
Environmental Imaging Solutions

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

Monthly Report: December 2017

Equinor

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1. Executive Summary

- An aerial survey of Equinor's Lease Area OCS-A 0512 in the New York Bight was conducted on the 15th and 16th of December 2017 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 December 2017 survey are presented here.
- A total of 517 birds, 29 marine mammals, one ray, and one large bony fish were recorded in the Survey Area in December 2017. The most abundant group recorded was gulls (n=349), followed by alcids (n=70), loons (n=46), gannets (n=38), marine mammals (n=29), ducks (n=8), phalaropes (n=5), grebes (n=1), rays (n=1) and large bony fish (n=1).
- No individuals listed as Endangered (Federally listed as Threatened or Endangered, and New York State listed as Endangered) were recorded.
- A total of 261 birds (50%) were recorded in flight during this survey. These consisted of mallards (n=6), American black ducks (n=2), red-throated loon (n=6), common loon (n=4), northern gannet (n=16), murre / razorbill (n=1), black-legged kittiwake (n=1), Bonaparte's gull (n=219), ring-billed gull (n=1), herring gull (n=3), large gull species (n=1), and small gull species (n=1). There were 256 birds recorded as sitting (50%).
- Of the total 29 marine mammals recorded 28 were submerged (consisting of seven bottlenose dolphins, 17 common dolphins, three harbour porpoise and a single marine mammal species). A single marine mammal (a common dolphin) was observed surfacing.

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 December 2017 survey.

3. Summary of Survey

The survey was undertaken on the 15th and 16th of December 2017. 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 15th of December 2017, the cloud cover was recorded as 7 to 9 (broken to overcast), visibility was greater than 10 km (6.2 miles), and no precipitation was recorded. Winds of 7-10 knots blew from a westerly direction. The outside air temperature at the survey altitude was recorded as 22 to 30°F. The sea state was 1 (rippled) and the water turbidity was 0 to 1 (clear to slightly turbid).

On the 16th of December 2017, the cloud cover was recorded as 2 to 4 (few to scattered), visibility was greater than 10 km (6.2 miles), and no precipitation was recorded. Winds of 30 knots blew from a westerly direction. The outside air temperature at the survey altitude was recorded as 31 to 32°F. The sea state was 3 to 4 (slight to moderate) and the water turbidity was 2 (moderately 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 517 birds (Table 1), 29 marine mammals, one ray, and one large bony fish (Table 2) were recorded in the Survey Area in December 2017. The most abundant group recorded was gulls (n=349), alcids (n=70), followed by loons (n=46), gannets (n=38), mammals (n=29), ducks (n=8), phalaropes (n=5), grebes (n=1), rays (n=1) and large bony fish (n=1).

No Endangered¹ species were recorded during the survey.

Table 1 Total number of individuals of the bird species (in taxonomic order) recorded during the December 2017 survey of the Lease Area OCS-A 0512 plus 4 km buffer.

Group	Species	Flying	Sitting	Total
Duck	Mallard	6	-	6
	American Black Duck	2	-	2
Loon	Red-throated Loon	6	4	10
	Common Loon	4	32	36
Grebe	Species Unknown - Grebe	-	1	1
Gannet	Northern Gannet	16	22	38
Phalarope	Red / Red-necked Phalarope	-	5	5
Alcid	Dovekie	-	3	3
	Murre* / Razorbill	1	64	65
	Species Unknown - Alcid	-	2	2
Gull	Black-legged Kittiwake	1	-	1
	Bonaparte's Gull	219	111	330
	Ring-billed Gull	1	-	1
	Herring Gull	3	-	3
	Great Black-backed Gull	-	2	2
	Species Unknown - Large	1	-	1
	Species Unknown - Small	1	10	11
Total Birds		261	256	517

*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 mammals and other fauna species (in taxonomic order) recorded during the December 2017 survey of the Lease Area OCS-A 0512 plus 4 km buffer.

