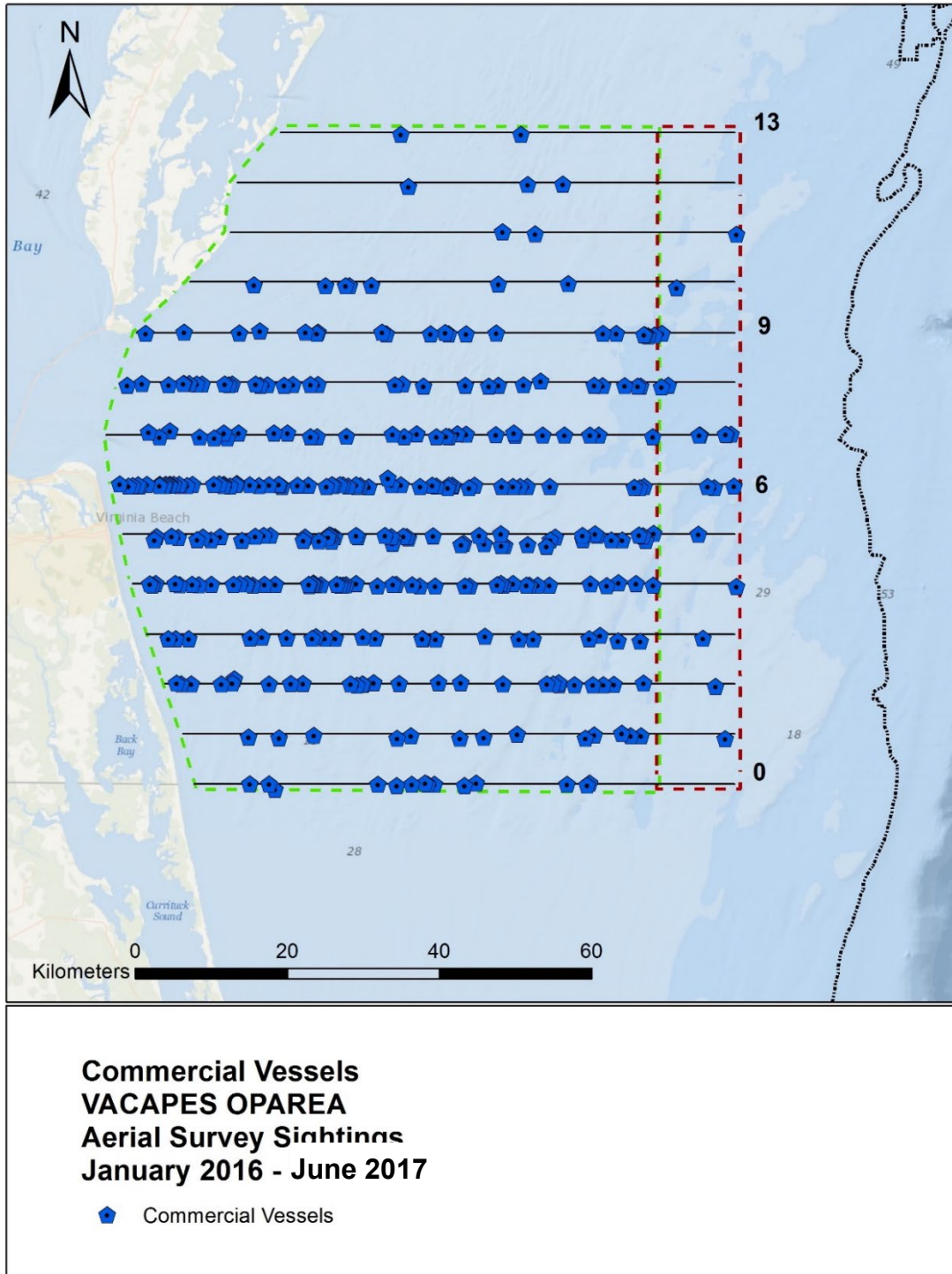


Figure 18. Commercial vessel sightings in the coastal VACAPES survey area between January 2016 and June 2017 (N=563).

4.6.2 Military Vessels

One hundred and thirty eight military vessels, including warships, air-cushion vehicles (e.g. hovercraft), rigid inflatable, and US Coast Guard vessels were observed within the survey area between January 2016 and June 2017 (**Appendix D, Figure 19**).

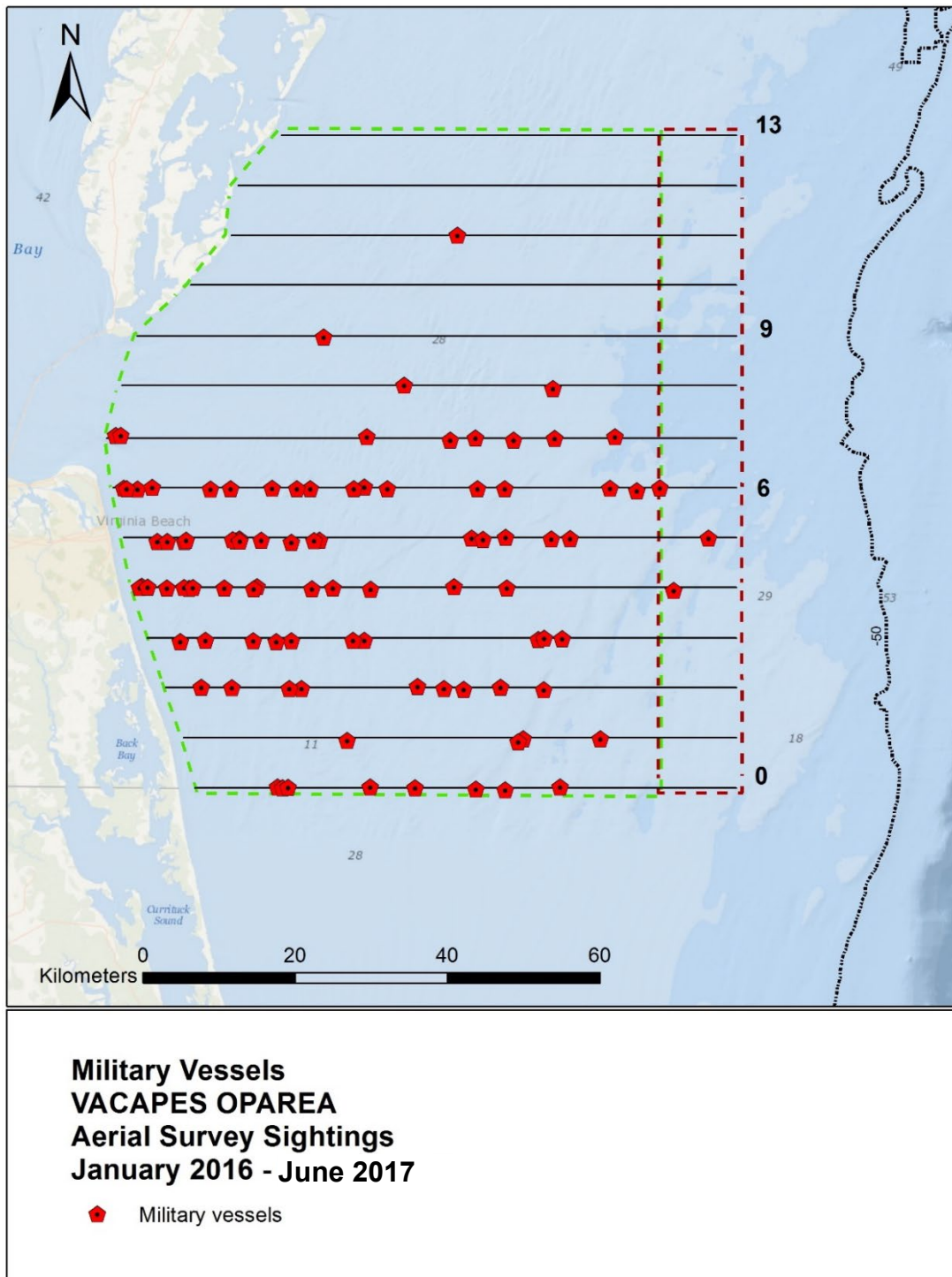


Figure 19. Military vessel sightings in the coastal VACAPES survey area between January 2016 and June 2017 (N=129).

4.6.3 Other Vessels

A total of 354 other vessel types were recorded in the survey area (**Appendix D, Figure 20**). This category of boats included pilot boats, sailboats, charter boats, head boats, trawl vessels, yacht and unknown vessels, all other small vessel sightings were categorized as recreational-fishing vessels.

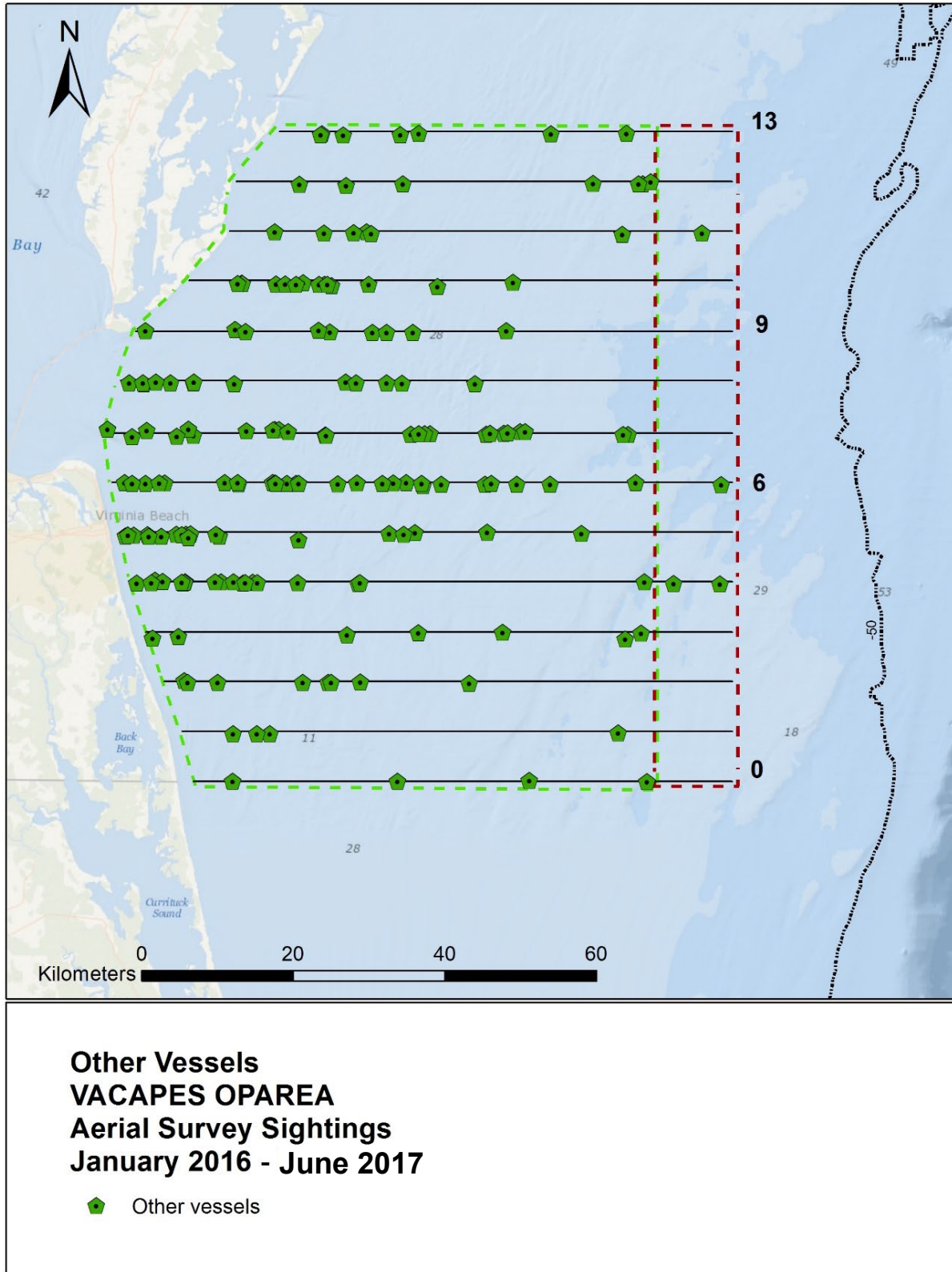


Figure 20. Other vessel sightings in the coastal VACAPES survey area between January 2016 and June 2017 (N=293).

5. Acknowledgements

We thank U.S. Fleet Forces Command and Joel Bell (NAVFAC Atlantic) for support of this work. We thank our VAQF aerial survey observers Kristy Phillips, Sara Rose, and Erin Bates and VAQF fellow Noelle Mathies. We thank our colleagues at St. Andrews University (Charles Paxton) for guidance on survey design. We thank Ed Coffman, owner and operator of Orion Aviation, and his highly skilled pilots: Rocky Walker, John Estes, Richard Waterman, Stan Huddle, Dave Huddle, and Bob Stickle, for excellent flying and a high level of professionalism. Surveys were conducted under National Marine Fisheries Service Scientific Permit No. 16473 held by the University of North Carolina Wilmington, and National Marine Fisheries Service Scientific General Authorization permit 17325 issued to VAQF.

6. Literature Cited

- Barco, S. G., W.M. Swingle, W.A. McLellan, R.N. Harris, and D. Pabst. 1999. Local abundance and distribution of bottlenose dolphins (*Tursiops truncatus*) in the nearshore waters of Virginia Beach, Virginia. *Marine Mammal Science* 15(2):394-408.
- Buckland, S.T., D.R. Anderson, K.P. Burnham, J.L. Laake, D.L. Borchers, and L. Thomas. 2001. *Introduction to Distance Sampling: Estimating Abundance of Biological Populations*. Oxford University Press, New York.
- DeMaster, D.P., L.F. Lowry, K.J. Frost, and R.A. Bengtsson. 2001. The effect of sea state on estimates of abundance for beluga whales (*Delphinapterus leucas*) in Norton Sound, Alaska. *Fishery Bulletin* 99:197–201.
- Gómez de Segura, A., E.A. Crespo, S.N. Pedraza, P.S. Hammond, and J.A. Raga. 2006. Abundance of small cetaceans in waters of the central Spanish Mediterranean. *Marine Biology* 150:149–160.
- Mallette S.D., G.G. Lockhart, R.J. McAlarney, E.W. Cummings, D.A. Pabst, W.A. McLellan, and S.G. Barco. 2014. *Documenting Whale Migration off Virginia's Coast for Use in Marine Spatial Planning: Aerial and Vessel Surveys in the Proximity of the Virginia Wind Energy Area (VAWEA)*. VAQF Scientific Report 2014-08. pp. 89
- Mallette, S.D., G.G. Lockhart, R.J. McAlarney, E.W. Cummings, D.A. Pabst, W.A. McLellan, and S.G. Barco. 2016. *Aerial Survey Baseline Monitoring in the Continental Shelf Region of the VACAPES OPAREA: 2015 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 Order 05, issued to HDR, Inc., Virginia Beach, Virginia. March 2016.
- McAlarney, R.J., E.W. Cummings, D.A. Pabst, and W.A. McLellan. 2013. *Aerial Surveys of the Proposed Undersea Warfare Training Range (USWTR) in Jacksonville, Florida, July 2013 to December 2013* Submitted to Naval Facilities Engineering Command Atlantic, Norfolk, Virginia.
- McAlarney, R., E. Cummings, B. McLellan, and A. Pabst. 2015. *Protected Species Monitoring in the Jacksonville OPAREA, Jacksonville, Florida, January 2014 – December 2014. Draft Report*. Prepared for U.S. Fleet Forces Command. Submitted to Naval Facilities Engineering Command

Atlantic, Norfolk, Virginia, under Contract No. N62470-10-3011, Task Orders 14, 38, and 49, issued to HDR, Inc., Virginia Beach, Virginia. 27 February 2015.

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

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

Torres, L.G., W.A. McLellan, E.M. Meagher, and D.A. Pabst. 2005. Seasonal distribution and relative abundance of bottlenose dolphins, *Tursiops truncatus*, along the US mid-Atlantic coast. *Journal of Cetacean Research and Management* 7:153–161.

This page intentionally left blank.

Appendix A

Aerial Survey Data Sheet

This page intentionally left blank.

AERIAL SURVEY DATA SHEET

Date: _____ Appendix A

Observer Side: _____

GPS#: _____

Page of

Pilot/Co-Pilot _____

Observers Left/Right: _____

Hobbs: _____

Time	Waypoint #	Event	Heading	Track #	Observer R / L	Visibility	BSS	Cloud	Glare L	Glare R	Vertical Angle	Horizontal degree	Sighting Cue	Species	Reliability	Min #	Max #	Best Est	Comments		

This page intentionally left blank.



Appendix B

Event Codes and Species List



This page intentionally left blank.

Codes for Variables on USWTR Aerial Survey Data Sheet

Date: Month, Day, Year

Track#: opportunistic track line=99

Event:

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

Confidence of cue

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

Visibility:

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

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

Sighting Cues:

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

Cloud Cover:

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

Vertical Angle is given in rough increments of 20 degrees with 1 being directly on the trackline and 4 being anything outside of survey wide to horizon

Horizontal Angle is given assuming the nose of the plane is 0 degrees and directly off the wing is 90 degrees – measurements are taken from 1-180 on each side of the plane.

Glare

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

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



Appendix C

Notes on Sighting Summary Sheets



This page intentionally left blank.

The Sighting Summary Sheet

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

The Sighting Summary sheet is broken into four sections; “Initial Sighting on Track”, “Time and Position of Sighting”, “Final Time and Position of Sighting”, and “Behavior and Additional Comments”. Each section and sub-heading will be detailed below.

Initial Sighting on Track

Time: The time the “break track” GPS way-point was taken.

WP#: GPS way-point number of the break track.

Lat/Long: The latitude and longitude associated with the break track way-point.

Track Line: The track line surveyed when the sighting was made.

On/Off Effort: Whether the sighting was made during an active survey track line (*i.e.* on effort) or during transit BETWEEN track lines (*i.e.* off effort). Sightings made during off effort transit to and from the range are NOT included in the sighting summaries.

Sighting Cue: Whether the initial sighting was a splash, a breach or body part.

Vertical Angle: Vertical “angle” between 1 and 4, the lower edge of view (“1”) to the horizon (“4”). A subjective and relative measure of how far away from the track line the initial sighting occurred.

Horizontal Bearing in Degrees: The horizontal degrees from front to back (0 to 180) at which the sighting occurred.

Observer: Three lettered initial of the observer who made the sighting.

Observer Side: On which side of the plane in the direction of travel the sighting occurred.

Time and Position of Sighting

Time: The time the GPS way-point was taken while relocating animals and circling above.

WP#: GPS way-point number of the sighting.

Lat/Long: The latitude and longitude associated with the way point obtained while circling over animals.

Beaufort Sea State: The sea state observed during the sighting.

Species: Scientific binomial name of the marine mammal species involved in the sighting. When species identity could not be established unequivocally, the next higher taxonomic level to which identity could be established was used. If a cetacean was identified as a dolphin but images obtained during the encounter were not sufficient to establish species ID, the designation “unidentified delphinid” or “*T. truncatus/S. frontalis*” is used. If the animal could be ID’d as a cetacean only, then “unidentified cetacean” is used. If a large body was observed but it could not be established whether a cetacean, fish/shark or turtle was involved in the sighting, the designation “unidentified marine vertebrate” is used.

Criteria used to identify species: Which species specific diagnostic features were used in classifying a sighting to species (see information on diagnosis of species).

Best images used for species ID: The images obtained during the sighting that best displayed the features used to establish species.

Numbers (Low/ High/ Best): Low, high, and best estimate of number of animals involved in the sighting.

Calves observed? Whether any calves were observed during the encounter. A conservative measure is used, in that only animals roughly half the size of the associated larger animal (the presumed mother) are designated as calves.

Calculated Distance from Track Line: The distances between the break track waypoint (2.0) and the initial position of each sighting (2.4) is calculated using the online software Scripts Movable

Type (<http://www.movable-type.co.uk/scripts/latlong.html>). Since there is a bias in estimating the location of a group of mobile marine mammals from a fast moving airplane, the distances calculated between break track and sighting are rounded to 0.1 km.

Photographer: Three lettered initials of observer seated in the right camera seat.

Card #: Memory card on which the photos from the particular sighting was made.

Frame Numbers: Starting and ending frame number.

Spacer: Image used to separate sighting to clarify when one sighting ends and the next begins. Image typically of interior of plane or a 45 degree angle shot of the horizon. If taking a shot of the interior of the plane, put the camera focus setting on "manual", take the picture, then immediately set it back to "automatic".

Final Time and Position of Sighting

Time: WP#: Lat: Long: Calculated Distance traveled: → see section above.

Behavior and Additional Comments

Any behavioral notes obtained during the sighting (*e.g.* group formation, relative travel speed, feeding events or presumed copulation attempts, presence of other cetaceans or sharks in or around the animal(s) in the sighting, interaction with inanimate objects such marine debris). This section also includes notes on altitude of the survey plane during the encounter as well as any indications (or lack thereof) of the animal(s) reacting to the presence of the plane.

Appendix D

Individual Sightings Tables

This page intentionally left blank.

All marine mammal sightings, including: bottlenose dolphin (*Tursiops truncatus*), Atlantic spotted dolphin (*Stenella frontalis*), short-beaked common dolphin (*Delphinus delphis*), fin whale (*Balaenoptera physalus*) and unidentified balaenopterid whale sightings in the Coastal VACAPES survey area from January through December 2016. Asterisk denotes an off-effort sighting.

Date	Time	Way Point	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort
30-Jan-2016	13:59:39	005	37.147066	-75.196840	10	2	Dde	2	90°	5	
30-Jan-2016	14:18:37	012	37.080197	-75.512697	9	3	Egl	2	90°	1	
2-Feb-2016	10:36:43	010	36.669236	-75.349988	2	3	Ttr	2	90°	6	
2-Feb-2016	14:09:09	055	36.964688	-75.567802	7	3	Egl	1	90°	1	
2-Feb-2016	9:38:37	008	36.615560	-75.357184		3	Mno	2	90°	1	*
2-Feb-2016	9:36:38	007	36.618361	-75.348882	1	3	Bph	2	90°	2	
17-Mar-2016	11:05:50	013	37.104089	-75.903568		2	Ttr	3	90°	1	*
17-Mar-2016	11:06:06	014	37.096083	-75.915430		2	Ttr	3	90°	1	*
17-Mar-2016	13:29:08	013	37.066338	-76.023102		2	Ttr	1	120°	4	*
17-Mar-2016	14:19:11	032	37.082846	-75.945366		2	Ttr	3	90°	10	*
17-Mar-2016	14:19:25	028	37.080540	-75.936539		2	Ttr	2	90°	2	*
17-Mar-2016	14:21:38	034	37.087677	-75.847109	9	2	Ttr	2	90°	1	
17-Mar-2016	15:03:42	043	37.018630	-75.681949	8	2	Ttr	2	120°	19	
17-Mar-2016	15:19:24	050	36.968727	-75.888557	7	2	Ttr	2	90°	12	
17-Mar-2016	15:19:32	051	36.968799	-75.883052	7	2	Ttr	2	90°	1	
17-Mar-2016	15:19:44	051	36.968852	-75.875200	7	2	Ttr	2	120°	3	
17-Mar-2016	15:20:38	052	36.968889	-75.840322	7	2	Ttr	2	90°	12	
17-Mar-2016	15:20:56	052	36.968975	-75.828675	7	2	Ttr	2	90°	4	
17-Mar-2016	15:21:32	053	36.968986	-75.805252	7	2	Ttr	2	90°	3	
17-Mar-2016	15:25:22	054	36.969278	-75.658658	7	2	Ttr	2	90°	9	
17-Mar-2016	16:15:52	068	36.904490	-75.683536	6	2	Ttr	2	90°	5	
17-Mar-2016	16:17:16	069	36.904371	-75.741607	6	2	Ttr	2	90°	1	
17-Mar-2016	16:20:38	074	36.906902	-75.746018	6	2	Ttr	2	90°	75	
17-Mar-2016	16:25:25	072	36.903960	-75.847458	6	2	Ttr	2	120°	6	
17-Mar-2016	16:25:29	077	36.903951	-75.849824	6	2	Ttr	2	120°	1	
17-Mar-2016	16:33:16	081	36.844190	-75.849244	5	3	Ttr	2	120°	5	
17-Mar-2016	16:33:37	077	36.844354	-75.835171	5	3	Ttr	2	90°	5	
17-Mar-2016	16:34:24	082	36.844796	-75.804211	5	3	Ttr	2	90°	15	
17-Mar-2016	16:34:31	083	36.844872	-75.799410	5	3	Ttr	2	90°	3	
17-Mar-2016	16:34:37	084	36.844933	-75.795597	5	3	Ttr	2	90°	15	
17-Mar-2016	16:54:29	097	36.854779	-75.071741	5	2	Ttr	1	90°	85	

Date	Time	Way Point	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort
17-Mar-2016	15:38:12	062	36.972542	-75.342410	7	2	Dde	3	90°	5	
18-Mar-2016	9:42:30	002	36.905585	-75.982065		2	Ttr	1	90°	10	*
18-Mar-2016	9:51:55	010	36.906566	-75.657103	6	2	Ttr	2	90°	1	
18-Mar-2016	10:39:35	023	36.967202	-75.684678	7	2	Ttr	3	90°	1	
18-Mar-2016	10:41:09	024	36.967125	-75.749962	7	2	Ttr	3	90°	2	
18-Mar-2016	10:42:57	019	36.966907	-75.824384	7	2	Ttr	2	45°	3	
18-Mar-2016	10:43:43	025	36.966625	-75.856422	7	2	Ttr	2	90°	1	
18-Mar-2016	10:50:34	022	37.024757	-75.934860	8	2	Ttr	1	45°	2	
18-Mar-2016	10:50:44	028	37.024836	-75.928119	8	2	Ttr	2	90°	1	
18-Mar-2016	10:51:16	029	37.025067	-75.906142	8	2	Ttr	3	110°	25	
18-Mar-2016	10:52:22	023	37.025439	-75.861557	8	2	Ttr	2	45°	2	
18-Mar-2016	10:53:29	024	37.025638	-75.816965	8	2	Ttr	2	45°	2	
18-Mar-2016	10:53:33	030	37.025586	-75.813698	8	2	Ttr	2	90°	1	
18-Mar-2016	10:54:01	031	37.025642	-75.795140	8	2	Ttr	2	90°	12	
18-Mar-2016	11:47:38	038	37.085758	-75.765830	9	2	Ttr	3	90°	18	
18-Mar-2016	11:47:46	039	37.085672	-75.771163	9	2	Ttr	3	90°	5	
18-Mar-2016	11:48:01	035	37.085633	-75.780161	9	2	Ttr	2	45°	3	
18-Mar-2016	11:52:28	041	37.072432	-75.829184		2	Ttr	4	90°	7	*
18-Mar-2016	11:52:47	037	37.066845	-75.831381	9	2	Ttr	2	45°	30	
18-Mar-2016	12:02:19	045	37.082739	-75.930543	9	2	Ttr	2	90°	20	
18-Mar-2016	12:11:43	049	37.061725	-76.002648		2	Ttr	3	90°	7	*
18-Mar-2016	13:52:42	045	37.075812	-75.981458		2	Ttr	2	90°	1	*
18-Mar-2016	13:52:53	050	37.080239	-75.975060		2	Ttr	3	90°	10	*
18-Mar-2016	13:58:41	046	37.125245	-75.884027		2	Ttr	2	100°	2	*
18-Mar-2016	14:00:21	051	37.142897	-75.819357		2	Ttr	2	90°	5	*
18-Mar-2016	14:01:11	053	37.143092	-75.785631	10	2	Ttr	2	100°	15	
18-Mar-2016	14:02:46	049	37.142794	-75.723948	10	2	Ttr	1	90°	2	
18-Mar-2016	14:04:32	050	37.142975	-75.656488	10	2	Ttr	2	70°	15	
18-Mar-2016	14:04:50	055	37.142967	-75.644810	10	2	Ttr	2	90°	20	
18-Mar-2016	14:09:56	052	37.143179	-75.444357	10	2	Ttr	2	90°	1	
18-Mar-2016	15:30:49	059	37.203044	-75.691914	11	2	Ttr	2	100°	4	
18-Mar-2016	15:58:31	067	36.719821	-75.446794	3	2	Ttr	2	90°	1	
18-Mar-2016	16:56:15	079	36.616180	-75.883538		2	Ttr	2	110°	5	*
18-Mar-2016	10:21:06	014	36.971797	-75.151227	7	2	Dde	2	90°	4	
18-Mar-2016	16:08:15	071	36.723920	-75.124797	3	2	Mno	3	90°	1	

