Digital Aerial Baseline Surveys of Marine Wildlife

In Support of New York State Offshore Wind Energy

Seasonal PAC Webinar #6 Fall 2017

Dial in number: 352 269 4250
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Introduction: Greg Lampman, NYSERDA

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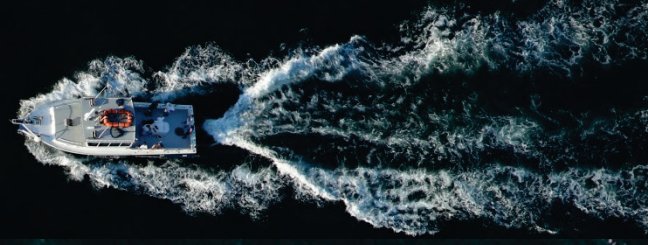
Outline



- Project Team
- Fall Survey #6 Timing
- Fall Data Collection
- Results of Summer Survey #5
  - Birds
  - Marine Mammals
  - Turtles
  - Sharks
  - Fish
- Some Large Bony Fish and Fish-shoal observations
- Participant Q and A

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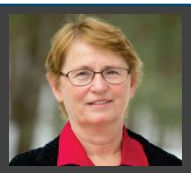
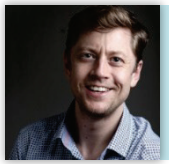


Ann Pembroke
Project Manager

Stuart Clough
Director APEM

Stephanie McGovern
Technical Director
APEM

Julia Robinson Willmott
Technical Director
Normandeau



Data Collection
David Campbell

Survey Design
Mark Rehfisch

Survey Execution
John McCarthy
(survey logistics)

David Mullock
(camera operator)

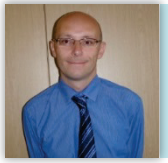


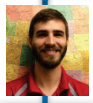
Image Analysis
Simon Warford

Preprocess

Simon Warford

Stephanie
McGovern

Image ID



Stephen Lindsay

Melinda Sweeny

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QA/QC

Adam Kent

Mark Hayes

Robert Kenney

Data Management/
Reporting

Karen Gilland

Julia Robinson
Willmott

Mark Rehfisch

Project Team. Those on call circled

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Survey Timing

Fall 2017 Survey # 6

Seasonal Surveys	Months (Purpose)
Summer	July/August (fin, and humpback whales, turtles, shearwaters and gulls)
Fall	October/November (northern gannet, red-throated loon, black-legged kittiwake, jaegers and skuas)
Winter	February/March (beaked whales, alcids)
Spring	April/May (right and sei whales, roseate tern, red phalarope)

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Data Collection

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Camera System

- Fall survey was flown with the Shearwater III camera system.

- Camera performed well although encountered a small software issue whilst out on task which was resolved during the flight

Survey Timing

The Fall survey was targeted to capture data during Mid-November

The survey started on the 9th of November and was completed on the 27th of November

There were a total of 8 flying days to complete the survey

OPA Survey Design

Flight plan is currently split between nearshore and offshore areas

Nearshore area

- Access to the restricted area around JFK was granted so all survey lines across the OPA were captured at 1.5cm

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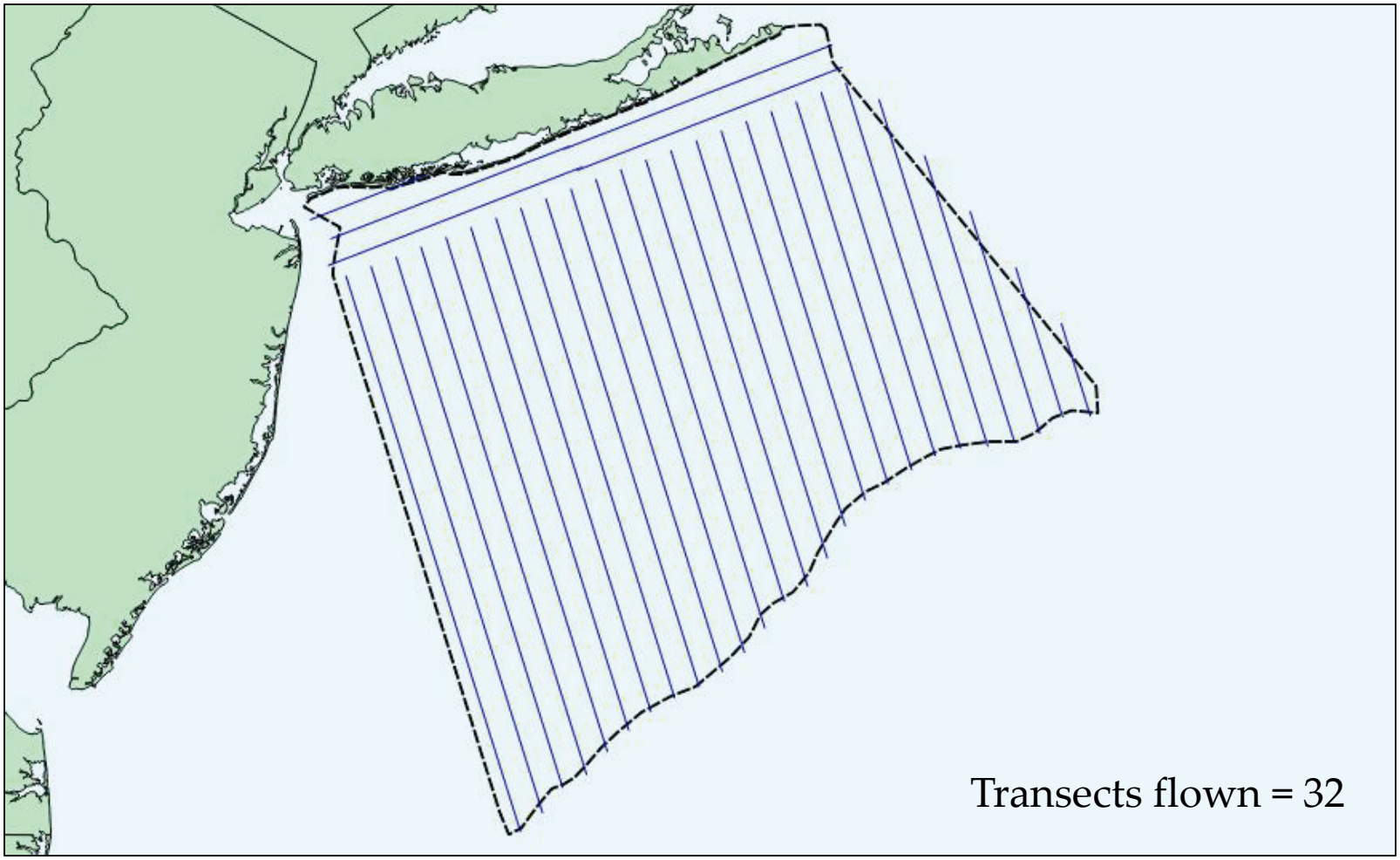
OPA Survey Design



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Weather and Survey

- Weather conditions were fairly favourable although the survey crew did experience some periods of poor weather during the survey period

Date (2017)	Action
November 9	6 lines of the OPA were flown
November 11	1 line and 1 partial line of the OPA were flown
November 12	7 lines of the OPA were flown
November 18	4 lines of the OPA and 2 line of the nearshore East were flown
November 20	3 lines of the nearshore West were flown
November 23	2 lines of the OPA were flown
November 26	4 lines of the OPA were flown
November 27	2 lines and 1 partial line of the OPA were flown

Images captured and Analysis

Total images captured:

