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Environmental Imaging Solutions

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

**Monthly Report: August Surveys I & II 2020**

**Equinor Wind US**

**APEM Ref: P00004197**

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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 August 20<sup>th</sup> and September 4<sup>th</sup>, 2020 using APEM Inc.'s high-resolution camera system to capture digital still imagery. The second August survey was delayed due to adverse weather conditions experienced at the end of August.
- 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 August 2020 surveys are presented here.
- A total of 68 birds were recorded in the survey area during the first August survey. The most abundant group recorded was shearwaters (n=49), followed by gulls (n=14), storm-petrels (n=3), and terns (n=2).
  - A total of 16 birds (24%) were recorded in flight during the survey. These consisted of great shearwater (n=5), herring gull (n=5), unidentified storm-petrel species (n=3), Cory's shearwater (n=1), 'commic' / Forster's tern (n=1), and Sterna tern species (n=1). There were 52 birds (76%) recorded as sitting.
  - A total of eight marine mammals were recorded, consisting of common dolphin (n=6), and common minke whale (n=2).
  - A total of 78 large bony fish, consisting of mahi-mahi (n=27), Atlantic bluefin tuna (n=27), unidentified billfish species (n=15), unidentified fish species (n=4), ocean sunfish (n=3), and unidentified tuna species (n=2) were also recorded.
  - A total of 41 sharks, consisting of blue shark (n=23), unidentified shark species (n=7), hammerhead shark species (n=4), unidentified Carcharhinidae shark species (n=3), basking shark (n=1), white shark (n=2), and oceanic whitetip shark (n=1) were recorded.
- A total of 157 birds were recorded in the survey area during the second August survey. The most abundant group recorded was shearwaters (n=94), followed by gulls (n=48), shorebirds (n=13), and jaegers (n=2).
  - A total of 70 birds (45%) were recorded in flight during the survey. These consisted of great shearwater (n=21), red / red-necked phalarope (n=13), herring gull (n=13), Cory's shearwater (n=10), great black-backed gull (n=6), unidentified large shearwater species (n=4), parasitic jaeger (n=2), and unidentified small shearwater species (n=1). There were 80 birds (51%) recorded as sitting, and seven birds recorded as perched (4%).
  - A total of eight marine mammals were recorded, consisting of unidentified dolphin species (n=5), common dolphin (n=1), harbor porpoise (n=1), and unidentified marine mammal species (n=1).
  - A total of 264 large bony fish, consisting of unidentified tuna species (n=243), mahi-mahi (n=13), ocean sunfish (n=4), unidentified billfish species (n=2), and unidentified fish species (n=2) were recorded during the survey.

- A total of 37 sharks, consisting of unidentified shark species (n=19), blue shark (n=4), white shark (n=4), unidentified Carcharhinidae shark species (n=4), basking shark (n=3), tiger shark (n=2), and shortfin mako (n=1) were also recorded.
- No turtles or rays were recorded in either August survey.
- Sterna tern species, Atlantic bluefin tuna, oceanic whitetip shark, shortfin mako, and basking shark are Listed species (Federally Listed as Threatened or Endangered, Massachusetts State Listed as Endangered). Sterna tern species are considered Listed due to the Listed status of the roseate tern (*Sterna dougallii*).

## 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 August 2020 surveys.

## 3. Summary of Survey

The first August survey was undertaken on August 20<sup>th</sup>, 2020 from 17:39 to 19:33 (UTC), and the second August survey was undertaken on September 4<sup>th</sup>, 2020 from 16:47 to 18:41 (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. Due to adverse weather conditions experienced at the end of August, what was to be the second August survey was rescheduled for the earliest possible alternative, resulting in the survey date being carried over to the beginning of September. For the purposes of this report, the survey is considered part of the 'August' survey block, therefore maintaining the designation of 'second August / August II' survey.

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.

