
Environmental Imaging Solutions

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

Monthly Report: April 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 April 7th, and 25th 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 April 2020 surveys are presented here.
- A total of 1,048 birds were recorded in the survey area during the first April survey. The most abundant group recorded was auks (n=806), followed by waterfowl (n=136), fulmars (n=47), gulls (n=42), loons (n=9) and gannets (n=8).
 - A total of 86 birds (8%) were recorded in flight during the survey. These consisted of northern fulmars (n=44), white-winged scoters (n=8), red-throated loons (n=7), Bonaparte's gulls (n=6), herring gulls (n=5), northern gannets (n=4), murre / razorbills (n=3), murre (n=3), great black-backed gulls (n=4) and; one razorbill, one black-legged kittiwake and one lesser black-backed gull. There were 962 birds (92%) recorded as sitting.
 - A total of 39 marine mammals were recorded, consisting of harbor porpoise (n=13), common dolphins (n=11), unidentified seal species (n=11), gray seal (n=2), one common minke whale and one unidentified marine mammal species.
 - Five spurdog were recorded during the survey. No turtles, rays or large bony fish were recorded.
- A total of 1,298 birds were recorded in the survey area during the second April survey. The most abundant group recorded was loons (n=853), followed by auks (n=233), waterfowl (n=96), gannets (n=86), gulls (n=23), terns (n=5), and storm-petrels (n=2).
 - A total of 65 birds (5%) were recorded in flight during the survey. These consisted of red-throated loons (n=24); northern gannets (n=18); 'commic' / Forster's terns (n=5); Bonaparte's gulls (n=4); white-winged scoters (n=4); great black-backed gulls (n=2); unidentified small gulls (n=2); unidentified storm-petrels (n=2); and one common / thick-billed murre; one herring gull; one laughing gull; and one murre / razorbill. There were 1,232 birds (94%) recorded as sitting, and one bird (<1%) recorded as diving.
 - A total of 46 marine mammals were recorded, consisting of harbor porpoise (n=34), unidentified marine mammal species (n=7), unidentified seal species (n=3), and gray seal (n=2).
 - One unidentified shark was recorded during the survey. No turtles, rays or large bony fish were recorded.
- No Listed species (Federally or State Listed as Threatened or Endangered) were recorded for either of the April surveys.

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 April 2020 surveys.

3. Summary of Survey

The first April survey was undertaken on April 7th, 2020 from 13:27 to 15:27 (UTC), and the second April survey was undertaken on April 25th, 2020 from 13:56 to 15:51 (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 April 7th, 2020, the cloud cover was recorded as 5-20% (few to scattered), visibility was greater than 10 km (6.2 miles), and no precipitation was recorded. Wind speed was recorded as 25 knots from a west-northwesterly direction. The outside air temperature at the survey altitude was recorded as 47 to 50°F. The sea state was 2 (smooth) and the water turbidity was 1 (slightly turbid). On April 25th, 2020, the cloud cover was recorded as 5-20% (few to scattered), visibility was greater than 10 km (6.2 miles), and no precipitation was recorded. Wind speed was recorded as 8 knots from a northwesterly direction. The outside air temperature at the survey altitude was recorded as 50 to 51°F. The sea state was 2 (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.