OPA ~ 400,000

From this we anticipate analyzing:

OPA ~ 320,000

To achieve 7% OPA coverage

Great White Shark

Total images screened so far:

OPA ~ 290,000

Percentage of images screened:

OPA ~ 91%

Giant Manta Ray

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Results of Summer Data Collection

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Results https://remote.normandeau.com

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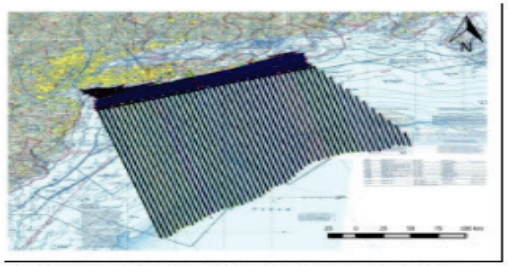
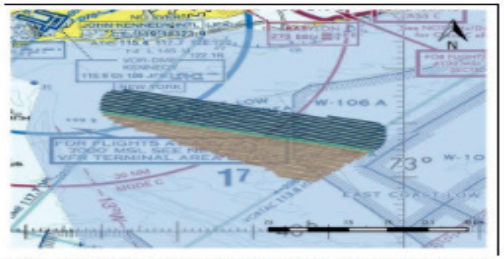
ReMOTe
Remote Marine and Onshore Technology
NYSERDA

Project Overview | Documents | Contacts | Results | Data Portal

Project Overview



New York Offshore Planning Area (OPA) showing transect survey lines.



Wind Energy Area (WEA) and the 4-km buffer showing image capture locations for the grid surveys.

Project Purpose

In preparation for offshore wind energy development, the New York State Energy and Research Development Authority (NYSERDA) initiated offshore high resolution aerial survey of marine and bird life, at that time the largest such project in U.S. history. Normandeau Associates, Inc. and APEM Inc. (Normandeau–APEM team) will gather 3 years of baseline surveys to assess the entire New York Offshore Planning Area (OPA). For the first year of this project, (Summer, 2016 through Spring, 2017) particular emphasis was placed on the Wind Energy Area (WEA).

The surveys use ultra-high resolution aerial digital imagery to assess use by birds, marine mammals, turtles, and fish. This proactive study of potential impacts will facilitate a more efficient track to energy production offshore New York by providing the necessary information to meet the U.S. Bureau of Ocean Energy Management's (BOEM's) regulatory requirements for environmental review of WEAs

How ReMOTe for NYSERDA Works

The data collected in the surveys of the OPA and WEA are uploaded to ReMOTe after each survey.

Normandeau and APEM analysts and taxa-specific experts log in to ReMOTe to access the data, identify species, and interpret results. As data review progresses, survey results are available on ReMOTe in real time.

NYSERDA Project Advisory Committee (PAC) members and other interested parties can log in to ReMOTe to access the data.

Example Images Collected from the Surveys

Survey Timing Summer (6 -21 August)
(Summer 2016, Timing July 26 -August 9)

Seasonal Surveys	Months (Purpose)
Summer	July/August (fin whales, turtles, shearwaters, storm petrels and gulls)
Fall	October/November (northern gannet, red-throated loon, black-legged kittiwake, jaegers and skuas)
Winter	February/March (beaked whales, alcids)
Spring	April/May (right and sei whales, roseate tern, red phalarope)

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Target Extraction - Summer

Number of Images for QC	Number of Images QC'd Not Blank	% Agreement Reached
31,271	71	99.77

Results

20% QC all animals & 100% QC Endangered Species

Birds

Marine mammals

Turtles

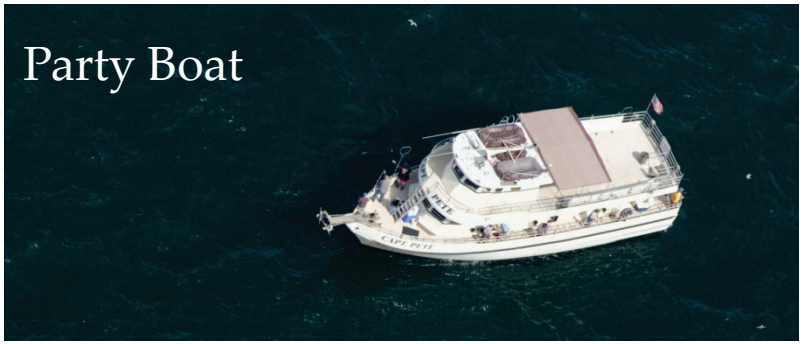
Cartilaginous and bony fish

Also extracted:

Fish shoals

Boats and buoys

Basking Shark



Party Boat

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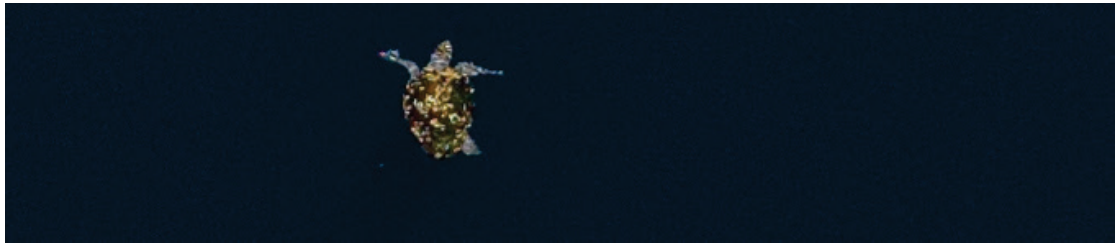
QC - Summer

Taxonomic Group	Number of Images	Number of Images for QC	% Agreement Reached
Birds	2,964	618	99
Marine Mammals	1,446	281	100
Turtles	711	711	100
Sharks	1,382	281	97
Rays	7,623	1,576	100
TOTAL	**5,693**	**1,738**	**99.3**



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Survey Comparison (Summer 2016 July 26 - August 9; Summer 2017 August 6-21)

Species Group	OPA Number 2016	OPA Number 2017
Avian	1,862	2,964
Mammal	924	1,446
Turtle	560	711
Shark	643	1,384
Ray	8,101	7,623
Large Bony Fish	577	1,792
Boat	15	39
Structure	1	1

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ID Success- Birds

Species	% ID Success
Loons 5	60
Petrels 3	100
Shearwaters 576	74
Storm-petrels 2080 - (splitting Wilson's from Leach's or band-rumped especially when sitting)	16
Gannets 4	100
Shorebirds 29	12
Phalaropes 138 – (most in red/red-necked blend)	1
Auks 4	0
Gulls 109	69
Terns 2	50
Nighthawks 1	100
Total Individuals	**Average Success**
2,964	**59 %**

Black-capped Petrel

Wilson's Storm-petrel

Northern Gannet

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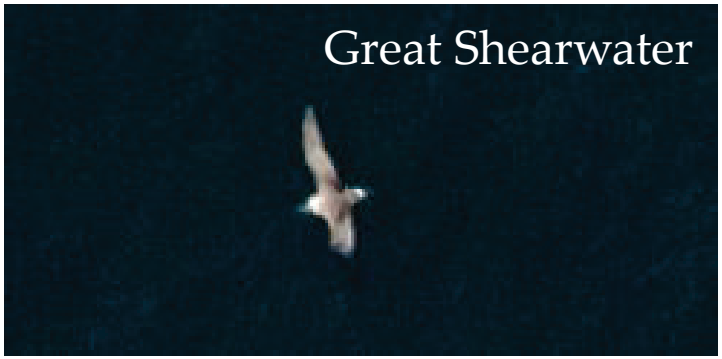
Survey Comparison- Avian (Summer 2016 and Summer 2017)

