



Environmental Imaging Solutions

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

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1. Executive Summary

- A digital aerial wildlife survey of the Bureau of Ocean Energy Management (BOEM) Lease Area Outer Continental Shelf – Atlantic (OCS-A) 0520, off the Massachusetts coast was conducted on July 21st, 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 July 2020 survey are presented here.
- A total of 31 birds were recorded in the July 2020 survey area. The most abundant group recorded was shearwaters (n=22), followed by storm-petrels (n=6), and gulls (n=3).
- A total of 29 birds (94%) were recorded in flight during the survey. These consisted of Cory's shearwater (n=19), unidentified storm-petrel species (n=5), great shearwater (n=2), great black-backed gull (n=2), and herring gull (n=1). There were two birds (6%) recorded as sitting.
- One marine mammal was recorded, consisting of common minke whale (n=1).
- Two turtles, consisting of loggerhead turtle (n=1), and Kemp's ridley turtle (n=1) were recorded.
- A total of 77 large bony fish consisting of mahi-mahi (n=25), unidentified billfish species (n=22), Atlantic bluefin tuna (n=11), unidentified tuna species (n=11), unidentified fish species (n=6), and ocean sunfish (n=2) were recorded.
- A total of 122 sharks consisting of unidentified shark species (n=41), unidentified Carcharhinidae shark species (n=25), unidentified hammerhead shark species (n=23), basking shark (n=10), scalloped hammerhead (n=6), smooth hammerhead (n=5), blue shark (n=3), sandbar shark (n=2), white shark (n=2), shortfin mako (n=2), blacktip shark (n=1), tiger shark (n=1), and great hammerhead (n=1) were recorded. One ray, consisting of Chilean devil ray (n=1) was also recorded.
- Loggerhead turtle, Kemp's ridley turtle, Atlantic bluefin tuna, basking shark, shortfin mako, scalloped hammerhead, and great hammerhead are Listed species (Federally Listed as Threatened or Endangered, Massachusetts State Listed as Threatened or 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, 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 July 2020 survey.

3. Summary of Survey

The survey was undertaken on July 21st, 2020 from 17:42 to 19:40 (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**). Coverage of images analyzed was calculated to be approximately 10% of the survey area.

On July 21st, 2020, the cloud cover was recorded as 0-10% (clear to few), visibility was greater than 10 km (6.2 miles), and no precipitation was recorded. Wind speed was recorded as 4 knots from a southeasterly direction. The outside air temperature at the survey altitude was recorded as 80 to 82°F. The sea state was 1 (calm / rippled), and the water turbidity was 0 (clear). The survey was conducted at an altitude of approximately 1,350 ft at a speed of approximately 120 knots.

No health and safety issues were reported during the survey.

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.

