

Digital Aerial Baseline Survey of Marine Wildlife in Support of Offshore Wind Energy



NYSERDA



Digital Aerial Baseline Survey of Marine Wildlife in Support of Offshore Wind Energy

Fall 2016 Taxonomic Analysis Summary Report

Prepared for

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Development Authority
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NYSERDA

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Introduction

The first fall survey for the Digital Aerial Baseline Survey of Marine Wildlife in Support of Offshore Wind Energy for the New York Offshore Planning Area (OPA) and Wind Energy Area (WEA) began on 5 November 2016 and finished 27 November 2016. Target extraction for the first fall survey for the NYSERDA Offshore Planning Area (OPA) and Wind Energy Area (WEA) was started in December 2016. All target extraction and quality control of target extraction was completed in March 2017. All animals were identified and all identifications reached quality control standards. Animals were also fully georeferenced with exact locations of individuals available for review on the data portal.

Methods

The survey collected imagery covering a 3109.22 km² area of the OPA and 94.10 km² of the WEA (Table 1) which amounts to 411,532 images. Of the 411,532 images collected, 405,446 were blank (Table 2). Target extraction QC reached 99.93% agreement. The initial target extraction identified 14,455 objects within imagery. Of these, 14,327 were collected within the OPA and 128 objects within imagery exclusively covering the WEA. These targets have been categorized into nine groups representing avian (birds), turtles, marine mammals, rays, sharks, bony fish individuals (excluding fish shoals), fixed structures, vessels, and unknown/other (Table 3). Of the large bony fish, only ocean sunfish was identified to species (see Appendix for a full list of scientific names). No bats were found in imagery. Reclassifications of targets included corrections of subsurface targets into appropriate groups, and unknown/other into species groups. Species listed on the state threatened and endangered list and those listed as “Endangered” or “Threatened” under the Endangered Species Act were flagged for review (Table 4). A total of 49 individuals were categorized into this group. This categorization was conservative. For example, it is possible that “hammerhead shark (unid.)” could represent scalloped hammerhead, and so this identification was placed into the endangered category.

Table 1. Total Images and Area Surveyed

Area	Total Number of Images Collected	km ² of Analysed Images within the Survey Area	Percent Coverage	Survey Area (km ²)
WEA area ^a	12,203	94.10	11.07%	850.92
OPA area	399,329	3,109.22	7.15%	43,471.78
Total	411,532	3,203.32	7.23% ^b	44,322.70

^a This table only represents the imagery that was processed and analysed per the scope of work. An additional 10% percent coverage was collected for the WEA but is being stored if needed for future processing and analysis.

^b Percent coverage of the entire OPA including the WEA imagery.

Table 2. Blank Images Detected

Area	Total Images Analyzed	Blank Images			
		Number Detected	Number Sent for QA	Total Percent QA	Total Percent Blank
WEA	12,203	12,135	1,262	10.41	99.44
OPA	399,329	393,311	39,336	10.00	98.49
Total	411,532	405,446	40,598	10.01	98.52

Table 3. Numbers within Species Groups Identified

Group	Total (OPA and WEA)	OPA	WEA
Avian	13,022	12,911	111
Marine Mammals	1,119	1,119	0
Large Bony Fish	199	185	14
Unknown/Other	84	81	3
Turtles	40	39	1
Vessels	16	16	0
Rays	4	4	0
Sharks	4	4	0
Fixed Structure	3	3	0

Table 4. Threatened and Endangered Species by Group Identified

Species	Total (OPA and WEA combined)	OPA	WEA
Turtle	40	39	1
Mammal	8	8	0
Shark	1	1	0

Quality Control

All identifications were made by biologists highly experienced in their species group. A minimum of 20% of all images identified were reviewed by a taxonomic expert and taxonomic agreement had to meet a minimum of 90% concurrence (Table 6). Failure to do would trigger a review of 100% of identifications made by the individual concerned. The 20% review included quality control review of 100% of ESA-listed species, and for endangered species a 100% agreement had to be reached on identifications (Table 7). Additional experts in the species concerned were called in to arbitrate identifications when concurrence could not be reached.