Species Group	OPA Number 2016	OPA Number 2017
Loon	3	5
Petrel	18	3
Shearwater	732	576
Storm-petrel	791	2080
Gannet	0	4
Cormorant	6	0
Raptor	2	1
Shorebird	7	29
Phalarope	0	138
Gull	114	109
Tern	48	3
Sterna Tern	141	13
Auk	0	4

Herring gulls


Great Shearwater

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Survey Comparison (OPA)-Avian
(Summer 2016 and Summer 2017)

Species	2016	2017
Common Loon	3	3
Loon species unknown		2
Black-capped Petrel	13	3
Petrel species unknown	5	
Cory's Shearwater	510	90
Great Shearwater	70	337
Sooty Shearwater	2	1
Audubon's Shearwater	8	
Shearwater species unk-Large	129	108
Shearwater species unk-Small	13	40
Wilson's Storm-Petrel	791	339
Leach's Storm-Petrel		2
Storm-petrel species unknown		1739
Northern Gannet		4
Double-crested Cormorant	6	
Osprey	1	
Bald Eagle	1	
Black-bellied Plover	6	
Semipalmated Plover		3
Shorebird species unknown	1	26

Species	2016	2017
Red-necked Phalarope		1
Red/Red-necked Phalarope		121
Phalarope species unknown		16
Murre/Razorbill		2
Auk species unknown		2
Laughing Gull	14	13
Ring-billed Gull	8	2
Herring Gull	21	33
Lesser Black-backed Gull		2
Great Black-backed Gull	52	25
Gull species unknown	4	
Gull species unknown - Large	4	3
Gull species unknown - Small	11	31
Least Tern	33	
Black Tern		2
Royal Tern	8	
Sterna Tern species unknown	141	13
Common Nighthawk		1
TOTAL	**1855**	**2963**

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Sub-surface Animals: ID Success

- Depth potentially obscures characters required for identification
- Clarity of water also affects identification

Subsurface animals ranked

- Breaching
- Near surface
- Significantly submerged

ID Success- Dolphins and Seals

ID Success 95%
Of which 80.5% were significantly submerged

Species	Number
Common Bottlenose Dolphin	175
Common Dolphin	853
Pilot Whale (unid.)	52
Risso's Dolphin	140
Rough-toothed dolphin	15
Short-finned Pilot Whale	24
Striped Dolphin	6
Dolphin species unknown	127
Seal species unknown	2
Mammal species unknown	41
TOTAL	1,435

Common Bottlenose Dolphin

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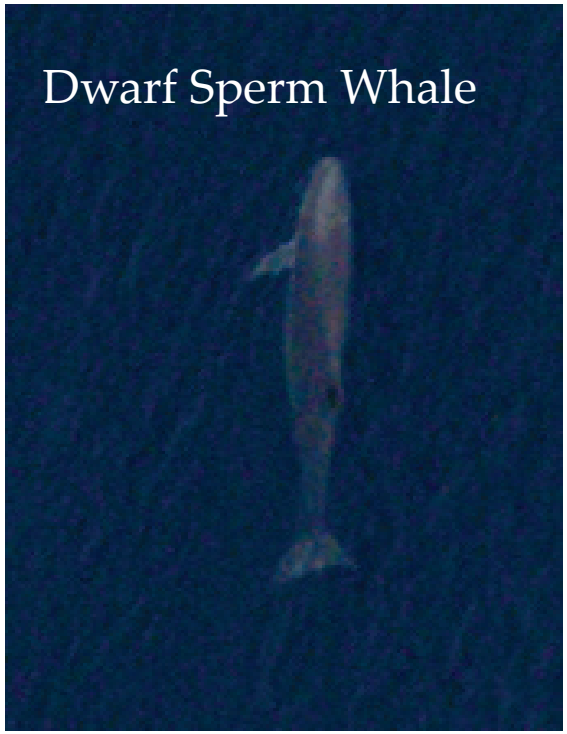
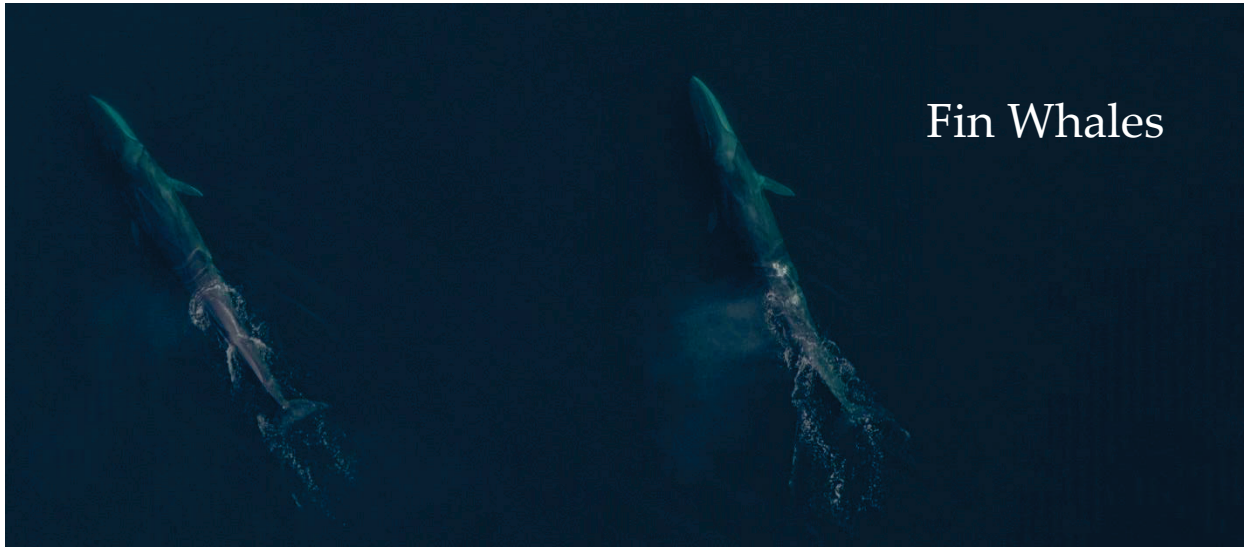
ID Success- Whales

Species	Number
Dwarf Sperm Whale	2
Fin Whale	4
Sei Whale	1
Sperm Whale	3
species unknown	1

ID Success 90% (one unidentified)
Unidentified individual= significantly submerged