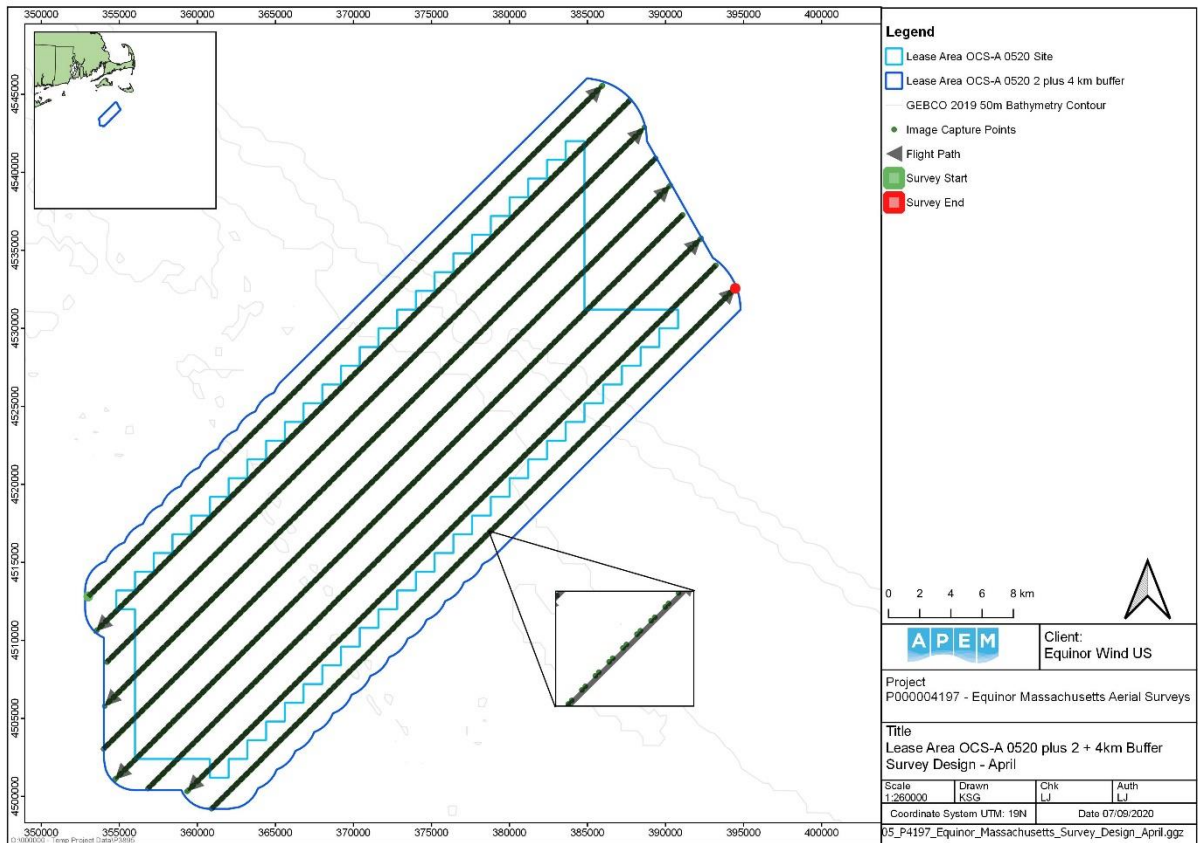


Figure 1 April I Survey Design of Lease Area OCS-A 0520 plus 2 km / 4 km buffer

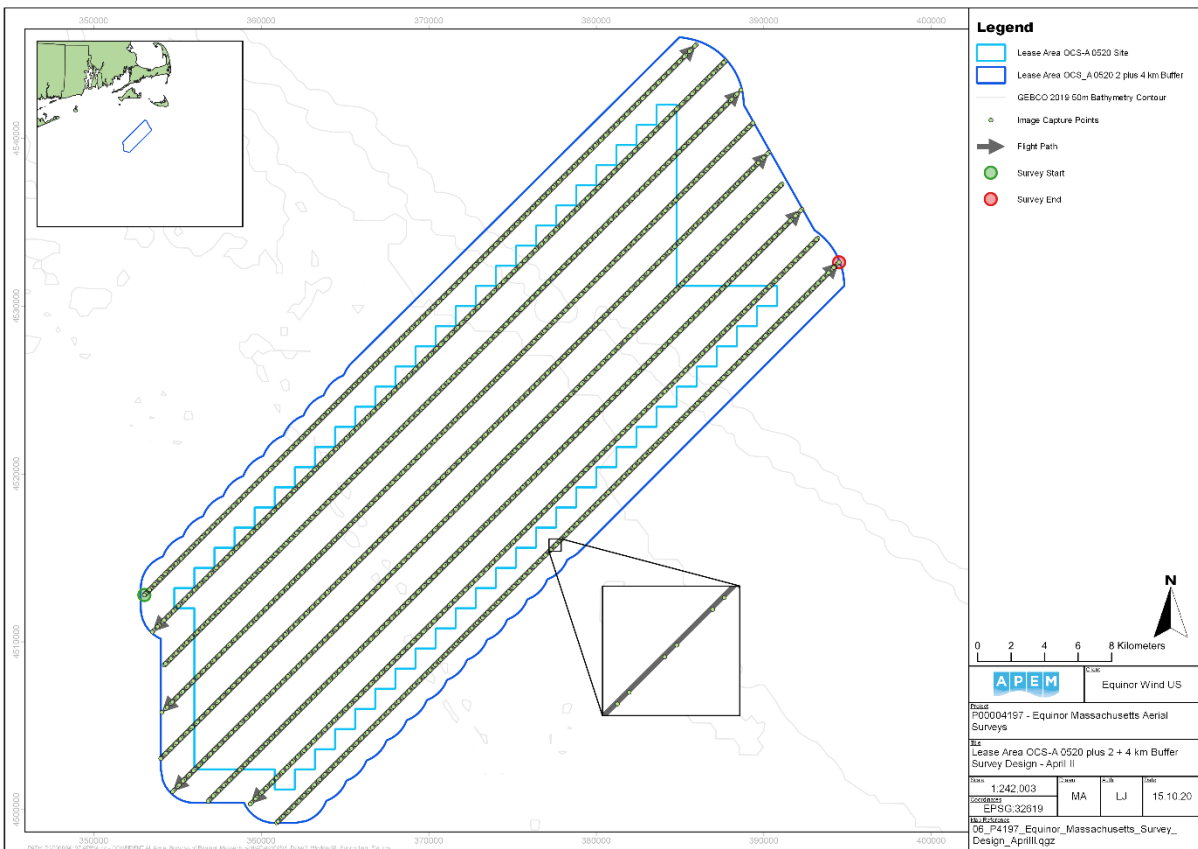


Figure 2 April II Survey Design of Lease Area OCS-A 0520 plus 2 km / 4 km buffer

4. Abundance and Distribution

4.1 Species Abundance

The numbers of marine wildlife species recorded during the April 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 April 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	8	70	78
	Long-tailed duck	0	46	46
	Black scoter	0	2	2
	Scoter species	0	10	10
Loon	Red-throated loon	7	1	8
	Loon species	0	1	1
Fulmar	Northern fulmar	44	3	47
Gannet	Northern gannet	4	4	8
Gull	Great black-backed gull	3	4	7
	Lesser black-backed gull	1	1	2
	Herring gull	5	19	24
	Black-legged kittiwake	1	0	1
	Bonaparte's gull	6	0	6
	Small gull species	0	2	2
Auk	Murre*	3	110	113
	Murre* / Razorbill	3	256	259
	Razorbill	1	59	60
	Atlantic puffin	0	318	318
	Auk species	0	56	56
Total Birds		86	962	<u>1,048</u>

*Murre refers to either Common or Thick-billed Murre

Table 2 Total number of individuals of marine mammals and other fauna recorded during the April 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	Common dolphin	11	0	11
