
Environmental Imaging Solutions

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

Monthly Report: July 2018

Equinor

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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 29th of July 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 July 2018 survey are presented here.
- A total of 100 birds and marine fauna were recorded in the Survey Area in July 2018. The most abundant species group recorded was petrels (n=32), followed by shearwaters (n=27), shorebirds (n=16), turtles (n=11), sharks (n=9), ducks (n=2), large bony fish (n=2) and loons (n=1).
- A total of 71 birds (91%) were recorded in flight during this survey. These consisted of unknown storm petrel species (n=32), great shearwater (n=16), unknown shorebird species (n=16) and Cory's shearwater (n=7). There were seven birds recorded as sitting (9%).
- A total of two sunfish were recorded in the July 2018 survey, whilst no marine mammals were recorded.
- Eleven turtles were recorded, consisting of six loggerhead turtles, four Kemp's ridley turtles and one loggerhead / Kemp's ridley turtle.
- A total of four sharks were recorded, consisting of two scalloped hammerheads and two unknown hammerhead species.
- The turtle and shark species recorded are listed as Endangered (Federally listed as Threatened or Endangered, and New York State listed as Endangered).

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 July 2018 survey.

3. Summary of Survey

The survey was undertaken on the 29th of July 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 29th of July 2018, the cloud cover was recorded as 0 to 95% (clear to overcast), visibility was greater than 10 km (6.2 miles), and no precipitation was recorded. Winds of 5-10 knots blew from a north-westerly direction. The outside air temperature at the survey altitude was recorded as 70 to 75°F. The sea state was 0 to 2 (calm to smooth) 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 78 birds, 11 turtles, nine sharks and two large bony fish (Table 1 and Table 2) were recorded in the Survey Area in July 2018. The most abundant species group recorded was petrels (n=32), followed by shearwaters (n=27), shorebirds (n=16), turtles (n=11), sharks (n=9), ducks (n=2), large bony fish (n=2) and loons (n=1).

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

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

Group	Species	Flying	Sitting	Total
Loon	Common loon	0	1	1
Shearwater	Cory's shearwater	7	1	8
	Great shearwater	16	1	17
	Species unknown - large	0	2	2
Duck	Species unknown	0	2	2
Shorebird	Species unknown	16	0	16
Storm-petrel	Species unknown	32	0	32
Total Birds		71	7	78

*Note: Murre refers to either common murre or thick-billed murre.

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

Group	Species	Surfacing	Submerged	Total
Turtles	Loggerhead turtle	2	4	6
	Kemp's ridley turtle	-	4	4
	Loggerhead / kemp's turtle	-	1	1
Total Turtles		2	9	11
Group	Species	Surfacing	Submerged	Total
Sharks	Great white shark	-	1	1
	Tiger shark	-	1	1
	Carcharhinidae species unknown	-	1	1
	Scalloped hammerhead	-	2	2
	Hammerhead species unknown	-	2	2
	Shark species	-	2	2

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

Total Sharks		-	9	9
Group	Species	Surfacing	Submerged	Total
Large Bony Fish	Ocean sunfish	-	2	2
Total Large Bony Fish		-	2	2

4.2 Spatial Distribution

Figure 1 shows the location of birds recorded throughout the Survey Area. No marine mammals or other large marine fauna were recorded.