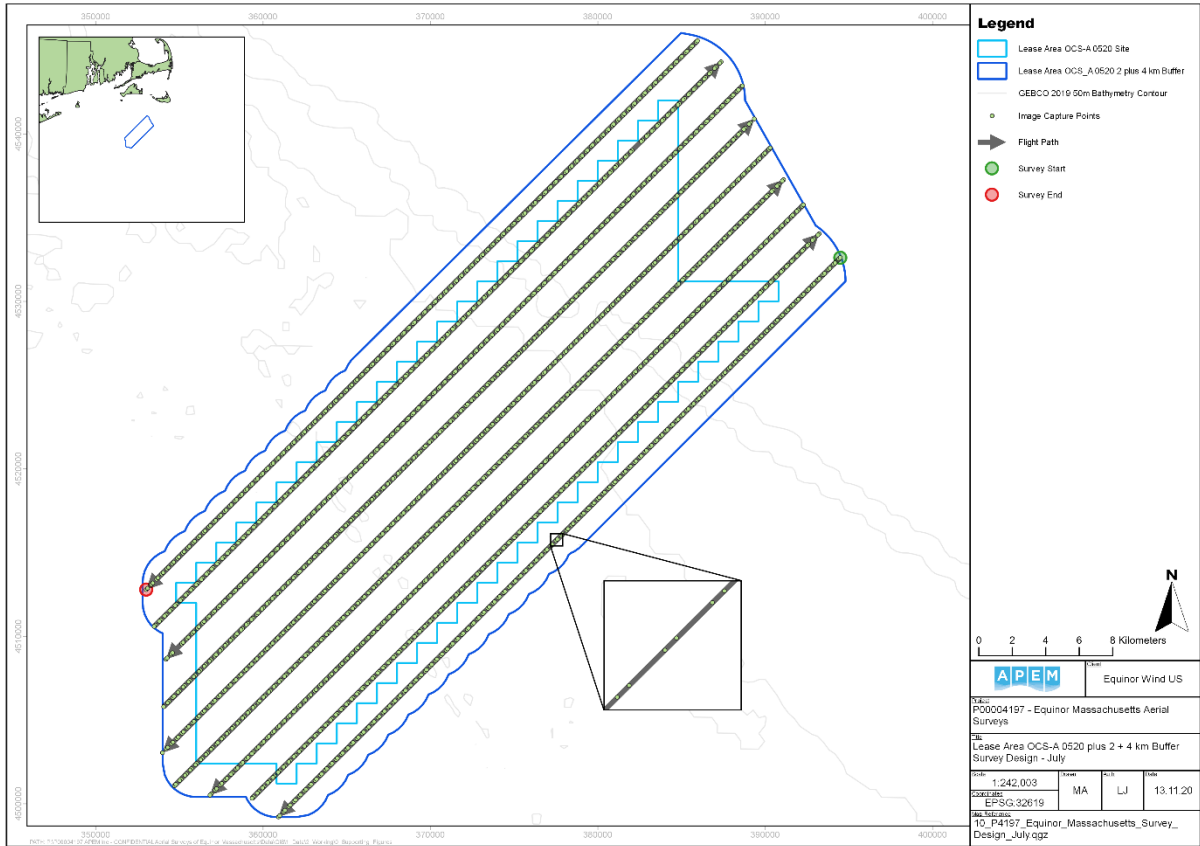


Figure 1 Survey design of Lease Area OCS-A 0520 plus 2 km / 4 km buffer

4. Abundance and Distribution

4.1 Species Abundance

The numbers of marine wildlife species recorded during the July 2020 survey are presented in **Table 1** and **Table 2**. Species scientific names are provided in Appendix I. Example individuals recorded during the surveys are provided in Appendix II.

Table 1 Total number of individuals of birds recorded during the July 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	5	1	6
Shearwater	Cory's Shearwater	19	1	20
	Great Shearwater	2	0	2
Gull	Great Black-backed Gull	2	0	2
	Herring Gull	1	0	1
Total Birds		29	2	<u>31</u>

Table 2 Total number of individuals of marine mammals and other fauna recorded during the July 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	1	0	1
Turtle	Loggerhead Turtle	1	0	1
	Kemp's Ridley Turtle	1	0	1
Large Bony Fish	Mahi-Mahi	25	0	25
	Ocean Sunfish	2	0	2
	Atlantic Bluefin Tuna	11	0	11
	Tuna sp. – unidentified	11	0	11
	Billfish sp. – unidentified	22	0	22
	Fish sp. – unidentified	6	0	6
Shark	Blacktip Shark	1	0	1
	Sandbar Shark	2	0	2
	Blue Shark	3	0	3
	Tiger Shark	1	0	1
	Carcharhinidae Shark sp. – unidentified	25	0	25
	Basking Shark	10	0	10
	White Shark	2	0	2
	Shortfin Mako	2	0	2
	Scalloped Hammerhead	6	0	6
	Great Hammerhead	1	0	1
	Smooth Hammerhead	5	0	5

Group	Species	Submerged	Surfacing	Total
	Hammerhead Shark sp. – unidentified	23	0	23
	Shark sp. – unidentified	41	0	41
Ray	Chilean Devil Ray	1	0	1
Total		203	0	<u>203</u>

4.2 Spatial Distribution

Figure 2 shows the location of all species recorded throughout the Survey Area.

Figure 3 shows the location and direction of travel for recorded Listed species (Federally Listed as Threatened or Endangered, Massachusetts State Listed as Endangered) from the July 2020 survey.