	Common minke whale	0	1	1
	Harbor porpoise	10	3	13
	Gray seal	0	2	2
	Seal species	9	2	11
	Marine mammal species	1	0	1

Group	Species	Submerged	Surfacing	Total
Shark	Spurdog	5	0	5
Total		36	8	44

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

Group	Species	Flying	Sitting	Diving	Total
Waterfowl	White-winged scoter	4	89	0	93
	Duck species	0	3	0	3
Loon	Red-throated loon	24	747	0	771
	Common Loon	0	58	1	59
	Loon species	0	23	0	23
Storm-petrel	Storm-petrel species	2	0	0	2
Gannet	Northern gannet	18	68	0	86
Gull	Bonaparte's gull	4	1	0	5
	Laughing gull	1	0	0	1
	Great black-backed gull	2	5	0	7
	Herring gull	1	0	0	1
	Small gull species	2	7	0	9
Tern	Commic / Forster's tern	5	0	0	5
Auk	Common / thick-billed murre	1	28	0	29
	Razorbill	0	26	0	26
	Murre* / Razorbill	1	167	0	168
	Auk species	0	10	0	10
Total Birds		65	1,232	1	1,298

**Murre refers to either Common or Thick-billed Murre*

Table 4 Total number of individuals of marine mammals and other fauna recorded during the April 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	Harbor porpoise	30	4	34
	Gray seal	1	1	2
	Seal species	0	3	3
	Marine mammal species	5	2	7
Shark	Shark species	1	0	1
Total		37	10	47

