

Aerial Surveys for Protected Marine Species in the Norfolk Canyon Region: 2016 Annual Progress Report

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Sperm whales (*Physeter macrocephalus*). Photo collected by the University of North Carolina Wilmington under NOAA Scientific Permit # 16473.

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Acronyms and Abbreviations

| | |
|---------|--|
| BSS | Beaufort Sea State |
| FACSFAC | Fleet Area Control and Surveillance Facility |
| km | kilometer(s) |
| m | meter(s) |
| SD | standard deviation |
| U.S. | United States |

1. Introduction

This report forms part of a multi-institutional monitoring project intended to provide information on the species composition, population identity, density, and baseline behavior of marine mammals and sea turtles present in United States (U.S.) Navy range complexes along the U.S. Atlantic Coast. This program began in 2007, with baseline aerial and vessel surveys, as well as a passive acoustic monitoring component in Onslow Bay, North Carolina, and has since expanded to include survey areas off Jacksonville, Florida, Cape Hatteras, North Carolina and Norfolk, Virginia. In Onslow Bay, six years of monitoring yielded a comprehensive picture of the density, distribution, and abundance of marine mammals and sea turtles and provided new insights into residency patterns among pelagic delphinid cetaceans in this region ([Read et al. 2014](#)). More than seven years of monitoring off Jacksonville have provided similar information on the density and distribution of marine mammals and sea turtles in this area. Off Cape Hatteras, almost six years of surveys have provided information on the complex patterns of distribution and diversity of the marine mammals and sea turtles in this highly productive area. In 2015, the Cape Hatteras survey area was modified to better serve the operational needs of the Atlantic Fleet Training and Testing program. The northern portion of the survey area was extended into Virginia to include Norfolk Canyon; southern tracklines #20–33 of the Cape Hatteras area were dropped to balance this shift in effort. In 2016, these two survey areas were designated as unique entities—Cape Hatteras, composed of 12 tracklines (#34–45), and Norfolk Canyon, composed of 16 tracklines (#46–61). The current report builds on this past body of work and describes monitoring activities in the newly designated Norfolk Canyon survey in 2016.

2. Summary of Norfolk Canyon Aerial Surveys

This document is an annual progress report to the U.S. Department of the Navy on aerial surveys conducted in the Norfolk Canyon, Virginia survey area from January through December 2016. The objective was to conduct two days of effort each month, each day flying a subset of the 16 tracklines that cover the area.

In 2016 survey effort occurred in all 12 months. At least two survey days were achieved for 5 of the 12 months (February, May, July, August, and October). A full day of effort occurred in March and December. Partial effort was conducted in January, April, June, September, and November. Limited effort occurred in these months as a result of deteriorating weather conditions. A total of 99 tracklines (7,089.25 kilometers [km]) over 18 days was covered in the Norfolk Canyon survey area during this reporting period.

A total of 122 sightings of 4,434 cetaceans was encountered while on effort during the 18 days of aerial surveys. Thirteen species of cetaceans were photo-documented, including bottlenose dolphins (*Tursiops truncatus*; 29 sightings for 701 individuals), short-finned pilot whales (*Globicephala macrorhynchus*; 26 sightings for 366 individuals), short-beaked common dolphins (*Delphinus delphis*; 21 sightings for 2,444 individuals), Atlantic spotted dolphins (*Stenella frontalis*; 10 sightings for 298 individuals), Risso's dolphins (*Grampus griseus*; 8 sightings for 194 individuals), fin whale (*Balaenoptera physalus*, 8 sightings for 11 individual), sperm whales (*Physeter macrocephalus*; 6 sightings for 11 individuals), humpback whale (*Megaptera*

novaeangliae, 2 sightings for 5 individuals), striped dolphins (*Stenella coeruleoalba*, 1 sighting of 350 individuals), Clymene dolphins (*Stenella clymene*, 1 sighting of 20 individuals), mesoplodont beaked whales (*Mesoplodon* sp.; 1 sighting of 3 individuals), Cuvier's beaked whales (*Ziphius cavirostris*; 1 sighting of 1 individuals), and a single minke whale (*Balaenoptera acutorostrata*). There were 7 sightings (28 individuals) where delphinid species identity could not be established with 100 percent certainty, and these were recorded as "unidentified delphinid."

Seventeen off-effort sightings were also recorded. These included 8 sightings of short-finned pilot whales (92 individuals), 3 sightings of humpback whales (5 individuals), 2 sightings of bottlenose dolphins (78 individuals), 2 sightings of fin whales (2 individuals), 1 sighting of mesoplodont beaked whales (4 individuals), and 1 Cuvier's beaked whale sighting (2 individuals). These off-effort sightings are included in species sighting maps and tables but are excluded from all other calculations.

One hundred and six sightings totaling 156 sea turtles were recorded during this survey period, 146 identified as loggerhead (*Caretta caretta*) and 10 as leatherback (*Dermochelys coriacea*) turtles. Sea turtles were detected during 9 of 18 survey days, with highest abundances observed in July and August.

While survey conditions were dominated by Beaufort Sea State (BSS) 1 to 3, at times surveys were conducted in higher sea states. Other aerial surveys have demonstrated that the rate of cetacean sightings is negatively affected by an increase in the BSS (e.g., DeMaster et al. 2001; Gómez de Segura et al. 2006; McAlarney et al. 2016). Effort-corrected cetacean sighting rates this year at the Norfolk Canyon site followed this general trend—sighting rates dropped from 44.5 to 6.6 sightings per 1,000 km as BSS increased from 1 to 4. Sea turtle sightings showed a more dramatic decrease in sighting rate in seas greater than a BSS 2.

In addition to cetaceans and sea turtles, other pelagic marine vertebrates (e.g., manta rays [*Manta birostris*], cownose rays [*Rhinoptera bonasus*], ocean sunfish [*Mola mola*], and sharks were observed. Commercial, military, and recreational vessels were also encountered in the survey area.

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

3. Methods

3.1 Survey Design and Logistics

Aerial survey effort was initiated in the waters off Cape Hatteras, North Carolina, in May 2011 to assess the distribution and abundance of offshore cetacean species and sea turtles. These surveys were included in the U.S. Navy's Atlantic Fleet Training and Testing Monitoring Program, established to document marine species that could potentially be impacted by naval activities. In 2015, the survey area was extended north, following the shelf break, into waters offshore of Virginia to include Norfolk Canyon (**Figure 1**). In 2016, these two areas were designated as separate entities: Cape Hatteras survey area south and Norfolk Canyon survey

area north. Both of these survey areas lie within the airspace of the Virginia Capes Operation Area (VACAPES) Fleet Area Control and Surveillance Facility (FACSFAC) in Virginia Beach (**Figure 2**). As this is controlled airspace, FACSFAC the morning of planned survey flights for information on area closures or restriction. Survey plans are modified to avoid interacting with any area activities. During this reporting period, the team recorded six days in which military exercises in VACAPES caused closures of the intended survey site so that survey efforts were shifted or terminated.

The Norfolk Canyon survey area covers approximately 9,700-square kilometers spanning continental shelf waters as well as deeper waters beyond the shelf break (**Table 1, Figure 1**). Placement of the survey area was designed to create continuous coverage of the shelf break from the northern extent of the Cape Hatteras survey area north to above Norfolk Canyon, Virginia. The survey area excludes coastal waters to minimize overlap with other ongoing coastal surveys at the mouth of the Chesapeake Bay. Sixteen tracklines, ranging from 73.2 to 74.3 km in length and orientated east to west, were evenly placed across the survey area at approximately 8.3-km intervals.

The University of North Carolina Wilmington provided experienced aerial observers and contracted Orion Aviation, Siler City, North Carolina, to provide planes and certified pilots. Surveys were conducted using National Oceanic and Atmospheric Administration's Southeast Regional Minimum Aircraft and Crew Provisions Guidelines (NOAA SER 2013), which require that aircraft are Code of Federal Regulations §135 certified and that pilots have demonstrated experience working below 305 meters (m) in support of biological observational studies. Surveys were flown in a Cessna 337 Skymaster, at 305-m altitude and 185-km/hour speed, with a pilot, co-pilot, and two observers. Each observer wore a Nomex® fire-retardant suit, a Switlik® inflatable life jacket, and a personal emergency position-indicating radio beacon, as well as additional safety equipment. An inflatable life raft, plane emergency position-indicating radio beacon, and satellite phone were also onboard at all times. All waypoints were collected using a handheld GPS receiver (Garmin 76) that recorded geographic position, date, and local time (Eastern Standard Time or Eastern Daylight Time as appropriate for the date of a survey). A complete list and description of data recorded in the plane can be found in **Appendix B**. Survey flights originated from the Fixed-base Operator in the Dare County Regional Airport in Manteo, North Carolina, or Signature Aviation in the Norfolk International Airport in Norfolk, Virginia. Utilizing both airports maximized "on-effort" survey time by decreasing transit time to and from the tracklines surveyed.

As marine mammals are the primary focus of these surveys, each sighting was investigated in order to collect photo documentation used to establish species identification. When a sighting was observed the aircraft would record the initial location of the first observation (event code 2.0), and estimate the location of the cue via a verticle and horizontal angle. The plane would then break track, going off-effort and fly over the animals to get their actual location (event code 2.4). Once the sighting had concluded the aircraft would return to the location of our initial observation and rejoin normal, on-effort trackline activity. To estimate sighting distance for each group we enter these two points (2.0 and 2.4) into an excel formula to generate a straight line distance. For sea turtles, other marine life and vessels a single point marking the location of our initial observation of the animals were taken along with verticle and horizontal estimations of its location. For these sightings the aircraft would remain on-effort and not break track.

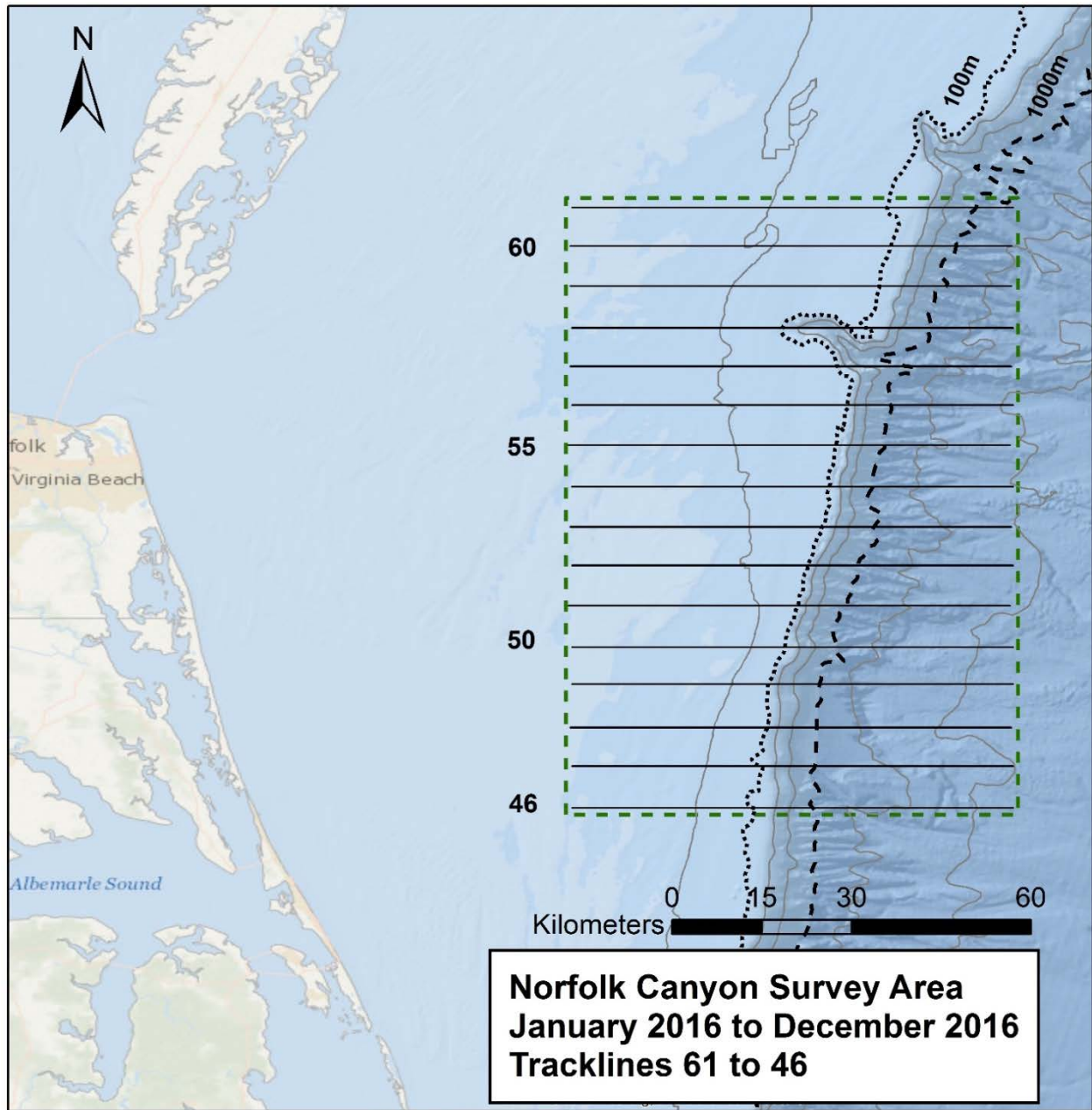


Figure 1. Norfolk Canyon survey area for 2016.

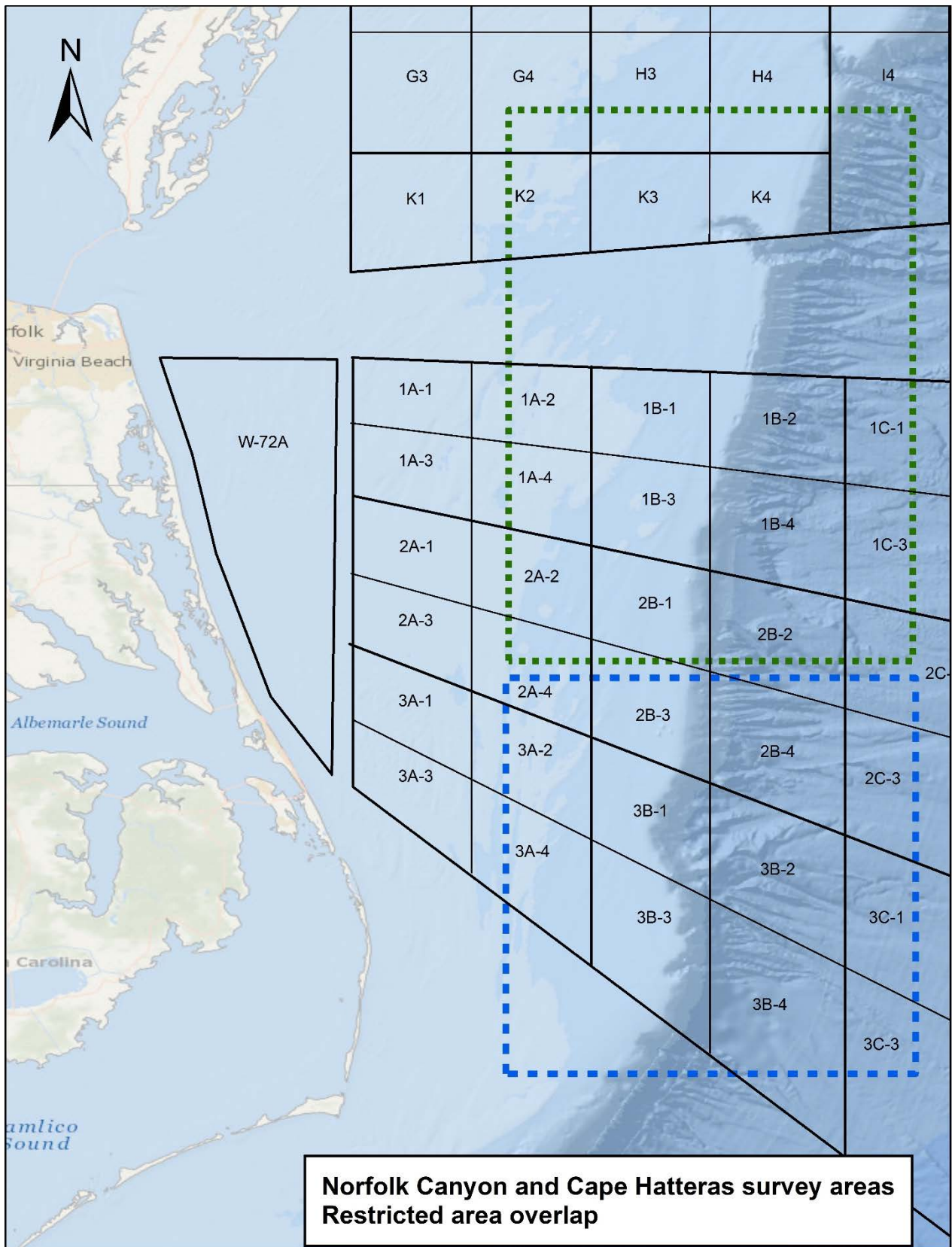


Figure 2. U.S. Navy operational surface grid and warning areas that overlap the Norfolk Canyon (green dotted box) and Cape Hatteras (blue dotted box) survey areas.

Table 1. Coordinates for trackline end points for the Norfolk Canyon survey area.

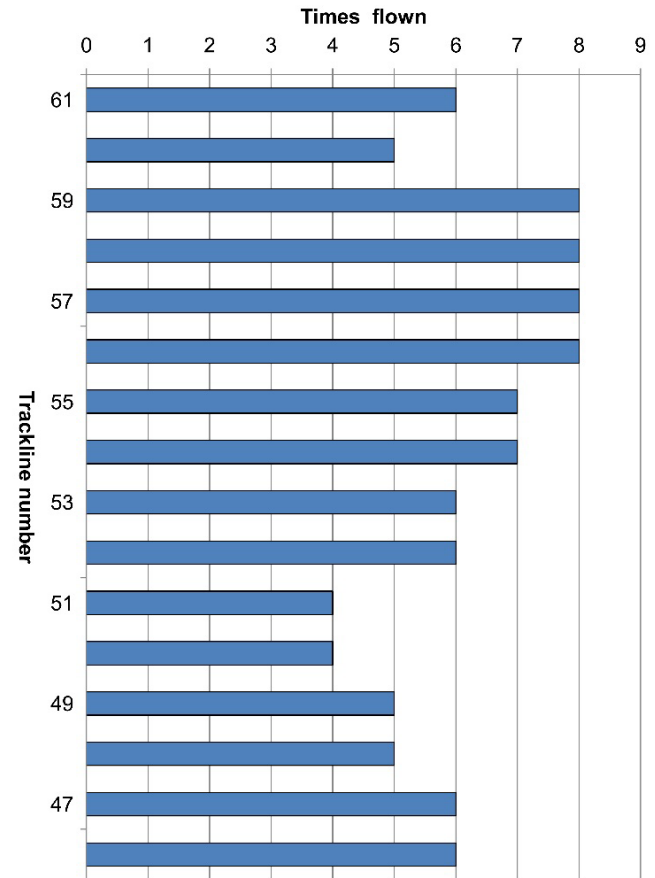
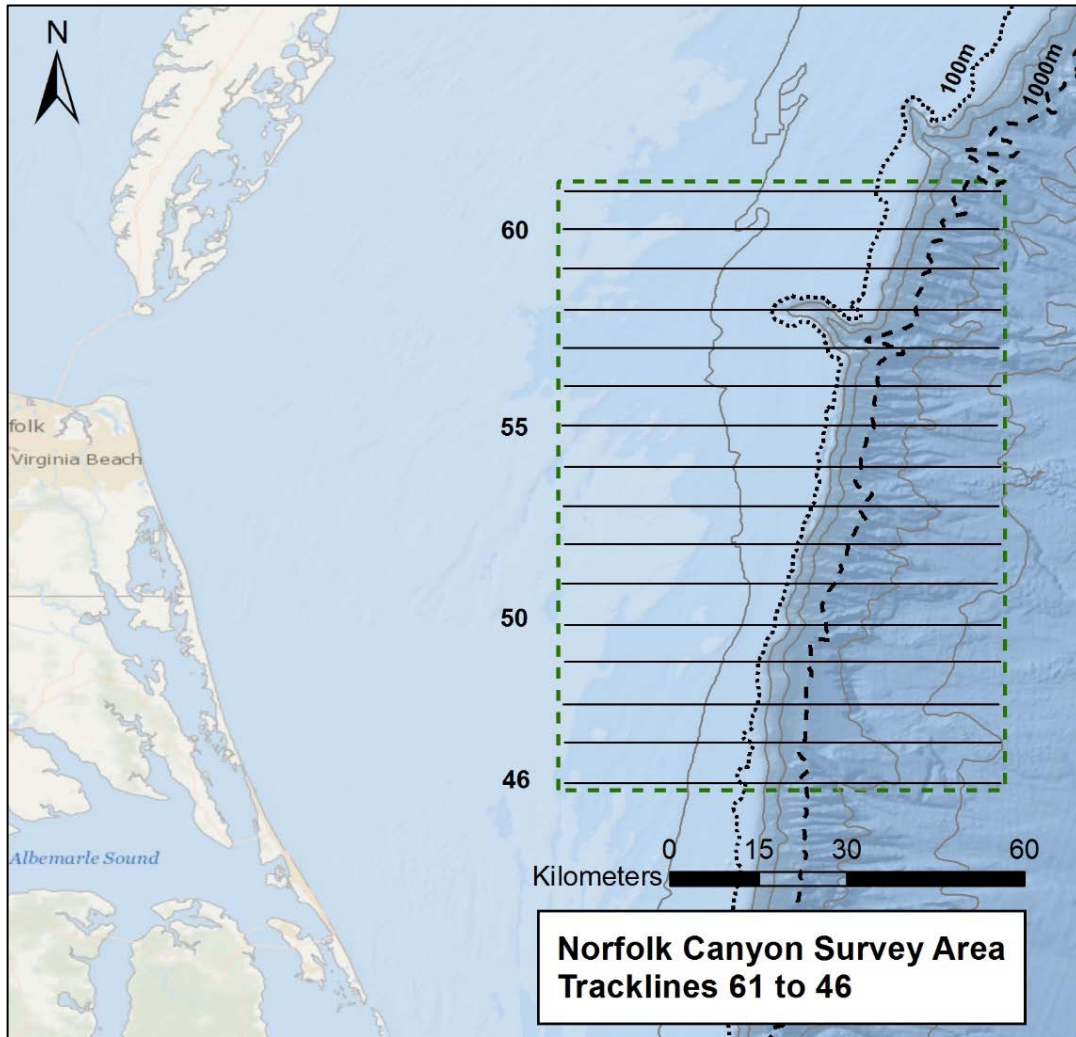
| Transect | Western Waypoint | | Eastern Waypoint | |
|----------|------------------|----------------|------------------|----------------|
| | Latitude (°N) | Longitude (°W) | Latitude (°N) | Longitude (°W) |
| 61 | 37.321320 | -75.161133 | 37.321320 | -74.333672 |
| 60 | 37.246289 | -75.161133 | 37.246384 | -74.333672 |
| 59 | 37.171448 | -75.161133 | 37.171448 | -74.333672 |
| 58 | 37.096512 | -75.161133 | 37.096512 | -74.333672 |
| 57 | 37.021576 | -75.161133 | 37.021576 | -74.333672 |
| 56 | 36.946640 | -75.161133 | 36.946640 | -74.333672 |
| 55 | 36.871704 | -75.161133 | 36.871704 | -74.333672 |
| 54 | 36.796768 | -75.161133 | 36.796768 | -74.333672 |
| 53 | 36.721897 | -75.161133 | 36.721897 | -74.333672 |
| 52 | 36.646942 | -75.161133 | 36.646942 | -74.333672 |
| 51 | 36.571960 | -75.161133 | 36.571960 | -74.333672 |
| 50 | 36.497024 | -75.161133 | 36.497024 | -74.333672 |
| 49 | 36.422088 | -75.161133 | 36.422088 | -74.333672 |
| 48 | 36.347152 | -75.161133 | 36.347152 | -74.333672 |
| 47 | 36.272216 | -75.161133 | 36.272216 | -74.333672 |
| 46 | 36.197280 | -75.161133 | 36.197280 | -74.333672 |

4. Results

Ninety-nine tracklines totaling 7,089.25 km were surveyed from January 2016 to December 2016 (**Table 2, Figure 3**). Conditions during the 18 survey days ranged from BSS 1 to 6 with greater than 70 percent of effort in sea states of BSS 3 or lower [BSS 1: 314.35 km (4.43 percent), BSS 2: 2,361.00 km (33.30 percent), BSS 3: 2,443.00 km (34.46 percent), BSS 4: 1,066.75 km (15.05 percent), BSS 5: 740.05 km (10.44 percent), BSS 6: 164.10 (2.31 percent)] (**Figure 4a and b**). An average BSS value, weighted by distance flown, was calculated for each month as a way to compare conditions across time (**Figure 4c**).

Table 2. Tracklines, km flown, and Hobbs hours (engine-on time) during aerial surveys of the Norfolk Canyon survey area from January 2016 to December 2016. Trackline numbers are listed in the order in which they were flown.

| Date | Tracklines Flown AM | Tracklines Flown PM | Total km Flown | Hobbs Hours |
|----------------|----------------------------|----------------------------|-----------------------|--------------------|
| 30-Jan-2016 | 56 to 59 | N/A | 290.50 | 2.4 |
| 01-Feb-2016 | 55 to 52 | N/A | 294.70 | 2.5 |
| 22-Feb-2016 | 61 to 58 | N/A | 292.20 | 2.2 |
| 09-Mar-2016 | 50 to 53 | 46 and 47 | 418.55 | 5.6 |
| 21-Apr-2016 | 56 to 59 | N/A | 283.95 | 3.3 |
| 09-May-2016 | 59 to 56 | 55 to 52 | 567.95 | 8.3 |
| 20-May-2016 | N/A | 46 to 49 | 296.85 | 2.3 |
| 13-Jun-2016 | 61 to 58 | N/A | 291.95 | 2.4 |
| 07-Jul-2016 | 46 to 49 | 54 to 57 | 585.35 | 6.8 |
| 08-Jul-2016 | 61, 58, 52 to 50 | 53, 59 to 61 | 598.35 | 7.3 |
| 11-Aug-2016 | N/A | 46 to 49 | 286.40 | 3.5 |
| 24-Aug-2016 | 50 to 53 | 54 to 57 | 587.55 | 5.4 |
| 25-Aug-2016 | 57 to 54 | N/A | 283.35 | 3.7 |
| 12-Sep-2016 | N/A | 46 to 49 | 294.45 | 2.5 |
| 03-Oct-2016 | 58 to 61 | N/A | 288.85 | 2.6 |
| 20-Oct-2016 | 50 to 53 | 54 to 57 | 558.40 | 6.9 |
| 03-Nov-2016 | 46 to 49 | N/A | 289.40 | 3.3 |
| 11-Dec-2016 | 58 to 61 | 54 to 57 | 580.50 | 6.4 |
| 18 days | 99 Tracklines | | 7089.25 | 77.4 |



1

2 Figure 3. Survey tracklines and realized effort in the Norfolk Canyon survey area for 2016.

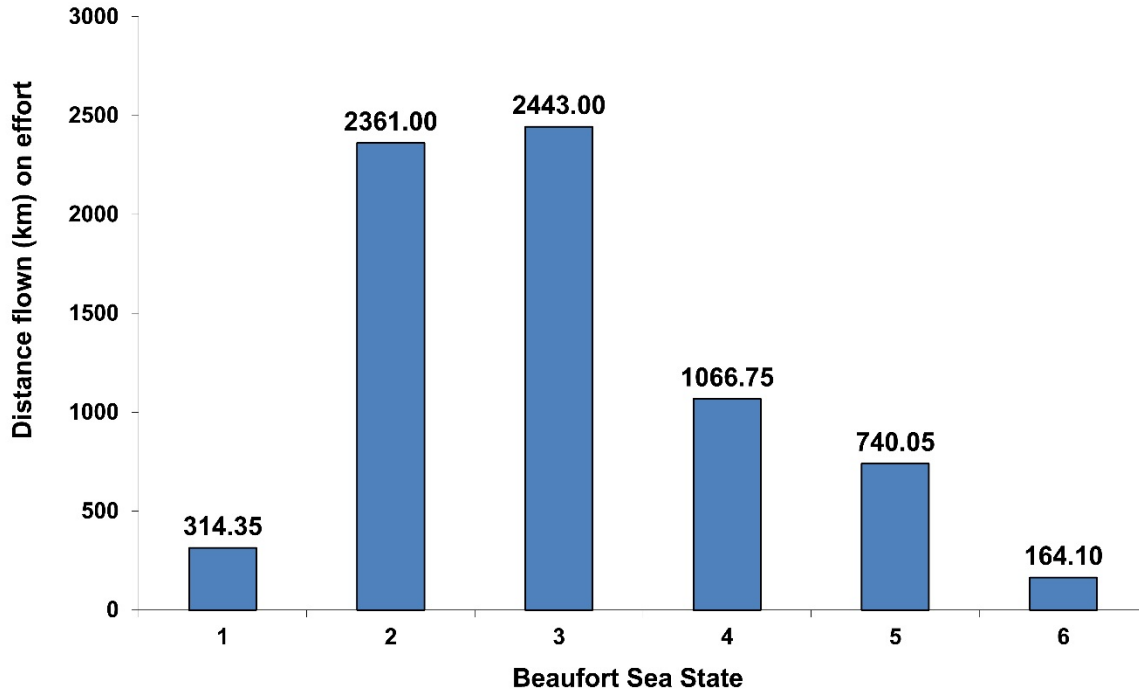


Figure 4a. Total distance surveyed per BSS category during aerial surveys in the Norfolk Canyon survey area in 2016.

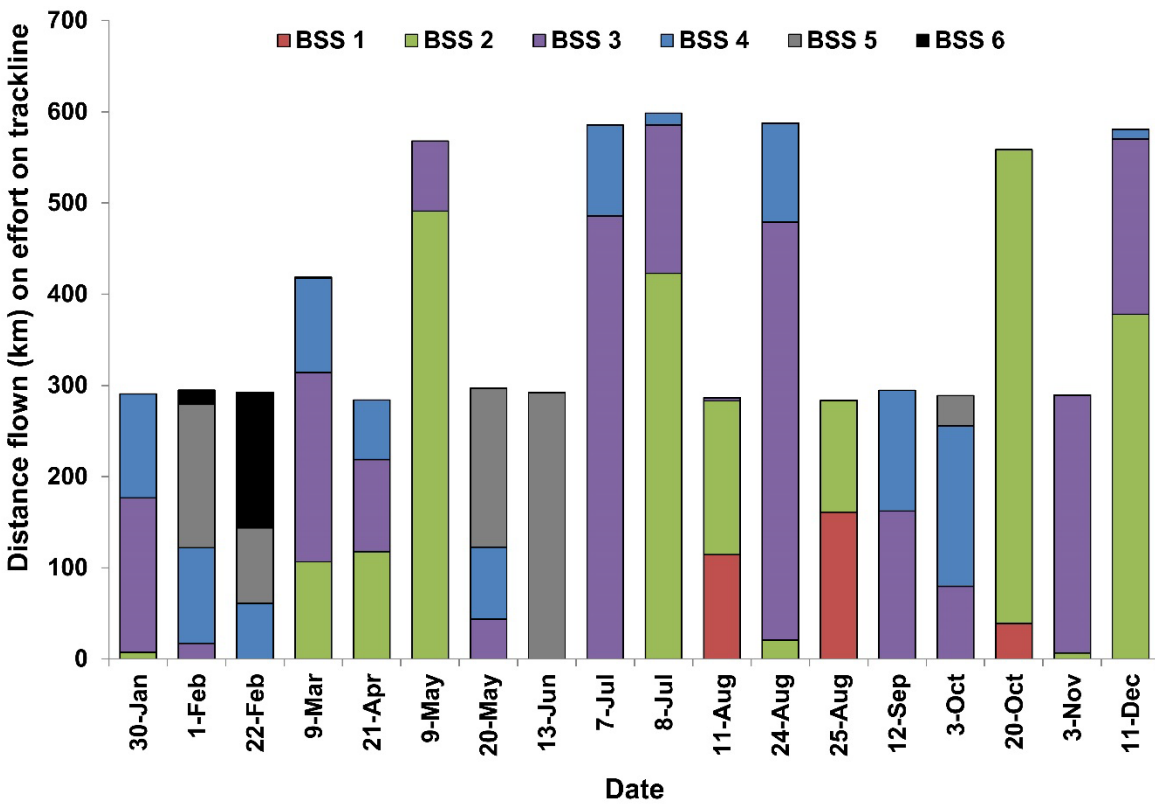


Figure 4b. Effort by BSS category for each survey day during aerial surveys in the Norfolk Canyon survey area in 2016.

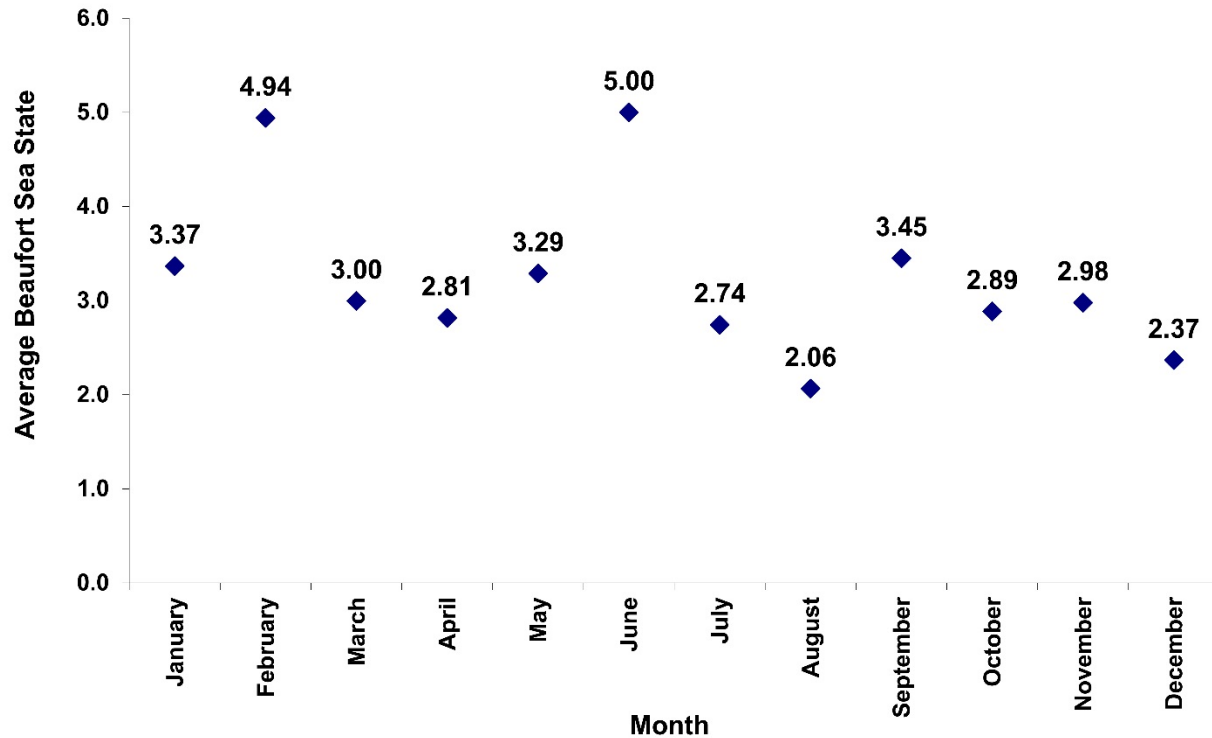


Figure 4c. Distance-weighted average BSS for each month in the Norfolk Canyon survey area in 2016.

The majority of cetacean sightings (94.3 percent) also occurred in BSS of 3 or less (**Figure 5a**). Cetacean sighting rates decreased as BSS increased, with 44.5 sightings/1,000 km surveyed in BSS 1, 33 sightings/1,000 km in BSS 2, 9.4 sightings/1,000 km in BSS 3, and 6.6 sightings/1,000 km in BSS 4 (**Figure 5b**). Sighting rates per month ranged from zero to 35.6/1,000 km. Sighting rate was highest in May, with 31 sightings recorded over 12 tracklines (**Figure 5c**).

Eighty-four percent of the sightings occurred within 1.2 km of the trackline (**Figure 6a**). Mean sighting distance for all cetacean sightings was 0.86 km (standard deviation [SD]=0.55). Mean sighting distances across sea states varied by 0.46 km (**Figure 6b**). Average sighting distances are normally calculated after removing outliers, defined as any value in excess of three SD from the mean (mean=0.86 km, SD=0.55, $0.86 + [3 \times 0.55] = 2.51$ km, outlier > 2.51 km). Two sighting distances were identified as outliers during this reporting period—2.84 and 3.22 km, both record in BSS 4 conditions. In addition, three sightings did not have associated sighting distances and were excluded from these calculations. The remaining 117 sighting distances are represented in **Figures 6a and b**.

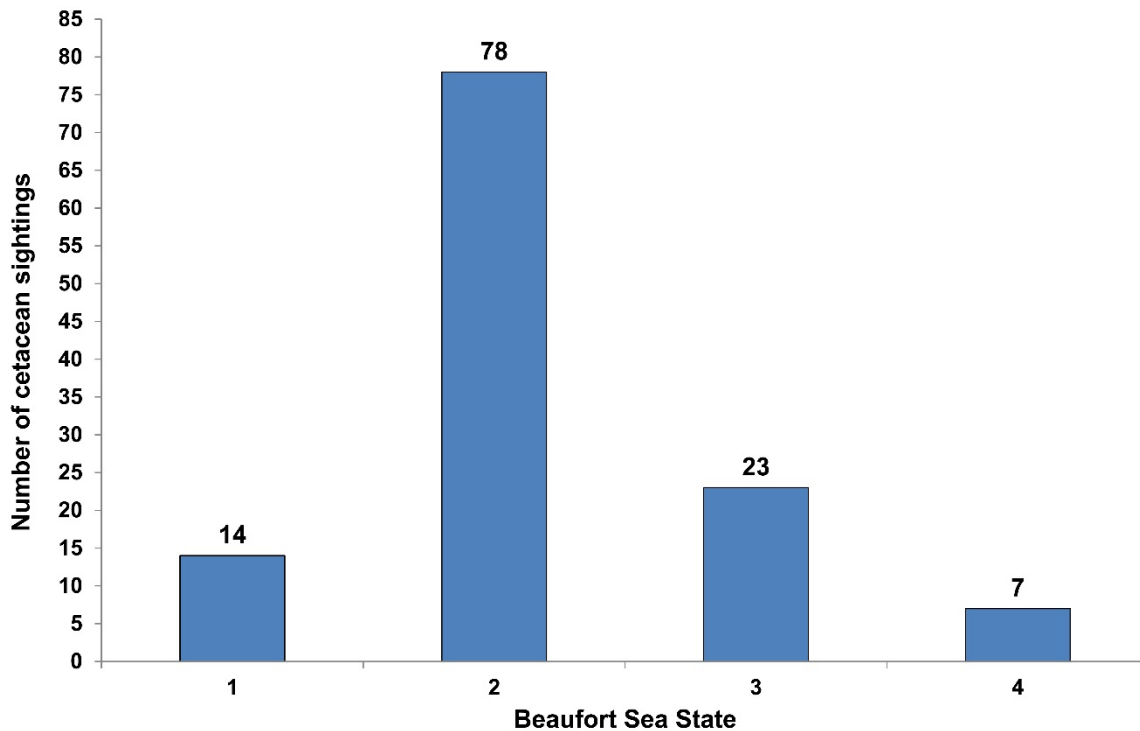


Figure 5a. Number of cetacean sightings per Beaufort Sea State category during aerial surveys in the Norfolk Canyon survey area in 2016.

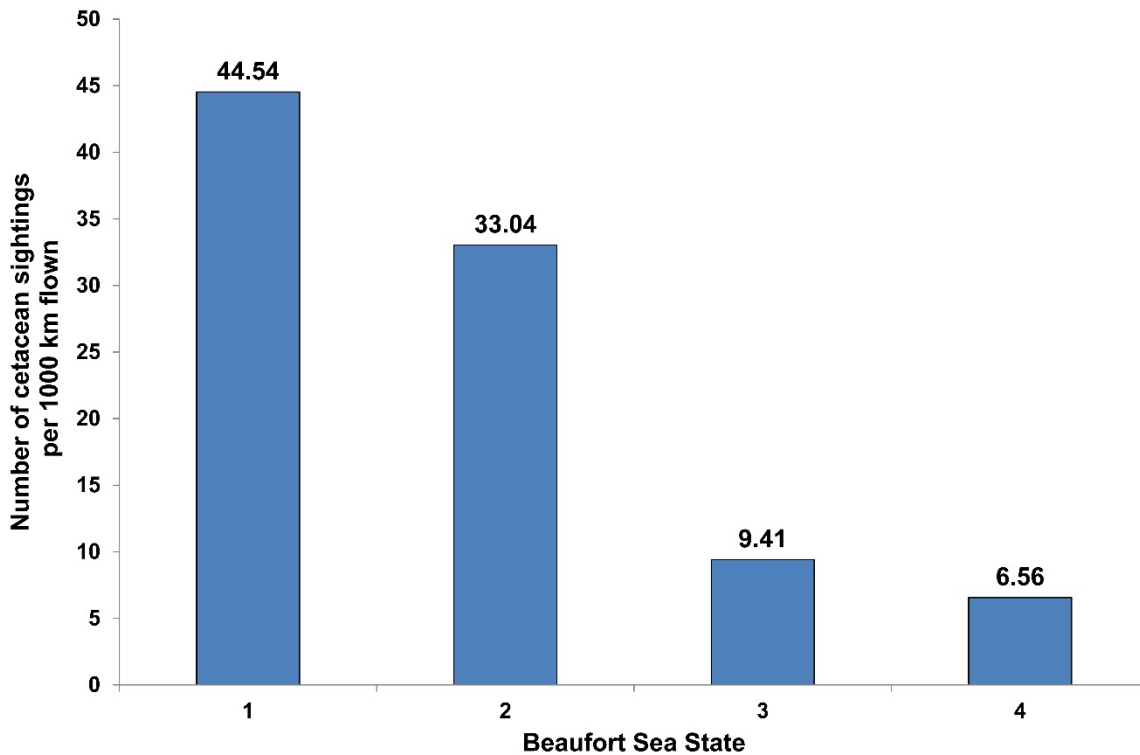


Figure 5b. Cetacean sightings per 1,000 km flown by BSS category during aerial surveys in the Norfolk Canyon survey area in 2016.