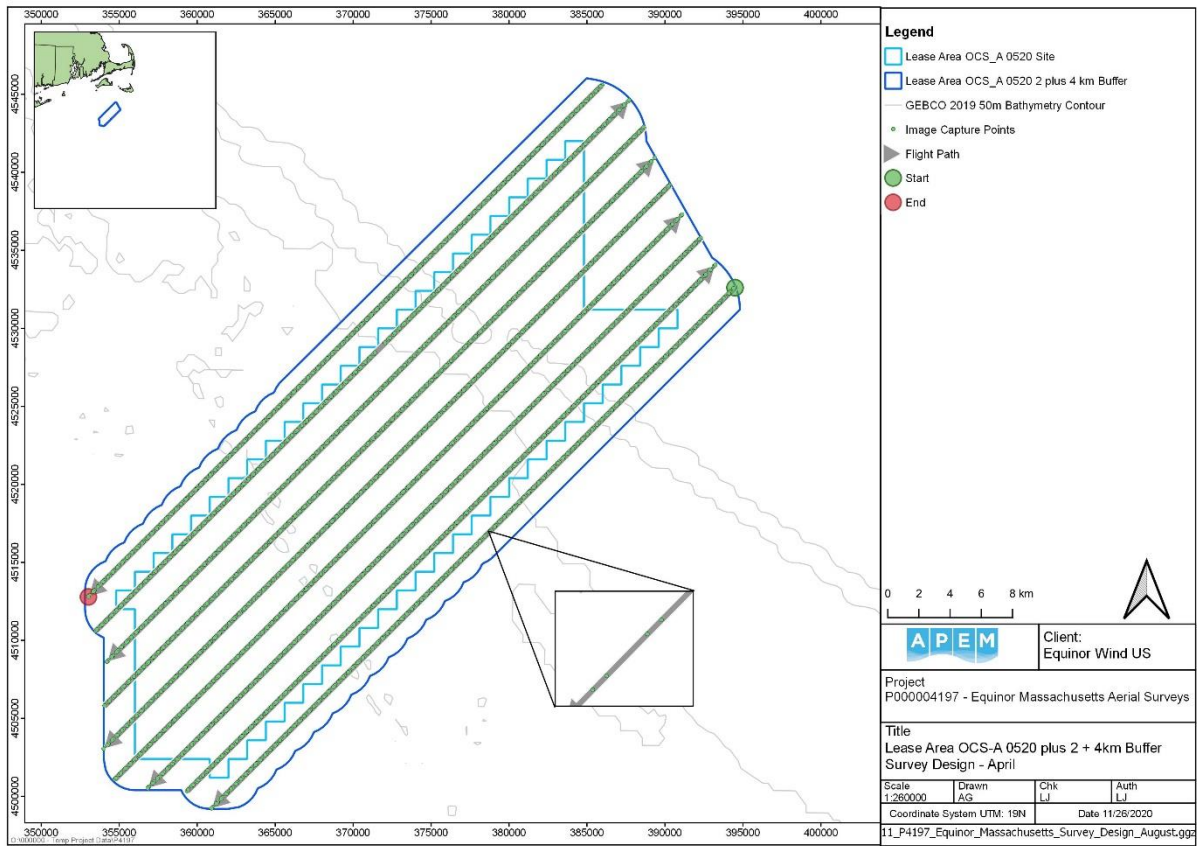
On August 20<sup>th</sup>, 2020, the cloud cover was recorded as 20-40% (partially cloudy), visibility was greater than 10 km (6.2 miles), and no precipitation was recorded. Wind speed was recorded

as 9 knots from an easterly direction. The outside air temperature at the survey altitude was recorded as 67 to 69°F. The sea state was 1 (calm/rippled) and the water turbidity was 0 (clear). On September 4<sup>th</sup>, 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 6-10 knots from a westerly direction. The outside air temperature at the survey altitude was recorded as 79 to 81°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.