Results

Quality Control Results (Fall 2016)

Table 6. All Species

Taxonomic Group	Number of Images	Number of Images for QC	% Agreement Reached
Avian	13,022	2,868	99
Turtles	40	40	100
Marine mammals	1,119	237	100
TOTAL	14,181	3,145	99

Table 7. Endangered Species Only

Taxonomic Group	Number of Images	% Agreement Reached
Turtles	40	100
Marine mammals	8	100
Shark	1	100
TOTAL	49	100

Identification Success

Identification success varied by species groups and by depth of subsurface animals. All identifications had a level of certainty ascribed to them (e.g., possible, probable, and definite), and subsurface animals were also ranked as “breaching,” “near surface,” and “significantly submerged.”

All (100%) of avian identifications were classified to species or species group (n=13,022), with a species identification success of over 90% (Table 8). Avian species level identifications varied by species groups depending on size and coloration. Of auk species, 49% remained at group level identification. Only 4% of ducks remained at group level, only 0.7% of loons remained at group level and 39% of phalaropes remained at group level. All other shorebirds (n=61) remained unidentified. Of gulls 89% were identified to species, and 11% were identified to the category of “gull species-large” or “gull species-small.” Of 188 shearwaters, 95% (n=178) were identified to species. All other avian species groups consisting of cormorants, petrels, storm petrels, terns, and jaegers, achieved 100% identification success rates.

The fall survey recorded 1,119 marine mammals (Table 10). Of dolphins, 49% (n=528) were classed as “species unknown.” Of these, 315 were classed as significantly submerged. Out of 22 whales, only one was not ascribed to species or species group. Fourteen pinnipeds were recorded, of which two were clearly identifiable. Problems with identification frequently stemmed from subsurface depth obscuring important features, and nine of the 14 pinnipeds fell in to this category.

Species Presence

All turtle species encountered in the fall survey are classified as endangered (Kemp’s ridley and leatherback) or threatened (loggerhead). Forty-nine animals listed as state or federally threatened or endangered species were recorded in the OPA, and one in the WEA. Of marine mammals, eight were listed. These were blue whale (n=1), fin whale (n=5), humpback whale (n=1), and sperm whale (n=1) (Table 9, Figure 1). Overall 40 turtles were recorded, consisting of three identified species: Kemp’s ridley, leatherback, and loggerhead (Table 11, Figure 2). The remaining listed species was an unknown shark classed as unknown hammerhead species which could be scalloped hammerhead.

Large numbers of marine mammals were encountered (n=1,119) (Table 10). Most of these were dolphins (n=1,092) consisting of 8 identified species. Numbers were dominated by short-beaked common dolphin (n=223), Risso’s dolphin (n=124), common bottlenose dolphin (n=59), Atlantic spotted dolphin (n=54) and striped dolphin (n=75). Other dolphin species include pilot whale (n=9) and harbor porpoise (n=4), besides dolphin species unknown (n=528). Of whale species (n=13), fin whales (n=5) and beaked whales (n=4) were the only species with more than one encounter (Table 10).

Of fish species (Table 12), four rays, four sharks, and 199 large bony fish were encountered, along with 83 fish shoals.