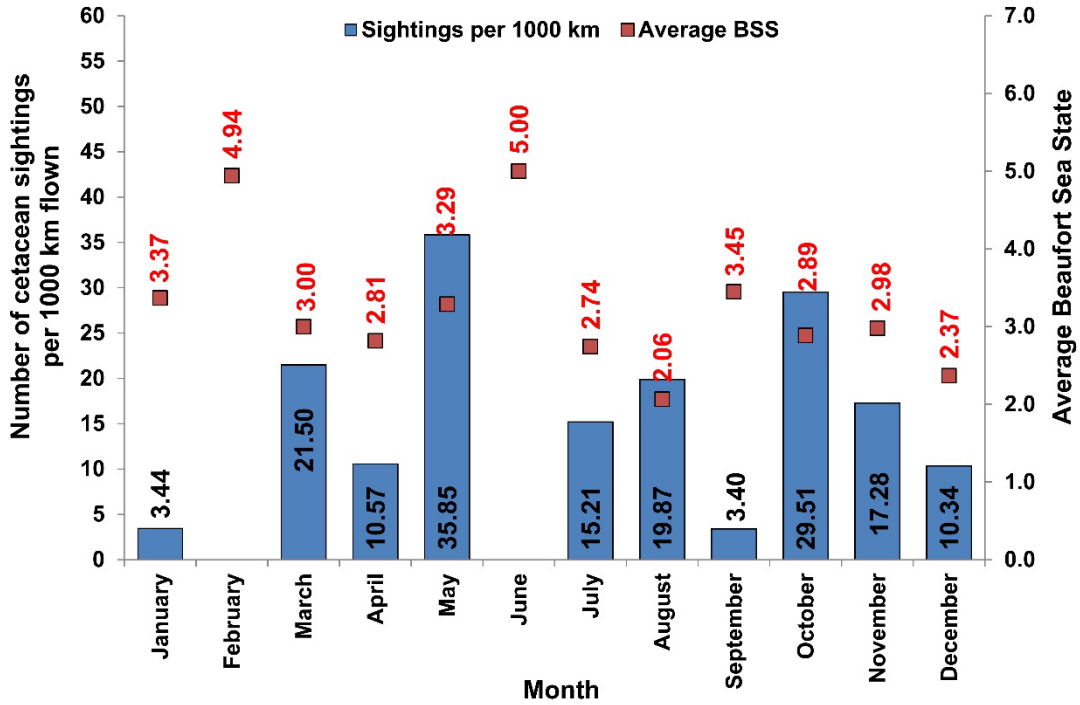


Figure 5c. Cetacean sightings per 1,000 km surveyed and the average BSS per month during aerial surveys in the Norfolk Canyon survey area in 2016.

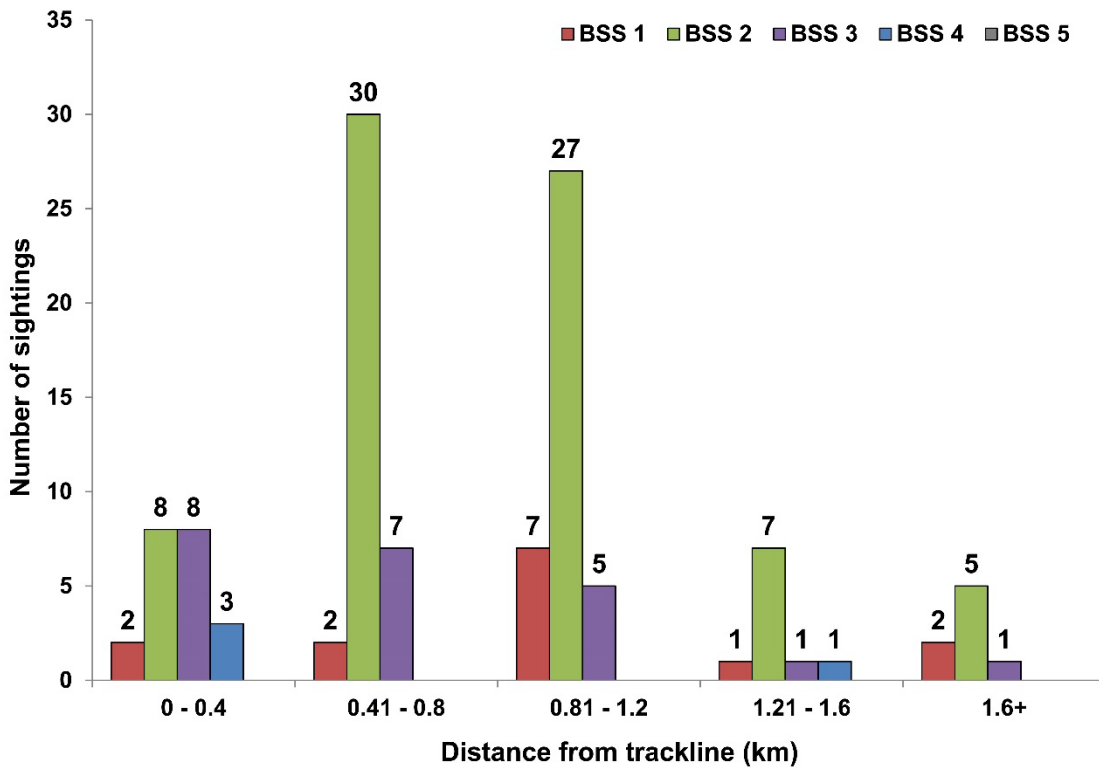


Figure 6a. Sighting distances by BSS category for 117 of 122 on-effort cetacean sightings from during aerial surveys in the Norfolk Canyon survey area in 2016.

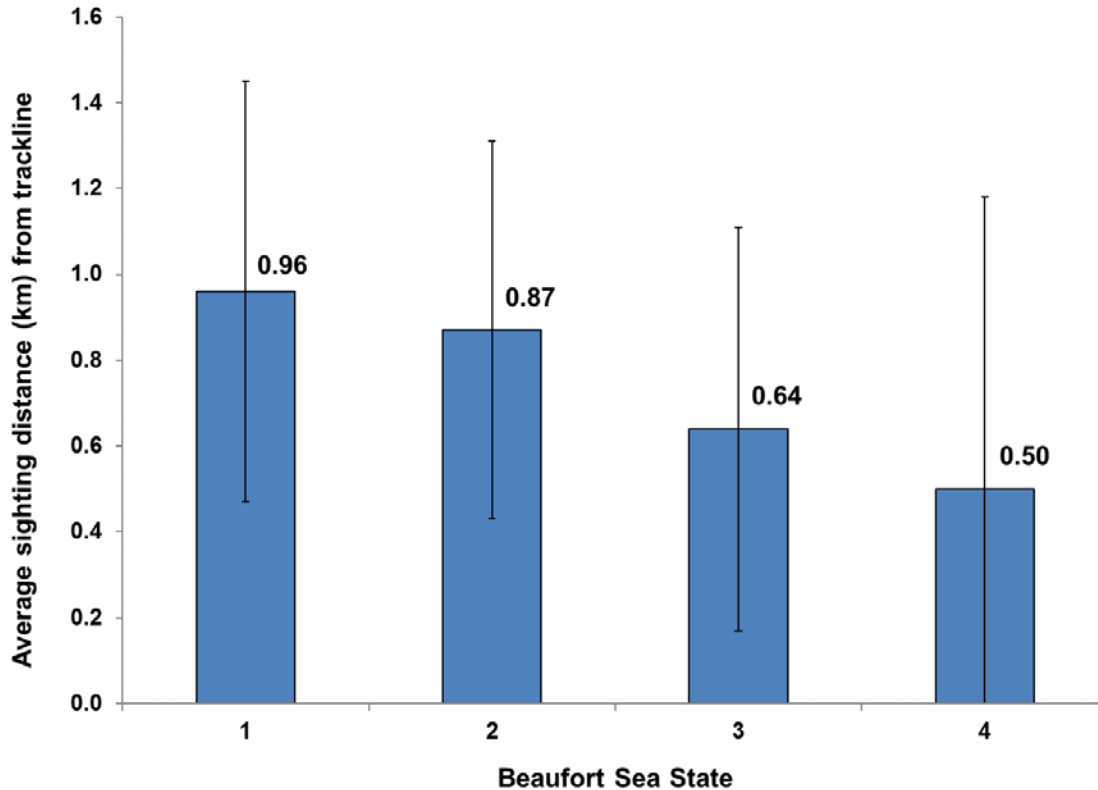


Figure 6b. Average sighting distances by BSS for 117 of 122 on-effort cetacean sightings during aerial surveys in the Norfolk Canyon survey area in 2016. Error bars denote standard deviation for each category.

4.1 Marine Mammal Sightings

A total of 122 sightings of 4,434 individual cetaceans representing 13 species was documented while on effort during the reporting period (**Table 3, Figure 7**). Summary information follows below for each species individually. Two endangered species, the sperm whale and the fin whale, were encountered in the survey area. Six identified cetacean species had additional sightings that were recorded while off effort. A sighting was considered off-effort if it occurred while transiting to or from the survey area or between tracklines, or while investigating a separate sighting cue. If two species were seen associated with the same sighting cue both were considered on effort. The off-effort sightings are included in the tables and maps for each species but are excluded from any calculations. The number of individuals listed represents the best estimate of group size. Examples of in plane datasheets and species codes are in **Appendices A and B**. An explanation of our sighting summary sheets as well as daily sighting summaries in **Appendix C and D**.

Table 3. Total numbers of on-effort sightings and individuals for each species by month for the Norfolk Canyon survey area in 2016.

| Species | Number of: | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Totals |
|-----------------------------------|--------------------------|-----------|-----|------------|-----------|------------|-----|------------|------------|----------|-------------|------------|------------|-------------|
| CETACEANS | | | | | | | | | | | | | | |
| <i>Tursiops truncatus</i> | Sightings | | | 2 | 1 | 2 | | 6 | 8 | | 8 | 1 | 1 | 29 |
| | Individuals | | | 57 | 10 | 22 | | 174 | 180 | | 180 | 75 | 3 | 701 |
| <i>Delphinus delphis</i> | Sightings | | | 5 | | 11 | | 2 | | | 2 | | 1 | 21 |
| | Individuals | | | 738 | | 477 | | 404 | | | 450 | | 375 | 2444 |
| <i>Stenella frontalis</i> | Sightings | | | | 1 | 1 | | 2 | 4 | | 2 | | | 10 |
| | Individuals | | | | 2 | 20 | | 29 | 179 | | 68 | | | 298 |
| <i>Grampus griseus</i> | Sightings | | | | | 5 | | | 1 | | 1 | 1 | | 8 |
| | Individuals | | | | | 78 | | | 70 | | 28 | 18 | | 194 |
| <i>Stenella coeruleoalba</i> | Sightings | | | | | | | | | | 1 | | | 1 |
| | Individuals | | | | | | | | | | 350 | | | 350 |
| <i>Stenella clymene</i> | Sightings | | | | | 1 | | | | | | | | 1 |
| | Individuals | | | | | 20 | | | | | | | | 20 |
| <i>Globicephala macrorhynchus</i> | Sightings | 1 | | | | 4 | | 3 | 6 | | 9 | | 3 | 26 |
| | Individuals | 25 | | | | 27 | | 45 | 124 | | 103 | | 42 | 366 |
| <i>Balaenoptera physalus</i> | Sightings | | | 1 | | 5 | | 1 | 1 | | | | | 8 |
| | Individuals | | | 4 | | 5 | | 1 | 1 | | | | | 11 |
| <i>Physeter macrocephalus</i> | Sightings | | | | | | | 2 | 1 | | | 3 | | 6 |
| | Individuals | | | | | | | 2 | 1 | | | 8 | | 11 |
| <i>Megaptera novaeangliae</i> | Sightings | | | 1 | 1 | | | | | | | | | 2 |
| | Individuals | | | 4 | 1 | | | | | | | | | 5 |
| <i>Mesoplodon sp.</i> | Sightings | | | | | | | | 1 | | | | | 1 |
| | Individuals | | | | | | | | 3 | | | | | 3 |
| <i>Ziphius cavirostris</i> | Sightings | | | | | | | | 1 | | | | | 1 |
| | Individuals | | | | | | | | 2 | | | | | 2 |
| <i>Balaenoptera acutorostrata</i> | Sightings | | | | | | | 1 | | | | | | 1 |
| | Individuals | | | | | | | 1 | | | | | | 1 |
| Unidentified delphinid | Sightings | | | | | 2 | | 1 | | 1 | 2 | | 1 | 7 |
| | Individuals | | | | | 10 | | 7 | | 2 | 7 | | 2 | 28 |
| Total Cetaceans | Total sightings | 1 | | 9 | 3 | 31 | | 18 | 23 | 1 | 25 | 5 | 6 | 122 |
| | Total individuals | 25 | | 803 | 13 | 659 | | 663 | 560 | 2 | 1186 | 101 | 422 | 4434 |

| Species | Number of: | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Totals |
|-----------------------------|--------------------------|-----|-----|----------|-----|----------|-----|-----------|-----------|-----|-----------|-----|----------|------------|
| SEA TURTLES | | | | | | | | | | | | | | |
| <i>Caretta caretta</i> | Sightings | | | 1 | | | | 46 | 36 | | 11 | | 2 | 96 |
| | Individuals | | | 1 | | | | 72 | 60 | | 11 | | 2 | 146 |
| <i>Dermochelys coriacea</i> | Sightings | | | | | 1 | | 4 | 4 | | | | 1 | 10 |
| | Individuals | | | | | 1 | | 4 | 4 | | | | 1 | 10 |
| Total Sea Turtles | Total sightings | | | 1 | | 1 | | 50 | 40 | | 11 | | 3 | 106 |
| | Total individuals | | | 1 | | 1 | | 76 | 64 | | 11 | | 3 | 156 |

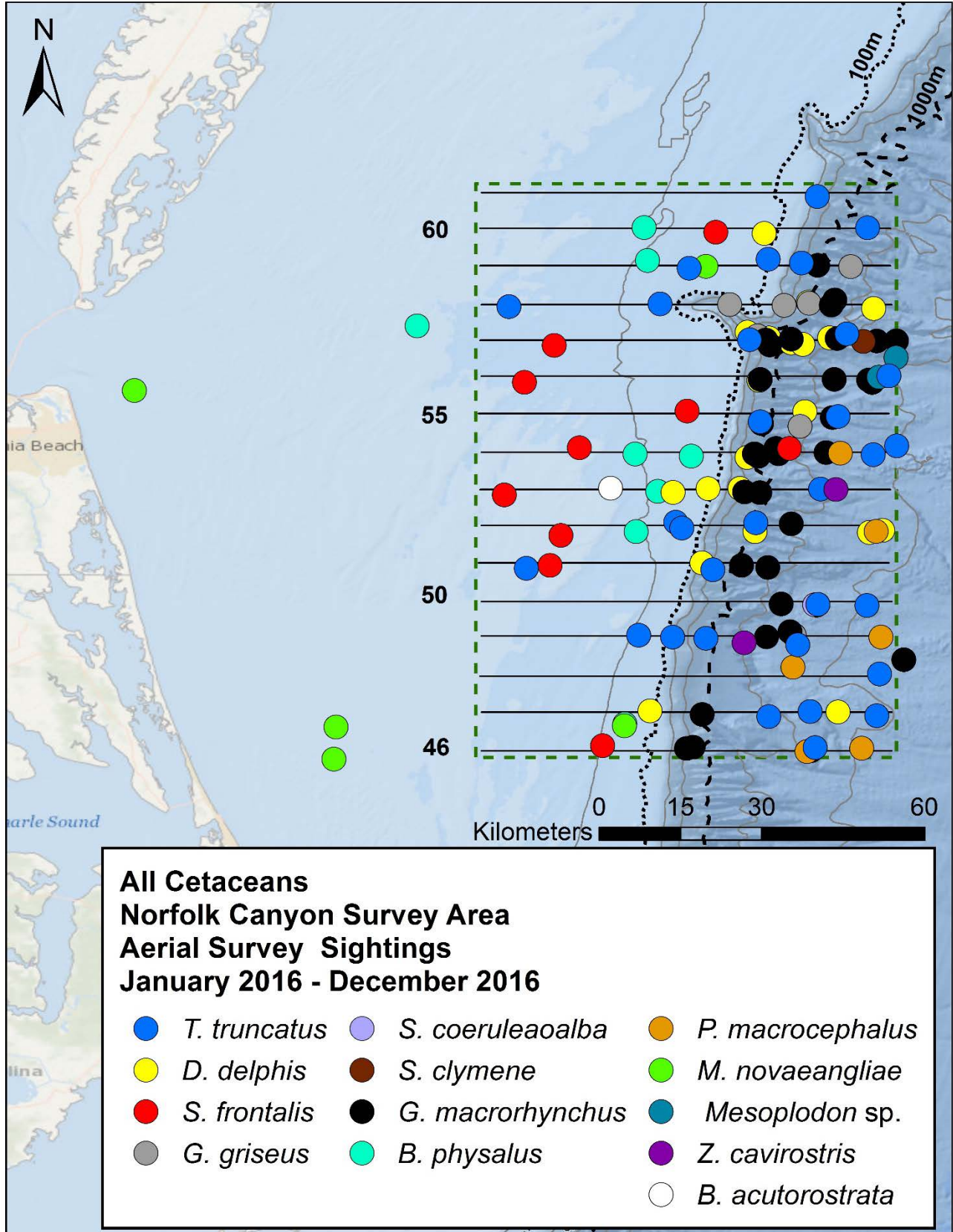


Figure 7. All cetacean sightings during aerial surveys conducted in the Norfolk Canyon survey area in 2016.

4.2 Dolphins

4.2.1 Bottlenose dolphin (*Tursiops truncatus*)

This species was the most commonly observed cetacean species, with 29 sightings totaling 701 individuals (**Table 4, Figure 8**). Bottlenose dolphins were observed in eight of twelve months in this reporting period, with groups ranging in size between 1 and 75 individuals (mean=24.0, SD=20.9). In addition, on two occasions, bottlenose dolphins were observed while the survey team was circling on other cetaceans and were therefore considered off-effort sightings. The majority of sightings occurred more than 37 km from shore and in waters beyond the 100-m isobath. Based on the distance from shore (i.e., greater than 34 km), most of these bottlenose dolphins were likely the offshore ecotype (Torres et al. 2003, 2005).

Table 4. Bottlenose dolphin (*Tursiops truncatus*) sightings in the Norfolk Canyon survey area in 2016. Asterisk denotes an off-effort sighting.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Off Effort (*) |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|----------------|
| 09-Mar-2016 | 11:02:54 | 32 | 36.561391 | -74.695834 | 51 | 2 | 3 | 120° | 40 | |
| 09-Mar-2016 | 11:35:50 | 40 | 36.489696 | -74.385549 | 50 | 3 | 1 | 45° | 17 | |
| 21-Apr-2016 | 14:20:30 | 20 | 37.096999 | -74.802083 | 58 | 2 | 3 | 80° | 10 | |
| 09-May-2016 | 9:38:53 | 10 | 37.186583 | -74.584055 | 59 | 2 | 1 | 100° | 21 | |
| 09-May-2016 | 9:46:01 | 14 | 37.179323 | -74.517188 | 59 | 2 | 1 | 120° | 1 | |
| 07-Jul-2016 | 11:10:29 | 27 | 36.423383 | -74.709582 | 49 | 3 | 1 | 90° | 75 | |
| 07-Jul-2016 | 14:31:33 | 46 | 36.793467 | -74.372645 | 54 | 3 | 2 | 100° | 25 | |
| 07-Jul-2016 | 15:55:03 | 68 | 37.024724 | -74.621563 | 57 | 3 | 2 | 90° | 25 | |
| 08-Jul-2016 | 9:41:50 | 7 | 37.091402 | -75.106500 | 58 | 2 | 2 | 60° | 8 | |
| 08-Jul-2016 | 10:35:36 | 22 | 36.645529 | -74.758003 | 52 | 2 | 1 | 60° | 7 | |
| 08-Jul-2016 | 16:20:25 | 98 | 37.250200 | -74.383966 | 60 | 2 | 2 | 90° | 34 | |
| 11-Aug-2016 | 13:49:34 | 72 | 36.203544 | -74.489828 | 46 | 2 | 2 | 90° | 25 | |
| 11-Aug-2016 | 14:04:02 | 80 | 36.267788 | -74.365312 | 47 | 1 | 1 | 90° | 40 | |
| 11-Aug-2016 | 14:15:05 | 86 | 36.266240 | -74.582797 | 47 | 1 | 2 | 45° | 25 | |
| 11-Aug-2016 | 15:05:30 | 99 | 36.351611 | -74.360006 | 48 | 1 | 2 | 60° | 5 | |
| 11-Aug-2016 | 15:20:07 | 105 | 36.410336 | -74.524717 | 49 | 1 | 3 | 100° | 22 | |
| 11-Aug-2016 | 15:38:56 | 117 | 36.426023 | -74.776592 | 49 | 2 | 1 | 90° | 10 | |
| 11-Aug-2016 | 15:43:04 | 121 | 36.429820 | -74.845060 | 49 | 2 | 2 | 90° | 18 | |
| 25-Aug-2016 | 9:44:34 | 11 | 37.036347 | -74.425765 | 57 | 1 | 3 | 100° | 35 | |
| 25-Aug-2016 | 11:10:03 | 44 | 36.811233 | -74.325508 | | 1 | 3 | 90° | 18 | * |
| 03-Oct-2016 | 10:12:25 | 8 | 37.168492 | -74.743496 | 59 | 4 | 1 | 90° | 8 | |
| 20-Oct-2016 | 9:54:54 | 17 | 36.491995 | -74.484280 | 50 | 1 | 1 | 90° | 60 | * |
| 20-Oct-2016 | 10:37:32 | 37 | 36.564483 | -75.071408 | 51 | 2 | 2 | 60° | 6 | |
| 20-Oct-2016 | 10:58:25 | 48 | 36.657561 | -74.770265 | 52 | 2 | 2 | 90° | 6 | |

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Off Effort (*) |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|----------------|
| 20-Oct-2016 | 11:07:01 | 52 | 36.656037 | -74.609065 | 52 | 2 | 2 | 60° | 7 | |
| 20-Oct-2016 | 11:24:21 | 63 | 36.724095 | -74.478618 | 53 | 2 | 1 | 90° | 18 | |
| 20-Oct-2016 | 14:34:09 | 98 | 36.870267 | -74.443707 | 55 | 2 | 2 | 100° | 30 | |
| 20-Oct-2016 | 14:47:34 | 107 | 36.859745 | -74.600062 | 55 | 2 | 3 | 60° | 30 | |
| 20-Oct-2016 | 15:44:02 | 129 | 36.952034 | -74.340923 | 56 | 2 | 1 | 90° | 75 | |
| 03-Nov-2016 | 11:12:24 | 25 | 36.276172 | -74.499561 | 47 | 3 | 1 | 100° | 75 | |
| 11-Dec-2016 | 10:57:07 | 28 | 37.312952 | -74.485224 | 61 | 2 | 1 | 90° | 3 | |

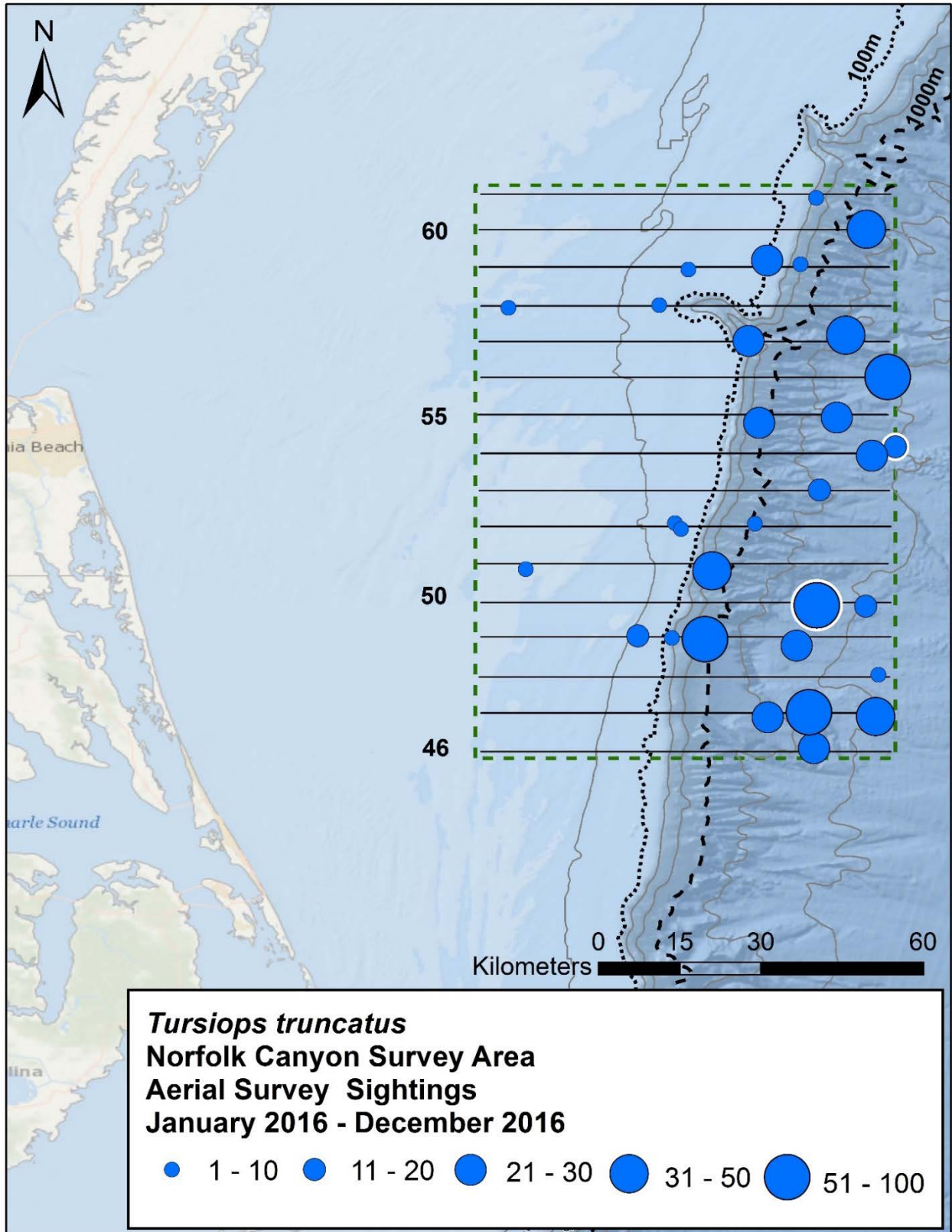


Figure 8. Bottlenose dolphin (*Tursiops truncatus*) sightings in the Norfolk Canyon survey area in 2016 (N=31). Symbol size indicates group size. White outlines denote off-effort sightings.

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

Twenty-one sightings totaling 2,444 individuals (mean=166, SD=162.06) were recorded, occurring from inshore of the 100-m isobath to seaward of the 1,500-m isobath (**Table 5, Figure 9**). Group sizes were highly variable; five groups had fewer than 10 animals, while three largest groups contained more than 300 individuals. This species was observed in five of 12 months surveyed.

Table 5. Short-beaked common dolphin (*Delphinus delphis*) sightings in the Norfolk Canyon survey area in December 2016.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Off Effort (*) |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|----------------|
| 09-Mar-2016 | 9:46:52 | 8 | 36.717479 | -74.775632 | 53 | 3 | 1 | 150° | 55 | |
| 09-Mar-2016 | 9:54:09 | 12 | 36.724964 | -74.705384 | 53 | 3 | 2 | 60° | 18 | |
| 09-Mar-2016 | 10:04:13 | 16 | 36.725123 | -74.641357 | 53 | 3 | 3 | 60° | 600 | |
| 09-Mar-2016 | 10:19:31 | 23 | 36.641029 | -74.353894 | 52 | 3 | 3 | 100° | 45 | |
| 09-Mar-2016 | 16:27:41 | 77 | 36.275169 | -74.443764 | 47 | 3 | 1 | 100° | 20 | |
| 09-May-2016 | 10:06:58 | 29 | 37.087378 | -74.371664 | 58 | 2 | 3 | 90° | 17 | |
| 09-May-2016 | 10:20:47 | 38 | 37.100014 | -74.503439 | 58 | 2 | 3 | 90° | 50 | |
| 09-May-2016 | 11:08:26 | 58 | 37.027870 | -74.582538 | 57 | 2 | 3 | 90° | 7 | |
| 09-May-2016 | 11:14:18 | 62 | 37.018136 | -74.537901 | 57 | 2 | 1 | 90° | 65 | |
| 09-May-2016 | 11:18:13 | 66 | 37.015240 | -74.514376 | 57 | 2 | 1 | 60° | 95 | |
| 09-May-2016 | 11:24:08 | 70 | 37.028520 | -74.460320 | 57 | 2 | 4 | 100° | 125 | |
| 09-May-2016 | 11:34:38 | 74 | 37.021364 | -74.392610 | 57 | 2 | 3 | 90° | 60 | |
| 09-May-2016 | 15:28:30 | 96 | 36.880007 | -74.510205 | 55 | 2 | 2 | 90° | 2 | |
| 09-May-2016 | 15:47:33 | 103 | 36.787739 | -74.626829 | 54 | 2 | 1 | 150° | 8 | |
| 09-May-2016 | 17:12:38 | 128 | 36.636588 | -74.380285 | 52 | 2 | 3 | 100° | 8 | |
| 09-May-2016 | 17:27:05 | 132 | 36.638218 | -74.610988 | 52 | 2 | 1 | 90° | 40 | |
| 07-Jul-2016 | 10:09:58 | 14 | 36.277526 | -74.822243 | 47 | 4 | 1 | 90° | 400 | |
| 08-Jul-2016 | 16:00:48 | 90 | 37.238658 | -74.592319 | 60 | 2 | 1 | 45° | 4 | |
| 20-Oct-2016 | 10:24:43 | 33 | 36.575532 | -74.717391 | 51 | 2 | 2 | 90° | 175 | |
| 20-Oct-2016 | 16:04:54 | 139 | 37.039842 | -74.626596 | 57 | 2 | 2 | 90° | 275 | |
| 11-Dec-2016 | 14:32:12 | 53 | 36.942944 | -74.602747 | 56 | 2 | 1 | 90° | 375 | |

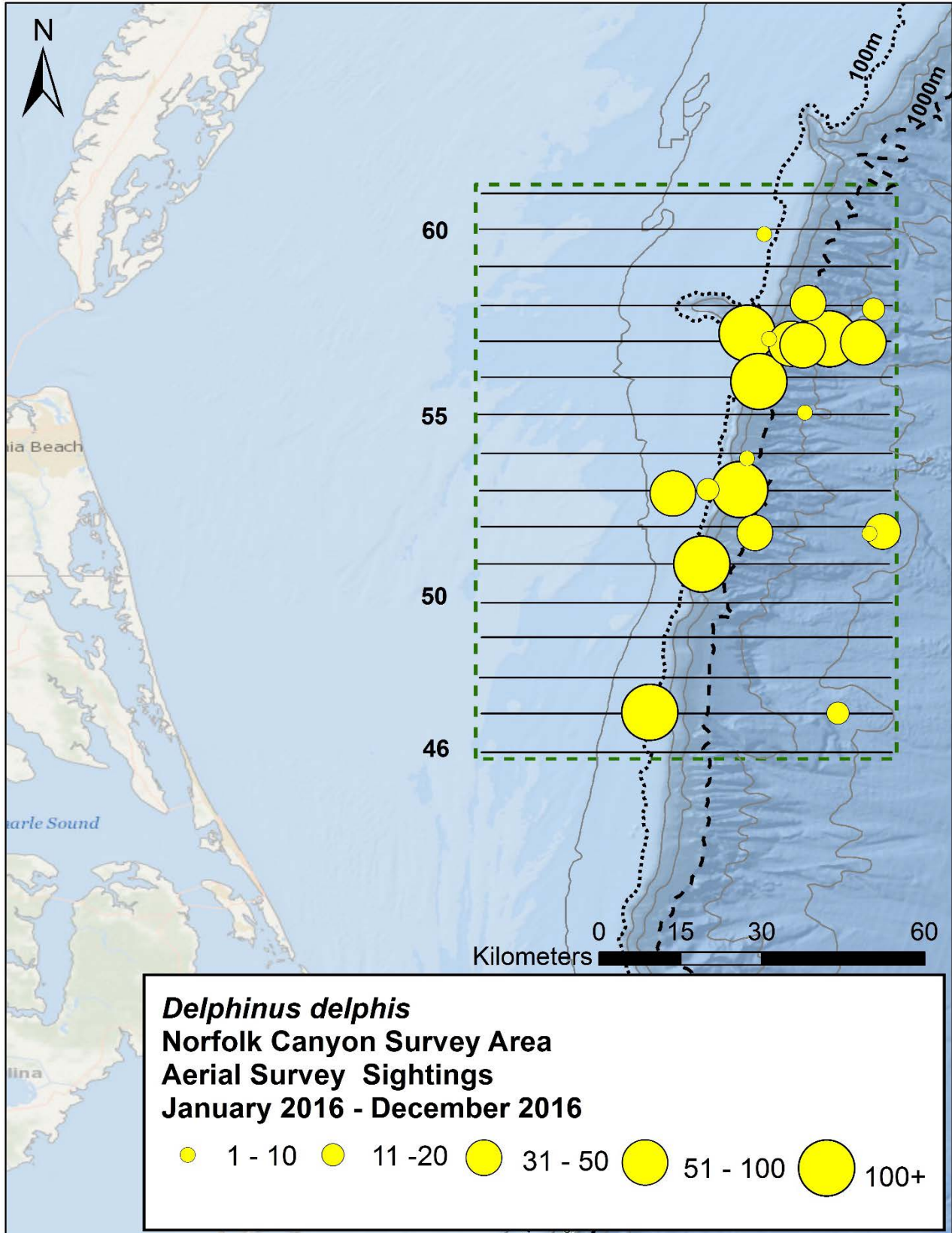


Figure 9. Short-beaked common dolphin (*Delphinus delphis*) sightings in the Norfolk Canyon survey area in 2016 (N=21). Symbol size indicates group size.

4.2.3 Atlantic spotted dolphin (*Stenella frontalis*)

Ten sightings of Atlantic spotted dolphins were made while on effort in the survey area, for a total of 298 individuals. Group sizes were between 2 and 125 individuals (mean=29.8, SD=35.65) (**Table 6, Figure 10**). There are two distinct forms, or ecotypes, of the Atlantic spotted dolphin in the western North Atlantic: a heavily spotted, larger form that typically occurs on the continental shelf and is most often encountered around the 200-m isobath or in shallower water, and a less spotted and smaller form that occurs farther offshore and around islands (Perrin et al. 1987, 1994). Examination of photos collected during each sighting suggests that both ecotypes are present within the survey area. This species was observed in five of 12 months surveyed.

Table 6. Atlantic spotted dolphin (*Stenella frontalis*) sightings in the Norfolk Canyon survey area in 2016.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Off Effort (*) |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|----------------|
| 21-Apr-2016 | 13:59:37 | 14 | 37.013179 | -75.015291 | 57 | 2 | 2 | 90° | 2 | |
| 09-May-2016 | 15:11:45 | 92 | 36.881159 | -74.747714 | 55 | 2 | 3 | 90° | 20 | |
| 08-Jul-2016 | 10:56:14 | 32 | 36.570566 | -75.023765 | 51 | 3 | 1 | 90° | 14 | |
| 08-Jul-2016 | 15:54:44 | 86 | 37.241184 | -74.689771 | 60 | 2 | 2 | 45° | 15 | |
| 11-Aug-2016 | 13:19:33 | 61 | 36.207144 | -74.917842 | 46 | 2 | 3 | 45° | 125 | |
| 25-Aug-2016 | 10:31:58 | 31 | 36.938836 | -75.075073 | 56 | 2 | 2 | 90° | 24 | |
| 25-Aug-2016 | 11:21:02 | 49 | 36.806079 | -74.541757 | 54 | 1 | 3 | 90° | 12 | |
| 25-Aug-2016 | 11:45:19 | 63 | 36.807372 | -74.964485 | 54 | 2 | 2 | 90° | 18 | |
| 20-Oct-2016 | 10:49:37 | 44 | 36.630975 | -75.001571 | 52 | 2 | 3 | 90° | 18 | |
| 20-Oct-2016 | 11:46:53 | 74 | 36.712164 | -75.115567 | 53 | 2 | 2 | 45° | 50 | |

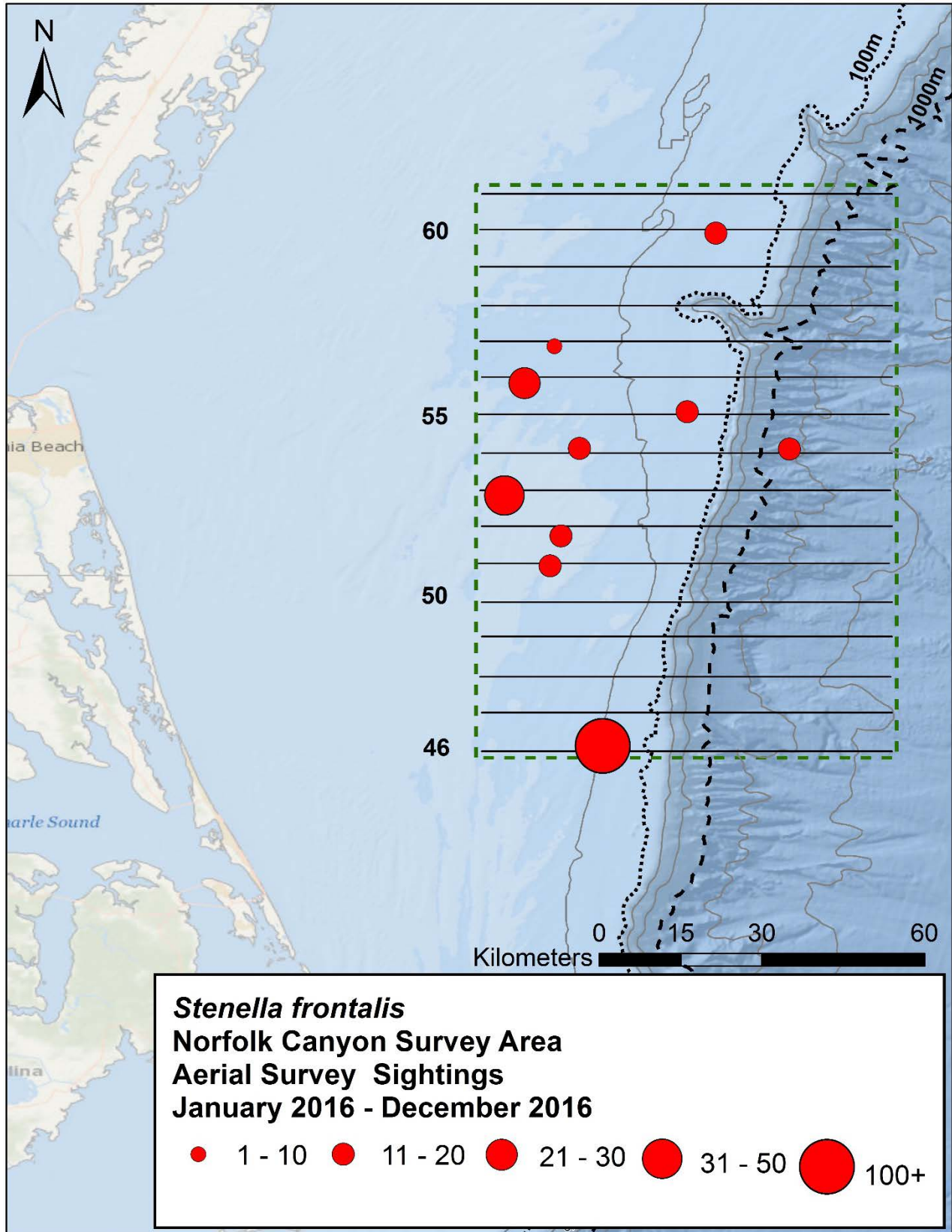


Figure 10. Atlantic spotted dolphin (*Stenella frontalis*) sightings in the Norfolk Canyon survey area in 2016 (N=10). Symbol size indicates group size.

