
Environmental Imaging Solutions

Digital Aerial Wildlife Survey of BOEM Lease Area OCS-A 520

Monthly Report: May Surveys I & II 2020

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1. Executive Summary

- Two digital aerial wildlife surveys of the Bureau of Ocean Energy Management (BOEM) Lease Area Outer Continental Shelf – Atlantic (OCS-A) 0520, off the Massachusetts coast were conducted on May 5th, and 31st 2020 using APEM Inc.'s high-resolution camera system to capture digital still imagery.
- Images collected have been analyzed by APEM Inc. (hereafter referred to as APEM) and quality assured by Normandeau Associates (hereafter referred to as Normandeau). Raw counts of all species and incidental observations recorded during the May 2020 surveys are presented here.
- A total of 121 birds were recorded in the survey area during the first May survey. The most abundant group recorded was terns (n=52), followed by loons (n=31); wildfowl (n=15); gulls (n=11); gannets (n=11); and fulmars (n=1).
 - A total of 35 birds (29%) were recorded in flight during the survey. These consisted of 'commic' / Forster's tern (n=10); northern gannet (n=7); common tern (n=5); great black-backed gull (n=5); roseate tern (n=3); red-throated loon (n=1); northern fulmar (n=1); Bonaparte's gull (n=1); laughing gull (n=1); and herring gull (n=1). There were 86 birds (71%) recorded as sitting.
 - A total of 11 marine mammals were recorded, consisting of harbor porpoise (n=7); unidentified marine mammal sp. (n=2); gray seal (n=1); and unidentified seal sp. (n=1). No turtles, large bony fish, sharks, or rays were recorded.
- A total of 122 birds were recorded in the survey area during the second May survey. The most abundant group recorded was shearwaters (n=105), followed by gulls (n=10); storm-petrels (n=5); and loons (n=2).
 - A total of 55 birds (45%) were recorded in flight during the survey. These consisted of sooty shearwater (n=26); Cory's shearwater (n=11); great shearwater (n=6); Wilson's storm-petrel (n=5); herring gull (n=3); red-throated loon (n=2); great black-backed gull (n=1); and unidentified shearwater sp. (n=1). There were 67 birds (55%) recorded as sitting.
 - A total of 14 marine mammals were recorded, consisting of common dolphin (n=7); common minke whale (n=3); harbor porpoise (n=2); and unidentified dolphin sp. (n=2).
 - A total of three large bony fish, consisting of ocean sunfish (n=2); and north Atlantic swordfish (n=1) were recorded during the survey, as well as six sharks, consisting of basking shark (n=6). No turtles or rays were recorded.
 - A total of 302 fish shoals were recorded during the survey.
- The roseate tern which was recorded in May Survey 1 and basking shark recorded in May Survey 2 are Listed species (Federally Listed as Threatened or Endangered, Massachusetts State Listed as Endangered).

2. Introduction

APEM and Normandeau were contracted by Equinor Wind US to provide a full year of digital aerial wildlife surveys of the Massachusetts Lease Area OCS-A 0520. Surveys will be carried out on a monthly basis from December 2019 through November 2020, except for April, May, August and September, when two surveys per month shall be carried out in order to coincide with potential use of the area by roseate tern (*Sterna dougallii*).

The aims and objectives of the work are to assess the abundance and distribution of birds, marine mammals, sharks, rays, large bony fish, and turtles present in the Lease Area OCS-A 0520 over the course of a full year. The surveys will provide the baseline information required for conducting impact assessments and are consistent with the survey guidelines for providing avian, marine mammal, and sea turtle information for renewable energy development on the OCS (BOEM 2017 and 2019).

The Survey Area referred to herein is comprised of the Lease Area OCS-A 0520, plus a 2 km (c. 1 NM) buffer surrounding it with an approximately 4 km (c. 2 NM) buffer towards the northeast end.

Images were captured using a grid-based survey design with a 1.5 cm ground sampling distance (GSD). Images were analyzed by APEM and quality assurance was undertaken by Normandeau. This report describes the results of the first and second May 2020 surveys.

3. Summary of Survey

The first May survey was undertaken on May 5th, 2020 from 14:33 to 16:24 (UTC), and the second May survey was undertaken on May 31st, 2020 from 17:47 to 19:42 (UTC). Data collected were 1.5 cm GSD digital still images using a GPS-linked bespoke flight management system to ensure the tracks were flown with a high degree of accuracy.

The digital aerial survey captured images along nine lines spaced approximately 1.9 km across-track and 0.5 km along-track between image nodes within the survey area (**Figure 1** and **Figure 2**). Coverage of images analyzed was calculated to be approximately 10% of the survey area.

On May 5th, 2020, the cloud cover was recorded as 0% (clear), visibility was greater than 10 km (6.2 miles), and no precipitation was recorded. Wind speed was recorded as 22-24 knots from a northerly direction. The outside air temperature at the survey altitude was recorded as 43 to 45°F. The sea state was 3 (slightly moderate) and the water turbidity was 1-2 (slightly to moderately turbid). On May 31st, 2020, the cloud cover was recorded as 0% (clear), visibility was greater than 10 km (6.2 miles), and no precipitation was recorded. Wind speed was recorded as 22-24 knots from a northerly direction. The outside air temperature at the survey altitude was recorded as 57 to 59°F. The sea state was 1-2 (calm / rippled to smooth) and the water turbidity was 1 (slightly turbid). Both surveys were conducted at an altitude of approximately 1,360 ft at a speed of approximately 145 knots.