Date	Time	Way Point	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort
18-Mar-2016	14:43:25	055	37.140428	-75.072933		2	BA LA	1	90°	1	*
20-Apr-2016	13:57:23	044	36.905407	-75.914364	6	3	Ttr	3	90°	1	
20-Apr-2016	14:41:54	042	37.019207	-75.983356		2	Ttr	3	90°	10	*
20-Apr-2016	14:42:42	044	37.024919	-75.951493	8	2	Ttr	3	90°	15	
20-Apr-2016	14:45:21	054	37.025924	-75.841412	8	3	Ttr	2	140°	2	
20-Apr-2016	15:01:41	056	37.029411	-75.362961	8	3	Ttr	2	110°	3	
20-Apr-2016	15:32:57	063	37.093831	-75.482005	9	2	Ttr	2	120°	2	
20-Apr-2016	16:06:45	071	37.152300	-75.540570	10	3	Ttr	2	90°	2	
20-Apr-2016	16:31:36	059	37.205538	-75.422120	11	2	Ttr	2	90°	5	
20-Apr-2016	17:03:23	083	37.271405	-75.387040	12	2	Ttr	2	80°	6	
20-Apr-2016	17:20:46	089	37.326896	-75.237268	13	2	Ttr	2	100°	65	
10-May-2016	13:08:38	020	37.085401	-75.945465		2	Ttr	3	90°	5	*
10-May-2016	16:27:44	038	37.080944	-75.978291		2	Ttr	2	95°	1	*
10-May-2016	11:32:22	006	36.904863	-75.202245	6	3	Sfr	2	90°	12 5	
27-Jun-2016	11:47:50	065	36.725841	-75.662281	3	2	Ttr	2	110°	12	
27-Jun-2016	11:53:02	067	36.725125	-75.865814	3	2	Ttr	3	90°	2	
27-Jun-2016	13:38:08	072	36.786433	-75.900362	4	2	Ttr	2	110°	2	
27-Jun-2016	10:20:09	018	36.551677	-75.072072	0	1	Sfr	2	100°	30	
27-Jun-2016	10:28:32	020	36.555463	-75.061391		1	Sfr	3	30°	12 5	*
14-Jul-2016	10:23:27	016	37.158711	-75.225685	10	2	Ttr	2	110°	25	
14-Jul-2016	10:41:51	021	37.141629	-75.789228	10	2	Ttr	3	90°	40	
14-Jul-2016	11:30:54	036	37.024661	-75.840312	8	2	Ttr	3	90°	5	
14-Jul-2016	11:31:25	044	37.024382	-75.856201	8	2	Ttr	1	90°	1	
14-Jul-2016	11:32:45	046	37.020946	-75.852734	8	2	Ttr	1	90°	3	
14-Jul-2016	11:38:25	050	37.023566	-75.927648	8	2	Ttr	2	90°	6	
14-Jul-2016	14:47:45	092	36.854681	-75.959362		2	Ttr	2	120°	4	*
14-Jul-2016	17:00:49	119	36.551015	-75.700756	0	2	Ttr	2	90°	12	
14-Jul-2016	17:03:36	120	36.550198	-75.807390	0	2	Ttr	3	90°	12	
14-Jul-2016	17:03:41	121	36.550197	-75.811146	0	2	Ttr	2	90°	7	
14-Jul-2016	17:04:46	123	36.549852	-75.852907		2	Ttr	2	110°	4	*
8-Aug-2016	9:37:38	015	37.263506	-75.157898	12	1	Ttr	1	90°	25	
8-Aug-2016	10:48:03	053	37.085581	-75.854090	9	1	Ttr	2	110°	12	

Date	Time	Way Point	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort
8-Aug-2016	10:48:47	053	37.085636	-75.827838	9	1	Ttr	1	120°	2	
8-Aug-2016	10:48:56	054	37.085650	-75.822803	9	1	Ttr	2	100°	1	
8-Aug-2016	10:49:22	055	37.085648	-75.806403	9	1	Ttr	1	90°	8	
8-Aug-2016	10:51:13	060	37.085757	-75.736271	9	1	Ttr	3	90°	25	
8-Aug-2016	11:30:51	075	37.024714	-75.928106	8	2	Ttr	2	120°	3	
8-Aug-2016	11:31:16	076	37.024815	-75.944117	8	2	Ttr	2	90°	2	
8-Aug-2016	11:31:18	082	37.024810	-75.945434	8	1	Ttr	0	90°	6	
8-Aug-2016	12:21:28	099	36.905832	-75.989427		2	Ttr	2	120°	6	*
8-Aug-2016	15:37:58	170	36.606026	-75.813393	1	2	Ttr	3	90°	6	
8-Aug-2016	15:38:46	171	36.606363	-75.785400	1	2	Ttr	1	135°	1	
13-Sep-2016	10:27:37	019	36.787368	-75.921749	4	3	Ttr	2	90°	7	
13-Sep-2016	12:37:09	058	36.905670	-75.787987	6	3	Ttr	1	120°	1	
13-Sep-2016	13:52:25	100	37.250598	-75.500011	12	2	Ttr	3	45°	60 0	
21-Oct-2016	9:24:24	009	36.552265	-75.444759	0	1	Ttr	1	45°	30	
21-Oct-2016	10:03:30	012	36.607363	-75.787979	1	1	Ttr	2	110°	7	
21-Oct-2016	10:39:43	037	36.731979	-75.226497	3	1	Ttr	2	90°	12 5	
21-Oct-2016	10:53:31	038	36.724588	-75.661059	3	2	Ttr	2	100°	12	
21-Oct-2016	10:59:40	042	36.723434	-75.897532	3	2	Ttr	2	90°	5	
21-Oct-2016	13:39:00	076	36.904996	-75.949929	6	1	Ttr	2	110°	5	
21-Oct-2016	13:40:33	077	36.904793	-75.889855	6	1	Ttr	2	90°	5	
21-Oct-2016	14:25:49	084	36.960588	-75.859331	7	1	Ttr	1	90°	15	
21-Oct-2016	14:46:10	117	37.322545	-75.421241	13	1	Ttr	2	110°	1	
21-Oct-2016	14:46:57	118	37.322948	-75.391033	13	1	Ttr	2	100°	2	
7-Nov-2016	9:36:52	009	37.086216	-75.745703	9	3	Ttr	3	90°	12	
7-Nov-2016	10:29:20	016	36.966578	-75.945629	7	3	Ttr	3	110°	8	
7-Nov-2016	11:26:05	030	36.956988	-76.064418		3	Ttr	2	90°	10	*
10-Dec-2016	11:49:11	010	37.284108	-75.524476		3	Ttr	3	110°	3	*
10-Dec-2016	12:43:02	016	37.143148	-75.669403	10	2	Ttr	3	90°	8	
10-Dec-2016	12:56:24	019	37.088568	-75.728740	9	2	Ttr	2	90°	18	
10-Dec-2016	13:04:30	023	37.081875	-75.595835	9	2	Ttr	1	90°	1	
10-Dec-2016	10:26:52	003	36.971991	-75.998851		2	Mno	3	80°	1	*
10-Dec-2016	11:23:08	012	37.280594	-75.517368	12	2	Mno	4	90°	1	
10-Dec-2016	11:30:20	013	37.287523	-75.504611		2	Mno	3	90°	2	*

Date	Time	Way Point	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort
21-Dec-2016	10:21:50	009	36.605656	-75.727977	1	2	Ttr	2	80°	4	
21-Dec-2016	10:25:40	011	36.613398	-75.876767		2	Ttr	1	90°	1	*
21-Dec-2016	10:27:25	011	36.646461	-75.887817	1	1	Ttr	3	90°	4	
21-Dec-2016	11:17:55	018	36.760934	-75.936808		2	Ttr	2	90°	10	*
21-Dec-2016	11:18:14	019	36.769925	-75.941153		2	Ttr	3	90°	5	*
21-Dec-2016	11:24:35	021	36.787820	-75.721841	4	2	Ttr	3	90°	6	
21-Dec-2016	15:52:32	055	37.085862	-75.695364	9	2	Ttr	2	100°	5	
21-Dec-2016	12:13:24	039	36.943809	-75.945309		1	Mno	2	10°	1	*
21-Dec-2016	16:07:21	076	36.954361	-75.971474		1	Mno	4	90°	1	*
11-Jan-2017	10:13:29	17	36.909453	-75.806130	6	2	Mno	1	70°	1	
11-Jan-2017	12:15:27	35	36.725837	-75.228612	3	2	Dde	2	110°	45	
11-Jan-2017	12:39:56	42	36.729315	-75.738584	3	2	Mno	1	110°	1	
11-Jan-2017	13:17:16	47	36.794056	-75.929881		2	Mno	2	90°	1	*
11-Jan-2017	13:34:32	49	36.946835	-75.960599		2	Mno	1	120°	1	*
11-Jan-2017	13:35:16	50	36.950703	-75.956174		2	Mno	1	90°	1	*
12-Jan-2017	10:22:46	15	37.142752	-75.126372	10	3	Dde	4	90°	70	
12-Jan-2017	12:44:33	34	36.952649	-76.010734		2	Mno	4	90°	1	*
12-Jan-2017	12:47:41	35	36.946673	-76.013919		2	Mno	3	90°	1	*
12-Jan-2017	12:47:55	36	36.949633	-76.00444		2	Mno	3	90°	1	*
21-Feb-2017	9:39:08	3	36.944251	-76.029401		2	Mno	4	90°	2	*
21-Feb-2017	11:31:07	28	37.032392	-75.349545	8	2	Dde	1	90°	150	
21-Feb-2017	13:58:37	41	37.099091	-75.393629	9	2	Dde	1	90°	35	
24-Feb-2017	12:50	2	36.553051	-75.867936		1	Ttr	1	110°	2	*
24-Feb-2017	12:51	3	36.544470	-75.844331		1	Ttr	1	90°	2	*
24-Feb-2017	12:52:13	3	36.550784	-75.804552	0	1	Ttr	3	90°	7	
24-Feb-2017	12:52	5	36.552168	-75.802243	0	1	Ttr	2	90°	2	
24-Feb-2017	12:52	6	36.552002	-75.791423	0	1	Ttr	2	100°	3	
24-Feb-2017	13:26:25	8	36.606829	-75.768328	1	1	Ttr	2	90°	10	
24-Feb-2017	13:28	13	36.606631	-75.833505	1	1	Ttr	2	130°	2	
24-Feb-2017	13:30	15	36.659116	-75.898122		1	Ttr	2	110°	20	
24-Feb-2017	14:15	25	36.721514	-75.881558	3	1	Mno	1	90°	2	
24-Feb-2017	14:46	32	36.788835	-75.728762	4	1	Ttr	1	100°	17	
24-Feb-2017	15:47	48	36.909716	-75.170487	6	2	Mno	3	70°	1	
24-Feb-2017	16:35	55	36.965739	-76.042144		2	Mno	3	90°	1	*

Date	Time	Way Point	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort
26-Mar-2017	10:20:10	9	37.264828	-75.415089	12	1	Dde	1	90°	20	
26-Mar-2017	10:46:20	16	37.188662	-75.644585	11	2	Ttr	1	90°	75	
26-Mar-2017	11:46:53	30	37.036094	-75.146732		1	Dde	1	90°	18	*
27-Mar-2017	9:41:34	5	37.089407	-75.231603	9	2	Dde	2	90°	4	
27-Mar-2017	10:18:32	16	36.968648	-75.928196	7	3	Ttr	2	60°	5	
14-Apr-2017	10:02:42	7	37.025985	-75.646895	8	2	Ttr	2	90°	8	
14-Apr-2017	10:39:55	27	36.93798	-75.198593	6	1	Ttr	2	110°	3	
31-May-2017	10:28:18	11	37.205491	-75.351115	11	2	Ttr	1	105°	20	
31-May-2017	10:35:27	14	37.19067	-75.134873	11	2	DE LPH	3	90°	1	
31-May-2017	11:20:27	22	37.088082	-75.679075	9	2	Ttr	1	90°	3	
31-May-2017	11:26:11	25	37.096	-75.515678	9	2	Ttr	3	90°	3	
31-May-2017	11:54:39	39	37.027439	-75.748314	8	1	Ttr	2	90°	13	
31-May-2017	14:02:04	37	36.963738	-75.809496	7	2	Ttr	2	90°	2	
1-Jun-2017	10:32:46	43	36.72966	-75.888284	3	1	Ttr	2	90°	10	
1-Jun-2017	10:39:16	46	36.788128	-75.799226	4	1	Ttr	3	90°	5	
1-Jun-2017	10:45:46	63	36.790373	-75.535694	4	1	Ttr	2	90°	8	
1-Jun-2017	10:51:33	51	36.792553	-75.299474	4	1	DE LP	3	90°	2	
1-Jun-2017	11:09:38	57	36.849291	-75.655896	5	1	Ttr	2	90°	6	
1-Jun-2017	11:13:33	58	36.848049	-75.809102	5	1	Ttr	3	90°	7	
1-Jun-2017	13:15:35	66	36.901922	-75.886342	6	1	Ttr	2	90°	4	
1-Jun-2017	13:44:08	135	36.968148	-75.475093	7	1	Ttr	3	90°	25	
1-Jun-2017	14:05:50	154	37.025197	-75.898002	8	1	Ttr	0	90°	10	
1-Jun-2017	14:07:18	155	37.024944	-75.836823	8	1	Ttr	1	90°	1	
1-Jun-2017	14:10:12	158	37.024658	-75.716992	8	1	Ttr	2	90°	30	
1-Jun-2017	14:38:40	111	37.091506	-75.637243	9	1	Ttr	3	90°	5	
1-Jun-2017	14:56:42	117	37.147357	-75.560299	10	1	Ttr	3	90°	1	
1-Jun-2017	14:57:20	192	37.145571	-75.534774	10	1	Ttr	2	90°	1	
1-Jun-2017	15:35:47	216	37.263378	-75.627492	12	1	Ttr	1	130°	2	
1-Jun-2017	15:36:47	217	37.263624	-75.585012	12	1	Ttr	1	90°	2	
22-Jun-2017	12:07:02	45	36.903624	-75.906307	6	2	Ttr	2	90°	8	
22-Jun-2017	12:48:51	35	36.96737	-75.767780	7	2	Ttr	2	90°	2	
22-Jun-2017	12:53:46	39	36.965543	-75.943015	7	1	Ttr	2	90°	1	
22-Jun-2017	14:51:51	61	37.024556	-75.865241	8	2	Ttr	2	90°	2	

Date	Time	Way Point	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort
22-Jun-2017	14:55:45	45	37.023508	-75.697387	8	1	Ttr	3	90°	5	
22-Jun-2017	15:33:33	56	37.088564	-75.847989	9	1	Ttr	2	90°	1	
22-Jun-2017	16:22:11	67	37.258607	-75.656010	12	1	Ttr	2	90°	20	

Loggerhead sea turtle (*Caretta caretta*) and Leatherback sea turtle (*Dermochelys coriacea*) sightings in the coastal VACAPES survey area from January through December 2016. Asterisk denotes an off-effort sighting.

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
10-May-2016	11:19:21	003	36.906777	-75.512920	6	3	Cca	2	90°	1	
10-May-2016	13:08:04	018	37.085487	-75.924330	9	2	Cca	2	90°	1	
27-Jun-2016	10:10:13	005	36.550864	-75.454856	0	1	Cca	2	90°	1	
27-Jun-2016	10:10:38	006	36.550822	-75.437170	0	1	Dco	3	90°	1	
27-Jun-2016	10:10:51	007	36.550821	-75.427469	0	1	Cca	3	90°	1	
27-Jun-2016	10:11:41	006	36.550988	-75.393492	0	1	Cca	3	90°	1	
27-Jun-2016	10:11:41	008	36.550962	-75.393636	0	1	Cca	3	90°	1	
27-Jun-2016	10:11:56	007	36.551073	-75.383752	0	1	Cca	2	90°	1	
27-Jun-2016	10:12:12	008	36.551101	-75.373840	0	1	Cca	2	90°	1	
27-Jun-2016	10:12:24	009	36.551121	-75.366186	0	1	Cca	2	90°	3	
27-Jun-2016	10:12:35	009	36.551105	-75.359252	0	1	Cca	3	90°	1	
27-Jun-2016	10:13:00	010	36.551136	-75.344065	0	1	Cca	3	90°	1	
27-Jun-2016	10:13:22	010	36.551145	-75.331021	0	1	Cca	3	90°	1	
27-Jun-2016	10:13:30	011	36.551173	-75.325821	0	1	Cca	2	90°	1	
27-Jun-2016	10:14:22	011	36.551198	-75.294738	0	1	Cca	3	90°	1	
27-Jun-2016	10:14:43	012	36.551200	-75.281414	0	1	Cca	3	90°	1	
27-Jun-2016	10:14:49	012	36.551213	-75.277799	0	1	Cca	3	90°	1	
27-Jun-2016	10:15:31	013	36.551188	-75.250691	0	1	Cca	3	90°	1	
27-Jun-2016	10:16:34	013	36.551208	-75.210290	0	1	Cca	3	90°	1	
27-Jun-2016	10:16:52	014	36.551190	-75.198516	0	1	Cca	3	90°	1	
27-Jun-2016	10:17:18	014	36.551215	-75.181780	0	1	Cca	3	90°	1	
27-Jun-2016	10:17:30	015	36.551203	-75.173914	0	1	Cca	2	90°	1	
27-Jun-2016	10:18:24	015	36.551228	-75.139162	0	1	Cca	2	90°	1	

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
27-Jun-2016	10:18:44	016	36.551273	-75.126429	0	1	Cca	3	90°	1	
27-Jun-2016	10:19:22	016	36.551194	-75.101733	0	1	Cca	2	90°	1	
27-Jun-2016	10:39:11	022	36.606754	-75.076194	1	1	Cca	3	90°	3	
27-Jun-2016	10:39:23	023	36.606865	-75.083864	1	1	Cca	2	90°	1	
27-Jun-2016	10:39:38	024	36.607450	-75.093253	1	1	Cca	2	90°	3	
27-Jun-2016	10:39:54	023	36.608093	-75.103654	1	1	Cca	4	90°	1	
27-Jun-2016	10:40:15	025	36.608548	-75.116734	1	1	Cca	3	90°	1	
27-Jun-2016	10:40:39	026	36.608807	-75.131309	1	1	Cca	2	90°	2	
27-Jun-2016	10:40:44	024	36.608847	-75.134507	1	1	Cca	3	90°	2	
27-Jun-2016	10:40:57	025	36.608878	-75.142528	1	1	Cca	3	90°	2	
27-Jun-2016	10:43:22	027	36.608998	-75.234575	1	1	Cca	3	90°	1	
27-Jun-2016	10:43:51	028	36.608988	-75.253022	1	1	Cca	1	90°	1	
27-Jun-2016	10:44:13	029	36.608957	-75.267229	1	1	Cca	3	90°	2	
27-Jun-2016	10:44:42	027	36.608996	-75.285813	1	1	Cca	3	90°	1	
27-Jun-2016	10:44:50	030	36.608954	-75.290660	1	1	Cca	2	90°	1	
27-Jun-2016	10:48:39	032	36.609916	-75.304973	1	1	Cca	2	90°	1	
27-Jun-2016	10:50:39	031	36.608799	-75.406446	1	1	Cca	3	90°	1	
27-Jun-2016	10:56:18	034	36.608310	-75.630187	1	1	Cca	3	90°	1	
27-Jun-2016	10:58:01	039	36.607999	-75.697169	1	1	Cca	2	90°	1	
27-Jun-2016	10:59:49	040	36.607449	-75.766014	1	1	Cca	2	90°	1	
27-Jun-2016	11:07:18	044	36.668750	-75.784890	2	1	Cca	2	90°	1	
27-Jun-2016	11:11:13	045	36.669036	-75.621583	2	1	Cca	3	90°	1	
27-Jun-2016	11:14:25	047	36.669550	-75.499344	2	1	Cca	3	90°	2	
27-Jun-2016	11:16:32	048	36.669393	-75.420372	2	1	Cca	3	3°	1	
27-Jun-2016	11:17:33	049	36.669438	-75.381787	2	1	Cca	2	3°	1	
27-Jun-2016	11:19:06	051	36.669422	-75.321930	2	1	Cca	2	90°	1	
27-Jun-2016	11:19:46	052	36.669508	-75.296088	2	1	Cca	2	90°	1	
27-Jun-2016	11:20:14	053	36.669545	-75.278191	2	1	Cca	2	90°	1	
27-Jun-2016	11:20:34	054	36.669621	-75.265413	2	1	Cca	3	90°	1	
27-Jun-2016	11:21:28	055	36.669496	-75.229967	2	1	Cca	3	90°	1	
27-Jun-2016	11:22:49	056	36.669439	-75.177916	2	1	Cca	3	90°	1	
27-Jun-2016	11:23:02	047	36.669410	-75.169717	2	1	Cca	2	110°	1	
27-Jun-2016	11:23:17	057	36.669468	-75.160330	2	1	Cca	1	90°	1	
27-Jun-2016	11:23:42	058	36.669401	-75.144334	2	1	Cca	1	90°	2	
27-Jun-2016	11:24:23	059	36.669302	-75.118337	2	1	Cca	3	110°	1	

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
27-Jun-2016	11:24:33	060	36.669286	-75.112054	2	1	Cca	1	90°	2	
27-Jun-2016	11:25:33	049	36.669256	-75.074189	2	1	Cca	4	90°	1	
27-Jun-2016	11:27:30	063	36.703605	-75.023623		1	Dco	1	90°	1	*
27-Jun-2016	11:29:20	052	36.725392	-75.069057	3	1	Cca	3	90°	1	
27-Jun-2016	11:29:54	065	36.726075	-75.090208	3	1	Cca	2	90°	1	
27-Jun-2016	11:29:58	066	36.726127	-75.092667	3	1	Cca	2	90°	1	
27-Jun-2016	11:31:46	054	36.726510	-75.160030	3	1	Cca	3	90°	1	
27-Jun-2016	11:32:17	067	36.726522	-75.179634	3	1	Cca	2	90°	1	
27-Jun-2016	11:32:44	055	36.726507	-75.196296	3	1	Cca	3	90°	1	
27-Jun-2016	11:34:07	068	36.726459	-75.247968	3	1	Cca	2	90°	1	
27-Jun-2016	11:34:40	069	36.726435	-75.268976	3	1	Cca	2	90°	1	
27-Jun-2016	11:35:31	070	36.726471	-75.300656	3	1	Cca	2	90°	1	
27-Jun-2016	11:36:31	072	36.726539	-75.337867	3	1	Cca	2	90°	1	
27-Jun-2016	11:36:52	073	36.726555	-75.350574	3	1	Cca	2	90°	2	
27-Jun-2016	11:37:06	057	36.726591	-75.359098	3	1	Cca	3	90°	2	
27-Jun-2016	11:37:55	074	36.726593	-75.389569	3	1	Cca	2	90°	1	
27-Jun-2016	11:38:37	075	36.726595	-75.415354	3	1	Cca	3	90°	1	
27-Jun-2016	11:47:31	080	36.725868	-75.649862	3	1	Cca	1	90°	1	
27-Jun-2016	13:47:22	075	36.787148	-75.537516	4	2	Cca	2	90°	1	
27-Jun-2016	13:48:22	076	36.787118	-75.499093	4	2	Cca	2	90°	1	
27-Jun-2016	13:48:30	089	36.787138	-75.493903	4	1	Cca	3	90°	1	
27-Jun-2016	13:48:47	077	36.787183	-75.482762	4	2	Cca	3	90°	1	
27-Jun-2016	13:49:03	078	36.787254	-75.472355	4	2	Cca	3	90°	1	
27-Jun-2016	13:50:11	079	36.787319	-75.429117	4	2	Cca	3	110°	1	
27-Jun-2016	13:50:51	080	36.787287	-75.403548	4	2	Cca	3	90°	1	
27-Jun-2016	13:51:49	081	36.787305	-75.365355	4	2	Cca	2	90°	1	
27-Jun-2016	13:52:03	082	36.787289	-75.356470	4	2	Cca	3	90°	1	
27-Jun-2016	13:52:23	090	36.787262	-75.343504	4	1	Cca	2	90°	1	
27-Jun-2016	13:52:26	083	36.787236	-75.341333	4	2	Cca	3	90°	1	
27-Jun-2016	13:52:38	084	36.787241	-75.333857	4	2	Cca	2	90°	1	
27-Jun-2016	13:53:15	091	36.787220	-75.309806	4	1	Cca	3	90°	1	
27-Jun-2016	13:53:30	092	36.787183	-75.300343	4	1	Cca	2	90°	2	
27-Jun-2016	13:54:27	093	36.787274	-75.264046	4	1	Cca	2	90°	1	
27-Jun-2016	13:54:51	094	36.787239	-75.248513	4	1	Cca	2	90°	1	
27-Jun-2016	13:55:25	095	36.787214	-75.226569	4	1	Cca	2	90°	1	

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
27-Jun-2016	13:55:39	096	36.787251	-75.217431	4	1	Cca	3	45°	1	
27-Jun-2016	13:55:47	097	36.787292	-75.212373	4	1	Cca	2	80°	1	
27-Jun-2016	13:56:25	085	36.787211	-75.187086	4	2	Cca	2	90°	1	
27-Jun-2016	13:57:12	086	36.787144	-75.156255	4	2	Cca	2	90°	3	
27-Jun-2016	13:57:38	098	36.787104	-75.139482	4	1	Cca	2	80°	1	
27-Jun-2016	13:58:28	100	36.787051	-75.107042	4	1	Cca	3	90°	1	
27-Jun-2016	13:59:19	087	36.786955	-75.074668	4	2	Cca	2	90°	1	
27-Jun-2016	14:05:12	091	36.853023	-75.060178	5	2	Cca	3	90°	1	
27-Jun-2016	14:05:15	092	36.852972	-75.062418	5	2	Cca	3	90°	1	
27-Jun-2016	14:06:37	093	36.850729	-75.117409	5	2	Cca	2	90°	1	
27-Jun-2016	14:06:49	108	36.850646	-75.125949	5	1	Cca	2	90°	1	
27-Jun-2016	14:07:04	094	36.850591	-75.136378	5	2	Cca	3	90°	1	
27-Jun-2016	14:08:07	095	36.850253	-75.179332	5	2	Cca	2	90°	1	
27-Jun-2016	14:08:50	109	36.850017	-75.208448	5	1	Cca	2	90°	1	
27-Jun-2016	14:09:19	096	36.849912	-75.228586	5	2	Cca	1	90°	1	
27-Jun-2016	14:11:34	098	36.849312	-75.319970	5	2	Cca	2	90°	1	
27-Jun-2016	14:12:00	099	36.849201	-75.337303	5	2	Cca	3	110°	1	
27-Jun-2016	14:13:43	100	36.848620	-75.406454	5	2	Cca	2	90°	1	
27-Jun-2016	14:14:59	102	36.848255	-75.456752	5	2	Cca	2	90°	1	
27-Jun-2016	14:20:48	106	36.845468	-75.690329	5	2	Cca	2	90°	1	
27-Jun-2016	14:36:33	124	36.904737	-75.704850	6	3	Cca	3	90°	1	
27-Jun-2016	14:40:13	126	36.905167	-75.564592	6	2	Cca	3	90°	1	
27-Jun-2016	14:41:45	117	36.904733	-75.505528	6	2	Cca	3	90°	1	
27-Jun-2016	14:42:19	127	36.904917	-75.483367	6	2	Cca	3	90°	1	
27-Jun-2016	14:43:06	128	36.904897	-75.453578	6	2	Cca	3	90°	1	
27-Jun-2016	14:44:32	130	36.904921	-75.398002	6	2	Cca	3	90°	1	
27-Jun-2016	14:45:40	131	36.904848	-75.355125	6	2	Cca	2	90°	2	
27-Jun-2016	14:46:05	118	36.904886	-75.338681	6	2	Cca	2	90°	1	
27-Jun-2016	14:46:21	119	36.904925	-75.328682	6	2	Cca	2	90°	1	
27-Jun-2016	14:49:23	122	36.904720	-75.212229	6	2	Cca	1	90°	1	
27-Jun-2016	14:49:28	123	36.904731	-75.209020	6	2	Cca	3	90°	1	
27-Jun-2016	14:50:16	124	36.904919	-75.178506	6	2	Cca	2	90°	1	
27-Jun-2016	14:50:31	136	36.904889	-75.168866	6	2	Cca	3	80°	3	
27-Jun-2016	14:50:44	125	36.904857	-75.160419	6	2	Cca	2	90°	1	
27-Jun-2016	14:51:35	138	36.904819	-75.127940	6	2	Cca	3	80°	2	

