
Environmental Imaging Solutions

**Ornithological and Marine Fauna Aerial Survey of Lease Area OCS-
A 0512**

Monthly Report: June 2018

Equinor

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Address: 120 Long Ridge
Stamford
Connecticut
CT 06902
USA

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Project Director: Stuart Clough

Project Manager: Laura Jervis

Key Contributors: Sean Sweeney, Simon Warford, Julia Robinson Willmott
(Normandeau Associates)

APEM, Inc.
2603 NW 13th Street
#402
Gainesville
Florida
FL 32609

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1. Executive Summary

- An aerial survey of Equinor's Lease Area OCS-A 0512 lease area and a 4 km (2.5 mile) buffer in the New York Bight was conducted on the 14th of June 2018 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 June 2018 survey are presented here.
- A total of 189 birds and marine fauna were recorded in the Survey Area in June 2018. The most abundant species group recorded was shearwaters (n=125), followed by marine mammals (n=23), gulls (n=10), turtles (n=8), sharks (n=6), sunfish (n=6), petrels (n=5), gannets (n=3), cormorants (n=2), and alcids (n=1).
- A total of 119 birds (82%) were recorded in flight during this survey. These consisted of Cory's shearwaters (n=54), great shearwaters (n=17), large shearwater species (n=14), sooty shearwater (n=14), storm-petrel species (n=5), herring gull (n=5), northern gannet (n=2), Manx shearwater (n=2), cormorant species (n=2), great black-backed gull (n=1), laughing gull (n=1), small gull species (n=1) and small shearwater species (n=1). There were 27 birds recorded as sitting (18%).
- Eight turtles were recorded, consisting of seven loggerhead turtles and one loggerhead / Kemp's ridley turtle were recorded during the survey. These turtle species are listed as Endangered (Federally listed as Threatened or Endangered, and New York State listed as Endangered).
- A total of 23 marine mammals were recorded in June 2018, comprising of 22 bottlenose dolphins and a single humpback whale.
- A total of six blue sharks and six sunfish were also recorded in the June 2018 survey.

2. Introduction

APEM and Normandeau were contracted by Equinor to provide monthly aerial digital survey data of the Lease Area OCS-A 0512 from November 2017 until October 2018.

The aims and objectives of the work required by Equinor were to assess the abundance and distribution of primarily birds present in the Lease Area OCS-A 0512, and also to gather information on other marine fauna such as marine mammals, sharks, rays, and turtles. These surveys will provide the baseline information required for conducting impact assessments and will meet the U.S. Bureau of Ocean Energy Management's (BOEM's) regulatory requirements for environmental review of Wind Energy Areas.

The Survey Area referred to herein comprise of the Lease Area OCS-A 0512 (its proposed turbine array footprint) plus a 4 km (2.5 mile) buffer surrounding it. The Survey Area data in this report represent the total number of birds, other marine fauna, and incidental occurrences recorded across all images (including those that may fall outside the proposed Lease Area OCS-A 0512 plus buffer region).

To meet the objectives of the project, 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 June 2018 survey.

3. Summary of Survey

The survey was undertaken on the 14th of June 2018. 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 aerial digital survey captured images along 28 lines spaced approximately 0.8 km across-track and 0.6 km along-track between image nodes within the Lease Area OCS-A 0512 plus 4 km buffer. Coverage was calculated to be approximately 10% generated from 1,550 image capture points.

On the 14th of June 2018, the cloud cover was recorded as 0 to 10% (clear to few), visibility was greater than 10 km (6.2 miles), and no precipitation was recorded. Winds of 10-17 knots blew from a westerly direction. The outside air temperature at the survey altitude was recorded as 68 to 82°F. The sea state was 2 to 3 (smooth to slightly moderate) and the water turbidity was 1 (slightly turbid).

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 of the data to check for missed animals in 10% of images recorded as empty and also quality assured 20% of the bird species identification undertaken by APEM (and 100% of Listed species). Normandeau identify 100% of the species of non-avian marine fauna including marine mammals, sharks, rays, turtles. Birds and marine fauna identified from the images were 'snagged' (i.e. located within the images) and categorised usually to species, but sometimes 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 following the completion of the October 2018 survey.

4. Abundance and Distribution

4.1 Species Abundance

A total of 146 birds, 23 marine mammals, eight turtles, six sharks, and six large bony fish (Table 1 and Table 2) were recorded in the Survey Area in June 2018. The most abundant species group recorded was shearwaters (n=125), followed by marine mammals (n=23), gulls (n=10), turtles (n=8), sharks (n=6), large bony fish (n=6), petrels (n=5), gannets (n=3), cormorants (n=2) and alcids (n=1).