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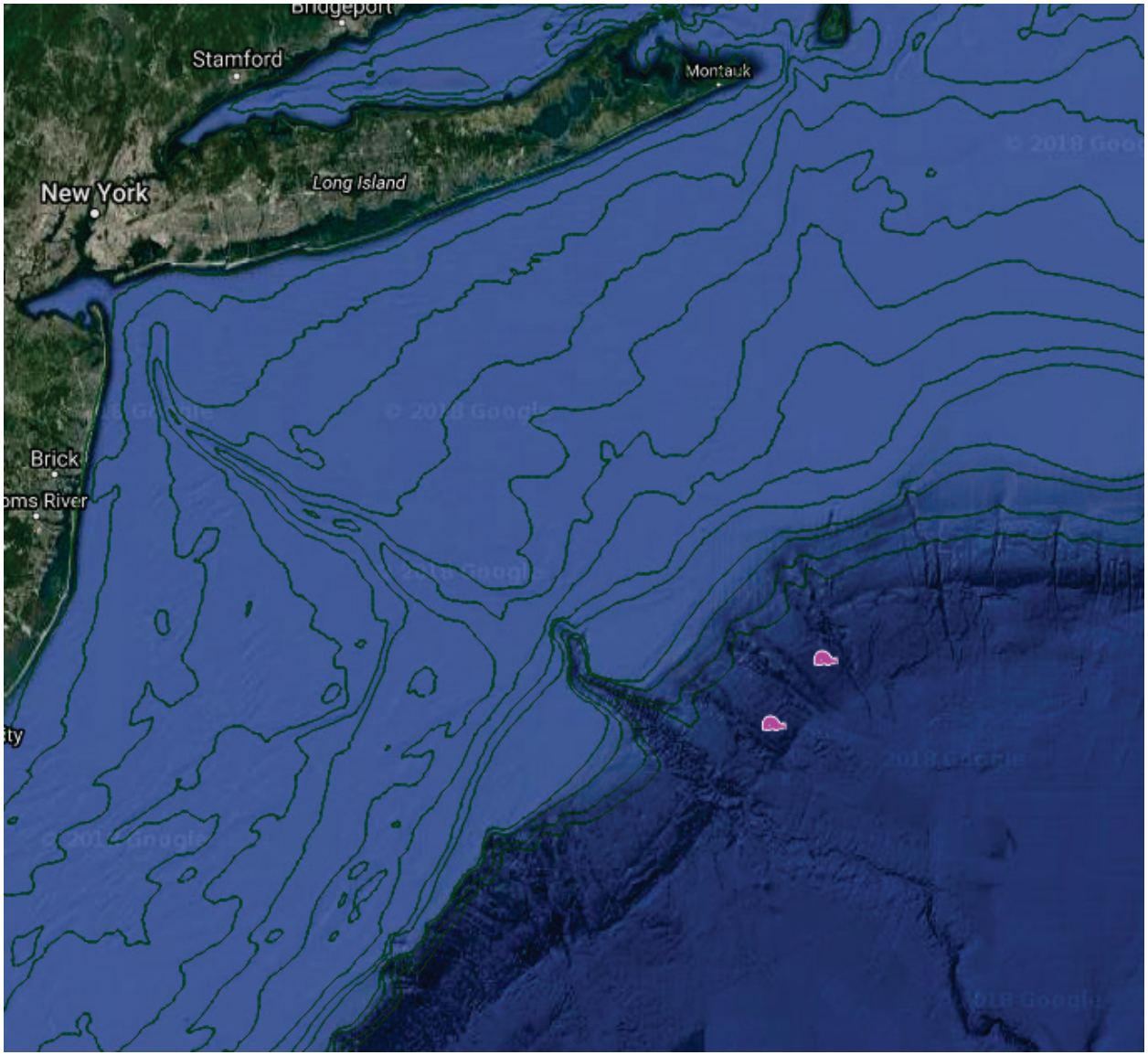
Dwarf Sperm Whale Locations



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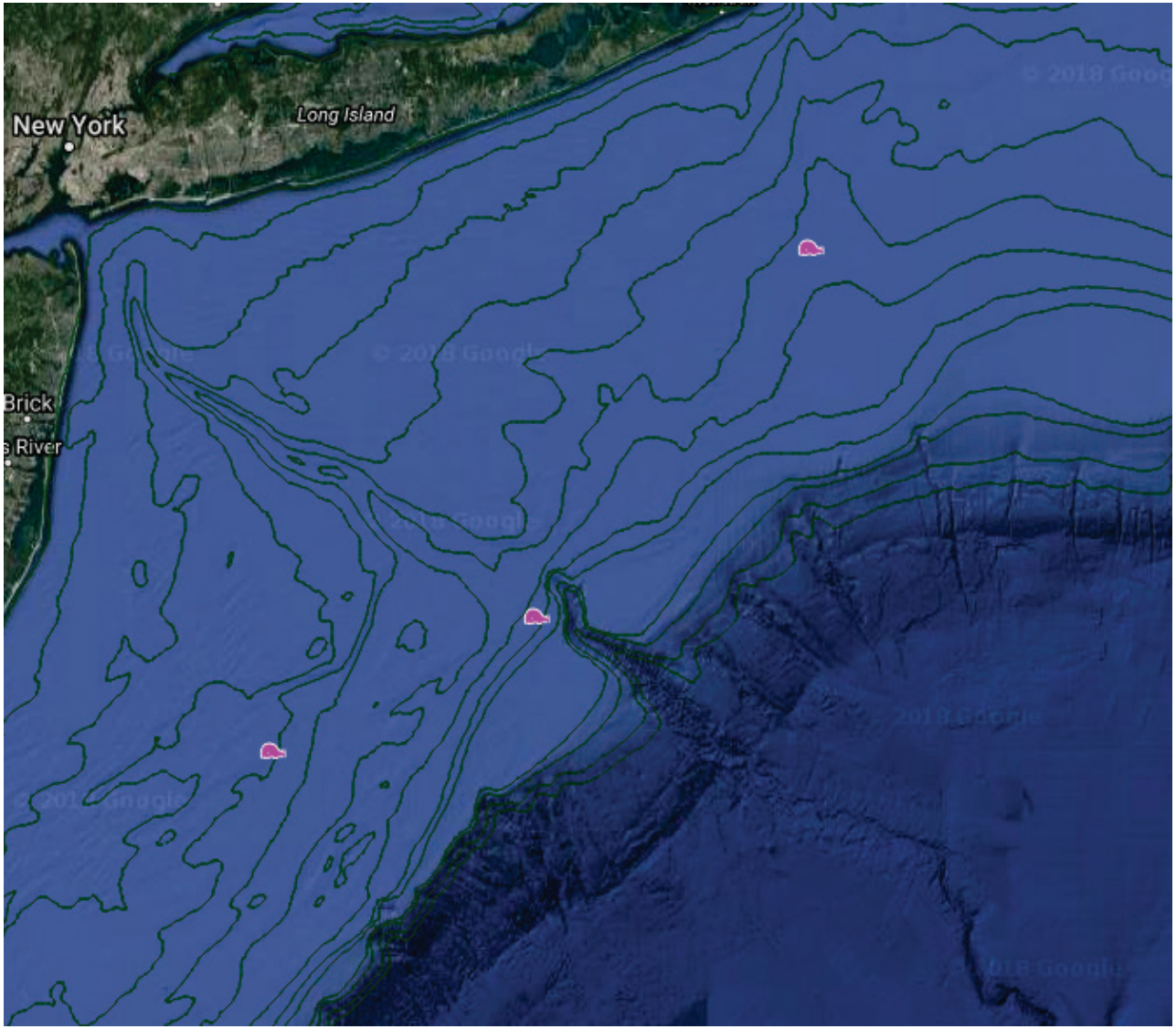
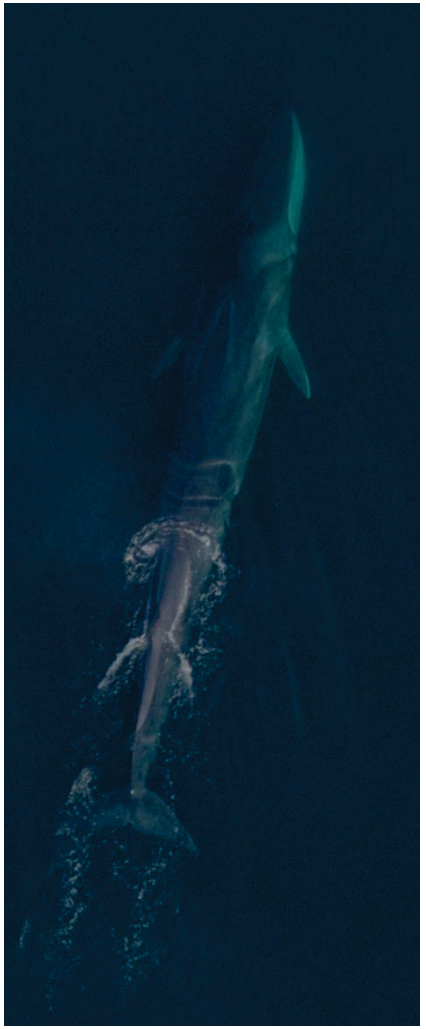
Fin Whale Locations