4.2.4 Risso's dolphin (*Grampus griseus*)

Risso dolphins were encountered eight times in 2016, with all sightings coming while on effort. Sightings occurred in May, August, October, and November. Group sizes ranged from fewer than 10 individuals to larger groups of 50 or more animals (mean=24.3, SD=24.21) (Table 7, Figure 11). All sightings occurred seaward of the 100-m isobath.

Table 7. Risso's dolphin (*Grampus griseus*) sightings in the Norfolk Canyon survey area in 2016.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Off Effort (*) |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|----------------|
| 09-May-2016 | 9:46:01 | 14 | 37.179323 | -74.517188 | 59 | 2 | 1 | 120° | 7 | |
| 09-May-2016 | 9:57:29 | 22 | 37.171867 | -74.417836 | 59 | 2 | 1 | 90° | 50 | |
| 09-May-2016 | 10:18:41 | 37 | 37.097884 | -74.502071 | 58 | 2 | 3 | 90° | 1 | |
| 09-May-2016 | 10:25:31 | 43 | 37.093878 | -74.552296 | 58 | 2 | 3 | 90° | 5 | |
| 09-May-2016 | 10:29:16 | 47 | 37.095369 | -74.662034 | 58 | 2 | 2 | 90° | 15 | |
| 25-Aug-2016 | 9:32:13 | 6 | 37.032486 | -74.605609 | 57 | 1 | 2 | 90° | 70 | |
| 20-Oct-2016 | 14:40:29 | 103 | 36.850382 | -74.520117 | 55 | 2 | 3 | 60° | 28 | |
| 03-Nov-2016 | 9:48:39 | 5 | 36.429898 | -74.531643 | 49 | 3 | 1 | 90° | 18 | |

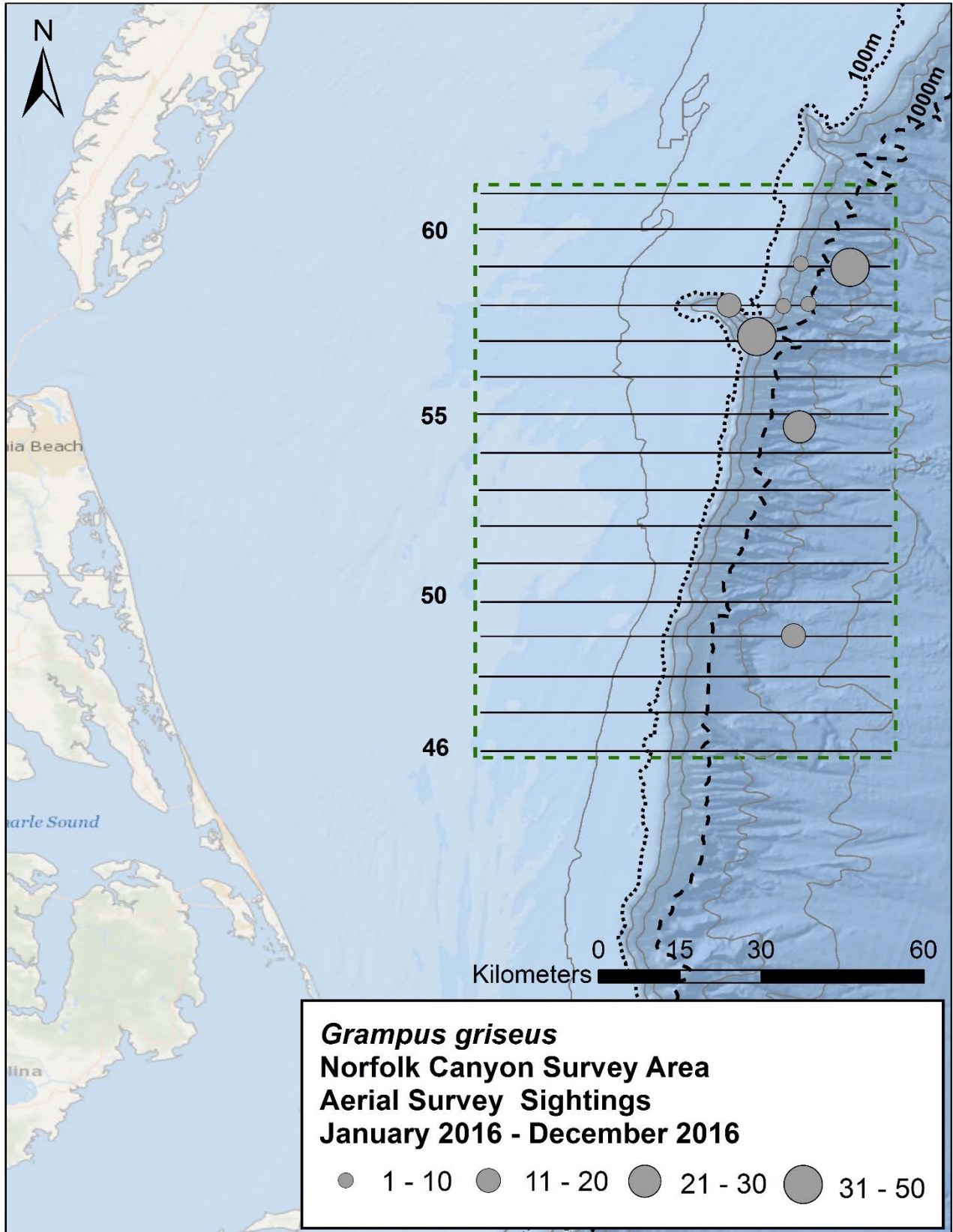


Figure 11. Risso's dolphin (*Grampus griseus*) sightings in the Norfolk Canyon survey area in 2016 to December 2016 (N=8). Symbol size indicates group size.

4.2.5 Striped dolphin (*Stenella coeruleoalba*)

A single sighting of 350 striped dolphins was observed during this reporting period in the southern portion of the Norfolk Canyon survey area beyond the 1,500-m isobath (**Table 8, Figure 12**).

Table 8. Striped dolphin (*Stenella coeruleoalba*) sighting in the Norfolk Canyon survey area in 2016.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Off Effort (*) |
|-------------|---------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|----------------|
| 20-Oct-2016 | 9:48:59 | 14 | 36.491092 | -74.490679 | 50 | 1 | 1 | 90° | 350 | |

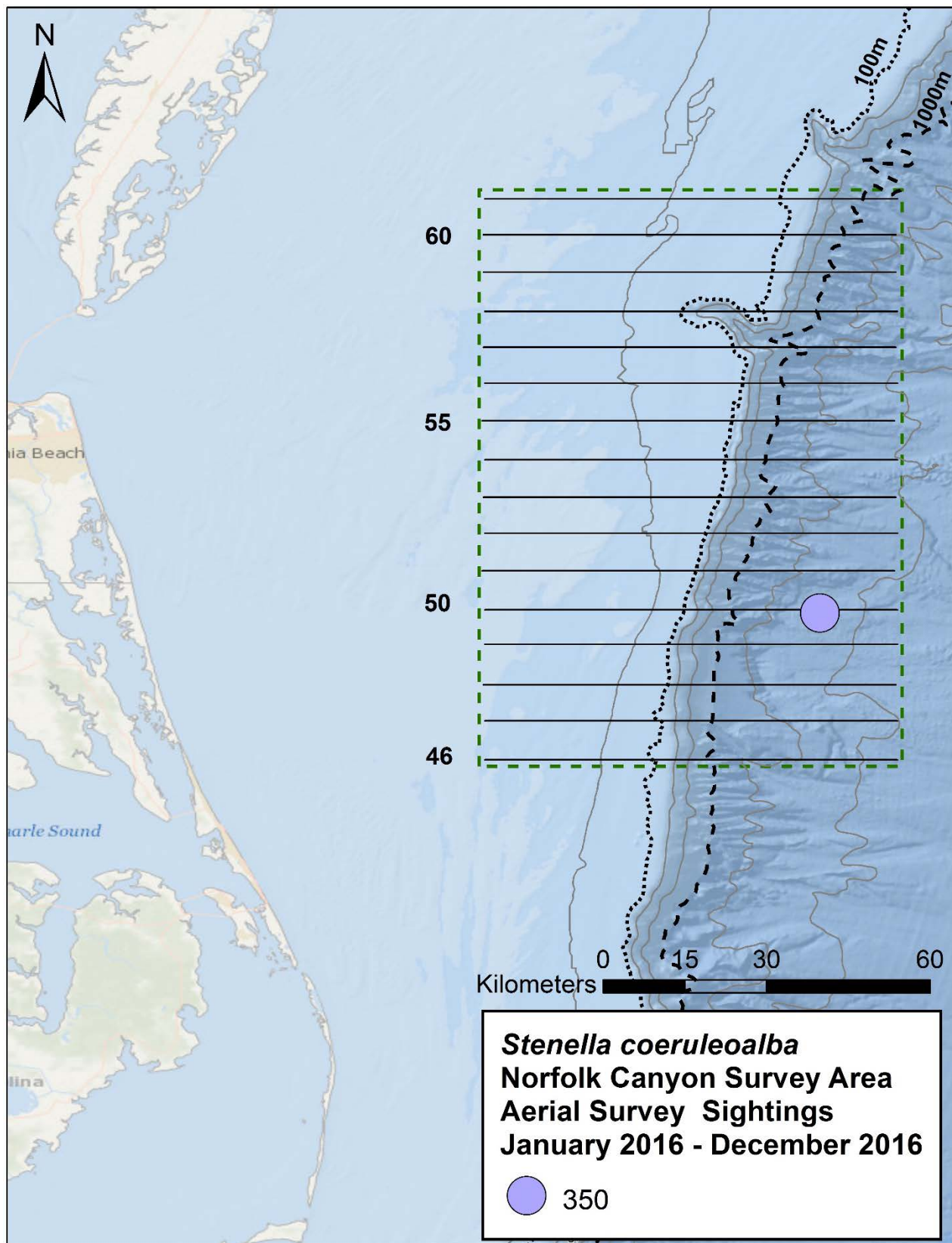


Figure 12. Striped dolphin (*Stenella coeruleoalba*) sighting in the Norfolk Canyon survey area in 2016.

4.2.6 Clymene dolphin (*Stenella clymene*)

A single group of 20 Clymene dolphins was observed beyond the 1,500-m isobath in the northern portion of the survey area (**Table 9, Figure 13**).

Table 9. Clymene dolphin (*Stenella clymene*) sighting in the Norfolk Canyon survey area in 2016.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Off Effort (*) |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|----------------|
| 09-May-2016 | 11:34:38 | 74 | 37.021364 | -74.392610 | 57 | 2 | 3 | 90° | 20 | |

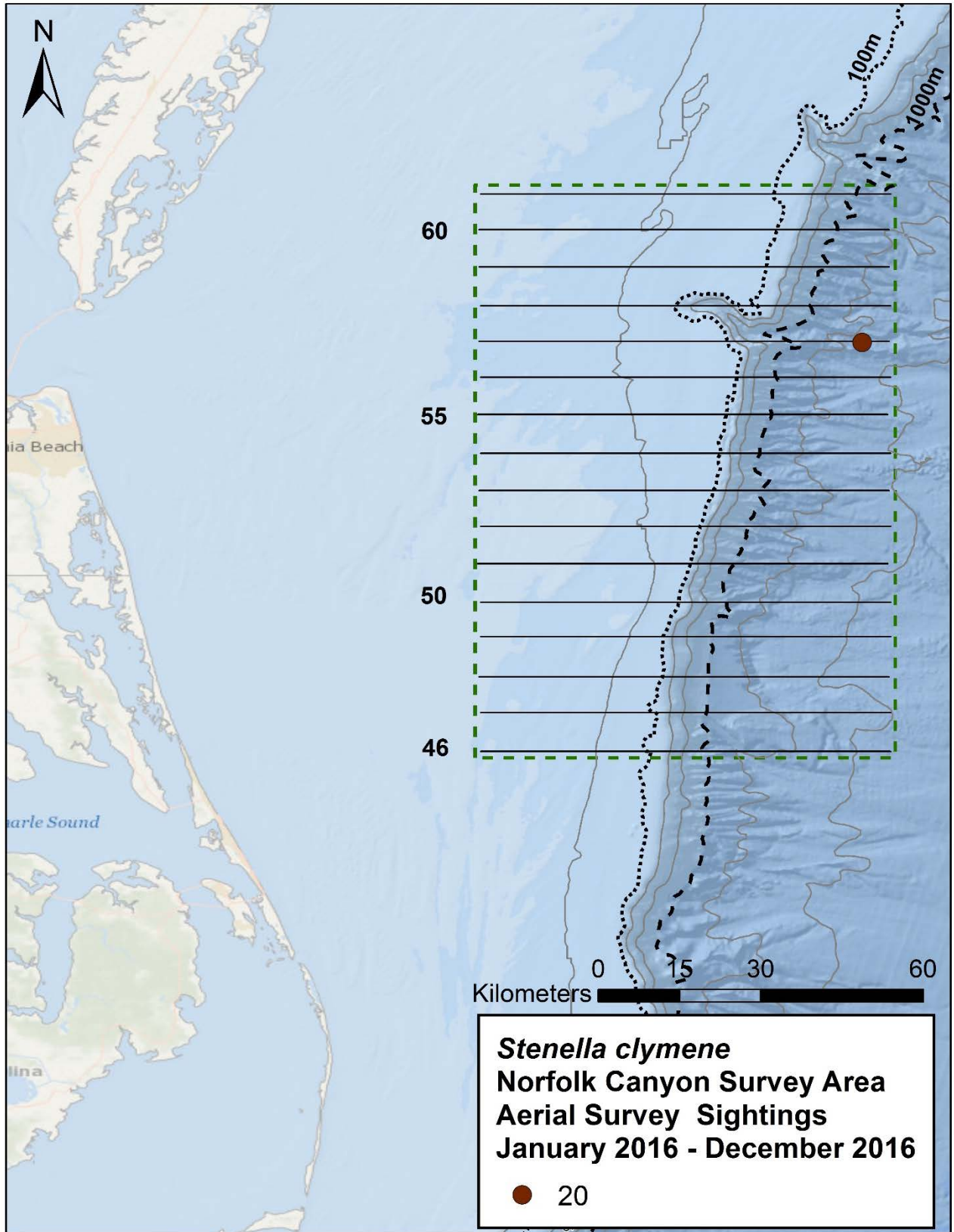


Figure 13. Clymene dolphin (*Stenella clymene*) sighting in the Norfolk Canyon survey area in 2016.

4.3 Whales

4.3.1 Short-finned pilot whale (*Globicephala macrorhynchus*)

The short-finned pilot whale was observed 26 times for a total of 366 individuals while on effort, and was seen in seven of 12 months. Group sizes ranged from 2 to 47 individuals (mean=14.08, SD=12.96) (**Table 10**). Eight off-effort sightings totaling 92 individuals were also logged while transiting between tracklines. Sightings of pilot whales in this region of the western North Atlantic occur primarily along or offshore of the continental shelf break (Waring et al. 2016), and sightings in the Norfolk Canyon survey area followed this pattern. Short-finned pilot whales were observed from the 100-m isobath to waters seaward of the 2,000 m in depth (**Figure 14**). The geographic extent of our survey area encompasses waters shared by both species of *Globicephala* (summarized in Waring et al. 2016). A careful examination of all photos suggests that all sightings were of short-finned pilot whales.

Table 10. Short-finned pilot whale (*Globicephala macrorhynchus*) sightings in the Norfolk Canyon survey area in 2016. Asterisk denotes an off-effort sighting.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Off Effort (*) |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|----------------|
| 30-Jan-2016 | 10:31:16 | 12 | 37.024004 | -74.589371 | 57 | 4 | 1 | 90° | 25 | |
| 09-May-2016 | 9:51:24 | 18 | 37.174705 | -74.484645 | 59 | 2 | 1 | 100° | 11 | |
| 09-May-2016 | 10:14:32 | 33 | 37.104661 | -74.449932 | 58 | 2 | 3 | 90° | 5 | |
| 09-May-2016 | 11:45:18 | 80 | 36.943459 | -74.382125 | 56 | 2 | 3 | 100° | 7 | |
| 09-May-2016 | 11:51:09 | 84 | 36.944701 | -74.451279 | 56 | 2 | 2 | 120° | 4 | |
| 07-Jul-2016 | 9:34:26 | 5 | 36.204575 | -74.735498 | 46 | 4 | 1 | 90° | 25 | |
| 07-Jul-2016 | 14:20:14 | 40 | 36.794877 | -74.563368 | 54 | 3 | 1 | 110° | 4 | * |
| 07-Jul-2016 | 15:48:27 | 64 | 37.025971 | -74.537725 | 57 | 3 | 1 | 90° | 3 | |
| 08-Jul-2016 | 14:38:55 | 57 | 36.717961 | -74.631714 | 53 | 2 | 1 | 45° | 17 | |
| 11-Aug-2016 | 13:35:46 | 65 | 36.201955 | -74.748983 | 46 | 2 | 1 | 90° | 47 | |
| 11-Aug-2016 | 14:23:19 | 90 | 36.270424 | -74.717086 | 47 | 2 | 3 | 90° | 45 | |
| 11-Aug-2016 | 15:27:21 | 109 | 36.426602 | -74.587654 | 49 | 2 | 1 | 90° | 5 | |
| 25-Aug-2016 | 9:50:53 | 15 | 37.021948 | -74.365678 | 57 | 1 | 1 | 60° | 5 | |
| 25-Aug-2016 | 11:27:10 | 53 | 36.805887 | -74.568732 | 54 | 1 | 3 | 110° | 14 | |
| 25-Aug-2016 | 11:33:04 | 57 | 36.790108 | -74.604054 | 54 | 1 | 2 | 90° | 8 | |
| 20-Oct-2016 | 9:41:42 | 10 | 36.492629 | -74.558193 | 50 | 1 | 2 | 90° | 6 | |
| 20-Oct-2016 | 9:53:32 | 16 | 36.490350 | -74.486473 | 50 | 1 | 1 | 90° | 16 | * |
| 20-Oct-2016 | 10:14:39 | 24 | 36.566191 | -74.584958 | 51 | 2 | 1 | 100° | 4 | |
| 20-Oct-2016 | 10:21:11 | 28 | 36.570254 | -74.637779 | 51 | 2 | 2 | 45° | 2 | |
| 20-Oct-2016 | 11:12:05 | 56 | 36.654046 | -74.537934 | 52 | 2 | 1 | 60° | 7 | |
| 20-Oct-2016 | 11:30:47 | 67 | 36.716863 | -74.601014 | 53 | 2 | 1 | 90° | 8 | |
| 20-Oct-2016 | 14:17:09 | 91 | 36.795171 | -74.612052 | 54 | 2 | 1 | 100° | 6 | |

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Off Effort (*) |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|----------------|
| 20-Oct-2016 | 14:34:40 | 99 | 36.867987 | -74.455026 | 55 | 2 | 1 | 100° | 14 | * |
| 20-Oct-2016 | 14:48:27 | 108 | 36.855733 | -74.597511 | 55 | 2 | 3 | 60° | 30 | * |
| 20-Oct-2016 | 15:28:37 | 121 | 36.944640 | -74.600240 | 56 | 2 | 1 | 90° | 35 | |
| 20-Oct-2016 | 15:39:32 | 125 | 36.938339 | -74.374788 | 56 | 2 | 1 | 60° | 10 | |
| 20-Oct-2016 | 15:57:45 | 135 | 37.014001 | -74.581436 | 57 | 2 | 3 | 90° | 25 | |
| 03-Nov-2016 | 9:59:44 | 6 | 36.437069 | -74.540329 | 49 | 3 | 1 | 90° | 12 | * |
| 03-Nov-2016 | 10:15:04 | 11 | 36.380526 | -74.310900 | | 3 | 1 | 90° | 6 | * |
| 03-Nov-2016 | 11:32:53 | 36 | 36.197263 | -74.498209 | 46 | 3 | 2 | 90° | 7 | * |
| 11-Dec-2016 | 9:54:31 | 14 | 37.094393 | -74.457115 | 58 | 3 | 1 | 90° | 28 | |
| 11-Dec-2016 | 13:40:04 | 40 | 36.797689 | -74.467612 | 54 | 2 | 1 | 100° | 5 | |
| 11-Dec-2016 | 14:48:53 | 58 | 37.022312 | -74.326015 | | 2 | 2 | 90° | 3 | * |
| 11-Dec-2016 | 14:54:04 | 62 | 37.027066 | -74.445272 | 57 | 2 | 3 | 90° | 9 | |

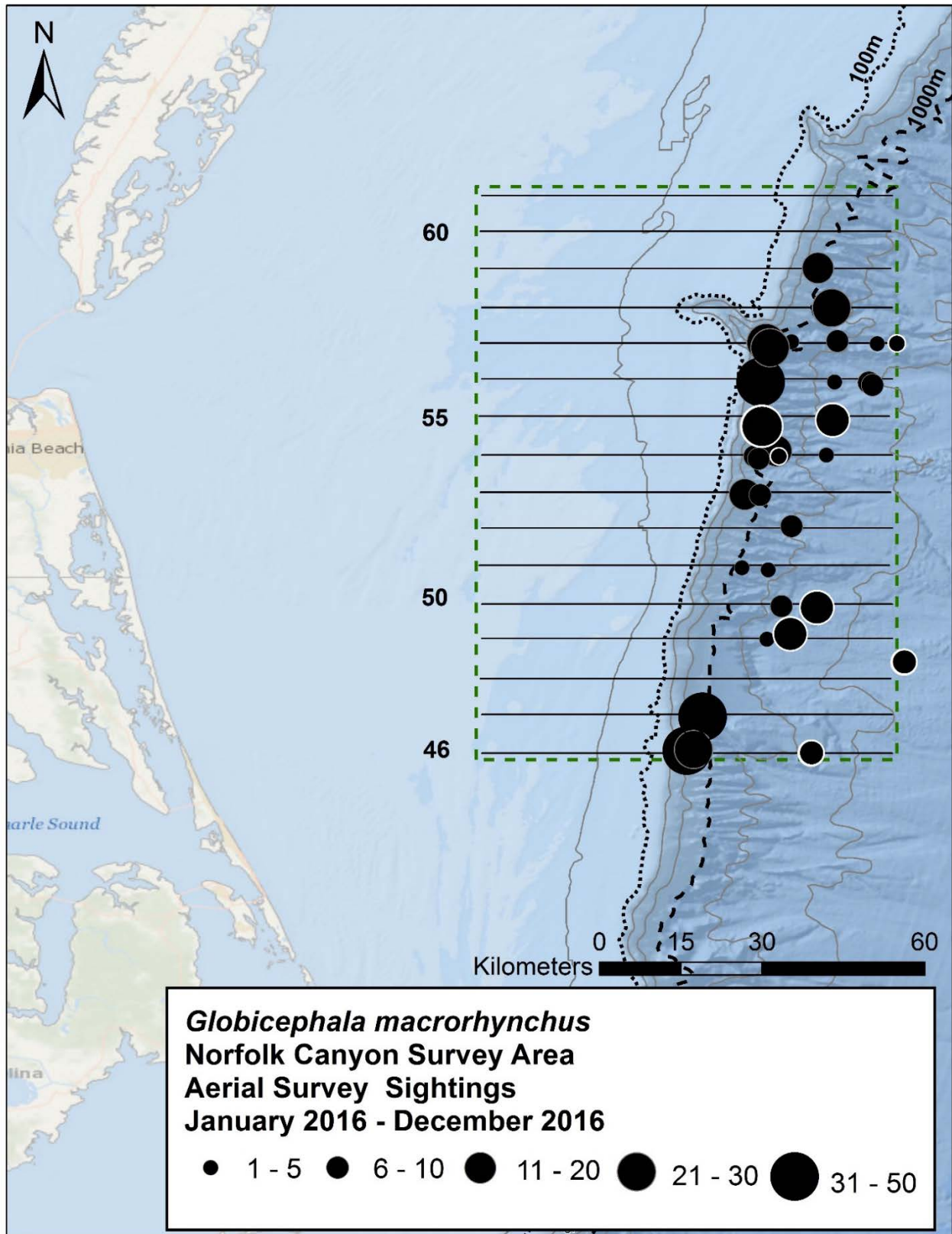


Figure 14. Short-finned pilot whale (*Globicephala macrorhynchus*) sightings in the Norfolk Canyon survey area in 2016 (N=34). Symbol size indicates group size. White outlines denote off-effort sighting.

4.3.2 Fin whale (*Balaenoptera physalus*)

Eight sightings of fin whales (*Balaenoptera physalus*), including 11 individuals in all, occurred while on effort, and this species was observed in 5 of 12 months surveyed (**Table 11, Figure 15**). Seven sightings were single animals and the eighth was a group of four. All on-effort sightings occurred between the 50-m and 100-m isobaths. There were also two off-effort sightings of single individuals this year. One occurred beyond the 1,500-m isobath in the southern portion of the Norfolk Canyon survey area and the other was inside the 50-m isobaths while transiting out to the survey site.

Table 11. Fin whale (*Balaenoptera physalus*) sightings in the Norfolk Canyon survey area in 2016. Asterisk denotes an off-effort sighting.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Off Effort (*) |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|----------------|
| 09-Mar-2016 | 16:59:40 | 83 | 36.251177 | -74.873034 | 47 | 4 | 4 | 90° | 4 | |
| 09-May-2016 | 9:18:13 | 3 | 37.184208 | -74.827439 | 59 | 2 | 3 | 90° | 1 | |
| 09-May-2016 | 15:57:46 | 107 | 36.790409 | -74.738907 | 54 | 2 | 4 | 90° | 1 | |
| 09-May-2016 | 16:13:46 | 112 | 36.794546 | -74.852228 | 54 | 2 | 3 | 90° | 1 | |
| 09-May-2016 | 16:48:00 | 121 | 36.719608 | -74.806673 | 53 | 2 | 1 | 90° | 1 | |
| 09-May-2016 | 17:46:16 | 141 | 36.638168 | -74.850340 | 52 | 2 | 1 | 90° | 1 | |
| 08-Jul-2016 | 15:42:55 | 81 | 37.250304 | -74.834005 | 60 | 3 | 3 | 90° | 1 | |
| 11-Aug-2016 | 13:19:33 | 61 | 36.207144 | -74.917842 | 46 | 2 | 3 | 45° | 1 | |
| 20-Oct-2016 | 9:49:41 | 15 | 36.491819 | -74.484322 | 50 | 1 | 1 | 90° | 1 | * |
| 11-Dec-2016 | 9:19:00 | 5 | 37.052287 | -75.291467 | TE | 3 | 1 | 90° | 1 | * |

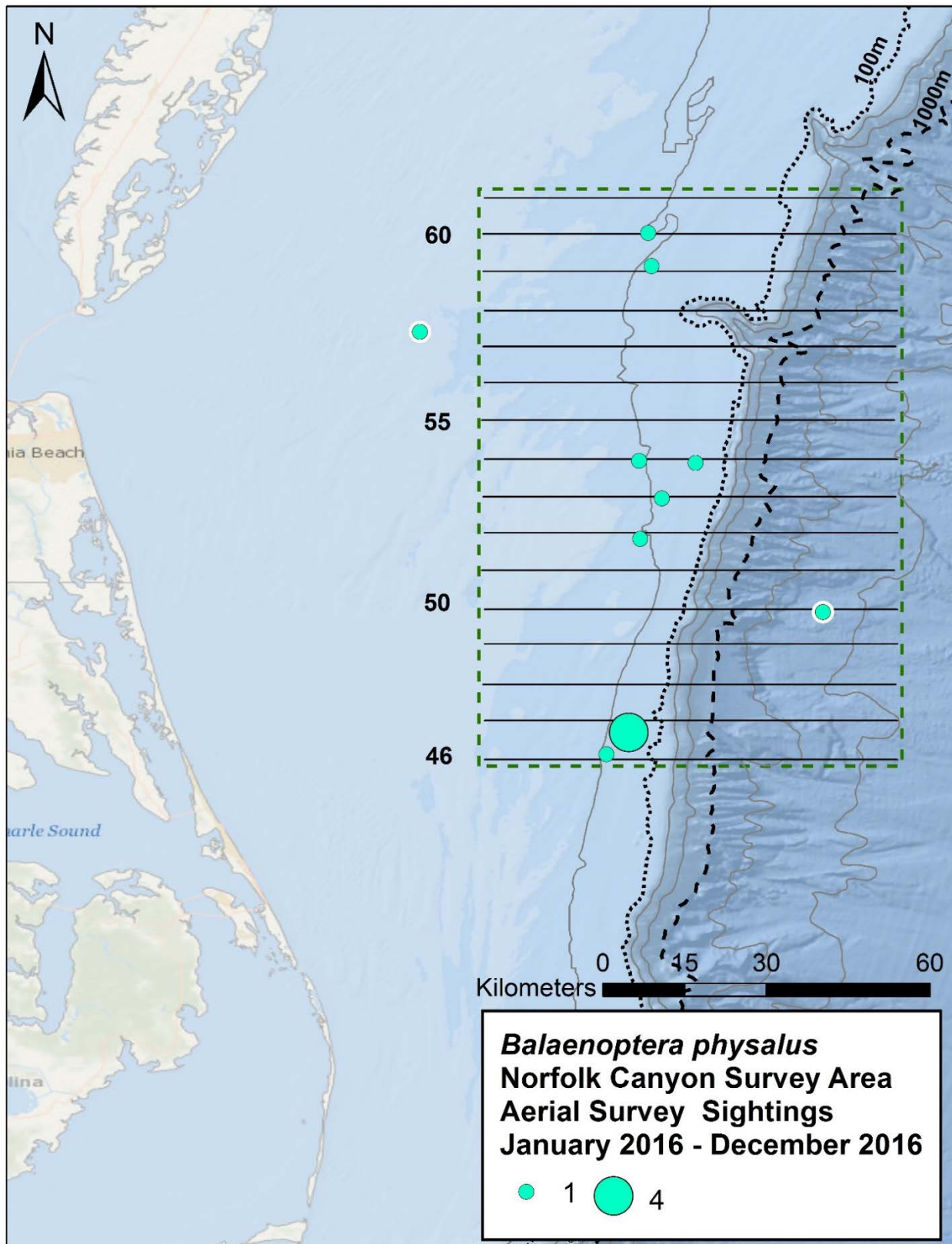


Figure 15. Fin whale (*Balaenoptera physalus*) sightings in the Norfolk Canyon survey area in 2016 (N=10). Symbol size indicates group size. White outline denotes an off-effort sighting.

4.3.3 Sperm whale (*Physeter macrocephalus*)

Sperm whales were observed six times on effort, either as single individuals or in small groups of 3 or 4 whales. All sightings occurred beyond the 1,500-m isobath in the southern portion of the Norfolk Canyon survey area (Table 12, Figure 16).

Table 12. Sperm whale (*Physeter macrocephalus*) sightings in the Norfolk Canyon survey area in 2016.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Off Effort (*) |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|----------------|
| 07-Jul-2016 | 10:56:24 | 23 | 36.425846 | -74.357251 | 49 | 3 | 1 | 90° | 1 | |
| 08-Jul-2016 | 10:20:52 | 16 | 36.638825 | -74.366662 | 52 | 3 | 1 | 90° | 1 | |
| 24-Aug-2016 | 13:54:59 | 34 | 36.796048 | -74.439148 | 54 | 4 | 2 | 90° | 1 | |
| 03-Nov-2016 | 10:28:45 | 15 | 36.365050 | -74.534206 | 48 | 3 | 2 | 60° | 1 | |
| 03-Nov-2016 | 11:28:36 | 32 | 36.202079 | -74.395880 | 46 | 3 | 3 | 90° | 3 | |
| 03-Nov-2016 | 11:32:33 | 35 | 36.195576 | -74.506199 | 46 | 3 | 2 | 90° | 4 | |

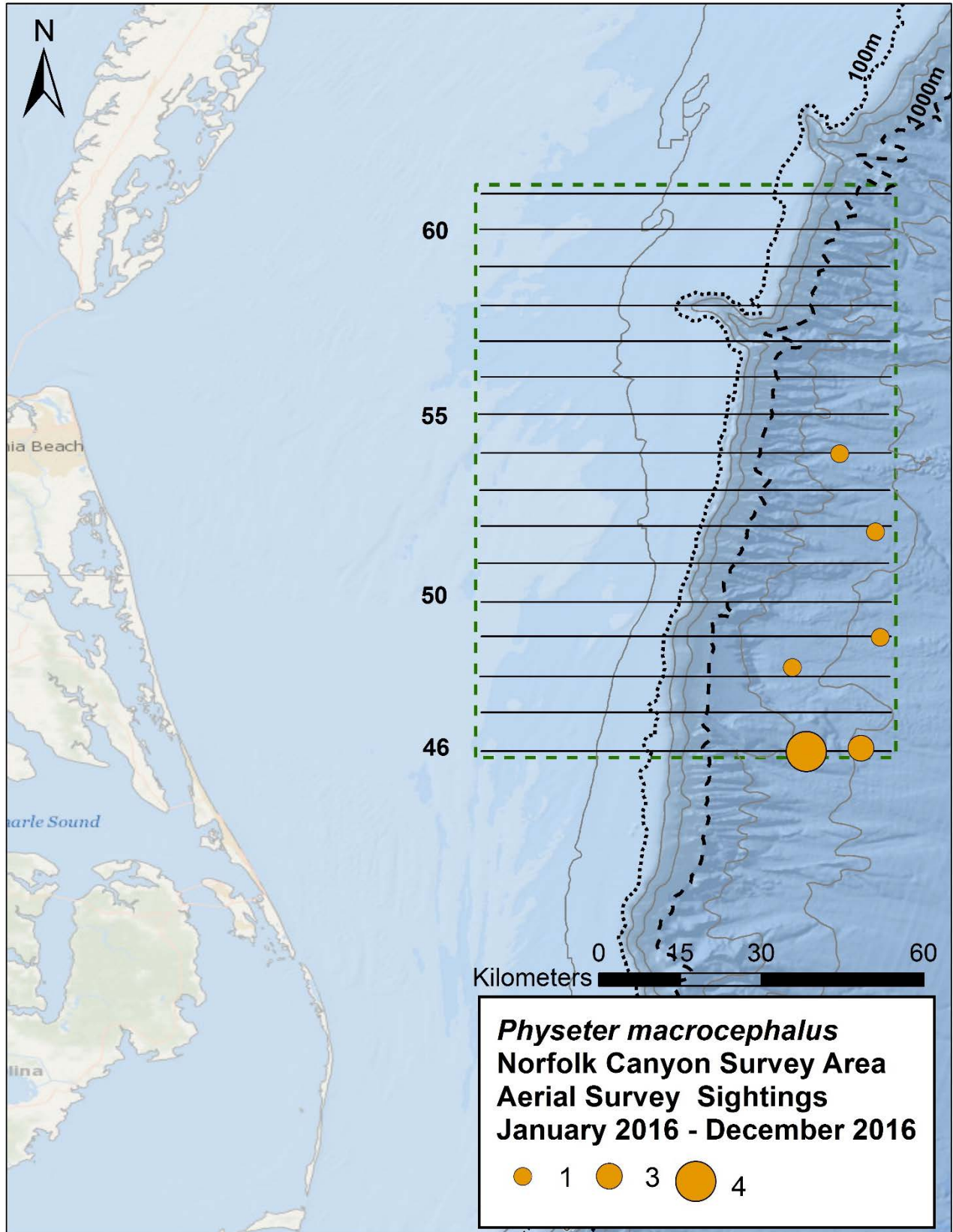


Figure 16. Sperm whale (*Physeter macrocephalus*) sightings in the Norfolk Canyon survey area in 2016 (N=6). Symbol size indicates group size.

4.3.4 Humpback whale (*Megaptera novaeangliae*)

Humpback whales were observed both inside the Norfolk Canyon survey area and in inshore waters (Table 13, Figure 17). On 9 2016, a group of four humpback whales was observed on-effort in the southern portion of the survey area. Two additional off-effort sightings, a single animal and a pair, occurred that same day during transits to and from the site. A single individual was observed on effort just north of Norfolk Canyon on 21 April 2016. One additional off-effort sighting was made on 11 December 2016, off the mouth of Chesapeake Bay. Because HDR was conducting tagging and photo-identification work on these animals, aerial observation effort was limited in order to minimize disturbance. Since this species has been the focus of current and past photo-identification work, all efforts were made to document features on the animals that could aid in identifying the individual. Images collected from each sighting were shared with teams responsible for maintaining the North Atlantic Humpback Whale Catalogue.

Table 13. Humpback whale (*Megaptera novaengliae*) sightings in the Norfolk Canyon survey area in 2016. Asterisk denotes an off-effort sighting.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Off Effort (*) |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|----------------|
| 09-Mar-2016 | 9:18:20 | 3 | 36.244891 | -75.454717 | TE | 2 | 3 | 90° | 1 | * |
| 09-Mar-2016 | 12:20:16 | 44 | 36.180282 | -75.458903 | TE | 3 | 1 | 90° | 2 | * |
| 09-Mar-2016 | 16:54:39 | 81 | 36.247482 | -74.873968 | 47 | 4 | 4 | 90° | 4 | |
| 21-Apr-2016 | 14:55:59 | 32 | 37.172452 | -74.709750 | 59 | 3 | 3 | 90° | 1 | |
| 11-Dec-2016 | 15:29:59 | 67 | 36.922333 | -75.860914 | TE | 2 | 3 | 90° | 2 | * |

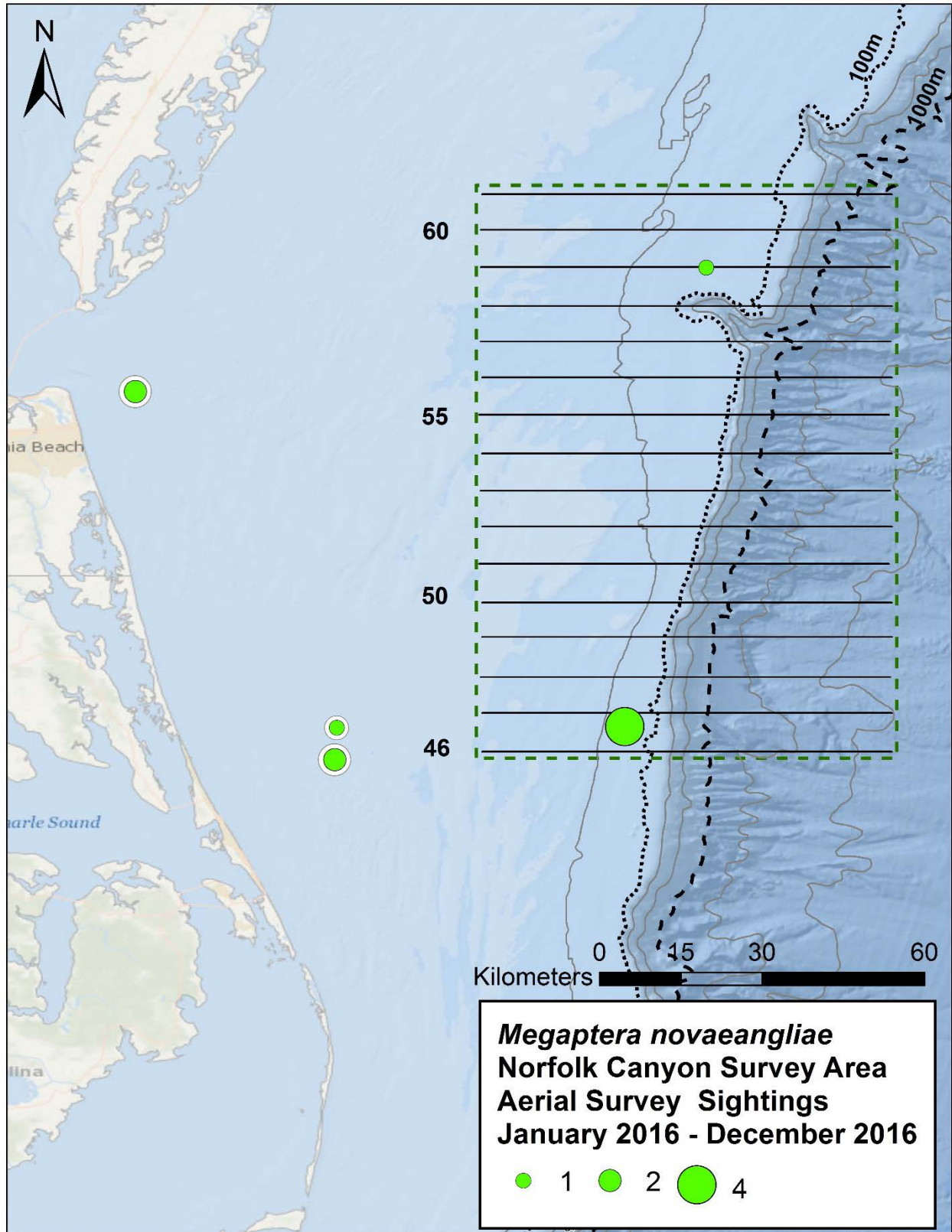


Figure 17. Humpback whale (*Megaptera novaeangliae*) sightings in the Norfolk Canyon survey area in 2016 (N=5). Symbols size indicates group size. White outline denotes off-effort sightings.