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
27-Jun-2016	14:52:14	127	36.904818	-75.102686	6	2	Cca	2	90°	1	
27-Jun-2016	14:52:27	139	36.904803	-75.094850	6	2	Cca	2	90°	1	
27-Jun-2016	14:56:14	144	36.967180	-75.066149	7	2	Cca	3	90°	3	
27-Jun-2016	14:56:54	133	36.966786	-75.091143	7	2	Cca	2	90°	1	
27-Jun-2016	14:57:24	145	36.967597	-75.110107	7	2	Cca	3	80°	3	
27-Jun-2016	14:57:39	134	36.967751	-75.119564	7	2	Cca	2	90°	1	
27-Jun-2016	14:59:09	136	36.967823	-75.178388	7	2	Cca	2	90°	1	
27-Jun-2016	14:59:28	146	36.967767	-75.190670	7	2	Cca	3	90°	3	
27-Jun-2016	14:59:29	137	36.967768	-75.191651	7	2	Cca	2	120°	1	
27-Jun-2016	15:00:13	138	36.967617	-75.221263	7	2	Cca	2	90°	1	
27-Jun-2016	15:02:39	140	36.966915	-75.318783	7	2	Cca	1	90°	1	
27-Jun-2016	15:10:46	142	36.963719	-75.645997	7	2	Cca	2	90°	1	
27-Jun-2016	15:38:32	148	37.023681	-75.800396	8	2	Cca	1	90°	1	
27-Jun-2016	15:39:35	149	37.023817	-75.759507	8	2	Cca	2	90°	1	
27-Jun-2016	15:39:40	156	37.023862	-75.756147	8	2	Cca	2	100°	1	
27-Jun-2016	15:40:23	150	37.023935	-75.727656	8	2	Cca	2	90°	1	
27-Jun-2016	15:55:33	159	37.266559	-75.509105	12	2	Cca	2	80°	1	
27-Jun-2016	15:57:04	153	37.262169	-75.448033	12	2	Cca	2	90°	1	
27-Jun-2016	15:59:41	160	37.263109	-75.340345	12	2	Dco	2	70°	1	
27-Jun-2016	16:02:47	161	37.264397	-75.214539	12	2	Cca	3	90°	2	
27-Jun-2016	16:03:18	162	37.264569	-75.194154	12	2	Dco	1	70°	2	
27-Jun-2016	16:03:22	157	37.264569	-75.191025	12	2	Cca	2	90°	1	
27-Jun-2016	16:13:37	165	37.313820	-75.039631		2	Cca	2	90°	1	*
27-Jun-2016	16:14:23	167	37.323445	-75.066057	13	2	Cca	2	120°	1	
27-Jun-2016	16:14:50	169	37.321882	-75.084092	13	2	Cca	3	90°	1	
27-Jun-2016	16:17:06	175	37.323421	-75.176003	13	2	Cca	2	90°	1	
14-Jul-2016	9:41:37	006	37.265908	-75.243617	12	2	Cca	2	100°	1	
14-Jul-2016	9:42:13	007	37.265687	-75.260600	12	2	Cca	2	90°	1	
14-Jul-2016	10:20:49	013	37.147993	-75.190535	10	2	Cca	1	90°	1	
14-Jul-2016	10:21:01	015	37.148148	-75.198033	10	2	Cca	2	90°	1	
14-Jul-2016	10:21:11	014	37.148125	-75.204426	10	2	Cca	1	90°	1	
14-Jul-2016	10:30:25	019	37.146726	-75.333373	10	2	Cca	1	110°	1	
14-Jul-2016	10:39:07	020	37.143074	-75.681109	10	2	Cca	2	90°	1	
14-Jul-2016	10:51:24	030	37.087730	-75.732209	9	2	Cca	2	115°	1	
14-Jul-2016	11:07:40	029	37.034303	-75.134056		3	Cca	2	90°	1	*

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
14-Jul-2016	11:21:14	035	37.027164	-75.549355	8	2	Cca	2	115°	1	
14-Jul-2016	13:47:34	056	36.968327	-75.916282	7	2	Cca	2	90°	1	
14-Jul-2016	13:48:27	057	36.968500	-75.883658	7	2	Cca	2	90°	1	
14-Jul-2016	13:49:43	058	36.969127	-75.835273	7	2	Cca	3	90°	1	
14-Jul-2016	13:49:59	059	36.969016	-75.825199	7	2	Cca	3	90°	1	
14-Jul-2016	14:20:14	068	36.968351	-75.228370	7	2	Cca	2	90°	1	
14-Jul-2016	14:21:12	046	36.968179	-75.190417	7	2	Cca	2	80°	1	
14-Jul-2016	14:21:26	069	36.968141	-75.180885	7	2	Dco	3	90°	1	
14-Jul-2016	14:21:54	047	36.967793	-75.162020	7	2	Cca	3	90°	1	
14-Jul-2016	14:22:52	071	36.952262	-75.136174		2	Dco	3	110°	1	*
14-Jul-2016	14:33:37	050	36.907673	-75.492097	6	2	Cca	2	90°	1	
14-Jul-2016	14:36:31	075	36.906811	-75.606752	6	2	Cca	2	90°	1	
14-Jul-2016	14:44:43	056	36.904077	-75.936251	6	2	Cca	3	90°	1	
14-Jul-2016	14:49:51	094	36.843334	-75.874216	5	2	Cca	2	90°	1	
14-Jul-2016	14:55:46	097	36.846014	-75.649821	5	2	Cca	1	90°	1	
14-Jul-2016	15:02:19	059	36.848484	-75.394973	5	2	Cca	3	90°	1	
14-Jul-2016	15:07:58	099	36.850142	-75.177694	5	2	Cca	2	90°	1	
14-Jul-2016	15:10:42	101	36.801797	-75.137119		2	Cca	2	90°	1	*
14-Jul-2016	15:36:25	104	36.786519	-75.929563	4	2	Cca	2	90°	1	
14-Jul-2016	16:27:10	083	36.608085	-75.767757	1	1	Cca	2	90°	1	
14-Jul-2016	16:33:25	114	36.610650	-75.533129	1	2	Cca	2	90°	1	
14-Jul-2016	16:41:16	115	36.612924	-75.242151	1	2	Cca	2	90°	1	
8-Aug-2016	9:23:40	009	37.260214	-75.582962	12	1	Cca	2	90°	1	
8-Aug-2016	9:25:12	006	37.260815	-75.524967	12	1	Cca	1	90°	1	
8-Aug-2016	9:29:49	012	37.262504	-75.351189	12	1	Cca	1	90°	1	
8-Aug-2016	9:31:08	010	37.262975	-75.303372	12	1	Cca	1	110°	1	
8-Aug-2016	9:46:34	015	37.330041	-75.288884	13	1	Cca	1	90°	1	
8-Aug-2016	9:49:33	016	37.329245	-75.404613	13	1	Cca	2	90°	1	
8-Aug-2016	9:52:16	017	37.325885	-75.510511	13	1	Cca	1	90°	1	
8-Aug-2016	9:52:41	018	37.325272	-75.527121	13	1	Cca	1	90°	1	
8-Aug-2016	10:07:38	036	37.204933	-75.605179	11	1	Cca	2	90°	1	
8-Aug-2016	10:10:11	035	37.202196	-75.512193	11	1	Cca	2	90°	1	
8-Aug-2016	10:10:25	037	37.202033	-75.504003	11	1	Cca	2	90°	1	
8-Aug-2016	10:13:25	038	37.203682	-75.393586	11	1	Cca	1	90°	1	
8-Aug-2016	10:16:53	041	37.203642	-75.274314	11	1	Dco	2	90°	1	

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
8-Aug-2016	10:24:21	041	37.143475	-75.205739	10	1	Cca	1	90°	1	
8-Aug-2016	10:29:00	043	37.143520	-75.384434	10	1	Cca	1	90°	1	
8-Aug-2016	10:31:25	044	37.143480	-75.473531	10	1	Cca	2	90°	1	
8-Aug-2016	10:33:13	046	37.143441	-75.537785	10	1	Cca	1	90°	1	
8-Aug-2016	10:34:53	045	37.143229	-75.597268	10	1	Cca	2	90°	1	
8-Aug-2016	10:37:09	048	37.142999	-75.676249	10	1	Cca	1	90°	1	
8-Aug-2016	10:39:54	047	37.142751	-75.772233	10	2	Cca	2	90°	1	
8-Aug-2016	10:50:56	059	37.085724	-75.747595	9	1	Cca	2	90°	1	
8-Aug-2016	10:53:11	056	37.085928	-75.661309	9	1	Cca	0	90°	1	
8-Aug-2016	10:56:23	057	37.086228	-75.545623	9	1	Cca	1	90°	1	
8-Aug-2016	10:56:33	063	37.086252	-75.539883	9	2	Cca	2	90°	1	
8-Aug-2016	10:57:08	064	37.086218	-75.519793	9	2	Cca	2	110°	1	
8-Aug-2016	11:00:36	065	37.086030	-75.395235	9	2	Cca	2	120°	1	
8-Aug-2016	11:21:17	070	37.025616	-75.575105	8	2	Cca	1	90°	1	
8-Aug-2016	11:22:40	071	37.025556	-75.625896	8	2	Cca	1	90°	1	
8-Aug-2016	11:23:39	073	37.025463	-75.662152	8	1	Cca	1	90°	1	
8-Aug-2016	11:28:51	073	37.025006	-75.853757	8	2	Cca	1	100°	1	
8-Aug-2016	11:39:45	083	36.967247	-75.800231	7	2	Cca	1	80°	1	
8-Aug-2016	11:43:45	084	36.967404	-75.662330	7	2	Cca	2	110°	1	
8-Aug-2016	11:48:29	086	36.967090	-75.493642	7	2	Cca	2	90°	1	
8-Aug-2016	11:50:43	087	36.966813	-75.411944	7	2	Cca	2	100°	1	
8-Aug-2016	11:53:19	089	36.966547	-75.314845	7	1	Cca	2	90°	1	
8-Aug-2016	12:09:23	093	36.905860	-75.527309	6	2	Cca	2	100°	1	
8-Aug-2016	12:16:34	105	36.905687	-75.802125	6	1	Cca	1	90°	1	
8-Aug-2016	14:06:32	104	36.839605	-75.755454	5	1	Cca	2	90°	1	
8-Aug-2016	14:07:37	105	36.839149	-75.718143	5	1	Cca	2	90°	1	
8-Aug-2016	14:08:54	107	36.838741	-75.673861	5	1	Cca	2	110°	1	
8-Aug-2016	14:09:40	122	36.838520	-75.647313	5	1	Cca	1	90°	1	
8-Aug-2016	14:15:21	110	36.836144	-75.446462	5	1	Cca	1	90°	1	
8-Aug-2016	14:18:33	111	36.834832	-75.332295	5	1	Cca	1	100°	1	
8-Aug-2016	14:20:59	112	36.833686	-75.245948	5	1	Cca	1	90°	1	
8-Aug-2016	14:26:19	130	36.788448	-75.198322	4	1	Cca	0	90°	1	
8-Aug-2016	14:31:50	135	36.788871	-75.402579	4	1	Cca	1	90°	1	
8-Aug-2016	14:33:47	116	36.788783	-75.474909	4	1	Cca	2	80°	1	
8-Aug-2016	14:37:06	118	36.788700	-75.601116	4	1	Cca	2	80°	1	

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
8-Aug-2016	14:52:33	128	36.723771	-75.813014	3	1	Cca	2	120°	1	
8-Aug-2016	14:55:14	129	36.724093	-75.720825	3	1	Cca	2	90°	1	
8-Aug-2016	14:56:07	130	36.724104	-75.691489	3	1	Cca	2	80°	1	
8-Aug-2016	14:58:59	131	36.724303	-75.595430	3	1	Cca	2	75°	1	
8-Aug-2016	14:59:44	153	36.724455	-75.570091	3	1	Cca	1	90°	1	
8-Aug-2016	15:01:47	132	36.724556	-75.501582	3	1	Dco	3	90°	1	
8-Aug-2016	15:02:29	154	36.724542	-75.478253	3	1	Cca	1	90°	1	
8-Aug-2016	15:03:42	133	36.724488	-75.438293	3	1	Cca	2	130°	1	
8-Aug-2016	15:08:36	138	36.724605	-75.278115	3	1	Cca	2	90°	1	
8-Aug-2016	15:22:23	164	36.670847	-75.460800	2	2	Cca	1	100°	1	
8-Aug-2016	15:31:18	166	36.670047	-75.802201	2	2	Cca	1	110°	1	
8-Aug-2016	15:37:42	150	36.605256	-75.823009	1	2	Cca	2	120°	1	
8-Aug-2016	15:47:01	173	36.606893	-75.500922	1	2	Cca	1	90°	1	
8-Aug-2016	16:10:13	161	36.552420	-75.569853	0	2	Cca	2	90°	1	
8-Aug-2016	16:12:12	179	36.552089	-75.644745	0	2	Cca	1	110°	1	
13-Sep-2016	12:59:12	039	36.966299	-75.241296	7	3	Cca	2	90°	1	
13-Sep-2016	13:06:21	041	36.964284	-75.513372	7	3	Cca	2	90°	2	
13-Sep-2016	13:40:28	055	37.203377	-75.703782	11	3	Cca	2	90°	1	
13-Sep-2016	13:48:46	097	37.262180	-75.590524	12	2	Cca	2	135°	1	
13-Sep-2016	14:01:57	103	37.265895	-75.280698	12	2	Cca	1	110°	1	
13-Sep-2016	14:04:40	104	37.266826	-75.180536	12	2	Cca	2	90°	1	
13-Sep-2016	14:18:04	068	37.321181	-75.563032	13	3	Cca	1	90°	1	
21-Oct-2016	9:51:03	010	36.607892	-75.299592	1	1	Dco	2	90°	1	
21-Oct-2016	10:20:01	018	36.670665	-75.412382	2	1	Cca	3	90°	1	
21-Oct-2016	10:20:18	019	36.670752	-75.401624	2	1	Cca	2	90°	1	
21-Oct-2016	10:22:08	026	36.667500	-75.334161	2	1	Cca	2	90°	1	
21-Oct-2016	10:23:48	027	36.669271	-75.354196	2	1	Cca	3	90°	1	
21-Oct-2016	10:27:17	031	36.670729	-75.217930	2	1	Dco	1	90°	1	
21-Oct-2016	10:35:03	027	36.724698	-75.106858	3	2	Cca	2	90°	1	
21-Oct-2016	10:44:44	035	36.725169	-75.323221	3	2	Cca	3	90°	2	
21-Oct-2016	10:45:42	036	36.724946	-75.361299	3	2	Cca	3	90°	1	
21-Oct-2016	11:15:54	053	36.788794	-75.399892	4	1	Cca	2	120°	1	
21-Oct-2016	11:24:19	059	36.788355	-75.054345	4	1	Cca	2	90°	1	
21-Oct-2016	11:29:26	052	36.848809	-75.129142	5	1	Cca	3	90°	1	
21-Oct-2016	13:45:17	079	36.905600	-75.702307	6	1	Cca	2	90°	1	

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
21-Oct-2016	13:46:09	081	36.906126	-75.668070	6	1	Cca	2	90°	1	
21-Oct-2016	13:47:36	082	36.905935	-75.610034	6	1	Cca	1	90°	1	
21-Oct-2016	13:48:13	083	36.905962	-75.584787	6	1	Cca	2	90°	1	
21-Oct-2016	13:49:01	084	36.906286	-75.552512	6	1	Cca	2	100°	1	
21-Oct-2016	13:54:13	087	36.906451	-75.344203	6	1	Cca	1	90°	1	
21-Oct-2016	13:57:30	089	36.906510	-75.212519	6	1	Cca	2	90°	1	
21-Oct-2016	13:59:23	090	36.906471	-75.134651	6	1	Dco	2	100°	1	
21-Oct-2016	14:00:36	091	36.906366	-75.084016	6	1	Dco	2	100°	1	
21-Oct-2016	14:06:52	094	36.966527	-75.143853	7	1	Cca	2	110°	1	
21-Oct-2016	14:08:22	076	36.965747	-75.200027	7	1	Cca	3	90°	1	
21-Oct-2016	14:12:51	078	36.964994	-75.366812	7	1	Cca	3	90°	1	
21-Oct-2016	14:15:39	079	36.964309	-75.471741	7	1	Cca	3	90°	1	
21-Oct-2016	14:17:43	080	36.963246	-75.550304	7	1	Cca	3	90°	1	
21-Oct-2016	14:40:54	114	37.321907	-75.629427	13	1	Cca	1	90°	1	
21-Oct-2016	14:44:22	115	37.322539	-75.491888	13	1	Cca	2	90°	1	
21-Oct-2016	14:46:18	089	37.322752	-75.416659	13	1	Cca	3	90°	1	
21-Oct-2016	14:47:27	119	37.322951	-75.372151	13	1	Cca	2	90°	1	
21-Oct-2016	14:48:44	120	37.323043	-75.322422	13	1	Cca	3	90°	1	
21-Oct-2016	14:49:37	090	37.322936	-75.288065	13	1	Cca	3	90°	1	
21-Oct-2016	14:50:13	121	37.323196	-75.264500	13	1	Cca	3	90°	1	
21-Oct-2016	14:51:02	122	37.322889	-75.232411	13	1	Cca	2	70°	1	
21-Oct-2016	14:53:05	125	37.323301	-75.150765	13	1	Cca	1	90°	1	
21-Oct-2016	14:53:41	094	37.323278	-75.127236	13	1	Cca	3	90°	1	
21-Oct-2016	14:53:55	126	37.322994	-75.118158	13	1	Cca	1	90°	1	
21-Oct-2016	14:57:17	128	37.286726	-75.028705		1	Cca	3	3°	1	*
21-Oct-2016	15:00:58	098	37.265438	-75.141661	12	1	Cca	3	90°	1	
21-Oct-2016	15:07:57	132	37.263183	-75.389971	12	1	Cca	3	90°	1	
21-Oct-2016	15:12:23	101	37.261388	-75.548681	12	1	Cca	3	90°	1	
21-Oct-2016	15:14:20	133	37.260448	-75.617831	12	1	Cca	3	90°	1	
21-Oct-2016	15:16:13	103	37.259473	-75.684579	12	1	Cca	3	90°	1	
31-May-2017	9:46:46	3	37.322683	-75.457112	13	2	TURT	2	110°	1	
31-May-2017	9:55:18	6	37.305453	-75.131415		2	Cca	2	90°	1	*
31-May-2017	9:56:39	7	37.273187	-75.148810		2	TURT	2	90°	1	*
31-May-2017	10:01:58	9	37.268311	-75.329983	12	2	Cca	3	110°	1	
31-May-2017	10:25:40	13	37.205203	-75.457235	11	1	TURT	2	90°	1	

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
31-May-2017	10:25:48	10	37.204991	-75.451687	11	2	TURT	2	105°	1	
31-May-2017	10:26:43	14	37.205263	-75.414873	11	1	Dco	2	140°	1	
31-May-2017	10:31:13	15	37.205669	-75.233000	11	1	Cca	2	90°	1	
31-May-2017	10:47:38	19	37.145475	-75.160158	10	1	Cca	2	90°	1	
31-May-2017	10:49:54	20	37.15013	-75.237308	10	1	Cca	3	90°	1	
31-May-2017	10:57:49	19	37.150043	-75.396543	10	2	Cca	1	90°	1	
31-May-2017	11:20:58	26	37.088762	-75.656928	9	1	Cca	2	110°	1	
31-May-2017	11:32:48	31	37.092168	-75.277516	9	1	Cca	2	90°	1	
31-May-2017	11:34:39	32	37.092909	-75.210548	9	1	Cca	3	110°	1	
31-May-2017	11:38:25	34	37.030895	-75.133054		1	Cca	2	90°	1	*
31-May-2017	11:40:30	29	37.024297	-75.208203	8	2	TURT	1	105°	1	
31-May-2017	11:46:20	36	37.025746	-75.430013	8	1	Cca	2	110°	1	
31-May-2017	11:50:30	37	37.027086	-75.590109	8	1	Cca	2	110°	1	
31-May-2017	11:52:49	38	37.027069	-75.677677	8	1	Cca	2	90°	1	
31-May-2017	14:56:17	46	36.847049	-75.545577	5	1	Cca	2	90°	1	
31-May-2017	14:58:47	48	36.847174	-75.443549	5	1	Cca	2	90°	1	
31-May-2017	15:00:14	49	36.847362	-75.384736	5	1	Cca	3	90°	1	
31-May-2017	15:01:05	50	36.847478	-75.350330	5	1	Cca	3	80°	1	
31-May-2017	15:13:15	63	36.915112	-75.341284	6	1	Cca	2	105°	1	
31-May-2017	15:16:15	58	36.910849	-75.452555	6	1	Cca	2	90°	1	
31-May-2017	15:53:19	68	36.727799	-75.649980	3	1	Cca	3	90°	1	
31-May-2017	15:54:37	69	36.727743	-75.601963	3	1	TURT	2	80°	1	
31-May-2017	15:59:25	72	36.673666	-75.609242	2	1	Cca	2	90°	1	
31-May-2017	16:16:37	76	36.609359	-75.623124	1	1	Cca	2	90°	1	
31-May-2017	16:17:41	77	36.609552	-75.581819	1	1	TURT	2	90°	1	
31-May-2017	16:19:12	79	36.583789	-75.545483		1	Cca	3	90°	1	*
31-May-2017	16:21:41	81	36.554104	-75.609831	0	1	Cca	1	130°	1	
1-Jun-2017	9:21:50	5	36.550119	-75.453916	0	1	TURT	1	90°	1	
1-Jun-2017	9:22:40	4	36.550138	-75.419102	0	1	Cca	2	110°	1	
1-Jun-2017	9:23:45	5	36.549685	-75.375040	0	1	Cca	2	110°	1	
1-Jun-2017	9:24:06	6	36.550507	-75.363463	0	1	TURT	1	90°	1	
1-Jun-2017	9:25:49	7	36.550824	-75.297983	0	1	Cca	1	90°	1	
1-Jun-2017	9:25:54	6	36.550758	-75.292179	0	1	Cca	2	90°	1	
1-Jun-2017	9:26:11	7	36.550553	-75.281909	0	1	Cca	2	110°	1	
1-Jun-2017	9:27:39	8	36.550329	-75.225987	0	1	Cca	2	90°	1	

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
1-Jun-2017	9:28:10	9	36.550357	-75.206568	0	1	Cca	2	90°	1	
1-Jun-2017	9:28:33	10	36.550434	-75.191743	0	1	Cca	2	90°	1	
1-Jun-2017	9:29:01	8	36.551838	-75.17613	0	1	TURT	1	120°	1	
1-Jun-2017	9:29:27	9	36.552259	-75.1593	0	1	TURT	1	120°	1	
1-Jun-2017	9:32:29	12	36.614575	-75.164865	1	1	Cca	1	90°	1	
1-Jun-2017	9:35:07	14	36.617132	-75.262797	1	1	Cca	2	90°	1	
1-Jun-2017	9:35:10	13	36.615344	-75.26637	1	1	Cca	1	90°	1	
1-Jun-2017	9:35:13	15	36.61703	-75.266656	1	1	Cca	2	100°	1	
1-Jun-2017	9:35:37	14	36.615252	-75.283708	1	1	TURT	1	90°	1	
1-Jun-2017	9:36:06	15	36.615157	-75.301653	1	1	TURT	1	90°	1	
1-Jun-2017	9:36:44	16	36.616144	-75.325596	1	1	Cca	2	90°	1	
1-Jun-2017	9:37:30	16	36.614949	-75.353268	1	1	Cca	1	90°	1	
1-Jun-2017	9:37:31	17	36.616395	-75.354501	1	1	Cca	2	90°	1	
1-Jun-2017	9:38:54	18	36.615389	-75.406360	1	1	Cca	2	90°	1	
1-Jun-2017	9:39:48	17	36.614639	-75.438187	1	1	TURT	2	120°	1	
1-Jun-2017	9:42:28	18	36.614251	-75.538473	1	1	Cca	1	120°	1	
1-Jun-2017	9:44:05	19	36.614018	-75.603355	1	1	Cca	1	90°	1	
1-Jun-2017	9:44:07	19	36.613916	-75.602236	1	1	TURT	2	90°	1	
1-Jun-2017	9:45:48	20	36.613561	-75.666127	1	1	TURT	2	90°	1	
1-Jun-2017	9:59:39	26	36.669735	-75.636014	2	1	Cca	2	100°	1	
1-Jun-2017	10:00:36	27	36.669307	-75.596508	2	1	TURT	2	90°	1	
1-Jun-2017	10:02:13	24	36.669047	-75.528263	2	1	Cca	2	100°	1	
1-Jun-2017	10:03:04	28	36.669121	-75.495551	2	1	TURT	2	90°	1	
1-Jun-2017	10:03:56	29	36.669171	-75.460105	2	1	TURT	1	90°	1	
1-Jun-2017	10:04:44	25	36.66886	-75.426453	2	1	Cca	2	125°	1	
1-Jun-2017	10:04:48	30	36.669214	-75.425583	2	1	TURT	2	90°	1	
1-Jun-2017	10:04:58	31	36.669302	-75.418344	2	1	TURT	2	90°	1	
1-Jun-2017	10:05:41	26	36.668983	-75.388377	2	1	Cca	2	110°	1	
1-Jun-2017	10:06:04	32	36.669473	-75.375247	2	1	TURT	1	90°	1	
1-Jun-2017	10:06:17	33	36.669392	-75.366217	2	1	TURT	1	90°	1	
1-Jun-2017	10:07:16	34	36.669297	-75.327098	2	1	TURT	1	90°	1	
1-Jun-2017	10:14:28	30	36.731015	-75.170471	3	1	Cca	2	100°	1	
1-Jun-2017	10:14:52	37	36.730027	-75.187324	3	1	TURT	1	90°	1	
1-Jun-2017	10:15:34	38	36.730533	-75.212255	3	1	TURT	1	90°	1	
1-Jun-2017	10:16:04	31	36.731572	-75.229318	3	1	Cca	1	90°	1	

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
1-Jun-2017	10:16:09	39	36.730615	-75.232288	3	1	TURT	2	120°	1	
1-Jun-2017	10:16:23	40	36.730685	-75.24109	3	1	TURT	2	90°	1	
1-Jun-2017	10:17:47	41	36.731119	-75.294868	3	1	Cca	1	90°	1	
1-Jun-2017	10:19:15	42	36.731233	-75.353907	3	1	TURT	2	90°	1	
1-Jun-2017	10:19:33	43	36.731238	-75.366132	3	1	TURT	2	90°	1	
1-Jun-2017	10:21:25	33	36.731284	-75.439980	3	1	Cca	2	110°	1	
1-Jun-2017	10:21:59	44	36.731289	-75.462469	3	1	Cca	0	90°	1	
1-Jun-2017	10:22:09	34	36.731419	-75.469063	3	1	Cca	1	90°	1	
1-Jun-2017	10:22:56	45	36.731297	-75.500201	3	1	TURT	1	90°	1	
1-Jun-2017	10:23:35	46	36.731299	-75.525938	3	1	Cca	1	90°	1	
1-Jun-2017	10:23:48	47	36.731292	-75.534525	3	1	TURT	1	90°	1	
1-Jun-2017	10:24:56	35	36.731472	-75.578696	3	1	Cca	1	90°	1	
1-Jun-2017	10:25:18	48	36.731241	-75.593154	3	1	Cca	1	90°	1	
1-Jun-2017	10:25:37	49	36.730936	-75.60593	3	1	TURT	1	90°	1	
1-Jun-2017	10:26:06	36	36.730538	-75.625224	3	1	Cca	1	90°	1	
1-Jun-2017	10:26:14	50	36.730362	-75.630138	3	1	TURT	2	90°	1	
1-Jun-2017	10:42:41	59	36.789444	-75.658709	4	1	TURT	2	90°	1	
1-Jun-2017	10:44:05	60	36.790209	-75.602754	4	1	TURT	2	90°	1	
1-Jun-2017	10:44:48	61	36.790522	-75.574176	4	1	Cca	1	90°	1	
1-Jun-2017	10:45:23	62	36.79049	-75.55063	4	1	Cca	1	90°	1	
1-Jun-2017	10:45:37	47	36.791151	-75.540951	4	1	Cca	2	90°	1	
1-Jun-2017	10:46:07	48	36.790895	-75.520618	4	1	Cca	2	125°	1	
1-Jun-2017	10:46:27	49	36.791048	-75.507455	4	1	Cca	2	90°	1	
1-Jun-2017	10:48:50	64	36.79157	-75.411353	4	1	Cca	0	90°	1	
1-Jun-2017	10:49:38	50	36.791756	-75.377551	4	1	Cca	2	90°	1	
1-Jun-2017	10:50:49	65	36.79235	-75.330027	4	1	TURT	2	90°	3	
1-Jun-2017	10:51:17	66	36.792641	-75.31103	4	1	Cca	2	120°	1	
1-Jun-2017	10:51:30	67	36.792733	-75.302319	4	1	Cca	1	120°	1	
1-Jun-2017	10:53:06	68	36.793491	-75.23778	4	1	Cca	1	90°	1	
1-Jun-2017	10:54:16	69	36.793916	-75.190615	4	1	Cca	1	90°	1	
1-Jun-2017	10:57:49	73	36.851207	-75.18146	5	1	Cca	1	150°	1	
1-Jun-2017	10:59:08	74	36.85219	-75.234155	5	1	TURT	1	120°	1	
1-Jun-2017	10:59:31	54	36.85397	-75.250254	5	1	Cca	3	90°	1	
1-Jun-2017	11:01:57	75	36.852115	-75.348324	5	1	Cca	1	90°	1	
1-Jun-2017	11:02:17	76	36.852015	-75.361569	5	1	TURT	1	90°	1	