Group	Species	Surfacing	Submerged	Total
Marine Mammal	Common Dolphin	1	17	18
	Bottlenose Dolphin	-	7	7
	Harbour Porpoise	-	3	3
	Species Unknown	-	1	1
Total Mammals		1	28	29
Rays	Cownose Ray	-	1	1
Total Rays		-	1	1
Large Bony Fish	Ocean Sunfish	-	1	1
Total Large Bony Fish		-	1	1

4.2 Spatial Distribution

Figure 1 shows the location of birds, marine mammals and other fauna species recorded throughout the Survey Area.

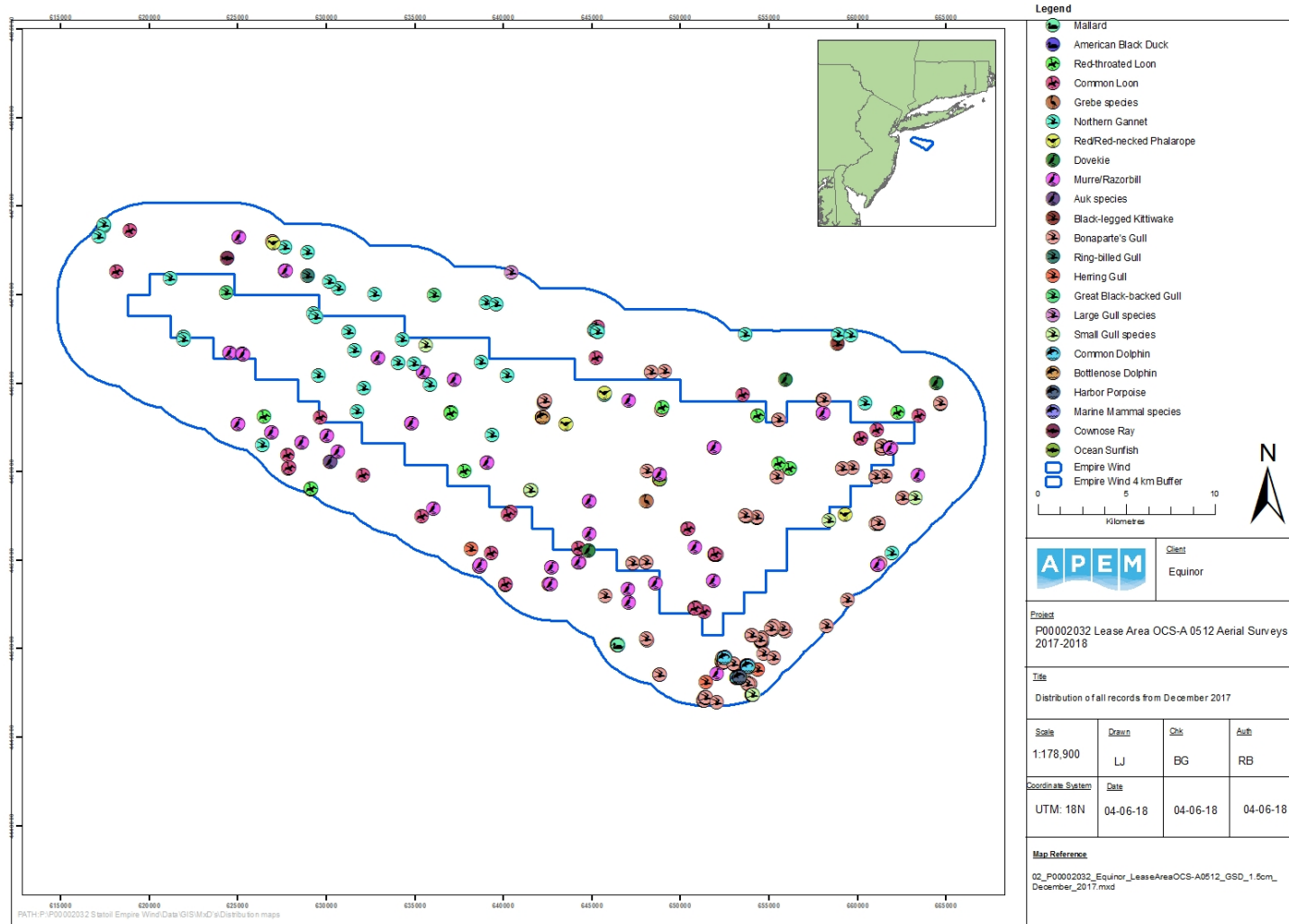


Figure 1 Distribution of all records from the December 2017 survey of Lease Area OCS-A 0512 plus 4 km (2.5 mile) buffer.

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

5. Shipping Observations

One small fishing vessel (with a south-westerly bearing) and one small craft (stationary) were observed visually from the aircraft on the 15th December 2017. No vessels were recorded visually during the flight on the 16th December.

No vessels were recorded in the imagery.

6. General Conclusions

A total of 517 birds, 29 marine mammals, one ray, and one large bony fish were recorded in the Survey Area in December 2017. The most abundant group recorded was gulls (n=349), alcids (n=70), followed by loons (n=46), gannets (n=38), marine mammals (n=29), ducks (n=8), phalaropes (n=5), grebes (n=1), rays (n=1) and large bony fish (n=1).

A total of 261 birds (50%) were recorded in flight during this survey. These consisted of mallards (n=6), American black ducks (n=2), red-throated loon (n=6), common loon (n=4), northern gannet (n=16), murre / razorbill (n=1), black-legged kittiwake (n=1), Bonaparte's gull (n=219), ring-billed gull (n=1), herring gull (n=3), large gull species (n=1), and small gull species (n=1). There were 256 birds recorded as sitting (50%).