4.3.5 Mesoplodont beaked whale (*Mesoplodon* spp.)

On two occasions beaked whales were observed for which no species identification could be made. The animals displayed coloration patterns inconsistent with Cuvier's beaked whales, therefore they are classified here as Mesoplodont beaked whales (**Table 14, Figure 18**). Both sightings occurred inshore of the 2,000-m isobaths on 25 Aug 2016. One group of four individuals was encountered while transiting between tracklines and is considered an off-effort sighting. Shortly after beginning the next trackline a second group of three individuals was encountered.

Table 14. Mesoplodont beaked whales (*Mesoplodon* sp.) in the Norfolk Canyon survey area in 2016. Asterisk denotes an off-effort sightings.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Off Effort (*) |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|----------------|
| 25-Aug-2016 | 9:55:13 | 20 | 36.988621 | -74.326492 | | 1 | 2 | 90° | 4 | * |
| 25-Aug-2016 | 10:05:11 | 23 | 36.949525 | -74.361315 | 56 | 1 | 1 | 90° | 3 | |

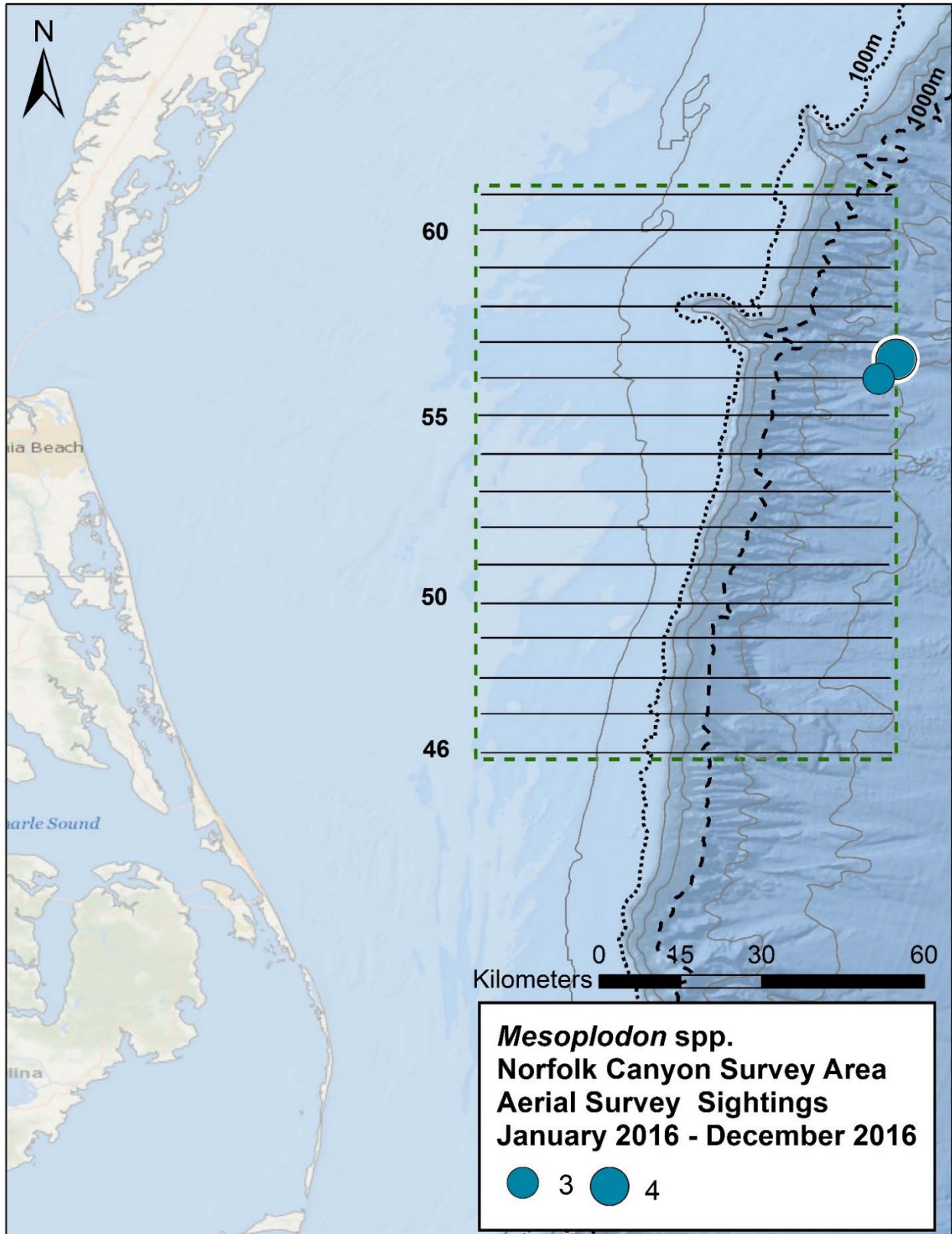


Figure 18. Unidentified *Mesoplodon* sp. beaked whale sightings in the Norfolk Canyon survey area in 2016. Symbol size indicates group size. White outline denotes an off-effort sighting.

4.3.6 Cuvier's beaked whale (*Ziphius cavirostris*)

On two occasions, a pair of Cuvier's beaked whales was sighted seaward of the 1,500-m isobath, one of which was an off-effort sighting (**Table 15, Figure 19**). Photodocumentation of all beaked whales continues to better define characteristic of each species, as well as building catalog images of distinctive scarring patterns used for identification of individual animals for this species.

Table 15. Cuvier's beaked whale (*Ziphius cavirostris*) sightings in the Norfolk Canyon survey area in 2016. Asterisk denotes an off-effort sighting.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Off Effort (*) |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|----------------|
| 08-Jul-2016 | 14:45:39 | 62 | 36.723260 | -74.447741 | 53 | 2 | 2 | 90° | 2 | * |
| 11-Aug-2016 | 15:31:30 | 113 | 36.414506 | -74.632599 | 49 | 2 | 2 | 90° | 2 | |

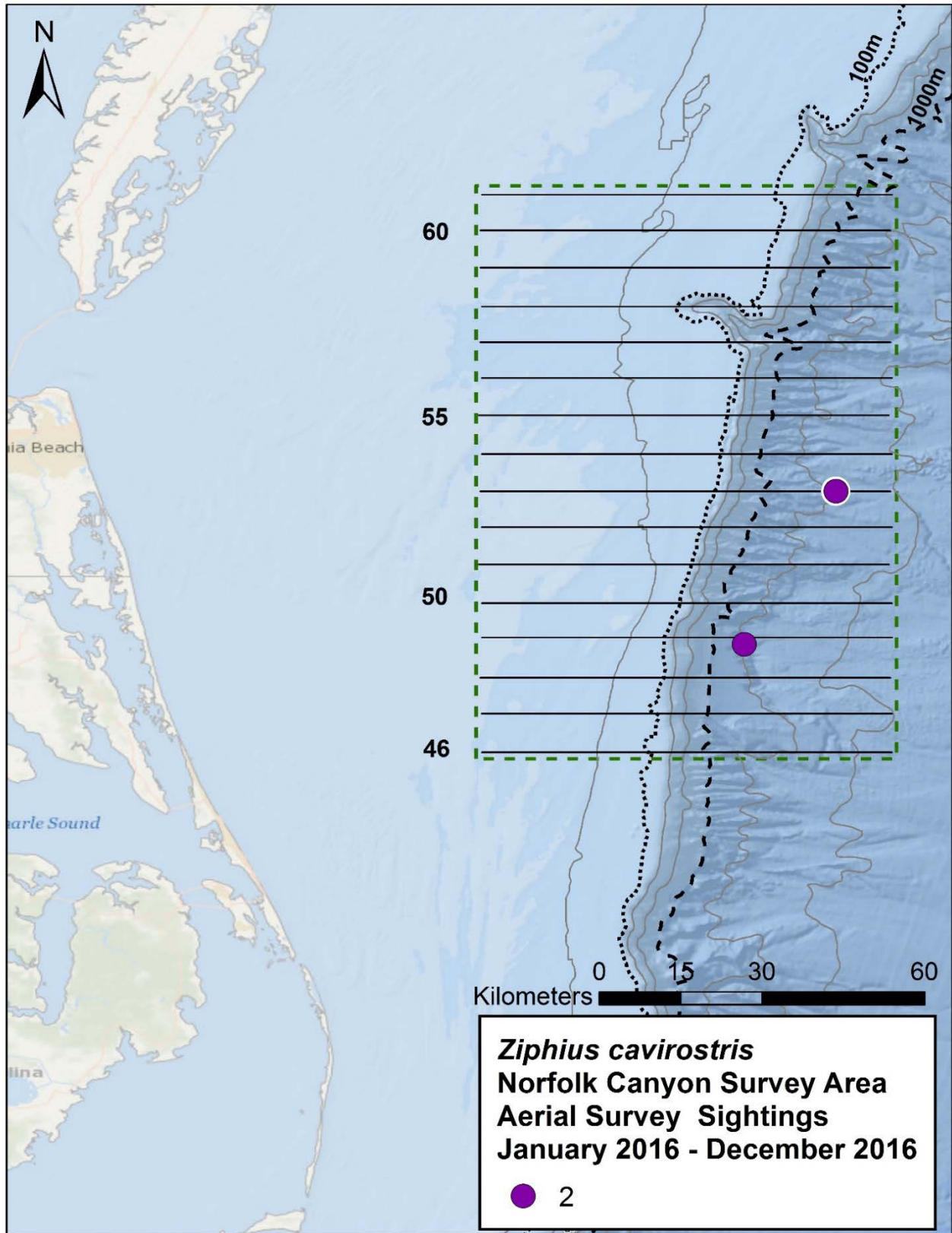


Figure 19. Cuvier's beaked whale (*Ziphius cavirostris*) sightings in the Norfolk Canyon survey area in 2016 (N=2). Symbol size indicates group size. White outline denotes an off-effort sighting.

4.3.7 Minke whale (*Balaenoptera acutorostrata*)

A single minke whale was observed on effort inshore of the 50-m isobath in 2016 (**Table 16, Figure 20**).

Table 16. Minke whale (*Balaenoptera acutorostrata*) sighting in the Norfolk Canyon survey area in 2016.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Off Effort (*) |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|----------------|
| 08-Jul-2016 | 14:14:02 | 52 | 36.725595 | -74.901699 | 53 | 2 | 2 | 60° | 1 | |

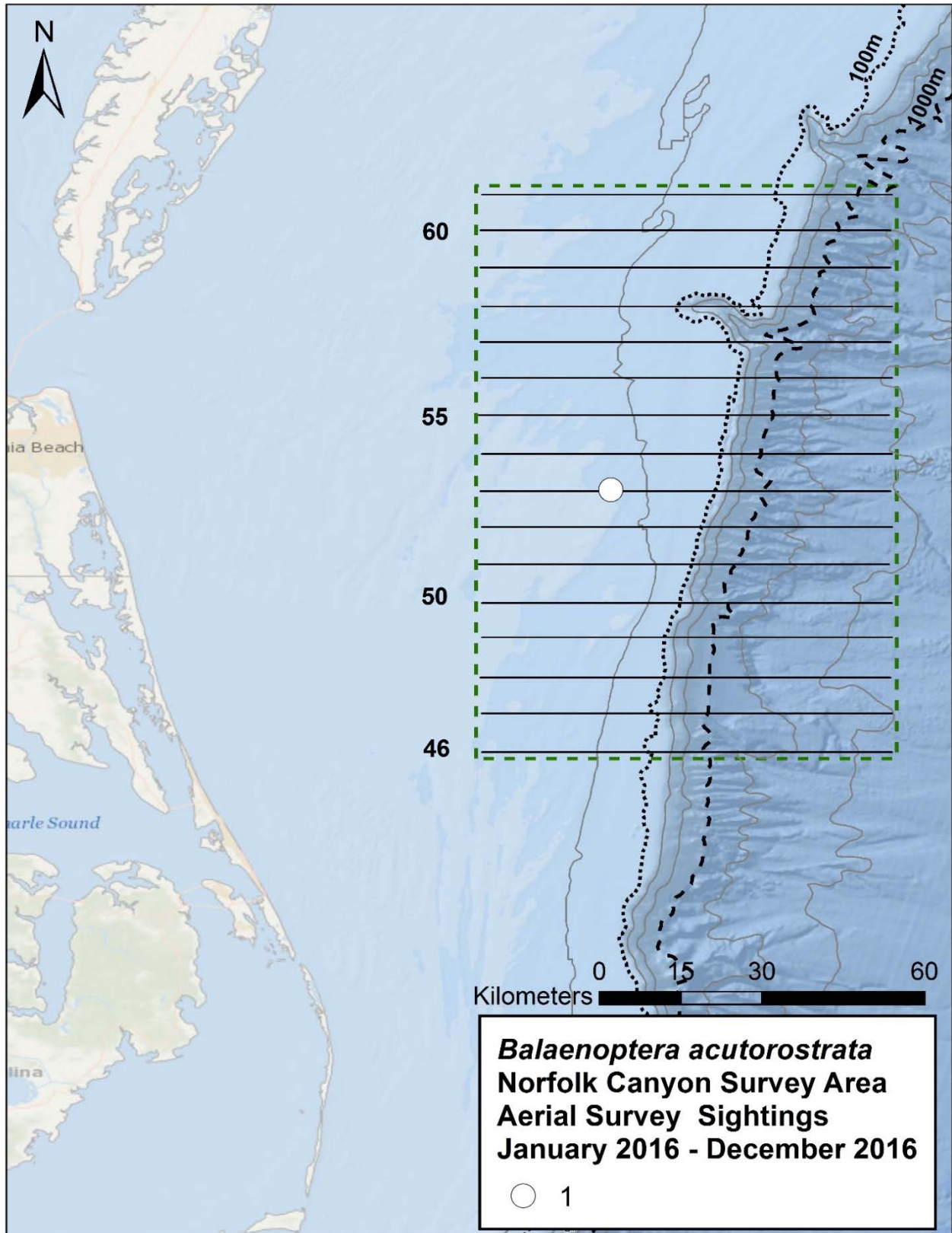


Figure 20. Minke whale (*Balaenoptera acutorostrata*) sighting in the Norfolk Canyon survey area in 2016.

4.4 Sea Turtles

There were 106 sightings totaling 156 individuals of two sea turtle species (loggerhead and leatherback sea turtles) during the reporting period (**Tables 17 and 18, Figures 21 and 22**). Loggerhead sea turtles represented the majority (93.5 percent) of total sea turtles sighted. The only other sea turtle species identified in the Norfolk Canyon, Virginia survey area was the leatherback sea turtle (6.4 percent of total sea turtles sighted). Sighting rates were negatively correlated with BSS, with rates sharply declining at BSS higher than 2 (**Figures 23a-b**). Ninety percent of all sea turtle sightings occurred in the months of July and August (**Figure 23c**).

4.4.1 Loggerhead sea turtle (*Caretta caretta*)

Sightings of loggerhead sea turtles occurred in five of 12 months, for a total of 146 animals (**Table 17, Figure 21**). All sightings were over the continental shelf, inshore of the 100-m isobath. Sea turtles are reported as the number of individuals in an area and are not considered a group since strong association with one another is not known. Between one and four turtles were recorded at any one time (mean=1.52, SD=0.77).

4.4.2 Leatherback sea turtle (*Dermochelys coriacea*)

Ten sightings of lone leatherback sea turtles were observed in the northern portion of the Norfolk Canyon survey area from the inshore waters to seaward of the 1,000-m isobath (**Table 18, Figure 22**).

Table 17. Loggerhead sea turtle (*Caretta caretta*) sightings in the Norfolk Canyon survey area in 2016.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|
| 09-Mar-2016 | 10:39:31 | 15 | 36.640903 | -74.857354 | 52 | 3 | 2 | 90° | 1 |
| 07-Jul-2016 | 10:25:27 | 11 | 36.274745 | -75.061921 | 47 | 3 | 2 | 90° | 1 |
| 07-Jul-2016 | 11:30:01 | 25 | 36.425584 | -74.935253 | 49 | 3 | 2 | 90° | 1 |
| 07-Jul-2016 | 14:07:57 | 33 | 36.792609 | -74.940732 | 54 | 3 | 3 | 90° | 1 |
| 07-Jul-2016 | 14:08:31 | 34 | 36.792685 | -74.917556 | 54 | 3 | 2 | 90° | 1 |
| 07-Jul-2016 | 14:09:17 | 38 | 36.792706 | -74.887176 | 54 | 3 | 1 | 90° | 1 |
| 07-Jul-2016 | 15:09:31 | 52 | 36.881681 | -74.946817 | 55 | 3 | 2 | 90° | 2 |
| 07-Jul-2016 | 15:12:04 | 47 | 36.883584 | -75.043419 | 55 | 3 | 2 | 90° | 1 |
| 07-Jul-2016 | 15:14:34 | 48 | 36.885277 | -75.139814 | 55 | 3 | 2 | 90° | 1 |
| 07-Jul-2016 | 15:18:12 | 55 | 36.942334 | -75.114057 | 56 | 3 | 1 | 90° | 2 |
| 07-Jul-2016 | 15:20:01 | 52 | 36.942540 | -75.038816 | 56 | 3 | 1 | 90° | 1 |
| 07-Jul-2016 | 15:20:54 | 56 | 36.942607 | -75.006156 | 56 | 3 | 1 | 90° | 1 |
| 07-Jul-2016 | 15:21:55 | 57 | 36.942690 | -74.968101 | 56 | 3 | 1 | 90° | 1 |
| 07-Jul-2016 | 15:23:06 | 53 | 36.942740 | -74.923765 | 56 | 3 | 1 | 90° | 1 |
| 07-Jul-2016 | 16:14:17 | 72 | 37.019114 | -75.038954 | 57 | 3 | 1 | 90° | 2 |
| 08-Jul-2016 | 9:24:59 | 3 | 37.322449 | -75.036577 | 61 | 2 | 2 | 90° | 1 |

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|
| 08-Jul-2016 | 9:25:00 | 3 | 37.322477 | -75.035766 | 61 | 2 | 2 | 90° | 3 |
| 08-Jul-2016 | 9:39:36 | 7 | 37.092072 | -75.138218 | 58 | 2 | 1 | 90° | 2 |
| 08-Jul-2016 | 9:39:55 | 5 | 37.092518 | -75.124251 | 58 | 2 | 2 | 90° | 3 |
| 08-Jul-2016 | 9:48:35 | 10 | 37.092499 | -75.018691 | 58 | 2 | 1 | 90° | 1 |
| 08-Jul-2016 | 9:50:25 | 10 | 37.092902 | -74.948882 | 58 | 2 | 1 | 90° | 1 |
| 08-Jul-2016 | 9:51:41 | 11 | 37.092880 | -74.901199 | 58 | 2 | 2 | 90° | 1 |
| 08-Jul-2016 | 9:52:04 | 11 | 37.092782 | -74.887019 | 58 | 2 | 1 | 90° | 1 |
| 08-Jul-2016 | 10:42:26 | 23 | 36.640773 | -74.884538 | 52 | 2 | 2 | 45° | 1 |
| 08-Jul-2016 | 10:43:07 | 25 | 36.640830 | -74.910189 | 52 | 2 | 2 | 90° | 2 |
| 08-Jul-2016 | 10:46:45 | 27 | 36.640632 | -75.050063 | 52 | 2 | 2 | 90° | 2 |
| 08-Jul-2016 | 11:39:38 | 42 | 36.490574 | -75.041756 | 50 | 2 | 2 | 90° | 1 |
| 08-Jul-2016 | 14:04:40 | 47 | 36.720231 | -75.126709 | 53 | 2 | 2 | 90° | 1 |
| 08-Jul-2016 | 14:07:48 | 49 | 36.720812 | -75.007770 | 53 | 2 | 2 | 90° | 1 |
| 08-Jul-2016 | 14:08:09 | 43 | 36.720745 | -74.994495 | 53 | 2 | 2 | 90° | 2 |
| 08-Jul-2016 | 14:08:58 | 44 | 36.720845 | -74.963958 | 53 | 2 | 1 | 60° | 2 |
| 08-Jul-2016 | 14:31:44 | 55 | 36.719752 | -74.860806 | 53 | 2 | 1 | 90° | 1 |
| 08-Jul-2016 | 15:20:40 | 55 | 37.168156 | -74.809060 | 59 | 2 | 2 | 90° | 1 |
| 08-Jul-2016 | 15:23:39 | 56 | 37.167366 | -74.928283 | 59 | 2 | 3 | 90° | 3 |
| 08-Jul-2016 | 15:24:13 | 69 | 37.167158 | -74.950632 | 59 | 2 | 2 | 90° | 1 |
| 08-Jul-2016 | 15:25:01 | 70 | 37.166887 | -74.981326 | 59 | 2 | 2 | 90° | 1 |
| 08-Jul-2016 | 15:25:01 | 57 | 37.166932 | -74.981461 | 59 | 2 | 3 | 90° | 4 |
| 08-Jul-2016 | 15:25:56 | 71 | 37.166644 | -75.016679 | 59 | 2 | 2 | 90° | 3 |
| 08-Jul-2016 | 15:33:40 | 74 | 37.242655 | -75.100166 | 60 | 3 | 1 | 90° | 1 |
| 08-Jul-2016 | 15:35:23 | 76 | 37.242973 | -75.024984 | 60 | 3 | 2 | 90° | 1 |
| 08-Jul-2016 | 15:36:24 | 63 | 37.242966 | -74.983295 | 60 | 2 | 2 | 60° | 2 |
| 08-Jul-2016 | 15:37:03 | 64 | 37.242918 | -74.956500 | 60 | 2 | 2 | 60° | 3 |
| 08-Jul-2016 | 15:37:04 | 77 | 37.242972 | -74.956180 | 60 | 3 | 2 | 90° | 2 |
| 08-Jul-2016 | 15:38:01 | 78 | 37.242927 | -74.916972 | 60 | 3 | 2 | 90° | 2 |
| 08-Jul-2016 | 16:34:25 | 103 | 37.319773 | -74.718724 | 61 | 2 | 2 | 90° | 1 |
| 08-Jul-2016 | 16:36:53 | 81 | 37.320104 | -74.812139 | 61 | 3 | 1 | 90° | 2 |
| 08-Jul-2016 | 16:41:18 | 82 | 37.320128 | -74.980288 | 61 | 3 | 2 | 90° | 2 |
| 11-Aug-2016 | 13:13:33 | 57 | 36.196736 | -75.117741 | 46 | 2 | 2 | 90° | 1 |
| 11-Aug-2016 | 13:14:51 | 58 | 36.196833 | -75.071105 | 46 | 2 | 1 | 90° | 3 |
| 11-Aug-2016 | 13:16:25 | 59 | 36.196947 | -75.015627 | 46 | 2 | 1 | 90° | 4 |
| 11-Aug-2016 | 14:43:32 | 65 | 36.344990 | -75.131745 | 48 | 2 | 2 | 90 | 1 |
| 11-Aug-2016 | 14:46:37 | 66 | 36.346668 | -75.015093 | 48 | 2 | 2 | 90 | 1 |
| 11-Aug-2016 | 14:47:31 | 96 | 36.346868 | -74.981527 | 48 | 2 | 2 | 90° | 2 |
| 24-Aug-2016 | 9:48:22 | 3 | 36.496713 | -75.023393 | 50 | 3 | 2 | 90° | 1 |
| 24-Aug-2016 | 10:27:52 | 13 | 36.573267 | -74.965058 | 51 | 3 | 1 | 90° | 1 |

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|
| 24-Aug-2016 | 10:28:33 | 10 | 36.573202 | -74.991666 | 51 | 3 | 2 | 60° | 1 |
| 24-Aug-2016 | 10:39:48 | 16 | 36.646499 | -75.064925 | 52 | 3 | 2 | 60° | 1 |
| 24-Aug-2016 | 11:24:56 | 23 | 36.722675 | -75.110506 | 53 | 3 | 2 | 90° | 1 |
| 24-Aug-2016 | 11:25:57 | 28 | 36.722690 | -75.148258 | 53 | 3 | 1 | 90° | 1 |
| 24-Aug-2016 | 13:36:57 | 28 | 36.796343 | -75.032182 | 54 | 3 | 2 | 90° | 2 |
| 24-Aug-2016 | 13:39:12 | 29 | 36.796546 | -74.952579 | 54 | 3 | 2 | 90° | 3 |
| 24-Aug-2016 | 13:41:26 | 31 | 36.796747 | -74.873870 | 54 | 3 | 3 | 90° | 1 |
| 24-Aug-2016 | 15:07:16 | 49 | 37.023007 | -74.832889 | 57 | 3 | 1 | 90° | 1 |
| 25-Aug-2016 | 9:18:57 | 3 | 37.021051 | -75.032085 | 57 | 2 | 2 | 90° | 1 |
| 25-Aug-2016 | 9:21:11 | 4 | 37.021295 | -74.950070 | 57 | 2 | 3 | 90° | 1 |
| 25-Aug-2016 | 10:24:45 | 27 | 36.947988 | -74.862374 | 56 | 2 | 1 | 90° | 2 |
| 25-Aug-2016 | 10:26:36 | 28 | 36.947863 | -74.925112 | 56 | 2 | 1 | 90° | 1 |
| 25-Aug-2016 | 10:26:56 | 17 | 36.947884 | -74.936415 | 56 | 1 | 2 | 90° | 2 |
| 25-Aug-2016 | 10:28:39 | 19 | 36.947813 | -74.995062 | 56 | 2 | 1 | 90° | 2 |
| 25-Aug-2016 | 10:29:25 | 20 | 36.947759 | -75.021776 | 56 | 2 | 2 | 90° | 2 |
| 25-Aug-2016 | 10:29:28 | 29 | 36.947723 | -75.023380 | 56 | 2 | 2 | 90° | 3 |
| 25-Aug-2016 | 10:30:37 | 21 | 36.947708 | -75.063372 | 56 | 2 | 2 | 90° | 3 |
| 25-Aug-2016 | 10:45:34 | 26 | 36.871095 | -75.078798 | 55 | 2 | 2 | 90° | 1 |
| 25-Aug-2016 | 10:50:48 | 38 | 36.871675 | -74.887096 | 55 | 2 | 1 | 90° | 1 |
| 25-Aug-2016 | 10:51:37 | 27 | 36.871591 | -74.857243 | 55 | 2 | 2 | 90° | 2 |
| 25-Aug-2016 | 11:41:09 | 38 | 36.798209 | -74.841203 | 54 | 1 | 1 | 90° | 1 |
| 25-Aug-2016 | 11:42:32 | 61 | 36.798127 | -74.891538 | 54 | 2 | 1 | 90° | 1 |
| 25-Aug-2016 | 11:43:57 | 41 | 36.798050 | -74.943312 | 54 | 1 | 2 | 90° | 3 |
| 25-Aug-2016 | 11:49:23 | 44 | 36.796241 | -74.990776 | 54 | 1 | 2 | 90° | 2 |
| 25-Aug-2016 | 11:50:28 | 45 | 36.797666 | -75.029072 | 54 | 1 | 2 | 90° | 2 |
| 25-Aug-2016 | 11:51:03 | 46 | 36.797771 | -75.050481 | 54 | 1 | 1 | 90° | 2 |
| 25-Aug-2016 | 11:53:38 | 66 | 36.797511 | -75.143444 | 54 | 2 | 2 | 90° | 1 |
| 25-Aug-2016 | 11:53:59 | 47 | 36.797888 | -75.155806 | 54 | 1 | 2 | 90° | 2 |
| 20-Oct-2016 | 9:20:26 | 3 | 36.498288 | -74.958962 | 50 | 2 | 1 | 90° | 1 |
| 20-Oct-2016 | 10:42:19 | 23 | 36.572867 | -75.157640 | 51 | 2 | 3 | 90° | 1 |
| 20-Oct-2016 | 10:47:51 | 26 | 36.647901 | -75.033963 | 52 | 2 | 3 | 90° | 1 |
| 20-Oct-2016 | 10:48:33 | 42 | 36.648081 | -75.006948 | 52 | 2 | 2 | 90° | 1 |
| 20-Oct-2016 | 11:37:13 | 71 | 36.721935 | -74.806616 | 53 | 2 | 1 | 90° | 1 |
| 20-Oct-2016 | 11:41:12 | 42 | 36.721622 | -74.952941 | 53 | 2 | 2 | 90° | 1 |
| 20-Oct-2016 | 11:41:58 | 43 | 36.721807 | -74.980716 | 53 | 2 | 2 | 90° | 1 |
| 20-Oct-2016 | 11:44:25 | 45 | 36.721422 | -75.070592 | 53 | 2 | 2 | 90° | 1 |
| 20-Oct-2016 | 11:45:27 | 47 | 36.721284 | -75.108492 | 53 | 2 | 1 | 90° | 1 |
| 20-Oct-2016 | 13:58:47 | 79 | 36.797676 | -75.061031 | 54 | 2 | 2 | 90° | 1 |
| 20-Oct-2016 | 14:00:17 | 80 | 36.797670 | -74.997696 | 54 | 2 | 1 | 90° | 1 |

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|
| 11-Dec-2016 | 11:14:10 | 25 | 37.320528 | -75.050978 | 61 | 2 | 2 | 90° | 1 |
| 11-Dec-2016 | 13:24:44 | 36 | 36.792615 | -74.982921 | 54 | 3 | 1 | 90° | 1 |

Table 18. Leatherback sea turtle (*Dermochelys coriacea*) sightings in the Norfolk Canyon survey area in 2016.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|
| 09-May-2016 | 11:01:00 | 56 | 37.020717 | -74.801430 | 57 | 2 | 3 | 90° | 1 |
| 08-Jul-2016 | 15:25:23 | 58 | 37.166809 | -74.995595 | 59 | 2 | 1 | 90° | 1 |
| 08-Jul-2016 | 15:58:17 | 69 | 37.242735 | -74.644394 | 60 | 2 | 1 | 90° | 1 |
| 08-Jul-2016 | 16:42:35 | 105 | 37.320134 | -75.029541 | 61 | 3 | 2 | 90° | 1 |
| 08-Jul-2016 | 16:44:09 | 106 | 37.320059 | -75.089237 | 61 | 2 | 1 | 90° | 1 |
| 24-Aug-2016 | 14:30:43 | 47 | 36.945828 | -75.132441 | 56 | 3 | 2 | 90° | 1 |
| 25-Aug-2016 | 9:17:16 | 3 | 37.020971 | -75.095402 | 57 | 2 | 1 | 100° | 1 |
| 25-Aug-2016 | 10:45:32 | 36 | 36.871143 | -75.080576 | 55 | 2 | 1 | 90° | 1 |
| 25-Aug-2016 | 10:47:55 | 37 | 36.871424 | -74.995603 | 55 | 2 | 1 | 90° | 1 |
| 11-Dec-2016 | 13:55:02 | 36 | 36.872926 | -74.534337 | 55 | 2 | 2 | 90° | 1 |

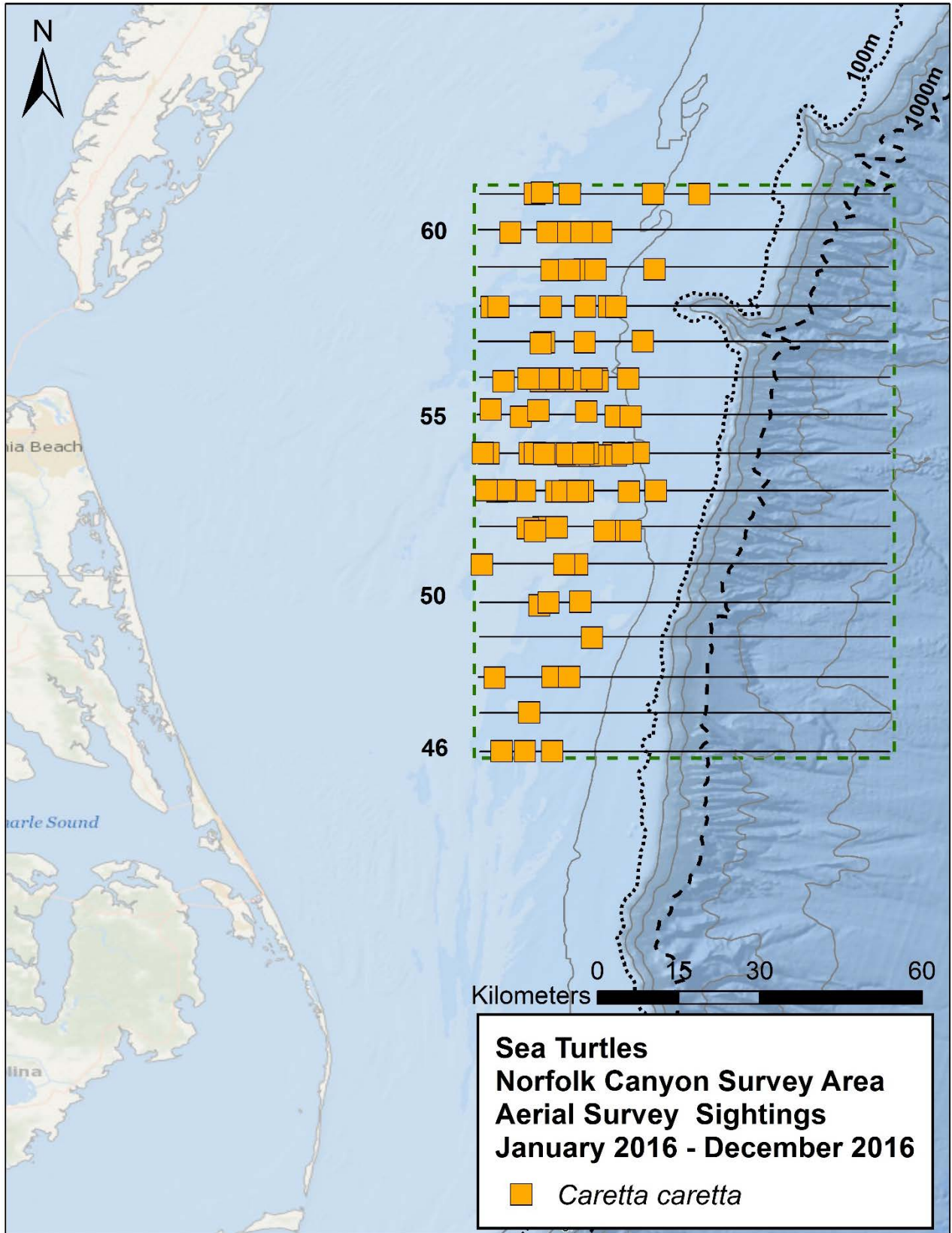


Figure 21. Loggerhead sea turtle (*Caretta caretta*) sightings in the Norfolk Canyon survey area in 2016 (N=96).

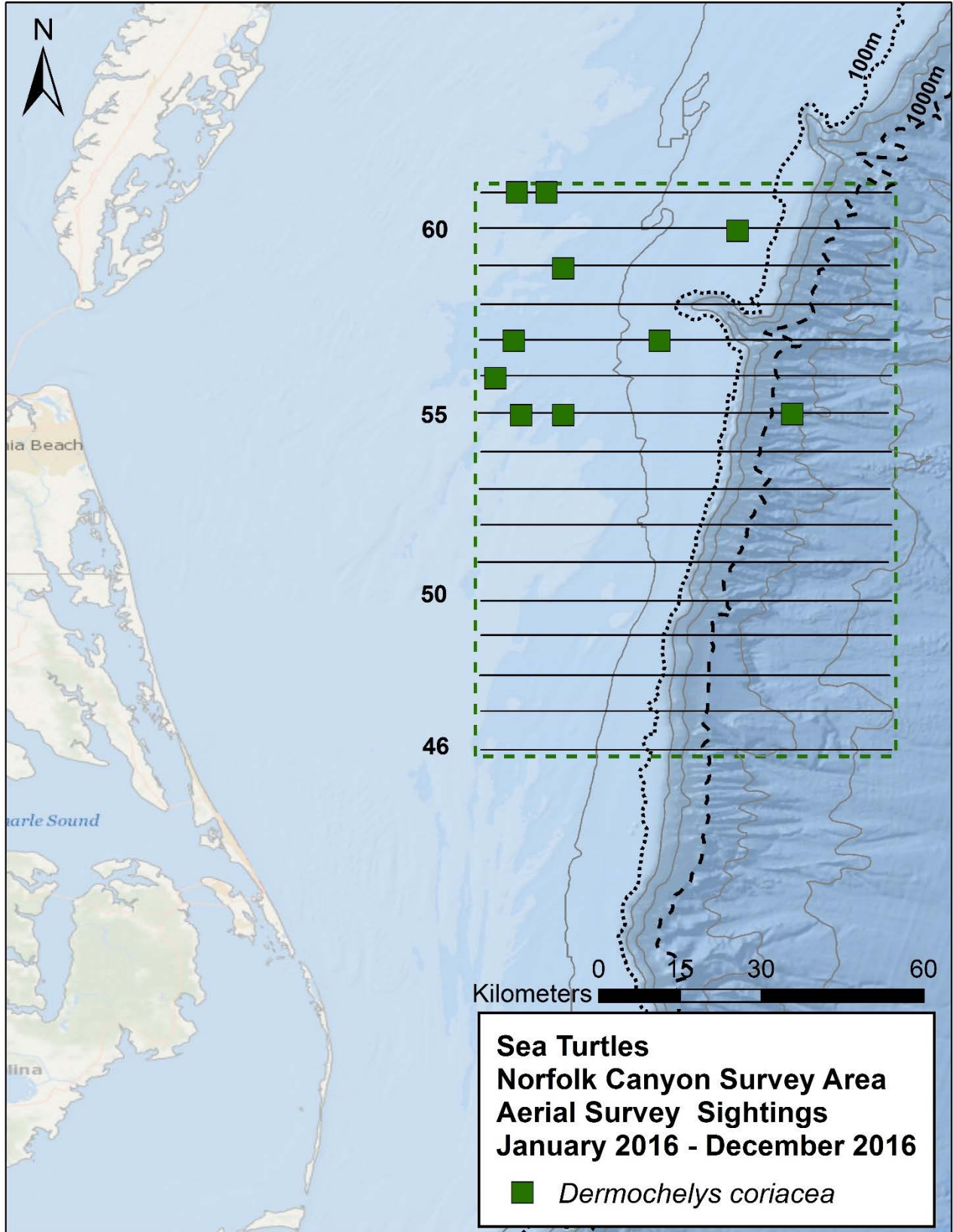


Figure 22. Leatherback sea turtle (*Dermochelys coriacea*) sightings in the Norfolk Canyon survey area in 2016 (N=10).

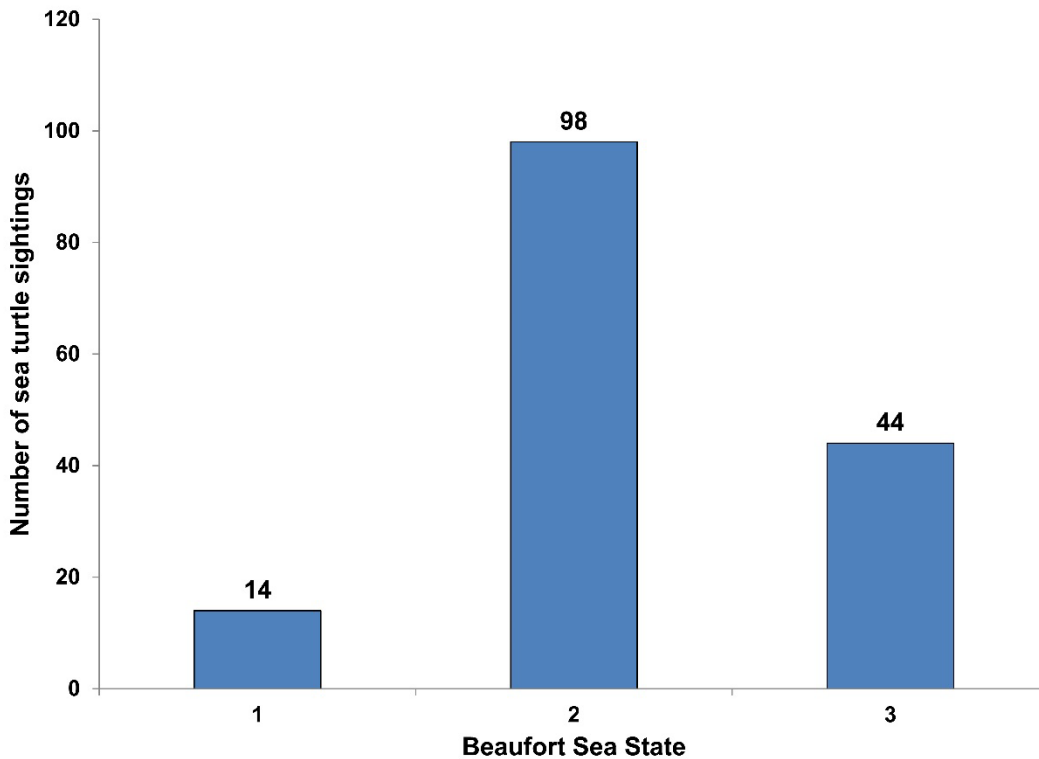


Figure 23a. Total number of sea turtle sightings by Beaufort Sea State category in the Norfolk Canyon survey area in 2016.