No health and safety issues were reported during the surveys.

APEM analyzed the images to enumerate birds to species level, and to enumerate any other non-avian marine fauna. Normandeau provided quality assurance (QA) of the data to check for missed animals in 10% of images recorded as empty and quality assured 20% of the bird species identification undertaken by APEM (and 100% of Listed species). Normandeau also identified 100% of the species of non-avian marine fauna including marine mammals, turtles,

sharks, and rays. Birds and marine fauna identified from the images were 'snagged' (i.e. located within the images) and categorized to species when possible, otherwise to the species grouping.

Data reported are raw counts of animals that have not yet been subject to extrapolation for population estimates. Design-based population estimates will be provided in the annual report.

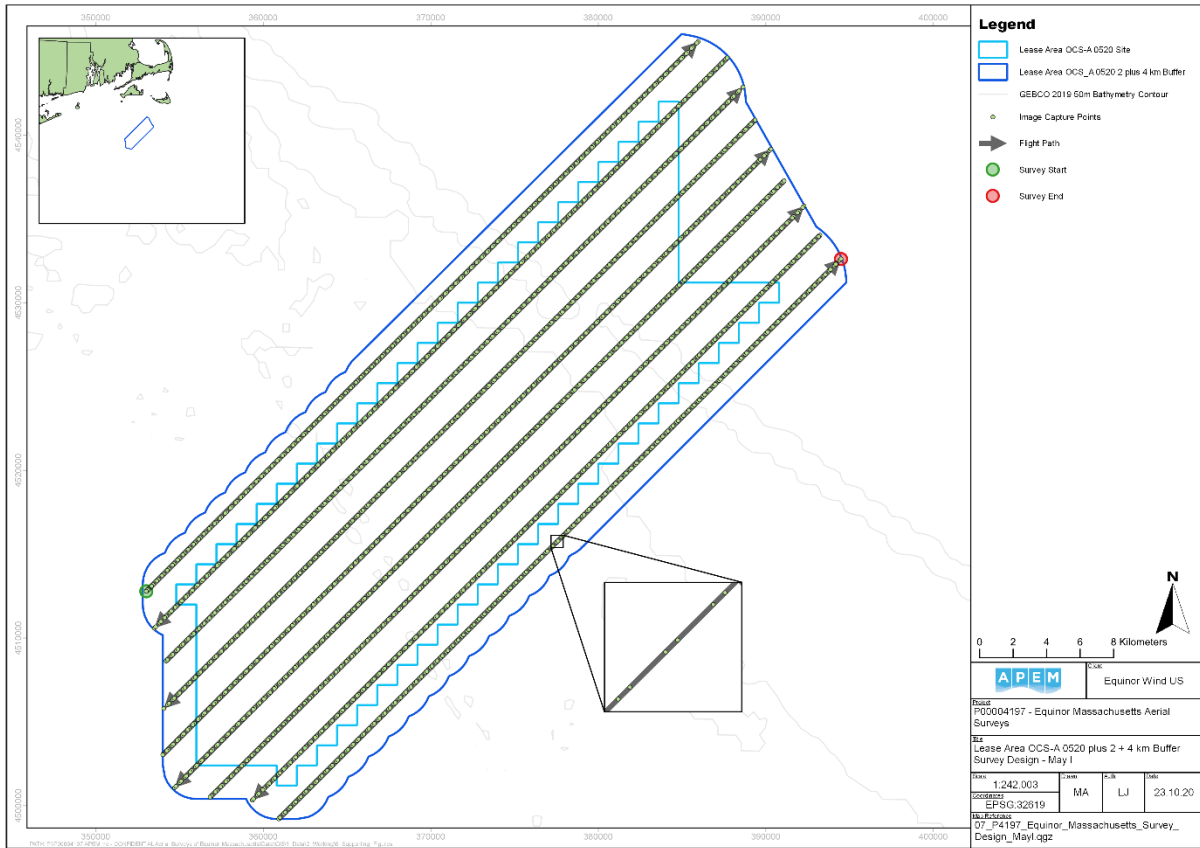


Figure 1 May I Survey Design of Lease Area OCS-A 0520 plus 2 km / 4 km buffer

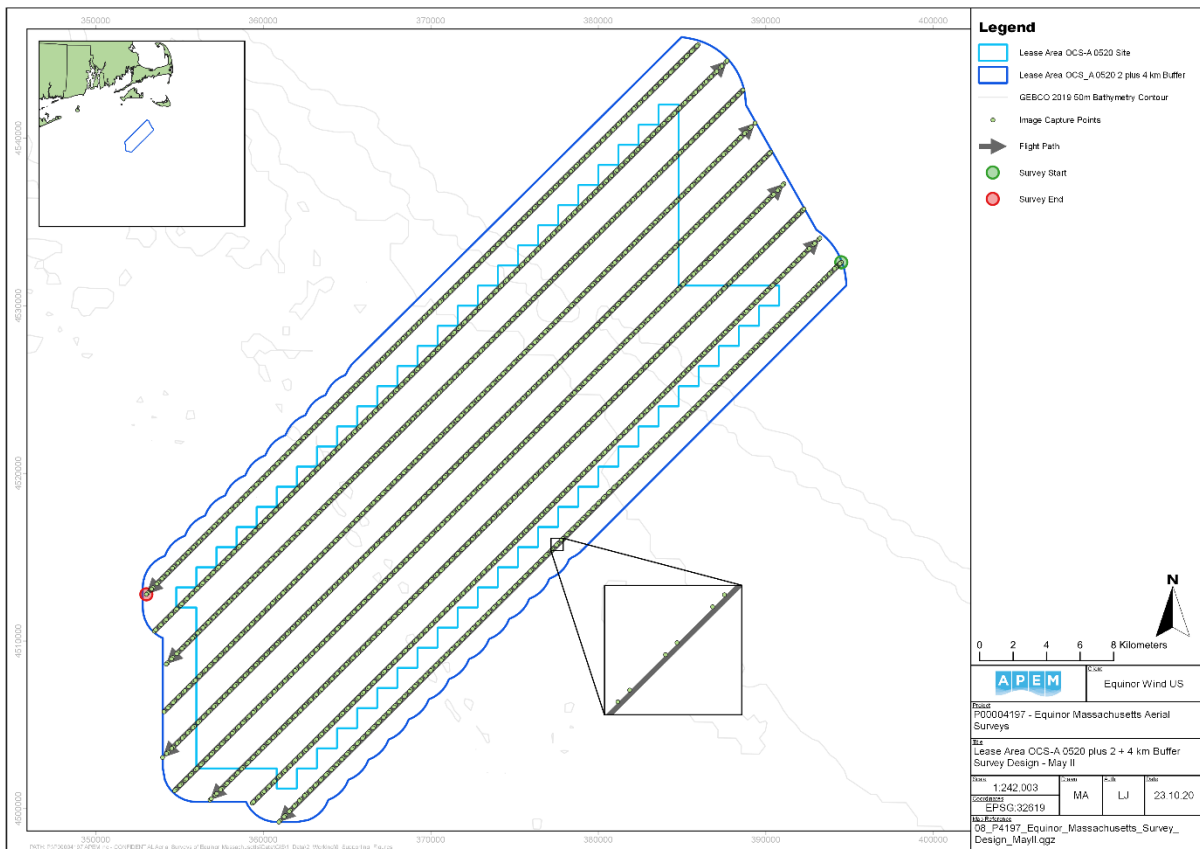


Figure 2 May II Survey Design of Lease Area OCS-A 0520 plus 2 km / 4 km buffer

4. Abundance and Distribution

4.1 Species Abundance

The numbers of marine wildlife species recorded during the May 2020 surveys are presented in **Table 1** to **Table 4**. Species scientific names are provided in Appendix I. Example images of individuals recorded during the surveys are provided in Appendix II.

Table 1 Total number of individuals of birds recorded during the May I 2020 survey of the Lease Area OCS-A 0520 WEA plus 2 km / 4 km irregular buffer

Group	Species	Flying	Sitting	Total
Waterfowl	White-winged scoter	0	15	15
Loon	Red-throated loon	1	29	30
	Common loon	0	1	1
Fulmar	Northern fulmar	1	0	1
Gannet	Northern gannet	7	4	11
Gull	Bonaparte's gull	1	0	1