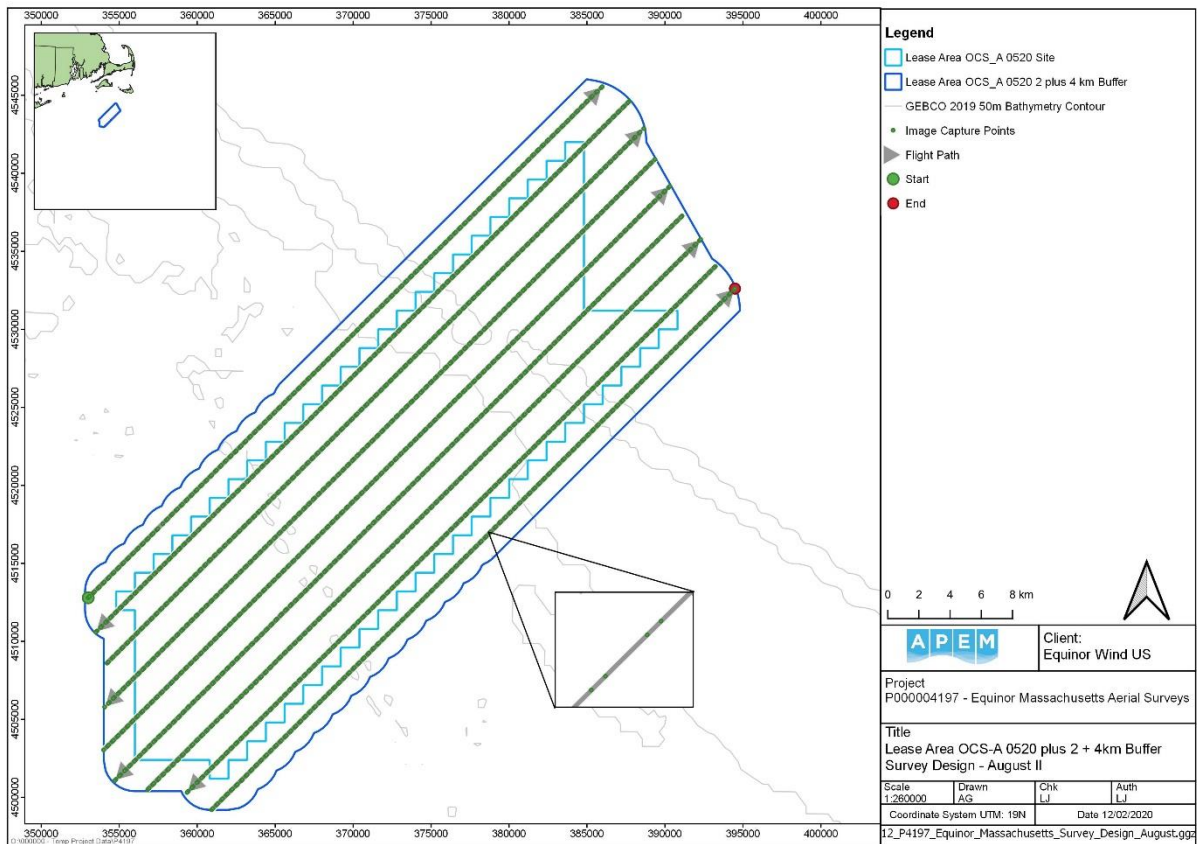
No health and safety issues were reported during the surveys.

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 August I Survey Design of Lease Area OCS-A 0520 plus 2 km / 4 km buffer**



**Figure 2 August 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 August 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 August I 2020 survey of the Lease Area OCS-A 0520 WEA plus 2 km / 4 km irregular buffer**

Group	Species	Flying	Sitting	Total
Storm-petrel	Storm-petrel sp. – unidentified	3	0	<b>3</b>
Shearwater	Cory's Shearwater	1	4	<b>5</b>
	Great Shearwater	5	6	<b>11</b>
	Large Shearwater sp. – unidentified	0	33	<b>33</b>
Gull	Herring Gull	5	7	<b>12</b>
	Large Gull sp. - unidentified	0	2	<b>2</b>
Tern	'Commic'* / Forster's tern	1	0	<b>1</b>
	Sterna Tern sp. – unidentified	1	0	<b>1</b>
<b>Total Birds</b>		<b>16</b>	<b>52</b>	<b><u>68</u></b>

\*'Commic' refers to either common or Arctic tern

**Table 2 Total number of individuals of marine mammals and other fauna recorded during the August 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 Minke Whale	2	0	<b>2</b>
	Common Dolphin	6	0	<b>6</b>
Large Bony Fish	Mahi-mahi	27	0	<b>27</b>
	Ocean Sunfish	3	0	<b>3</b>
	Atlantic Bluefin Tuna	27	0	<b>27</b>
	Tuna sp. – unidentified	2	0	<b>2</b>
	Billfish sp. – unidentified	15	0	<b>15</b>
	Fish sp. – unidentified	4	0	<b>4</b>
Shark	Oceanic Whitetip Shark	1	0	<b>1</b>
	Blue Shark	23	0	<b>23</b>
	Carcharhinidae Shark sp. – unidentified	3	0	<b>3</b>
	Basking Shark	1	0	<b>1</b>
	White Shark	2	0	<b>2</b>
	Hammerhead Shark sp. – unidentified	4	0	<b>4</b>
	Shark sp. – unidentified	7	0	<b>7</b>
<b>Total</b>		<b>127</b>	<b>0</b>	<b><u>127</u></b>