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
1-Jun-2017	11:02:55	77	36.852064	-75.386996	5	1	Cca	1	90°	1	
1-Jun-2017	11:03:39	78	36.851941	-75.416789	5	1	Cca	1	90°	1	
1-Jun-2017	11:03:52	79	36.852021	-75.425477	5	1	TURT	2	90°	1	
1-Jun-2017	11:04:09	80	36.851915	-75.436868	5	1	TURT	2	90°	1	
1-Jun-2017	11:04:49	81	36.851758	-75.463294	5	1	TURT	2	90°	1	
1-Jun-2017	11:06:20	82	36.851633	-75.522814	5	1	TURT	2	70°	1	
1-Jun-2017	11:07:03	55	36.85171	-75.552053	5	1	Cca	3	90°	1	
1-Jun-2017	11:07:51	56	36.850682	-75.584285	5	1	Cca	2	90°	1	
1-Jun-2017	11:08:06	83	36.850356	-75.593261	5	1	TURT	1	90°	1	
1-Jun-2017	11:09:49	84	36.849903	-75.661536	5	1	TURT	2	90°	2	
1-Jun-2017	13:20:09	102	36.905896	-75.696965	6	1	TURT	2	90°	1	
1-Jun-2017	13:23:24	105	36.906823	-75.562886	6	1	Cca	1	90°	1	
1-Jun-2017	13:24:27	106	36.90628	-75.519289	6	1	TURT	1	90°	2	
1-Jun-2017	13:24:41	68	36.907137	-75.508208	6	1	Cca	3	90°	1	
1-Jun-2017	13:24:48	107	36.906221	-75.504218	6	1	TURT	2	110°	1	
1-Jun-2017	13:25:04	108	36.906253	-75.493394	6	1	Cca	1	100°	1	
1-Jun-2017	13:26:12	109	36.906443	-75.446318	6	1	Cca	2	110°	1	
1-Jun-2017	13:26:28	110	36.906497	-75.434992	6	1	TURT	2	90°	1	
1-Jun-2017	13:26:39	111	36.906542	-75.427355	6	1	TURT	2	90°	1	
1-Jun-2017	13:27:04	112	36.906591	-75.410266	6	1	Cca	1	120°	1	
1-Jun-2017	13:28:17	113	36.906919	-75.359142	6	1	Cca	1	90°	1	
1-Jun-2017	13:28:56	114	36.907095	-75.332226	6	1	TURT	2	90°	1	
1-Jun-2017	13:29:15	115	36.90717	-75.319583	6	1	Cca	2	120°	1	
1-Jun-2017	13:29:36	116	36.907226	-75.305091	6	1	TURT	2	90°	1	
1-Jun-2017	13:29:53	117	36.907266	-75.293884	6	1	Cca	0	90°	1	
1-Jun-2017	13:30:15	118	36.907365	-75.278942	6	1	Cca	0	90°	1	
1-Jun-2017	13:30:28	119	36.907404	-75.26986	6	1	Cca	1	90°	2	
1-Jun-2017	13:31:12	69	36.906518	-75.237157	6	1	Cca	3	90°	1	
1-Jun-2017	13:31:27	120	36.907419	-75.230652	6	1	Cca	0	90°	1	
1-Jun-2017	13:31:45	121	36.907444	-75.218419	6	1	Cca	1	90°	1	
1-Jun-2017	13:32:10	122	36.90753	-75.201653	6	1	TURT	2	90°	1	
1-Jun-2017	13:32:21	123	36.907646	-75.194097	6	1	Cca	1	90°	1	
1-Jun-2017	13:32:35	124	36.908074	-75.184726	6	1	Cca	2	90°	1	
1-Jun-2017	13:32:48	125	36.909011	-75.175595	6	1	Cca	2	90°	1	
1-Jun-2017	13:33:07	126	36.909932	-75.162939	6	1	TURT	2	90°	2	

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
1-Jun-2017	13:34:00	71	36.928011	-75.136989		1	Cca	3	90°	1	*
1-Jun-2017	13:36:00	73	36.970218	-75.180405	7	1	Cca	2	90°	1	
1-Jun-2017	13:36:53	74	36.970382	-75.218378	7	1	Cca	2	90°	1	
1-Jun-2017	13:37:16	75	36.970275	-75.235230	7	1	Cca	3	90°	1	
1-Jun-2017	13:37:26	76	36.970233	-75.242137	7	1	Cca	2	90°	1	
1-Jun-2017	13:39:10	77	36.968433	-75.313874	7	1	Cca	2	90°	1	
1-Jun-2017	13:39:39	78	36.968044	-75.333678	7	1	Cca	3	90°	1	
1-Jun-2017	13:41:19	80	36.96753	-75.402094	7	1	Cca	2	90°	1	
1-Jun-2017	13:42:12	132	36.969679	-75.439937	7	1	TURT	1	110°	1	
1-Jun-2017	13:42:29	81	36.968148	-75.450480	7	1	Cca	3	90°	1	
1-Jun-2017	13:49:50	138	36.968985	-75.519044	7	1	Cca	1	90°	1	
1-Jun-2017	13:50:02	139	36.968917	-75.526893	7	1	TURT	2	90°	1	
1-Jun-2017	13:53:33	144	36.967122	-75.665775	7	1	TURT	2	120°	1	
1-Jun-2017	13:55:43	147	36.966503	-75.749833	7	1	Cca	2	110°	1	
1-Jun-2017	13:56:59	86	36.966806	-75.801486	7	1	Cca	2	90°	1	
1-Jun-2017	14:00:58	151	36.964203	-75.954178	7	1	Cca	2	90°	1	
1-Jun-2017	14:01:37	88	36.963319	-75.979901	7	1	Cca	2	90°	1	
1-Jun-2017	14:09:11	90	37.024461	-75.758480	8	1	Cca	2	90°	1	
1-Jun-2017	14:09:34	156	37.024485	-75.742736	8	1	Cca	2	90°	1	
1-Jun-2017	14:09:49	157	37.024593	-75.732338	8	1	Cca	2	90°	1	
1-Jun-2017	14:13:34	159	37.023612	-75.578516	8	1	Cca	1	90°	1	
1-Jun-2017	14:13:57	160	37.023286	-75.563449	8	1	Cca	1	90°	1	
1-Jun-2017	14:15:30	92	37.022185	-75.498823	8	1	Cca	2	90°	1	
1-Jun-2017	14:16:30	93	37.021759	-75.457837	8	1	Cca	2	90°	1	
1-Jun-2017	14:17:06	161	37.02154	-75.433563	8	1	TURT	2	90°	1	
1-Jun-2017	14:17:58	94	37.02159	-75.397683	8	1	Cca	2	90°	1	
1-Jun-2017	14:18:34	163	37.021181	-75.373028	8	1	Cca	1	90°	1	
1-Jun-2017	14:19:07	96	37.021157	-75.349348	8	2	TURT	2	90°	1	
1-Jun-2017	14:20:07	97	37.020732	-75.308667	8	2	TURT	2	90°	1	
1-Jun-2017	14:20:09	164	37.020632	-75.308136	8	1	Cca	1	90°	2	
1-Jun-2017	14:20:44	98	37.020607	-75.283659	8	2	Cca	1	90°	1	
1-Jun-2017	14:21:23	165	37.020153	-75.258525	8	1	Cca	1	90°	1	
1-Jun-2017	14:21:54	166	37.019958	-75.237066	8	1	Cca	2	90°	1	
1-Jun-2017	14:22:09	167	37.01994	-75.227229	8	1	Cca	2	90°	2	
1-Jun-2017	14:22:27	168	37.019849	-75.214852	8	1	TURT	2	90°	1	

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
1-Jun-2017	14:22:49	99	37.020331	-75.199512	8	2	Cca	2	90°	1	
1-Jun-2017	14:22:55	169	37.020417	-75.196383	8	1	Cca	1	90°	1	
1-Jun-2017	14:26:59	172	37.09734	-75.176693	9	1	TURT	2	120°	1	
1-Jun-2017	14:27:29	173	37.097913	-75.197188	9	1	Cca	2	90°	1	
1-Jun-2017	14:27:59	103	37.095567	-75.213453	9	1	Cca	3	90°	1	
1-Jun-2017	14:28:17	174	37.097779	-75.229239	9	1	TURT	1	120°	1	
1-Jun-2017	14:29:28	175	37.097383	-75.276292	9	1	TURT	2	90°	1	
1-Jun-2017	14:29:54	104	37.095817	-75.291116	9	1	Cca	3	90°	1	
1-Jun-2017	14:31:21	105	37.095038	-75.348665	9	1	Cca	1	90°	1	
1-Jun-2017	14:31:56	106	37.095167	-75.372471	9	1	Cca	2	90°	1	
1-Jun-2017	14:32:11	176	37.095941	-75.384126	9	1	Cca	1	90°	1	
1-Jun-2017	14:32:25	177	37.095823	-75.393638	9	1	TURT	1	90°	1	
1-Jun-2017	14:32:59	107	37.095646	-75.415682	9	1	Cca	3	90°	1	
1-Jun-2017	14:33:11	108	37.095508	-75.423728	9	1	Cca	2	90°	1	
1-Jun-2017	14:34:05	178	37.094916	-75.459722	9	1	TURT	1	90°	1	
1-Jun-2017	14:34:38	179	37.094612	-75.481634	9	1	TURT	2	90°	1	
1-Jun-2017	14:34:47	109	37.094651	-75.487424	9	1	Cca	2	90°	1	
1-Jun-2017	14:36:11	180	37.093553	-75.541852	9	1	TURT	1	90°	1	
1-Jun-2017	14:36:55	110	37.093182	-75.570221	9	1	Cca	3	90°	1	
1-Jun-2017	14:40:11	184	37.09029	-75.695197	9	1	TURT	2	90°	1	
1-Jun-2017	14:41:04	185	37.089739	-75.729822	9	1	TURT	4	45°	1	
1-Jun-2017	14:41:08	112	37.089799	-75.732471	9	1	Cca	2	90°	1	
1-Jun-2017	14:54:48	116	37.147969	-75.639702	10	1	Cca	2	90°	1	
1-Jun-2017	14:56:29	190	37.145544	-75.570869	10	1	Cca	1	90°	1	
1-Jun-2017	14:56:58	191	37.145504	-75.550497	10	1	TURT	2	90°	1	
1-Jun-2017	14:57:44	193	37.145652	-75.518519	10	1	Cca	2	90°	1	
1-Jun-2017	14:57:44	193	37.145652	-75.518519	10	1	TURT	2	90°	1	
1-Jun-2017	14:57:46	118	37.147497	-75.514917	10	1	TURT	3	90°	1	
1-Jun-2017	14:58:04	119	37.147552	-75.502558	10	1	Cca	3	90°	1	
1-Jun-2017	14:58:41	194	37.145794	-75.478947	10	1	TURT	2	90°	1	
1-Jun-2017	15:00:26	120	37.14779	-75.404981	10	1	Cca	3	90°	1	
1-Jun-2017	15:01:00	195	37.145935	-75.38423	10	1	Cca	1	90°	1	
1-Jun-2017	15:01:05	121	37.147857	-75.378191	10	1	Cca	3	90°	1	
1-Jun-2017	15:01:14	196	37.145963	-75.374417	10	1	Cca	1	90°	1	
1-Jun-2017	15:01:34	197	37.145954	-75.360684	10	1	Cca	1	90°	1	

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
1-Jun-2017	15:01:45	198	37.145987	-75.352855	10	1	Cca	2	90°	1	
1-Jun-2017	15:01:51	122	37.147873	-75.346785	10	1	Cca	3	90°	1	
1-Jun-2017	15:02:05	123	37.147854	-75.337311	10	1	Cca	3	90°	1	
1-Jun-2017	15:02:21	199	37.146041	-75.328629	10	1	Cca	2	90°	2	
1-Jun-2017	15:02:39	200	37.146012	-75.315966	10	1	Cca	1	90°	1	
1-Jun-2017	15:02:42	124	37.147891	-75.31241	10	1	Cca	3	90°	1	
1-Jun-2017	15:02:50	201	37.146036	-75.308525	10	1	Cca	1	90°	1	
1-Jun-2017	15:03:38	202	37.146003	-75.27627	10	1	Cca	1	120°	1	
1-Jun-2017	15:04:18	204	37.14604	-75.248082	10	1	Cca	2	90°	1	
1-Jun-2017	15:04:21	205	37.146044	-75.246284	10	1	Cca	1	90°	1	
1-Jun-2017	15:04:38	126	37.148174	-75.231931	10	1	Cca	3	90°	1	
1-Jun-2017	15:05:10	206	37.145974	-75.211797	10	1	Cca	1	120°	1	
1-Jun-2017	15:05:42	127	37.148407	-75.187976	10	1	Cca	3	90°	1	
1-Jun-2017	15:06:01	207	37.146697	-75.177271	10	1	Cca	2	90°	1	
1-Jun-2017	15:09:45	130	37.208958	-75.19657	11	1	Cca	3	90°	1	
1-Jun-2017	15:10:18	131	37.209245	-75.21808	11	1	Cca	3	90°	1	
1-Jun-2017	15:12:41	132	37.209136	-75.312496	11	1	Cca	3	90°	1	
1-Jun-2017	15:13:02	210	37.209973	-75.325527	11	1	TURT	2	90°	1	
1-Jun-2017	15:15:38	211	37.209615	-75.427998	11	1	Cca	1	90°	1	
1-Jun-2017	15:16:30	133	37.209401	-75.463331	11	1	Cca	3	90°	1	
1-Jun-2017	15:19:33	134	37.208012	-75.580972	11	1	Cca	2	90°	1	
1-Jun-2017	15:20:50	135	37.207727	-75.630233	11	1	Cca	3	90°	1	
1-Jun-2017	15:40:38	218	37.264021	-75.419262	12	1	TURT	2	150°	1	
1-Jun-2017	15:41:00	219	37.263986	-75.403117	12	1	Cca	1	90°	1	
1-Jun-2017	15:41:22	139	37.264364	-75.386371	12	2	Cca	2	90°	1	
1-Jun-2017	15:41:48	220	37.264115	-75.368756	12	1	Cca	1	90°	1	
1-Jun-2017	15:42:46	221	37.264193	-75.327075	12	1	Cca	1	90°	1	
1-Jun-2017	15:43:38	222	37.264323	-75.289522	12	1	TURT	1	70°	1	
1-Jun-2017	15:44:40	223	37.264375	-75.245532	12	1	Cca	1	150°	1	
1-Jun-2017	15:45:02	141	37.263881	-75.229367	12	1	Cca	3	90°	1	
1-Jun-2017	15:45:10	224	37.264367	-75.224705	12	1	Cca	1	90°	1	
1-Jun-2017	15:45:32	225	37.264611	-75.208654	12	1	Cca	2	90°	2	
1-Jun-2017	15:45:56	226	37.265759	-75.191755	12	1	TURT	1	90°	1	
1-Jun-2017	15:46:06	142	37.265315	-75.183784	12	1	Cca	2	90°	1	
1-Jun-2017	15:46:34	227	37.267581	-75.163887	12	1	TURT	2	90°	2	

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
1-Jun-2017	15:49:59	231	37.327992	-75.209599	13	1	TURT	2	150°	1	
1-Jun-2017	15:51:22	233	37.328176	-75.26451	13	1	TURT	1	90°	1	
1-Jun-2017	15:52:45	234	37.327962	-75.319119	13	1	TURT	2	90°	1	
1-Jun-2017	15:53:33	146	37.328037	-75.35083	13	1	Cca	2	90°	1	
1-Jun-2017	15:53:37	147	37.327992	-75.353674	13	1	Cca	2	80°	1	
1-Jun-2017	15:53:41	235	37.327821	-75.356328	13	1	TURT	2	90°	1	
1-Jun-2017	15:55:35	236	37.327622	-75.43021	13	1	TURT	1	90°	1	
1-Jun-2017	15:58:27	148	37.32705	-75.54261	13	1	Cca	2	80°	1	
22-Jun-2017	9:52:59	4	36.550282	-75.415696	0	2	Cca	2	90°	1	
22-Jun-2017	10:10:06	8	36.615195	-75.302300	1	2	TURT	2	110°	1	
22-Jun-2017	10:23:52	9	36.612476	-75.794139	1	2	TURT	2	90°	1	
22-Jun-2017	10:57:34	19	36.730758	-75.307233	3	2	Cca	1	90°	1	
22-Jun-2017	10:58:10	11	36.732064	-75.328105	3	3	Cca	2	90°	1	
22-Jun-2017	10:58:23	20	36.730921	-75.336593	3	2	Cca	2	90°	1	
22-Jun-2017	11:02:50	22	36.731026	-75.497593	3	2	TURT	1	90°	1	
22-Jun-2017	11:03:14	23	36.731086	-75.512086	3	2	Cca	1	90°	1	
22-Jun-2017	11:06:15	25	36.730987	-75.618822	3	2	TURT	2	90°	1	
22-Jun-2017	11:08:39	26	36.730891	-75.703581	3	2	Cca	1	90°	1	
22-Jun-2017	11:09:36	27	36.730777	-75.737341	3	2	Cca	1	90°	1	
22-Jun-2017	11:19:46	34	36.786236	-75.827916	4	2	Cca	2	120°	1	
22-Jun-2017	11:20:10	16	36.784245	-75.806548	4	3	Cca	2	110°	1	
22-Jun-2017	11:24:38	35	36.788816	-75.628352	4	2	Cca	1	90°	1	
22-Jun-2017	11:31:13	37	36.792185	-75.357128	4	2	Cca	1	120°	1	
22-Jun-2017	11:57:37	22	36.850023	-75.726449	5	2	Cca	2	90°	1	
22-Jun-2017	11:58:49	23	36.849445	-75.770425	5	2	Cca	3	90°	1	
22-Jun-2017	12:11:56	46	36.904957	-75.710334	6	2	Cca	1	120°	1	
22-Jun-2017	12:14:10	47	36.905577	-75.621907	6	2	TURT	2	120°	1	
22-Jun-2017	12:16:09	49	36.906121	-75.542730	6	2	TURT	1	120°	1	
22-Jun-2017	12:52:00	38	36.966339	-75.878730	7	1	Cca	3	90°	1	
22-Jun-2017	14:51:13	60	37.025629	-75.890632	8	2	Cca	1	90°	1	
22-Jun-2017	14:52:18	62	37.024114	-75.846785	8	2	TURT	2	135°	1	
22-Jun-2017	14:52:30	44	37.024859	-75.835431	8	1	Cca	3	90°	1	
22-Jun-2017	14:55:09	65	37.023321	-75.725370	8	2	Cca	2	90°	1	
22-Jun-2017	14:55:35	66	37.02318	-75.706813	8	2	Cca	1	90°	1	
22-Jun-2017	14:57:47	67	37.022638	-75.612899	8	2	TURT	2	90°	1	

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #	Off Effort (*)
22-Jun-2017	14:58:37	68	37.022418	-75.577065	8	2	TURT	1	90°	1	
22-Jun-2017	15:00:07	69	37.02192	-75.512919	8	2	Cca	1	90°	1	
22-Jun-2017	15:00:15	70	37.0219	-75.507123	8	2	Cca	1	90°	1	
22-Jun-2017	15:00:35	46	37.024141	-75.491096	8	1	Cca	3	90°	1	
22-Jun-2017	15:02:08	71	37.021311	-75.425398	8	2	Cca	1	90°	1	
22-Jun-2017	15:07:33	47	37.02019	-75.189368	8	1	Cca	2	90°	1	
22-Jun-2017	15:07:56	48	37.01994	-75.172751	8	1	Cca	3	90°	1	
22-Jun-2017	15:09:52	49	37.021082	-75.087777	8	1	Cca	3	90°	1	
22-Jun-2017	15:15:18	52	37.098309	-75.176271	9	1	Cca	3	90°	1	
22-Jun-2017	15:16:38	76	37.097772	-75.222245	9	2	Cca	2	135°	1	
22-Jun-2017	15:18:39	77	37.096888	-75.295500	9	2	Cca	1	110°	1	
22-Jun-2017	15:21:11	53	37.097498	-75.389336	9	1	Cca	3	90°	1	
22-Jun-2017	15:22:37	78	37.094964	-75.441029	9	2	Cca	1	100°	1	
22-Jun-2017	15:26:35	54	37.094075	-75.588845	9	1	Cca	3	90°	1	
22-Jun-2017	15:29:31	79	37.091132	-75.695641	9	2	Cca	1	90°	1	
22-Jun-2017	15:33:23	81	37.088761	-75.838972	9	2	Cca	2	135°	1	
22-Jun-2017	15:41:51	85	37.144921	-75.721848	10	2	Cca	1	90°	1	
22-Jun-2017	15:43:48	86	37.141628	-75.640315	10	2	Cca	1	90°	1	
22-Jun-2017	15:47:27	87	37.143187	-75.485741	10	2	Cca	1	90°	2	
22-Jun-2017	15:48:33	58	37.143446	-75.440945	10	1	Cca	3	90°	1	
22-Jun-2017	15:48:54	88	37.143741	-75.424535	10	2	Cca	2	90°	1	
22-Jun-2017	15:49:48	89	37.144084	-75.386440	10	2	Cca	1	90°	1	
22-Jun-2017	15:54:16	90	37.145732	-75.202320	10	2	Cca	1	90°	1	
22-Jun-2017	16:02:33	93	37.210263	-75.188117	11	2	TURT	1	135°	1	
22-Jun-2017	16:03:00	94	37.210165	-75.204541	11	2	Cca	2	90°	1	
22-Jun-2017	16:03:36	95	37.210116	-75.227125	11	2	TURT	2	135°	1	
22-Jun-2017	16:23:13	98	37.25932	-75.612127	12	2	Cca	1	90°	1	
22-Jun-2017	16:23:26	68	37.259518	-75.603212	12	1	Cca	3	90°	1	
22-Jun-2017	16:24:18	99	37.259923	-75.565966	12	2	Cca	2	90°	1	
22-Jun-2017	16:29:39	69	37.262707	-75.332252	12	1	Cca	3	90°	1	
22-Jun-2017	16:38:40	102	37.326451	-75.129290	13	2	Cca	1	90°	1	
22-Jun-2017	16:41:58	103	37.328438	-75.263843	13	2	Cca	2	110°	1	
22-Jun-2017	16:47:54	104	37.327550	-75.511527	13	2	Cca	2	100°	1	
22-Jun-2017	16:49:41	105	37.327251	-75.586640	13	2	TURT	2	100°	1	
22-Jun-2017	16:50:11	106	37.327086	-75.607782	13	2	Cca	1	90°	1	

Unidentified shark, manta ray (*Manta birostris*), cownose ray (*Rhinoptera bonasus*), ocean sunfish (*Mola mola*) and cobia (*Rachycentron canadum*) sightings in the coastal VACAPES survey area from January through December 2016.

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #
27-Jun-2016	10:41:43	026	36.608857	-75.171320	1	1	Hammerhead	2	90°	1
27-Jun-2016	10:50:09	030	36.608760	-75.386101	1	1	Shark	2	90°	1
27-Jun-2016	11:24:24	048	36.669255	-75.117978	2	1	Shark	2	100°	1
27-Jun-2016	11:42:04	078	36.726072	-75.542778	3	1	Shark	3	90°	1
27-Jun-2016	11:45:07	078	36.726072	-75.542778	3	1	Shark	3	90°	1
27-Jun-2016	11:47:45	081	36.725818	-75.658873	3	1	Shark	2	90°	1
27-Jun-2016	13:59:48	088	36.786634	-75.055857	4	2	Shark	2	90°	1
27-Jun-2016	14:09:07	110	36.849966	-75.219843	5	1	Hammerhead	3	45°	1
27-Jun-2016	14:10:19	097	36.849657	-75.269242	5	2	Shark	2	110°	1
27-Jun-2016	14:11:29	111	36.849315	-75.316689	5	1	Shark	2	70°	1
27-Jun-2016	14:12:55	112	36.848742	-75.374211	5	1	Shark	3	60°	1
27-Jun-2016	14:13:30	113	36.848675	-75.397651	5	1	Shark	2	60°	1
27-Jun-2016	14:14:55	101	36.848273	-75.454143	5	2	Shark	3	90°	1
27-Jun-2016	14:15:52	103	36.847846	-75.490977	5	2	Shark	3	90°	1
27-Jun-2016	14:46:22	132	36.904946	-75.328112	6	2	Shark	2	60°	1
27-Jun-2016	14:49:01	121	36.904743	-75.226436	6	2	Shark	3	90°	1
27-Jun-2016	16:13:03	164	37.295179	-75.038340		2	Shark	2	90°	1
27-Jun-2016	16:19:53	178	37.323361	-75.288155	13	2	Shark	2	90°	1
14-Jul-2016	14:07:48	064	36.957311	-75.635484	7	2	Sharks	3	90°	40
14-Jul-2016	14:53:51	096	36.845276	-75.724401	5	2	Shark	2	120°	1
8-Aug-2016	15:11:33	160	36.724397	-75.177297	3	1	Shark	2	110°	1
21-Oct-2016	9:42:57	006	36.571440	-75.030993		1	Hammerhead	1	90°	1
21-Oct-2016	10:20:30	020	36.670701	-75.394011	2	1	Shark	2	90°	1
21-Oct-2016	10:21:37	025	36.670845	-75.351339	2	1	Shark	3	90°	1
21-Oct-2016	10:28:52	032	36.670854	-75.151761	2	1	Hammerhead	1	90°	1
21-Oct-2016	10:44:11	034	36.725184	-75.302193	3	2	Shark	3	90°	1
21-Oct-2016	11:22:16	057	36.788523	-75.138171	4	1	Shark	1	90°	1
21-Oct-2016	11:22:42	058	36.788694	-75.120475	4	1	Hammerhead	2	90°	1
21-Oct-2016	11:24:13	048	36.788391	-75.058548	4	1	Hammerhead	2	90°	1
21-Oct-2016	11:32:31	054	36.848219	-75.241870	5	1	Shark	2	110°	1
21-Oct-2016	11:51:21	059	36.841470	-75.930024	5	1	Sharks	3	90°	2
21-Oct-2016	13:49:33	085	36.906112	-75.530553	6	1	Shark	1	90°	1

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #
21-Oct-2016	13:52:20	086	36.906479	-75.419553	6	1	Hammerhead	1	90°	1
21-Oct-2016	13:58:36	070	36.906231	-75.167475	6	1	Sharks	2	90°	2
21-Oct-2016	13:58:51	071	36.906590	-75.156834	6	1	Sharks	2	90°	2
21-Oct-2016	14:50:29	091	37.322966	-75.253967	13	1	Shark	2	90°	1
21-Oct-2016	10:27:21	023	36.670709	-75.214721	2	2	Manta ray	2	90°	1
21-Oct-2016	10:28:43	024	36.670879	-75.158004	2	2	Manta ray	2	90°	1
27-Jun-2016	11:01:39	037	36.607118	-75.836254	1	1	Cownose ray	3	90°	1
27-Jun-2016	11:33:34	056	36.726541	-75.227448	3	1	Cownose ray	3	90°	6
27-Jun-2016	11:46:06	063	36.727795	-75.594508	3	2	Cownose ray	2	90°	3
27-Jun-2016	11:50:25	066	36.725541	-75.763788	3	2	Cownose ray	2	90°	4
27-Jun-2016	13:59:01	101	36.786977	-75.086063	4	1	Cownose ray	3	90°	20
27-Jun-2016	13:59:16	102	36.786935	-75.076717	4	1	Cownose ray	2	90°	10
27-Jun-2016	14:00:54	105	36.806130	-75.032522		1	Cownose ray	3	90°	200
27-Jun-2016	14:17:19	104	36.847316	-75.549086	5	2	Cownose ray	2	90°	2
27-Jun-2016	14:19:38	105	36.845997	-75.642426	5	2	Cownose ray	3	110°	7
27-Jun-2016	14:44:09	129	36.904953	-75.412924	6	2	Cownose ray	3	90°	30
27-Jun-2016	14:47:11	133	36.904968	-75.296803	6	2	Cownose ray	3	90°	50
27-Jun-2016	14:47:16	120	36.904962	-75.293151	6	2	Cownose ray	2	90°	2
27-Jun-2016	14:47:47	134	36.904953	-75.273432	6	2	Cownose ray	3	90°	30
27-Jun-2016	14:49:41	135	36.904799	-75.200542	6	2	Cownose ray	3	90°	40
27-Jun-2016	14:50:56	137	36.904841	-75.152573	6	2	Cownose ray	2	90°	40
27-Jun-2016	14:51:26	126	36.904826	-75.133487	6	2	Cownose ray	2	110°	20
27-Jun-2016	14:53:03	128	36.904716	-75.071960	6	2	Cownose ray	3	90°	50
27-Jun-2016	14:54:44	130	36.938280	-75.041098		2	Cownose ray	2	90°	50
27-Jun-2016	14:56:10	143	36.967530	-75.063709	7	2	Cownose ray	2	80°	50
27-Jun-2016	14:58:02	135	36.967834	-75.134107	7	2	Cownose ray	2	90°	1
27-Jun-2016	15:01:05	139	36.967423	-75.255522	7	2	Cownose ray	1	90°	5
27-Jun-2016	15:32:10	146	36.965705	-75.987309		2	Cownose ray	2	90°	100
27-Jun-2016	16:01:39	155	37.263920	-75.260879	12	2	Cownose ray	1	90°	4
27-Jun-2016	16:02:54	156	37.264406	-75.210377	12	2	Cownose ray	2	90°	20
27-Jun-2016	16:03:50	158	37.264744	-75.172160	12	2	Cownose ray	2	90°	6
27-Jun-2016	16:04:19	159	37.264839	-75.152996	12	2	Cownose ray	2	90°	7
27-Jun-2016	16:04:45	160	37.264965	-75.135370	12	2	Cownose ray	2	90°	25
27-Jun-2016	16:14:25	168	37.323311	-75.067041	13	2	Cownose ray	3	90°	75