	Laughing gull	1	0	1
	Great black-backed gull	5	1	6
	Herring gull	1	2	3
Tern	Roseate tern	3	0	3
	Common tern	5	0	5
	'Commic'* / Forster's tern	10	0	10
	Sterna tern sp. – unidentified	0	34	34
Total Birds		35	86	<u>121</u>

*'Commic' refers to either common or Arctic tern

Table 2 Total number of individuals of marine mammals recorded during the May I 2020 survey of the Lease Area OCS-A 0520 WEA plus 2 km / 4 km irregular buffer

Group	Species	Submerged	Surfacing	Total
Marine Mammal	Harbor porpoise	6	1	7
	Gray seal	1	0	1
	Seal sp. – unidentified	0	1	1
	Marine mammal sp. – unidentified	2	0	2
Total		9	2	<u>11</u>

Table 3 Total number of individuals of birds recorded during the May II 2020 survey of the Lease Area OCS-A 0520 WEA plus 2 km / 4 km irregular buffer

Group	Species	Flying	Sitting	Total
Loon	Red-throated loon	2	0	2
Storm-petrel	Wilson's storm-petrel	5	0	5
Shearwater	Cory's shearwater	11	2	13

Group	Species	Flying	Sitting	Total
	Sooty shearwater	26	35	61
	Great shearwater	6	8	14
	Shearwater sp. – unidentified	1	16	17
Gull	Small gull sp. – unidentified	0	1	1
	Great black-backed gull	1	3	4
	Herring gull	3	2	5
Total Birds		55	67	<u>122</u>

*'Commic' refers to either common or Arctic tern

Table 4 Total number of individuals of marine mammals and other fauna recorded during the May II 2020 survey of the Lease Area OCS-A 0520 WEA plus 2 km / 4 km irregular buffer

Group	Species	Submerged	Surfacing	Total
Marine Mammal	Common minke whale	3	0	3
	Common dolphin	6	1	7
	Harbor porpoise	1	1	2
	Dolphin sp. – unidentified	1	1	2
Large Bony Fish	Ocean sunfish	2	0	2
	North Atlantic swordfish	1	0	1
Shark	Basking shark	6	0	6
Total		20	3	<u>23</u>

4.2 Spatial Distribution

Figure 3 and **Figure 4** show the location of all species recorded throughout the Survey Area during the May surveys.