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

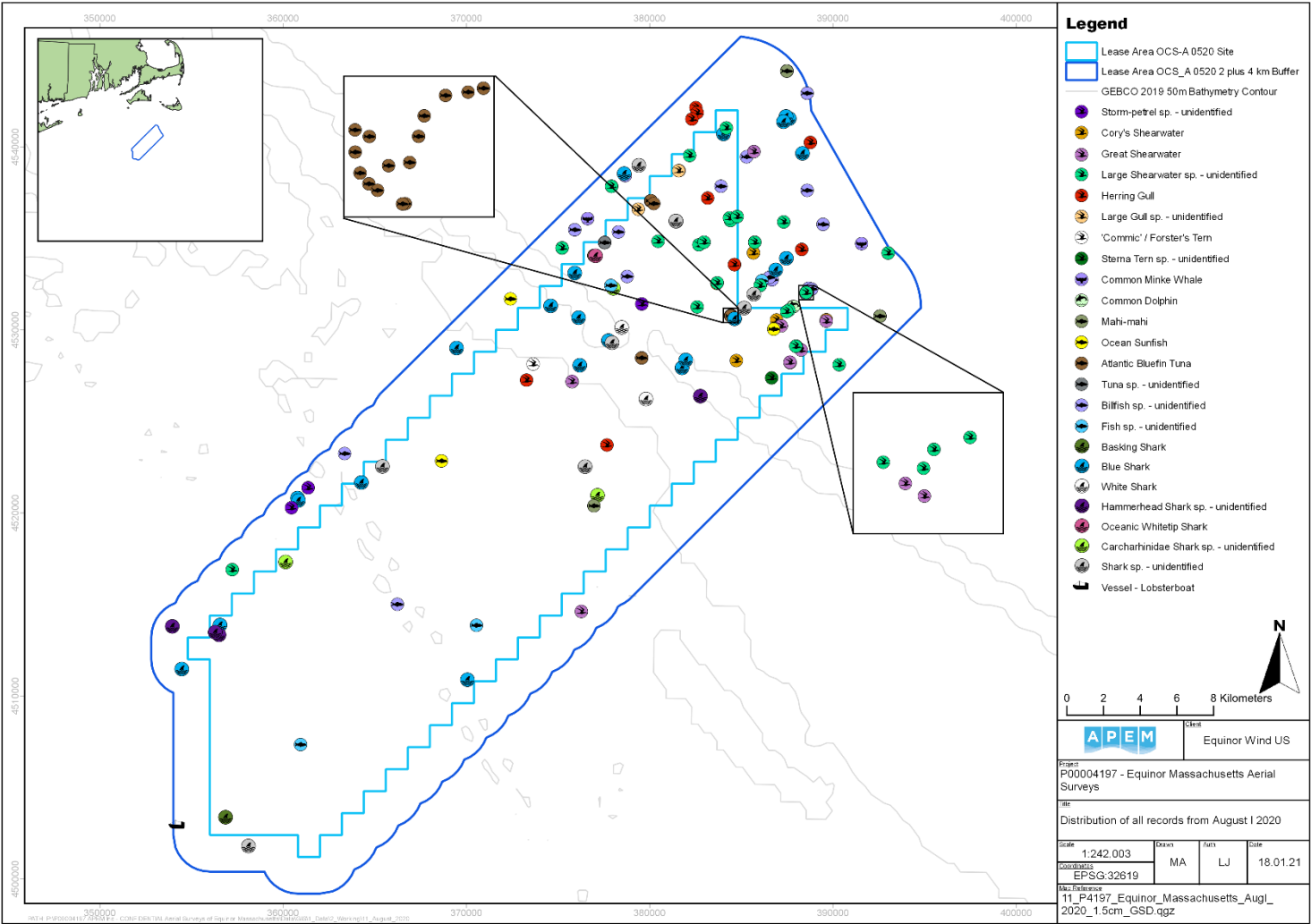
Group	Species	Flying	Perched	Sitting	Total
Shorebird	Red / Red-necked Phalarope	13	0	0	<b>13</b>
Shearwater	Cory's Shearwater	10	0	26	<b>36</b>
	Great Shearwater	21	0	7	<b>28</b>
	Large Shearwater sp. – unidentified	4	0	25	<b>29</b>
Gull	Ring-billed Gull	0	0	1	<b>1</b>
	Great Black-backed Gull	6	0	1	<b>7</b>
	Herring Gull	13	6	19	<b>38</b>
	Large Gull sp. – unidentified	0	0	1	<b>1</b>
	Gull sp. – unidentified	0	1	0	<b>1</b>
Jaeger	Parasitic Jaeger	2	0	0	<b>2</b>
<b>Total Birds</b>		<b>70</b>	<b>7</b>	<b>80</b>	<b><u>157</u></b>