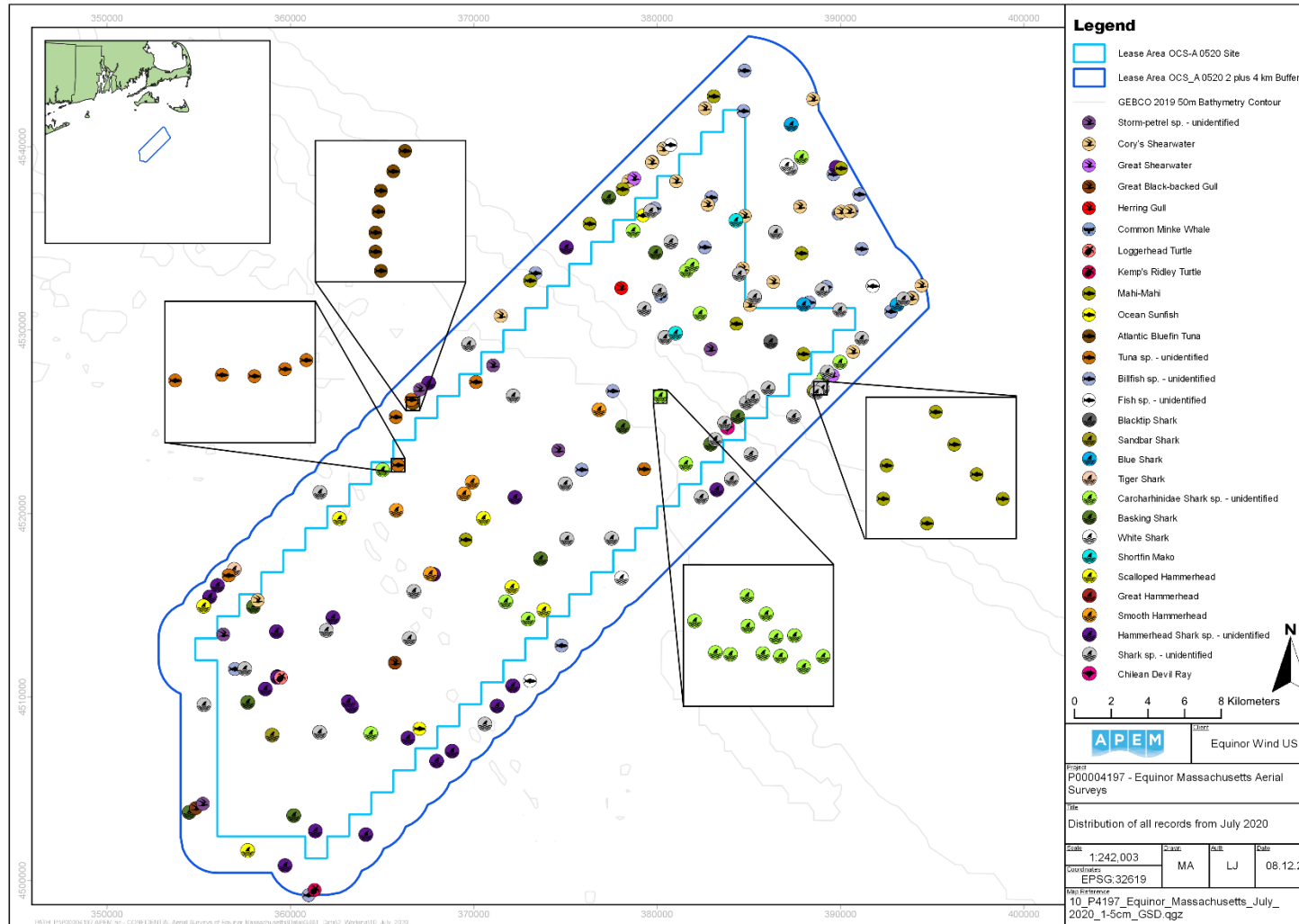


Figure 2 Distribution of all records from the July 2020 survey of Lease Area OCS-A 0520 plus 2 km / 4 km irregular buffer