Figure 5 shows the location and flight direction of the Listed roseate tern (Federally Listed as Threatened or Endangered, Massachusetts State Listed as Endangered) sightings (n=3) for the May I 2020 survey. All three roseate terns were located in the southwest of the Survey Area, flying in a generally westerly direction.

Figure 6 shows the location and direction of travel of the Listed basking shark (Federally Listed as Endangered) for the May II 2020 survey. All basking sharks were located from the center to the south of the Survey Area.

Figure 7 shows the location of fish shoals recorded throughout the Survey Area during the May II survey, defined as groupings of two or more small indistinct fish.

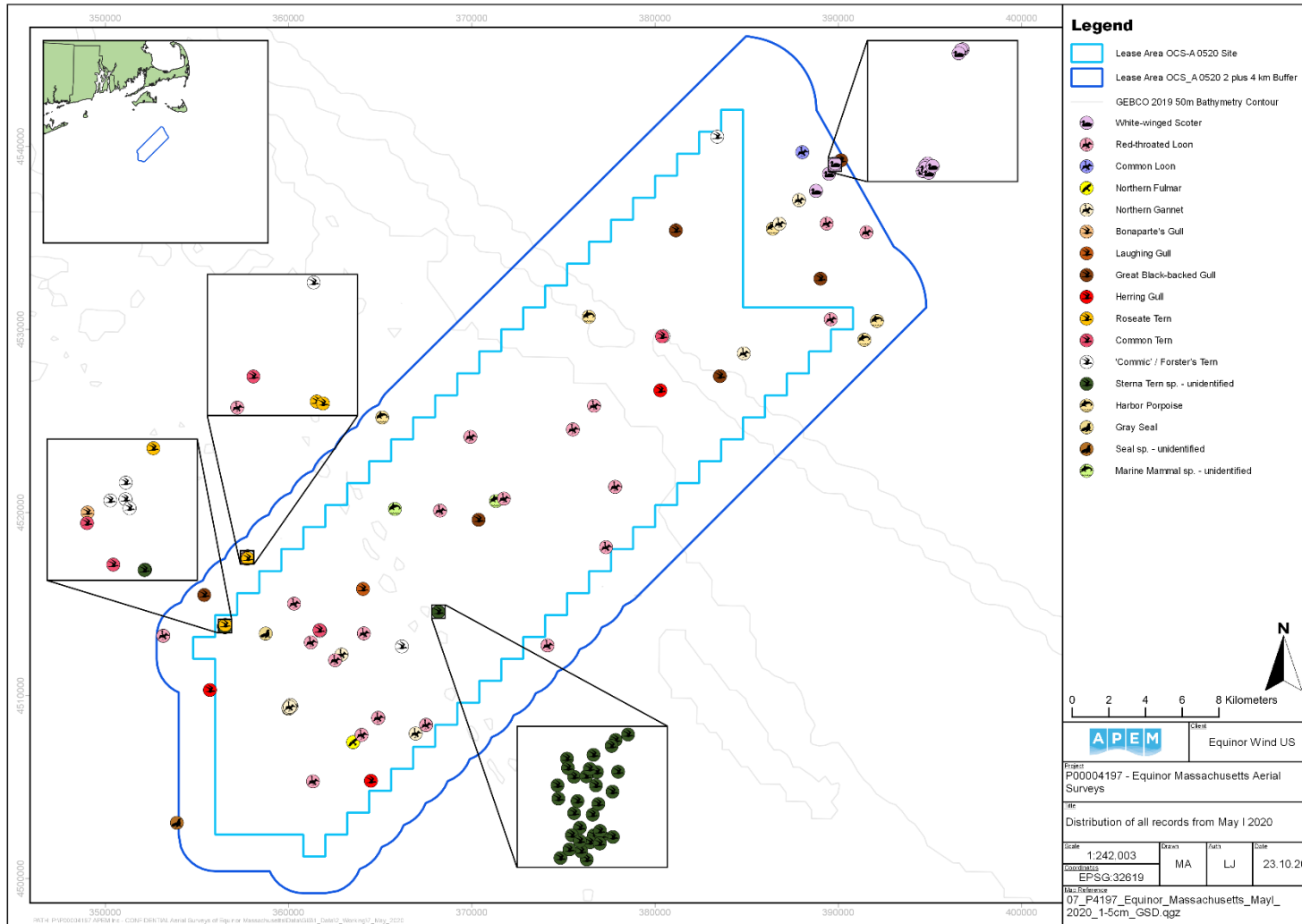


Figure 3 Distribution of all records from the May I 2020 survey of Lease Area OCS-A 0520 plus 2 km / 4 km irregular buffer

Note: Individuals may appear to overlap if they are in close proximity to each other.