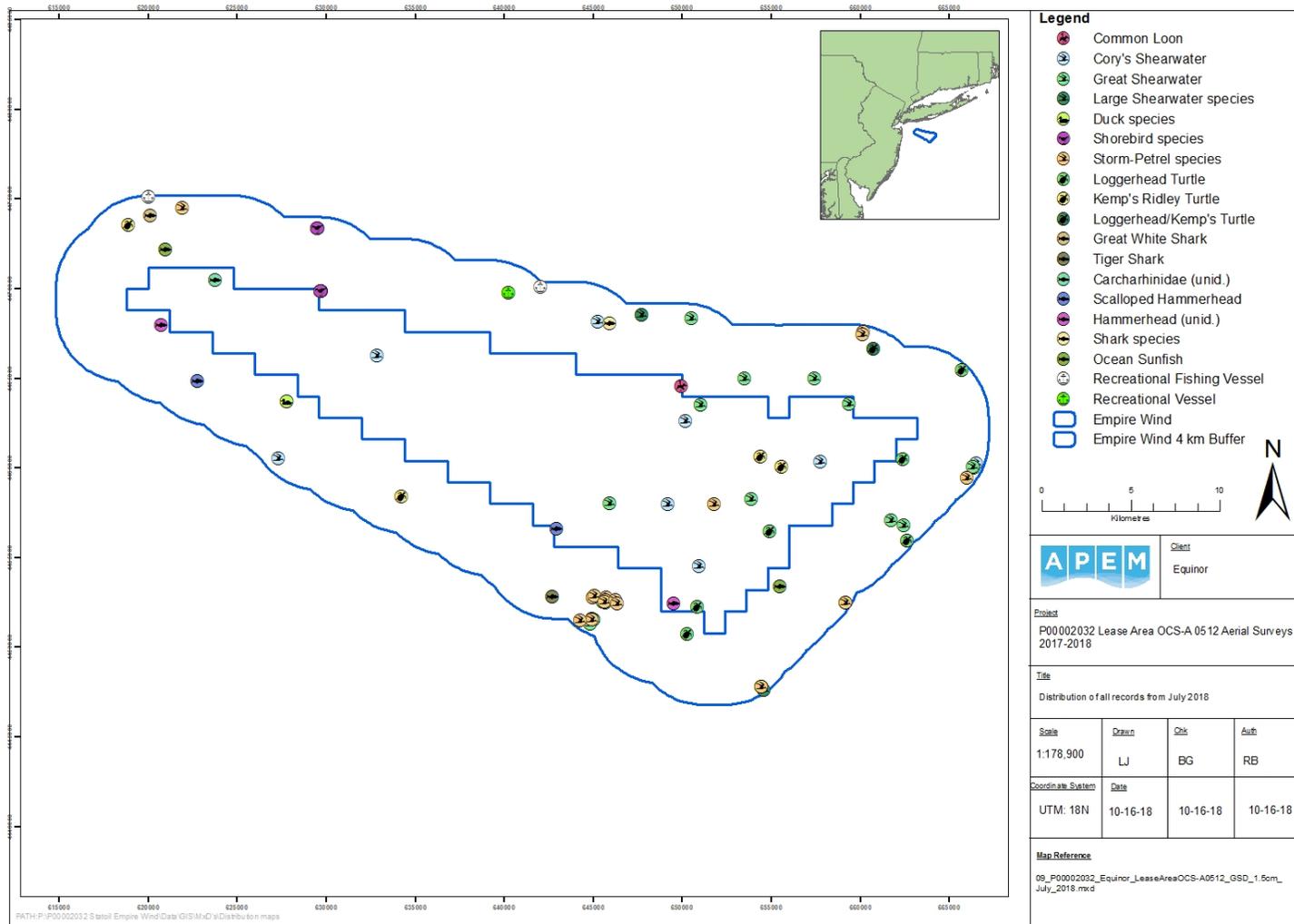


Figure 1 Distribution of all records from the July 2018 survey of Lease Area OCS-A 0512 plus 4 km (2.5 mile) buffer.

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

5. Shipping Observations

Seven vessels were observed visually from the aircraft on the 27th July 2018. These were recorded as one fishing vessel, one speedboat, two yachts, one ferry, and two trawlers. Three vessels were captured in the imagery classified as two recreational fishing vessels and one recreational vessel.

6. General Conclusions

A total of 100 birds and marine fauna were recorded in the Survey Area in July 2018. The most abundant species group recorded was petrels (n=32), followed by shearwaters (n=27), shorebirds (n=16), turtles (n=11), sharks (n=9), ducks (n=2), large bony fish (n=2) and loons (n=1).

A total of 71 birds (91%) were recorded in flight during this survey. These consisted of unknown storm petrel species (n=32), great shearwater (n=16), unknown shorebird species (n=16), and Cory's shearwater (n=7). There were seven birds recorded as sitting (9%).

Eleven turtles, consisting of six loggerhead turtles and four Kemp's ridley turtles and one loggerhead / Kemp's ridley turtle, were recorded in the July survey. Four sharks, consisting of two scalloped hammerheads and two unknown hammerhead species were recorded during the survey. All these turtle and shark 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
Common loon	<i>Gavia immer</i>	Gaviidae	Aves
Cory's shearwater	<i>Calonectris diomedea</i>	Procellariidae	Aves
Great shearwater	<i>Ardenna gravis</i>	Procellariidae	Aves
Loggerhead turtle	<i>Caretta caretta</i>	Reptilia	Cheloniidae
Kemp's ridley turtle	<i>Lepidochelys kempii</i>	Reptilia	Cheloniidae
Great white shark	<i>Carcharodon carcharias</i>	Chondrichthyes	Lamnidae
Tiger shark	<i>Galeocerdo cuvier</i>	Chondrichthyes	Carcharhinidae
Scalloped hammerhead	<i>Sphyrna lewini</i>	Chondrichthyes	Sphyrnidae
Ocean sunfish	<i>Mola mola</i>	Actinopterygii	Molidae