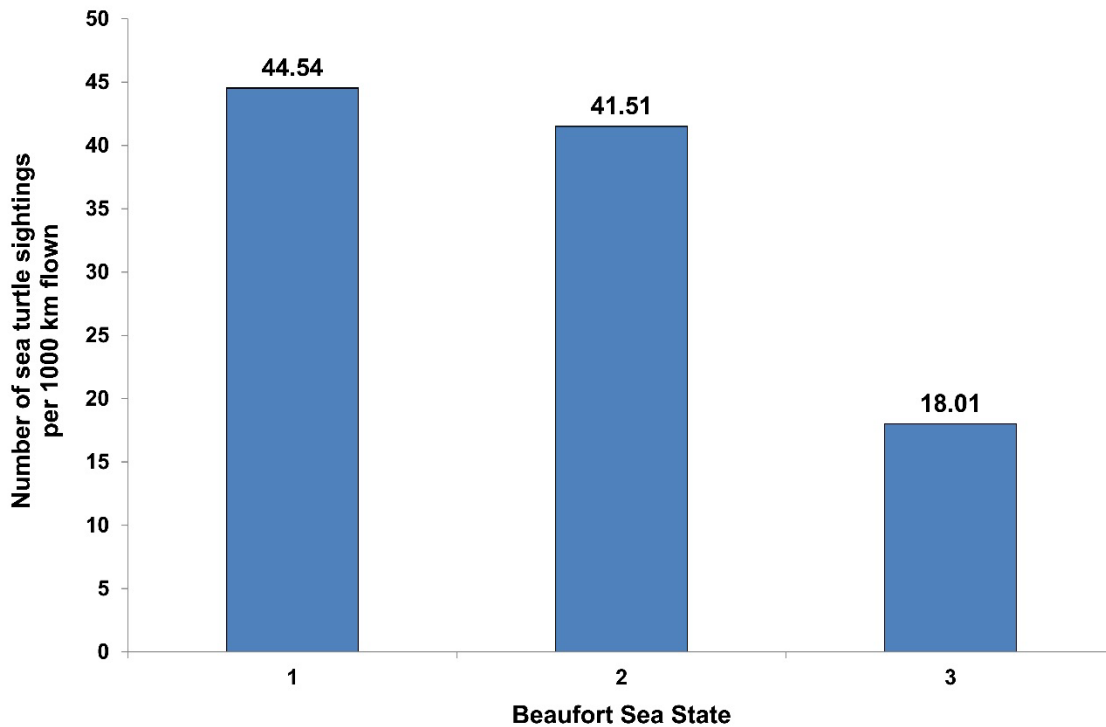


Figure 23b. Sea turtle sightings per 1,000 km flown by Beaufort Sea State category in the Norfolk Canyon survey area in 2016.

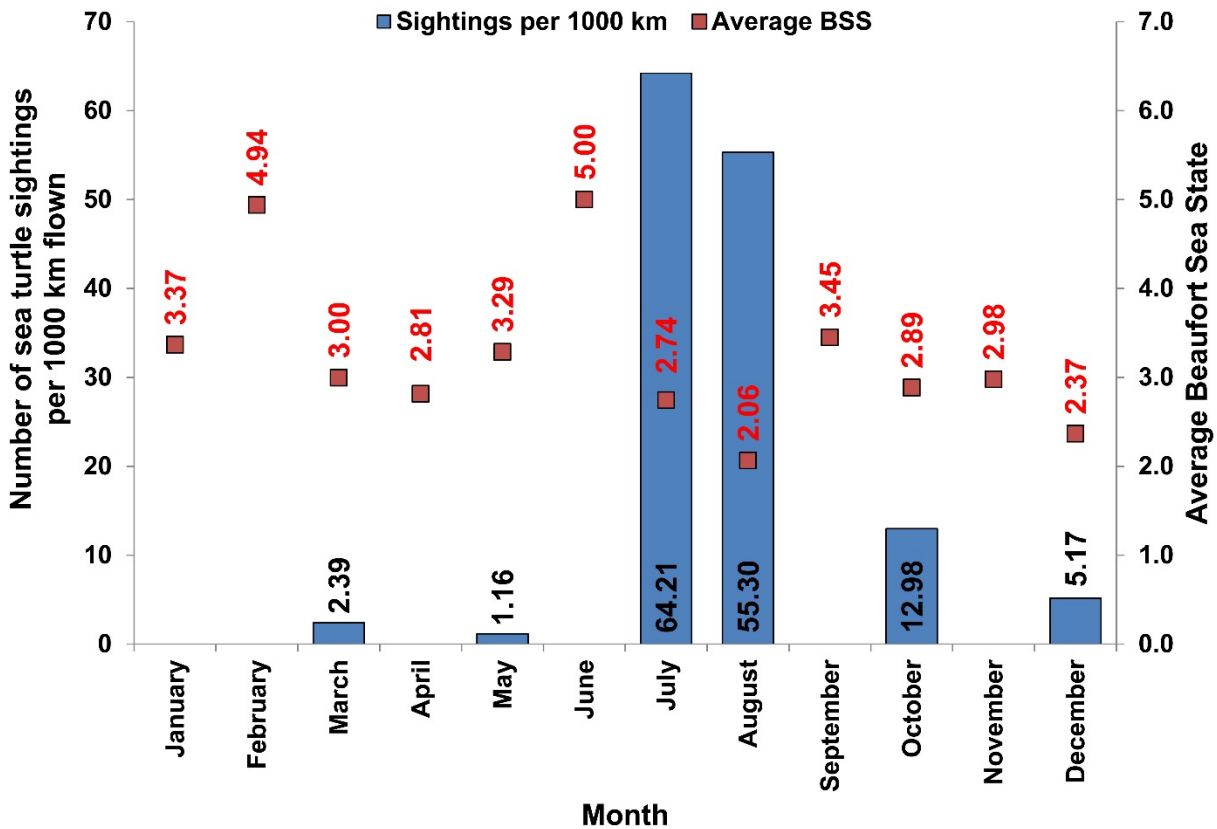


Figure 23c. Sea turtle sightings per 1,000 km surveyed and the average Beaufort Sea State per month in the Norfolk Canyon survey area in 2016.

4.5 Other Marine Vertebrate Sightings

4.5.1 Cartilaginous Fishes (Chondrichthyes)

Eleven sharks were recorded during the reporting period, largely inshore of the 1000-m isobath (Tables 19). Seven of the 11 sharks could be identified as hammerhead sharks (*Sphyrna* sp.) based on head shape, but since none of these sightings could be identified to species they are combined here with unidentified sharks. Two species of rays were identified: 21 manta rays (Table 20) and more than 42,000 cownose rays (Table 21). All sightings are represented in Figure 24.

Table 19. Shark sightings in the Norfolk Canyon survey area in 2016.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Comments |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|-------------------|
| 21-Apr-2016 | 14:38:04 | 28 | 37.110670 | -74.312093 | 56 | 4 | 3 | 90° | 1 | Shark |
| 07-Jul-2016 | 15:29:05 | 59 | 36.942880 | -74.700244 | 56 | 3 | 2 | 90° | 1 | Hammerhead shark |
| 08-Jul-2016 | 14:40:48 | 60 | 36.720685 | -74.606419 | 53 | 2 | 2 | 90° | 1 | Shark |
| 20-Oct-2016 | 10:33:06 | 20 | 36.572136 | -74.943513 | 51 | 2 | 1 | 90° | 1 | Hammerhead shark |
| 20-Oct-2016 | 11:35:31 | 70 | 36.722084 | -74.743106 | 53 | 2 | 2 | 90° | 1 | Shark |
| 20-Oct-2016 | 14:09:31 | 85 | 36.798274 | -74.849649 | 54 | 2 | 1 | 90° | 1 | Hammerhead shark |
| 20-Oct-2016 | 14:12:57 | 87 | 36.798291 | -74.705115 | 54 | 2 | 1 | 90° | 1 | Shark |
| 20-Oct-2016 | 15:14:55 | 117 | 36.947536 | -75.103883 | 56 | 2 | 1 | 90° | 1 | Hammerhead shark |
| 17-Nov-2015 | 11:39:11 | 33 | 35.553075 | -74.844616 | 37 | 2 | 2 | 90° | 3 | Hammerhead sharks |

Table 20. Manta ray (*Manta birostris*) sightings in the Norfolk Canyon survey area in 2016.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|
| 20-May-2016 | 14:05:50 | 34 | 36.346925 | -74.728054 | 48 | 4 | 1 | 90° | 1 |
| 07-Jul-2016 | 11:06:38 | 21 | 36.426997 | -74.600528 | 49 | 4 | 2 | 90° | 1 |
| 07-Jul-2016 | 14:28:30 | 43 | 36.792353 | -74.436562 | 54 | 3 | 1 | 90° | 2 |
| 07-Jul-2016 | 15:00:42 | 43 | 36.875285 | -74.611979 | 55 | 3 | 2 | 90° | 1 |
| 07-Jul-2016 | 15:01:25 | 44 | 36.875840 | -74.639535 | 55 | 3 | 1 | 90° | 1 |
| 07-Jul-2016 | 15:02:20 | 45 | 36.876578 | -74.674738 | 55 | 3 | 2 | 90° | 1 |
| 07-Jul-2016 | 15:09:26 | 46 | 36.881669 | -74.943499 | 55 | 3 | 2 | 90° | 1 |
| 07-Jul-2016 | 15:25:38 | 58 | 36.942809 | -74.829120 | 56 | 3 | 1 | 90° | 1 |
| 07-Jul-2016 | 15:46:21 | 62 | 37.019466 | -74.513415 | 57 | 3 | 1 | 90° | 1 |
| 08-Jul-2016 | 11:09:13 | 31 | 36.562227 | -74.648080 | 51 | 2 | 1 | 60° | 1 |
| 08-Jul-2016 | 16:15:47 | 96 | 37.241922 | -74.442437 | 60 | 2 | 3 | 90° | 2 |
| 08-Jul-2016 | 16:16:00 | 74 | 37.242660 | -74.432529 | 60 | 2 | 1 | 90° | 1 |
| 08-Jul-2016 | 16:16:31 | 75 | 37.243088 | -74.410093 | 60 | 2 | 3 | 90° | 2 |
| 24-Aug-2016 | 13:40:24 | 30 | 36.796665 | -74.910994 | 54 | 3 | 3 | 90° | 1 |
| 25-Aug-2016 | 11:43:01 | 40 | 36.798209 | -74.909052 | 54 | 1 | 1 | 90° | 1 |
| 20-Oct-2016 | 9:26:13 | 4 | 36.498347 | -74.723984 | 50 | 1 | 2 | 90° | 1 |
| 20-Oct-2016 | 10:23:40 | 31 | 36.573574 | -74.703388 | 51 | 2 | 2 | 60° | 1 |
| 20-Oct-2016 | 14:11:13 | 86 | 36.798162 | -74.777665 | 54 | 2 | 1 | 90° | 1 |

Table 21. Cownose ray (*Rhinoptera bonasus*) sightings in the Norfolk Canyon survey area in 2016.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|
| 20-May-2016 | 14:35:28 | 34 | 36.423587 | -74.979554 | 49 | 3 | 1 | 90° | 550 |
| 20-May-2016 | 14:35:28 | 41 | 36.423558 | -74.979846 | 49 | 3 | 1 | 90° | 900 |
| 07-Jul-2016 | 14:03:10 | 35 | 36.791995 | -75.136078 | 54 | 3 | 2 | 90° | 11,000 |
| 07-Jul-2016 | 14:03:14 | 30 | 36.791998 | -75.133837 | 54 | 3 | 2 | 90° | 5,000 |
| 07-Jul-2016 | 14:04:20 | 31 | 36.792427 | -75.089923 | 54 | 3 | 1 | 90° | 4,000 |
| 07-Jul-2016 | 14:07:57 | 37 | 36.792623 | -74.940940 | 54 | 3 | 1 | 90° | 2,000 |
| 08-Jul-2016 | 14:05:29 | 48 | 36.720567 | -75.095565 | 53 | 2 | 3 | 90° | 5,000 |
| 08-Jul-2016 | 14:08:24 | 50 | 36.720781 | -74.985094 | 53 | 2 | 1 | 90° | 1,250 |
| 08-Jul-2016 | 15:35:30 | 62 | 37.242856 | -75.019860 | 60 | 2 | 1 | 90° | 80 |
| 24-Aug-2016 | 10:28:13 | 14 | 36.573247 | -74.978403 | 51 | 3 | 2 | 90° | 700 |
| 24-Aug-2016 | 10:29:28 | 15 | 36.573205 | -75.026600 | 51 | 3 | 3 | 90° | 1,700 |
| 24-Aug-2016 | 10:29:58 | 12 | 36.566182 | -75.041352 | 51 | 3 | 2 | 90° | 4,000 |
| 24-Aug-2016 | 11:21:17 | 22 | 36.723147 | -74.976228 | 53 | 3 | 2 | 90° | 1,200 |
| 24-Aug-2016 | 11:22:21 | 27 | 36.723085 | -75.015636 | 53 | 3 | 2 | 90° | 500 |
| 03-Oct-2016 | 9:39:19 | 3 | 37.092588 | -75.089652 | 58 | 4 | 3 | 100° | 225 |
| 20-Oct-2016 | 11:40:05 | 41 | 36.721716 | -74.911664 | 53 | 2 | 4 | 90° | 100 |
| 20-Oct-2016 | 11:42:24 | 72 | 36.721730 | -74.996918 | 53 | 2 | 1 | 60° | 2,100 |
| 20-Oct-2016 | 11:42:38 | 44 | 36.721588 | -75.005116 | 53 | 2 | 1 | 90° | 100 |
| 20-Oct-2016 | 11:44:52 | 46 | 36.721348 | -75.086954 | 53 | 2 | 1 | 90° | 70 |
| 20-Oct-2016 | 15:17:58 | 73 | 36.947861 | -74.986479 | 56 | 2 | 3 | 45° | 85 |
| 20-Oct-2016 | 15:18:24 | 118 | 36.947637 | -74.969305 | 56 | 2 | 1 | 90° | 1,500 |
| 20-Oct-2016 | 15:19:19 | 74 | 36.948032 | -74.933441 | 56 | 2 | 3 | 45° | 150 |
| 20-Oct-2016 | 16:13:48 | 142 | 37.021377 | -74.958493 | 57 | 2 | 1 | 90° | 110 |
| 03-Nov-2016 | 12:02:36 | 23 | 36.190576 | -75.026790 | 46 | 3 | 2 | 90° | 600 |

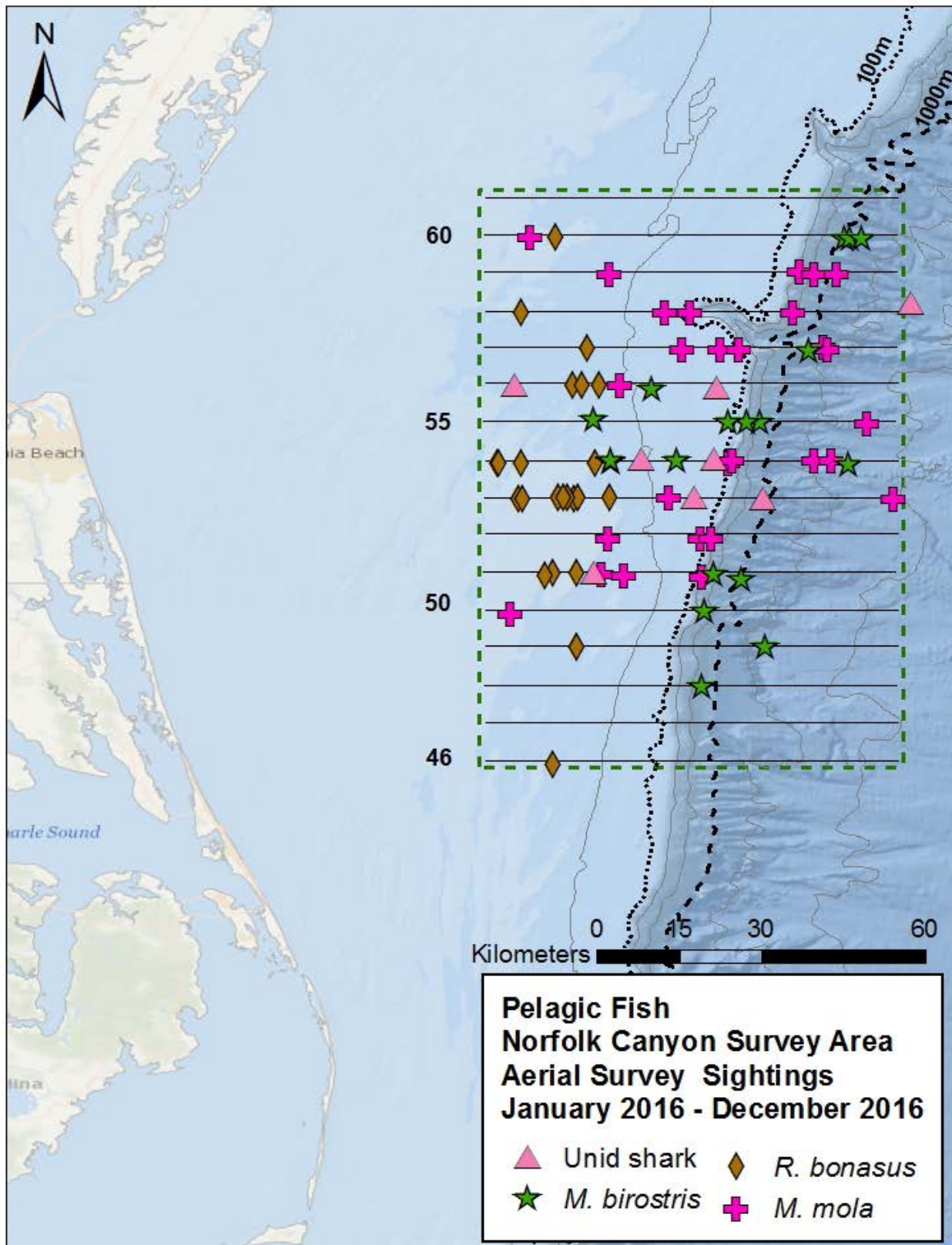


Figure 24. Pelagic fish sightings: Unidentified shark, Manta ray (*Manta birostris*), cownose ray (*Rhinoptera bonasus*), ocean sunfish (*Mola mola*) in the Norfolk Canyon survey area in 2016 (N=79).

4.5.2 Other fishes

Thirty-three ocean sunfish were recorded, with the majority inshore of the 100-m isobath (**Table 22, Figure 24**).

Table 22. Ocean sunfish (*Mola mola*) sightings in the Norfolk Canyon survey area in 2016.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|
| 30-Jan-2016 | 10:25:51 | 9 | 37.022270 | -74.484158 | 57 | 4 | 2 | 90° | 1 |
| 30-Jan-2016 | 11:18:46 | 16 | 37.174767 | -74.534242 | 59 | 3 | 1 | 90° | 1 |
| 09-Mar-2016 | 10:14:40 | 19 | 36.720797 | -74.346301 | 53 | 3 | 2 | 90° | 1 |
| 09-Mar-2016 | 10:36:18 | 26 | 36.640851 | -74.730273 | 52 | 3 | 1 | 60° | 1 |
| 09-Mar-2016 | 11:00:14 | 30 | 36.563701 | -74.727264 | 51 | 2 | 1 | 90° | 1 |
| 21-Apr-2016 | 13:48:31 | 10 | 37.019411 | -74.692363 | 57 | 3 | 2 | 80° | 1 |
| 09-May-2016 | 9:11:31 | 1 | 37.168954 | -74.911825 | 59 | 2 | 1 | 90° | 1 |
| 09-May-2016 | 10:23:53 | 41 | 37.092012 | -74.547063 | 58 | 2 | 4 | 90° | 1 |
| 09-May-2016 | 10:33:54 | 50 | 37.091478 | -74.751678 | 58 | 2 | 2 | 90° | 1 |
| 09-May-2016 | 10:35:21 | 51 | 37.091513 | -74.803268 | 58 | 2 | 2 | 90° | 1 |
| 09-May-2016 | 15:55:01 | 62 | 36.791605 | -74.674557 | 54 | 3 | 2 | 90° | 1 |
| 09-May-2016 | 16:50:18 | 73 | 36.722544 | -74.794302 | 53 | 2 | 2 | 90° | 1 |
| 09-May-2016 | 17:31:44 | 135 | 36.640342 | -74.710508 | 52 | 2 | 2 | 80° | 1 |
| 08-Jul-2016 | 10:43:16 | 24 | 36.640858 | -74.916360 | 52 | 2 | 1 | 90° | 1 |
| 08-Jul-2016 | 11:01:42 | 29 | 36.568409 | -74.927748 | 51 | 2 | 1 | 90° | 4 |
| 08-Jul-2016 | 11:02:48 | 30 | 36.567412 | -74.884838 | 51 | 2 | 2 | 60° | 1 |
| 08-Jul-2016 | 11:41:23 | 38 | 36.490383 | -75.111343 | 50 | 2 | 1 | 90° | 1 |
| 08-Jul-2016 | 15:13:05 | 53 | 37.169521 | -74.503971 | 59 | 3 | 2 | 90° | 1 |
| 08-Jul-2016 | 15:34:16 | 75 | 37.242875 | -75.071672 | 60 | 3 | 2 | 90° | 1 |
| 25-Aug-2016 | 11:19:03 | 47 | 36.797844 | -74.503184 | 54 | 1 | 2 | 90° | 1 |
| 20-Oct-2016 | 14:13:52 | 88 | 36.797884 | -74.666862 | 54 | 2 | 1 | 60° | 2 |
| 20-Oct-2016 | 14:24:18 | 94 | 36.797728 | -74.468796 | 54 | 2 | 1 | 90° | 2 |
| 20-Oct-2016 | 15:20:22 | 119 | 36.947977 | -74.892610 | 56 | 2 | 2 | 90° | 1 |
| 11-Dec-2016 | 10:08:26 | 19 | 37.169696 | -74.458004 | 59 | 3 | 1 | 90° | 1 |
| 11-Dec-2016 | 13:51:38 | 35 | 36.870522 | -74.399373 | 55 | 2 | 1 | 90° | 1 |
| 11-Dec-2016 | 14:57:03 | 65 | 37.018985 | -74.477054 | 57 | 2 | 2 | 90° | 1 |
| 11-Dec-2016 | 15:01:28 | 49 | 37.019371 | -74.653853 | 57 | 2 | 1 | 90° | 1 |
| 11-Dec-2016 | 15:04:21 | 50 | 37.019370 | -74.767660 | 57 | 2 | 2 | 90° | 1 |

4.6 Vessel Sightings

4.6.1 Commercial

A total of 38 commercial vessels, including cargo vessels, tankers vessels, car carrier vessels, container vessels, and commercial fishing vessels, was observed in the Norfolk Canyon survey area (Table 23, Figure 25).

Table 23. Commercial vessel sightings in the Norfolk Canyon survey area in 2016.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Comments |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|---------------------------|
| 30-Jan-2016 | 10:02:27 | 8 | 36.946257 | -75.001559 | 56 | 4 | 3 | 45° | 1 | Commercial fishing vessel |
| 30-Jan-2016 | 10:06:05 | 6 | 36.946927 | -74.851640 | 56 | 4 | 3 | 60° | 1 | Cargo vessel |
| 30-Jan-2016 | 11:17:54 | 22 | 37.172584 | -74.499336 | 59 | 3 | 2 | 90° | 1 | Commercial fishing vessel |
| 01-Feb-2016 | 9:53:04 | 8 | 36.797564 | -74.812284 | 54 | 4 | 3 | 45° | 1 | Cargo vessel |
| 22-Feb-2016 | 8:57:50 | 5 | 37.326841 | -75.135105 | 61 | 4 | 3 | 45° | 1 | Commercial fishing vessel |
| 22-Feb-2016 | 9:39:57 | 10 | 37.239277 | -75.152904 | 60 | 4 | 4 | 90° | 1 | Commercial fishing vessel |
| 22-Feb-2016 | 9:47:59 | 16 | 37.169076 | -74.933576 | 59 | 4 | 2 | 90° | 1 | Commercial fishing vessel |
| 09-Mar-2016 | 10:42:13 | 16 | 36.641002 | -74.962714 | 52 | 3 | 2 | 60° | 1 | Commercial fishing vessel |
| 09-Mar-2016 | 10:59:38 | 19 | 36.564210 | -74.751067 | 51 | 2 | 4 | 60° | 1 | Commercial fishing vessel |
| 09-Mar-2016 | 11:53:32 | 28 | 36.491523 | -74.526887 | 50 | 3 | 3 | 90° | 1 | Commercial fishing vessel |
| 09-Mar-2016 | 12:07:50 | 30 | 36.491211 | -75.103448 | 50 | 2 | 4 | 40° | 1 | Commercial fishing vessel |
| 21-Apr-2016 | 13:25:21 | 4 | 36.943087 | -74.757023 | 56 | 2 | 4 | 90° | 1 | Cargo vessel |
| 21-Apr-2016 | 13:49:41 | 11 | 37.019370 | -74.739224 | 57 | 3 | 2 | 90° | 1 | Cargo vessel |
| 09-May-2016 | 10:38:01 | 52 | 37.091475 | -74.897572 | 58 | 2 | 4 | 40° | 1 | Cargo vessel |
| 09-May-2016 | 11:58:34 | 46 | 36.940924 | -74.599911 | 56 | 2 | 3 | 90° | 1 | Cargo vessel |
| 20-May-2016 | 13:16:38 | 24 | 36.197308 | -74.799534 | 46 | 5 | 3 | 60° | 1 | Cargo vessel |
| 20-May-2016 | 14:24:44 | 38 | 36.423340 | -74.564942 | 49 | 5 | 1 | 45° | 1 | Cargo vessel |
| 07-Jul-2016 | 9:43:10 | 8 | 36.189824 | -74.686080 | 46 | 4 | 3 | 45° | 1 | Cargo vessel |
| 07-Jul-2016 | 10:27:02 | 12 | 36.274348 | -75.121569 | 47 | 3 | 3 | 45° | 1 | Cargo vessel |
| 07-Jul-2016 | 14:16:37 | 35 | 36.792831 | -74.615901 | 54 | 3 | 3 | 60° | 1 | Cargo vessel |
| 08-Jul-2016 | 15:49:44 | 84 | 37.240578 | -74.813060 | 60 | 2 | 3 | 45° | 1 | Cargo vessel |
| 24-Aug-2016 | 10:53:43 | 21 | 36.646756 | -74.574878 | 52 | 3 | 2 | 45° | 1 | Tanker |

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Comments |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|---------------------------|
| 24-Aug-2016 | 11:14:20 | 25 | 36.723285 | -74.715061 | 53 | 3 | 2 | 45° | 1 | Cargo vessel |
| 24-Aug-2016 | 13:46:26 | 34 | 36.796848 | -74.691786 | 54 | 4 | 4 | 45° | 1 | Tanker |
| 24-Aug-2016 | 14:03:29 | 39 | 36.872802 | -74.372418 | 55 | 3 | 4 | 90° | 1 | Car carrier |
| 24-Aug-2016 | 14:09:07 | 39 | 36.873006 | -74.592690 | 55 | 4 | 3 | 60° | 1 | Tanker |
| 24-Aug-2016 | 14:48:09 | 45 | 36.946393 | -74.476885 | 56 | 3 | 3 | 90° | 2 | Car carrier |
| 12-Sep-2016 | 14:06:35 | 65 | 36.271755 | -75.039868 | 47 | 4 | 4 | 90° | 1 | Tanker |
| 20-Oct-2016 | 14:56:52 | 68 | 36.871594 | -74.789714 | 55 | 2 | 3 | 45° | 1 | Car carrier |
| 03-Nov-2016 | 9:33:20 | 3 | 36.426932 | -75.041422 | 49 | 3 | 3 | 45° | 1 | Commercial fishing vessel |
| 03-Nov-2016 | 10:42:17 | 18 | 36.356500 | -74.843486 | 48 | 3 | 3 | 60° | 1 | Tanker |
| 03-Nov-2016 | 10:57:15 | 11 | 36.275841 | -75.057703 | 47 | 3 | 4 | 90° | 1 | Commercial fishing vessel |
| 03-Nov-2016 | 11:04:44 | 23 | 36.277606 | -74.769930 | 47 | 3 | 1 | 90° | 1 | Tanker |
| 03-Nov-2016 | 11:15:59 | 28 | 36.278765 | -74.384661 | 47 | 2 | 1 | 60° | 1 | Commercial fishing vessel |
| 11-Dec-2016 | 10:09:45 | 14 | 37.169167 | -74.516216 | 59 | 3 | 4 | 60° | 1 | Cargo vessel |
| 11-Dec-2016 | 11:13:39 | 31 | 37.320627 | -75.030170 | 61 | 2 | 1 | 90° | 1 | Tanker |
| 11-Dec-2016 | 14:08:51 | 47 | 36.884366 | -75.098822 | 55 | 2 | 3 | 90° | 1 | Tug and barge |

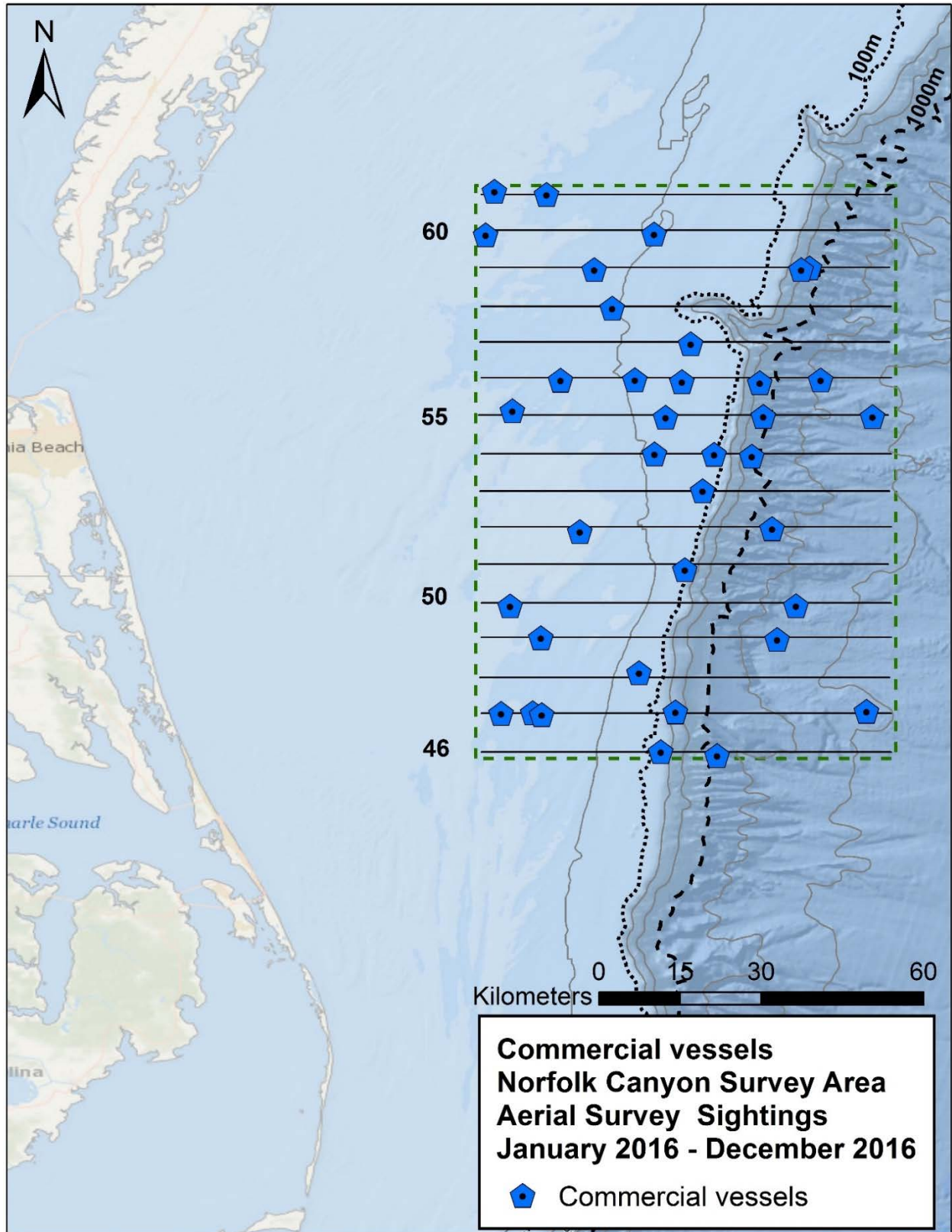


Figure 25. Commercial vessel sightings in the Norfolk Canyon survey area in 2016 (N=38).

4.6.2 Military Vessels

Twelve military vessels were observed in the Norfolk Canyon survey area (Table 24, Figure 26).

Table 24. Military vessel sightings in the Norfolk Canyon survey area in 2016.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Comments |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|-----------|
| 09-May-2016 | 15:26:30 | 54 | 36.873930 | -74.505795 | 55 | 2 | 3 | 60° | 1 | Submarine |
| 09-May-2016 | 16:55:23 | 74 | 36.721487 | -74.616852 | 53 | 2 | 2 | 60° | 1 | Military |
| 24-Aug-2016 | 10:17:47 | 9 | 36.573230 | -74.571736 | 51 | 3 | 2 | 45° | 1 | Military |
| 24-Aug-2016 | 10:22:55 | 11 | 36.573343 | -74.771164 | 51 | 3 | 4 | 90° | 1 | Military |
| 24-Aug-2016 | 10:51:22 | 20 | 36.646885 | -74.656248 | 52 | 3 | 2 | 45° | 1 | Military |
| 24-Aug-2016 | 11:18:01 | 26 | 36.723240 | -74.852408 | 53 | 3 | 4 | 45° | 1 | Military |
| 12-Sep-2016 | 14:20:07 | 43 | 36.347913 | -74.899339 | 48 | 3 | 3 | 35° | 1 | Military |
| 03-Nov-2016 | 11:54:15 | 22 | 36.190362 | -74.670881 | 46 | 3 | 4 | 60° | 1 | Military |
| 09-May-2016 | 15:44:40 | 101 | 36.796485 | -74.572935 | 54 | 2 | 4 | 40° | 1 | Military |
| 09-Mar-2016 | 10:34:04 | 14 | 36.640562 | -74.641585 | 52 | 3 | 3 | 90° | 1 | Military |
| 20-Oct-2016 | 10:02:47 | 20 | 36.497842 | -74.382895 | 50 | 2 | 1 | 45° | 1 | Military |
| 20-Oct-2016 | 14:08:06 | 84 | 36.799704 | -74.909327 | 54 | 2 | 3 | 45° | 1 | Military |

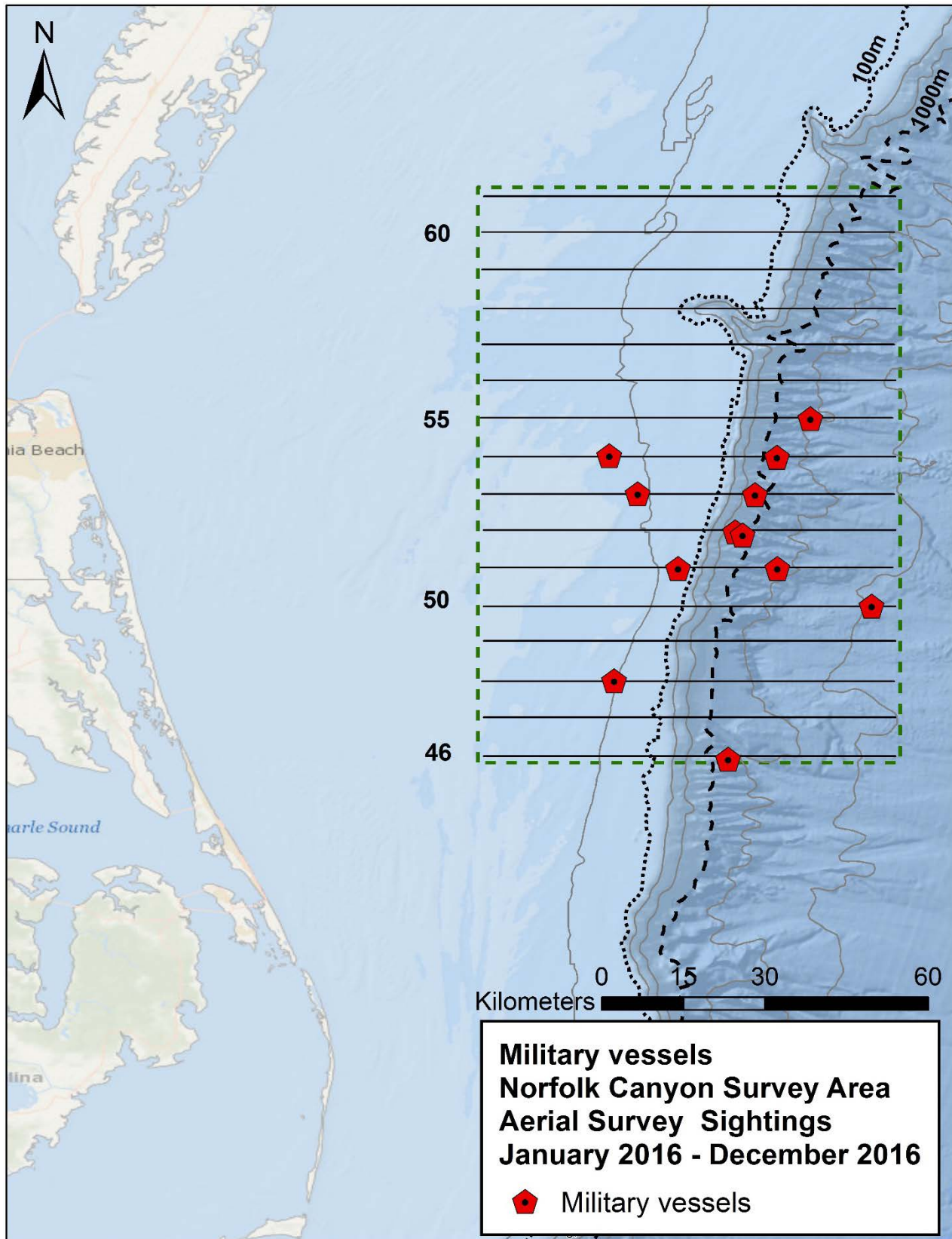


Figure 26. Military vessel sightings in the Norfolk Canyon survey area in 2016 (N=12).

4.6.3 Other Vessels

A total of 51 other vessels was recorded in the survey area (**Table 25, Figure 27**). Besides two sailboats and a single research vessel, all other vessel sightings were categorized as recreational sport-fishing vessels.

Table 25. Other vessel sightings in the Norfolk Canyon survey area in 2016.