This season had high bird activity, with 13,022 individuals recorded representing 34 species (Table 8). The survey was timed to provide as much information as possible on northern gannets and red-throated loons, and was anticipated to coincide with sea duck and gull activity. As anticipated, large numbers of northern gannets were reported (n=2,960). Of these, 867 were documented as flying. Both red-throated and common loons were documented. Of the 227 red-throated loons, 102 were sitting on the water. There

were 2,340 sea ducks, with 6 different species identified most of which were black scoters (n=2,252), of which 1,773 were sitting on the water. There were 5,479 gulls identified in the imagery of 8 different species. Amongst these were 2,292 herring gulls, 1,098 Bonaparte’s gulls, 778 laughing gulls, 376 great black-backed gulls and 230 black-legged kittiwakes. Small numbers of ring-billed gulls, lesser black-backed gulls and little gulls were also identified. Out of the 5,479 gulls, 1,911 were reported as flying. Remaining species occurring in notable numbers include 1,559 phalaropes of two species and 188 shearwaters of three species. Red phalaropes were the most frequently encountered phalarope species (n= 881). Of the remaining phalaropes, 69 were identified as red-necked phalaropes, 609 remained unidentified to species, and overall 588 of the phalaropes were flying. Cory’s shearwater was the most frequently encountered shearwater (n=166), along with 8 great shearwaters, 4 Audubon’s shearwaters and 10 unknown large shearwaters (possibly great or Cory’s). Of the shearwaters, 98 were in flight.

Flight Height

Avian flight height data will be presented in detail in the semi-annual report. However, here we present a brief overview of flight altitude assessment success.

We were able to calculate flight heights for 705 out of 867 flying northern gannet, and 119 of the 125 flying red-throated loons had flight height altitude ascribed to them. Of the 479 flying black scoter reported, 391 had flight altitude ascribed to them. Flight heights were ascribed to 432 of the 537 flying sea ducks, 1,489 of the 1,911 flying gulls, 106 of the 588 flying phalaropes, and 69 of the 98 flying shearwaters.

Table 8. Avian Species identified (12,911 in OPA, 111 in WEA)*

Name	# in Species Group	OPA-species	WEA-species
Auk	81		
Black Guillemot		1	0
Common Murre		11	0
Dovekie		3	0
Razorbill		24	0
species unknown		40	0
Cormorant	67		
Double-crested Cormorant		67	
Duck	2,340		
Black Scoter		2,218	34
Bufflehead		5	0
Gadwall		3	0
Long-tailed Duck		3	0
species unknown		10	0
Surf Scoter		46	0

Name	# in Species Group	OPA-species	WEA-species
White-winged Scoter		21	0
Fulmar	3		
Northern Fulmar		3	0
Gannet	2,960		
Northern Gannet		2,944	16
Gull	5,479		
Black-legged Kittiwake		230	0
Bonaparte's Gull		1,087	11
Great Black-backed Gull		376	0
Herring Gull		2,282	10
Laughing Gull		779	0
Lesser Black-backed Gull		9	0
Little Gull		4	0
Ring-billed Gull		91	1
species unknown		1	0
species unknown - Large		17	0
species unknown - Small		581	0
Loon	280		
Common Loon ^a		49	2
Red-throated Loon		222	5
species unknown		2	0
Pelican	1		
Brown Pelican		1	0
Petrel	1		
Black-capped Petrel		1	0
Phalarope	1,557		
Red Phalarope		873	8
Red-necked Phalarope		69	0
species unknown		609	0
Shearwater	188		
Audubon's Shearwater		0	4
Cory's Shearwater		146	20
Great Shearwater		8	0
species unknown-Large		10	0

Name	# in Species Group	OPA-species	WEA-species
Shorebird	61		
species unknown		61	0
Jaegers	1		
Pomarine Jaeger		1	0
Storm-petrel	1		
Wilson's Storm-Petrel		1	0
Tern	2		
Royal Tern		2	0

*Highlight denotes classed as endangered

^a listed as species of concern by NYSDEC

Table 9. Threatened and Endangered Species Identified

Species	TOTAL (OPA & WEA)	OPA	WEA
Blue Whale*	1	1	0
Fin Whale*	5	5	0
Sperm Whale*	1	1	0
Humpback Whale ^a	1	1	0
Kemp's Ridley Turtle*	1	1	0
Leatherback Turtle*	29	28	1
Loggerhead Turtle*	6	6	0
Turtle species unknown*	4	4	0
Hammerhead Shark (unid)	1	1	0