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #
27-Jun-2016	16:14:45	168	37.321911	-75.080656	13	2	Cownose ray	2	110°	10
27-Jun-2016	16:15:13	169	37.322507	-75.099439	13	2	Cownose ray	2	90°	6
27-Jun-2016	16:15:27	170	37.322839	-75.108921	13	2	Cownose ray	3	90°	15
27-Jun-2016	16:15:29	170	37.322910	-75.110330	13	2	Cownose ray	2	110°	8
27-Jun-2016	16:15:50	171	37.323149	-75.124413	13	2	Cownose ray	2	90°	6
27-Jun-2016	16:16:08	172	37.323301	-75.136852	13	2	Cownose ray	2	110°	1
27-Jun-2016	16:16:40	173	37.323397	-75.158695	13	2	Cownose ray	2	90°	5
27-Jun-2016	16:17:03	174	37.323422	-75.174176	13	2	Cownose ray	2	90°	4
27-Jun-2016	16:17:57	176	37.323442	-75.210169	13	2	Cownose ray	2	90°	4
27-Jun-2016	16:19:50	177	37.323365	-75.286054	13	2	Cownose ray	2	90°	5
27-Jun-2016	16:25:08	179	37.322937	-75.502422	13	2	Cownose ray	2	90°	4
14-Jul-2016	9:22:31	003	37.321539	-75.667544	13	2	Cownose ray	3	100°	75
14-Jul-2016	9:57:57	009	37.259965	-75.701373	12	2	Cownose ray	3	90°	100
14-Jul-2016	9:58:13	010	37.259845	-75.708968	12	2	Cownose ray	3	90°	200
14-Jul-2016	9:58:37	007	37.259625	-75.720256	12	2	Cownose ray	1	90°	12
14-Jul-2016	11:38:50	051	37.023390	-75.943366	8	2	Cownose ray	2	90°	15
14-Jul-2016	16:47:13	086	36.552747	-75.187335	0	3	Cownose ray	2	80°	40
14-Jul-2016	16:54:48	118	36.552068	-75.469412	0	2	Cownose ray	3	90°	50
13-Sep-2016	9:38:44	007	36.607428	-75.853098	1	3	Cownose ray	2	90°	70
13-Sep-2016	12:33:06	057	36.905001	-75.934462	6	3	Cownose ray	2	110°	7
21-Oct-2016	9:45:55	009	36.606687	-75.100565	1	1	Cownose ray	2	90°	50
21-Oct-2016	10:04:33	013	36.607276	-75.829387	1	1	Cownose ray	2	90°	30
21-Oct-2016	10:10:36	016	36.669747	-75.775240	2	1	Cownose ray	1	90°	25
21-Oct-2016	10:33:51	035	36.724684	-75.061739	3	1	Cownose ray	2	90°	75
21-Oct-2016	10:43:45	032	36.725393	-75.285127	3	2	Cownose ray	2	90°	100 0
21-Oct-2016	10:43:59	033	36.725065	-75.294160	3	2	Cownose ray	3	90°	500
21-Oct-2016	10:44:33	040	36.724915	-75.316399	3	1	Cownose ray	1	90°	300
21-Oct-2016	11:13:35	052	36.788590	-75.494207	4	1	Cownose ray	1	90°	50
21-Oct-2016	13:45:21	080	36.905680	-75.699652	6	1	Cownose ray	1	90°	15
21-Oct-2016	14:20:53	081	36.962432	-75.671170	7	1	Cownose ray	2	90°	40
21-Oct-2016	15:14:39	102	37.260251	-75.628868	12	1	Cownose ray	2	90°	10
10-May-2016	11:26:25	004	36.907046	-75.264649	6	3	Ocean sunfish	2	90°	1
27-Jun-2016	10:48:21	029	36.612420	-75.316663	1	1	Cobia	2	90°	2
27-Jun-2016	11:18:49	046	36.669455	-75.332719	2	1	Ocean sunfish	2	90°	1

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Species	Angle out	Degree Forward	Best #
27-Jun-2016	13:58:19	099	36.787067	-75.113440	4	1	Ocean sunfish	2	80°	1
1-Jun-2017	13:59:16	150	36.965414	-75.887922	7	1	Shark	1	150°	1
1-Jun-2017	15:24:01	212	37.206589	-75.75263	11	1	Shark	3	90°	1
26-Mar-2017	12:09:54	24	37.025179	-75.784139	8	1	Shark	2	90°	1
31-May-2017	9:51:35	4	37.323321	-75.264432	13	2	Shark	2	90°	1
31-May-2017	11:29:57	30	37.090941	-75.383491	9	1	Shark	2	90°	8
1-Jun-2017	10:26:24	37	36.730358	-75.637289	3	1	Shark	2	110°	1
1-Jun-2017	10:26:50	38	36.730332	-75.654389	3	1	Shark	2	90°	1
1-Jun-2017	10:27:09	39	36.730271	-75.667290	3	1	Shark	2	90°	1
1-Jun-2017	10:27:51	40	36.730266	-75.694798	3	1	Shark	2	90°	1
1-Jun-2017	13:55:31	85	36.967128	-75.744266	7	1	Shark	2	90°	1
1-Jun-2017	14:01:12	87	36.963848	-75.963774	7	1	Shark	2	90°	1
1-Jun-2017	15:03:55	125	37.148103	-75.262178	10	1	Shark	3	90°	5
1-Jun-2017	15:51:36	145	37.32826	-75.273572	13	1	Shark	2	110°	4
1-Jun-2017	14:43:30	186	37.088122	-75.822164	9	1	Manta ray	2	120°	1
31-May-2017	15:03:19	54	36.847526	-75.259049	5	1	Ocean sunfish	2	80°	1
31-May-2017	10:56:38	23	37.150523	-75.366256	10	1	Ocean sunfish	2	90°	1
11-Jan-2017	11:00:50	26	36.552761	-75.491434	0	1	Dead humpback	4	110°	1
1-Jun-2017	13:56:02	148	36.966412	-75.762367	7	1	Cownose ray	2	150°	100
1-Jun-2017	9:29:11	11	36.551251	-75.167293	0	1	Cownose ray	2	90°	1
22-Jun-2017	11:37:16	18	36.794288	-75.104302	4	3	Cownose ray	2	90°	1
22-Jun-2017	16:15:30	62	37.206342	-75.669166	11	1	Cownose ray	2	90°	100
22-Jun-2017	16:15:32	63	37.206326	-75.670575	11	1	Cownose ray	2	90°	25
1-Jun-2017	10:06:34	27	36.668853	-75.353770	2	1	Fish school	2	125°	1
1-Jun-2017	10:19:05	32	36.731525	-75.347007	3	1	Fish school	1	125°	1
22-Jun-2017	11:13:35	12	36.731661	-75.884235	3	3	Fish school	2	90°	2
22-Jun-2017	12:49:43	36	36.966806	-75.797672	7	2	Fish school	2	90°	1
22-Jun-2017	15:31:42	55	37.092053	-75.777065	9	1	Fish school	3	90°	1
22-Jun-2017	16:03:58	61	37.209637	-75.241150	11	1	Fish school	2	90°	1
22-Jun-2017	16:52:19	72	37.329238	-75.230500	13	1	Fish school	3	90°	1

Commercial, military and other vessel sightings in the coastal VACAPES survey area from January through December 2016

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
29-Jan-2016	14:09:17	003	36.545114	-75.725288	0	3	4	90°	2	Tug and barge
29-Jan-2016	14:19:03	004	36.551618	-75.266583	0	3	5	45°	1	Cargo vessel
29-Jan-2016	14:26:10	007	36.613523	-75.215799	1	4	3	90°	1	Cargo vessel
29-Jan-2016	14:30:19	008	36.612208	-75.369543	1	4	3	70°	1	Cargo vessel
29-Jan-2016	14:38:54	008	36.609383	-75.668742	1	4	3	45°	1	Tug and barge
29-Jan-2016	14:58:49	012	36.671834	-75.316415	2	4	2	45°	1	Cargo vessel
29-Jan-2016	15:06:36	015	36.722796	-75.221127	3	4	4	10°	1	Cargo vessel
29-Jan-2016	15:13:53	016	36.724075	-75.490147	3	4	4	90°	1	Car carrier
30-Jan-2016	15:06:50	014	37.030932	-75.336627	8	3	3	90°	1	Commercial fishing vessel
30-Jan-2016	15:57:46	020	36.834789	-75.327323	5	3	3	90°	1	Cargo vessel
2-Feb-2016	9:18:19	003	36.550342	-75.546003	0	3	4	100°	1	Cargo vessel
2-Feb-2016	10:30:27	017	36.668979	-75.605756	2	3	3	90°	1	Cargo vessel
2-Feb-2016	10:54:59	013	36.726223	-75.597602	3	3	3	90°	1	Cargo vessel
2-Feb-2016	10:58:33	014	36.725536	-75.745824	3	3	3	90°	1	Cargo vessel
2-Feb-2016	11:06:25	027	36.786705	-75.867957	4	3	3	90°	1	Cargo vessel
2-Feb-2016	11:07:07	029	36.786581	-75.839525	4	3	3	90°	1	Tug and barge
2-Feb-2016	11:09:03	030	36.786830	-75.760224	4	3	2	45°	1	Cargo vessel
2-Feb-2016	11:15:02	033	36.787015	-75.513755	4	3	3	30°	1	Cargo vessel
2-Feb-2016	11:15:35	034	36.786982	-75.490979	4	3	4	75°	1	Cargo vessel
2-Feb-2016	11:30:29	020	36.836709	-75.355089	5	3	3	90°	1	Commercial fishing vessel
2-Feb-2016	11:32:02	037	36.837492	-75.418994	5	3	3	30°	1	Cargo vessel
2-Feb-2016	11:32:46	021	36.837925	-75.449731	5	3	4	90°	1	Cargo vessel
2-Feb-2016	11:37:26	038	36.839691	-75.644464	5	3	3	45°	1	Cargo vessel
2-Feb-2016	11:37:52	039	36.839909	-75.663066	5	3	3	45°	1	Barge
2-Feb-2016	11:38:25	040	36.840112	-75.685648	5	3	3	45°	1	Cargo vessel
2-Feb-2016	13:37:18	045	36.905549	-75.957367	6	3	3	135°	1	Cargo vessel
2-Feb-2016	13:39:39	026	36.903934	-75.858272	6	3	3	90°	1	Cargo vessel
2-Feb-2016	13:41:12	027	36.904129	-75.794417	6	3	4	90°	1	Cargo vessel
2-Feb-2016	13:43:03	046	36.904307	-75.717943	6	3	3	75°	1	Tug and barge
2-Feb-2016	13:44:38	028	36.904350	-75.652255	6	3	3	80°	1	Cargo vessel

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
2-Feb-2016	13:46:06	047	36.904434	-75.590385	6	3	4	80°	1	Cargo vessel
2-Feb-2016	13:48:54	048	36.904079	-75.473478	6	3	2	15°	1	Cargo vessel
2-Feb-2016	13:49:39	049	36.904120	-75.441861	6	3	3	15°	1	Cargo vessel
2-Feb-2016	14:00:55	052	36.966873	-75.263731	7	3	3	60°	1	Cargo vessel
2-Feb-2016	14:03:42	053	36.966235	-75.374153	7	3	3	45°	1	Cargo vessel
2-Feb-2016	14:41:14	058	36.964096	-75.623628	7	3	3	50°	1	Cargo vessel
2-Feb-2016	14:42:16	059	36.963601	-75.666373	7	3	3	45°	1	Cargo vessel
2-Feb-2016	14:42:31	060	36.963516	-75.676414	7	3	3	45°	1	Cargo vessel
2-Feb-2016	14:46:33	061	36.961852	-75.840269	7	3	3	30°	1	Cargo vessel
2-Feb-2016	14:57:36	064	37.023941	-75.751369	8	2	3	35°	1	Cargo vessel
2-Feb-2016	14:58:27	065	37.024046	-75.715997	8	2	3	15°	1	Cargo vessel
2-Feb-2016	15:15:48	068	37.087445	-75.224798	9	2	4	45°	1	Cargo vessel
2-Feb-2016	15:16:18	069	37.087520	-75.244824	9	2	4	45°	1	Cargo vessel
2-Feb-2016	15:20:07	070	37.087609	-75.402722	9	2	4	45°	1	Cargo vessel
2-Feb-2016	15:24:08	071	37.087834	-75.571815	9	2	3	60°	1	Cargo vessel
2-Feb-2016	15:26:27	072	37.087317	-75.666197	9	2	3	100°	1	Cargo vessel
2-Feb-2016	15:26:56	073	37.087269	-75.685326	9	2	4	45°	1	Cargo vessel
22-Feb-2016	10:26:39	027	37.084703	-75.177949	9	4	2	90°	1	Cargo vessel
22-Feb-2016	13:23:04	004	37.207624	-75.394118	11	3	3	30°	1	Cargo vessel
22-Feb-2016	13:35:08	005	37.146427	-75.296102	10	3	3	90°	1	Cargo vessel
22-Feb-2016	13:37:42	007	37.145484	-75.399817	10	3	3	60°	1	Cargo vessel
22-Feb-2016	14:27:05	014	36.967743	-75.459584	7	3	2	15°	1	Cargo vessel
22-Feb-2016	14:28:33	015	36.967794	-75.519760	7	3	3	30°	1	Cargo vessel
22-Feb-2016	14:33:14	016	36.967768	-75.710822	7	3	3	30°	1	Cargo vessel
22-Feb-2016	14:44:02	014	36.903931	-75.899111	6	3	3	90°	1	Cargo vessel
22-Feb-2016	14:47:14	020	36.907377	-75.784810	6	3	3	15°	1	Cargo vessel
22-Feb-2016	14:53:33	021	36.914844	-75.561910	6	3	3	30°	1	Cargo vessel
22-Feb-2016	15:07:34	024	36.847626	-75.184778	5	3	3	90°	1	Cargo vessel
22-Feb-2016	15:16:01	026	36.846103	-75.538207	5	3	3	15°	1	Cargo vessel
22-Feb-2016	15:18:28	027	36.845148	-75.639755	5	3	3	15°	1	Cargo vessel
22-Feb-2016	15:27:05	030	36.787874	-75.874126	4	3	3	10°	1	Cargo vessel
22-Feb-2016	15:32:54	032	36.789000	-75.671619	4	3	3	90°	1	Cargo vessel
22-Feb-2016	15:34:42	033	36.789509	-75.607688	4	3	4	45°	1	Cargo vessel
22-Feb-2016	15:40:40	020	36.790550	-75.394547	4	3	4	60°	1	Cargo vessel

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
22-Feb-2016	15:41:11	021	36.790571	-75.376129	4	3	3	45°	1	Cargo vessel
22-Feb-2016	15:46:20	023	36.791175	-75.195207	4	3	3	70°	1	Tanker
22-Feb-2016	16:01:54	026	36.726467	-75.666610	3	3	3	45°	1	Cargo vessel
22-Feb-2016	16:08:20	039	36.675541	-75.785949	2	3	3	45°	1	Cargo vessel
22-Feb-2016	16:15:21	040	36.671467	-75.543119	2	3	3	60°	1	Cargo vessel
22-Feb-2016	16:25:28	031	36.672834	-75.183884	2	3	3	90°	1	Tanker
22-Feb-2016	16:37:12	034	36.609608	-75.525548	1	3	3	90°	1	Cargo vessel
17-Mar-2016	10:17:34	003	37.322722	-75.545744	13	2	4	115°	3	Tug and barge
17-Mar-2016	10:55:51	009	37.260543	-75.533644	12	2	3	90°	2	Cargo vessel
17-Mar-2016	10:55:51	009	37.260543	-75.533644	12	2	3	90°	1	Tug
17-Mar-2016	13:52:43	019	37.205195	-75.046997	11	2	3	90°	1	Cargo vessel
17-Mar-2016	14:38:35	034	37.087892	-75.157189	9	2	3	90°	1	Cargo vessel
17-Mar-2016	14:47:48	041	37.024187	-75.157699	8	2	4	60°	1	Cargo vessel
17-Mar-2016	15:19:30	050	36.968783	-75.884302	7	2	3	90°	2	Tug and barge
17-Mar-2016	15:35:56	056	36.969397	-75.376222	7	2	3	90°	1	Cargo vessel
17-Mar-2016	16:11:47	071	36.904945	-75.514014	6	2	4	90°	1	Cargo vessel
17-Mar-2016	16:14:02	072	36.904709	-75.607424	6	2	4	90°	1	Cargo vessel
17-Mar-2016	16:27:43	073	36.903498	-75.938731	6	2	3	80°	1	Cargo vessel
17-Mar-2016	16:39:19	080	36.846785	-75.608140	5	2	4	90°	1	Cargo vessel
17-Mar-2016	17:15:40	104	36.787144	-75.440643	4	2	4	90°	1	Cargo vessel
17-Mar-2016	17:15:51	087	36.787189	-75.447552	4	3	4	110°	1	Cargo vessel
17-Mar-2016	17:19:02	105	36.786805	-75.576282	4	2	4	90°	1	Cargo vessel
17-Mar-2016	17:21:31	106	36.786591	-75.676714	4	2	3	90°	1	Cargo vessel
18-Mar-2016	9:46:18	005	36.905583	-75.870116	6	2	3	90°	2	Tug and barge
18-Mar-2016	9:48:04	006	36.906006	-75.803581	6	2	2	110°	1	Commercial fishing vessel
18-Mar-2016	9:48:32	008	36.906093	-75.785710	6	2	3	90°	1	Commercial fishing vessel
18-Mar-2016	9:59:59	013	36.906869	-75.434070	6	2	3	90°	1	Cargo vessel
18-Mar-2016	10:06:33	006	36.906300	-75.183888	6	2	3	15°	1	Cargo vessel
18-Mar-2016	10:09:02	007	36.906120	-75.089744	6	2	4	45°	1	Cargo vessel
18-Mar-2016	10:12:50	010	36.968305	-75.062945	7	2	3	45°	1	Cargo vessel
18-Mar-2016	10:13:48	016	36.967280	-75.100805	7	2	3	90°	1	Cargo vessel
18-Mar-2016	10:13:50	017	36.967317	-75.102267	7	2	3	90°	1	Cargo vessel
18-Mar-2016	10:28:59	022	36.966835	-75.250309	7	2	3	90°	1	Cargo vessel

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
18-Mar-2016	10:32:42	018	36.967316	-75.402846	7	2	3	90°	1	Cargo vessel
18-Mar-2016	11:23:38	028	37.026159	-75.148326	8	2	4	30°	1	Cargo vessel
18-Mar-2016	11:32:07	031	37.085938	-75.182374	9	2	4	45°	1	Cargo vessel
18-Mar-2016	11:42:14	033	37.086034	-75.565732	9	2	4	40°	1	Cargo vessel
18-Mar-2016	14:05:19	051	37.142928	-75.626229	10	2	3	90°	2	Tug and barge
18-Mar-2016	14:05:28	056	37.142914	-75.620343	10	2	3	70°	2	Tug and barge
18-Mar-2016	17:30:17	083	36.550947	-75.446836	0	2	3	90°	1	Cargo vessel
20-Apr-2016	9:59:14	003	36.553540	-75.504167	0	4	3	45°	1	Supply vessel
20-Apr-2016	10:01:03	004	36.553808	-75.429423	0	4	3	70°	1	Cargo vessel
20-Apr-2016	10:05:00	005	36.554344	-75.263042	0	4	2	40°	1	Cargo vessel
20-Apr-2016	10:10:31	009	36.610670	-75.186998	1	3	3	90°	1	Cargo vessel
20-Apr-2016	10:10:54	010	36.610355	-75.202920	1	3	4	60°	1	Cargo vessel
20-Apr-2016	10:12:13	009	36.611407	-75.255880	1	4	4	90°	1	Tanker
20-Apr-2016	10:24:43	010	36.606498	-75.764488	1	4	4	90°	1	Cargo vessel
20-Apr-2016	10:37:53	016	36.672188	-75.580662	2	3	4	45°	1	Cargo vessel
20-Apr-2016	10:40:23	018	36.672509	-75.485575	2	3	3	45°	1	Cargo vessel
20-Apr-2016	10:41:14	013	36.672538	-75.452879	2	4	4	90°	1	Supply vessel
20-Apr-2016	10:44:56	019	36.673266	-75.308578	2	3	3	15°	1	Cargo vessel
20-Apr-2016	10:53:18	016	36.729419	-75.248109	3	4	4	100°	1	Tanker
20-Apr-2016	10:57:38	018	36.728142	-75.417398	3	4	4	90°	1	Cargo vessel
20-Apr-2016	11:13:10	027	36.787978	-75.903387	4	3	3	45°	1	Cargo vessel
20-Apr-2016	11:19:16	028	36.789889	-75.670729	4	3	3	15°	1	Cargo vessel
20-Apr-2016	11:30:59	030	36.791752	-75.220842	4	3	3	10°	1	Cargo vessel
20-Apr-2016	11:43:56	035	36.845755	-75.533420	5	3	2	10°	1	Cargo vessel
20-Apr-2016	11:44:27	036	36.845389	-75.556267	5	3	3	30°	1	Cargo vessel
20-Apr-2016	13:57:49	032	36.905454	-75.898273	6	2	3	50°	1	Cargo vessel
20-Apr-2016	13:58:14	033	36.905663	-75.883326	6	2	4	90°	1	Cargo vessel
20-Apr-2016	14:00:15	045	36.906232	-75.810946	6	3	3	90°	3	Tug and barge
20-Apr-2016	14:37:54	050	36.967080	-75.915723	7	2	3	90°	1	Cargo vessel
21-Apr-2016	13:45:37	004	36.843546	-75.902447	5	3	3	90°	1	Cargo vessel
21-Apr-2016	13:46:08	005	36.843999	-75.880089	5	3	3	90°	1	Cargo vessel
21-Apr-2016	13:49:25	003	36.845736	-75.744542	5	3	4	120°	1	Cargo vessel
21-Apr-2016	13:49:40	004	36.845864	-75.734933	5	3	3	80°	1	Cargo vessel
21-Apr-2016	13:51:57	005	36.846755	-75.647515	5	3	3	75°	1	Cargo vessel

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
21-Apr-2016	13:58:25	006	36.849340	-75.394507	5	3	4	110°	1	Cargo vessel
21-Apr-2016	14:04:10	007	36.850830	-75.169565	5	3	3	90°	1	Cargo vessel
21-Apr-2016	14:14:29	017	36.906869	-75.466815	6	3	4	20°	2	Cargo vessel
21-Apr-2016	14:21:15	018	36.904926	-75.751690	6	3	3	45°	1	Cargo vessel
21-Apr-2016	14:24:02	012	36.904187	-75.868868	6	3	3	80°	1	Tanker
21-Apr-2016	14:24:34	019	36.903908	-75.891265	6	3	1	90°	1	Cargo vessel
21-Apr-2016	14:25:28	013	36.903378	-75.928747	6	3	3	90°	1	Supply vessel
21-Apr-2016	14:25:51	014	36.903244	-75.944774	6	3	3	80°	1	Tanker
21-Apr-2016	15:01:30	027	37.026465	-75.541131	8	3	4	30°	1	Cargo vessel
21-Apr-2016	15:05:03	028	37.025254	-75.677175	8	3	4	45°	1	Cargo vessel
21-Apr-2016	15:05:43	029	37.025054	-75.702873	8	3	3	15°	1	Tug
21-Apr-2016	15:06:43	030	37.024609	-75.740908	8	3	4	30°	1	Cargo vessel
21-Apr-2016	15:08:11	031	37.024133	-75.797538	8	3	4	15°	1	Cargo vessel
21-Apr-2016	15:11:59	033	37.022358	-75.947932	8	3	4	30°	1	Cargo vessel
21-Apr-2016	15:19:43	024	37.088435	-75.752462	9	4	4	85°	1	Tanker
21-Apr-2016	15:49:05	039	37.142550	-75.656016	10	3	3	45°	1	Tug
10-May-2016	11:10:23	004	36.906109	-75.818451	6	2	4	90°	1	Cargo vessel
10-May-2016	11:13:14	005	36.906117	-75.721850	6	2	4	90°	1	Cargo vessel
10-May-2016	11:16:35	006	36.906539	-75.608367	6	2	4	90°	1	Cargo vessel
10-May-2016	11:18:31	007	36.906771	-75.542306	6	2	3	90°	1	Cargo vessel
10-May-2016	11:45:18	010	36.907001	-75.050977	6	2	3	45°	1	Cargo vessel
27-Jun-2016	11:25:28	061	36.669296	-75.077594	2	1	4	90°	1	Tug
27-Jun-2016	11:30:04	053	36.726222	-75.096214	3	1	3	90°	1	Cargo vessel
27-Jun-2016	13:44:57	088	36.787396	-75.631210	4	2	3	90°	2	Cargo vessel
27-Jun-2016	14:22:28	117	36.844824	-75.756676	5	2	3	90°	1	Cargo vessel
27-Jun-2016	14:33:58	114	36.904439	-75.804216	6	2	4	90°	1	Cargo vessel
27-Jun-2016	14:38:45	116	36.905075	-75.620192	6	2	4	90°	1	Cargo vessel
27-Jun-2016	14:52:50	140	36.904719	-75.079972	6	2	3	90°	1	Cargo vessel
27-Jun-2016	14:55:56	132	36.968167	-75.054997	7	2	4	90°	1	Cargo vessel
27-Jun-2016	15:30:04	152	36.961252	-75.899808	7	2	2	90°	1	Tanker
27-Jun-2016	15:36:18	147	37.023385	-75.886658	8	2	4	90°	1	Cargo vessel
14-Jul-2016	14:35:15	074	36.907133	-75.556010	6	2	4	90°	1	Cargo vessel
14-Jul-2016	14:37:04	076	36.906615	-75.628607	6	2	3	90°	1	Cargo vessel
14-Jul-2016	14:37:27	077	36.906470	-75.644216	6	2	2	90°	1	Cargo vessel

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
14-Jul-2016	14:43:27	089	36.904716	-75.883661	6	2	2	90°	1	Cargo vessel
14-Jul-2016	14:51:33	095	36.844195	-75.808865	5	2	2	90°	1	Cargo vessel
14-Jul-2016	14:57:55	098	36.847061	-75.565807	5	2	4	90°	1	Cargo vessel
14-Jul-2016	15:24:09	064	36.789096	-75.548525	4	3	4	90°	1	Cargo vessel
14-Jul-2016	15:27:00	066	36.788482	-75.636110	4	2	4	90°	1	Tanker
14-Jul-2016	15:32:00	069	36.787564	-75.788259	4	2	3	90°	1	Cargo vessel
14-Jul-2016	16:15:16	077	36.670111	-75.596461	2	3	4	120°	1	Cargo vessel
8-Aug-2016	10:34:36	047	37.143253	-75.587427	10	1	3	30°	1	Cargo vessel
8-Aug-2016	10:39:36	050	37.142695	-75.761608	10	1	4	90°	1	Cargo vessel
8-Aug-2016	10:53:00	061	37.085905	-75.668056	9	1	3	90°	1	Cargo vessel
8-Aug-2016	11:10:45	060	37.025246	-75.188738	8	1	4	120°	2	Cargo vessel
8-Aug-2016	11:10:53	061	37.025394	-75.193480	8	1	3	100°	1	Cargo vessel
8-Aug-2016	11:11:23	062	37.025653	-75.212440	8	1	4	75°	1	Cargo vessel
8-Aug-2016	11:12:16	063	37.025806	-75.245346	8	1	4	75°	1	Cargo vessel
8-Aug-2016	11:12:35	064	37.025844	-75.257566	8	1	4	45°	1	Cargo vessel
8-Aug-2016	11:16:27	065	37.025760	-75.398930	8	1	4	45°	1	Cargo vessel
8-Aug-2016	11:17:47	067	37.025721	-75.448095	8	1	4	45°	1	Cargo vessel
8-Aug-2016	11:20:39	069	37.025618	-75.551851	8	1	4	30°	1	Cargo vessel
8-Aug-2016	11:23:46	072	37.025431	-75.665879	8	2	4	90°	1	Cargo vessel
8-Aug-2016	11:26:16	074	37.025159	-75.757822	8	1	3	45°	1	Cargo vessel
8-Aug-2016	11:27:13	075	37.025148	-75.793027	8	1	4	50°	1	Cargo vessel
8-Aug-2016	11:27:31	076	37.025109	-75.803983	8	1	3	50°	1	Cargo vessel
8-Aug-2016	11:28:24	077	37.025076	-75.837060	8	1	3	90°	1	Cargo vessel
8-Aug-2016	11:28:37	078	37.025040	-75.845330	8	1	3	45°	1	Cargo vessel
8-Aug-2016	11:28:55	079	37.025014	-75.856306	8	1	3	45°	1	Cargo vessel
8-Aug-2016	11:29:07	080	37.024987	-75.864000	8	1	3	15°	1	Cargo vessel
8-Aug-2016	11:30:48	081	37.024706	-75.926390	8	1	4	10°	1	Cargo vessel
8-Aug-2016	11:39:37	087	36.967263	-75.804578	7	1	3	45°	1	Cargo vessel
8-Aug-2016	11:46:45	085	36.967145	-75.555627	7	2	4	90°	1	Cargo vessel
8-Aug-2016	11:52:49	088	36.966609	-75.333564	7	2	3	90°	1	Cargo vessel
8-Aug-2016	11:57:17	090	36.965423	-75.170597	7	1	4	10°	1	Cargo vessel
8-Aug-2016	12:00:35	093	36.904476	-75.189719	6	1	3	30°	1	Cargo vessel
8-Aug-2016	12:00:47	094	36.904982	-75.197550	6	1	3	15°	1	Cargo vessel
8-Aug-2016	12:04:04	095	36.905695	-75.322792	6	1	4	30°	1	Cargo vessel