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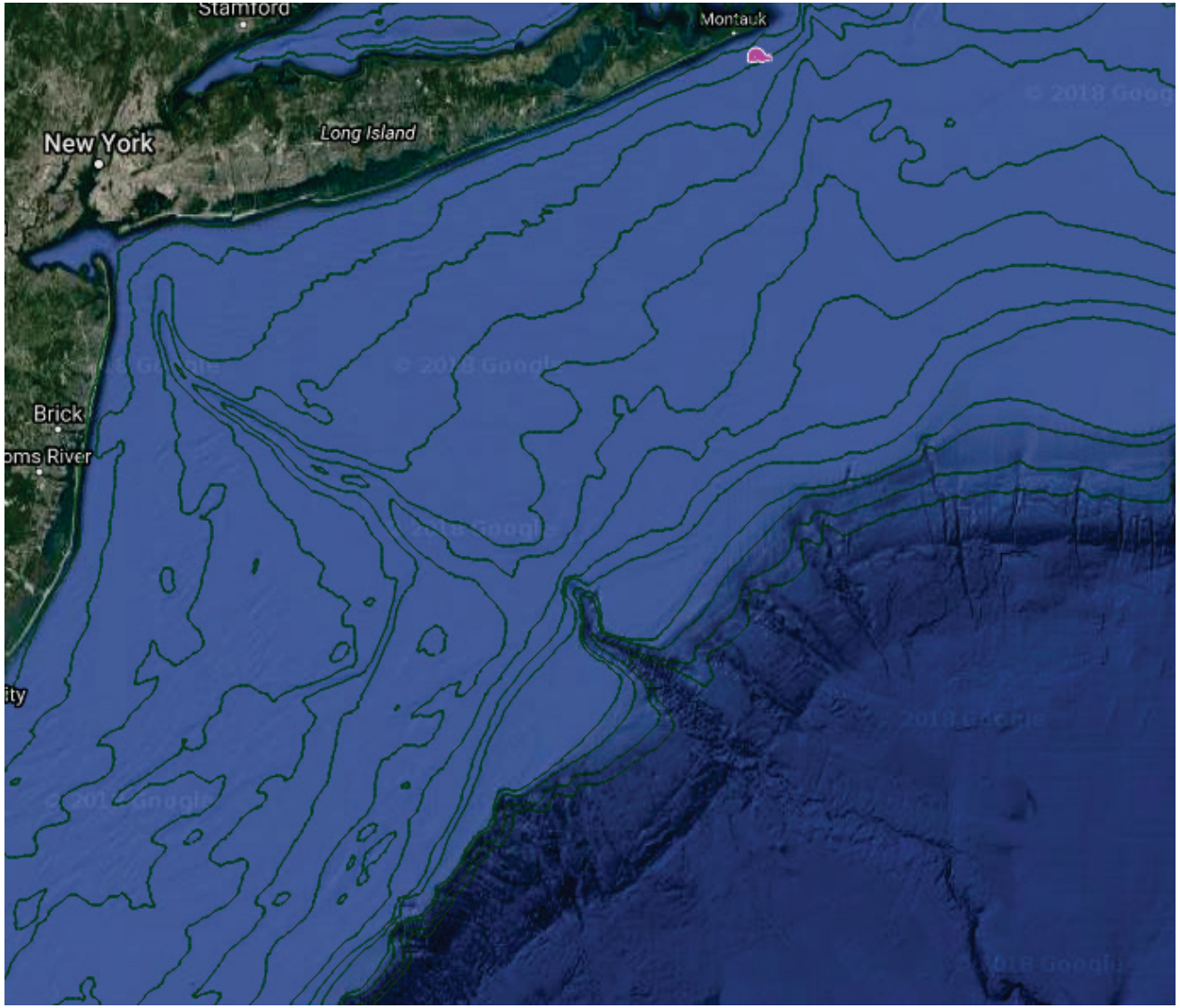
Sei Whale Locations



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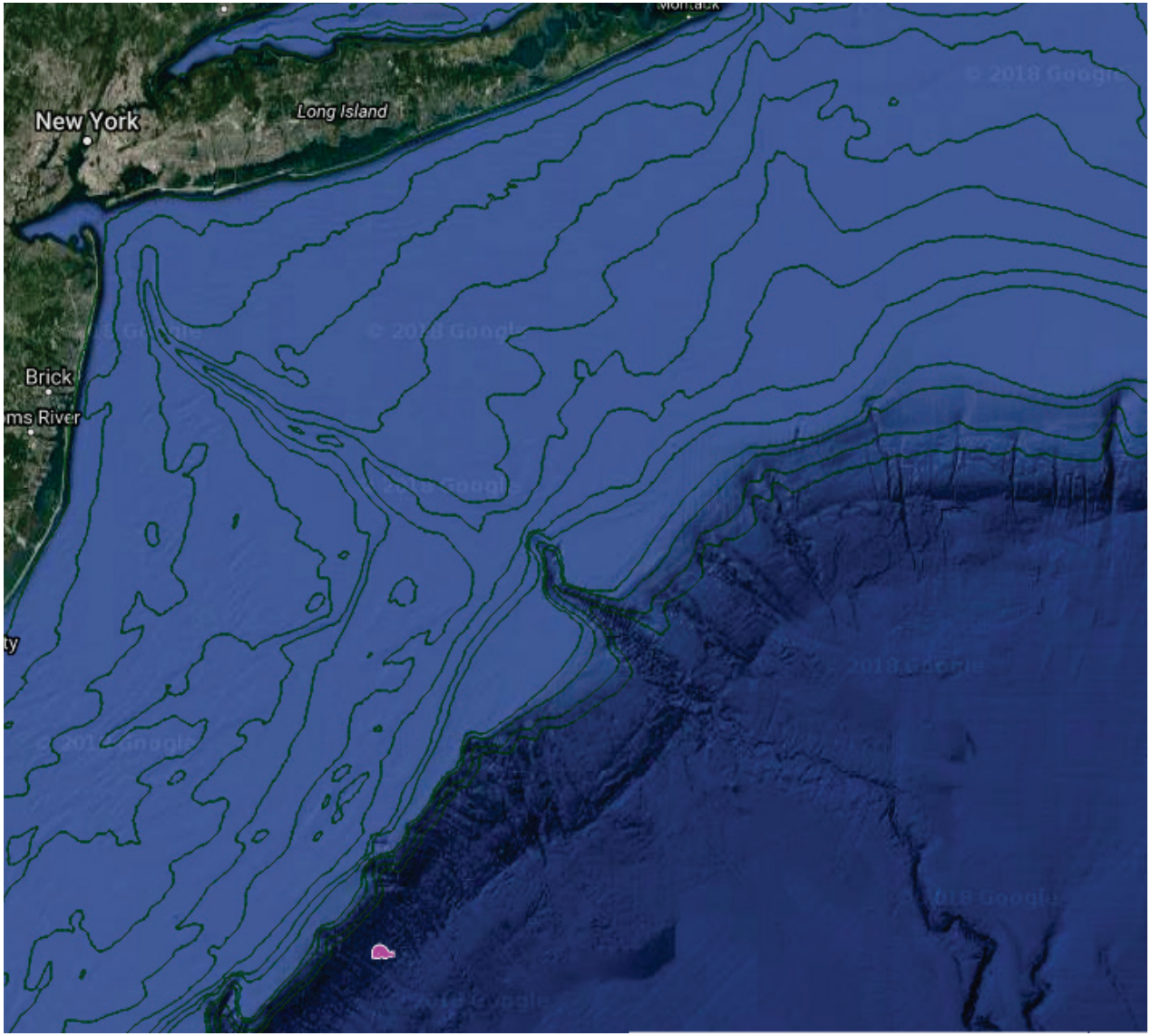
Sperm Whale Locations