**Table 4 Total number of individuals of marine mammals and other fauna recorded during the August 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 Dolphin	1	0	<b>1</b>
	Dolphin sp. – unidentified	5	0	<b>5</b>
	Harbor Porpoise	1	0	<b>1</b>
	Marine Mammal sp. – unidentified	1	0	<b>1</b>
Large Bony Fish	Mahi-mahi	13	0	<b>13</b>
	Ocean Sunfish	4	0	<b>4</b>
	Billfish sp. – unidentified	2	0	<b>2</b>
	Tuna sp. – unidentified	243	0	<b>243</b>
	Fish sp. – unidentified	2	0	<b>2</b>
Shark	Basking Shark	3	0	<b>3</b>
	Blue Shark	4	0	<b>4</b>
	Shortfin Mako	1	0	<b>1</b>
	Carcharhinidae Shark sp. – unidentified	4	0	<b>4</b>
	White Shark	4	0	<b>4</b>
	Tiger Shark	2	0	<b>2</b>
	Shark sp. – unidentified	19	0	<b>19</b>
<b>Total</b>		<b>309</b>	<b>0</b>	<b><u>309</u></b>

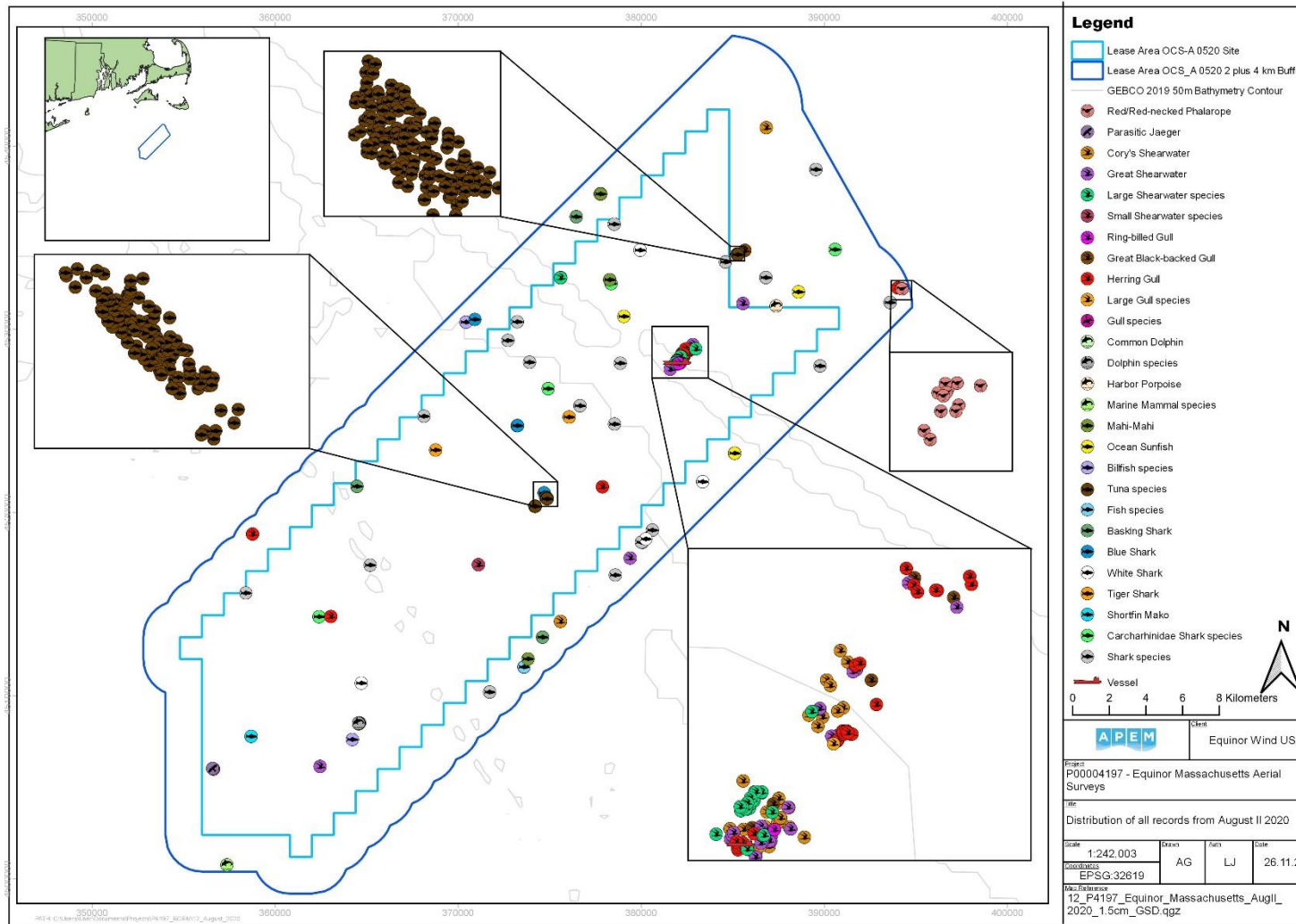
## 4.2 Spatial Distribution

**Figure 3** and **Figure 4** show the location of all species recorded throughout the Survey Area during the August surveys. **Figure 5** and **Figure 6** show the location and direction of travel of Listed species (Federally Listed as Threatened or Endangered) for the August I and August II 2020 surveys. For the first August survey, the majority of Threatened or Endangered species were located in the northeast of the Survey Area, with a notable concentration of Atlantic bluefin tuna. For the second August survey, Threatened or Endangered species were sparsely distributed across the Survey Area.