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
8-Aug-2016	12:04:56	096	36.905774	-75.356009	6	1	4	45°	1	Cargo vessel
8-Aug-2016	12:05:12	097	36.905818	-75.366622	6	1	3	30°	1	Cargo vessel
8-Aug-2016	12:05:28	092	36.905833	-75.376688	6	2	3	90°	1	Cargo vessel
8-Aug-2016	12:07:47	098	36.905823	-75.465662	6	1	0	90°	1	Cargo vessel
8-Aug-2016	12:08:25	100	36.905875	-75.490051	6	1	3	75°	1	Cargo vessel
8-Aug-2016	12:13:46	102	36.905737	-75.694906	6	1	3	45°	1	Cargo vessel
8-Aug-2016	12:17:51	106	36.905509	-75.850451	6	1	2	5°	1	Cargo vessel
8-Aug-2016	14:02:15	115	36.839372	-75.905671	5	1	3	90°	1	Cargo vessel
8-Aug-2016	14:04:05	119	36.840369	-75.842446	5	1	4	30°	1	Cargo vessel
8-Aug-2016	14:04:39	120	36.840135	-75.822410	5	1	4	90°	1	Cargo vessel
8-Aug-2016	14:05:57	121	36.839812	-75.776396	5	1	2	15°	1	Cargo vessel
8-Aug-2016	14:12:20	109	36.837436	-75.554490	5	1	2	90°	1	Cargo vessel
8-Aug-2016	14:15:10	125	36.836245	-75.453151	5	1	3	5°	1	Cargo vessel
8-Aug-2016	14:16:49	126	36.835561	-75.393801	5	1	4	60°	1	Cargo vessel
8-Aug-2016	14:16:58	127	36.835483	-75.388712	5	1	4	30°	1	Cargo vessel
8-Aug-2016	14:29:41	133	36.788806	-75.322996	4	1	4	130°	1	Cargo vessel
8-Aug-2016	14:30:08	115	36.788838	-75.339784	4	1	4	90°	1	Cargo vessel
8-Aug-2016	14:30:36	134	36.788847	-75.356866	4	1	4	160°	1	Cargo vessel
8-Aug-2016	14:35:51	117	36.788869	-75.553590	4	1	4	90°	1	Cargo vessel
8-Aug-2016	14:41:35	120	36.788140	-75.768178	4	1	3	90°	1	Cargo vessel
8-Aug-2016	14:50:30	147	36.722420	-75.883679	3	1	3	30°	1	Cargo vessel
8-Aug-2016	14:50:49	148	36.722657	-75.872874	3	1	4	45°	1	Cargo vessel
8-Aug-2016	14:51:23	149	36.722586	-75.853835	3	1	4	15°	1	Cargo vessel
8-Aug-2016	14:56:42	150	36.724202	-75.672011	3	1	4	30°	1	Cargo vessel
8-Aug-2016	14:57:16	151	36.724239	-75.653284	3	1	4	45°	1	Cargo vessel
8-Aug-2016	14:57:43	152	36.724313	-75.638268	3	1	4	45°	1	Cargo vessel
8-Aug-2016	15:05:50	156	36.724578	-75.367633	3	1	3	90°	1	Cargo vessel
8-Aug-2016	15:16:36	163	36.670980	-75.242697	2	2	3	100°	1	Cargo vessel
8-Aug-2016	15:40:39	172	36.606110	-75.719407	1	2	4	45°	2	Cargo vessel
8-Aug-2016	15:53:58	175	36.607207	-75.269241	1	2	3	30°	1	Cargo vessel
13-Sep-2016	9:08:39	007	36.552213	-75.500411	0	3	4	45°	1	Cargo vessel
13-Sep-2016	9:42:19	014	36.670103	-75.871097	2	3	4	120°	1	Cargo vessel
13-Sep-2016	9:44:05	016	36.669372	-75.805328	2	3	4	80°	1	Cargo vessel
13-Sep-2016	9:45:55	017	36.669852	-75.735117	2	3	3	90°	1	Cargo vessel

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
13-Sep-2016	9:49:06	021	36.670338	-75.614734	2	3	4	45°	1	Cargo vessel
13-Sep-2016	9:57:21	022	36.670822	-75.308295	2	3	4	90°	1	Cargo vessel
13-Sep-2016	9:58:50	023	36.670671	-75.258137	2	3	4	30°	1	Cargo vessel
13-Sep-2016	10:04:49	026	36.722526	-75.188887	3	3	4	135°	1	Cargo vessel
13-Sep-2016	10:09:07	013	36.724652	-75.346754	3	3	3	60°	1	Cargo vessel
13-Sep-2016	10:13:27	027	36.724650	-75.508674	3	3	2	45°	1	Cargo vessel
13-Sep-2016	10:15:18	014	36.724588	-75.579062	3	3	4	60°	1	Cargo vessel
13-Sep-2016	10:29:39	033	36.787320	-75.849432	4	3	3	90°	1	Cargo vessel
13-Sep-2016	10:31:38	037	36.787956	-75.769397	4	3	3	45°	1	Cargo vessel
13-Sep-2016	10:33:57	038	36.788343	-75.677314	4	3	4	75°	1	Cargo vessel
13-Sep-2016	10:34:10	039	36.788091	-75.668276	4	3	4	60°	1	Cargo vessel
13-Sep-2016	10:35:19	040	36.788179	-75.622784	4	3	3	45°	1	Cargo vessel
13-Sep-2016	10:42:09	041	36.788555	-75.352398	4	3	3	45°	1	Cargo vessel
13-Sep-2016	10:50:00	044	36.842278	-75.181001	5	3	3	120°	1	Cargo vessel
13-Sep-2016	10:50:51	026	36.842460	-75.215326	5	3	1	90°	1	Tanker
13-Sep-2016	10:51:15	045	36.842755	-75.231634	5	3	3	45°	1	Cargo vessel
13-Sep-2016	10:52:20	046	36.842747	-75.273465	5	3	3	15°	1	Cargo vessel
13-Sep-2016	10:53:34	047	36.842561	-75.321880	5	3	4	90°	1	Cargo vessel
13-Sep-2016	10:59:21	048	36.842448	-75.552380	5	3	3	30°	1	Cargo vessel
13-Sep-2016	12:38:33	059	36.905786	-75.736901	6	3	3	45°	1	Cargo vessel
13-Sep-2016	12:40:09	062	36.906009	-75.678826	6	3	3	45°	1	Cargo vessel
13-Sep-2016	12:41:10	063	36.905751	-75.641838	6	3	4	60°	1	Cargo vessel
13-Sep-2016	13:05:16	070	36.964537	-75.471965	7	3	4	90°	1	Cargo vessel
13-Sep-2016	13:05:23	040	36.964625	-75.476433	7	3	4	90°	1	Tanker
13-Sep-2016	13:05:45	071	36.964439	-75.490287	7	3	4	45°	1	Cargo vessel
13-Sep-2016	13:07:00	072	36.963881	-75.537897	7	3	3	45°	1	Cargo vessel
13-Sep-2016	13:14:14	074	36.961221	-75.818439	7	3	2	60°	1	Cargo vessel
21-Oct-2016	9:16:39	004	36.551092	-75.762200	0	1	4	90°	1	Cargo vessel
21-Oct-2016	9:17:20	005	36.551229	-75.734030	0	1	4	90°	1	Cargo vessel
21-Oct-2016	9:21:16	007	36.551815	-75.574105	0	1	4	80°	1	Cargo vessel
21-Oct-2016	9:44:52	008	36.607174	-75.063364	1	1	3	90°	1	Tanker
21-Oct-2016	9:54:05	016	36.607702	-75.418724	1	1	3	45°	1	Cargo vessel
21-Oct-2016	10:08:23	019	36.668970	-75.864239	2	1	3	90°	1	Cargo vessel
21-Oct-2016	10:08:44	020	36.669187	-75.849243	2	1	3	90°	1	Cargo vessel

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
21-Oct-2016	10:15:11	022	36.670464	-75.597282	2	1	4	90°	1	Cargo vessel
21-Oct-2016	10:25:38	029	36.670677	-75.285154	2	1	3	45°	1	Cargo vessel
21-Oct-2016	10:43:13	030	36.725374	-75.264135	3	2	3	90°	1	Tanker
21-Oct-2016	10:49:33	041	36.724678	-75.509906	3	1	3	45°	1	Cargo vessel
21-Oct-2016	10:56:11	040	36.724237	-75.763251	3	2	4	80°	1	Cargo vessel
21-Oct-2016	11:03:16	044	36.787373	-75.911973	4	1	3	100°	1	Cargo vessel
21-Oct-2016	11:06:32	049	36.788068	-75.779322	4	1	3	70°	1	Cargo vessel
21-Oct-2016	11:12:50	051	36.788761	-75.524821	4	1	4	90°	1	Cargo vessel
21-Oct-2016	11:15:54	045	36.788769	-75.399686	4	1	2	90°	1	Tanker
21-Oct-2016	11:21:29	056	36.788843	-75.170050	4	1	4	45°	1	Cargo vessel
21-Oct-2016	11:32:49	063	36.848026	-75.252869	5	1	3	30°	1	Cargo vessel
21-Oct-2016	11:33:24	064	36.847880	-75.274015	5	1	4	40°	1	Cargo vessel
21-Oct-2016	11:43:46	067	36.844522	-75.649632	5	1	3	60°	1	Cargo vessel
21-Oct-2016	11:44:41	070	36.844379	-75.683671	5	1	3	10°	1	Cargo vessel
21-Oct-2016	14:24:14	083	36.961102	-75.799210	7	1	4	90°	1	Tanker
7-Nov-2016	9:16:18	005	37.141829	-75.135929	10	4	1	90°	1	Cargo vessel
7-Nov-2016	9:23:11	007	37.085606	-75.168505	9	4	4	90°	1	Cargo vessel
7-Nov-2016	9:39:47	008	37.086270	-75.864755	9	4	4	90°	1	Cargo vessel
7-Nov-2016	9:56:36	012	37.024665	-75.413549	8	4	4	45°	1	Cargo vessel
7-Nov-2016	10:08:26	015	36.967891	-75.062233	7	4	3	70°	1	Cargo vessel
7-Nov-2016	10:25:24	016	36.967394	-75.783076	7	4	4	15°	1	Cargo vessel
7-Nov-2016	10:41:34	019	36.905927	-75.602295	6	4	4	45°	1	Cargo vessel
7-Nov-2016	10:46:49	020	36.905729	-75.393816	6	4	4	90°	1	Cargo vessel
7-Nov-2016	11:04:05	022	36.845962	-75.314529	5	4	3	45°	1	Cargo vessel
7-Nov-2016	11:09:13	023	36.844263	-75.531158	5	4	4	90°	1	Cargo vessel
7-Nov-2016	11:17:18	028	36.842337	-75.870375	5	3	3	90°	1	Cargo vessel
10-Dec-2016	11:14:08	009	37.264584	-75.305097	12	3	4	90°	1	Cargo vessel
10-Dec-2016	15:40:33	035	36.906439	-75.633002	6	3	4	90°	1	Cargo vessel
10-Dec-2016	16:00:25	035	36.846583	-75.645060	5	3	3	90°	1	Cargo vessel
10-Dec-2016	16:09:55	036	36.849983	-75.255652	5	3	4	90°	1	Cargo vessel
10-Dec-2016	16:18:14	042	36.790160	-75.262232	4	3	2	130°	1	Tanker
10-Dec-2016	16:28:14	039	36.787465	-75.626693	4	3	2	90°	1	Cargo vessel
21-Dec-2016	9:48:41	005	36.552114	-75.523952	0	1	2	30°	1	Cargo vessel
21-Dec-2016	9:49:32	003	36.552214	-75.490970	0	2	3	90°	1	Tanker

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
21-Dec-2016	9:54:36	006	36.552913	-75.296111	0	1	4	80°	1	Cargo vessel
21-Dec-2016	10:14:40	009	36.606577	-75.453937	1	2	4	120°	1	Cargo vessel
21-Dec-2016	10:17:04	008	36.606366	-75.545712	1	2	3	60°	1	Tanker
21-Dec-2016	10:32:33	013	36.670410	-75.789134	2	1	4	45°	1	Cargo vessel
21-Dec-2016	10:34:58	014	36.670653	-75.702843	2	1	4	45°	1	Cargo vessel
21-Dec-2016	10:35:27	015	36.670761	-75.684818	2	1	2	15°	1	Cargo vessel
21-Dec-2016	10:43:13	016	36.671347	-75.390588	2	2	3	100°	1	Cargo vessel
21-Dec-2016	10:44:53	017	36.671540	-75.325717	2	2	4	90°	1	Cargo vessel
21-Dec-2016	10:47:27	018	36.671457	-75.227635	2	3	4	30°	1	Cargo vessel
21-Dec-2016	11:11:28	016	36.724461	-75.709715	3	2	4	90°	1	Tanker
21-Dec-2016	11:19:36	023	36.785587	-75.907871	4	1	3	45°	1	Cargo vessel
21-Dec-2016	11:21:56	024	36.787478	-75.820921	4	1	3	15°	1	Cargo vessel
21-Dec-2016	11:24:02	025	36.787868	-75.742839	4	1	2	25°	1	Cargo vessel
21-Dec-2016	11:24:27	026	36.787829	-75.726595	4	1	3	30°	1	Cargo vessel
21-Dec-2016	11:26:12	028	36.787949	-75.659360	4	1	4	30°	1	Cargo vessel
21-Dec-2016	11:33:01	030	36.788414	-75.390775	4	2	3	45°	1	Cargo vessel
21-Dec-2016	11:36:56	022	36.788404	-75.238403	4	2	3	90°	1	Tanker
21-Dec-2016	11:41:46	032	36.787909	-75.047184	4	2	3	90°	1	Cargo vessel
21-Dec-2016	11:46:06	025	36.849513	-75.103107	5	2	3	60°	1	Cargo vessel
21-Dec-2016	11:48:21	034	36.848802	-75.191135	5	2	3	45°	1	Cargo vessel
21-Dec-2016	11:54:24	026	36.847307	-75.426835	5	2	3	80°	1	Cargo vessel
21-Dec-2016	11:56:07	035	36.846597	-75.494532	5	1	1	75°	2	Cargo vessel
21-Dec-2016	11:58:55	036	36.845312	-75.605593	5	1	3	30°	1	Cargo vessel
21-Dec-2016	11:58:55	027	36.845439	-75.605571	5	2	3	100°	1	Commercial fishing vessel
21-Dec-2016	12:04:34	029	36.843152	-75.834310	5	2	3	90°	1	Tanker
21-Dec-2016	14:17:39	035	36.904836	-75.930632	6	1	2	45°	1	Cargo vessel
21-Dec-2016	14:17:58	044	36.905351	-75.917753	6	1	2	45°	1	Cargo vessel
21-Dec-2016	14:18:42	036	36.905620	-75.889616	6	1	2	80°	1	Cargo vessel
21-Dec-2016	14:18:59	045	36.905618	-75.878283	6	1	3	45°	1	Cargo vessel
21-Dec-2016	14:21:57	038	36.906031	-75.765482	6	1	2	70°	1	Tanker
21-Dec-2016	14:23:05	039	36.906707	-75.722871	6	1	3	90°	1	Cargo vessel
21-Dec-2016	14:29:00	048	36.906812	-75.496148	6	1	4	45°	1	Cargo vessel
21-Dec-2016	14:29:38	042	36.906791	-75.471502	6	1	4	90°	1	Cargo vessel

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
21-Dec-2016	14:49:09	052	36.967138	-75.301459	7	1	3	60°	1	Cargo vessel
21-Dec-2016	14:52:49	054	36.967280	-75.446833	7	1	4	30°	1	Cargo vessel
21-Dec-2016	14:59:53	056	36.967397	-75.730426	7	1	3	15°	1	Cargo vessel
21-Dec-2016	15:11:23	061	37.025167	-75.865200	8	1	3	15°	1	Cargo vessel
21-Dec-2016	15:24:38	064	37.026248	-75.362242	8	1	3	30°	1	Cargo vessel
21-Dec-2016	15:39:02	054	37.086076	-75.183903	9	2	3	90°	1	Cargo vessel
21-Dec-2016	15:45:58	067	37.086279	-75.447045	9	1	4	90°	2	Cargo vessel
21-Dec-2016	15:46:39	068	37.086321	-75.473301	9	1	4	60°	1	Cargo vessel
21-Dec-2016	15:47:21	069	37.086319	-75.499559	9	1	4	75°	1	Cargo vessel
21-Dec-2016	15:54:50	072	37.085880	-75.782577	9	1	3	45°	1	Cargo vessel
21-Dec-2016	15:58:31	073	37.084134	-75.921560	9	1	3	90°	1	Cargo vessel
22-Dec-2016	9:23:55	003	37.323382	-75.367200	13	3	2	90°	1	Cargo vessel
22-Dec-2016	9:42:52	010	37.263674	-75.356962	12	4	3	90°	1	Cargo vessel
22-Dec-2016	10:05:28	014	37.205528	-75.345704	11	3	3	90°	1	Commercial fishing vessel
22-Dec-2016	10:51:12	022	37.087882	-75.477905	9	3	2	90°	1	Commercial fishing vessel
22-Dec-2016	11:16:21	025	37.024437	-75.510123	8	4	3	60°	2	Tug and barge
29-Jan-2016	14:16:17	003	36.550315	-75.388889	0	3	4	45°	1	Military
29-Jan-2016	14:55:12	013	36.670160	-75.479464	2	4	3	90°	1	Military
30-Jan-2016	15:01:29	013	37.028841	-75.540290	8	3	3	90°	1	USCG
2-Feb-2016	10:28:22	013	36.669017	-75.688792	2	3	3	90°	1	Military
2-Feb-2016	10:58:53	015	36.725421	-75.759874	3	3	3	90°	1	Military
2-Feb-2016	11:05:03	024	36.788725	-75.924577	4	3	2	120°	1	Military
2-Feb-2016	11:06:44	028	36.786622	-75.854753	4	3	2	90°	1	Military
2-Feb-2016	11:11:09	031	36.787063	-75.674519	4	3	0	90°	1	Military
22-Feb-2016	13:21:10	003	37.207120	-75.463132	11	3	3	45°	1	USCG
22-Feb-2016	14:39:21	017	36.966718	-75.965452	7	3	2	15°	1	Military
22-Feb-2016	14:43:06	013	36.903777	-75.932582	6	3	3	90°	1	Military
22-Feb-2016	15:10:07	025	36.848249	-75.294606	5	3	3	60°	1	Military
22-Feb-2016	15:53:09	036	36.729561	-75.306050	3	3	3	30°	1	Military
22-Feb-2016	16:19:30	041	36.672098	-75.395914	2	3	2	10°	1	Military
22-Feb-2016	16:33:17	044	36.610982	-75.362460	1	3	3	45°	1	Military
17-Mar-2016	16:04:02	065	36.905069	-75.196745	6	2	3	90°	1	Military
17-Mar-2016	17:07:53	085	36.787104	-75.142081	4	2	2	90°	1	Military

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
18-Mar-2016	9:44:04	004	36.904472	-75.952523	6	2	2	90°	1	USCG
18-Mar-2016	10:01:06	005	36.906878	-75.391468	6	2	3	45°	1	Military
18-Mar-2016	10:30:38	017	36.966940	-75.318132	7	2	3	45°	1	Military
18-Mar-2016	11:19:04	027	37.026102	-75.320861	8	2	3	45°	1	Military
18-Mar-2016	11:44:44	034	37.085692	-75.659379	9	2	4	45°	1	Military
18-Mar-2016	15:54:42	062	36.726508	-75.596864	3	2	4	90°	1	Military
18-Mar-2016	16:37:02	074	36.669206	-75.332872	2	2	4	90°	1	Military
18-Mar-2016	16:39:55	075	36.669109	-75.450296	2	2	3	80°	1	Military
18-Mar-2016	17:29:54	082	36.551111	-75.431990	0	2	4	90°	1	Military
20-Apr-2016	9:53:50	003	36.552336	-75.722862	0	3	4	90°	1	Military
20-Apr-2016	9:57:13	004	36.553076	-75.586665	0	3	4	75°	1	Military
20-Apr-2016	10:03:57	006	36.554177	-75.308345	0	3	4	90°	1	Military
20-Apr-2016	10:12:03	008	36.611443	-75.249101	1	4	3	90°	1	Military
20-Apr-2016	10:31:10	015	36.669860	-75.835952	2	3	3	45°	1	Military
20-Apr-2016	10:39:32	017	36.672321	-75.517904	2	3	3	15°	1	Military
20-Apr-2016	10:55:42	017	36.728770	-75.341019	3	4	3	60°	1	Military
20-Apr-2016	11:04:49	020	36.725433	-75.704234	3	3	3	90°	1	Military
20-Apr-2016	11:12:31	025	36.786837	-75.927694	4	3	2	135°	3	Military
20-Apr-2016	11:12:50	026	36.787817	-75.916121	4	3	3	90°	1	Military
20-Apr-2016	11:17:03	023	36.789122	-75.755419	4	3	3	90°	1	Military
20-Apr-2016	11:24:38	029	36.790822	-75.465264	4	3	1	10°	1	Military
20-Apr-2016	11:38:50	034	36.847710	-75.322136	5	3	3	30°	1	Military
20-Apr-2016	11:49:55	037	36.843051	-75.786898	5	3	4	115°	1	Military
20-Apr-2016	11:51:42	038	36.842061	-75.862261	5	3	3	45°	2	Military
20-Apr-2016	11:52:39	039	36.841633	-75.902669	5	3	3	45°	3	Military
20-Apr-2016	14:05:50	035	36.908084	-75.598182	6	3	3	80°	1	Military
20-Apr-2016	14:29:53	049	36.967592	-75.595117	7	2	4	90°	1	Military
20-Apr-2016	14:38:57	051	36.966804	-75.957978	7	2	3	90°	1	Military
21-Apr-2016	13:48:25	009	36.845598	-75.781601	5	3	3	30°	1	Military
21-Apr-2016	13:58:33	011	36.849372	-75.389452	5	3	4	80°	1	Military
21-Apr-2016	14:06:59	014	36.908552	-75.162623	6	3	3	90°	1	Military
21-Apr-2016	14:08:51	015	36.907837	-75.236076	6	3	4	30°	1	Military
21-Apr-2016	14:13:37	016	36.907041	-75.431409	6	3	4	30°	1	Military
21-Apr-2016	14:47:58	024	36.969074	-75.228788	7	3	4	60°	1	Military

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
10-May-2016	11:07:38	003	36.905928	-75.910687	6	2	4	90°	1	Military
27-Jun-2016	11:09:11	041	36.668968	-75.706461	2	1	3	90°	1	USCG
27-Jun-2016	11:46:36	064	36.726775	-75.613641	3	2	1	90°	1	Military
27-Jun-2016	11:52:08	082	36.725197	-75.830567	3	1	3	90°	1	Military
27-Jun-2016	13:41:39	087	36.786927	-75.760126	4	2	4	90°	1	Military
27-Jun-2016	13:46:04	074	36.787409	-75.587694	4	2	2	90°	1	Military
27-Jun-2016	14:14:34	114	36.848343	-75.439862	5	1	4	90°	1	Military
27-Jun-2016	14:23:22	108	36.844448	-75.791653	5	2	3	90°	1	Military
27-Jun-2016	14:25:07	109	36.843551	-75.859790	5	2	2	90°	1	Military
27-Jun-2016	14:33:26	113	36.904313	-75.824920	6	2	3	90°	1	Military
14-Jul-2016	14:45:01	090	36.903991	-75.948536	6	2	3	130°	1	Military
14-Jul-2016	15:18:57	103	36.789722	-75.387615	4	2	4	90°	1	Military
14-Jul-2016	15:54:07	109	36.730395	-75.332519	3	2	4	90°	1	Military
8-Aug-2016	12:14:47	095	36.905783	-75.734054	6	2	3	90°	1	USCG
8-Aug-2016	14:38:14	119	36.788662	-75.643315	4	1	4	90°	1	Military
13-Sep-2016	9:08:05	006	36.552181	-75.521144	0	3	4	90°	1	Military
13-Sep-2016	9:26:06	006	36.607497	-75.370259	1	3	4	90°	1	Military
13-Sep-2016	10:30:49	035	36.787639	-75.802991	4	3	2	30°	1	Military
13-Sep-2016	11:03:07	028	36.842245	-75.704865	5	3	1	45°	1	Military
13-Sep-2016	12:40:10	035	36.905993	-75.677922	6	3	4	90°	1	Military
13-Sep-2016	13:05:16	070	36.964537	-75.471965	7	3	4	90°	1	Military
21-Oct-2016	9:17:47	006	36.551202	-75.715521	0	1	3	45°	1	Military
21-Oct-2016	9:59:16	011	36.607729	-75.620897	1	1	4	90°	1	Military
21-Oct-2016	10:10:11	021	36.669661	-75.791172	2	1	3	30°	1	Military
21-Oct-2016	10:55:13	039	36.724422	-75.726165	3	2	4	90°	1	Military
21-Oct-2016	10:58:53	041	36.723740	-75.867262	3	2	4	100°	1	Military
21-Oct-2016	11:03:53	045	36.786997	-75.887565	4	1	2	30°	1	Military
21-Oct-2016	11:04:31	046	36.787362	-75.862536	4	1	3	75°	1	Military
21-Oct-2016	11:04:50	047	36.787680	-75.849269	4	1	4	135°	1	Military
21-Oct-2016	11:28:24	051	36.849048	-75.090648	5	1	4	90°	1	Military
21-Oct-2016	11:37:28	065	36.846988	-75.423142	5	1	3	30°	1	Military
21-Oct-2016	11:44:09	068	36.844658	-75.663815	5	1	3	30°	1	Military
21-Oct-2016	11:44:22	069	36.844286	-75.671777	5	1	2	15°	1	Military
21-Oct-2016	11:47:20	057	36.843179	-75.780746	5	1	4	140°	3	Military

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
21-Oct-2016	11:50:16	071	36.841971	-75.887587	5	1	2	45°	1	Military
21-Oct-2016	13:42:57	066	36.905338	-75.794960	6	1	3	90°	2	Military
21-Oct-2016	13:45:25	067	36.905762	-75.697532	6	1	4	90°	1	Military
21-Oct-2016	13:47:31	068	36.906056	-75.613667	6	1	3	90°	1	Military Research
21-Oct-2016	14:13:11	096	36.964726	-75.378614	7	1	3	90°	1	Military
21-Dec-2016	9:43:54	003	36.552015	-75.707314	0	1	4	90°	1	Military
21-Dec-2016	12:02:30	028	36.844238	-75.749664	5	2	3	90°	1	USCG
21-Dec-2016	14:27:14	041	36.906584	-75.564252	6	1	3	85°	1	USCG
21-Dec-2016	14:52:30	053	36.967186	-75.434611	7	1	4	45°	1	Military
29-Jan-2016	15:06:15	016	36.722624	-75.207791	3	4	3	90°	1	Recreational fishing vessel
30-Jan-2016	9:47:39	003	36.903937	-75.507696	6	2	3	90°	2	Recreational fishing vessel
30-Jan-2016	14:52:28	012	37.023831	-75.883084	8	3	3	70°	1	Trawl vessel
30-Jan-2016	15:20:54	017	36.965761	-75.414203	7	3	3	90°	1	Charter boat
30-Jan-2016	15:27:35	019	36.963574	-75.652762	7	3	3	90°	1	Recreational fishing vessel
30-Jan-2016	15:33:03	020	36.961718	-75.848493	7	3	2	90°	1	Recreational fishing vessel
2-Feb-2016	10:18:08	007	36.607356	-75.786011	1	3	3	90°	1	Recreational fishing vessel
2-Feb-2016	10:28:30	014	36.669042	-75.683584	2	3	3	120°	1	Unknown
2-Feb-2016	10:29:26	015	36.669168	-75.646202	2	3	3	90°	1	Recreational fishing vessel
2-Feb-2016	10:29:32	016	36.669191	-75.642145	2	3	2	90°	2	Recreational fishing vessel
2-Feb-2016	10:34:35	018	36.669216	-75.437937	2	3	3	90°	1	Recreational fishing vessel
2-Feb-2016	10:55:30	021	36.726164	-75.618726	3	3	3	15°	2	Recreational fishing vessel
2-Feb-2016	11:05:34	025	36.789197	-75.903086	4	3	2	145°	1	Recreational fishing vessel
2-Feb-2016	11:05:50	026	36.787598	-75.891842	4	3	3	90°	1	Recreational fishing vessel
2-Feb-2016	11:12:53	032	36.787268	-75.602837	4	3	3	45°	1	Recreational fishing vessel