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Survey Comparison (OPA)-Mammals
(Summer 2016 and Summer 2017)

Species Group	2016	2017
Dolphin	904	1,392
Unid. Mammal		41
Whale	20	11

Sei Whale

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Survey Comparison (OPA)-Mammals
(Summer 2016 and Summer 2017)

Species	2016	2017
Common Dolphin	56	853
Pilot Whale (unid.)	102	52
Short-finned Pilot Whale		24
Risso's Dolphin	166	140
Rough-toothed dolphin		15
Striped Dolphin		6
Common Bottlenose Dolphin	96	175
Common Minke Whale	1	
Fin Whale	10	4
Sei Whale		1
Dwarf Sperm Whale		2
Sperm Whale		3
Beaked Whale (unid.)	8	

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ID Success- Turtles

Species	Number
Kemp's Ridley Turtle	24
Loggerhead Turtle	649
Loggerhead/Kemp's Turtle	20
Turtle species unknown	13
Leatherback Turtle	5
TOTAL	**711**

Loggerhead Turtles

ID Success 95%
70% were significantly submerged

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Survey Comparison (OPA)-Turtles
(Summer 2016 and Summer 2017)

Species	2016	2017
Loggerhead Turtle	388	649
Kemp's Ridley Turtle	15	24
Loggerhead/Kemp's Turtle	10	20
Green Turtle	1	0
Leatherback Turtle	9	5

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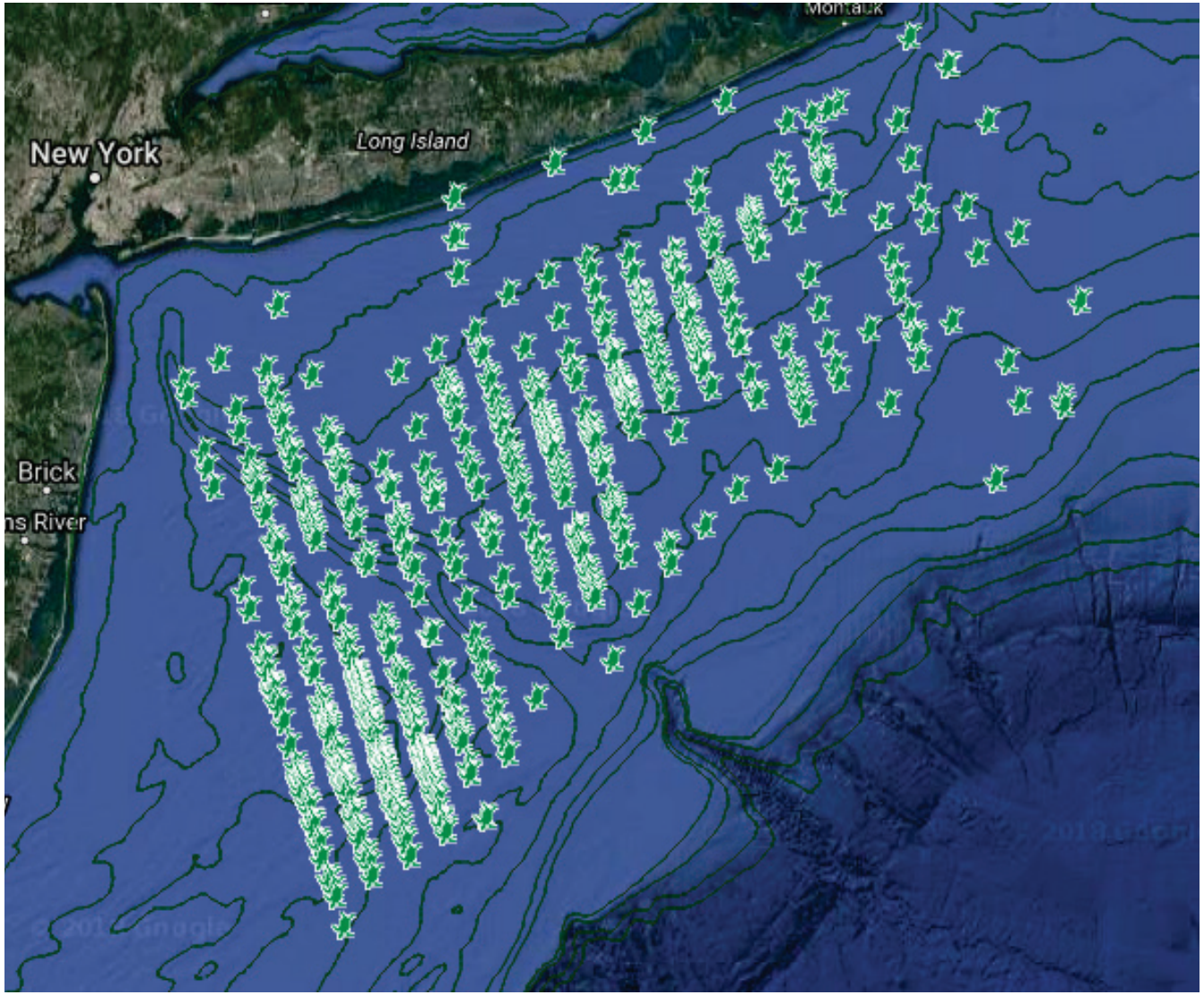
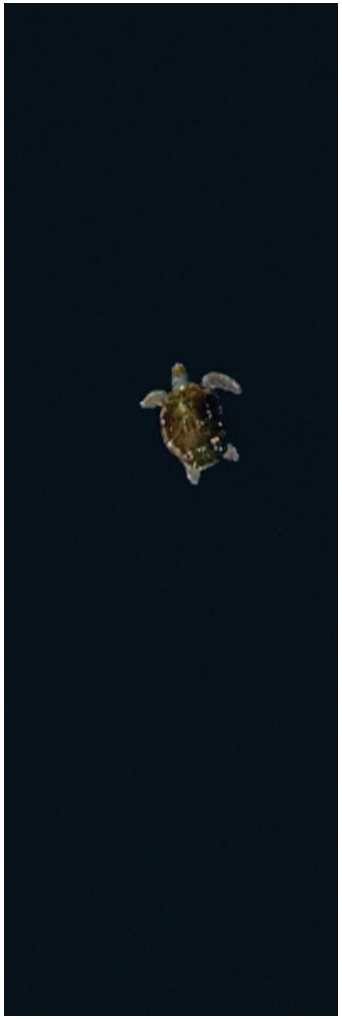
Hardshell Turtle Locations