The loggerhead turtles and loggerhead / Kemp's ridley turtle recorded during the survey are classified as Endangered¹ species.

Table 1 Total number of individuals of the bird and marine fauna species (in taxonomic order) recorded during the June 2018 survey of the Lease Area OCS-A 0512 plus 4 km buffer.

Group	Species	Flying	Sitting	Total
Shearwater	Cory's Shearwater	54	8	62
	Great Shearwater	17	1	18
	Sooty Shearwater	14	1	15
	Manx Shearwater	2	0	2
	Species Unknown - Large	14	11	25
	Species Unknown - Small	1	2	3
Storm-petrel	Species Unknown	5	0	5
Gannet	Northern Gannet	2	1	3
Cormorant	Species Unknown	2	0	2
Alcid	Murre* / Razorbill	0	1	1
Gull	Laughing Gull	1	0	1
	Herring Gull	5	1	6
	Great Black-backed Gull	1	0	1
	Species Unknown - Small	1	1	2
Total Birds		119	27	146

*Note: Murre refers to either Common Murre or Thick-billed Murre.

¹ Federally listed as Threatened or Endangered, New York State listed as Endangered.

Table 2 Total number of individuals of the marine mammal and other fauna species (in taxonomic order) recorded during the June 2018 survey of the Lease Area OCS-A 0512 plus 4 km buffer.

Group	Species	Surfacing	Submerged	Total
Marine Mammal	Humpback whale	-	1	1
	Bottlenose dolphin	18	4	22
Total Mammals		18	5	23
Group	Species	Surfacing	Submerged	Total
Turtles	Loggerhead turtle	2	5	7
	Loggerhead / Kemp's ridley turtle	-	1	1
Total Turtles		-	8	8
Group	Species	Surfacing	Submerged	Total
Sharks	Blue shark	-	6	6
Total Sharks		-	6	6
Group	Species	Surfacing	Submerged	Total
Large Bony Fish	Ocean sunfish	-	6	6
Total Large Bony Fish		-	6	6

4.2 Spatial Distribution

Figure 1 shows the location of birds and marine fauna recorded throughout the Survey Area.