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
2-Feb-2016	14:07:28	031	36.965144	-75.526162	7	3	3	90°	1	Recreational fishing vessel
2-Feb-2016	16:10:05	045	37.204599	-75.730350	11	2	3	90°	1	Charter boat
22-Feb-2016	14:34:41	010	36.967764	-75.769979	7	3	3	90°	1	Trawl vessel
22-Feb-2016	15:27:34	031	36.787647	-75.858739	4	3	2	90°	1	Recreational fishing vessel
17-Mar-2016	10:47:57	009	37.263833	-75.183201	12	3	3	90°	1	Recreational fishing vessel
17-Mar-2016	13:39:20	018	37.205209	-75.593925	11	2	4	90°	1	Recreational fishing vessel
17-Mar-2016	13:51:32	023	37.205152	-75.094978	11	2	4	90°	1	Trawl vessel
17-Mar-2016	14:06:32	030	37.140865	-75.487559	10	2	3	90°	1	Trawl vessel
17-Mar-2016	14:10:30	026	37.140909	-75.645124	10	2	3	90°	1	Trawl vessel
17-Mar-2016	16:44:07	081	36.848805	-75.412521	5	2	4	90°	1	Recreational fishing vessel
17-Mar-2016	17:26:16	089	36.786144	-75.861854	4	2	4	140°	1	Unknown
18-Mar-2016	9:48:08	007	36.906032	-75.801388	6	2	3	90°	1	Recreational fishing vessel
18-Mar-2016	9:49:59	009	36.906330	-75.730591	6	2	2	90°	1	Recreational fishing vessel
18-Mar-2016	11:41:07	032	37.086103	-75.523966	9	2	3	30°	1	Recreational fishing vessel
18-Mar-2016	11:42:44	037	37.086023	-75.583969	9	2	4	90°	1	Recreational fishing vessel
18-Mar-2016	14:01:21	048	37.143105	-75.778772	10	2	3	100°	1	Recreational fishing vessel
18-Mar-2016	14:02:40	054	37.142808	-75.727600	10	2	4	90°	1	Trawl vessel
18-Mar-2016	14:06:14	057	37.143040	-75.590236	10	2	1	90°	1	Recreational fishing vessel
20-Apr-2016	10:03:00	005	36.554075	-75.348670	0	3	4	90°	1	Unknown
20-Apr-2016	10:11:16	011	36.610876	-75.217920	1	3	4	30°	1	Unknown
20-Apr-2016	10:30:34	014	36.669892	-75.858829	2	3	3	115°	1	Recreational fishing vessel
20-Apr-2016	10:52:01	022	36.729632	-75.184232	3	3	4	45°	1	Unknown
20-Apr-2016	11:37:38	033	36.847867	-75.272846	5	3	4	45°	1	Unknown
20-Apr-2016	15:57:52	069	37.144510	-75.687151	10	3	4	90°	1	Trawl vessel
20-Apr-2016	16:36:34	060	37.204268	-75.612588	11	2	3	90°	1	Trawl vessel

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
21-Apr-2016	13:45:21	003	36.843234	-75.914798	5	3	2	135°	1	Recreational fishing vessel
21-Apr-2016	13:46:18	006	36.844087	-75.872476	5	3	3	90°	1	Recreational fishing vessel
21-Apr-2016	13:46:36	007	36.844379	-75.858165	5	3	4	90°	1	Recreational fishing vessel
21-Apr-2016	13:46:45	008	36.844510	-75.851549	5	3	4	135°	1	Recreational fishing vessel
21-Apr-2016	13:55:15	010	36.848016	-75.519376	5	3	3	45°	1	Recreational fishing vessel
21-Apr-2016	14:19:56	011	36.905476	-75.695730	6	3	3	90°	1	Recreational fishing vessel
21-Apr-2016	14:28:55	022	36.968366	-75.975849	7	3	2	135°	1	Trawl vessel
21-Apr-2016	14:32:01	023	36.969361	-75.855849	7	3	3	90°	1	Recreational fishing vessel
21-Apr-2016	14:35:07	017	36.969475	-75.727657	7	3	3	90°	1	Recreational fishing vessel
21-Apr-2016	14:35:15	018	36.969550	-75.721837	7	3	3	90°	1	Recreational fishing vessel
21-Apr-2016	15:11:21	032	37.022886	-75.922474	8	3	3	45°	1	Recreational fishing vessel
21-Apr-2016	15:18:51	036	37.088201	-75.788077	9	3	3	45°	1	Sailboat
21-Apr-2016	15:49:04	028	37.142586	-75.655873	10	3	2	45°	1	Recreational fishing vessel
10-May-2016	12:19:34	013	37.024406	-75.849087	8	3	4	90°	1	Sailboat
10-May-2016	14:57:02	023	37.142725	-75.663877	10	2	3	90°	1	Trawl vessel
10-May-2016	15:31:59	029	37.203701	-75.586577	11	3	4	90°	1	Trawl vessel
10-May-2016	16:17:01	036	37.320443	-75.629577	13	2	4	135°	1	Recreational fishing vessel
27-Jun-2016	10:58:55	035	36.607654	-75.731921	1	1	4	140°	1	Head boat
27-Jun-2016	10:59:26	036	36.607550	-75.751157	1	1	4	60°	1	Charter boat
27-Jun-2016	11:06:42	043	36.668594	-75.809160	2	1	3	90°	1	Recreational fishing vessel
27-Jun-2016	13:41:19	073	36.786848	-75.773030	4	2	3	90°	1	Recreational fishing vessel
27-Jun-2016	14:25:14	119	36.843531	-75.864037	5	3	4	90°	1	Recreational fishing vessel

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
27-Jun-2016	14:27:01	120	36.842540	-75.935154	5	3	1	90°	1	Recreational fishing vessel
27-Jun-2016	14:27:15	110	36.842662	-75.944630	5	2	3	90°	1	Recreational fishing vessel
27-Jun-2016	14:34:34	115	36.904493	-75.780785	6	2	3	90°	1	Recreational fishing vessel
27-Jun-2016	15:04:22	141	36.966548	-75.388249	7	2	3	90°	1	Recreational fishing vessel
27-Jun-2016	15:07:07	147	36.965666	-75.498000	7	2	2	110°	1	Charter boat
27-Jun-2016	15:07:19	148	36.965598	-75.506017	7	2	2	100°	1	Charter boat
27-Jun-2016	15:07:32	149	36.965529	-75.514802	7	2	3	90°	1	Charter boat
27-Jun-2016	15:38:51	155	37.023736	-75.788101	8	2	3	90°	1	Sailboat
27-Jun-2016	16:25:29	171	37.322853	-75.516980	13	2	4	60°	1	Recreational fishing vessel
14-Jul-2016	9:22:42	003	37.321568	-75.660942	13	2	3	60°	1	Recreational fishing vessel
14-Jul-2016	9:39:21	006	37.266514	-75.171346	12	2	3	90°	1	Recreational fishing vessel
14-Jul-2016	10:31:28	020	37.146368	-75.375849	10	2	2	90°	1	Recreational fishing vessel
14-Jul-2016	10:59:53	032	37.088785	-75.385629	9	2	3	90°	1	Recreational fishing vessel
14-Jul-2016	11:23:48	037	37.026557	-75.622941	8	2	3	60°	1	Recreational fishing vessel
14-Jul-2016	11:38:51	039	37.023400	-75.944378	8	2	3	90°	1	Recreational fishing vessel
14-Jul-2016	13:52:32	060	36.968796	-75.730129	7	2	3	90°	3	Trawl vessel
14-Jul-2016	14:16:43	067	36.968627	-75.364560	7	2	4	90°	1	Recreational fishing vessel
14-Jul-2016	14:25:53	073	36.908833	-75.192672	6	2	3	90°	1	Recreational fishing vessel
14-Jul-2016	14:34:39	051	36.907308	-75.532584	6	2	4	45°	1	Recreational fishing vessel
14-Jul-2016	14:35:08	052	36.907216	-75.551544	6	2	3	40°	1	Recreational fishing vessel
14-Jul-2016	14:39:31	085	36.905934	-75.726364	6	2	1	90°	1	Recreational fishing vessel

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
14-Jul-2016	14:44:19	055	36.904365	-75.918865	6	2	3	90°	1	Recreational fishing vessel
14-Jul-2016	14:58:08	058	36.847122	-75.557496	5	2	3	90°	1	Recreational fishing vessel
14-Jul-2016	15:12:15	062	36.790334	-75.179581	4	2	3	90°	1	Charter boat
14-Jul-2016	15:31:01	067	36.787768	-75.758572	4	2	3	90°	1	Recreational fishing vessel
14-Jul-2016	15:34:15	070	36.786994	-75.859556	4	2	3	90°	1	Recreational fishing vessel
14-Jul-2016	15:49:17	107	36.728970	-75.513625	3	2	2	90°	1	Recreational fishing vessel
14-Jul-2016	15:52:37	108	36.729986	-75.388986	3	2	1	90°	1	Recreational fishing vessel
14-Jul-2016	16:15:19	078	36.670111	-75.598737	2	3	4	130°	1	Recreational fishing vessel
8-Aug-2016	9:34:22	013	37.263839	-75.189305	12	1	0	90°	1	Recreational fishing vessel
8-Aug-2016	10:18:43	042	37.203673	-75.213250	11	1	3	90°	2	Recreational fishing vessel
8-Aug-2016	10:38:13	049	37.142820	-75.714090	10	1	3	45°	2	Recreational fishing vessel
8-Aug-2016	10:40:04	048	37.142712	-75.778137	10	2	3	90°	1	Charter boat
8-Aug-2016	10:40:15	049	37.142684	-75.784617	10	2	3	90°	1	Charter boat
8-Aug-2016	10:50:17	054	37.085662	-75.772301	9	1	3	60°	1	Recreational fishing vessel
8-Aug-2016	11:17:20	066	37.025736	-75.431335	8	1	4	45°	1	Recreational fishing vessel
8-Aug-2016	11:20:19	068	37.025616	-75.539500	8	1	4	45°	1	Recreational fishing vessel
8-Aug-2016	11:50:48	088	36.966770	-75.408634	7	1	3	45°	1	Recreational fishing vessel
8-Aug-2016	12:08:11	099	36.905848	-75.480696	6	1	3	70°	1	Recreational fishing vessel
8-Aug-2016	12:12:10	094	36.905814	-75.634262	6	2	3	90°	1	Recreational fishing vessel
8-Aug-2016	12:14:09	103	36.905733	-75.709361	6	1	2	45°	1	Recreational fishing vessel

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
8-Aug-2016	12:14:35	104	36.905698	-75.725984	6	1	1	90°	1	Recreational fishing vessel
8-Aug-2016	14:03:45	118	36.840430	-75.854322	5	1	3	45°	1	Recreational fishing vessel
8-Aug-2016	14:08:24	106	36.838958	-75.691264	5	1	3	90°	1	Recreational fishing vessel
8-Aug-2016	14:42:34	139	36.788125	-75.805468	4	1	4	90°	1	Recreational fishing vessel
8-Aug-2016	14:49:48	145	36.720222	-75.906110	3	1	2	90°	1	Recreational fishing vessel
8-Aug-2016	14:50:58	127	36.722491	-75.867972	3	1	3	90°	1	Recreational fishing vessel
13-Sep-2016	9:17:25	008	36.552776	-75.175439	0	3	4	90°	1	Recreational fishing vessel
13-Sep-2016	9:42:48	015	36.667987	-75.853642	2	3	3	100°	2	Recreational fishing vessel
13-Sep-2016	10:27:19	030	36.785758	-75.930437	4	3	3	135°	6	Recreational fishing vessel
13-Sep-2016	10:28:03	031	36.786394	-75.908925	4	3	3	110°	2	Recreational fishing vessel
13-Sep-2016	10:29:18	032	36.787205	-75.863705	4	3	2	90°	1	Recreational fishing vessel
13-Sep-2016	10:30:32	034	36.787888	-75.814172	4	3	3	90°	1	Recreational fishing vessel
13-Sep-2016	10:31:12	036	36.787852	-75.787038	4	3	4	80°	1	Recreational fishing vessel
13-Sep-2016	11:05:47	049	36.841920	-75.808735	5	3	2	30°	1	Recreational fishing vessel
13-Sep-2016	11:07:57	050	36.841300	-75.894642	5	3	3	90°	1	Recreational fishing vessel
13-Sep-2016	11:08:25	029	36.841230	-75.912881	5	3	2	90°	2	Recreational fishing vessel
13-Sep-2016	11:09:19	051	36.841398	-75.947743	5	3	2	30°	6	Recreational fishing vessel
13-Sep-2016	12:32:41	056	36.904920	-75.949456	6	3	3	90°	3	Recreational fishing vessel
13-Sep-2016	12:34:20	034	36.905057	-75.890242	6	3	3	90°	2	Recreational fishing vessel

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
13-Sep-2016	12:38:50	060	36.905534	-75.726260	6	3	3	60°	1	Recreational fishing vessel
13-Sep-2016	12:39:46	061	36.905848	-75.692270	6	3	3	90°	1	Recreational fishing vessel
13-Sep-2016	12:47:15	064	36.906227	-75.415979	6	3	4	45°	1	Recreational fishing vessel
13-Sep-2016	12:48:32	065	36.906362	-75.369060	6	3	3	45°	1	Recreational fishing vessel
13-Sep-2016	12:49:55	066	36.906288	-75.319688	6	3	3	45°	1	Recreational fishing vessel
13-Sep-2016	12:58:14	038	36.965605	-75.204034	7	3	1	90°	1	Yacht
13-Sep-2016	12:58:26	069	36.965840	-75.211505	7	3	4	90°	1	Recreational fishing vessel
13-Sep-2016	13:09:59	073	36.962781	-75.651820	7	3	3	110°	1	Recreational fishing vessel
13-Sep-2016	13:15:39	075	36.960602	-75.873348	7	3	3	80°	1	Recreational fishing vessel
13-Sep-2016	13:29:04	049	37.142400	-75.698086	10	3	4	90°	1	Recreational fishing vessel
13-Sep-2016	13:30:19	086	37.142717	-75.651150	10	2	3	90°	1	Sailboat
13-Sep-2016	13:39:14	053	37.203698	-75.656803	11	3	3	90°	1	Sailboat
13-Sep-2016	13:45:59	094	37.261406	-75.694334	12	2	2	90°	1	Recreational fishing vessel
13-Sep-2016	13:50:09	098	37.262911	-75.540067	12	2	3	100°	1	Recreational fishing vessel
13-Sep-2016	14:17:36	107	37.321134	-75.544392	13	2	3	45°	1	Recreational fishing vessel
13-Sep-2016	14:20:35	109	37.320832	-75.662912	13	2	2	30°	1	Sailboat
21-Oct-2016	9:16:04	003	36.551010	-75.786104	0	1	3	135°	1	Recreational fishing vessel
21-Oct-2016	11:22:19	047	36.788513	-75.136331	4	1	4	90°	1	Charter boat
21-Oct-2016	11:40:36	066	36.845797	-75.536113	5	1	2	20°	1	Recreational fishing vessel
21-Oct-2016	13:40:21	064	36.904807	-75.898174	6	1	3	90°	1	Recreational fishing vessel
21-Oct-2016	14:01:01	072	36.906119	-75.066539	6	1	4	90°	1	Recreational fishing vessel
21-Oct-2016	14:27:55	085	36.959592	-75.939264	7	1	3	90°	1	Charter boat

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
21-Oct-2016	15:14:32	134	37.260516	-75.624565	12	1	3	90°	1	Recreational fishing vessel
7-Nov-2016	9:41:10	009	37.085812	-75.920727	9	4	3	60°	1	Recreational fishing vessel
10-Dec-2016	15:18:04	032	36.968755	-75.357017	7	3	4	90°	1	Recreational fishing vessel
10-Dec-2016	15:49:10	032	36.903891	-75.938534	6	3	3	90°	1	Trawl vessel
10-Dec-2016	15:53:01	038	36.842479	-75.943616	5	3	2	90°	1	Sailboat
10-Dec-2016	15:56:16	039	36.844556	-75.813879	5	3	3	110°	1	Recreational fishing vessel
10-Dec-2016	16:31:39	040	36.787124	-75.752136	4	3	2	90°	1	Pilot boat
10-Dec-2016	16:32:08	044	36.787167	-75.769908	4	2	3	90°	1	Recreational fishing vessel
21-Dec-2016	9:48:11	004	36.552046	-75.543246	0	1	3	90°	1	Recreational fishing vessel
21-Dec-2016	11:25:21	027	36.787868	-75.692257	4	1	3	120°	1	Recreational fishing vessel
21-Dec-2016	11:27:42	029	36.788168	-75.600420	4	1	3	70°	1	Recreational fishing vessel
21-Dec-2016	11:41:15	031	36.788096	-75.067701	4	2	2	15°	1	Recreational fishing vessel
21-Dec-2016	14:21:31	037	36.905983	-75.782044	6	1	3	90°	1	Recreational fishing vessel
21-Dec-2016	14:26:10	040	36.906693	-75.605409	6	1	2	90°	1	Recreational fishing vessel
21-Dec-2016	14:27:08	046	36.906618	-75.567857	6	1	3	60°	2	Recreational fishing vessel
21-Dec-2016	14:28:39	047	36.906875	-75.509534	6	1	3	45°	2	Recreational fishing vessel
21-Dec-2016	14:31:18	049	36.907011	-75.406596	6	1	3	30°	1	Recreational fishing vessel
21-Dec-2016	14:51:12	046	36.967389	-75.382665	7	2	4	90°	1	Recreational fishing vessel
21-Dec-2016	14:59:19	055	36.967283	-75.707829	7	1	2	30°	1	Recreational fishing vessel
21-Dec-2016	15:04:30	047	36.967114	-75.917560	7	2	4	110°	1	Recreational fishing vessel

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
21-Dec-2016	15:09:49	059	37.023792	-75.923992	8	1	3	90°	1	Recreational fishing vessel
21-Dec-2016	15:10:20	060	37.024807	-75.904530	8	1	3	90°	1	Recreational fishing vessel
21-Dec-2016	15:11:50	062	37.025243	-75.848445	8	1	2	15°	1	Recreational fishing vessel
21-Dec-2016	15:18:13	063	37.025991	-75.607763	8	1	2	45°	1	Recreational fishing vessel
21-Dec-2016	15:19:23	050	37.026010	-75.562451	8	1	3	90°	1	Trawl vessel
21-Dec-2016	15:49:01	070	37.086190	-75.562916	9	1	3	80°	1	Recreational fishing vessel
21-Dec-2016	15:51:16	071	37.086096	-75.647404	9	1	2	90°	1	Recreational fishing vessel
22-Dec-2016	9:24:55	004	37.323224	-75.320033	13	3	3	110°	1	Recreational fishing vessel
22-Dec-2016	9:27:21	005	37.323628	-75.207600	13	3	3	90°	1	Recreational fishing vessel
22-Dec-2016	9:40:03	009	37.264299	-75.257282	12	4	3	90°	1	Recreational fishing vessel
22-Dec-2016	9:42:42	005	37.263815	75.350803	12	3	3	90°	1	Recreational fishing vessel
22-Dec-2016	10:47:19	021	37.087934	-75.664262	9	2	3	90°	1	Recreational fishing vessel
11-Jan-2017	9:43:47	7	36.850169	-75.162398	5	2	4	90°	1	Commercial
11-Jan-2017	10:00:09	10	36.905583	-75.396097	6	2	3	90°	1	Commercial
11-Jan-2017	10:04:02	12	36.905407	-75.524726	6	2	4	90°	1	Commercial
11-Jan-2017	10:05:07	13	36.905308	-75.560962	6	2	4	90°	1	Commercial
11-Jan-2017	10:06:11	14	36.905306	-75.597035	6	2	4	90°	2	Commercial
11-Jan-2017	11:06:22	22	36.553131	-75.256015	0	2	4	90°	1	Commercial
11-Jan-2017	11:22:19	25	36.607354	-75.250840	1	2	3	90°	1	Commercial
11-Jan-2017	15:35:12	57	37.025975	-75.073146	8	2	3	90°	1	Commercial
11-Jan-2017	15:56:43	60	37.08626	-75.684277	9	2	1	90°	2	Commercial
12-Jan-2017	9:32:38	3	37.323285	-75.171117	13	3	4	60°	1	Commercial
12-Jan-2017	10:10:43	10	37.205675	-75.291891	11	3	4	60°	1	Commercial
12-Jan-2017	10:21:30	13	37.140745	-75.127367	10	3	4	90°	2	Commercial
12-Jan-2017	11:07:43	21	37.088046	-75.421255	9	2	1	60°	1	Commercial
12-Jan-2017	12:26:10	31	36.78741	-75.532662	4	2	3	60°	1	Commercial

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
21-Feb-2017	10:26:20	8	36.850842	-75.105820	5	2	4	80°	1	Commercial
21-Feb-2017	10:41:26	13	36.905203	-75.537414	6	2	3	45°	1	Commercial
21-Feb-2017	10:45:38	15	36.904677	-75.720968	6	2	3	30°	1	Commercial
21-Feb-2017	10:46:32	16	36.904308	-75.761067	6	2	3	20°	1	Commercial
21-Feb-2017	11:12:40	20	36.969344	-75.324285	7	2	3	15°	1	Commercial
21-Feb-2017	11:13:05	21	36.969293	-75.309536	7	2	4	45°	1	Commercial
21-Feb-2017	11:17:51	22	36.968571	-75.139084	7	2	4	120°	1	Commercial
21-Feb-2017	11:24:21	26	37.027864	-75.129242	8	2	4	75°	1	Commercial
21-Feb-2017	11:42:59	31	37.02653	-75.461661	8	2	4	60°	2	Commercial
21-Feb-2017	11:47:53	32	37.025085	-75.685632	8	2	4	45°	1	Commercial
21-Feb-2017	14:08:07	44	37.087375	-75.242103	9	2	3	30°	1	Commercial
21-Feb-2017	14:31:12	48	37.140741	-75.713089	10	2	4	60°	1	Commercial
21-Feb-2017	14:31:42	49	37.140738	-75.734929	10	2	4	60°	1	Commercial
21-Feb-2017	14:31:54	50	37.14073	-75.743875	10	2	4	45°	2	Commercial
21-Feb-2017	14:33:02	51	37.14063	-75.792356	10	2	4	45°	1	Commercial
21-Feb-2017	14:57:20	54	37.205839	-75.085710	11	2	4	30°	1	Commercial
21-Feb-2017	15:56:57	63	36.849355	-75.062934	5	1	3	100°	1	Commercial
21-Feb-2017	16:08:00	65	36.845073	-75.553697	5	1	2	15°	1	Commercial
21-Feb-2017	16:08:53	66	36.84471	-75.593065	5	1	3	15°	1	Commercial
21-Feb-2017	16:12:16	67	36.843153	-75.742649	5	1	2	15°	1	Commercial
24-Feb-2017	14:59	35	36.791183	-75.245024	4	1	3	90°	1	Commercial
24-Feb-2017	15:30	45	36.913558	-75.784807	6	2	4	90°	1	Commercial
24-Feb-2017	15:44	47	36.909573	-75.276483	6	2	3	90°	1	Commercial
26-Mar-2017	11:05:23	22	37.14794	-75.232393	10	1	4	60°	1	Commercial
26-Mar-2017	11:06:16	23	37.147548	-75.264293	10	1	4	60°	1	Commercial
26-Mar-2017	11:13:08	25	37.145021	-75.511168	10	1	4	75°	1	Commercial
26-Mar-2017	11:56:24	34	37.029945	-75.283980	8	1	4	45°	2	Commercial
26-Mar-2017	11:57:41	35	37.029832	-75.330604	8	1	4	80°	1	Commercial
26-Mar-2017	11:58:56	37	37.029341	-75.377050	8	1	3	60°	1	Commercial
26-Mar-2017	12:00:39	38	37.028984	-75.439456	8	1	4	45°	1	Commercial
26-Mar-2017	14:03:53	44	36.551106	-75.783769	0	1	3	90°	1	Commercial
26-Mar-2017	14:04:33	45	36.551195	-75.758790	0	1	4	80°	1	Commercial
26-Mar-2017	14:07:23	46	36.551723	-75.649732	0	1	4	90°	1	Commercial
26-Mar-2017	14:07:57	47	36.551837	-75.628055	0	1	4	80°	1	Commercial

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
26-Mar-2017	14:43:46	55	36.669706	-75.860060	2	1	3	70°	1	Commercial
26-Mar-2017	14:43:57	56	36.669528	-75.853775	2	1	3	60°	1	Commercial
26-Mar-2017	14:44:08	57	36.669516	-75.846607	2	1	3	45°	1	Commercial
26-Mar-2017	14:47:57	58	36.670653	-75.707334	2	1	4	45°	1	Commercial
26-Mar-2017	15:27:31	65	36.788649	-75.912632	4	1	3	15°	1	Commercial
26-Mar-2017	15:27:54	66	36.788245	-75.898322	4	1	4	15°	1	Commercial
26-Mar-2017	15:54:24	70	36.849353	-75.325133	5	1	3	45°	1	Commercial
26-Mar-2017	16:01:20	72	36.84532	-75.605674	5	1	2	15°	1	Commercial
27-Mar-2017	10:02:40	10	37.029065	-75.534397	8	3	4	80°	1	Commercial
27-Mar-2017	10:02:47	11	37.029081	-75.538598	8	3	4	70°	1	Commercial
27-Mar-2017	10:05:34	12	37.027304	-75.633478	8	3	3	90°	1	Commercial
27-Mar-2017	10:13:37	13	37.023783	-75.914426	8	3	4°	70	1	Commercial
27-Mar-2017	10:18:51	17	36.968647	-75.914155	7	3	3	90°	1	Commercial
27-Mar-2017	10:45:17	20	36.908891	-75.357577	6	2	3	110°	1	Commercial
27-Mar-2017	10:49:17	21	36.90689	-75.497263	6	2	3	90°	1	Commercial
27-Mar-2017	12:04:45	32	36.66959	-75.274713	2	2	2	110°	1	Commercial
27-Mar-2017	12:34:19	35	36.612858	-75.157338	1	2	1	100°	1	Commercial
13-Apr-2017	10:20:20	4	37.323608	-75.239425	13	3	3	45°	1	Commercial
13-Apr-2017	11:22:57	12	36.909476	-75.131657	6	4	4	15°	1	Commercial
13-Apr-2017	11:25:40	13	36.904357	-75.267291	6	4	2	15°	1	Commercial
13-Apr-2017	11:31:04	14	36.904635	-75.521006	6	4	4	45°	1	Commercial
13-Apr-2017	11:33:24	15	36.904517	-75.627699	6	4	2	45°	1	Commercial
13-Apr-2017	11:35:17	16	36.904319	-75.714569	6	4	3	45°	4	Commercial
13-Apr-2017	13:41:29	22	36.846186	-75.663936	5	3	4	80°	1	Commercial
14-Apr-2017	9:44:02	4	37.089266	-75.316030	9	1	2	15°	1	Commercial
14-Apr-2017	9:57:54	9	37.02728	-75.429407	8	1	3	30°	1	Commercial
14-Apr-2017	9:58:20	10	37.027106	-75.450015	8	1	3	60°	1	Commercial
14-Apr-2017	9:59:20	12	37.026971	-75.499697	8	1	4	45°	1	Commercial
14-Apr-2017	10:04:05	14	37.025724	-75.707808	8	1	4	75°	1	Commercial
14-Apr-2017	10:04:52	15	37.024993	-75.742021	8	1	3	45°	1	Commercial
14-Apr-2017	10:12:34	19	36.967821	-75.963706	7	1	3	130°	2	Commercial
14-Apr-2017	10:21:32	22	36.968979	-75.645882	7	1	4	15°	1	Commercial
14-Apr-2017	10:52:08	32	36.907982	-75.520912	6	1	2	30°	1	Commercial
14-Apr-2017	10:53:51	33	36.90746	-75.594604	6	1	2	15°	1	Commercial