*Highlight denotes classed as endangered

^a listed as threatened or endangered by NYSDEC

Table 10. Marine Mammal Species Identified (1,199 in OPA, 0 in WEA)*

Name	# in Species Group	OPA-species	WEA-species
Dolphin	1,083		
Atlantic Spotted Dolphin		54	0
Atlantic White-sided Dolphin		16	0
Common Bottlenose Dolphin		59	0
Harbor Porpoise		4	0
Risso's Dolphin		124	0
Short-beaked Common Dolphin		223	0

Name	# in Species Group	OPA-species	WEA-species
Striped Dolphin		75	0
Pilot Whale (unid.)		9	0
Dolphin species unknown		528	0
Seal	14		
Gray Seal		2	0
species unknown		12	0
Whale	22		
Beaked Whale (unid.)		4	0
Blue Whale* ^a		1	0
Fin Whale* ^a		5	0
Humpback Whale ^a		1	0
Whale species unknown		1	0
Sperm Whale*		1	0

*Highlight denotes classed as endangered

^a listed as threatened or endangered by NYSDEC

Table 11. Turtle Species Identified (39 in OPA, 1 in WEA)*

Name	OPA-species	WEA-species
Kemp's Ridley Turtle	1	0
Leatherback Turtle	28	1
Loggerhead Turtle	6	0
Turtle Species Unknown	4	0

*All listed under the Endangered Species Act

Table 12. Fish Species Identified (193 in OPA, 14 in WEA)

Name	OPA-species	WEA-species
Cownose/Bullnose Ray	1	0
Giant Manta Ray	1	0
Ray Species Unknown	6	0
Blue Shark	2	0
Hammerhead (unid.)	1	0
Shark Species Unknown	1	0
Large bony Fish (unid.)	24	10

Ocean Sunfish	161	4
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Spatial Distribution of Animals Classed as Threatened or Endangered

All animals have had their location mapped. Presenting locations of animals spread over such a broad area is difficult as the size of the icon representing the animal suggests a greater spatial use than is real. A better idea of spatial use can be obtained by using the map tool in REMOTe (remote.normandeau.com), which allows for zoom.

Images below show the locations of the endangered species encountered in the Fall 2016 survey.

Figure 1. Blue Whale, Fin Whale, Sperm Whale, and Humpback Whale Distribution over the OPA. Animals not labeled are Fin Whales (n=5)