**Figure 3** Distribution of all records from the August 1 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 August 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.

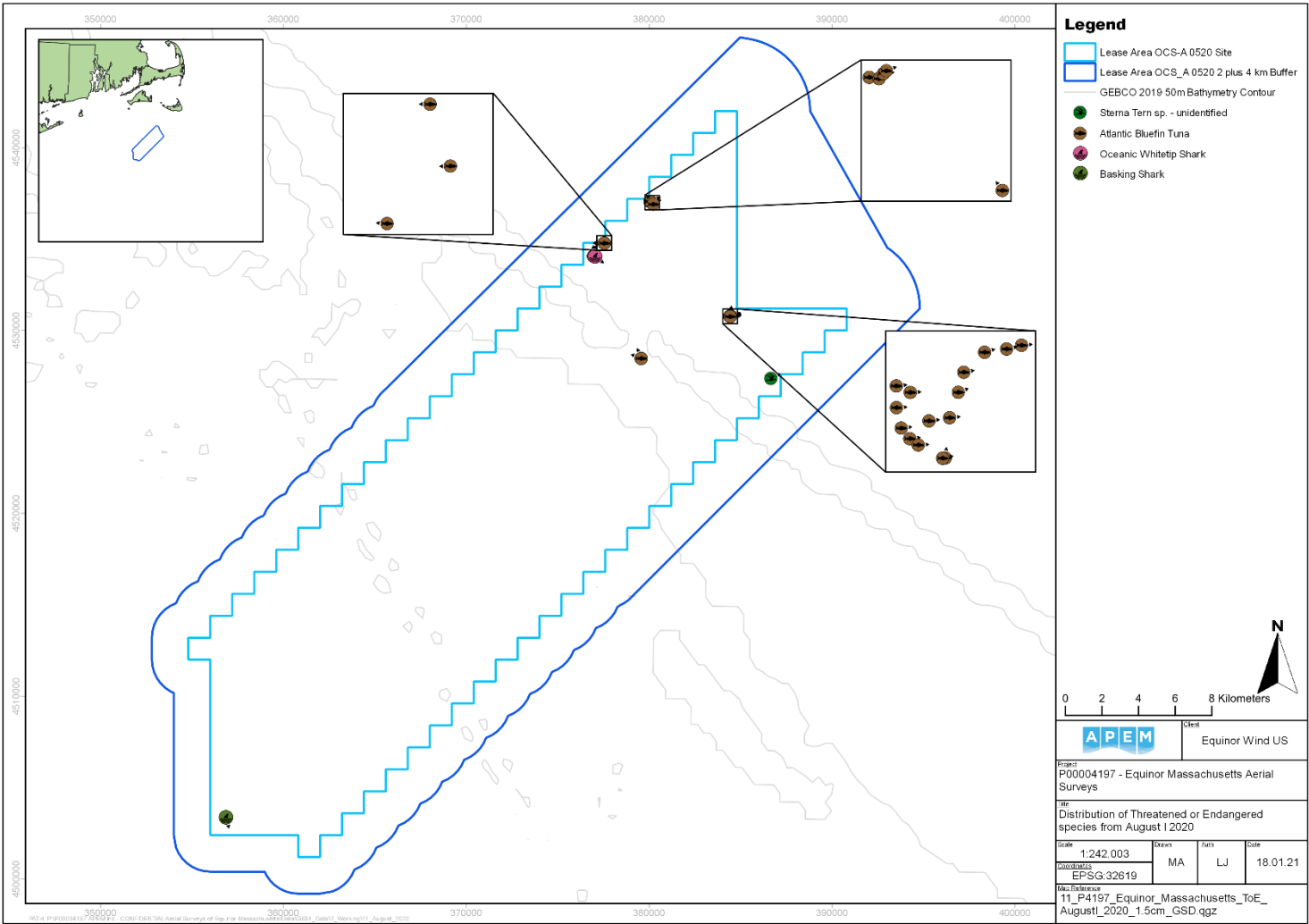
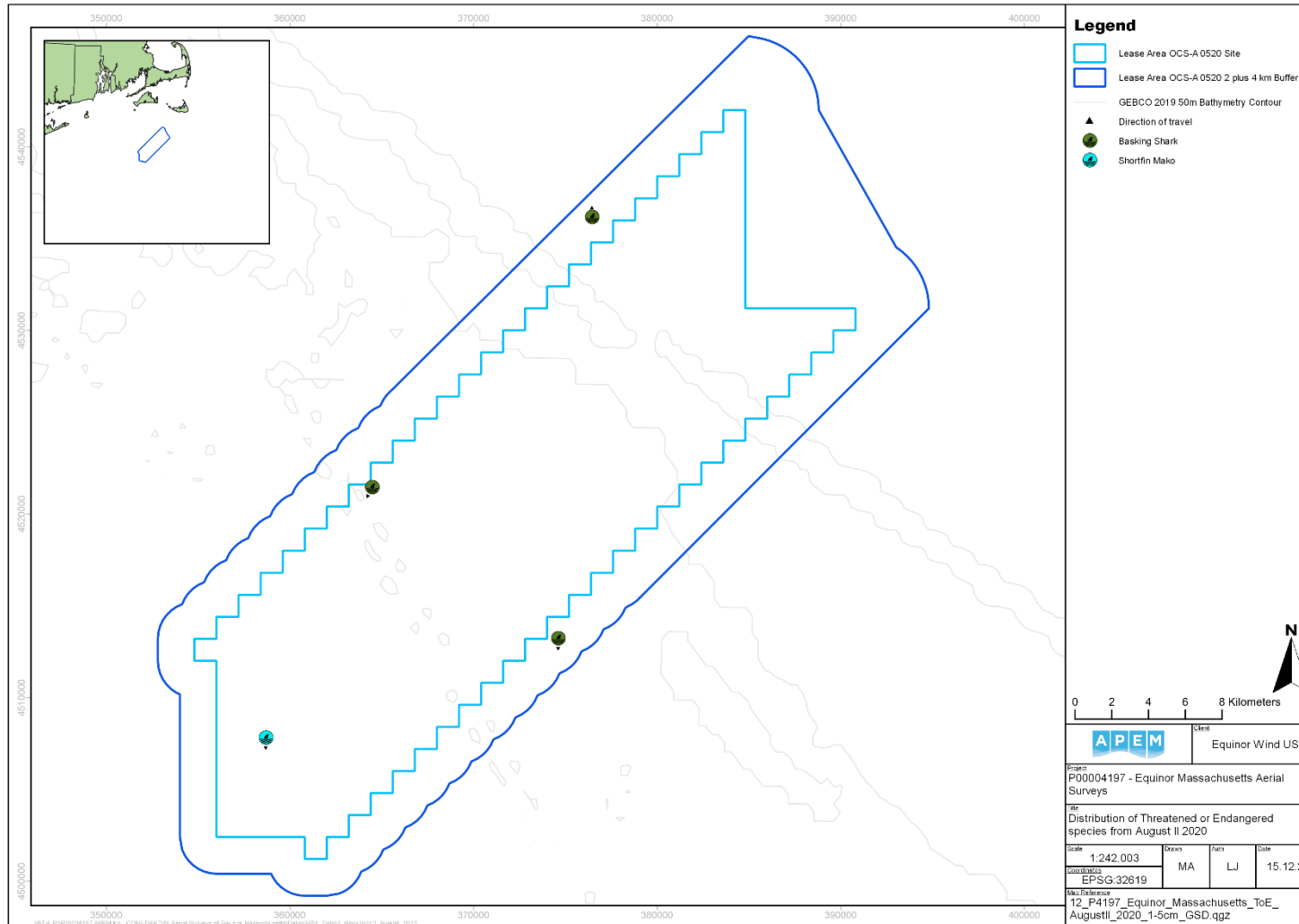