4.2 Spatial Distribution

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

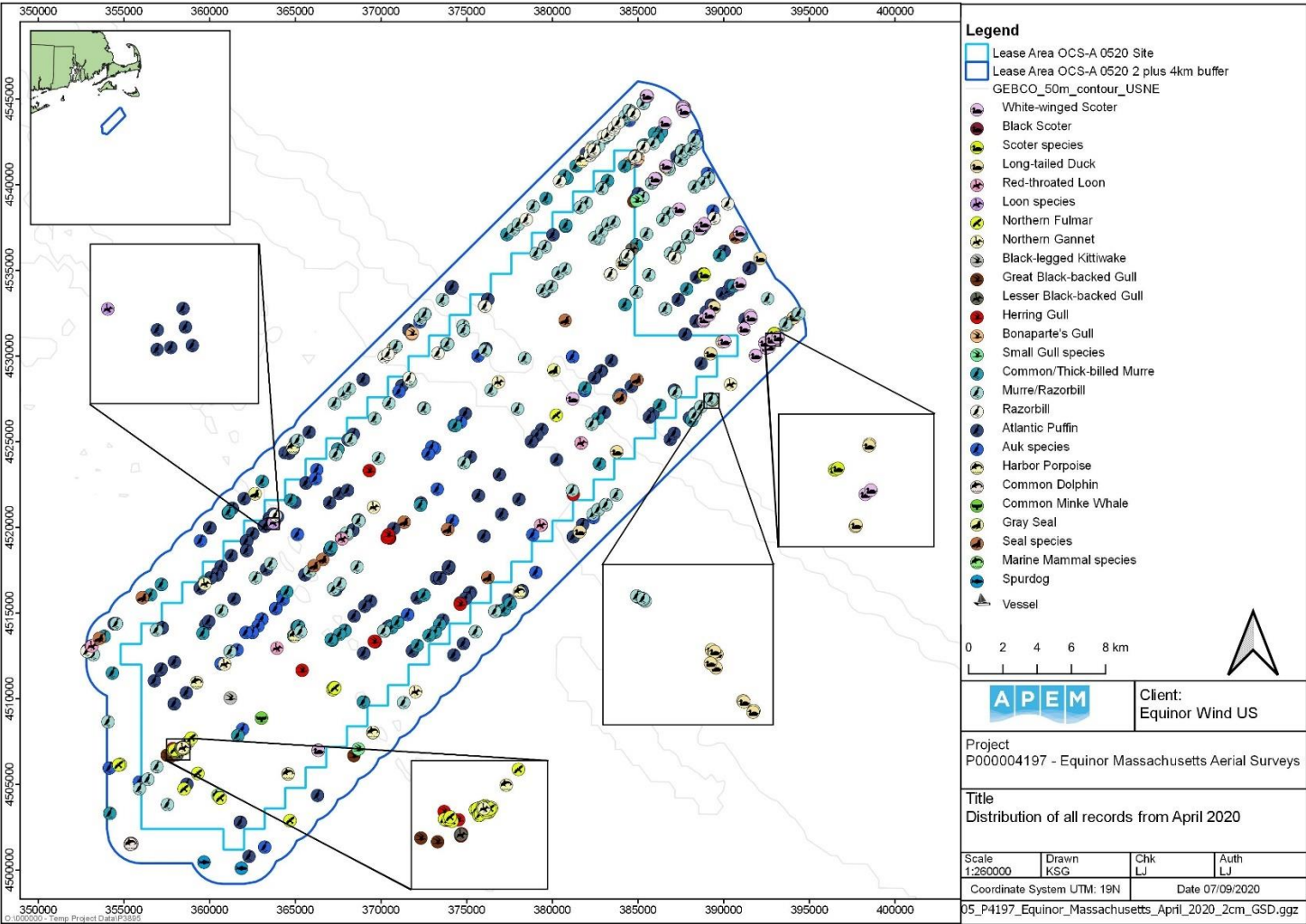


Figure 3 Distribution of all records from the April 2020 survey of Lease Area OCS-A 0520 plus 2 km / 4 km irregular buffer