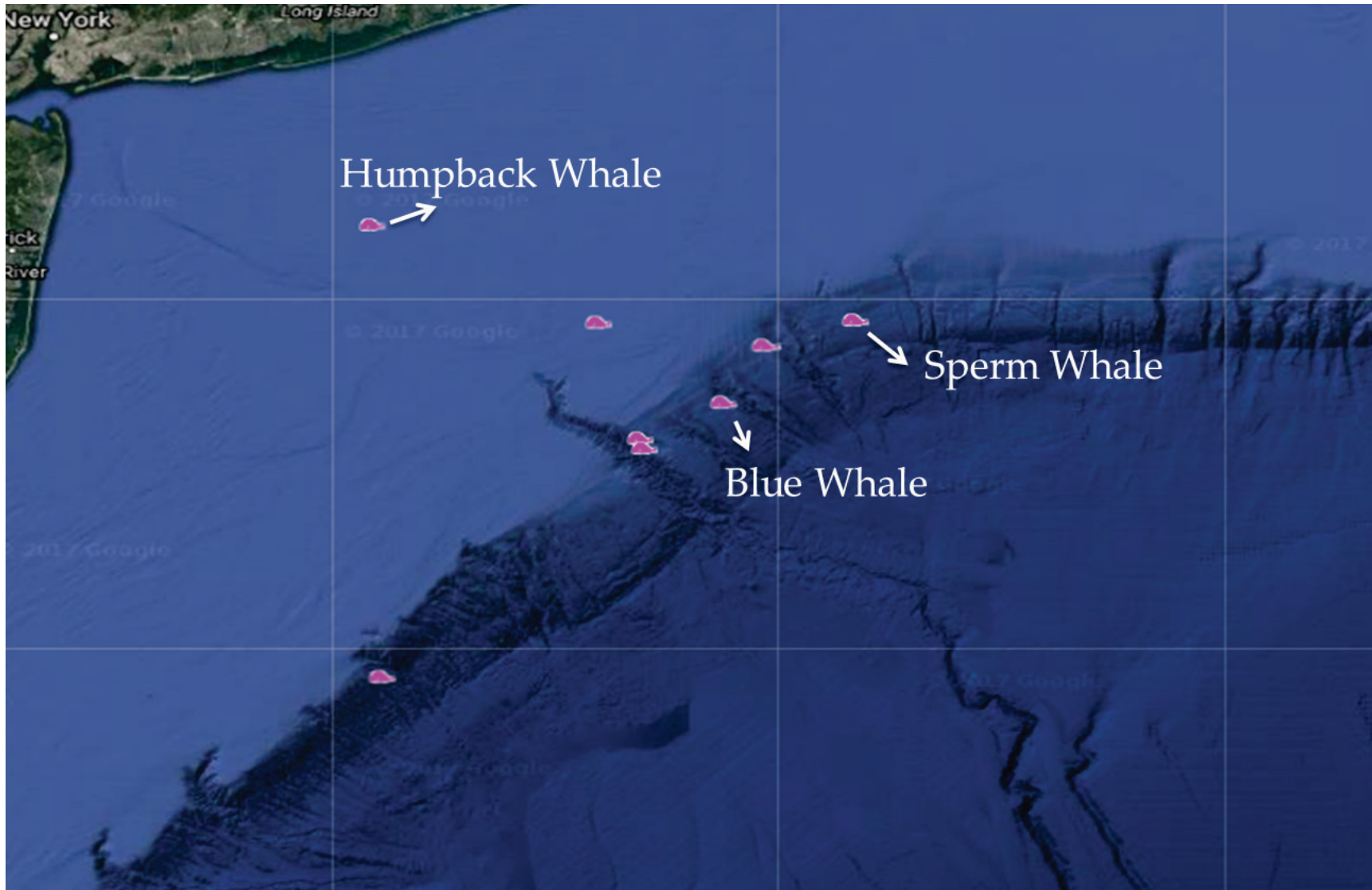


Figure 2. Turtle Distribution over the OPA. Animal highlighted in Red Encountered in the WEA