Figure 5 Distribution of Threatened or Endangered species from the August 1 2020 survey of Lease Area OCS-A 0520 plus 2 km / 4 km irregular buffer

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



**Figure 6** Distribution of Threatened or Endangered species from the August 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

A single vessel, identified as a lobster boat, was recorded within the imagery during the August I 2020 survey. Four vessels, one identified as a survey vessel, and three identified as yachts, were recorded visually from the aircraft during the first August survey.

A single vessel, identified as a trawler, was recorded within the imagery during the August II 2020 survey. Three vessels, one identified as a survey vessel, the other two unidentified, were recorded visually from the aircraft during the second August survey.



## Appendix I Species List

Common Name	Scientific Name	Family	Class
Cory's Shearwater	<i>Calonectris borealis</i>	Procellariidae	Aves
Great Shearwater	<i>Ardenna gravis</i>	Procellariidae	Aves
Red-necked Phalarope	<i>Phalaropus lobatus</i>	Scolopacidae	Aves
Red Phalarope	<i>Phalaropus fulicarius</i>	Scolopacidae	Aves
Ring-billed Gull	<i>Larus delawarensis</i>	Laridae	Aves
Great Black-backed Gull	<i>Larus marinus</i>	Laridae	Aves
Herring Gull	<i>Larus smithsonianus</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
Parasitic Jaeger	<i>Stercorarius parasiticus</i>	Stercorariidae	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
Atlantic Bluefin Tuna	<i>Thunnus thynnus</i>	Scombridae	Actinopterygii
Mahi-mahi	<i>Coryphaena hippurus</i>	Coryphaenidae	Actinopterygii
Ocean Sunfish	<i>Mola mola</i>	Molidae	Actinopterygii
Oceanic Whitetip Shark	<i>Carcharhinus longimanus</i>	Carcharhinidae	Chondrichthyes
Tiger Shark	<i>Galeocerdo cuvier</i>	Carcharhinidae	Chondrichthyes
Blue Shark	<i>Prionace glauca</i>	Carcharhinidae	Chondrichthyes
Basking Shark	<i>Cetorhinus maximus</i>	Cetorhinidae	Chondrichthyes
White Shark	<i>Carcharodon carcharias</i>	Lamnidae	Chondrichthyes
Shortfin Mako	<i>Isurus oxyrinchus</i>	Lamnidae	Chondrichthyes

## Appendix II Example 'Snags' from the Surveys



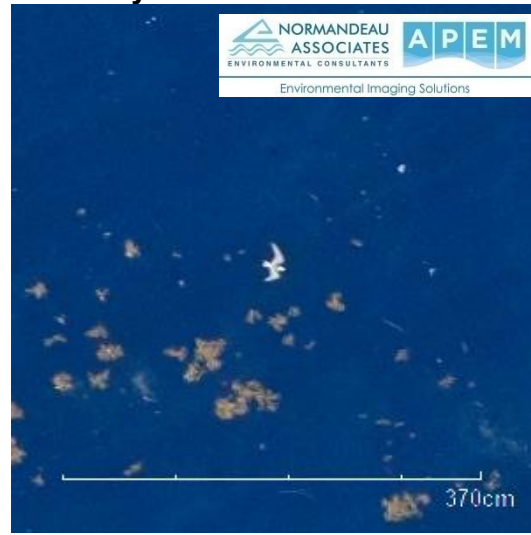
**a. Red / Red-necked Phalarope**



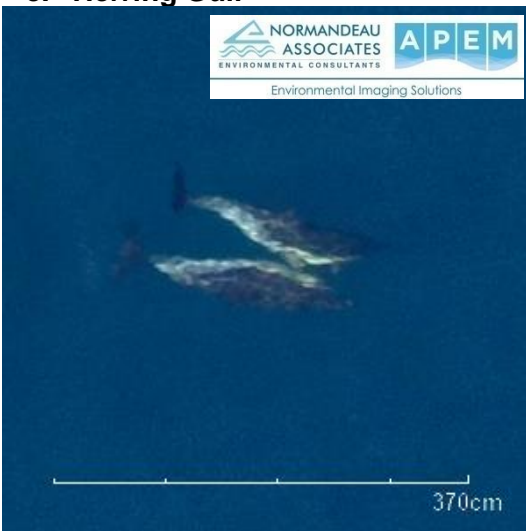
**b. Cory's Shearwater**



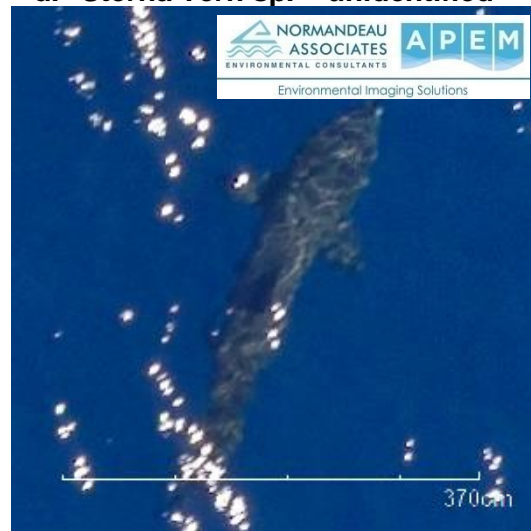
**c. Herring Gull**



**d. Sterna Tern sp. – unidentified**



**e. Common Dolphin**



**f. Basking Shark**