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Comments |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|-----------------------------|
| 09-Mar-2016 | 10:39:02 | 27 | 36.640894 | -74.837910 | 52 | 3 | 1 | 90° | 1 | Recreational fishing vessel |
| 21-Apr-2016 | 15:29:04 | 24 | 37.166818 | -75.093087 | 59 | 3 | 3 | 60° | 1 | Recreational fishing vessel |
| 09-May-2016 | 9:13:25 | 3 | 37.169309 | -74.846309 | 59 | 2 | 2 | 45° | 1 | Recreational fishing vessel |
| 09-May-2016 | 10:32:41 | 27 | 37.091689 | -74.706162 | 58 | 2 | 2 | 90° | 1 | Recreational fishing vessel |
| 09-May-2016 | 10:39:18 | 53 | 37.091336 | -74.943469 | 58 | 2 | 3 | 90° | 1 | Recreational fishing vessel |
| 09-May-2016 | 15:55:38 | 63 | 36.791615 | -74.696843 | 54 | 3 | 3 | 90° | 1 | Recreational fishing vessel |
| 09-May-2016 | 16:51:19 | 124 | 36.720805 | -74.759660 | 53 | 2 | 1 | 40° | 1 | Recreational fishing vessel |
| 20-May-2016 | 14:01:15 | 32 | 36.346754 | -74.913449 | 48 | 3 | 2 | 60° | 1 | Recreational fishing vessel |
| 20-May-2016 | 14:37:15 | 35 | 36.423397 | -75.050747 | 49 | 3 | 1 | 90° | 1 | Recreational fishing vessel |
| 13-Jun-2016 | 10:32:03 | 9 | 37.096445 | -74.595173 | 58 | 5 | 4 | 100° | 1 | Recreational fishing vessel |
| 07-Jul-2016 | 10:01:13 | 12 | 36.277371 | -74.538502 | 47 | 4 | 2 | 45° | 1 | Sailboat |
| 07-Jul-2016 | 11:25:47 | 30 | 36.426521 | -74.766737 | 49 | 3 | 3 | 45° | 1 | Recreational fishing vessel |
| 07-Jul-2016 | 14:05:34 | 36 | 36.792559 | -75.038869 | 54 | 3 | 4 | 45° | 1 | Recreational fishing vessel |
| 07-Jul-2016 | 14:06:55 | 32 | 36.792677 | -74.983166 | 54 | 3 | 3 | 90° | 1 | Recreational fishing vessel |
| 07-Jul-2016 | 14:29:55 | 44 | 36.792297 | -74.380929 | 54 | 3 | 1 | 90° | 1 | Sailboat |
| 07-Jul-2016 | 15:19:21 | 51 | 36.942722 | -75.064433 | 56 | 3 | 1 | 90° | 1 | Recreational fishing vessel |
| 07-Jul-2016 | 16:03:44 | 71 | 37.020342 | -74.636573 | 57 | 3 | 4 | 90° | 1 | Recreational fishing vessel |
| 08-Jul-2016 | 10:32:27 | 20 | 36.640619 | -74.721639 | 52 | 2 | 3 | 90° | 1 | Recreational fishing vessel |
| 08-Jul-2016 | 15:16:07 | 68 | 37.169052 | -74.626692 | 59 | 2 | 3 | 90° | 3 | Recreational |

| Date | Time | Way Point | Latitude | Longitude-1 | Track Number | BSS | Angle out | Degree Forward | Best # | Comments |
|-------------|----------|-----------|-----------|-------------|--------------|-----|-----------|----------------|--------|-----------------------------|
| | | | | | | | | | | fishing vessel |
| 08-Jul-2016 | 15:27:39 | 59 | 37.166199 | -75.083632 | 59 | 2 | 1 | 45° | 1 | Recreational fishing vessel |
| 11-Aug-2016 | 13:34:34 | 46 | 36.197251 | -74.751226 | 46 | 1 | 2 | 90 | 10 | Recreational fishing vessel |
| 11-Aug-2016 | 13:40:17 | 68 | 36.196583 | -74.716992 | 46 | 2 | 2 | 90° | 2 | Recreational fishing vessel |
| 11-Aug-2016 | 14:28:23 | 93 | 36.273776 | -74.745282 | 47 | 2 | 2 | 90° | 1 | Recreational fishing vessel |
| 24-Aug-2016 | 9:56:22 | 3 | 36.497099 | -74.743593 | 50 | 3 | 3 | 90° | 1 | Recreational fishing vessel |
| 24-Aug-2016 | 9:56:30 | 4 | 36.497137 | -74.739336 | 50 | 3 | 2 | 90° | 2 | Recreational fishing vessel |
| 24-Aug-2016 | 10:20:18 | 9 | 36.573348 | -74.668696 | 51 | 3 | 1 | 45° | 1 | Recreational fishing vessel |
| 24-Aug-2016 | 10:21:26 | 10 | 36.573499 | -74.712880 | 51 | 3 | 3 | 45° | 1 | Recreational fishing vessel |
| 24-Aug-2016 | 10:24:51 | 12 | 36.573488 | -74.847185 | 51 | 3 | 3 | 90° | 1 | Recreational fishing vessel |
| 24-Aug-2016 | 10:56:34 | 18 | 36.646828 | -74.475028 | 52 | 4 | 2 | 60° | 1 | Recreational fishing vessel |
| 25-Aug-2016 | 9:39:07 | 9 | 37.021586 | -74.574087 | 57 | 1 | 2 | 60° | 1 | Recreational fishing vessel |
| 03-Oct-2016 | 10:40:50 | 13 | 37.242332 | -74.799238 | 60 | 3 | 3 | 90° | 1 | Recreational fishing vessel |
| 20-Oct-2016 | 10:02:37 | 11 | 36.497673 | -74.389163 | 50 | 1 | 3 | 45° | 1 | Recreational fishing vessel |
| 20-Oct-2016 | 11:23:18 | 61 | 36.721450 | -74.470279 | 53 | 2 | 3 | 90° | 1 | Recreational fishing vessel |
| 20-Oct-2016 | 14:14:18 | 89 | 36.798007 | -74.649392 | 54 | 2 | 1 | 90° | 1 | Recreational fishing vessel |
| 11-Dec-2016 | 9:33:31 | 7 | 37.092247 | -74.741421 | 58 | 3 | 2 | 90° | 1 | Recreational fishing vessel |
| 11-Dec-2016 | 10:42:34 | 17 | 37.242313 | -74.594079 | 60 | 3 | 1 | 90° | 1 | Research vessel |
| 11-Dec-2016 | 10:42:35 | 24 | 37.242331 | -74.593167 | 60 | 2 | 1 | 90° | 1 | Recreational fishing vessel |
| 11-Dec-2016 | 13:32:10 | 38 | 36.792694 | -74.704902 | 54 | 2 | 1 | 90° | 1 | Recreational fishing vessel |

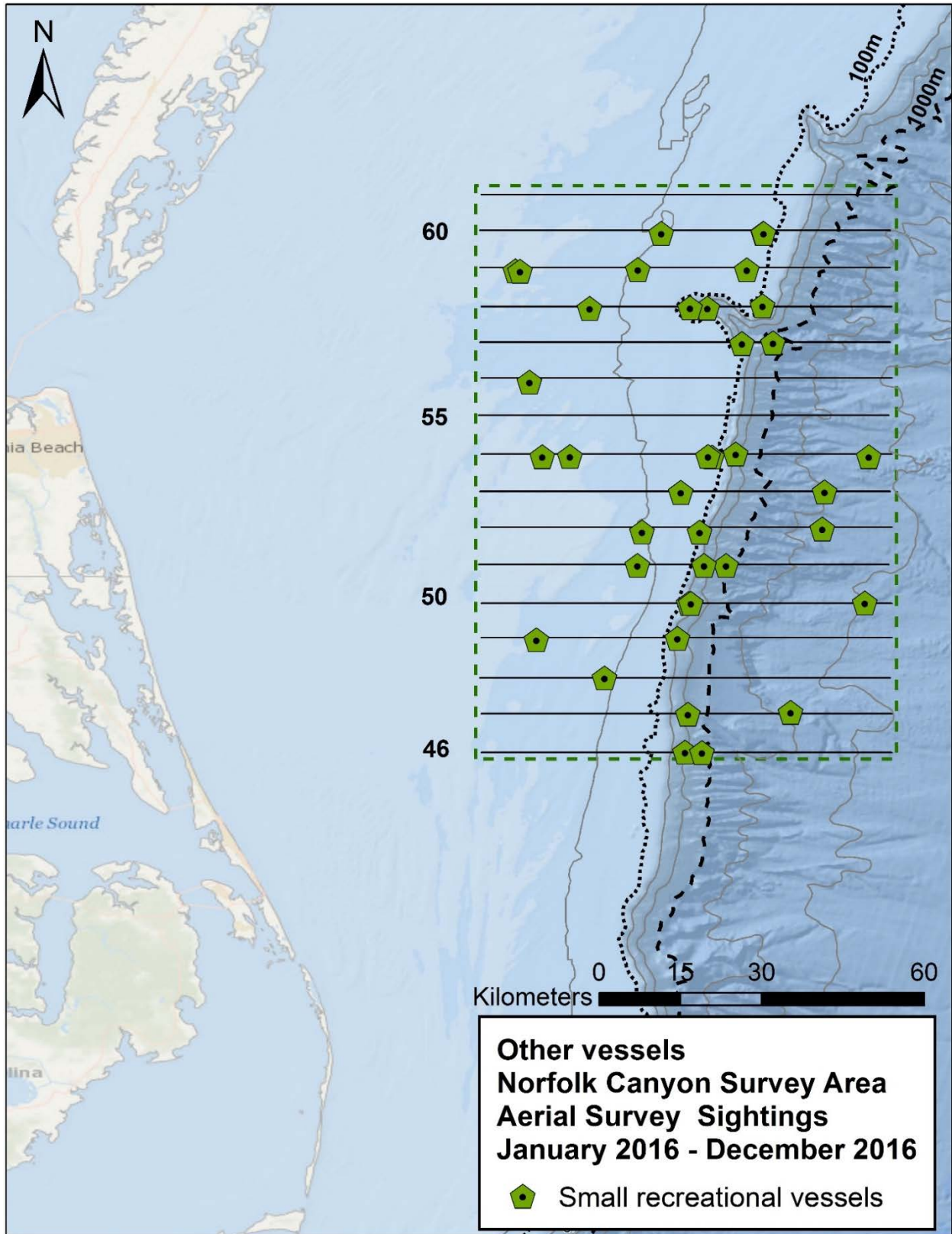


Figure 27. Other vessel sightings in the Norfolk Canyon survey area in 2016 (N=51).

5. Acknowledgements

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6. Literature Cited

- 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.
- McAlarney, R., E. Cummings, W. McLellan, and A. Pabst. 2014. *Protected Species Monitoring in the Virginia Capes OPAREA: January 2013–December 2013. Draft Report*. Prepared for U.S. Fleet Forces Command. Submitted to Naval Facilities Engineering Command Atlantic, Norfolk, Virginia. February 2015.
- Perrin, W.F., E.D. Mitchell, J.G. Mead, D.K. Caldwell, M.C. Caldwell, P.J.H. van Bree, and W. H. Dawbin. 1987. Revision of the spotted dolphins, *Stenella* sp. *Marine Mammal Science* 3:99–170.
- 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.
- Read, A.J., S.G. Barco, J. Bell, D.L. Borchers, M.L. Burt, E.W. Cummings, J. Dunn, E.M. Fougères, L. Hazen, L.E. Williams Hodge, A.M. Laura, R.J. McAlarney, P. Nilsson, D.A. Pabst, C.G.M. Paxton, S.Z. Schneider, K.W. Urian, D.M. Waples, and W.A. McLellan. 2014. Occurrence, distribution and abundance of cetaceans in Onslow Bay, North Carolina, USA. *Journal of Cetacean Research and Management* 14:23–35.
- Torres, L.G., P.E. Rosel, C. D’Agrosa, and A.J. Read. 2003. Improving management of overlapping bottlenose dolphin ecotypes through spatial analysis and genetics. *Marine Mammal Science* 19:502–514.

- 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.
- Waring, G.T., Josephson, E., Maze-Foley, K. and P.E. Rosel. 2016. *US Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2015*. NOAA Technical Memorandum NMFS-NE-238. National Marine Fisheries Service, Woods Hole, Massachusetts.



A

Aerial Survey Data Sheet




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B

Event Codes and Species List



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Codes for Variables on USWTR Aerial Survey Data Sheet

Date: Month, Day, Year

Track#: opportunistic track line=99

Event:

- | | |
|--|---|
| 1.1 = On effort/on track | 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 | 2.9 = Unidentified sighting, requires comments |
| TE = Transit Leg on Effort | |

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> | Scl |
| 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 |



C

Notes on Sighting Summary Sheets



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The Sighting Summary Sheet

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

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

Initial Sighting on Track

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

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

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

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

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

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

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

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

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

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

Time and Position of Sighting

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

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

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

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

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

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

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

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

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

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

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

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

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

Frame Numbers: Starting and ending frame number.

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

Final Time and Position of Sighting

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

Behavior and Additional Comments

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



D

Sighting Summary Sheets



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Sunday, December 11, 2016 Sighting # 7

Initial sighting on Track

Time: 14:47 WP#: 57 Lat: 37.015947 Long: -74.330590
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Blow
 On/Off Effort: Off Trackline: 56 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 14:48 WP#: 58 Lat: 37.022312 Long: -74.326015
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 3 / 3 / 3
 Features used in Species ID: Dark body, blunt melon, short pectorals

Representative images used for Species ID: 6658, 6664
 Photographer: Ryan Frame numbers: 6658 - 6690 Spacer: 6691
 Calculated distance from Trackline: 0.82 km

Final Time and Position of Sighting

Time: 14:50 WP#: 59 Lat: 37.022636 Long: -74.320734
 Calculated Distance Traveled: 0.47 km

Behavior and Additional Comments

Milling, slow travel

Sunday, December 11, 2016 Sighting # 8

Initial sighting on Track

Time: 14:53 WP#: 61 Lat: 37.019099 Long: -74.449511
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 57 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 14:54 WP#: 62 Lat: 37.027066 Long: -74.445272
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 6 / 12 / 9
 Features used in Species ID: Dark body, blunt melon, short pectorals

Representative images used for Species ID: 6698
 Photographer: Ryan Frame numbers: 6692 - 6707 Spacer: 6708
 Calculated distance from Trackline: 0.96 km

Final Time and Position of Sighting

Time: 14:55 WP#: 63 Lat: 37.027527 Long: -74.447088
 Calculated Distance Traveled: 0.17 km

Behavior and Additional Comments

Milling

Saturday, January 30, 2016 Sighting # 1

Initial sighting on Track

Time: 10:28 WP#: 11 Lat: 37.022859 Long: -74.590520
Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
On/Off Effort: On Trackline: 57 Beaufort Sea State: 4
Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 10:31 WP#: 12 Lat: 37.024004 Long: -74.589371
Species: Globicephala macrorhynchus Numbers (Low/High/Best): 20 / 30 / 25
Features used in Species ID: Black body, blunt head, small pectorals

Representative images used for Species ID: 6052, 6053, 6057
Photographer: Ryan Frame numbers: 6039 - 6059 Spacer: 6060
Calculated distance from Trackline: 0.16 km

Final Time and Position of Sighting

Time: 10:32 WP#: 13 Lat: 37.025873 Long: -74.591487
Calculated Distance Traveled: 0.28 km

Behavior and Additional Comments

Traveling north, subsurface, two groups with one larger group

Wednesday, March 9, 2016 Sighting # 1

Initial sighting on Track

Time: 9:13 WP#: 2 Lat: 36.265686 Long: -75.463223
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
 On/Off Effort: Off Trackline: N/A Beaufort Sea State: 2
 Observer: Tiffany Observer side: Right

Actual Time and Position of Sighting

Time: 9:18 WP#: 3 Lat: 36.244891 Long: -75.454717
 Species: *Megaptera novaeangliae* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: Large black body, long white pectorals, small dorsal fin

Representative images used for Species ID: 6638, 6640, 6642, 6652, 6657
 Photographer: Tiffany Frame numbers: 6601 - 6668 Spacer: 6669
 Calculated distance from Trackline: 2.44 km

Final Time and Position of Sighting

Time: 9:23 WP#: 4 Lat: 36.237732 Long: -75.457136
 Calculated Distance Traveled: 0.83 km

Behavior and Additional Comments

Playing with bottlenose dolphins, rolling on back, staying just below the surface

Wednesday, March 9, 2016 Sighting # 2

Initial sighting on Track

Time: 9:46 WP#: 7 Lat: 36.721362 Long: -74.767498
 Vertical Angle: 1 Horizontal Bearing in Degrees: 150 Sighting Cue: Body
 On/Off Effort: On Trackline: 53 Beaufort Sea State: 3
 Observer: Tiffany Observer side: Right

Actual Time and Position of Sighting

Time: 9:46 WP#: 8 Lat: 36.717479 Long: -74.775632
 Species: *Delphinus delphis* Numbers (Low/High/Best): 40 / 60 / 55
 Features used in Species ID: Multi colored body consisting of cream color, gray, white

Representative images used for Species ID: 6690, 6702, 6719, 6721, 6726, 6753
 Photographer: Tiffany Frame numbers: 6670 - 6756 Spacer: 6757
 Calculated distance from Trackline: 0.84 km

Final Time and Position of Sighting

Time: 9:51 WP#: 9 Lat: 36.715973 Long: -74.779542
 Calculated Distance Traveled: 0.39 km

Behavior and Additional Comments

Fast subsurface travel, west, tight group, regular surfacing

Wednesday, March 9, 2016 Sighting # 3

Initial sighting on Track

Time: 9:53 WP#: 11 Lat: 36.721921 Long: -74.707660
 Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
 On/Off Effort: On Trackline: 53 Beaufort Sea State: 3
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:54 WP#: 12 Lat: 36.724964 Long: -74.705384
 Species: *Delphinus delphis* Numbers (Low/High/Best): 15 / 25 / 18
 Features used in Species ID: Multi colored, gray, cream and white

Representative images used for Species ID: 6786, 6788, 6794, 6800
 Photographer: Tiffany Frame numbers: 6780 - 6806 Spacer: 6807
 Calculated distance from Trackline: 0.94 km

Final Time and Position of Sighting

Time: 10:01 WP#: 13 Lat: 36.729405 Long: -74.710515
 Calculated Distance Traveled: N/A

Behavior and Additional Comments

Slow travel in a tight group, dove deep on approach, no final location, evasive

Wednesday, March 9, 2016 Sighting # 4

Initial sighting on Track

Time: 10:03 WP#: 15 Lat: 36.720724 Long: -74.643690
 Vertical Angle: 3 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
 On/Off Effort: On Trackline: 53 Beaufort Sea State: 3
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 10:04 WP#: 16 Lat: 36.725123 Long: -74.641357
 Species: *Delphinus delphis* Numbers (Low/High/Best): 500 / 700 / 600
 Features used in Species ID: Multi colored, gray, cream and white

Representative images used for Species ID: 6812, 6815
 Photographer: Tiffany Frame numbers: 6808 - 6836 Spacer: 6837
 Calculated distance from Trackline: 0.53 km

Final Time and Position of Sighting

Time: 10:07 WP#: 17 Lat: 36.729703 Long: -74.649705
 Calculated Distance Traveled: 0.90 km

Behavior and Additional Comments

Massive group and multiple subgroups traveling just subsurface

Wednesday, March 9, 2016 Sighting # 5

Initial sighting on Track

Time: 10:18 WP#: 22 Lat: 36.638011 Long: -74.354446
 Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
 On/Off Effort: On Trackline: 52 Beaufort Sea State: 3
 Observer: Tiffany Observer side: Right

Actual Time and Position of Sighting

Time: 10:19 WP#: 23 Lat: 36.641029 Long: -74.353894
 Species: *Delphinus delphis* Numbers (Low/High/Best): 35 / 50 / 45
 Features used in Species ID: Multi colored, gray, cream and white

Representative images used for Species ID: 6845, 6852
 Photographer: Tiffany Frame numbers: 6838 - 6888 Spacer: 6889
 Calculated distance from Trackline: 0.34 km

Final Time and Position of Sighting

Time: 10:25 WP#: 24 Lat: 36.641662 Long: -74.354762
 Calculated Distance Traveled: 0.10 km

Behavior and Additional Comments

Milling, dove when we flew over, tight group, evasive

Wednesday, March 9, 2016 Sighting # 6

Initial sighting on Track

Time: 11:01 WP#: 31 Lat: 36.562769 Long: -74.686414
 Vertical Angle: 3 Horizontal Bearing in Degrees: 120 Sighting Cue: Body
 On/Off Effort: On Trackline: 51 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Right

Actual Time and Position of Sighting

Time: 11:02 WP#: 32 Lat: 36.561391 Long: -74.695834
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 20 / 50 / 40
 Features used in Species ID: Robust, uniform gray, white peduncle

Representative images used for Species ID: 6759, 6761, 6763, 6773
 Photographer: Tiffany Frame numbers: 6758 - 6778 Spacer: 6779
 Calculated distance from Trackline: 0.86 km

Final Time and Position of Sighting

Time: 11:17 WP#: 33 Lat: 36.573428 Long: -74.701762
 Calculated Distance Traveled: 1.44 km

Behavior and Additional Comments

Scattered, traveling, darting

Wednesday, March 9, 2016 Sighting # 7

Initial sighting on Track

Time: 11:35 WP#: 39 Lat: 36.491034 Long: -74.386228
 Vertical Angle: 1 Horizontal Bearing in Degrees: 45 Sighting Cue: Body
 On/Off Effort: On Trackline: 50 Beaufort Sea State: 3
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 11:35 WP#: 40 Lat: 36.489696 Long: -74.385549
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 15 / 25 / 17
 Features used in Species ID: Uniform gray, robust, white peduncles

Representative images used for Species ID: 6918, 6919
 Photographer: Tiffany Frame numbers: 6890 - 6940 Spacer: N/A
 Calculated distance from Trackline: 0.16 km

Final Time and Position of Sighting

Time: 11:49 WP#: 41 Lat: 36.490024 Long: -74.388012
 Calculated Distance Traveled: 0.22 km

Behavior and Additional Comments

Milling, tight group, started traveling SW

Wednesday, March 9, 2016 Sighting # 8

Initial sighting on Track

Time: 12:20 WP#: 44 Lat: 36.180282 Long: -75.458903
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: Off Trackline: N/A Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 12:20 WP#: 44 Lat: 36.180282 Long: -75.458903
 Species: *Megaptera novaeangliae* Numbers (Low/High/Best): 2 / 2 / 2
 Features used in Species ID: Large, black body, white pectorals

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

Final Time and Position of Sighting

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

Behavior and Additional Comments

Swimming south, less than a body length apart, juvenile - subadult animals, roughly the same size
 They dove at the same time once we flew over and we were unable to relocate them

Wednesday, March 9, 2016 Sighting # 11

Initial sighting on Track

Time: 16:27 WP#: 76 Lat: 36.277534 Long: -74.448083
 Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
 On/Off Effort: On Trackline: 47 Beaufort Sea State: 3
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 16:27 WP#: 77 Lat: 36.275169 Long: -74.443764
 Species: *Delphinus delphis* Numbers (Low/High/Best): 10 / 30 / 20
 Features used in Species ID: Multi colored, gray, cream, white

Representative images used for Species ID: 7042, 7044
 Photographer: Tiffany Frame numbers: 7013 - 7120 Spacer: 7121
 Calculated distance from Trackline: 0.47 km

Final Time and Position of Sighting

Time: 16:39 WP#: 78 Lat: 36.281256 Long: -74.462900
 Calculated Distance Traveled: 1.84 km

Behavior and Additional Comments

Fast travel subsurface, spaced out, darting

Wednesday, March 9, 2016 Sighting # 12

Initial sighting on Track

Time: 16:53 WP#: 80 Lat: 36.275796 Long: -74.881312
 Vertical Angle: 4 Horizontal Bearing in Degrees: 90 Sighting Cue: Blow
 On/Off Effort: On Trackline: 47 Beaufort Sea State: 4
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 16:54 WP#: 81 Lat: 36.247482 Long: -74.873968
 Species: *Megaptera novaeangliae* Numbers (Low/High/Best): 4 / 4 / 4
 Features used in Species ID: Black body, large, long white pectorals

Representative images used for Species ID: 7128, 7143, 7153, 7164
 Photographer: Tiffany Frame numbers: 7122 - 7185 Spacer: 7186
 Calculated distance from Trackline: 3.22 km

Final Time and Position of Sighting

Time: 15:56 WP#: 82 Lat: 36.250712 Long: -74.868709
 Calculated Distance Traveled: 0.59 km

Behavior and Additional Comments

Traveling, one group of 2 and then 2 separate individuals, looked like subadult size, fin whales in the same area

Wednesday, March 9, 2016 Sighting # 13

Initial sighting on Track

Time: 16:53 WP#: 80 Lat: 36.275796 Long: -74.881312
 Vertical Angle: 4 Horizontal Bearing in Degrees: 90 Sighting Cue: Blow
 On/Off Effort: On Trackline: 47 Beaufort Sea State: 4
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 17:01 WP#: 84 Lat: 36.274476 Long: -74.876772
 Species: *Balaenoptera physalis* Numbers (Low/High/Best): 4 / 4 / 4
 Features used in Species ID: Long, slender body, small pectorals, dorsal fin set back, white mouth

Representative images used for Species ID: 7213, 7225, 7277, 7309, 7326
 Photographer: Tiffany Frame numbers: 7187 - 7350 Spacer: 7351
 Calculated distance from Trackline: 2.84 km

Final Time and Position of Sighting

Time: 17:18 WP#: 86 Lat: 36.294197 Long: -74.850406
 Calculated Distance Traveled: 5.20 km

Behavior and Additional Comments

Seen with Mno's, traveling, spaced out, small calf present 1/3 of the mothers body length

Thursday, April 21, 2016 Sighting # 1

Initial sighting on Track

Time: 13:56 WP#: 13 Lat: 37.018954 Long: -75.022107
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 57 Beaufort Sea State: 2
 Observer: Ryan Observer side: Left

Actual Time and Position of Sighting

Time: 13:59 WP#: 14 Lat: 37.013179 Long: -75.015291
 Species: *Stenella frontalis* Numbers (Low/High/Best): 2 / 2 / 2
 Features used in Species ID: Alternating light and dark pattern down body, spotting

Representative images used for Species ID: 7375, 7379, 7380
 Photographer: Ryan Frame numbers: 7373 - 7386 Spacer: 7387
 Calculated distance from Trackline: 0.88 km

Final Time and Position of Sighting

Time: 14:04 WP#: 15 Lat: 37.022730 Long: -75.018226
 Calculated Distance Traveled: 1.10 km

Behavior and Additional Comments

2 animals diving regularly, elusive

Thursday, April 21, 2016 Sighting # 2

Initial sighting on Track

Time: 14:19 WP#: 19 Lat: 37.092536 Long: -74.805495
 Vertical Angle: 3 Horizontal Bearing in Degrees: 80 Sighting Cue: Body
 On/Off Effort: On Trackline: 58 Beaufort Sea State: 2
 Observer: Sarah Observer side: Left

Actual Time and Position of Sighting

Time: 14:20 WP#: 20 Lat: 37.096999 Long: -74.802083
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 8 / 10 / 10
 Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 7390, 7394, 7395
 Photographer: Ryan Frame numbers: 7388 - 7397 Spacer: 7398
 Calculated distance from Trackline: 0.58 km

Final Time and Position of Sighting

Time: 14:24 WP#: 21 Lat: 37.102949 Long: -74.806268
 Calculated Distance Traveled: 0.76 km

Behavior and Additional Comments

Group of 8 and a separate pair, traveling

Thursday, April 21, 2016 Sighting # 3

Initial sighting on Track

Time: 14:55 WP#: 31 Lat: 37.169227 Long: -74.713140
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Blow
 On/Off Effort: On Trackline: 59 Beaufort Sea State: 3
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 14:55 WP#: 32 Lat: 37.172452 Long: -74.709750
 Species: *Megaptera novaeangliae* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: Large, black body, long white pectorals

Representative images used for Species ID: 7435, 7437, 7470
 Photographer: Ryan Frame numbers: 7416 - 7480 Spacer: 7481
 Calculated distance from Trackline: 0.47 km

Final Time and Position of Sighting

Time: 15:19 WP#: 33 Lat: 37.172428 Long: -74.721250
 Calculated Distance Traveled: 1.02 km

Behavior and Additional Comments

White along the lips - unusual
 Sub-adult, diving regularly

Monday, May 9, 2016 Sighting # 1

Initial sighting on Track

Time: 9:14 WP#: 2 Lat: 37.16948 Long: -74.821999
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 59 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 9:18 WP#: 3 Lat: 37.18408 Long: -74.827439
 Species: *Balaenoptera physalis* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: White jaw, long fusiform body, dorsal fin well back on body.

Representative images used for Species ID: 7666, 7678, 7680
 Photographer: Ryan Frame numbers: 7661-7734 Spacer: 7735
 Calculated distance from Trackline: 1.64 km

Final Time and Position of Sighting

Time: 9:24 WP#: 4 Lat: 37.178985 Long: -74.818654
 Calculated Distance Traveled: 0.96 km

Behavior and Additional Comments

Shallow dives, several healed prop wounds present.

Monday, May 9, 2016 Sighting # 2

Initial sighting on Track

Time: 9:37 WP#: 9 Lat: 37.176516 Long: -74.583442
 Vertical Angle: 1 Horizontal Bearing in Degrees: 180 Sighting Cue: Blow
 On/Off Effort: On Trackline: 59 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 9:38 WP#: 10 Lat: 37.186583 Long: -74.584055
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 20 / 22 / 21
 Features used in Species ID: White peduncles, robust body appearance.

Representative images used for Species ID: 7775, 7776, 7782
 Photographer: Ryan Frame numbers: 7760-7784 Spacer: 7785
 Calculated distance from Trackline: 1.21 km

Final Time and Position of Sighting

Time: 9:40 WP#: 11 Lat: 37.180241 Long: -74.587913
 Calculated Distance Traveled: 0.78 km

Behavior and Additional Comments

Three groups of 5-6 individuals

Monday, May 9, 2016 Sighting # 3

Initial sighting on Track

Time: 9:44 WP#: 13 Lat: 37.170661 Long: -74.514021
 Vertical Angle: 1 Horizontal Bearing in Degrees: 120 Sighting Cue: Body
 On/Off Effort: On Trackline: 59 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 9:46 WP#: 14 Lat: 37.179323 Long: -74.517188
 Species: *Grampus griseus* Numbers (Low/High/Best): 6 / 8 / 7
 Features used in Species ID: White scaring present along animals body, tall dorsal fin, no rostrum and cleft in melon.

Representative images used for Species ID: 7804, 7817, 7819
 Photographer: Ryan Frame numbers: 7786-7826 Spacer: 7827
 Calculated distance from Trackline: 1.0 km

Final Time and Position of Sighting

Time: 9:48 WP#: 15 Lat: 37.181859 Long: -74.525623
 Calculated Distance Traveled: 0.80 km

Behavior and Additional Comments

Five Risso's with a single Tursiops, not a mixed group but animals were all in the same area.

Monday, May 9, 2016 Sighting # 4

Initial sighting on Track

Time: 9:44 WP#: 13 Lat: 37.170661 Long: -74.514021
 Vertical Angle: 1 Horizontal Bearing in Degrees: 120 Sighting Cue: Body
 On/Off Effort: Off Trackline: 59 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 9:46 WP#: 14 Lat: 37.179323 Long: -74.517188
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: Robust body appearance.

Representative images used for Species ID: 7822
 Photographer: Ryan Frame numbers: 7786-7826 Spacer: 7827
 Calculated distance from Trackline: 1.0 km

Final Time and Position of Sighting

Time: 9:48 WP#: 15 Lat: 37.181859 Long: -74.525623
 Calculated Distance Traveled: 0.80 km

Behavior and Additional Comments

Animal near Grampus

Monday, May 9, 2016 Sighting # 5

Initial sighting on Track

Time: 9:50 WP#: 17 Lat: 37.169322 Long: -74.484024
 Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
 On/Off Effort: On Trackline: 59 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 9:51 WP#: 18 Lat: 37.174705 Long: -74.484645
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 9 / 12 / 11
 Features used in Species ID: Black, no rostrum, short pectoral fins

Representative images used for Species ID: 7832, 7841
 Photographer: Ryan Frame numbers: 7828-7845 Spacer: 7846
 Calculated distance from Trackline: 0.60 km

Final Time and Position of Sighting

Time: 9:52 WP#: 19 Lat: 37.168586 Long: -74.484524
 Calculated Distance Traveled: 0.68 km

Behavior and Additional Comments

Traveling as one group.

Monday, May 9, 2016 Sighting # 6

Initial sighting on Track

Time: 9:58 WP#: 21 Lat: 37.170976 Long: -74.409824
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 59 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 9:57 WP#: 22 Lat: 37.171867 Long: -74.417836
 Species: *Grampus griseus* Numbers (Low/High/Best): 45 / 55 / 50
 Features used in Species ID: White head, scarring on body, blunt head

Representative images used for Species ID: 7857, 7859
 Photographer: Ryan Frame numbers: 7847-7862 Spacer: 7863
 Calculated distance from Trackline: 0.72 km

Final Time and Position of Sighting

Time: 9:58 WP#: 23 Lat: 37.179014 Long: -74.424089
 Calculated Distance Traveled: 0.9 km

Behavior and Additional Comments

Several large groups of 10-15 animals.

Monday, May 9, 2016 Sighting # 7

Initial sighting on Track

Time: 10:06 WP#: 28 Lat: 37.093646 Long: -74.377659
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 58 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 10:07 WP#: 29 Lat: 37.087378 Long: -74.371664
 Species: *Delphinus delphis* Numbers (Low/High/Best): 15 / 18 / 17
 Features used in Species ID: Dark dorsal surface with yellow below the mid-line
 pointed saddle pattern below dorsal fin

Representative images used for Species ID: 7880
 Photographer: Ryan Frame numbers: 7864-7893 Spacer: 7894
 Calculated distance from Trackline: 0.88 km

Final Time and Position of Sighting

Time: 10:09 WP#: 30 Lat: 37.093895 Long: -74.381030
 Calculated Distance Traveled: 0.79 km

Behavior and Additional Comments

One large group traveling.

Monday, May 9, 2016 Sighting # 8

Initial sighting on Track

Time: 10:11 WP#: 32 Lat: 37.091190 Long: -74.44563
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 58 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 10:14 WP#: 33 Lat: 37.104661 Long: -74.449932
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 4 / 5 / 5
 Features used in Species ID: Blunt heads, black body and short pectoral fins.

Representative images used for Species ID: 7901, 7905
 Photographer: Ryan Frame numbers: 7895-7909 Spacer: 7910
 Calculated distance from Trackline: 1.55 km

Final Time and Position of Sighting

Time: 10:15 WP#: 34 Lat: 37.106017 Long: -74.451513
 Calculated Distance Traveled: 0.21 km

Behavior and Additional Comments

Small group

Monday, May 9, 2016 Sighting # 9

Initial sighting on Track

Time: 10:18 WP#: 36 Lat: 37.094595 Long: -74.494576
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 58 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 10:18 WP#: 37 Lat: 37.097884 Long: -74.502071
 Species: *Grampus griseus* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: Grey scarred body, tall dorsal fin, pointed melon with crease.

Representative images used for Species ID: No images
 Photographer: Ryan Frame numbers: NA Spacer: NA
 Calculated distance from Trackline: 0.76 km

Final Time and Position of Sighting

Time: 10:21 WP#: 39 Lat: 37.103448 Long: -74.501584
 Calculated Distance Traveled: 0.42 km

Behavior and Additional Comments

Monday, May 9, 2016 Sighting # 10

Initial sighting on Track

Time: 10:18 WP#: 36 Lat: 37.094595 Long: -74.494576
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 58 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 10:18 WP#: 38 Lat: 37.100014 Long: -74.503439
 Species: *Delphinus delphis* Numbers (Low/High/Best): 45 / 55 / 50
 Features used in Species ID: Dark dorsal surface, yellow mid-body coloration

Representative images used for Species ID: 7927, 7932, 7940
 Photographer: Ryan Frame numbers: 7911-7948 Spacer: 7949
 Calculated distance from Trackline: 0.76 km

Final Time and Position of Sighting

Time: 10:21 WP#: 39 Lat: 37.103448 Long: -74.501584
 Calculated Distance Traveled: 0.62 km

Behavior and Additional Comments

Monday, May 9, 2016 Sighting # 11

Initial sighting on Track

Time: 10:24 WP#: 42 Lat: 37.091721 Long: -74.555886
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 58 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 10:25 WP#: 43 Lat: 37.093878 Long: -74.552296
 Species: *Grampus griseus* Numbers (Low/High/Best): 5 / 5 / 5
 Features used in Species ID: White body, blunt head and scarring.

Representative images used for Species ID: 7952, 7954
 Photographer: Ryan Frame numbers: 7950-7957 Spacer: 7958
 Calculated distance from Trackline: 0.40 km

Final Time and Position of Sighting

Time: 10:25 WP#: 44 Lat: 37.092200 Long: -74.559833
 Calculated Distance Traveled: 0.69 km

Behavior and Additional Comments

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Monday, May 9, 2016 Sighting # 12

Initial sighting on Track

Time: 10:28 WP#: 46 Lat: 37.091408 Long: -74.663129
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 58 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 10:29 WP#: 47 Lat: 37.095369 Long: -74.662034
 Species: *Grampus griseus* Numbers (Low/High/Best): 14 / 16 / 15
 Features used in Species ID: White body

Representative images used for Species ID: 7959, 7973, 7981, 7983, 7985
 Photographer: Ryan Frame numbers: 7959-7987 Spacer: 7988
 Calculated distance from Trackline: 0.45 km

Final Time and Position of Sighting

Time: 10:30 WP#: 48 Lat: 37.091843 Long: -74.670742
 Calculated Distance Traveled: 0.78 km

Behavior and Additional Comments

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| Two groups, at least three calves present. |
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Monday, May 9, 2016 Sighting # 13

Initial sighting on Track

Time: 11:07 WP#: 57 Lat: 37.020602 Long: -74.581215
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 57 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 10:08 WP#: 58 Lat: 37.027870 Long: -74.582538
 Species: Delphinus delphis Numbers (Low/High/Best): 6 / 8 / 7
 Features used in Species ID: Dark dorsal surface and yellow below mid-body

Representative images used for Species ID: 7991, 7992
 Photographer: Ryan Frame numbers: 7989-8014 Spacer: 8015
 Calculated distance from Trackline: 0.82 km

Final Time and Position of Sighting

Time: 11:10 WP#: 59 Lat: 37.031032 Long: -74.590667
 Calculated Distance Traveled: 0.80 km

Behavior and Additional Comments

At least one calf in the group.

Monday, May 9, 2016 Sighting # 14

Initial sighting on Track

Time: 11:13 WP#: 61 Lat: 37.020191 Long: -74.526212
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
 On/Off Effort: On Trackline: 57 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 11:14 WP#: 62 Lat: 37.018136 Long: -74.537901
 Species: Delphinus delphis Numbers (Low/High/Best): 60 / 70 / 65
 Features used in Species ID: Dark dorsal surface and yellow below mid-body

Representative images used for Species ID: NA
 Photographer: Ryan Frame numbers: NA Spacer: NA
 Calculated distance from Trackline: 1.06 km

Final Time and Position of Sighting

Time: 11:16 WP#: 63 Lat: 37.015738 Long: -74.538035
 Calculated Distance Traveled: 0.27 km

Behavior and Additional Comments

Two large groups traveling.

Monday, May 9, 2016 Sighting # 15

Initial sighting on Track

Time: 11:17 WP#: 65 Lat: 37.621006 Long: -74.511829
 Vertical Angle: 1 Horizontal Bearing in Degrees: 60 Sighting Cue: Splash
 On/Off Effort: On Trackline: 57 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 11:18 WP#: 66 Lat: 37.015240 Long: -74.514376
 Species: Delphinus delphis Numbers (Low/High/Best): 90 / 100 / 95
 Features used in Species ID: Dark dorsal surface and yellow below mid-body

Representative images used for Species ID: 8059, 8065, 8067, 8068, 8080
 Photographer: Ryan Frame numbers: 8059-8090 Spacer: 8091
 Calculated distance from Trackline: 0.68 km

Final Time and Position of Sighting

Time: 11:20 WP#: 67 Lat: 37.016993 Long: -74.514376
 Calculated Distance Traveled: 0.19 km

Behavior and Additional Comments

Three medium sized animals, traveling fast.

Monday, May 9, 2016 Sighting # 16

Initial sighting on Track

Time: 11:23 WP#: 69 Lat: 37.020523 Long: -74.463052
 Vertical Angle: 4 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
 On/Off Effort: On Trackline: 57 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 11:24 WP#: 70 Lat: 37.028520 Long: -74.460320
 Species: Delphinus delphis Numbers (Low/High/Best): 100 / 150 / 125
 Features used in Species ID: Dark dorsal surface and yellow below mid-body

Representative images used for Species ID: 8094, 8096, 8104, 8106, 8109, 8110
 Photographer: Ryan Frame numbers: 8092-8119 Spacer: 8120
 Calculated distance from Trackline: 0.92 km

Final Time and Position of Sighting

Time: 11:28 WP#: 71 Lat: 37.037874 Long: -74.467162
 Calculated Distance Traveled: 1.2 km

Behavior and Additional Comments

One large group and three smaller groups. Very fast travel.

Monday, May 9, 2016 Sighting # 17

Initial sighting on Track

Time: 11:32 WP#: 73 Lat: 37.020413 Long: -74.396088
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 57 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 11:34 WP#: 74 Lat: 37.021364 Long: -74.392610
 Species: *Delphinus delphis* Numbers (Low/High/Best): 58 / 62 / 60
 Features used in Species ID: Dark dorsal surface and yellow below mid-body

Representative images used for Species ID: 8123
 Photographer: Ryan Frame numbers: 8121-8144 Spacer: 8145
 Calculated distance from Trackline: 0.33 km

Final Time and Position of Sighting

Time: 11:37 WP#: 75 Lat: 37.019520 Long: -74.392476
 Calculated Distance Traveled: 0.21 km

Behavior and Additional Comments

Double sighting

Monday, May 9, 2016 Sighting # 18

Initial sighting on Track

Time: 11:32 WP#: 73 Lat: 37.020413 Long: -74.396088
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 57 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 11:32 WP#: 74 Lat: 37.021364 Long: -74.392610
 Species: *Stenella clymene* Numbers (Low/High/Best): 19 / 21 / 20
 Features used in Species ID: Mustache on snout

Representative images used for Species ID: 8121, 8123
 Photographer: Ryan Frame numbers: 8121-8144 Spacer: 8145
 Calculated distance from Trackline: 0.33 km

Final Time and Position of Sighting

Time: 11:37 WP#: 75 Lat: 37.019520 Long: -74.392476
 Calculated Distance Traveled: 0.21 km

Behavior and Additional Comments

Double sighting

Monday, May 9, 2016 Sighting # 19

Initial sighting on Track

Time: 11:44 WP#: 79 Lat: 36.944731 Long: -74.398923
 Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
 On/Off Effort: On Trackline: 56 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 11:45 WP#: 80 Lat: 36.943459 Long: -74.382125
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 6 / 8 / 7
 Features used in Species ID: Blunt head, dark coloration, short fins

Representative images used for Species ID: 8147, 8157
 Photographer: Ryan Frame numbers: 8146-8161 Spacer: 8162
 Calculated distance from Trackline: 1.5 km

Final Time and Position of Sighting

Time: 11:47 WP#: 81 Lat: 36.956061 Long: -74.389285
 Calculated Distance Traveled: 1.5 km

Behavior and Additional Comments

Two small groups traveling together.

Monday, May 9, 2016 Sighting # 20

Initial sighting on Track

Time: 11:49 WP#: 83 Lat: 36.9485258 Long: -74.454844
 Vertical Angle: 2 Horizontal Bearing in Degrees: 120 Sighting Cue: Body
 On/Off Effort: On Trackline: 56 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 11:51 WP#: 84 Lat: 36.944701 Long: -74.451279
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 4 / 4 / 4
 Features used in Species ID: Blunt head, dark coloration, short fins

Representative images used for Species ID: 8165
 Photographer: Ryan Frame numbers: 8163-8171 Spacer: 8172
 Calculated distance from Trackline: 0.53 km

Final Time and Position of Sighting

Time: 11:53 WP#: 85 Lat: 36.945705 Long: -74.458400
 Calculated Distance Traveled: 0.34 km

Behavior and Additional Comments

Four individuals spread far apart from one another.