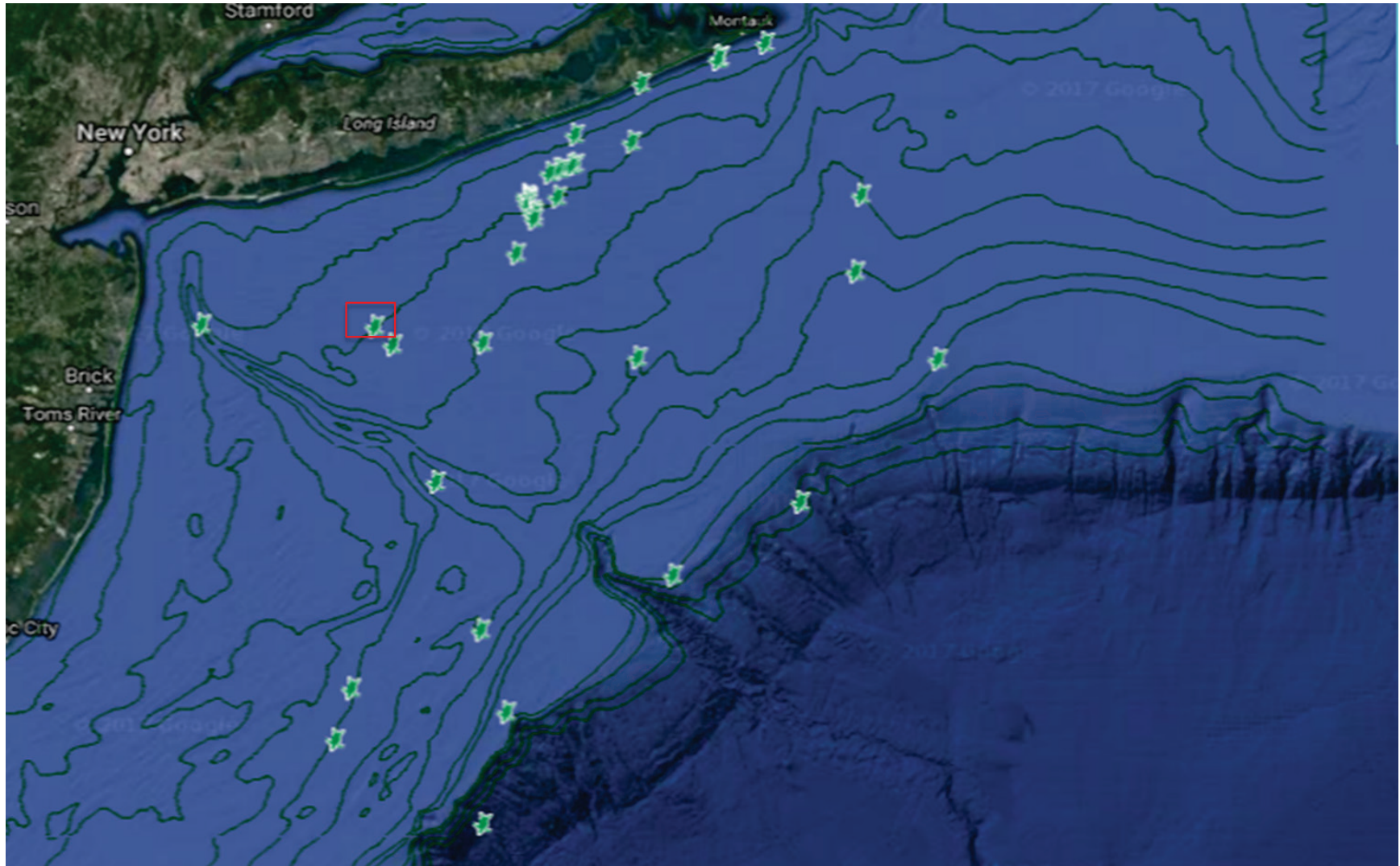
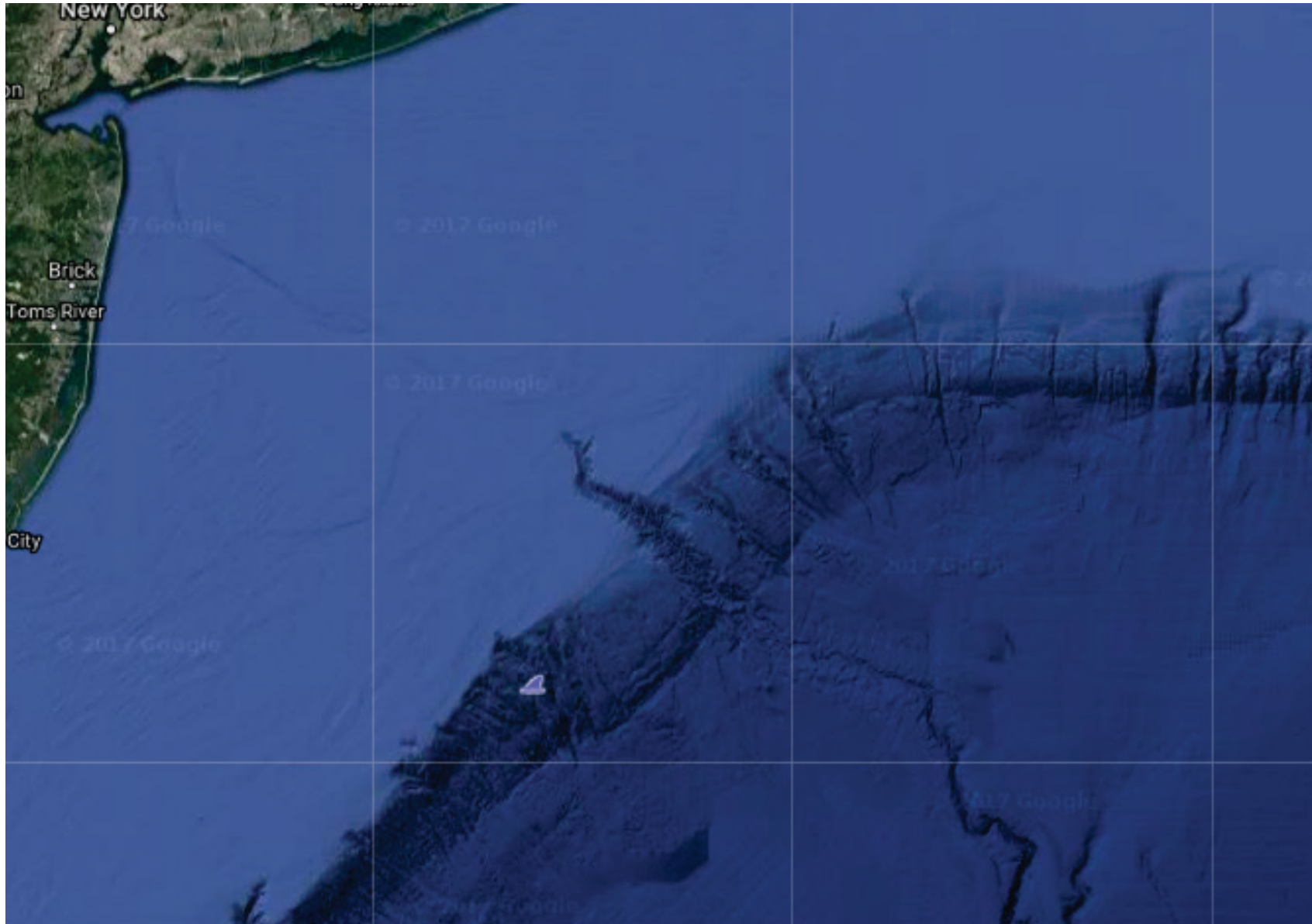