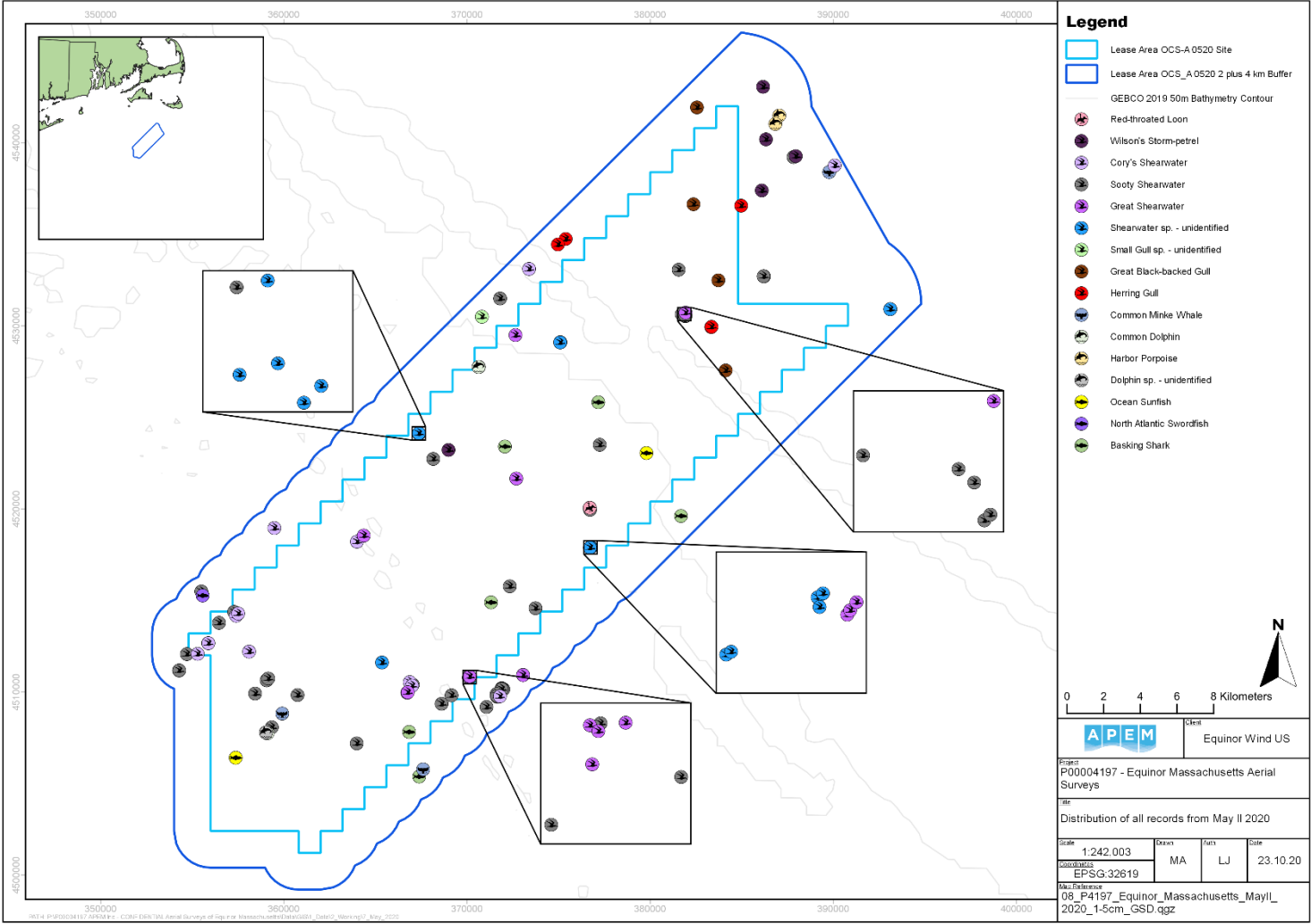


Figure 4 Distribution of all records from the May 11 2020 survey of Lease Area OCS-A 0520 plus 2 km / 4 km irregular buffer

Note: Individuals may appear to overlap if they are in close proximity to each other.