Monday, May 9, 2016 Sighting # 21

Initial sighting on Track

Time: 15:10 WP#: 91 Lat: 36.879121 Long: -74.741281
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 55 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 15:11 WP#: 92 Lat: 36.881159 Long: -74.747714
 Species: *Stenella frontalis* Numbers (Low/High/Best): 18 / 22 / 20
 Features used in Species ID: Light spotting pattern over the animals body.

Representative images used for Species ID: 8185, 8192
 Photographer: Ryan Frame numbers: 8173-8194 Spacer: 8195
 Calculated distance from Trackline: 0.62 km

Final Time and Position of Sighting

Time: 15:18 WP#: 93 Lat: 36.888001 Long: -74.746288
 Calculated Distance Traveled: 0.77 km

Behavior and Additional Comments

Well spread group.

Monday, May 9, 2016 Sighting # 22

Initial sighting on Track

Time: 15:26 WP#: 95 Lat: 36.873943 Long: -74.506110
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 55 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 15:28 WP#: 96 Lat: 36.880007 Long: -74.510205
 Species: *Delphinus delphis* Numbers (Low/High/Best): 2 / 2 / 2
 Features used in Species ID: Dark dorsal surface and yellow below mid-body

Representative images used for Species ID: 8206
 Photographer: Ryan Frame numbers: 8203-8211 Spacer: 8212
 Calculated distance from Trackline: 0.77 km

Final Time and Position of Sighting

Time: 15:28 WP#: 97 Lat: 36.875375 Long: -74.505868
 Calculated Distance Traveled: 0.63 km

Behavior and Additional Comments

Two dolphins near submarine, showing fast travel.

Monday, May 9, 2016 Sighting # 23

Initial sighting on Track

Time: 15:46 WP#: 102 Lat: 36.792498 Long: -74.629262
 Vertical Angle: 1 Horizontal Bearing in Degrees: 150 Sighting Cue: Body
 On/Off Effort: On Trackline: 54 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 15:47 WP#: 103 Lat: 36.787739 Long: -74.626829
 Species: *Delphinus delphis* Numbers (Low/High/Best): 8 / 8 / 8
 Features used in Species ID: Dark dorsal surface and yellow below mid-body

Representative images used for Species ID: 8213
 Photographer: Ryan Frame numbers: 8213-8227 Spacer: 8228
 Calculated distance from Trackline: 0.57 km

Final Time and Position of Sighting

Time: 15:52 WP#: 104 Lat: 36.792447 Long: -74.628386
 Calculated Distance Traveled: 0.60 km

Behavior and Additional Comments

Near a naval vessel

Monday, May 9, 2016 Sighting # 24

Initial sighting on Track

Time: 15:57 WP#: 106 Lat: 36.792059 Long: -74.746320
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Spalsh
 On/Off Effort: On Trackline: 54 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 15:57 WP#: 107 Lat: 36.790409 Long: -74.738907
 Species: *Balaenoptera physalis* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: White jaw, pointed rostrum and large body size.

Representative images used for Species ID: 8242, 8266
 Photographer: Ryan Frame numbers: 8229-8279 Spacer: 8280
 Calculated distance from Trackline: 0.69 km

Final Time and Position of Sighting

Time: 16:02 WP#: 108 Lat: 36.788682 Long: -74.746607
 Calculated Distance Traveled: 0.71 km

Behavior and Additional Comments

Showing avoidance, diving deep.

Monday, May 9, 2016 Sighting # 25

Initial sighting on Track

Time: 16:13 WP#: 111 Lat: 36.790914 Long: -74.846059
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Blow
 On/Off Effort: On Trackline: 54 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 16:13 WP#: 112 Lat: 36.794546 Long: -74.852228
 Species: *Balaenoptera physalis* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: White jaw, large size, pointed snout, sleek body, chevron on back.

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

Final Time and Position of Sighting

Time: 16:20 WP#: 113 Lat: 36.797232 Long: -74.852671
 Calculated Distance Traveled: 0.31 km

Behavior and Additional Comments

Animal diving deep to avoid us, relocate then dove deep again before we could photograph.

Monday, May 9, 2016 Sighting # 26

Initial sighting on Track

Time: 16:47 WP#: 120 Lat: 36.721558 Long: -74.831991
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Blow
 On/Off Effort: On Trackline: 53 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 16:48 WP#: 121 Lat: 36.719608 Long: -74.806673
 Species: *Balaenoptera physalis* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: White jaw, large size, pointed snout, chevron on back.

Representative images used for Species ID: 8297, 8299
 Photographer: Ryan Frame numbers: 8283-8313 Spacer: 8314
 Calculated distance from Trackline: 2.26 km

Final Time and Position of Sighting

Time: 16:48 WP#: 122 Lat: 36.722768 Long: -74.807685
 Calculated Distance Traveled: 0.36 km

Behavior and Additional Comments

Slow travel.

Monday, May 9, 2016 Sighting # 27

Initial sighting on Track

Time: 17:09 WP#: 127 Lat: 36.640248 Long: -74.389828
 Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: Splash
 On/Off Effort: On Trackline: 52 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 17:12 WP#: 128 Lat: 36.636588 Long: -74.380285
 Species: *Delphinus delphis* Numbers (Low/High/Best): 8 / 8 / 8
 Features used in Species ID: Beige lateral patch pointed, saddle pattern

Representative images used for Species ID: 8315
 Photographer: Ryan Frame numbers: 8315-8318 Spacer: NA
 Calculated distance from Trackline: 0.94 km

Final Time and Position of Sighting

Time: 17:18 WP#: 129 Lat: 36.649928 Long: -74.373752
 Calculated Distance Traveled: 1.59 km

Behavior and Additional Comments

Fast travel

Monday, May 9, 2016 Sighting # 28

Initial sighting on Track

Time: 17:25 WP#: 131 Lat: 36.639845 Long: -74.606488
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 52 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 17:27 WP#: 132 Lat: 36.638218 Long: -74.610988
 Species: *Delphinus delphis* Numbers (Low/High/Best): 35 / 45 / 40
 Features used in Species ID: Beige lateral patch, pointed saddle pattern

Representative images used for Species ID: 8325, 8326, 8328
 Photographer: Ryan Frame numbers: 8319-8331 Spacer: 8332
 Calculated distance from Trackline: 0.44 km

Final Time and Position of Sighting

Time: 17:28 WP#: 133 Lat: 36.639758 Long: -74.611432
 Calculated Distance Traveled: 0.18 km

Behavior and Additional Comments

Fast travel.

Monday, May 9, 2016 Sighting # 29

Initial sighting on Track

Time: 17:35 WP#: 136 Lat: 36.640321 Long: -74.822594
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 52 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 17:36 WP#: 137 Lat: 36.643952 Long: -74.818103
 Species: *Unidentified Delphinid* Numbers (Low/High/Best): 6 / 8 / 7
 Features used in Species ID: NA

Representative images used for Species ID: 8334
 Photographer: Ryan Frame numbers: 8333-8337 Spacer: 8338
 Calculated distance from Trackline: 0.57 km

Final Time and Position of Sighting

Time: 17:40 WP#: 138 Lat: 36.650466 Long: -74.825887
 Calculated Distance Traveled: 1.0 km

Behavior and Additional Comments

Dolphins on both sides of the plane, very fast travel - avoidance.

Monday, May 9, 2016 Sighting # 30

Initial sighting on Track

Time: 17:41 WP#: 140 Lat: 36.642811 Long: -74.854055
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 52 Beaufort Sea State: 2
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 17:46 WP#: 141 Lat: 36.638168 Long: -74.850340
 Species: *Balaenoptera physalis* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: White jaw, chevron, pointed snout, sleek body.

Representative images used for Species ID: 8371, 8375
 Photographer: Ryan Frame numbers: 8339-8397 Spacer: 8398
 Calculated distance from Trackline: 0.61 km

Final Time and Position of Sighting

Time: 17:49 WP#: 143 Lat: 36.645167 Long: -74.862028
 Calculated Distance Traveled: NA

Behavior and Additional Comments

Double sighting, Ttr bow riding fin whale.

Monday, May 9, 2016 Sighting # 31

Initial sighting on Track

Time: 17:41 WP#: 140 Lat: 36.642811 Long: -74.854055
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 2 Beaufort Sea State: 52
 Observer: Tiffany Observer side: Left

Actual Time and Position of Sighting

Time: 17:46 WP#: 141 Lat: 36.638168 Long: -74.850340
 Species: *Unidentified Delphinid* Numbers (Low/High/Best): 3 / 3 / 3
 Features used in Species ID: Grey robust body with white peduncles.

Representative images used for Species ID: 8371
 Photographer: Ryan Frame numbers: 8339-9397 Spacer: 9398
 Calculated distance from Trackline: NA

Final Time and Position of Sighting

Time: 17:49 WP#: 143 Lat: 36.645167 Long: -74.862020
 Calculated Distance Traveled: NA

Behavior and Additional Comments

Bow riding on the fin whale

Thursday, July 7, 2016 Sighting # 1

Initial sighting on Track

Time: 9:24 WP#: 4 Lat: 36.191357 Long: -74.731766
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 46 Beaufort Sea State: 4
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:34 WP#: 5 Lat: 36.204575 Long: -74.735498
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 15 / 30 / 25
 Features used in Species ID: Blunt head, black body, short pectorals

Representative images used for Species ID: 39
 Photographer: Ryan Frame numbers: 14 - 44 Spacer: 45
 Calculated distance from Trackline: 1.50 km

Final Time and Position of Sighting

Time: 9:41 WP#: 6 Lat: 36.202432 Long: -74.736601
 Calculated Distance Traveled: 0.26 km

Behavior and Additional Comments

Milling or slow travel North, tight group, started traveling NW once we flew over, multiple groups

Thursday, July 7, 2016 Sighting # 2

Initial sighting on Track

Time: 10:08 WP#: 13 Lat: 36.276413 Long: -74.819460
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
 On/Off Effort: On Trackline: 47 Beaufort Sea State: 4
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 10:09 WP#: 14 Lat: 36.277526 Long: -74.822243
 Species: *Delphinus delphis* Numbers (Low/High/Best): 300 / 500 / 400
 Features used in Species ID: Multi colored

Representative images used for Species ID: 49, 58, 64, 78
 Photographer: Ryan Frame numbers: 46 - 117 Spacer: 118
 Calculated distance from Trackline: 0.28 km

Final Time and Position of Sighting

Time: 10:19 WP#: 15 Lat: 36.275430 Long: -74.826855
 Calculated Distance Traveled: 0.47 km

Behavior and Additional Comments

Traveling subsurface fast, heading west, tight group

Thursday, July 7, 2016 Sighting # 3

Initial sighting on Track

Time: 10:55 WP#: 22 Lat: 36.426891 Long: -74.355109
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 49 Beaufort Sea State: 3
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 10:56 WP#: 23 Lat: 36.425846 Long: -74.357251
 Species: *Physeter macrocephalus* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: Large, wrinkled body, blunt melon, forward blow

Representative images used for Species ID: 132, 152
 Photographer: Ryan Frame numbers: 119 - 165 Spacer: 166
 Calculated distance from Trackline: 0.22 km

Final Time and Position of Sighting

Time: 10:59 WP#: 24 Lat: 36.429144 Long: -74.355410
 Calculated Distance Traveled: 0.40 km

Behavior and Additional Comments

Logging for a short bit then fluked and dove

Thursday, July 7, 2016 Sighting # 4

Initial sighting on Track

Time: 11:09 WP#: 26 Lat: 36.426733 Long: -74.710148
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 49 Beaufort Sea State: 3
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 11:10 WP#: 27 Lat: 36.423383 Long: -74.709582
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 50 / 100 / 75
 Features used in Species ID: Uniform gray

Representative images used for Species ID: 177, 178
 Photographer: Ryan Frame numbers: 167 - 232 Spacer: 233
 Calculated distance from Trackline: 0.38 km

Final Time and Position of Sighting

Time: 11:24 WP#: 28 Lat: 36.417480 Long: -74.705474
 Calculated Distance Traveled: 0.75 km

Behavior and Additional Comments

Fast travel southwest, subsurface with quick surfacings

Thursday, July 7, 2016 Sighting # 5

Initial sighting on Track

Time: 14:18 WP#: 39 Lat: 36.793075 Long: -74.548773
 Vertical Angle: 1 Horizontal Bearing in Degrees: 110 Sighting Cue: Body
 On/Off Effort: Off Trackline: 54 Beaufort Sea State: 3
 Observer: Pilot Observer side: Left

Actual Time and Position of Sighting

Time: 14:20 WP#: 40 Lat: 36.794877 Long: -74.563368
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 4 / 4 / 4
 Features used in Species ID: Black body, blunt head

Representative images used for Species ID: 246, 248
 Photographer: Ryan Frame numbers: 234 - 254 Spacer: 255
 Calculated distance from Trackline: 1.32 km

Final Time and Position of Sighting

Time: 14:23 WP#: 41 Lat: 36.796979 Long: -74.565664
 Calculated Distance Traveled: 0.31 km

Behavior and Additional Comments

Slow travel

Thursday, July 7, 2016 Sighting # 6

Initial sighting on Track

Time: 14:30 WP#: 45 Lat: 36.792345 Long: -74.365279
 Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
 On/Off Effort: On Trackline: 54 Beaufort Sea State: 3
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 14:31 WP#: 46 Lat: 36.793467 Long: -74.372645
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 20 / 30 / 25
 Features used in Species ID: Uniform gray

Representative images used for Species ID: 309, 320
 Photographer: Ryan Frame numbers: 256 - 327 Spacer: 328
 Calculated distance from Trackline: 0.67 km

Final Time and Position of Sighting

Time: 14:47 WP#: 47 Lat: 36.781843 Long: -74.380704
 Calculated Distance Traveled: 1.48 km

Behavior and Additional Comments

Fast subsurface travel SSW, showing bellies, quick surfacings

Thursday, July 7, 2016 Sighting # 7

Initial sighting on Track

Time: 15:47 WP#: 63 Lat: 37.019416 Long: -74.551681
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
 On/Off Effort: On Trackline: 57 Beaufort Sea State: 3
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 15:48 WP#: 64 Lat: 37.025971 Long: -74.537725
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 3 / 3 / 3
 Features used in Species ID: Dark body, blunt head

Representative images used for Species ID: 337, 348, 354
 Photographer: Ryan Frame numbers: 329 - 359 Spacer: 360
 Calculated distance from Trackline: 1.43 km

Final Time and Position of Sighting

Time: 15:50 WP#: 65 Lat: 37.027677 Long: -74.535519
 Calculated Distance Traveled: 0.27 km

Behavior and Additional Comments

Traveling North, quick surfacings

Thursday, July 7, 2016 Sighting # 8

Initial sighting on Track

Time: 15:54 WP#: 67 Lat: 37.019560 Long: -74.621559
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
 On/Off Effort: On Trackline: 57 Beaufort Sea State: 3
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 15:55 WP#: 68 Lat: 37.024724 Long: -74.621563
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 20 / 30 / 25
 Features used in Species ID: Uniform gray, white peduncles

Representative images used for Species ID: 361, 363, 381
 Photographer: Ryan Frame numbers: 361 - 386 Spacer: 387
 Calculated distance from Trackline: 0.57 km

Final Time and Position of Sighting

Time: 16:02 WP#: 57 Lat: 37.028543 Long: -74.622144
 Calculated Distance Traveled: 0.43 km

Behavior and Additional Comments

Milling, playful, belly up, multiple groups, white peduncles

Friday, July 8, 2016 Sighting # 1

Initial sighting on Track

Time: 9:40 WP#: 6 Lat: 37.092335 Long: -75.107287
 Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
 On/Off Effort: On Trackline: 58 Beaufort Sea State: 2
 Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 9:41 WP#: 7 Lat: 37.091402 Long: -75.106500
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 8 / 8 / 8
 Features used in Species ID: Robust grey body

Representative images used for Species ID: 412, 417
 Photographer: Erin Frame numbers: 388-418 Spacer: 419
 Calculated distance from Trackline: 0.13 km

Final Time and Position of Sighting

Time: 9:45 WP#: 8 Lat: 37.083955 Long: -75.110632
 Calculated Distance Traveled: 0.91 km

Behavior and Additional Comments

Slow travel at the surface in a few small groups, some animals milling.

Friday, July 8, 2016 Sighting # 2

Initial sighting on Track

Time: 10:19 WP#: 15 Lat: 36.639356 Long: -74.367609
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Wake
 On/Off Effort: On Trackline: 52 Beaufort Sea State: 3
 Observer: Ryan Observer side: Left

Actual Time and Position of Sighting

Time: 10:20 WP#: 16 Lat: 36.638825 Long: -74.366662
 Species: *Physeter macrocephalus* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: Large square head with asymmetrically placed blow hole, wrinkly body.

Representative images used for Species ID: 440, 449, 452
 Photographer: Erin Frame numbers: 420-456 Spacer: 457
 Calculated distance from Trackline: 0.10 km

Final Time and Position of Sighting

Time: 10:22 WP#: 17 Lat: 36.636800 Long: -74.366077
 Calculated Distance Traveled: 0.23 km

Behavior and Additional Comments

Traveling at the surface, could see animals wake, heading north.

Friday, July 8, 2016 Sighting # 3

Initial sighting on Track

Time: 10:33 WP#: 21 Lat: 36.640665 Long: -74.761489
 Vertical Angle: 1 Horizontal Bearing in Degrees: 60 Sighting Cue: Splash
 On/Off Effort: On Trackline: 52 Beaufort Sea State: 2
 Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 10:35 WP#: 22 Lat: 36.645529 Long: -74.758003
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 6 / 7 / 7
 Features used in Species ID: Robust body appearance, uniform gray coloration

Representative images used for Species ID: 474
 Photographer: Erin Frame numbers: 458-479 Spacer: 480
 Calculated distance from Trackline: 0.62 km

Final Time and Position of Sighting

Time: 10:38 WP#: 23 Lat: 36.643055 Long: -74.758464
 Calculated Distance Traveled: 0.28 km

Behavior and Additional Comments

No change in behavior, difficult to photograph.

Friday, July 8, 2016 Sighting # 4

Initial sighting on Track

Time: 10:55 WP#: 31 Lat: 36.570282 Long: -75.021581
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Spalsh
 On/Off Effort: On Trackline: 51 Beaufort Sea State: 3
 Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 10:56 WP#: 32 Lat: 36.570566 Long: -75.023765
 Species: *Stenella frontalis* Numbers (Low/High/Best): 14 / 15 / 14
 Features used in Species ID: White tip to rostrum, spotting pattern across animals body.

Representative images used for Species ID: 481, 494, 500, 511, 516
 Photographer: Erin Frame numbers: 481-523 Spacer: 524
 Calculated distance from Trackline: 0.20 km

Final Time and Position of Sighting

Time: 10:59 WP#: 33 Lat: 36.567026 Long: -75.022383
 Calculated Distance Traveled: 0.41 km

Behavior and Additional Comments

Two groups, non-directional travel, showing bellies and socializing.

Friday, July 8, 2016 Sighting # 5

Initial sighting on Track

Time: 14:10 WP#: 51 Lat: 36.720900 Long: -74.903102
 Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
 On/Off Effort: On Trackline: 53 Beaufort Sea State: 2
 Observer: Ryan Observer side: Left

Actual Time and Position of Sighting

Time: 14:14 WP#: 52 Lat: 36.725595 Long: -74.901699
 Species: *Balaenoptera acutorostrata* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: Small fusiform shape with white bands on pectoral fins.

Representative images used for Species ID: 532, 544, 545, 555
 Photographer: Erin Frame numbers: 525-566 Spacer: 567
 Calculated distance from Trackline: 0.54 km

Final Time and Position of Sighting

Time: 14:30 WP#: 53 Lat: 36.725689 Long: -74.906132
 Calculated Distance Traveled: 0.40 km

Behavior and Additional Comments

Animal looked small even for a minke.

Friday, July 8, 2016 Sighting # 6

Initial sighting on Track

Time: 14:37 WP#: 56 Lat: 36.721264 Long: -74.639084
 Vertical Angle: 1 Horizontal Bearing in Degrees: 45 Sighting Cue: Body
 On/Off Effort: On Trackline: 53 Beaufort Sea State: 2
 Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 14:38 WP#: 57 Lat: 36.717961 Long: -74.631714
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 12 / 19 / 17
 Features used in Species ID: Square head, black body, dorsal fin place 1/3 back on the animals body.

Representative images used for Species ID: 579, 585, 590, 593, 594
 Photographer: Erin Frame numbers: 568-598 Spacer: 599
 Calculated distance from Trackline: 0.75 km

Final Time and Position of Sighting

Time: 14:40 WP#: 58 Lat: 36.719724 Long: -74.637289
 Calculated Distance Traveled: 0.53 km

Behavior and Additional Comments

One dense group of animals hanging at the surface.

Friday, July 8, 2016 Sighting # 7

Initial sighting on Track

Time: 14:44 WP#: 61 Lat: 36.720768 Long: -74.444999
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 53 Beaufort Sea State: 2
 Observer: Ryan Observer side: Left

Actual Time and Position of Sighting

Time: 14:45 WP#: 62 Lat: 36.723260 Long: -74.447741
 Species: *Ziphius cavirostris* Numbers (Low/High/Best): 2 / 2 / 2
 Features used in Species ID: White heads with copper yellow bodies, small pectoral fins

Representative images used for Species ID: 600, 601
 Photographer: Erin Frame numbers: 600-601 Spacer: 602
 Calculated distance from Trackline: 0.37 km

Final Time and Position of Sighting

Time: 14:52 WP#: 63 Lat: 36.727595 Long: -74.437663
 Calculated Distance Traveled: 1.02 km

Behavior and Additional Comments

One white animal and one white head and copper body.

Friday, July 8, 2016 Sighting # 8

Initial sighting on Track

Time: 15:40 WP#: 79 Lat: 37.243081 Long: -74.832850
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 60 Beaufort Sea State: 3
 Observer: Ryan Observer side: Left

Actual Time and Position of Sighting

Time: 15:42 WP#: 81 Lat: 37.250304 Long: -74.834005
 Species: *Balaenoptera physalis* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: Large fusiform baleen whale with white right jaw

Representative images used for Species ID: 621, 655, 658
 Photographer: Erin Frame numbers: 603-672 Spacer: 673
 Calculated distance from Trackline: 0.81 km

Final Time and Position of Sighting

Time: 15:48 WP#: 82 Lat: 37.241954 Long: -74.829457
 Calculated Distance Traveled: 1.01 km

Behavior and Additional Comments

Something on the animals left pectoral fin.

Friday, July 8, 2016 Sighting # 9

Initial sighting on Track

Time: 15:52 WP#: 85 Lat: 37.243135 Long: -74.703046
 Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: Body
 On/Off Effort: On Trackline: 60 Beaufort Sea State: 2
 Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 15:54 WP#: 86 Lat: 37.241184 Long: -74.689771
 Species: *Stenella frontalis* Numbers (Low/High/Best): 12 / 18 / 15
 Features used in Species ID: Alternating light and dark coloration along the length of the animal.
 white tip to rostrum, spotting present.
 Representative images used for Species ID: 697, 698
 Photographer: Erin Frame numbers: 674-706 Spacer: 707
 Calculated distance from Trackline: 1.20 km

Final Time and Position of Sighting

Time: 15:57 WP#: 87 Lat: 37.238894 Long: -74.693627
 Calculated Distance Traveled: 0.43 km

Behavior and Additional Comments

Two loose groups, milling and socializing.

Friday, July 8, 2016 Sighting # 10

Initial sighting on Track

Time: 15:59 WP#: 89 Lat: 37.243153 Long: -74.591857
 Vertical Angle: 1 Horizontal Bearing in Degrees: 45 Sighting Cue: Body
 On/Off Effort: On Trackline: 60 Beaufort Sea State: 2
 Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 16:00 WP#: 90 Lat: 37.238658 Long: -74.592319
 Species: *Delphinus delphis* Numbers (Low/High/Best): 4 / 4 / 4
 Features used in Species ID: Dark dorsal surface and yellow mid-body to ventral surface.
 Representative images used for Species ID: 710, 714
 Photographer: Erin Frame numbers: 707-714 Spacer: 715
 Calculated distance from Trackline: 0.80 km

Final Time and Position of Sighting

Time: 16:03 WP#: 91 Lat: 37.236451 Long: -74.598880
 Calculated Distance Traveled: 0.63 km

Behavior and Additional Comments

Friday, July 8, 2016 Sighting # 11

Initial sighting on Track

Time: 16:06 WP#: 93 Lat: 37.242746 Long: -74.503206
 Vertical Angle: 3 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
 On/Off Effort: On Trackline: 60 Beaufort Sea State: 2
 Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 16:14 WP#: 94 Lat: 37.249697 Long: -74.509039
 Species: *Unidentified Delphinid* Numbers (Low/High/Best): 7 / 7 / 7
 Features used in Species ID:

Representative images used for Species ID: No images

Photographer: Erin Frame numbers: NA Spacer: NA
 Calculated distance from Trackline: 0.93 km

Final Time and Position of Sighting

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

Behavior and Additional Comments

No resight

Friday, July 8, 2016 Sighting # 12

Initial sighting on Track

Time: 16:17 WP#: 97 Lat: 37.243299 Long: -74.380080
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Spalsh
 On/Off Effort: On Trackline: 60 Beaufort Sea State: 2
 Observer: Ryan Observer side: Left

Actual Time and Position of Sighting

Time: 16:20 WP#: 98 Lat: 37.250200 Long: -74.383966
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 32 / 35 / 34
 Features used in Species ID: Robust grey body

Representative images used for Species ID: 740

Photographer: Erin Frame numbers: 715-745 Spacer: 746
 Calculated distance from Trackline: 0.84 km

Final Time and Position of Sighting

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

Behavior and Additional Comments

Milling in a long line.

Thursday, August 11, 2016 Sighting # 8

Initial sighting on Track

Time: 13:19 WP#: 60 Lat: 36.197096 Long: -74.923977
 Vertical Angle: 3 Horizontal Bearing in Degrees: 45 Sighting Cue: Splash
 On/Off Effort: On Trackline: 46 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 13:19 WP#: 61 Lat: 36.207144 Long: -74.917842
 Species: Stenella frontalis Numbers (Low/High/Best): 100 / 150 / 125
 Features used in Species ID: Alternating light and dark, spotting down body

Representative images used for Species ID: 2942, 2959, 2972, 2977
 Photographer: Ryan Frame numbers: 2930 - 3026 Spacer: 3027
 Calculated distance from Trackline: 1.25 km

Final Time and Position of Sighting

Time: 13:29 WP#: 62 Lat: 36.223360 Long: -74.910062
 Calculated Distance Traveled: 1.93 km

Behavior and Additional Comments

Fast travel, quick surfacings

Thursday, August 11, 2016 Sighting # 9

Initial sighting on Track

Time: 13:19 WP#: 60 Lat: 36.197096 Long: -74.923977
 Vertical Angle: 3 Horizontal Bearing in Degrees: 45 Sighting Cue: Body
 On/Off Effort: On Trackline: 46 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 13:19 WP#: 61 Lat: 36.207144 Long: -74.917842
 Species: *Balaenoptera physalis* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: Large, long, gray body, white mouth

Representative images used for Species ID: 2986, 3003
 Photographer: Ryan Frame numbers: 2930 - 3026 Spacer: 3027
 Calculated distance from Trackline: 1.25 km

Final Time and Position of Sighting

Time: 13:29 WP#: 62 Lat: 36.223360 Long: -74.910062
 Calculated Distance Traveled: 1.93 km

Behavior and Additional Comments

Surfaced in middle of group of Sfr

Thursday, August 11, 2016 Sighting # 10

Initial sighting on Track

Time: 13:34 WP#: 64 Lat: 36.199337 Long: -74.740717
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 46 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 13:35 WP#: 35 Lat: 36.201955 Long: -74.748983
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 42 / 52 / 47
 Features used in Species ID: Dark body, blunt head, short pectorals

Representative images used for Species ID: 3033, 3040, 3054
 Photographer: Ryan Frame numbers: 3028 - 3062 Spacer: 3063
 Calculated distance from Trackline: 0.80 km

Final Time and Position of Sighting

Time: 13:39 WP#: 66 Lat: 36.199963 Long: -74.740126
 Calculated Distance Traveled: 0.83 km

Behavior and Additional Comments

Milling, scattered

Thursday, August 11, 2016 Sighting # 11

Initial sighting on Track

Time: 13:48 WP#: 71 Lat: 36.197084 Long: -74.490862
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 46 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 13:49 WP#: 72 Lat: 36.203544 Long: -74.489828
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 20 / 30 / 25
 Features used in Species ID: Uniform gray, robust, white peduncles

Representative images used for Species ID: 3065, 3077
 Photographer: Ryan Frame numbers: 3064 - 3079 Spacer: 3080
 Calculated distance from Trackline: 0.72 km

Final Time and Position of Sighting

Time: 13:51 WP#: 73 Lat: 36.211626 Long: -74.486743
 Calculated Distance Traveled: 0.94 km

Behavior and Additional Comments

Milling, slow travel, multiple groups

Thursday, August 11, 2016 Sighting # 12

Initial sighting on Track

Time: 14:03 WP#: 79 Lat: 36.273057 Long: -74.370452
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 47 Beaufort Sea State: 1
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 14:04 WP#: 80 Lat: 36.267788 Long: -74.365312
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 30 / 50 / 40
 Features used in Species ID: Uniform gray, robust, white peduncles

Representative images used for Species ID: 3082, 3085, 3090, 3092
 Photographer: Ryan Frame numbers: 3081 - 3109 Spacer: 3110
 Calculated distance from Trackline: 0.75 km

Final Time and Position of Sighting

Time: 14:05 WP#: 81 Lat: 36.275524 Long: -74.366853
 Calculated Distance Traveled: 0.87 km

Behavior and Additional Comments

milling, chasing, breaching, multiple groups

Thursday, August 11, 2016 Sighting # 13

Initial sighting on Track

Time: 14:14 WP#: 85 Lat: 36.273535 Long: -74.589693
 Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: Splash
 On/Off Effort: On Trackline: 47 Beaufort Sea State: 1
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 14:15 WP#: 86 Lat: 36.266240 Long: -74.582797
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 20 / 30 / 25
 Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 3121, 3125
 Photographer: Ryan Frame numbers: 3111 - 3126 Spacer: 3127
 Calculated distance from Trackline: 1.02 km

Final Time and Position of Sighting

Time: 14:17 WP#: 87 Lat: 36.269652 Long: -74.583326
 Calculated Distance Traveled: 0.38 km

Behavior and Additional Comments

Multiple groups, darting

Thursday, August 11, 2016 Sighting # 14

Initial sighting on Track

Time: 14:21 WP#: 89 Lat: 36.273721 Long: -74.728594
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
 On/Off Effort: On Trackline: 47 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 14:23 WP#: 90 Lat: 36.270424 Long: -74.717086
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 35 / 55 / 45
 Features used in Species ID: Dark body, blunt head, short pectorals

Representative images used for Species ID: 3129, 3134
 Photographer: Ryan Frame numbers: 3128 - 3138 Spacer: 3139
 Calculated distance from Trackline: 1.10 km

Final Time and Position of Sighting

Time: 14:27 WP#: 91 Lat: 36.271952 Long: -74.717112
 Calculated Distance Traveled: 0.17 km

Behavior and Additional Comments

spaced out, multiple groups

Thursday, August 11, 2016 Sighting # 15

Initial sighting on Track

Time: 15:04 WP#: 98 Lat: 36.346377 Long: -74.352624
 Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
 On/Off Effort: On Trackline: 48 Beaufort Sea State: 1
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 15:05 WP#: 99 Lat: 36.351611 Long: -74.360006
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 5 / 5 / 5
 Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 3141, 3142, 3153, 3158
 Photographer: Ryan Frame numbers: 3140 - 3168 Spacer: 3169
 Calculated distance from Trackline: 0.88 km

Final Time and Position of Sighting

Time: 15:09 WP#: 100 Lat: 36.353074 Long: -74.356253
 Calculated Distance Traveled: 0.37 km

Behavior and Additional Comments

Slow travel

Thursday, August 11, 2016 Sighting # 16

Initial sighting on Track

Time: 15:19 WP#: 104 Lat: 36.423318 Long: -74.527449
 Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: Splash
 On/Off Effort: On Trackline: 49 Beaufort Sea State: 1
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 15:20 WP#: 105 Lat: 36.410336 Long: -74.524717
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 20 / 30 / 22
 Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 3170, 3174
 Photographer: Ryan Frame numbers: 3170 - 3179 Spacer: 3180
 Calculated distance from Trackline: 1.46 km

Final Time and Position of Sighting

Time: 15:23 WP#: 106 Lat: 36.418154 Long: -74.519802
 Calculated Distance Traveled: 0.97 km

Behavior and Additional Comments

Spread out, milling, darting

Thursday, August 11, 2016 Sighting # 17

Initial sighting on Track

Time: 15:26 WP#: 108 Lat: 36.423511 Long: -74.591464
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Blow
 On/Off Effort: On Trackline: 49 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 15:27 WP#: 109 Lat: 36.426602 Long: -74.587654
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 5 / 5 / 5
 Features used in Species ID: Dark body, blunt head, short pectorals

Representative images used for Species ID: 3181, 3183
 Photographer: Ryan Frame numbers: 3181 - 3191 Spacer: 3192
 Calculated distance from Trackline: 0.48 km

Final Time and Position of Sighting

Time: 15:29 WP#: 110 Lat: 36.432401 Long: -74.580795
 Calculated Distance Traveled: 0.89 km

Behavior and Additional Comments

Spread out, traveling

Thursday, August 11, 2016 Sighting # 18

Initial sighting on Track

Time: 15:30 WP#: 112 Lat: 36.423398 Long: -74.633758
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 49 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 15:31 WP#: 113 Lat: 36.414506 Long: -74.632599
 Species: *Ziphius cavirostris* Numbers (Low/High/Best): 2 / 2 / 2
 Features used in Species ID: White and copper body, small rostrum, dorsal fin set back on body

Representative images used for Species ID: 3194, 3199, 3202, 3205, 3220, 3245
 Photographer: Ryan Frame numbers: 3193 - 3252 Spacer: 3253
 Calculated distance from Trackline: 0.99 km

Final Time and Position of Sighting

Time: 15:33 WP#: 114 Lat: 36.415442 Long: -74.632909
 Calculated Distance Traveled: 0.11 km

Behavior and Additional Comments

Logging

Thursday, August 11, 2016 Sighting # 19

Initial sighting on Track

Time: 15:38 WP#: 116 Lat: 36.423613 Long: -74.775949
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 49 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 15:38 WP#: 117 Lat: 36.426023 Long: -74.776592
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 10 / 10 / 10
 Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 3254, 3265
 Photographer: Ryan Frame numbers: 3254 - 3266 Spacer: 3267
 Calculated distance from Trackline: 0.27 km

Final Time and Position of Sighting

Time: 15:40 WP#: 118 Lat: 36.428086 Long: -74.769735
 Calculated Distance Traveled: 0.66 km

Behavior and Additional Comments

Milling

Thursday, August 11, 2016 Sighting # 20

Initial sighting on Track

Time: 15:42 WP#: 120 Lat: 36.423515 Long: -74.840820
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 49 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 15:43 WP#: 121 Lat: 36.429820 Long: -74.845060
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 10 / 20 / 18
 Features used in Species ID: Uniform gray, robust, white peduncles

Representative images used for Species ID: 3274, 3276
 Photographer: Ryan Frame numbers: 3268 - 3278 Spacer: 3279
 Calculated distance from Trackline: 0.80 km

Final Time and Position of Sighting

Time: 15:44 WP#: 122 Lat: 36.430624 Long: -74.843738
 Calculated Distance Traveled: 0.15 km

Behavior and Additional Comments

Traveling subsurface

Wednesday, August 24, 2016 Sighting # 1

Initial sighting on Track

Time: 13:53 WP#: 33 Lat: 36.796362 Long: -74.438846
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 54 Beaufort Sea State: 4
 Observer: Ryan Observer side: Left

Actual Time and Position of Sighting

Time: 13:54 WP#: 34 Lat: 36.796048 Long: -74.439148
 Species: *Physeter macrocephalus* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: Large square head with asymetrically placed blow hole, wrinkled body behind pectoral fins, under-slung jaw
 Representative images used for Species ID: 3281, 3283
 Photographer: Erin Frame numbers: 3280 - 3294 Spacer: 3295
 Calculated distance from Trackline: 0.04 km

Final Time and Position of Sighting

Time: 13:55 WP#: 35 Lat: 36.794644 Long: -74.444159
 Calculated Distance Traveled: 0.47 km

Behavior and Additional Comments

Small individual, juvenile, stayed at the surface for a few breaths then dove straight down.