Figure 3. Hammerhead species (unid.) distribution in the OPA (possibly Scalloped Hammerhead).



APPENDIX

List of Species Encountered in the Fall 2016 Survey with Common and Scientific Names

Common Name	Scientific Name	Class	Family
Black Guillemot	<i>Cepphus grylle</i>	AVES	ALCIDAE
Common Murre	<i>Uria aalge</i>	AVES	ALCIDAE
Dovekie	<i>Alle alle</i>	AVES	ALCIDAE
Razorbill	<i>Alca torda</i>	AVES	ALCIDAE
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	AVES	PHALACROCORACIDAE
Black Scoter	<i>Melanitta americana</i>	AVES	ANATIDAE
Bufflehead	<i>Bucephala albeola</i>	AVES	ANATIDAE
Gadwall	<i>Anas strepera</i>	AVES	ANATIDAE
Long-tailed Duck	<i>Clangula hyemalis</i>	AVES	ANATIDAE
Surf Scoter	<i>Melanitta perspicillata</i>	AVES	ANATIDAE
White-winged Scoter	<i>Melanitta fusca</i>	AVES	ANATIDAE
Northern Fulmar	<i>Fulmarus glacialis</i>	AVES	PROCELLARIIDAE
Northern Gannet	<i>Morus bassanus</i>	AVES	SULIDAE
Black-legged Kittiwake	<i>Rissa tridactyla</i>	AVES	LARIDAE
Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>	AVES	LARIDAE
Great Black-backed Gull	<i>Larus marinus</i>	AVES	LARIDAE
Herring Gull	<i>Larus argentatus</i>	AVES	LARIDAE
Laughing Gull	<i>Leucophaeus atricilla</i>	AVES	LARIDAE
Lesser Black-backed Gull	<i>Larus fuscus</i>	AVES	LARIDAE
Little Gull	<i>Hydrocoloeus minutus</i>	AVES	LARIDAE
Ring-billed Gull	<i>Larus delawarensis</i>	AVES	LARIDAE
Common Loon	<i>Gavia immer</i>	AVES	GAVIIDAE
Red-throated Loon	<i>Gavia stellata</i>	AVES	GAVIIDAE
Brown Pelican	<i>Pelecanus occidentalis</i>	AVES	PELECANIDAE
Black-capped Petrel	<i>Pterodroma hasitata</i>	AVES	PROCELLARIIDAE
Red Phalarope	<i>Phalaropus fulicarius</i>	AVES	SCOLOPACIDAE