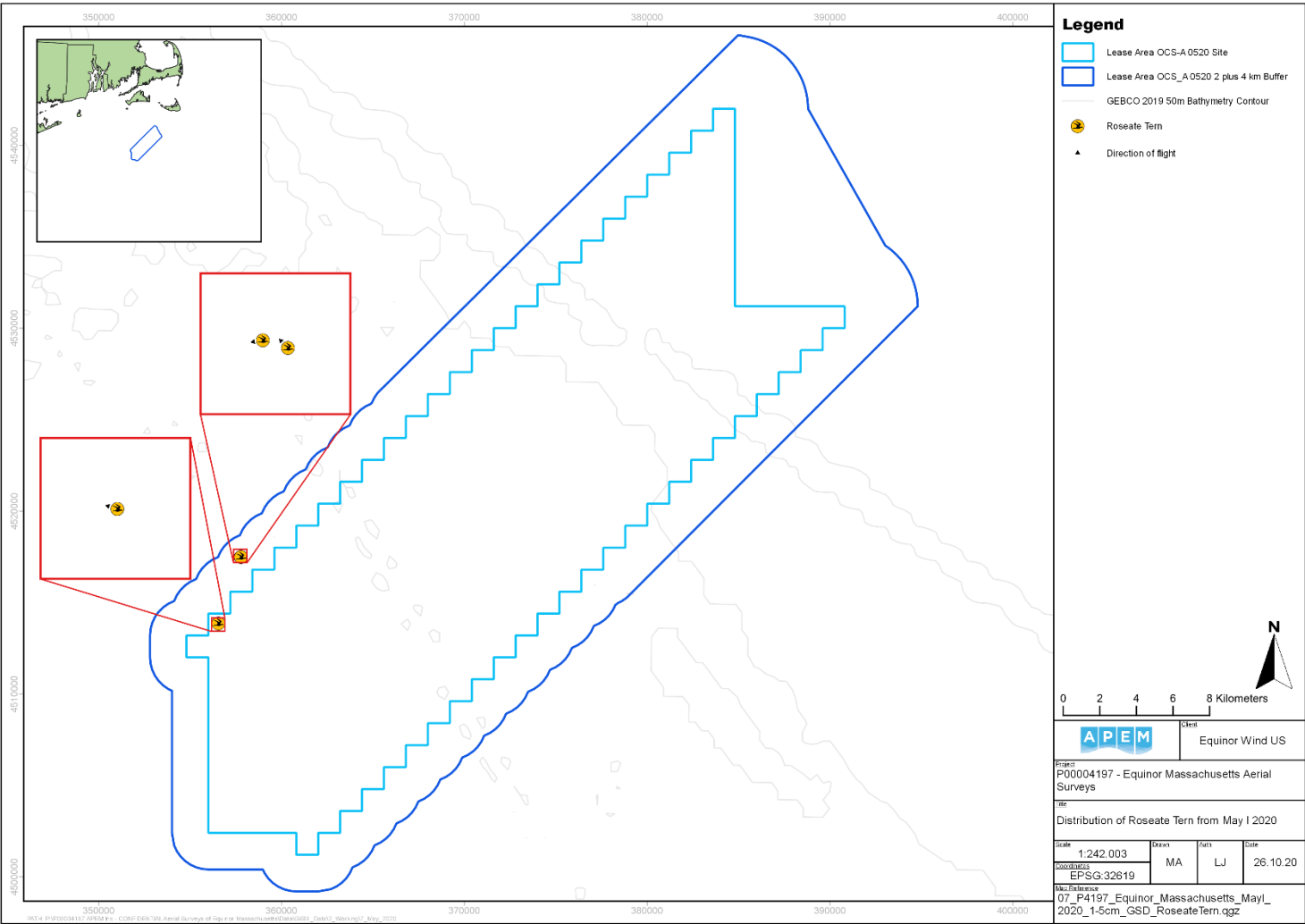


Figure 5 Distribution of roseate terns from the May I 2020 survey of Lease Area OCS-A 0520 plus 2 km / 4 km irregular buffer

Note: Individuals may appear to overlap if they are in close proximity to each other.