Thursday, August 25, 2016 Sighting # 1

Initial sighting on Track

Time: 9:30 WP#: 5 Lat: 37.021587 Long: -74.617515
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 57 Beaufort Sea State: 1
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:32 WP#: 6 Lat: 37.032486 Long: -74.605609
 Species: *Grampus griseus* Numbers (Low/High/Best): 60 / 80 / 70
 Features used in Species ID: Blunt head, white/gray body, cleft in middle of melon

Representative images used for Species ID: 3300, 3304, 3307, 3334, 3339
 Photographer: Ryan Frame numbers: 3296 - 3342 Spacer: 3343
 Calculated distance from Trackline: 1.61 km

Final Time and Position of Sighting

Time: 9:37 WP#: 7 Lat: 37.030083 Long: -74.607830
 Calculated Distance Traveled: 0.33 km

Behavior and Additional Comments

Spread out, slow travel, milling, calf present

Thursday, August 25, 2016 Sighting # 2

Initial sighting on Track

Time: 9:43 WP#: 10 Lat: 37.021196 Long: -74.415657
 Vertical Angle: 3 Horizontal Bearing in Degrees: 100 Sighting Cue: Splash
 On/Off Effort: On Trackline: 57 Beaufort Sea State: 1
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:44 WP#: 11 Lat: 37.036347 Long: -74.425765
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 25 / 45 / 35
 Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 3350, 3356, 3357, 3362, 3370, 3373
 Photographer: Ryan Frame numbers: 3344 - 3384 Spacer: 3385
 Calculated distance from Trackline: 1.91 km

Final Time and Position of Sighting

Time: 9:47 WP#: 12 Lat: 37.033736 Long: -74.426197
 Calculated Distance Traveled: 0.30 km

Behavior and Additional Comments

Spaced out, traveling subsurface south

Thursday, August 25, 2016 Sighting # 3

Initial sighting on Track

Time: 9:49 WP#: 14 Lat: 37.021112 Long: -74.366685
 Vertical Angle: 1 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
 On/Off Effort: On Trackline: 57 Beaufort Sea State: 1
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:50 WP#: 15 Lat: 37.021948 Long: -74.365678
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 5 / 5 / 5
 Features used in Species ID: Blunt head, dark body, short pectorals

Representative images used for Species ID: 3388, 3390
 Photographer: Ryan Frame numbers: 3386 - 3396 Spacer: 3397
 Calculated distance from Trackline: 0.13 km

Final Time and Position of Sighting

Time: 9:52 WP#: 16 Lat: 37.025008 Long: -74.362418
 Calculated Distance Traveled: 0.45 km

Behavior and Additional Comments

Milling subsurface in a tight group

Thursday, August 25, 2016 Sighting # 4

Initial sighting on Track

Time: 9:54 WP#: 19 Lat: 36.992388 Long: -74.314994
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: Off Trackline: Off Beaufort Sea State: 1
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 9:55 WP#: 20 Lat: 36.988621 Long: -74.326492
 Species: *Unidentified Mesoplodon* Numbers (Low/High/Best): 4 / 4 / 4
 Features used in Species ID: Long body, short pectorals, dorsal fin set far down back

Representative images used for Species ID: 3398
 Photographer: Ryan Frame numbers: 3398 - 3402 Spacer: 3403
 Calculated distance from Trackline: 1.10 km

Final Time and Position of Sighting

Time: 10:01 WP#: 21 Lat: 36.987699 Long: -74.331377
 Calculated Distance Traveled: 0.45 km

Behavior and Additional Comments

Calf present, dove as soon as we flew over, vessel headed toward them

Thursday, August 25, 2016 Sighting # 5

Initial sighting on Track

Time: 10:05 WP#: 15 Lat: 36.949516 Long: -74.360223
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 56 Beaufort Sea State: 1
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 10:05 WP#: 23 Lat: 36.949525 Long: -74.361315
 Species: *Unidentified Mesoplodon* Numbers (Low/High/Best): 3 / 3 / 3
 Features used in Species ID: Large, short pectorals, dorsal fin set back on body

Representative images used for Species ID: 8884
 Photographer: Ryan Frame numbers: 8883 - 8886 Spacer: 8887
 Calculated distance from Trackline: 0.10 km

Final Time and Position of Sighting

Time: 10:06 WP#: 24 Lat: 36.943654 Long: -74.361125
 Calculated Distance Traveled: 0.65 km

Behavior and Additional Comments

Made two passes before they dove, large body, logging at the surface

Thursday, August 25, 2016 Sighting # 6

Initial sighting on Track

Time: 10:30 WP#: 30 Lat: 36.947630 Long: -75.076335
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
 On/Off Effort: On Trackline: 56 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 10:31 WP#: 31 Lat: 36.938836 Long: -75.075073
 Species: *Stenella frontalis* Numbers (Low/High/Best): 20 / 32 / 24
 Features used in Species ID: Light blaze shooting up past dorsal fin

Representative images used for Species ID: 3411
 Photographer: Ryan Frame numbers: 3404 - 3431 Spacer: 3432
 Calculated distance from Trackline: 0.98 km

Final Time and Position of Sighting

Time: 10:35 WP#: 32 Lat: 36.940863 Long: -75.082429
 Calculated Distance Traveled: 0.69 km

Behavior and Additional Comments

Traveling, quickly surfacing

Thursday, August 25, 2016 Sighting # 7

Initial sighting on Track

Time: 11:08 WP#: 43 Lat: 36.809723 Long: -74.315444
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: Off Trackline: Off Beaufort Sea State: 1
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 11:10 WP#: 44 Lat: 36.811233 Long: -74.325508
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 15 / 25 / 18
 Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 3453, 3455
 Photographer: Ryan Frame numbers: 3433 - 3462 Spacer: 3463
 Calculated distance from Trackline: 0.91 km

Final Time and Position of Sighting

Time: 11:13 WP#: 45 Lat: 36.815220 Long: -74.324994
 Calculated Distance Traveled: 0.45 km

Behavior and Additional Comments

Tight group, traveling

Thursday, August 25, 2016 Sighting # 8

Initial sighting on Track

Time: 11:20 WP#: 48 Lat: 36.797976 Long: -74.547825
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 54 Beaufort Sea State: 1
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 11:21 WP#: 49 Lat: 36.806079 Long: -74.541757
 Species: *Stenella frontalis* Numbers (Low/High/Best): 12 / 12 / 12
 Features used in Species ID: Alternating light and dark pattern down body, spotting

Representative images used for Species ID: 3476, 3507, 3514, 3531, 3532, 3533
 Photographer: Ryan Frame numbers: 3464 - 3545 Spacer: 3546
 Calculated distance from Trackline: 1.10 km

Final Time and Position of Sighting

Time: 11:25 WP#: 50 Lat: 36.801427 Long: -74.544280
 Calculated Distance Traveled: 0.60 km

Behavior and Additional Comments

Circling, milling, playful

Thursday, August 25, 2016 Sighting # 9

Initial sighting on Track

Time: 11:26 WP#: 52 Lat: 36.798707 Long: -74.571775
 Vertical Angle: 3 Horizontal Bearing in Degrees: 110 Sighting Cue: Body
 On/Off Effort: On Trackline: 54 Beaufort Sea State: 1
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 11:27 WP#: 53 Lat: 36.805887 Long: -74.568732
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 14 / 14 / 14
 Features used in Species ID: Dark body, blunt head, short pectorals

Representative images used for Species ID: 3554, 3563, 3570, 3574, 3576
 Photographer: Ryan Frame numbers: 3547 - 3580 Spacer: 3581
 Calculated distance from Trackline: 0.84 km

Final Time and Position of Sighting

Time: 11:30 WP#: 54 Lat: 36.803202 Long: -74.569156
 Calculated Distance Traveled: 0.30 km

Behavior and Additional Comments

Milling, calves present, most dove for a bit and then surfaced

Thursday, August 25, 2016 Sighting # 10

Initial sighting on Track

Time: 11:31 WP#: 56 Lat: 36.799296 Long: -74.604430
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 54 Beaufort Sea State: 1
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 11:33 WP#: 57 Lat: 36.790108 Long: -74.604054
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 8 / 8 / 8
 Features used in Species ID: Blunt head, dark body, short pectorals

Representative images used for Species ID: 3594
 Photographer: Ryan Frame numbers: 3582 - 3600 Spacer: 3601
 Calculated distance from Trackline: 1.02 km

Final Time and Position of Sighting

Time: 11:34 WP#: 58 Lat: 36.791519 Long: -74.606258
 Calculated Distance Traveled: 0.25 km

Behavior and Additional Comments

Milling, all together except one off in the distance

Thursday, August 25, 2016 Sighting # 11

Initial sighting on Track

Time: 11:44 WP#: 62 Lat: 36.797993 Long: -74.968135
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
 On/Off Effort: On Trackline: 54 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 11:45 WP#: 36 Lat: 36.807372 Long: -74.964485
 Species: *Stenella frontalis* Numbers (Low/High/Best): 12 / 25 / 18
 Features used in Species ID: Alternating light and dark pattern down body, spotting

Representative images used for Species ID: 3627, 3636
 Photographer: Ryan Frame numbers: 3602 - 3637 Spacer: 3638
 Calculated distance from Trackline: 1.10 km

Final Time and Position of Sighting

Time: 11:48 WP#: 64 Lat: 36.807252 Long: -74.973497
 Calculated Distance Traveled: 0.80 km

Behavior and Additional Comments

Traveling subsurface, quick surfacings

Monday, September 12, 2016 Sighting # 7

Initial sighting on Track

Time: 13:27 WP#: 56 Lat: 36.198701 Long: -74.734573
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 46 Beaufort Sea State: 3
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 13:32 WP#: 57 Lat: 36.203604 Long: -74.732183
 Species: *Unidentified Delphinid* Numbers (Low/High/Best): 2 / 2 / 2
 Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: N/A
 Photographer: Tiffany Frame numbers: N/A Spacer: N/A
 Calculated distance from Trackline: 0.59 km

Final Time and Position of Sighting

Time: 13:32 WP#: 57 Lat: 36.203604 Long: -74.732183
 Calculated Distance Traveled: N/A

Behavior and Additional Comments

Traveling, no resight

Monday, October 3, 2016 Sighting # 1

Initial sighting on Track

Time: 10:12 WP#: 8 Lat: 37.168492 Long: -74.743496
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 59 Beaufort Sea State: 4
 Observer: Erin Observer side: Right

Actual Time and Position of Sighting

Time: 10:12 WP#: 8 Lat: 37.168492 Long: -74.743496
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 8 / 8 / 8
 Features used in Species ID: Gray body, whit peduncles

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

Final Time and Position of Sighting

Time: 10:19 WP#: 9 Lat: 37.167009 Long: -74.740048
 Calculated Distance Traveled: N/A

Behavior and Additional Comments

Fast subsurface travel, unable to relocate, white peduncles

Thursday, October 20, 2016 Sighting # 1

Initial sighting on Track

Time: 9:28 WP#: 5 Lat: 36.498186 Long: -74.629792
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 50 Beaufort Sea State: 1
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 9:30 WP#: 6 Lat: 36.490059 Long: -74.632928
 Species: *Unidentified Delphinid* Numbers (Low/High/Best): 4 / 4 / 4
 Features used in Species ID: N/A

Representative images used for Species ID: N/A
 Photographer: N/A Frame numbers: N/A Spacer: N/A
 Calculated distance from Trackline: 0.95 km

Final Time and Position of Sighting

Time: 9:39 WP#: 7 Lat: 36.499035 Long: -74.622701
 Calculated Distance Traveled: N/A

Behavior and Additional Comments

No resight, no photos, final time not accurate, evasive, 2 pairs but dove when we flew over

Thursday, October 20, 2016 Sighting # 2

Initial sighting on Track

Time: 9:41 WP#: 9 Lat: 36.497900 Long: -74.551065
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 50 Beaufort Sea State: 1
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 9:41 WP#: 10 Lat: 36.492629 Long: -74.558193
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 6 / 6 / 6
 Features used in Species ID: Blunt head, dark body, short pectorals

Representative images used for Species ID: 4488, 4494, 4498
 Photographer: Ryan Frame numbers: 4467 - 4514 Spacer: 4515
 Calculated distance from Trackline: 0.87 km

Final Time and Position of Sighting

Time: 9:45 WP#: 11 Lat: 36.495217 Long: -74.557824
 Calculated Distance Traveled: 0.29 km

Behavior and Additional Comments

Milling at the surface

Thursday, October 20, 2016 Sighting # 3

Initial sighting on Track

Time: 9:47 WP#: 13 Lat: 36.497934 Long: -74.490770
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
 On/Off Effort: On Trackline: 50 Beaufort Sea State: 1
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:48 WP#: 14 Lat: 36.491092 Long: -74.490679
 Species: *Stenella coeruleoalba* Numbers (Low/High/Best): 300 / 380 / 350
 Features used in Species ID: White strip going down body

Representative images used for Species ID: 4527, 4622, 4623, 4627
 Photographer: Ryan Frame numbers: 4516 - 4629 Spacer: 4630
 Calculated distance from Trackline: 0.76 km

Final Time and Position of Sighting

Time: 9:59 WP#: 18 Lat: 36.488751 Long: -74.495371
 Calculated Distance Traveled: 0.49 km

Behavior and Additional Comments

Darting, circling, fast travel, long group

Multiple species in the area

Thursday, October 20, 2016 Sighting # 4

Initial sighting on Track

Time: 9:47 WP#: 13 Lat: 36.497934 Long: -74.490770
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: Off Trackline: 50 Beaufort Sea State: 1
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:49 WP#: 15 Lat: 36.491819 Long: -74.484322
 Species: *Balaenoptera physalis* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: Large, slender, white around lip line

Representative images used for Species ID: 4550, 4579, 4585
 Photographer: Ryan Frame numbers: 4528 - 4591 Spacer: 4592
 Calculated distance from Trackline: 0.89 km

Final Time and Position of Sighting

Time: 9:59 WP#: 18 Lat: 36.488751 Long: -74.495371
 Calculated Distance Traveled: 1.05 km

Behavior and Additional Comments

Slow travel, regular surfacing

Multiple species in the area

Thursday, October 20, 2016 Sighting # 5

Initial sighting on Track

Time: 9:47 WP#: 13 Lat: 36.497934 Long: -74.490770
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: Off Trackline: 50 Beaufort Sea State: 1
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:53 WP#: 16 Lat: 36.490350 Long: -74.486473
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 12 / 20 / 16
 Features used in Species ID: Blunt head, dark body, short pectorals

Representative images used for Species ID: 4543
 Photographer: Ryan Frame numbers: 4538 - 4549 Spacer: 4630
 Calculated distance from Trackline: 0.93 km

Final Time and Position of Sighting

Time: 9:59 WP#: 18 Lat: 36.488751 Long: -74.495371
 Calculated Distance Traveled: 0.82 km

Behavior and Additional Comments

Dove, traveling under the surface, Ttr close by
 Seen with multiple species

Thursday, October 20, 2016 Sighting # 6

Initial sighting on Track

Time: 9:47 WP#: 13 Lat: 36.497934 Long: -74.490770
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: Off Trackline: 50 Beaufort Sea State: 1
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:54 WP#: 17 Lat: 36.491995 Long: -74.484280
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 50 / 70 / 60
 Features used in Species ID: Gray body, white peduncles

Representative images used for Species ID: N/A
 Photographer: N/A Frame numbers: N/A Spacer: N/A
 Calculated distance from Trackline: 0.88 km

Final Time and Position of Sighting

Time: 9:59 WP#: 18 Lat: 36.488751 Long: -74.495371
 Calculated Distance Traveled: 1.05 km

Behavior and Additional Comments

Traveling, seen with multiple species, final location not accurate

Thursday, October 20, 2016 Sighting # 7

Initial sighting on Track

Time: 10:13 WP#: 23 Lat: 36.572019 Long: -74.588558
 Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Splash
 On/Off Effort: On Trackline: 51 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 10:14 WP#: 24 Lat: 36.566191 Long: -74.584958
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 4 / 4 / 4
 Features used in Species ID: Dark body, blunt melon, short pectorals

Representative images used for Species ID: 4643
 Photographer: Ryan Frame numbers: 4631 - 4644 Spacer: 4645
 Calculated distance from Trackline: 0.72 km

Final Time and Position of Sighting

Time: 10:16 WP#: 25 Lat: 36.570825 Long: -74.589437
 Calculated Distance Traveled: 0.65 km

Behavior and Additional Comments

Traveling, 3 individuals milling around separately

Thursday, October 20, 2016 Sighting # 8

Initial sighting on Track

Time: 10:19 WP#: 27 Lat: 36.571364 Long: -74.643592
 Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: Body
 On/Off Effort: On Trackline: 51 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 10:21 WP#: 28 Lat: 36.570254 Long: -74.637779
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 2 / 2 / 2
 Features used in Species ID: Dark body, blunt melon, short pectorals

Representative images used for Species ID: 4650
 Photographer: Ryan Frame numbers: 4646 - 4655 Spacer: 4656
 Calculated distance from Trackline: 0.53 km

Final Time and Position of Sighting

Time: 10:22 WP#: 29 Lat: 36.568081 Long: -74.643167
 Calculated Distance Traveled: 0.54 km

Behavior and Additional Comments

Slow travel subsurface, regular surfacing

Thursday, October 20, 2016 Sighting # 9

Initial sighting on Track

Time: 10:24 WP#: 32 Lat: 36.573016 Long: -74.721199
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
 On/Off Effort: On Trackline: 51 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 10:24 WP#: 33 Lat: 36.575532 Long: -74.717391
 Species: *Delphinus delphis* Numbers (Low/High/Best): 150 / 200 / 175
 Features used in Species ID: Multi colored including cream color

Representative images used for Species ID: 4669
 Photographer: Ryan Frame numbers: 4657 - 4696 Spacer: 4697
 Calculated distance from Trackline: 0.44 km

Final Time and Position of Sighting

Time: 10:27 WP#: 34 Lat: 36.576652 Long: -74.725936
 Calculated Distance Traveled: 0.77 km

Behavior and Additional Comments

Multiple large groups

Thursday, October 20, 2016 Sighting # 10

Initial sighting on Track

Time: 10:36 WP#: 36 Lat: 36.571668 Long: -75.076439
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
 On/Off Effort: On Trackline: 51 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 10:37 WP#: 37 Lat: 36.564483 Long: -75.071408
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 6 / 6 / 6
 Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 4709
 Photographer: Ryan Frame numbers: 4698 - 4717 Spacer: 4718
 Calculated distance from Trackline: 0.92 km

Final Time and Position of Sighting

Time: 10:39 WP#: 38 Lat: 36.566262 Long: -75.067721
 Calculated Distance Traveled: 0.38 km

Behavior and Additional Comments

Fast travel, quick surfacing

Thursday, October 20, 2016 Sighting # 11

Initial sighting on Track

Time: 10:48 WP#: 43 Lat: 36.647936 Long: -74.997164
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
 On/Off Effort: On Trackline: 52 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 10:49 WP#: 44 Lat: 36.630975 Long: -75.001571
 Species: *Stenella frontalis* Numbers (Low/High/Best): 16 / 22 / 18
 Features used in Species ID: Alternating light and dark pattern down body, spotting

Representative images used for Species ID: 4723, 4741, 4743
 Photographer: Ryan Frame numbers: 4719 - 4745 Spacer: 4746
 Calculated distance from Trackline: 1.93 km

Final Time and Position of Sighting

Time: 10:51 WP#: 45 Lat: 36.634246 Long: -75.004881
 Calculated Distance Traveled: 0.47 km

Behavior and Additional Comments

Subsurface travel

Thursday, October 20, 2016 Sighting # 12

Initial sighting on Track

Time: 10:57 WP#: 47 Lat: 36.648463 Long: -74.771866
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 52 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 10:58 WP#: 48 Lat: 36.657561 Long: -74.770265
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 6 / 6 / 6
 Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 4761, 4766
 Photographer: Ryan Frame numbers: 4761 - 4776 Spacer: 4777
 Calculated distance from Trackline: 1.02 km

Final Time and Position of Sighting

Time: 11:01 WP#: 49 Lat: 36.650312 Long: -74.769755
 Calculated Distance Traveled: 0.81 km

Behavior and Additional Comments

3 pairs, slow travel, evasive

Thursday, October 20, 2016 Sighting # 13

Initial sighting on Track

Time: 11:06 WP#: 51 Lat: 36.648275 Long: -74.607875
 Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Splash
 On/Off Effort: On Trackline: 52 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 11:07 WP#: 52 Lat: 36.656037 Long: -74.609065
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 7 / 7 / 7
 Features used in Species ID: Uniform gray, robust, white peduncle

Representative images used for Species ID: 4786, 4796, 4797, 4800, 4801
 Photographer: Ryan Frame numbers: 4778 - 4804 Spacer: 4805
 Calculated distance from Trackline: 0.87 km

Final Time and Position of Sighting

Time: 11:08 WP#: 53 Lat: 36.657067 Long: -74.614517
 Calculated Distance Traveled: 0.50 km

Behavior and Additional Comments

Darting, circling, possible feeding

Thursday, October 20, 2016 Sighting # 14

Initial sighting on Track

Time: 11:10 WP#: 55 Lat: 36.648539 Long: -74.538002
 Vertical Angle: 1 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
 On/Off Effort: On Trackline: 52 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 11:12 WP#: 56 Lat: 36.654046 Long: -74.537934
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 7 / 7 / 7
 Features used in Species ID: Dark body, blunt head, short pectorals

Representative images used for Species ID: 4811
 Photographer: Ryan Frame numbers: 4806 - 4821 Spacer: 4822
 Calculated distance from Trackline: 0.61 km

Final Time and Position of Sighting

Time: 11:12 WP#: 57 Lat: 36.654652 Long: -74.535597
 Calculated Distance Traveled: 0.22 km

Behavior and Additional Comments

Milling

Thursday, October 20, 2016 Sighting # 15

Initial sighting on Track

Time: 11:23 WP#: 62 Lat: 36.721719 Long: -74.481904
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 52 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 11:24 WP#: 63 Lat: 36.724095 Long: -74.478618
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 15 / 20 / 18
 Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 4829, 4838, 4846, 4849, 4851
 Photographer: Ryan Frame numbers: 4823 - 4860 Spacer: 4861
 Calculated distance from Trackline: 0.39 km

Final Time and Position of Sighting

Time: 11:26 WP#: 64 Lat: 36.726020 Long: -74.478249
 Calculated Distance Traveled: 0.22 km

Behavior and Additional Comments

Circling, darting

Thursday, October 20, 2016 Sighting # 16

Initial sighting on Track

Time: 11:29 WP#: 66 Lat: 36.722434 Long: -74.609094
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 52 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 11:30 WP#: 67 Lat: 36.716863 Long: -74.601014
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 8 / 8 / 8
 Features used in Species ID: Dark body, blunt melon, short pectorals

Representative images used for Species ID: 4869, 4878
 Photographer: Ryan Frame numbers: 4862 - 4889 Spacer: 4890
 Calculated distance from Trackline: 0.95 km

Final Time and Position of Sighting

Time: 11:31 WP#: 68 Lat: 36.720762 Long: -74.605440
 Calculated Distance Traveled: 0.59 km

Behavior and Additional Comments

Milling

Friday, October 21, 2016 Sighting # 17

Initial sighting on Track

Time: 11:45 WP#: 73 Lat: 36.721514 Long: -75.115746
 Vertical Angle: 2 Horizontal Bearing in Degrees: 45 Sighting Cue: Splash
 On/Off Effort: On Trackline: 53 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 11:46 WP#: 74 Lat: 36.712164 Long: -75.115567
 Species: *Stenella frontalis* Numbers (Low/High/Best): 40 / 60 / 50
 Features used in Species ID: Alternating light and dark pattern down body, spotting

Representative images used for Species ID: 4902, 4904, 4913, 4921
 Photographer: Ryan Frame numbers: 4891 - 4929 Spacer: 4930
 Calculated distance from Trackline: 1.04 km

Final Time and Position of Sighting

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

Behavior and Additional Comments

Fast travel

Thursday, October 20, 2016 Sighting # 18

Initial sighting on Track

Time: 14:01 WP#: 81 Lat: 36.797922 Long: -74.947103
 Vertical Angle: 2 Horizontal Bearing in Degrees: 110 Sighting Cue: Body
 On/Off Effort: On Trackline: 54 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 14:06 WP#: 82 Lat: 36.808906 Long: -74.952694
 Species: *Unidentified Delphinid* Numbers (Low/High/Best): 3 / 3 / 3
 Features used in Species ID: N/A

Representative images used for Species ID: N/A
 Photographer: Ryan Frame numbers: N/A Spacer: N/A
 Calculated distance from Trackline: 1.32 km

Final Time and Position of Sighting

Time: 14:06 WP#: 82 Lat: 36.808906 Long: -74.952694
 Calculated Distance Traveled: N/A

Behavior and Additional Comments

No resight, not photos

Thursday, October 20, 2016 Sighting # 19

Initial sighting on Track

Time: 14:15 WP#: 90 Lat: 36.798191 Long: -74.605729
 Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
 On/Off Effort: On Trackline: 54 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 14:17 WP#: 91 Lat: 36.795171 Long: -74.612052
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 6 / 6 / 6
 Features used in Species ID: Dark body, blunt melon, short pectorals

Representative images used for Species ID: 4942, 4956
 Photographer: Ryan Frame numbers: 4942 - 4962 Spacer: 4963
 Calculated distance from Trackline: 0.66 km

Final Time and Position of Sighting

Time: 14:20 WP#: 92 Lat: 36.809428 Long: -74.619183
 Calculated Distance Traveled: 1.71 km

Behavior and Additional Comments

Traveling, 2 groups

Thursday, October 20, 2016 Sighting # 20

Initial sighting on Track

Time: 14:33 WP#: 97 Lat: 36.871726 Long: -74.455720
 Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
 On/Off Effort: On Trackline: 55 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 14:34 WP#: 98 Lat: 36.870267 Long: -74.443707
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 25 / 40 / 30
 Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 4976, 4981, 4985
 Photographer: Ryan Frame numbers: 4964 - 5009 Spacer: 5010
 Calculated distance from Trackline: 1.08 km

Final Time and Position of Sighting

Time: 14:37 WP#: 100 Lat: 36.871219 Long: -74.453751
 Calculated Distance Traveled: 0.90 km

Behavior and Additional Comments

Milling, scattered

Thursday, October 20, 2016 Sighting # 21

Initial sighting on Track

Time: 14:33 WP#: 97 Lat: 36.871726 Long: -74.455720
 Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
 On/Off Effort: Off Trackline: 55 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 14:34 WP#: 99 Lat: 36.867987 Long: -74.455026
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 10 / 20 / 14
 Features used in Species ID: Dark body, blunt melon, short pectorals

Representative images used for Species ID: 4973
 Photographer: Ryan Frame numbers: 4968 - 4988 Spacer: 5010
 Calculated distance from Trackline: 0.42 km

Final Time and Position of Sighting

Time: 14:37 WP#: 100 Lat: 36.871219 Long: -74.453751
 Calculated Distance Traveled: 0.38 km

Behavior and Additional Comments

Tight group, slow travel, subsurface, seen with Tursiops

Thursday, October 20, 2016 Sighting # 22

Initial sighting on Track

Time: 14:39 WP#: 102 Lat: 36.871504 Long: -74.510996
 Vertical Angle: 3 Horizontal Bearing in Degrees: 60 Sighting Cue: Splash
 On/Off Effort: On Trackline: 55 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 14:40 WP#: 103 Lat: 36.850382 Long: -74.520117
 Species: *Grampus griseus* Numbers (Low/High/Best): 25 / 35 / 28
 Features used in Species ID: Blunt melon with cleft in middle, gray/white body

Representative images used for Species ID: 5028
 Photographer: Ryan Frame numbers: 5011 - 5034 Spacer: 5035
 Calculated distance from Trackline: 2.49 km

Final Time and Position of Sighting

Time: 14:43 WP#: 104 Lat: 36.858868 Long: -74.511747
 Calculated Distance Traveled: 1.20 km

Behavior and Additional Comments

Scattered, milling

Thursday, October 20, 2016 Sighting # 23

Initial sighting on Track

Time: 14:46 WP#: 106 Lat: 36.871589 Long: -74.606755
 Vertical Angle: 3 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
 On/Off Effort: On Trackline: 55 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 14:47 WP#: 107 Lat: 36.859745 Long: -74.600062
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 20 / 40 / 30
 Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 5037, 5040
 Photographer: Ryan Frame numbers: 5036 - 5060 Spacer: 5061
 Calculated distance from Trackline: 1.45 km

Final Time and Position of Sighting

Time: 14:48 WP#: 109 Lat: 36.863989 Long: -74.600998
 Calculated Distance Traveled: 0.48 km

Behavior and Additional Comments

Tight group

Thursday, October 20, 2016 Sighting # 24

Initial sighting on Track

Time: 14:46 WP#: 106 Lat: 36.871589 Long: -74.606755
 Vertical Angle: 3 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
 On/Off Effort: Off Trackline: 55 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 14:48 WP#: 108 Lat: 36.855733 Long: -74.597511
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 20 / 40 / 30
 Features used in Species ID: Dark body, blunt melon, short pectorals

Representative images used for Species ID: 5055
 Photographer: Ryan Frame numbers: 5055 - 5059 Spacer: 5061
 Calculated distance from Trackline: 1.94 km

Final Time and Position of Sighting

Time: 14:48 WP#: 109 Lat: 36.863989 Long: -74.600998
 Calculated Distance Traveled: 0.97 km

Behavior and Additional Comments

Thursday, October 20, 2016 Sighting # 25

Initial sighting on Track

Time: 15:28 WP#: 120 Lat: 36.947785 Long: -74.591804
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 56 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 15:28 WP#: 121 Lat: 36.944640 Long: -74.600240
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 30 / 40 / 35
 Features used in Species ID: Dark body, blunt melon, short pectorals

Representative images used for Species ID: 5073, 5088
 Photographer: Ryan Frame numbers: 5070 - 5112 Spacer: 5113
 Calculated distance from Trackline: 0.83 km

Final Time and Position of Sighting

Time: 15:30 WP#: 122 Lat: 36.944072 Long: -74.594345
 Calculated Distance Traveled: 0.53 km

Behavior and Additional Comments

Milling, multiple groups

Thursday, October 20, 2016 Sighting # 26

Initial sighting on Track

Time: 15:38 WP#: 124 Lat: 36.947559 Long: -74.372202
 Vertical Angle: 1 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
 On/Off Effort: On Trackline: 56 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 15:39 WP#: 125 Lat: 36.938339 Long: -74.374788
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 8 / 15 / 10
 Features used in Species ID: Dark body, blunt melon, short pectorals

Representative images used for Species ID: 5115
 Photographer: Ryan Frame numbers: 5114 - 5121 Spacer: 5122
 Calculated distance from Trackline: 1.05 km

Final Time and Position of Sighting

Time: 15:41 WP#: 126 Lat: 36.957987 Long: -74.374316
 Calculated Distance Traveled: 2.85 km

Behavior and Additional Comments

Multiple groups milling

Thursday, October 20, 2016 Sighting # 27

Initial sighting on Track

Time: 15:42 WP#: 128 Lat: 36.951135 Long: -74.340557
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 56 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 15:44 WP#: 129 Lat: 36.952034 Long: -74.340923
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 60 / 100 / 75
 Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 5123
 Photographer: Ryan Frame numbers: 5123 - 5143 Spacer: 5144
 Calculated distance from Trackline: 0.11 km

Final Time and Position of Sighting

Time: 15:45 WP#: 130 Lat: 36.956211 Long: -74.346781
 Calculated Distance Traveled: 0.69 km

Behavior and Additional Comments

Traveling subsurface

Thursday, October 20, 2016 Sighting # 28

Initial sighting on Track

Time: 15:55 WP#: 134 Lat: 37.021326 Long: -74.584591
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 57 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 15:57 WP#: 135 Lat: 37.014001 Long: -74.581436
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 20 / 35 / 25
 Features used in Species ID: Dark body, blunt melon, short pectorals

Representative images used for Species ID: 5146
 Photographer: Ryan Frame numbers: 5145 - 5155 Spacer: 5156
 Calculated distance from Trackline: 0.86 km

Final Time and Position of Sighting

Time: 15:59 WP#: 136 Lat: 37.005258 Long: -74.587392
 Calculated Distance Traveled: 1.11 km

Behavior and Additional Comments

Multiple groups, slow travel

Thursday, October 20, 2016 Sighting # 29

Initial sighting on Track

Time: 16:01 WP#: 138 Lat: 37.022539 Long: -74.633393
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
 On/Off Effort: On Trackline: 57 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 16:04 WP#: 139 Lat: 37.039842 Long: -74.626596
 Species: *Delphinus delphis* Numbers (Low/High/Best): 200 / 300 / 275
 Features used in Species ID: Multi-colored including cream color

Representative images used for Species ID: 5157, 5158
 Photographer: Ryan Frame numbers: 5157 - 5178 Spacer: 5179
 Calculated distance from Trackline: 2.02 km

Final Time and Position of Sighting

Time: 16:05 WP#: 140 Lat: 37.036631 Long: -74.617644
 Calculated Distance Traveled: 0.87 km

Behavior and Additional Comments

Started breaching, darting, fast travel

Thursday, November 3, 2016 Sighting # 1

Initial sighting on Track

Time: 9:45 WP#: 4 Lat: 36.429042 Long: -74.537799
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 49 Beaufort Sea State: 3
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:48 WP#: 5 Lat: 36.429898 Long: -74.531643
 Species: *Grampus griseus* Numbers (Low/High/Best): 15 / 20 / 18
 Features used in Species ID: Blunt melon with cleft in middle, gray body, white scars

Representative images used for Species ID: 75
 Photographer: Tiffany Frame numbers: 70 - 198 Spacer: 199
 Calculated distance from Trackline: 0.56 km

Final Time and Position of Sighting

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

Behavior and Additional Comments

Fast travel subsurface, sighted with Gma

Thursday, November 3, 2016 Sighting # 2

Initial sighting on Track

Time: 9:45 WP#: 4 Lat: 36.429042 Long: -74.537799
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: Off Trackline: 49 Beaufort Sea State: 3
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:59 WP#: 6 Lat: 36.437069 Long: -74.540329
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 10 / 15 / 12
 Features used in Species ID: Dark body, blunt melon, short pectorals

Representative images used for Species ID: 172
 Photographer: Tiffany Frame numbers: 70 - 198 Spacer: 199
 Calculated distance from Trackline: 0.92 km

Final Time and Position of Sighting

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

Behavior and Additional Comments

Slow travel, milling, sighted with Ggr

Thursday, November 3, 2016 Sighting # 3

Initial sighting on Track

Time: 10:13 WP#: 11 Lat: 36.377641 Long: -74.305062
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: Off Trackline: N/A Beaufort Sea State: 3
 Observer: Tiffany Observer side: Right

Actual Time and Position of Sighting

Time: 10:15 WP#: 12 Lat: 36.380526 Long: -74.310900
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 6 / 6 / 6
 Features used in Species ID: Dark body, blunt melon, short pectorals

Representative images used for Species ID: 6121, 6123
 Photographer: Tiffany Frame numbers: 6050 - 6125 Spacer: 6126
 Calculated distance from Trackline: 0.61 km

Final Time and Position of Sighting

Time: 10:20 WP#: 13 Lat: 36.387052 Long: -74.303640
 Calculated Distance Traveled: 0.97 km

Behavior and Additional Comments

Slow travel, diving

Thursday, November 3, 2016 Sighting # 4

Initial sighting on Track

Time: 10:28 WP#: 14 Lat: 36.356049 Long: -74.537928
 Vertical Angle: 2 Horizontal Bearing in Degrees: 60 Sighting Cue: Body
 On/Off Effort: On Trackline: 48 Beaufort Sea State: 3
 Observer: Tiffany Observer side: Right

Actual Time and Position of Sighting

Time: 10:28 WP#: 15 Lat: 36.365050 Long: -74.534206
 Species: *Physeter macrocephalus* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: Large body, forward blow, blunt melon

Representative images used for Species ID: 6156, 6157, 6169, 6175
 Photographer: Tiffany Frame numbers: 6127 - 6177 Spacer: 6178
 Calculated distance from Trackline: 1.10 km

Final Time and Position of Sighting

Time: 10:32 WP#: 16 Lat: 36.363999 Long: -74.531560
 Calculated Distance Traveled: 0.26 km

Behavior and Additional Comments

Logging, small/juvenile

Thursday, November 3, 2016 Sighting # 5

Initial sighting on Track

Time: 11:11 WP#: 24 Lat: 36.278654 Long: -74.498207
 Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Body
 On/Off Effort: On Trackline: 47 Beaufort Sea State: 3
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 11:12 WP#: 25 Lat: 36.276172 Long: -74.499561
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 65 / 85 / 75
 Features used in Species ID: Uniform gray, robust

Representative images used for Species ID: 6185, 6193
 Photographer: Tiffany Frame numbers: 6179 - 6217 Spacer: 6218
 Calculated distance from Trackline: 0.30 km

Final Time and Position of Sighting

Time: 11:13 WP#: 26 Lat: 36.281321 Long: -74.501226
 Calculated Distance Traveled: 0.59 km

Behavior and Additional Comments

2 groups milling

Thursday, November 3, 2016 Sighting # 6

Initial sighting on Track

Time: 11:22 WP#: 31 Lat: 36.189660 Long: -74.412866
 Vertical Angle: 3 Horizontal Bearing in Degrees: 90 Sighting Cue: Blow
 On/Off Effort: On Trackline: 46 Beaufort Sea State: 3
 Observer: Tiffany Observer side: Right

Actual Time and Position of Sighting

Time: 11:28 WP#: 32 Lat: 36.202079 Long: -74.395880
 Species: *Physeter macrocephalus* Numbers (Low/High/Best): 3 / 3 / 3
 Features used in Species ID: Forward blow, large body, blunt melon

Representative images used for Species ID: N/A
 Photographer: Tiffany Frame numbers: N/A Spacer: N/A
 Calculated distance from Trackline: 2.10 km

Final Time and Position of Sighting

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

Behavior and Additional Comments

No photos, no resight, assumed location

Thursday, November 3, 2016 Sighting # 7

Initial sighting on Track

Time: 11:31 WP#: 34 Lat: 36.189803 Long: -74.498092
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: On Trackline: 46 Beaufort Sea State: 3
 Observer: Tiffany Observer side: Right

Actual Time and Position of Sighting

Time: 11:32 WP#: 35 Lat: 36.195576 Long: -74.506199
 Species: *Physeter macrocephalus* Numbers (Low/High/Best): 4 / 4 / 4
 Features used in Species ID: Blunt heads, large body, forward blow

Representative images used for Species ID: 6231, 6238, 6250, 6251, 6326, 6348, 6373, 6424
 Photographer: Tiffany Frame numbers: 6219 - 6562 Spacer: 6563
 Calculated distance from Trackline: 0.97 km

Final Time and Position of Sighting

Time: 11:49 WP#: 38 Lat: 36.198482 Long: -74.496999
 Calculated Distance Traveled: 0.89 km

Behavior and Additional Comments

Strange behavior!!!! Tight group, ramming each other, tail slaps, biting?, thrashing, vertical in water column, Gma darting around, in between long line buoys, thought they were entangled but once they got horizontal in formation no entanglement was seen. Perhaps depredation on long lines?
 Subadult-adult animals

Thursday, November 3, 2016 Sighting # 8

Initial sighting on Track

Time: 11:31 WP#: 34 Lat: 36.189803 Long: -74.498092
 Vertical Angle: 2 Horizontal Bearing in Degrees: 90 Sighting Cue: Body
 On/Off Effort: Off Trackline: 46 Beaufort Sea State: 3
 Observer: Tiffany Observer side: Right

Actual Time and Position of Sighting

Time: 11:32 WP#: 36 Lat: 36.197263 Long: -74.498209
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 7 / 7 / 7
 Features used in Species ID: Blunt head, dark body, short pectorals

Representative images used for Species ID: 6231, 6232
 Photographer: Tiffany Frame numbers: 6231 - 6259 Spacer: 6563
 Calculated distance from Trackline: 0.83 km

Final Time and Position of Sighting

Time: 11:49 WP#: 37 Lat: 36.198482 Long: -74.496999
 Calculated Distance Traveled: 0.17 km

Behavior and Additional Comments

Seen darting around the 4 sperm whales, around long line fishery

Sunday, December 11, 2016 Sighting # 1

Initial sighting on Track

Time: 9:14 WP#: 3 Lat: 37.064256 Long: -75.284199
 Vertical Angle: 2 Horizontal Bearing in Degrees: 100 Sighting Cue: Blow
 On/Off Effort: Off Trackline: Transit Beaufort Sea State: 3
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 9:15 WP#: 4 Lat: 37.055745 Long: -75.293304
 Species: *Balaenoptera physalis* Numbers (Low/High/Best): 1 / 1 / 1
 Features used in Species ID: Long body, white around mouth

Representative images used for Species ID: 228, 234
 Photographer: Ryan Frame numbers: 228 - 237 Spacer: N/A
 Calculated distance from Trackline: 1.24 km

Final Time and Position of Sighting

Time: 9:19 WP#: 5 Lat: 37.061867 Long: -75.286440
 Calculated Distance Traveled: 0.91 km

Behavior and Additional Comments

Traveling then dove deep

Sunday, December 11, 2016 Sighting # 2

Initial sighting on Track

Time: 9:38 WP#: 10 Lat: 37.092578 Long: -74.557351
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Blow
 On/Off Effort: On Trackline: 58 Beaufort Sea State: 3
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:38 WP#: 10 Lat: 37.092578 Long: -74.557351
 Species: *Unidentified Delphinid* Numbers (Low/High/Best): 2 / 2 / 2
 Features used in Species ID: The size of a Tt

Representative images used for Species ID: 251, 256
 Photographer: Ryan Frame numbers: 238 - 258 Spacer: 259
 Calculated distance from Trackline: N/A

Final Time and Position of Sighting

Time: 9:49 WP#: 11 Lat: 37.090975 Long: -74.559334
 Calculated Distance Traveled: 0.25 km

Behavior and Additional Comments

Traveling south, regular surfacing, no resight for photos

Sunday, December 11, 2016 Sighting # 3

Initial sighting on Track

Time: 9:51 WP#: 13 Lat: 37.091974 Long: -74.457300
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Blow
 On/Off Effort: On Trackline: 58 Beaufort Sea State: 3
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 9:54 WP#: 14 Lat: 37.094393 Long: -74.457115
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 20 / 35 / 28
 Features used in Species ID: Dark body, blunt head, short pectorals

Representative images used for Species ID: 251, 256
 Photographer: Ryan Frame numbers: 238 - 258 Spacer: 259
 Calculated distance from Trackline: 0.27 km

Final Time and Position of Sighting

Time: 9:58 WP#: 15 Lat: 37.101542 Long: -74.454795
 Calculated Distance Traveled: 0.82 km

Behavior and Additional Comments

Traveling north, large and dispersed group

Sunday, December 11, 2016 Sighting # 4

Initial sighting on Track

Time: 10:56 WP#: 27 Lat: 37.319648 Long: -74.489895
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
 On/Off Effort: On Trackline: 61 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 10:57 WP#: 28 Lat: 37.312952 Long: -74.485224
 Species: *Tursiops truncatus* Numbers (Low/High/Best): 3 / 3 / 3
 Features used in Species ID: Uniform gray, white peduncles

Representative images used for Species ID: 260
 Photographer: Ryan Frame numbers: 260 - 275 Spacer: 276
 Calculated distance from Trackline: 0.85 km

Final Time and Position of Sighting

Time: 10:00 WP#: 29 Lat: 37.312406 Long: -74.490265
 Calculated Distance Traveled: 0.45 km

Behavior and Additional Comments

Fast travel southeast, white peduncles

Sunday, December 11, 2016 Sighting # 5

Initial sighting on Track

Time: 13:38 WP#: 39 Lat: 36.792410 Long: -74.466023
 Vertical Angle: 1 Horizontal Bearing in Degrees: 100 Sighting Cue: Blow
 On/Off Effort: On Trackline: 54 Beaufort Sea State: 2
 Observer: Erin Observer side: Left

Actual Time and Position of Sighting

Time: 13:40 WP#: 40 Lat: 36.797689 Long: -74.467612
 Species: *Globicephala macrorhynchus* Numbers (Low/High/Best): 5 / 5 / 5
 Features used in Species ID: Dark body, blunt melon, short pectorals

Representative images used for Species ID: 6591, 6594
 Photographer: Ryan Frame numbers: 6581 - 6618 Spacer: 6619
 Calculated distance from Trackline: 0.60 km

Final Time and Position of Sighting

Time: 13:42 WP#: 41 Lat: 36.800115 Long: -74.462231
 Calculated Distance Traveled: 0.55 km

Behavior and Additional Comments

Slow travel subsurface or just below surface

Sunday, December 11, 2016 Sighting # 6

Initial sighting on Track

Time: 14:31 WP#: 52 Lat: 36.942908 Long: -74.601371
 Vertical Angle: 1 Horizontal Bearing in Degrees: 90 Sighting Cue: Splash
 On/Off Effort: On Trackline: 56 Beaufort Sea State: 2
 Observer: Ryan Observer side: Right

Actual Time and Position of Sighting

Time: 14:32 WP#: 53 Lat: 36.942944 Long: -74.602747
 Species: *Delphinus delphis* Numbers (Low/High/Best): 225 / 425 / 375
 Features used in Species ID: Multi colored, dark rostrum

Representative images used for Species ID: 6635
 Photographer: Ryan Frame numbers: 6620 - 6656 Spacer: 6657
 Calculated distance from Trackline: 0.12 km

Final Time and Position of Sighting

Time: 14:36 WP#: 54 Lat: 36.938046 Long: -74.606578
 Calculated Distance Traveled: 0.64 km

Behavior and Additional Comments

Darting, circling, fast travel, large dispersed group