Common Name	Scientific Name	Class	Family
Red-necked Phalarope	<i>Phalaropus lobatus</i>	AVES	SCOLOPACIDAE
Audubon's Shearwater	<i>Puffinus lherminieri</i>	AVES	PROCELLARIIDAE
Cory's Shearwater	<i>Calonectris diomedea</i>	AVES	PROCELLARIIDAE
Great Shearwater	<i>Ardenna gravis</i>	AVES	PROCELLARIIDAE
Pomarine Jaeger	<i>Stercorarius pomarinus</i>	AVES	STERCORARIIDAE
Wilson's Storm-Petrel	<i>Oceanites oceanicus</i>	AVES	HYDROBATIDAE
Royal Tern	<i>Thalasseus maximus</i>	AVES	LARIDAE
Ocean Sunfish	<i>Mola mola</i>	ACTINOPTERYGII	MOLIDAE
Atlantic Spotted Dolphin	<i>Stenella frontalis</i>	MAMMALIA	DELPHINIDAE
Atlantic White-sided Dolphin	<i>Lagenorhynchus acutus</i>	MAMMALIA	DELPHINIDAE
Common Bottlenose Dolphin	<i>Tursiops truncatus</i>	MAMMALIA	DELPHINIDAE
Harbor Porpoise	<i>Phocoena phocoena</i>	MAMMALIA	PHOCOENIDAE
Risso's Dolphin	<i>Grampus griseus</i>	MAMMALIA	DELPHINIDAE
Short-beaked Common Dolphin	<i>Delphinus delphis</i>	MAMMALIA	DELPHINIDAE
Striped Dolphin	<i>Stenella coeruleoalba</i>	MAMMALIA	DELPHINIDAE
Gray Seal	<i>Halichoerus grypus</i>	MAMMALIA	PHOCIDAE
Blue Whale	<i>Balaenoptera musculus</i>	MAMMALIA	BALAENOPTERIDAE
Fin Whale	<i>Balaenoptera physalus</i>	MAMMALIA	BALAENOPTERIDAE
Humpback Whale	<i>Megaptera novaeangliae</i>	MAMMALIA	BALAENOPTERIDAE
Sperm Whale	<i>Physeter macrocephalus</i>	MAMMALIA	PHYSETERIDAE
Giant Manta Ray	<i>Manta birostris</i>	CHONDRICHTHYES	MOBULIDAE
Blue Shark	<i>Prionace glauca</i>	CHONDRICHTHYES	CARCHARHINIDAE
Kemp's Ridley Turtle	<i>Lepidochelys kempii</i>	REPTILIA	CHELONIIDAE
Leatherback Turtle	<i>Dermochelys coriacea</i>	REPTILIA	DERMOCHELYIDAE
Loggerhead Turtle	<i>Caretta caretta</i>	REPTILIA	CHELONIIDAE