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
14-Apr-2017	10:54:34	34	36.907087	-75.625556	6	1	3	45°	1	Commercial
14-Apr-2017	11:08:04	43	36.841632	-75.847811	5	1	3	15°	1	Commercial
14-Apr-2017	11:10:35	44	36.845023	-75.757894	5	1	4	15°	1	Commercial
14-Apr-2017	11:23:30	46	36.849388	-75.312357	5	1	3	90°	1	Commercial
14-Apr-2017	11:40:56	49	36.78786	-75.620433	4	1	3	60°	1	Commercial
31-May-2017	11:50:11	30	37.027089	-75.576754	8	2	3	90°	1	Commercial
31-May-2017	14:37:39	42	36.908104	-75.735499	6	2	3	90°	1	Commercial
31-May-2017	15:08:55	57	36.911306	-75.183508	6	1	3	90°	1	Commercial
31-May-2017	15:25:28	61	36.791655	-75.677656	4	1	3	90°	1	Commercial
31-May-2017	15:52:17	67	36.727822	-75.688266	3	1	3	90°	1	Commercial
1-Jun-2017	14:14:07	91	37.023078	-75.555954	8	1	4	90°	1	Commercial
1-Jun-2017	9:46:12	21	36.612848	-75.680871	1	1	3	60°	1	Commercial
1-Jun-2017	10:28:55	51	36.730142	-75.736756	3	1	4	90°	1	Commercial
1-Jun-2017	10:36:38	56	36.785559	-75.91086	4	1	3	90°	3	Commercial
1-Jun-2017	11:10:21	85	36.849803	-75.682244	5	1	4	90°	1	Commercial
1-Jun-2017	11:10:37	86	36.8498	-75.692887	5	1	3	30°	1	Commercial
1-Jun-2017	11:12:23	87	36.84927	-75.761244	5	1	2	15°	1	Commercial
1-Jun-2017	13:13:56	97	36.905169	-75.957322	6	1	2	120°	1	Commercial
1-Jun-2017	13:21:09	103	36.90626	-75.656007	6	1	2	30°	1	Commercial
1-Jun-2017	13:21:25	104	36.906293	-75.644837	6	1	3	45°	1	Commercial
1-Jun-2017	13:37:07	129	36.970446	-75.23087	7	1	4	90°	1	Commercial
1-Jun-2017	13:39:18	130	36.970207	-75.321138	7	1	4	110°	1	Commercial
1-Jun-2017	13:39:29	131	36.970181	-75.32899	7	1	4	90°	1	Commercial
1-Jun-2017	13:42:52	133	36.969458	-75.466677	7	1	4	45°	1	Commercial
1-Jun-2017	13:50:21	140	36.968918	-75.539287	7	1	2	15°	1	Commercial
1-Jun-2017	13:50:35	141	36.968778	-75.548844	7	1	3	60°	1	Commercial
1-Jun-2017	13:50:44	142	36.968846	-75.554668	7	1	4	60°	1	Commercial
1-Jun-2017	13:50:49	143	36.968881	-75.557941	7	1	4	45°	2	Commercial
1-Jun-2017	13:54:03	145	36.966996	-75.685071	7	1	4	15°	1	Commercial
1-Jun-2017	13:54:54	146	36.966776	-75.717835	7	1	4	45°	1	Commercial
1-Jun-2017	14:18:19	162	37.021243	-75.383671	8	1	4	45°	1	Commercial
1-Jun-2017	14:36:58	181	37.093198	-75.571789	9	1	4	90°	3	Commercial
1-Jun-2017	14:37:29	182	37.092934	-75.591628	9	1	3	100°	1	Commercial
1-Jun-2017	14:37:40	183	37.092777	-75.598641	9	1	4	45°	1	Commercial

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
1-Jun-2017	14:44:28	187	37.087581	-75.859783	9	1	3	60°	1	Commercial
1-Jun-2017	15:03:50	203	37.146003	-75.267618	10	1	3	60°	1	Commercial
1-Jun-2017	15:49:06	230	37.326594	-75.174199	13	1	3	150°	1	Commercial
1-Jun-2017	15:51:00	232	37.328218	-75.24982	13	1	3	90°	1	Commercial
22-Jun-2017	9:45:43	3	36.548532	-75.712389	0	2	3	30°	1	Commercial
22-Jun-2017	10:00:17	5	36.556601	-75.123450	0	2	4	15°	1	Commercial
22-Jun-2017	10:29:12	13	36.669048	-75.845916	2	2	4	90°	1	Commercial
22-Jun-2017	10:29:34	14	36.668518	-75.831375	2	2	4	30°	1	Commercial
22-Jun-2017	10:30:19	15	36.668286	-75.801630	2	2	4	15°	1	Commercial
22-Jun-2017	10:30:37	16	36.668335	-75.790046	2	2	3	15°	1	Commercial
22-Jun-2017	11:01:18	21	36.731041	-75.441992	3	2	2	30°	1	Commercial
22-Jun-2017	11:05:30	24	36.730977	-75.592548	3	2	3	90°	2	Commercial
22-Jun-2017	11:17:28	30	36.785928	-75.919947	4	2	3	60°	1	Commercial
22-Jun-2017	11:31:52	38	36.792408	-75.330309	4	2	4	90°	1	Commercial
22-Jun-2017	11:59:24	41	36.84979	-75.789377	5	2	3	30°	1	Commercial
22-Jun-2017	12:14:43	48	36.905709	-75.599833	6	2	4	90°	1	Commercial
22-Jun-2017	12:45:00	52	36.96813	-75.630699	7	2	4	75°	1	Commercial
22-Jun-2017	12:45:36	53	36.968015	-75.651779	7	2	3	60°	1	Commercial
22-Jun-2017	14:50:08	59	37.025749	-75.934486	8	2	3	90°	1	Commercial
22-Jun-2017	15:08:58	72	37.019617	-75.129653	8	2	0	90°	1	Commercial
22-Jun-2017	15:13:01	75	37.094554	-75.094101	9	2	3	75°	1	Commercial
22-Jun-2017	15:34:43	82	37.086993	-75.888150	9	2	2	90°	1	Commercial
22-Jun-2017	16:51:22	107	37.326770	-75.658358	13	2	3	30°	1	Commercial
11-Jan-2017	9:33:14	7	36.847539	-75.617084	5	2	2	90°	1	Commercial
11-Jan-2017	9:33:34	8	36.848099	-75.602099	5	2	1	90°	1	Commercial
11-Jan-2017	9:34:17	9	36.848869	-75.571253	5	2	2	90°	1	Commercial
11-Jan-2017	9:34:52	10	36.849166	-75.545729	5	2	4	90°	1	Commercial
11-Jan-2017	9:35:21	11	36.849446	-75.525509	5	2	2	80°	1	Commercial
11-Jan-2017	9:41:45	13	36.849509	-75.248890	5	2	4	90°	2	Commercial
11-Jan-2017	9:42:23	14	36.849528	-75.221570	5	2	3	90°	1	Commercial
11-Jan-2017	9:52:36	18	36.905815	-75.144074	6	3	3	90°	1	Commercial
11-Jan-2017	11:32:56	30	36.606874	-75.631512	1	2	4	90°	1	Commercial
11-Jan-2017	11:48:09	33	36.670471	-75.610500	2	2	3	70°	1	Commercial
12-Jan-2017	9:40:25	4	37.266728	-75.117563	12	3	4	90°	1	Commercial

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
12-Jan-2017	10:38:14	14	37.141226	-75.298665	10	3	3	90°	1	Commercial
12-Jan-2017	11:13:58	19	37.087826	-75.122961	9	3	3	45°	1	Commercial
12-Jan-2017	11:55:03	25	36.968992	-75.537302	7	2	1	90°	1	Commercial
12-Jan-2017	12:24:09	29	36.787225	-75.460004	4	3	4	60°	1	Commercial
12-Jan-2017	12:27:46	31	36.786879	-75.592522	4	2	1	35°	1	Commercial
12-Jan-2017	12:28:27	32	36.786905	-75.618412	4	2	3	90°	1	Commercial
12-Jan-2017	12:29:07	33	36.786815	-75.643323	4	2	3	45°	1	Commercial
12-Jan-2017	12:29:24	34	36.786752	-75.653945	4	2	3	80°	1	Commercial
12-Jan-2017	12:30:59	35	36.786514	-75.713899	4	2	3	90°	1	Commercial
12-Jan-2017	12:31:30	36	36.786669	-75.733756	4	2	2	90°	1	Commercial
12-Jan-2017	12:32:17	37	36.78607	-75.763151	4	2	3	90°	1	Commercial
21-Feb-2017	11:25:45	15	37.025242	-75.191068	8	2	3	90°	1	Commercial
21-Feb-2017	11:28:09	16	37.026824	-75.293909	8	2	4	90°	1	Commercial
21-Feb-2017	14:16:02	32	37.142625	-75.061215	10	2	4	110°	1	Commercial
21-Feb-2017	14:42:19	36	37.206045	-75.626747	11	1	1	80°	1	Commercial
24-Feb-2017	14:05:02	13	36.729303	-75.626571	3	1	3	80°	1	Commercial
26-Mar-2017	11:14:05	16	37.144542	-75.544861	10	2	3	90°	1	Commercial
26-Mar-2017	15:15:13	38	36.727334	-75.562448	3	1	1	90°	1	Commercial
27-Mar-2017	9:33:27	3	37.08901	-75.521813	9	2	4	90°	1	Commercial
27-Mar-2017	10:19:08	11	36.968788	-75.902774	7	2	2	90°	1	Commercial
27-Mar-2017	10:33:45	12	36.968456	-75.276297	7	2	3	90°	1	Commercial
27-Mar-2017	10:43:53	15	36.908501	-75.31035	6	2	3	90°	1	Commercial
27-Mar-2017	10:58:06	16	36.905309	-75.802564	6	2	4	90°	1	Commercial
27-Mar-2017	11:12:26	22	36.848179	-75.435609	5	2	3	90°	1	Commercial
27-Mar-2017	11:15:58	23	36.849463	-75.279709	5	2	4	90°	1	Commercial
27-Mar-2017	11:24:10	27	36.790236	-75.249105	4	2	1	90°	1	Commercial
27-Mar-2017	11:53:50	30	36.730181	-75.349853	3	2	4	90°	1	Commercial
13-Apr-2017	10:37:01	6	37.261287	-75.478814	12	4	3	90°	1	Commercial
13-Apr-2017	11:11:36	13	36.969239	-75.289389	7	4	2	90°	1	Commercial
13-Apr-2017	13:39:08	21	36.845233	-75.748325	5	3	3	90°	3	Commercial
13-Apr-2017	13:41:31	22	36.84597	-75.663181	5	3	3	90°	2	Commercial
13-Apr-2017	13:54:09	23	36.849758	-75.221161	5	3	3	90°	1	Commercial
13-Apr-2017	14:05:52	26	36.787305	-75.260562	4	3	3	90°	1	Commercial
13-Apr-2017	14:15:13	27	36.787161	-75.655506	4	3	3	90°	5	Commercial

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
13-Apr-2017	14:18:48	29	36.786706	-75.805723	4	3	2	90°	4	Commercial
13-Apr-2017	15:05:06	35	36.669058	-75.644419	2	3	4	90°	1	Commercial
13-Apr-2017	15:49:38	41	36.551108	-75.519014	0	3	4	90°	1	Commercial
14-Apr-2017	9:53:00	5	37.028264	-75.195228	8	1	4	90°	1	Commercial
14-Apr-2017	10:13:30	10	36.968715	-75.929594	7	2	3	90°	1	Commercial
14-Apr-2017	10:20:22	12	36.968661	-75.686211	7	2	3	90°	1	Commercial
14-Apr-2017	10:47:12	17	36.90826	-75.308567	6	2	3	90°	1	Commercial
14-Apr-2017	11:10:59	23	36.844956	-75.746562	5	2	3	90°	1	Commercial
14-Apr-2017	11:41:50	26	36.788102	-75.656636	4	2	4	120°	1	Commercial
14-Apr-2017	11:43:23	27	36.787721	-75.722916	4	2	4	90°	1	Commercial
31-May-2017	13:58:33	47	36.962178	-75.936597	7	1	3	90°	1	Commercial
31-May-2017	14:08:17	51	36.96508	-75.576139	7	1	2	90°	1	Commercial
31-May-2017	14:11:39	52	36.964872	-75.445628	7	1	3	90°	1	Commercial
31-May-2017	14:27:45	55	36.911403	-75.369787	6	1	3	90°	1	Commercial
31-May-2017	14:32:36	57	36.909705	-75.548643	6	1	4	90°	1	Commercial
31-May-2017	15:09:10	62	36.915414	-75.192184	6	1	4	130°	1	Commercial
31-May-2017	15:23:23	66	36.792532	-75.599993	4	1	4	90°	1	Commercial
31-May-2017	16:12:49	78	36.608622	-75.768738	1	1	4	90°	1	Commercial
1-Jun-2017	9:14:18	3	36.548659	-75.762566	0	1	4	90°	1	Commercial
1-Jun-2017	11:15:16	59	36.850044	-75.875497	5	1	3	90°	1	Commercial
1-Jun-2017	13:23:33	67	36.908023	-75.556051	6	1	4	90°	1	Commercial
1-Jun-2017	14:27:21	102	37.095971	-75.18859	9	1	4	90°	1	Commercial
22-Jun-2017	10:33:46	8	36.670904	-75.666596	2	3	3	90°	1	Commercial
22-Jun-2017	11:49:05	21	36.852486	-75.403875	5	2	3	60°	1	Commercial
22-Jun-2017	12:16:19	29	36.906959	-75.535202	6	2	4	90°	1	Commercial
22-Jun-2017	12:41:22	33	36.968864	-75.500745	7	2	3	80°	1	Commercial
22-Jun-2017	12:44:25	34	36.968678	-75.609827	7	2	3	70°	1	Commercial
11-Jan-2017	15:26:44	56	37.026129	-75.407162	8	2	2	80°	1	Commercial
26-Mar-2017	15:27:02	63	36.791982	-75.929444	4	1	3	90°	1	Commercial
31-May-2017	15:02:33	51	36.847548	-75.290291	5	1	2	80°	1	Military
31-May-2017	15:03:00	53	36.84758	-75.272321	5	1	2	90°	1	Military
21-Feb-2017	10:31:11	11	36.905692	-75.089626	6	2	4	110°	1	Military
21-Feb-2017	10:39:07	12	36.905515	-75.437169	6	2	3	45°	1	Military
21-Feb-2017	11:23:24	25	37.027648	-75.088279	8	2	3	30°	1	Military

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
21-Feb-2017	16:05:55	64	36.845921	-75.461406	5	1	3	30°	2	Military
24-Feb-2017	13:42	17	36.671964	-75.464784	2	1	3	90°	1	Military
24-Feb-2017	14:45	31	36.788434	-75.782950	4	1	4	90°	1	Military
24-Feb-2017	14:55	33	36.790656	-75.401266	4	1	2	90°	1	Military
24-Feb-2017	15:26	43	36.909576	-75.931506	6	1	3	110°	1	Military
26-Mar-2017	14:43:28	54	36.670406	-75.871857	2	1	3	80°	1	Military
26-Mar-2017	15:27:14	64	36.79009	-75.922627	4	1	2	15°	1	Military
26-Mar-2017	16:00:26	71	36.845749	-75.569702	5	1	4	15°	1	Military
13-Apr-2017	13:38:21	21	36.845022	-75.776671	5	3	1	125°	1	Military
14-Apr-2017	9:58:43	11	37.027058	-75.468856	8	1	4	45°	1	Military
14-Apr-2017	10:07:16	16	37.024154	-75.845955	8	1	3	15°	1	Military
14-Apr-2017	10:49:18	30	36.908741	-75.399519	6	1	4	45°	1	Military
14-Apr-2017	11:41:15	50	36.788055	-75.633522	4	1	2	15°	1	Military
31-May-2017	15:02:46	52	36.847527	-75.281661	5	1	2	90°	1	Military
31-May-2017	16:14:47	75	36.609859	-75.695068	1	1	4	90°	1	Military
1-Jun-2017	9:12:45	3	36.549395	-75.829077	0	1	3	60°	1	Military
1-Jun-2017	9:46:31	22	36.612561	-75.693179	1	1	2	30°	1	Military
1-Jun-2017	10:54:56	70	36.795654	-75.163872	4	1	2	15°	1	Military
1-Jun-2017	13:14:18	98	36.90421	-75.942779	6	1	3	130°	1	Military
24-Feb-2017	13:18:16	7	36.610078	-75.429198	1	1	4	90°	1	Military
13-Apr-2017	10:52:25	9	36.968837	-75.938359	7	3	4	90°	1	Military
13-Apr-2017	10:54:08	11	36.969079	-75.881617	7	3	4	90°	1	Military
13-Apr-2017	13:35:35	20	36.84366	-75.878183	5	3	3	45°	1	Military
13-Apr-2017	14:17:46	28	36.786955	-75.762606	4	3	3	90°	1	Military
13-Apr-2017	14:18:48	29	36.786706	-75.805723	4	3	2	90°	1	Military
31-May-2017	15:29:11	67	36.789571	-75.819796	4	1	3	90°	1	Military
31-May-2017	15:50:07	72	36.727589	-75.766656	3	1	3	45°	1	Military
31-May-2017	16:02:21	75	36.672084	-75.708668	2	1	2	15°	1	Military
1-Jun-2017	10:01:24	23	36.668907	-75.561683	2	1	2	90°	1	Military
14-Apr-2017	11:05:26	22	36.842977	-75.941857	5	2	3	80°	1	Military
11-Jan-2017	9:28:54	3	36.864506	-75.799027	5	2	2	90°	1	Other
11-Jan-2017	15:15:45	54	37.02503	-75.835074	8	2	1	90°	1	Other
11-Jan-2017	15:23:54	55	37.025812	-75.518522	8	2	3	90°	1	Other
21-Feb-2017	10:42:42	14	36.905309	-75.592034	6	2	4	90°	1	Other

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
21-Feb-2017	11:10:37	19	36.969591	-75.397200	7	2	3	100°	1	Other
21-Feb-2017	11:51:52	33	37.023371	-75.867360	8	2	3	45°	1	Other
21-Feb-2017	13:44:49	38	37.085533	-75.693310	9	2	3	90°	1	Other
21-Feb-2017	13:46:35	39	37.085845	-75.626901	9	2	3	90°	1	Other
21-Feb-2017	14:30:36	47	37.140816	-75.687732	10	2	3	60°	2	Other
21-Feb-2017	15:08:58	57	37.263666	-75.339301	12	1	3	90°	1	Other
21-Feb-2017	15:24:33	60	37.325232	-75.682469	13	1	2	30°	1	Other
24-Feb-2017	14:42	30	36.787017	-75.886239	4	1	3	90°	1	Other
26-Mar-2017	10:08:50	5	37.322912	-75.195566	13	1	3	70°	1	Other
26-Mar-2017	10:57:36	19	37.207322	-75.277829	11	1	3	90°	1	Other
26-Mar-2017	11:09:02	24	37.146582	-75.363375	10	1	2	60°	1	Other
26-Mar-2017	11:53:33	33	37.031417	-75.181092	8	1	3	60°	1	Other
26-Mar-2017	11:58:08	36	37.029503	-75.347775	8	1	2	30°	1	Other
26-Mar-2017	12:02:07	39	37.028608	-75.494052	8	1	3	60°	1	Other
27-Mar-2017	9:34:21	3	37.08921	-75.483841	9	2	4	90°	1	Other
27-Mar-2017	10:55:41	22	36.905751	-75.718879	6	2	1	90°	1	Other
27-Mar-2017	11:40:32	27	36.786982	-75.829191	4	2	3	90°	5	Other
13-Apr-2017	10:16:20	3	37.323276	-75.371905	13	3	3	90°	1	Other
13-Apr-2017	10:54:43	9	36.969512	-75.859740	7	3	3	90°	1	Other
13-Apr-2017	15:55:50	33	36.550764	-75.805777	0	3	3	125°	1	Other
14-Apr-2017	9:32:23	3	37.088264	-75.749979	9	1	3	90°	1	Other
14-Apr-2017	9:56:42	8	37.027411	-75.370877	8	1	2	100°	1	Other
14-Apr-2017	10:01:49	13	37.026413	-75.609388	8	1	3	15°	1	Other
14-Apr-2017	10:16:07	20	36.967281	-75.834639	7	1	2	30°	1	Other
14-Apr-2017	10:16:40	21	36.968484	-75.815361	7	1	3	90°	1	Other
14-Apr-2017	10:29:13	23	36.968607	-75.378208	7	1	3	60°	1	Other
14-Apr-2017	10:50:53	31	36.908383	-75.467318	6	1	3	30°	1	Other
14-Apr-2017	10:56:09	35	36.906599	-75.693901	6	1	1	15°	1	Other
14-Apr-2017	10:57:03	36	36.906412	-75.732400	6	1	3	45°	2	Other
14-Apr-2017	10:57:37	37	36.906523	-75.756223	6	1	3	15°	1	Other
14-Apr-2017	10:59:18	38	36.905362	-75.828833	6	1	2	15°	1	Other
14-Apr-2017	11:00:40	39	36.904743	-75.886872	6	1	3	20°	1	Other
14-Apr-2017	11:05:45	42	36.840641	-75.929867	5	1	2	30°	1	Other
14-Apr-2017	11:17:45	45	36.848146	-75.508851	5	1	3	90°	1	Other

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
14-Apr-2017	11:46:10	51	36.78783	-75.843359	4	1	2	30°	1	Other
31-May-2017	9:42:49	3	37.32178	-75.633164	13	2	3	90°	1	Other
31-May-2017	10:11:59	6	37.26754	-75.678699	12	2	3	90°	2	Other
31-May-2017	10:18:18	9	37.204245	-75.754542	11	2	1	90°	1	Other
31-May-2017	14:01:07	36	36.963407	-75.844589	7	2	3	90°	1	Other
31-May-2017	15:43:04	64	36.793635	-75.914052	4	1	3	80°	1	Other
1-Jun-2017	9:16:24	4	36.549015	-75.675391	0	1	2	30°	1	Other
1-Jun-2017	9:53:59	25	36.667845	-75.871963	2	1	3	150°	6	Other
1-Jun-2017	10:31:55	52	36.729916	-75.855365	3	1	3	30°	5	Other
1-Jun-2017	10:36:08	55	36.785028	-75.931335	4	1	2	120°	3	Other
1-Jun-2017	10:39:48	57	36.787763	-75.777718	4	1	3	90°	1	Other
1-Jun-2017	10:40:28	58	36.788156	-75.75008	4	1	3	90°	2	Other
1-Jun-2017	11:12:44	88	36.849221	-75.775297	5	1	2	90°	1	Other
1-Jun-2017	11:15:12	89	36.84859	-75.871533	5	1	2	30°	1	Other
1-Jun-2017	11:15:41	90	36.848517	-75.890117	5	1	3	60°	3	Other
1-Jun-2017	11:16:31	91	36.848272	-75.922845	5	1	2	30°	6	Other
1-Jun-2017	13:14:38	99	36.905035	-75.92885	6	1	2	90°	1	Other
1-Jun-2017	13:14:55	100	36.904594	-75.916698	6	1	4	150°	3	Other
1-Jun-2017	13:15:57	101	36.904549	-75.873957	6	1	2	90°	1	Other
1-Jun-2017	13:57:14	149	36.966055	-75.809165	7	1	3	110°	1	Other
22-Jun-2017	10:28:29	12	36.668976	-75.876219	2	2	3	90°	1	Other
22-Jun-2017	11:17:42	31	36.785484	-75.910379	4	2	3	45°	1	Other
22-Jun-2017	11:18:04	32	36.786781	-75.896231	4	2	3	90°	1	Other
22-Jun-2017	11:18:38	33	36.786031	-75.873282	4	2	2	30°	1	Other
22-Jun-2017	11:27:56	36	36.790564	-75.492756	4	2	2	90°	1	Other
22-Jun-2017	12:00:44	42	36.849585	-75.839379	5	2	3	60°	1	Other
22-Jun-2017	12:54:27	54	36.965349	-75.965897	7	2	3	135°	1	Other
22-Jun-2017	14:52:32	63	37.023969	-75.836473	8	2	0	90°	1	Other
22-Jun-2017	14:53:27	64	37.023652	-75.797954	8	2	3	135°	1	Other
22-Jun-2017	15:32:19	80	37.089451	-75.799216	9	2	3	90°	1	Other
22-Jun-2017	16:51:41	108	37.326706	-75.671710	13	2	3	30°	1	Other
12-Jan-2017	11:46:24	28	36.970853	-75.929059	7	2	2	90°	1	Other
31-May-2017	14:58:25	47	36.84716	-75.458728	5	1	3	70°	1	Other
24-Feb-2017	15:26:20	29	36.910747	-75.953894	6	1	3	90°	1	Other

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
14-Apr-2017	11:45:28	28	36.787059	-75.811694	4	2	3	90°	1	Other
31-May-2017	11:56:48	40	37.027826	-75.831042	8	1	3	60°	1	Other
22-Jun-2017	16:17:30	64	37.205152	-75.744419	11	1	3	90°	1	Other
11-Jan-2017	9:30:37	4	36.86648	-75.723137	5	2	3	80°	1	Other
11-Jan-2017	15:17:32	48	37.025356	-75.765931	8	2	3	90	1	Other
11-Jan-2017	15:51:31	51	37.086517	-75.503984	9	2	4	90	1	Other
12-Jan-2017	10:02:42	8	37.20594	-75.664460	11	2	4	90°	1	Other
21-Feb-2017	11:45:24	19	37.025895	-75.572452	8	2	3	80°	1	Other
21-Feb-2017	11:46:42	20	37.025739	-75.63207	8	2	4	110°	1	Other
21-Feb-2017	13:40:42	25	37.083043	-75.844704	9	1	3	90°	1	Other
21-Feb-2017	14:41:10	35	37.205866	-75.66925	11	2	3	90°	1	Other
21-Feb-2017	14:45:49	37	37.206579	-75.498603	11	1	4	90°	1	Other
24-Feb-2017	14:07:52	14	36.72653	-75.741785	3	1	3	80°	1	Other
24-Feb-2017	14:45:36	19	36.788453	-75.765832	4	1	3	90°	1	Other
24-Feb-2017	15:21:15	25	36.84267	-75.870898	5	1	4	90°	1	Other
24-Feb-2017	15:22:21	26	36.841892	-75.916625	5	1	3	90°	1	Other
26-Mar-2017	11:59:38	23	37.028384	-75.400763	8	1	3	90°	1	Other
26-Mar-2017	16:06:22	44	36.842986	-75.811996	5	2	3	90°	1	Other
27-Mar-2017	10:59:18	17	36.905111	-75.844354	6	2	4	90°	1	Other
27-Mar-2017	11:03:05	20	36.844432	-75.848637	5	2	2	90°	1	Other
27-Mar-2017	11:05:24	21	36.845053	-75.746736	5	2	1	90°	1	Other
27-Mar-2017	11:17:51	24	36.850148	-75.197052	5	2	3	90°	1	Other
13-Apr-2017	10:52:48	10	36.968983	-75.926116	7	3	3	90°	1	Other
13-Apr-2017	14:49:56	32	36.725259	-75.046020	3	3	4	15°	1	Other
13-Apr-2017	15:08:01	36	36.668677	-75.777047	2	3	3	90°	1	Other
14-Apr-2017	10:19:04	11	36.968602	-75.731147	7	2	4	90°	1	Other
14-Apr-2017	11:02:34	18	36.904494	-75.967856	6	2	3	90°	1	Other
14-Apr-2017	11:05:22	21	36.843057	-75.944360	5	2	3	110°	1	Other
14-Apr-2017	11:45:52	29	36.786928	-75.829316	4	2	3	125°	1	Other
31-May-2017	9:41:18	2	37.320415	-75.696076	13	2	3	90°	1	Other
31-May-2017	11:57:10	41	37.028062	-75.845041	8	1	3	90°	1	Other
31-May-2017	13:59:23	48	36.962724	-75.907046	7	1	3	45°	1	Other
31-May-2017	14:29:51	56	36.910555	-75.447248	6	1	3	90°	1	Other
1-Jun-2017	9:45:22	20	36.613279	-75.651835	1	1	1	90°	1	Other

Date	Time	Waypoint	Latitude	Longitude-1	Track Number	BSS	Angle out	Degree Forward	Best #	Comments
1-Jun-2017	10:29:59	41	36.73015	-75.778728	3	1	4	90°	1	Other
1-Jun-2017	10:32:23	42	36.729804	-75.873540	3	1	2	90°	1	Other
1-Jun-2017	11:16:18	61	36.849456	-75.916337	5	2	3	90°	1	Other
1-Jun-2017	13:40:47	79	36.967671	-75.380269	7	1	3	90°	3	Other
1-Jun-2017	14:53:14	115	37.146841	-75.70735	10	1	3	90°	1	Other
22-Jun-2017	11:17:54	15	36.785015	-75.898334	4	3	2	80°	1	Other
22-Jun-2017	11:20:59	17	36.785185	-75.772831	4	3	3	90°	4	Other
22-Jun-2017	12:00:28	24	36.849458	-75.831937	5	2	3	60°	1	Other
22-Jun-2017	12:02:57	25	36.848673	-75.925771	5	2	2	90°	1	Other
22-Jun-2017	12:11:34	28	36.903859	-75.723002	6	2	2	90°	4	Other
22-Jun-2017	12:37:52	32	36.970236	-75.375187	7	2	3	90°	1	Other