Of the total 29 marine mammals recorded 28 were submerged (consisting of seven bottlenose dolphins, 17 common dolphins, three harbour porpoise and a single marine mammal species). A single marine mammal (a common dolphin) was observed surfacing.

Appendix I Species List in Taxonomic Order

Common Name	Scientific Name	Family	Class
Mallard	<i>Anas platyrhynchos</i>	Anatidae	Aves
American Black Duck	<i>Anas rubripes</i>	Anatidae	Aves
Red-throated Loon	<i>Gavia stellata</i>	Gaviidae	Aves
Common Loon	<i>Gavia immer</i>	Gaviidae	Aves
Northern Gannet	<i>Morus bassanus</i>	Sulidae	Aves
Red Phalarope	<i>Phalaropus fulicarius</i>	Scolopacidae	Aves
Red-necked Phalarope	<i>Phalaropus lobatus</i>	Scolopacidae	Aves
Common Murre	<i>Uria aalge</i>	Alcidae	Aves
Thick-billed Murre	<i>Uria lomvia</i>	Alcidae	Aves
Dovekie	<i>Alle alle</i>	Alcidae	Aves
Razorbill	<i>Alca torda</i>	Alcidae	Aves
Black-legged Kittiwake	<i>Rissa tridactyla</i>	Laridae	Aves
Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>	Laridae	Aves
Ring-billed Gull	<i>Larus delawarensis</i>	Laridae	Aves
Herring Gull	<i>Larus argentatus</i>	Laridae	Aves
Great Black-backed Gull	<i>Larus marinus</i>	Laridae	Aves
Common Dolphin	<i>Delphinus delphis</i>	Delphinidae	Mammalia
Bottlenose Dolphin	<i>Tursiops truncatus</i>	Delphinidae	Mammalia
Harbour Porpoise	<i>Phocoena phocoena</i>	Phocoenidae	Mammalia
Cownose Ray	<i>Rhinoptera bonasus</i>	Rhinopteridae	Chondrichthyes
Ocean Sunfish	<i>Mola mola</i>	Molidae	Actinopterygii