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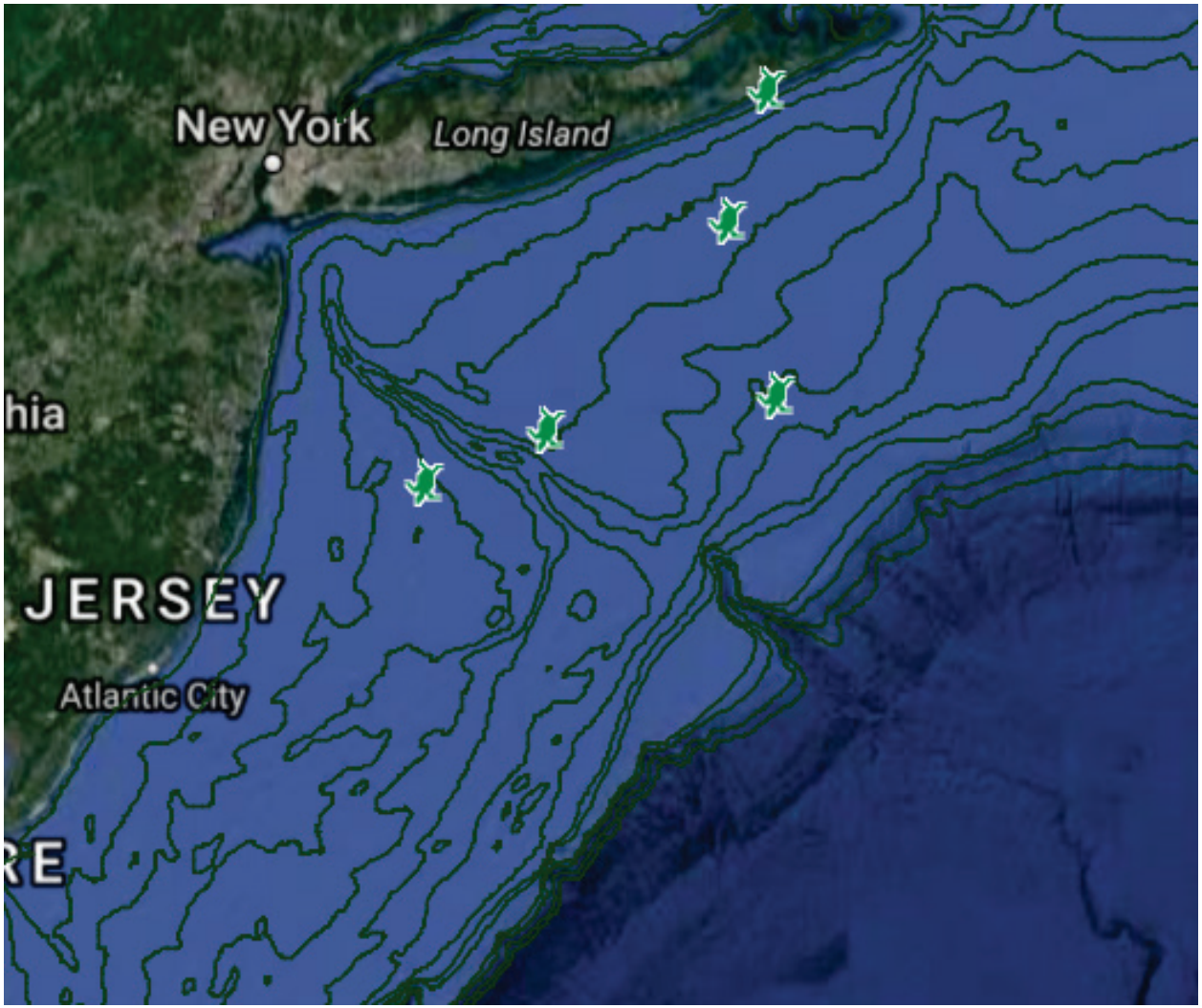
Leatherback Turtle Locations



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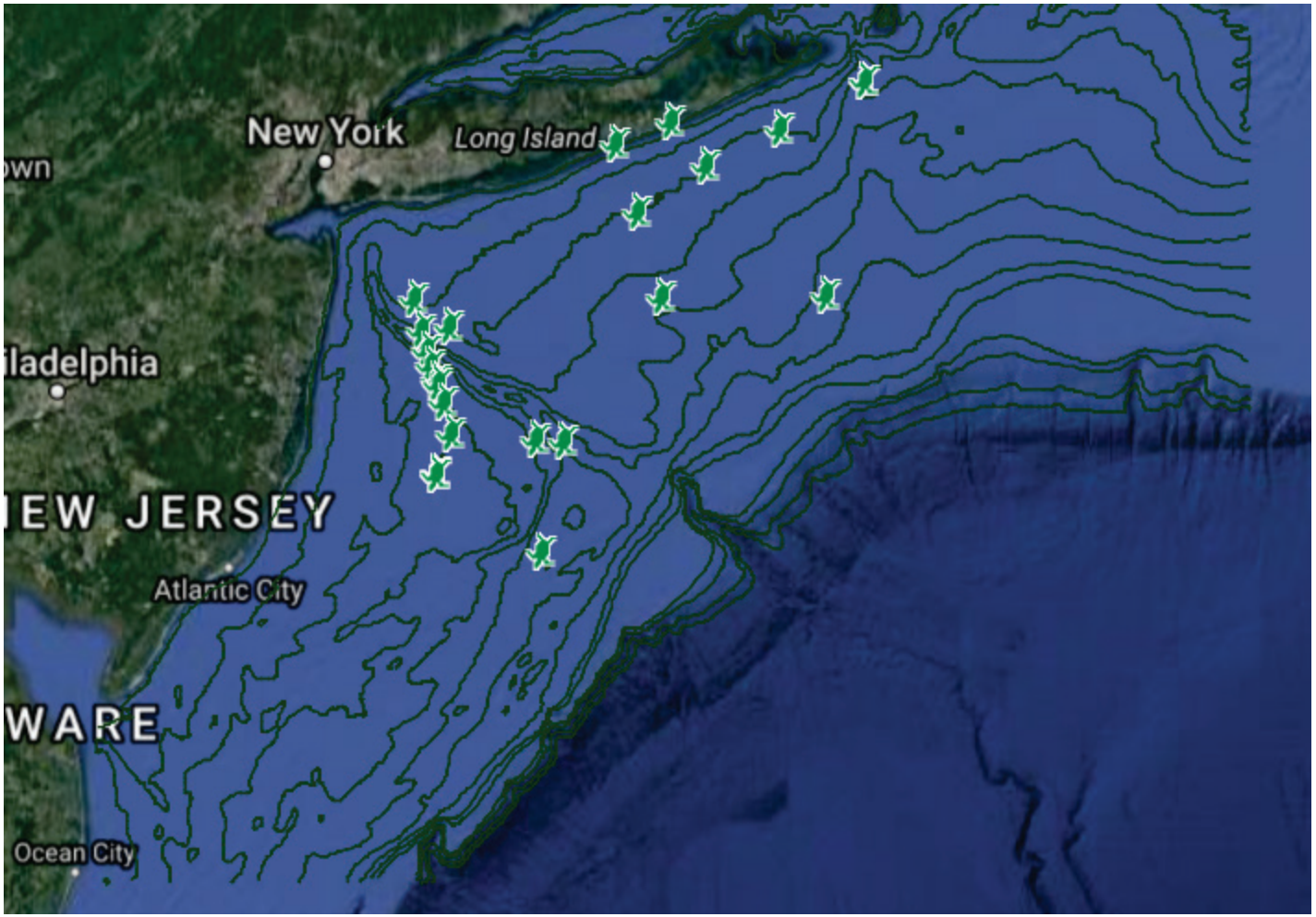
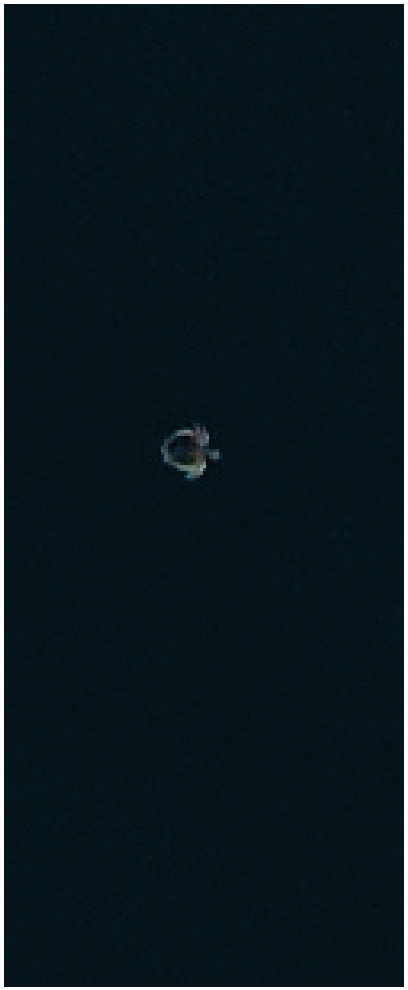
Kemp's Ridley Turtle Locations