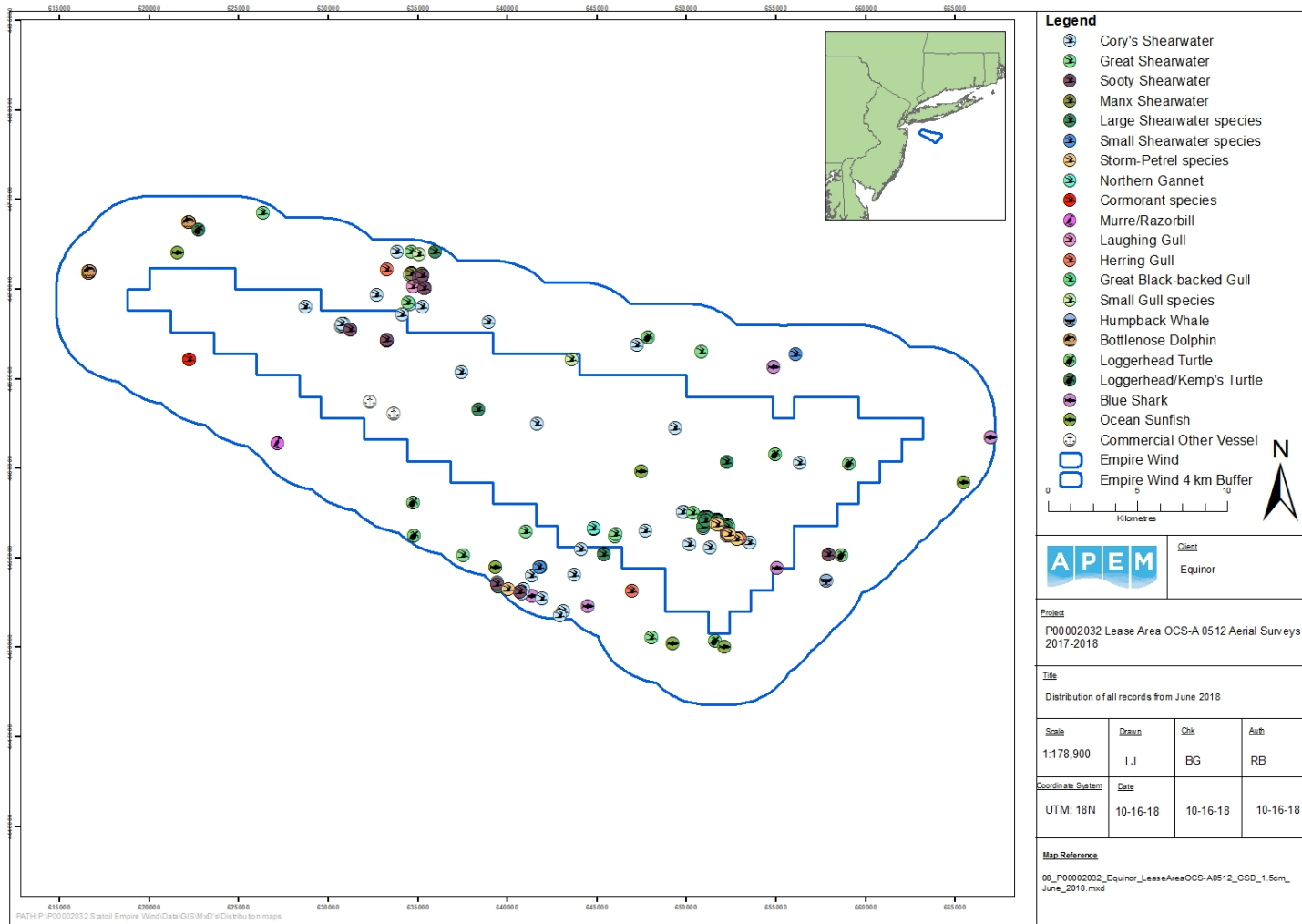


Figure 1 Distribution of all records from the June 2018 survey of Lease Area OCS-A 0512 plus 4 km (2.5 mile) buffer.

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

5. Shipping Observations

Two vessels identified as a survey boat and personnel water craft were recorded visually from the aircraft on the 20th of June 2018. Both of the vessels had a north westerly bearing. Two vessels were captured in the imagery classified as commercial (other) vessel types.

6. General Conclusions

A total of 189 birds and marine fauna were recorded in the Survey Area in June 2018. The most abundant species group recorded was shearwaters (n=125), followed by marine mammals (n=23), gulls (n=10), turtles (n=8), sharks (n=6), large bony fish (n=6), petrels (n=5), gannets (n=3), cormorants (n=2) and alcids (n=1).

A total of 119 birds (82%) were recorded in flight during this survey. These consisted of Cory's shearwaters (n=54), great shearwaters (n=17), large shearwater species (n=14), sooty shearwater (n=14), storm-petrel species (n=5), herring gull (n=5), northern gannet (n=2), Manx shearwater (n=2), cormorant species (n=2), great black-backed gull (n=1), laughing gull (n=1), small gull species (n=1) and small shearwater species (n=1). There were 27 birds recorded as sitting (18%).

Eight turtles, consisting of seven loggerhead turtles and one loggerhead / Kemp's ridley turtle, were recorded during the survey. These turtle species are listed as Endangered (Federally listed as Threatened or Endangered, and New York State listed as Endangered).

Appendix I Species List in Taxonomic Order

Common Name	Scientific Name	Family	Class
Cory's shearwater	<i>Calonectris diomedea</i>	Procellariidae	Aves
Great shearwater	<i>Ardenna gravis</i>	Procellariidae	Aves
Sooty shearwater	<i>Ardenna grisea</i>	Procellariidae	Aves
Manx shearwater	<i>Puffinus puffinus</i>	Procellariidae	Aves
Northern gannet	<i>Morus bassanus</i>	Sulidae	Aves
Laughing gull	<i>Leucophaeus atricilla</i>	Laridae	Aves
Herring gull	<i>Larus argentatus</i>	Laridae	Aves
Great black-backed gull	<i>Larus marinus</i>	Laridae	Aves
Humpback whale	<i>Megaptera novaeangliae</i>	Balaenopteridae	Mammalia
Bottlenose dolphin	<i>Tursiops truncatus</i>	Delphinidae	Mammalia
Loggerhead turtle	<i>Caretta caretta</i>	Celoniidae	Reptilia
Kemp's ridley turtle	<i>Lepidochelys kempii</i>	Celoniidae	Reptilia
Blue shark	<i>Prionace glauca</i>	Carcharhinidae	Chondrichthyes
Ocean sunfish	<i>Mola mola</i>	Molidae	Actinopterygii