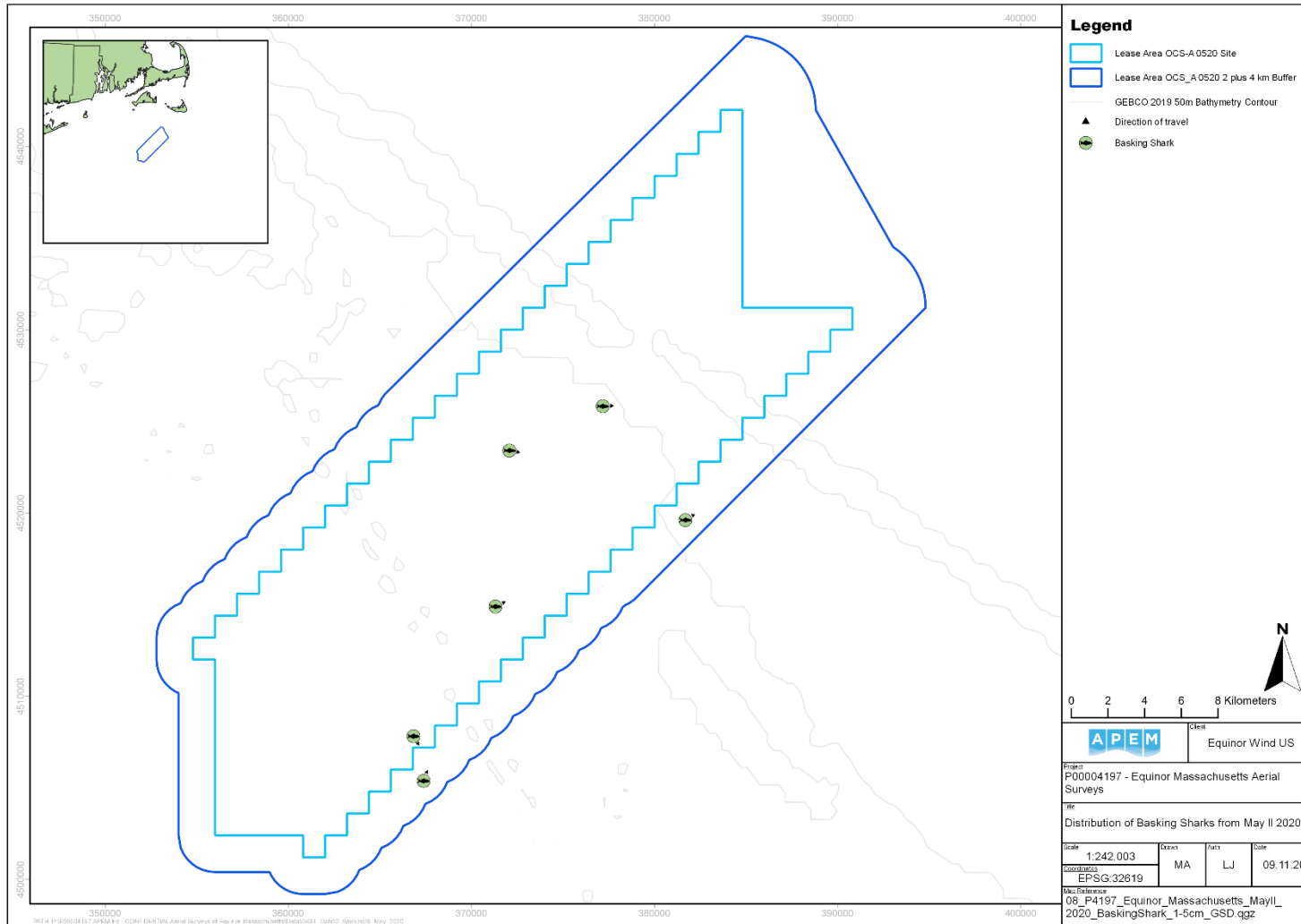


Figure 6 Distribution of basking sharks from the May II 2020 survey of Lease Area OCS-A 0520 plus 2 km / 4 km irregular buffer

Note: Individuals may appear to overlap if they are in close proximity to each other.

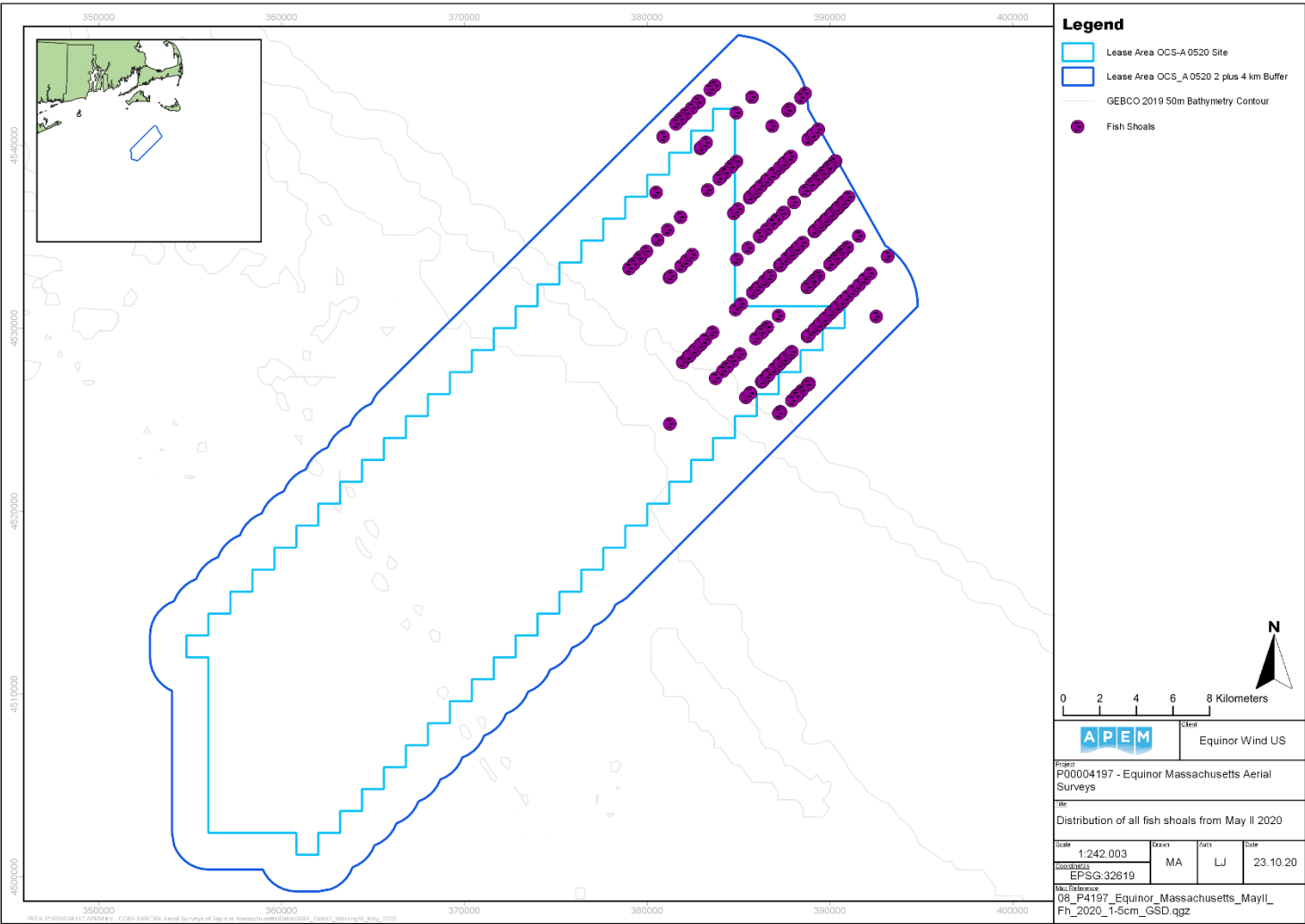


Figure 7 Distribution of fish shoal records from the May II 2020 survey of Lease Area OCS-A 0520 plus 2 km / 4 km irregular buffer

Note: Individuals may appear to overlap if they are in close proximity to each other.