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

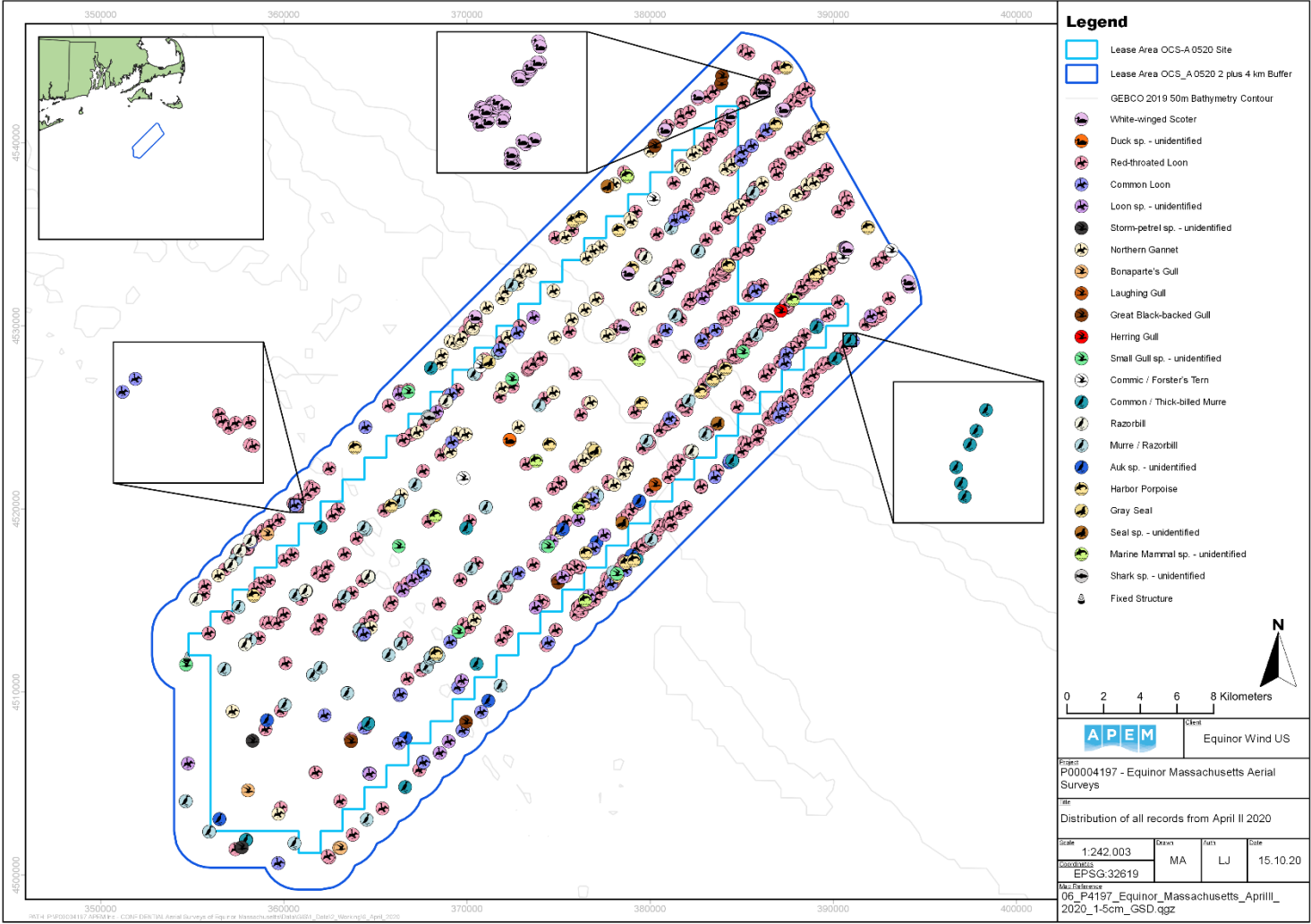


Figure 4 Distribution of all records from the April II 2020 survey of Lease Area OCS-A 0520 plus 2 km / 4 km irregular buffer

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

5. Shipping Observations

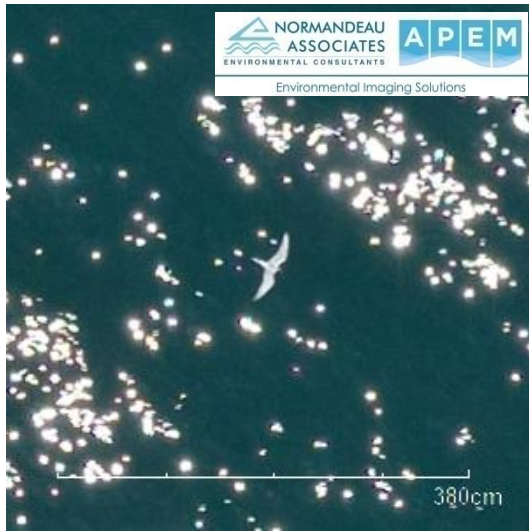
One vessel was recorded within the imagery during the April I 2020 survey.