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

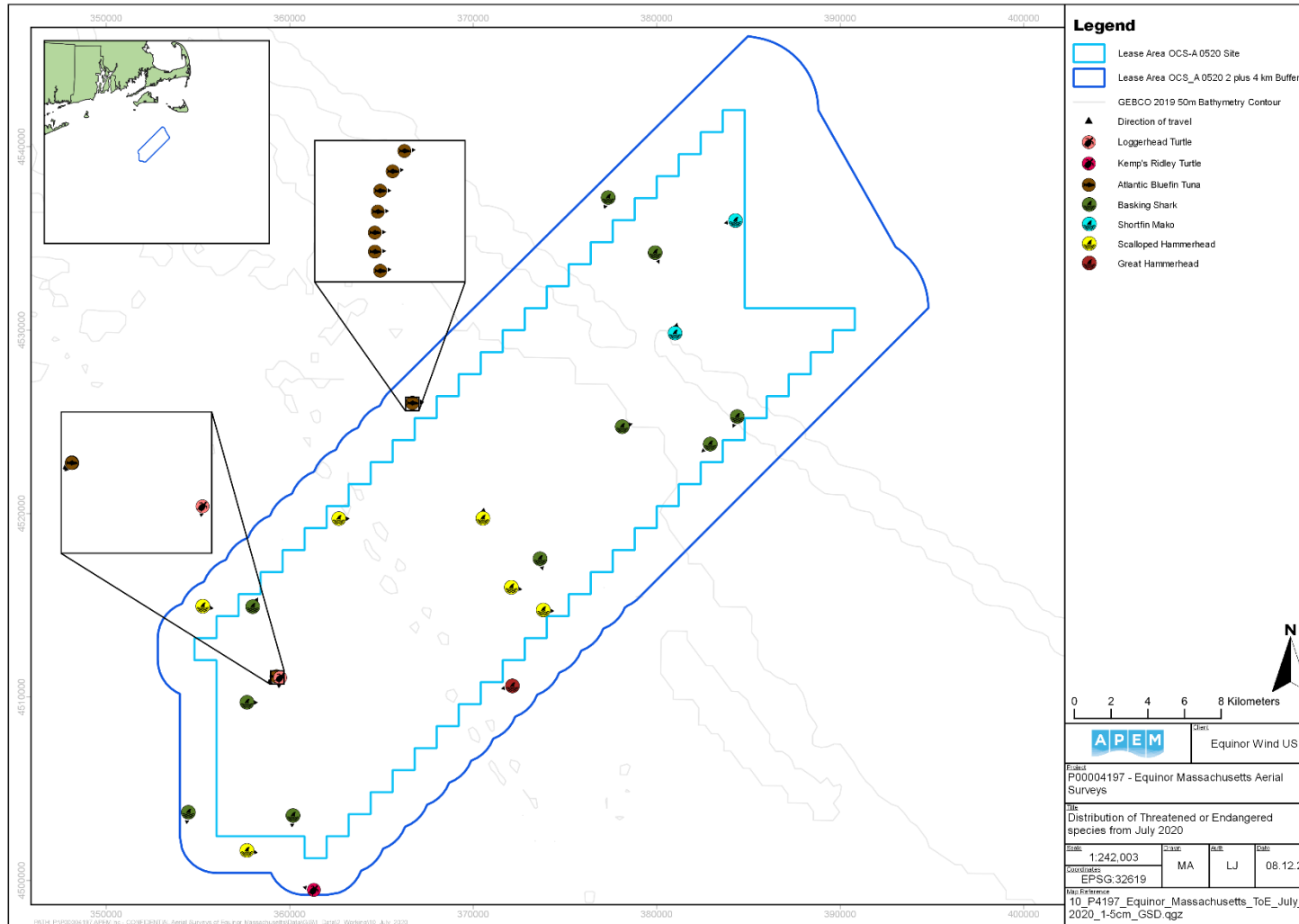


Figure 3 Distribution of Threatened or Endangered species from the July 2020 survey of Lease Area OCS-A 0520 plus 2 km / 4 km irregular buffer

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

5. Shipping Observations

A single vessel, identified as a fishing vessel, was recorded visually from the aircraft during the July 21st, 2020 survey. No vessels were recorded in the imagery.

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
Great Black-backed Gull	<i>Larus marinus</i>	Laridae	Aves
Herring Gull	<i>Larus smithsonianus</i>	Laridae	Aves
Common Minke Whale	<i>Balaenoptera acutorostrata</i>	Balaenopteridae	Mammalia
Loggerhead Turtle	<i>Caretta caretta</i>	Cheloniidae	Reptilia
Kemp's ridley Turtle	<i>Lepidochelys kempii</i>	Cheloniidae	Reptilia
Mahi-mahi	<i>Coryphaena hippurus</i>	Coryphaenidae	Actinopterygii
Ocean Sunfish	<i>Mola mola</i>	Molidae	Actinopterygii
Atlantic Bluefin Tuna	<i>Thunnus thynnus</i>	Scombridae	Actinopterygii
Blacktip Shark	<i>Carcharhinus limbatus</i>	Carcharhinidae	Chondrichthyes
Sandbar Shark	<i>Carcharhinus plumbeus</i>	Carcharhinidae	Chondrichthyes
Blue Shark	<i>Prionace glauca</i>	Carcharhinidae	Chondrichthyes
Tiger Shark	<i>Galeocerdo cuvier</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
Scalloped Hammerhead	<i>Sphyrna lewini</i>	Sphyrnidae	Chondrichthyes
Great Hammerhead	<i>Sphyrna mokarran</i>	Sphyrnidae	Chondrichthyes
Smooth Hammerhead	<i>Sphyrna zygaena</i>	Sphyrnidae	Chondrichthyes
Chilean Devil Ray	<i>Mobula tarapacana</i>	Mobulidae	Chondrichthyes