5. Shipping Observations

No vessels were recorded within the imagery during the May I 2020 survey.

No vessels were recorded within the imagery during the May II 2020 survey.

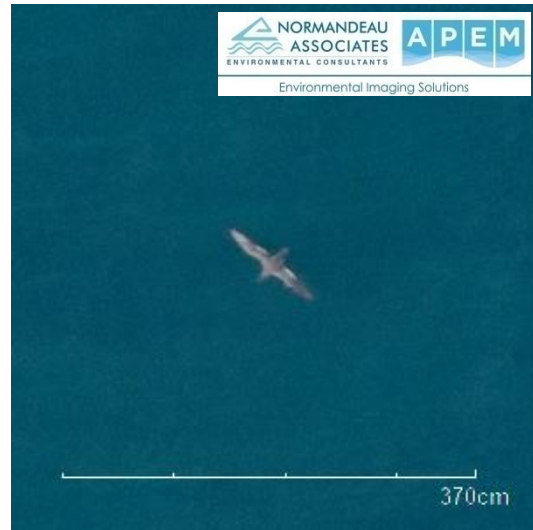
Appendix I Species List

Common Name	Scientific Name	Family	Class
White-winged Scoter	<i>Melanitta deglandi</i>	Anatidae	Aves
Red-throated Loon	<i>Gavia stellata</i>	Gaviidae	Aves
Common Loon	<i>Gavia immer</i>	Gaviidae	Aves
Wilson's Storm-petrel	<i>Oceanites oceanicus</i>	Oceanitidae	Aves
Northern Fulmar	<i>Fulmarus glacialis</i>	Procellariidae	Aves
Cory's Shearwater	<i>Calonectris borealis</i>	Procellariidae	Aves
Sooty Shearwater	<i>Ardenna grisea</i>	Procellariidae	Aves
Great Shearwater	<i>Ardenna gravis</i>	Procellariidae	Aves
Northern Gannet	<i>Morus bassanus</i>	Sulidae	Aves
Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>	Laridae	Aves
Laughing Gull	<i>Leucophaeus atricilla</i>	Laridae	Aves
Great Black-backed Gull	<i>Larus marinus</i>	Laridae	Aves
Herring Gull	<i>Larus smithsonianus</i>	Laridae	Aves
Roseate Tern	<i>Sterna dougallii</i>	Laridae	Aves
Common Tern	<i>Sterna hirundo</i>	Laridae	Aves
Arctic Tern	<i>Sterna paradisaea</i>	Laridae	Aves
Forster's Tern	<i>Sterna forsteri</i>	Laridae	Aves
Common Minke Whale	<i>Balaenoptera acutorostrata</i>	Balaenopteridae	Mammalia
Common Dolphin	<i>Delphinus delphis</i>	Delphinidae	Mammalia
Harbor Porpoise	<i>Phocoena phocoena</i>	Phocoenidae	Mammalia
Gray Seal	<i>Halichoerus grypus</i>	Phocidae	Mammalia
Ocean Sunfish	<i>Mola mola</i>	Molidae	Actinopterygii
North Atlantic Swordfish	<i>Xiphias gladius</i>	Xiphiidae	Actinopterygii
Basking Shark	<i>Cetorhinus maximus</i>	Cetorhinidae	Chondrichthyes

Appendix II Example 'Snags' from the Surveys



a. Wilson's Storm-petrel



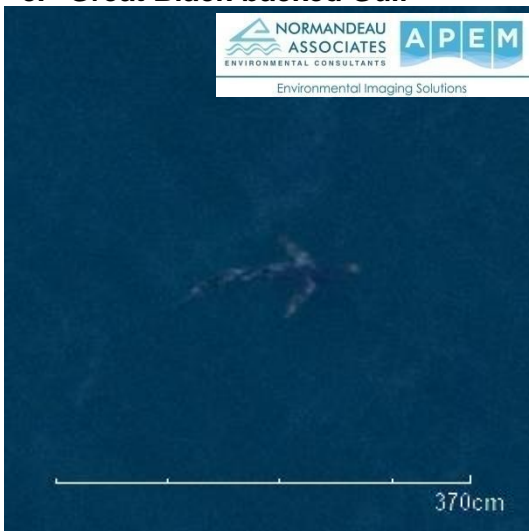
b. Cory's Shearwater



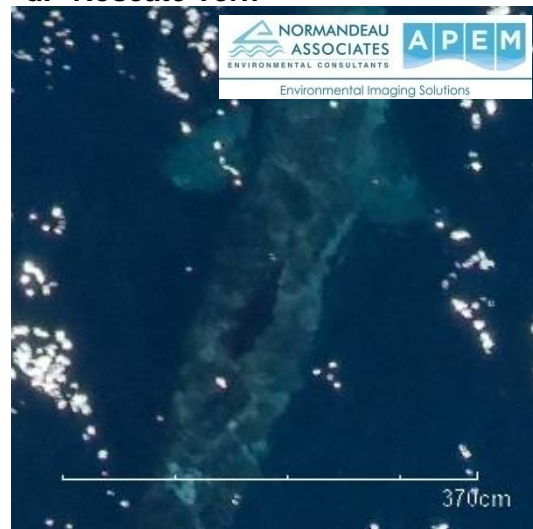
c. Great Black-backed Gull



d. Roseate Tern



e. North Atlantic Swordfish



f. Basking Shark