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

Appendix I Species List

Common Name	Scientific Name	Family	Class
White-winged Scoter	<i>Melanitta deglandi</i>	Anatidae	Aves
Long-tailed Duck	<i>Clangula hyemalis</i>	Anatidae	Aves
Black Scoter	<i>Melanitta americana</i>	Anatidae	Aves
Red-throated Loon	<i>Gavia stellata</i>	Gaviidae	Aves
Common Loon	<i>Gavia immer</i>	Gaviidae	Aves
Northern Fulmar	<i>Fulmarus glacialis</i>	Procellariidae	Aves
Northern Gannet	<i>Morus bassanus</i>	Sulidae	Aves
Black-legged Kittiwake	<i>Rissa tridactyla</i>	Laridae	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
Lesser Black-backed Gull	<i>Larus fuscus</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
Thick-billed Murre	<i>Uria lomvia</i>	Alcidae	Aves
Common Murre	<i>Uria aalge</i>	Alcidae	Aves
Razorbill	<i>Alca torda</i>	Alcidae	Aves
Atlantic Puffin	<i>Fratercula arctica</i>	Alcidae	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
Spurdog	<i>Squalus acanthias</i>	Squalidae	Chondrichthyes

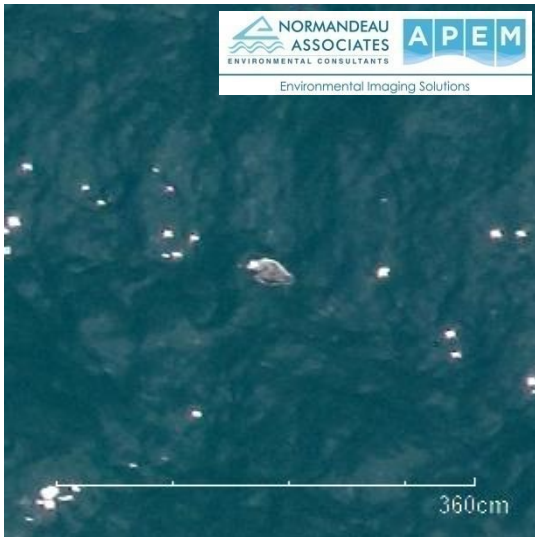
Appendix II Example 'Snags' from the Surveys



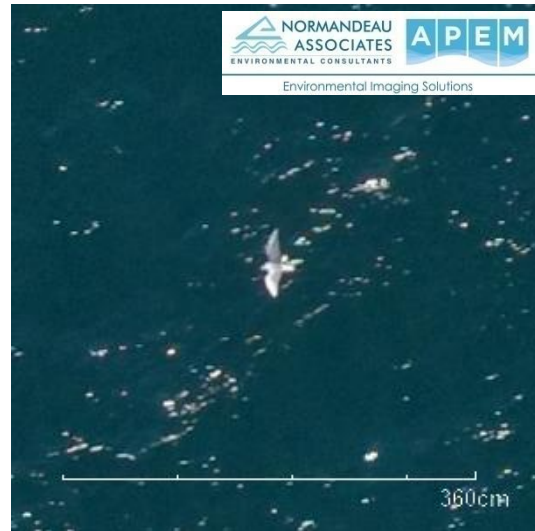
a. Commic / Forster's Tern



b. Red-throated Loon



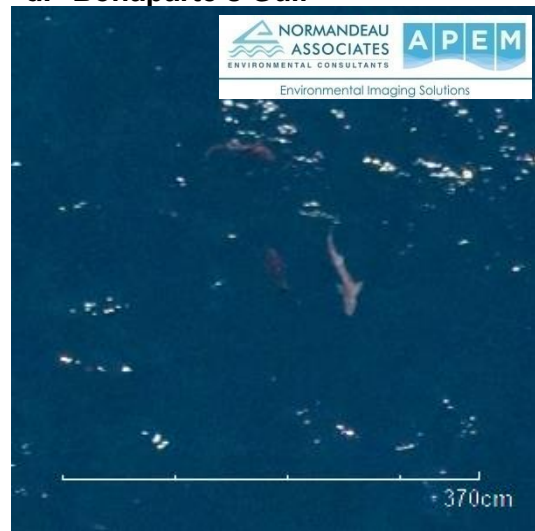
c. Common Loon



d. Bonaparte's Gull



e. Gray Seal



f. Spurdog