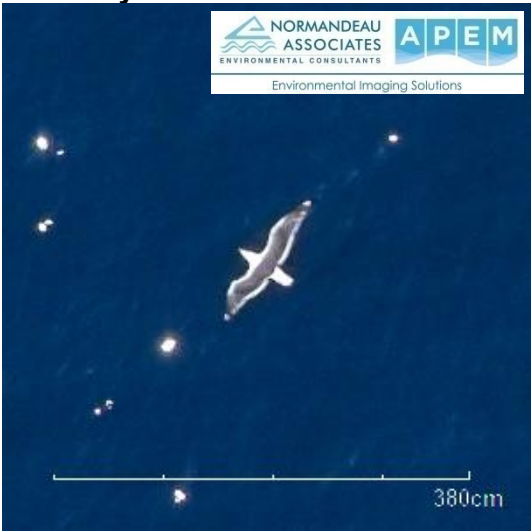
Appendix II Example 'Snags' from the Survey



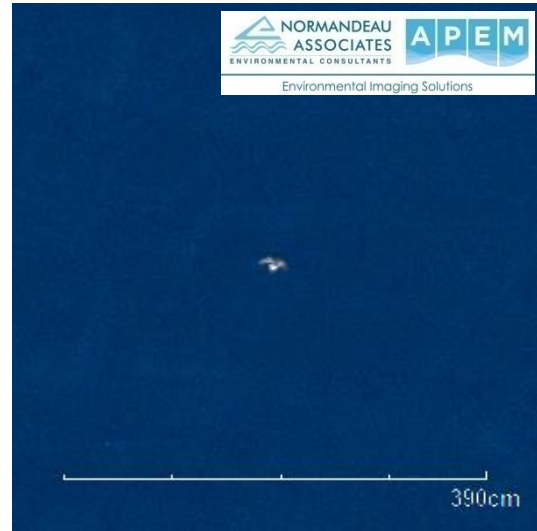
a. Cory's Shearwater



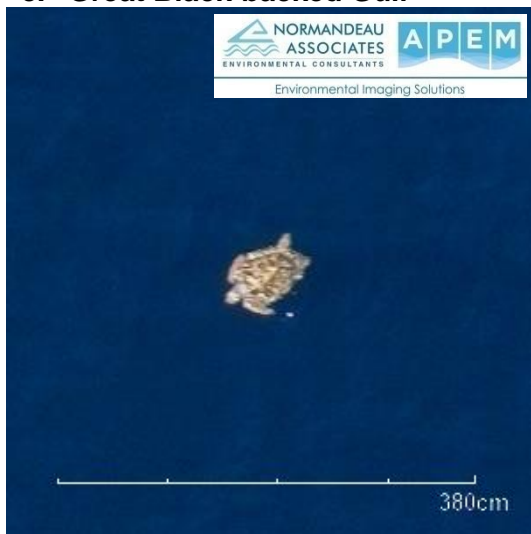
b. Great Shearwater



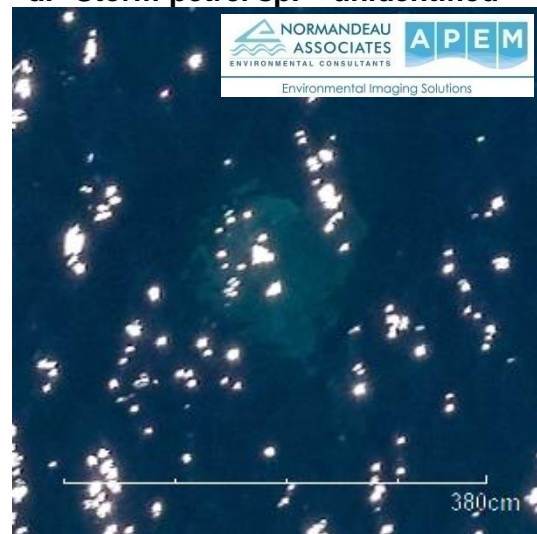
c. Great Black-backed Gull



d. Storm-petrel sp. – unidentified



e. Loggerhead Turtle



f. Chilean Devil Ray