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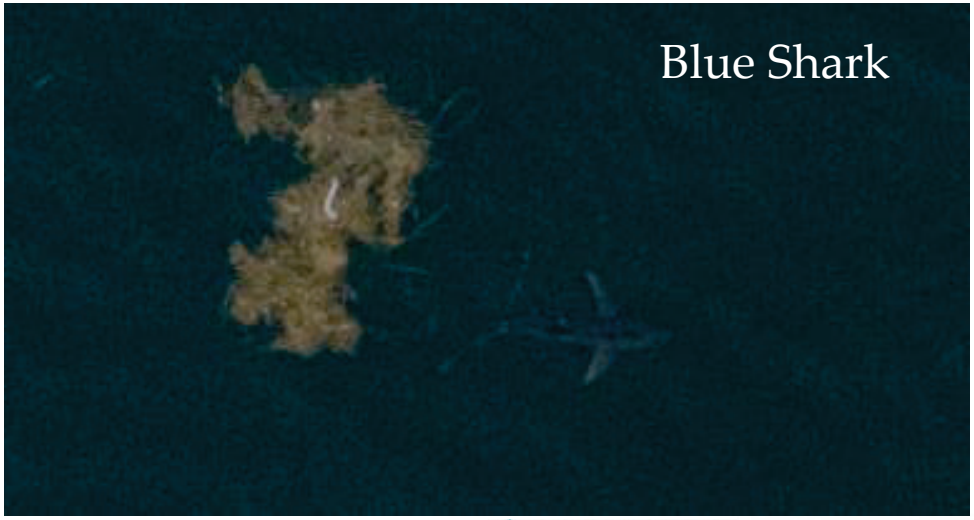
Sargassum



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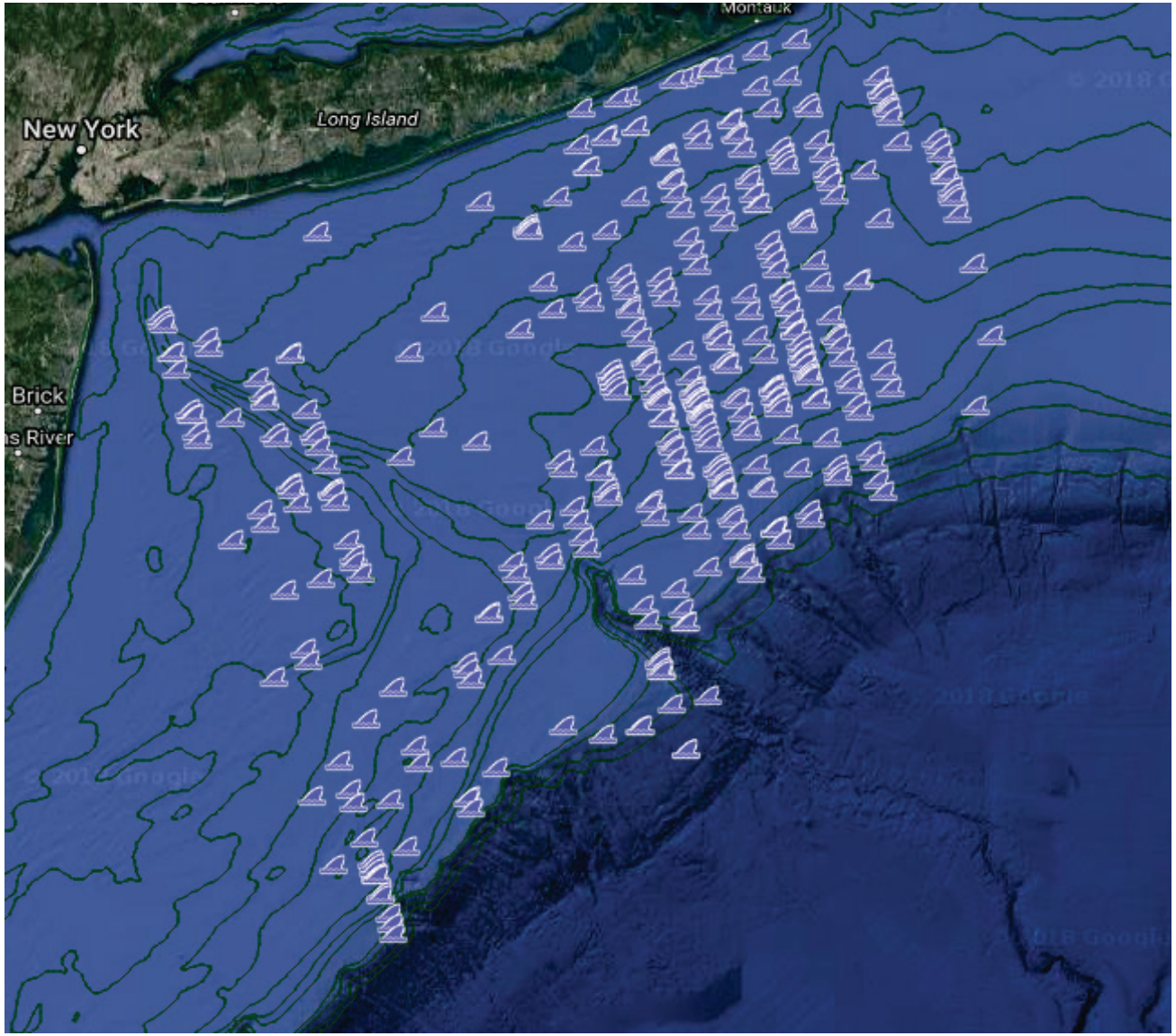
Survey Comparison (OPA)-Sharks
(Summer 2016 and Summer 2017)

Basking Shark

Species	2016	2017
Whale Shark	1	11
Sand Tiger Shark		1
Common Thresher Shark		2
Thresher Shark	2	3
Basking Shark	1	133
Great White Shark	1	13
Shortfin Mako	1	4
Blue Shark	5	21
Carcharhinidae (unid.)	132	319
Dusky Shark	1	2
Oceanic Whitetip Shark	1	
Sandbar Shark		21
Tiger Shark	4	8
Great Hammerhead	8	1
Hammerhead (unid.)	123	232
Scalloped Hammerhead	18	213
Smooth Hammerhead	9	57
TOTALS	**807**	**1382**

Hammerhead Sharks

Locations of Hammerhead Sharks



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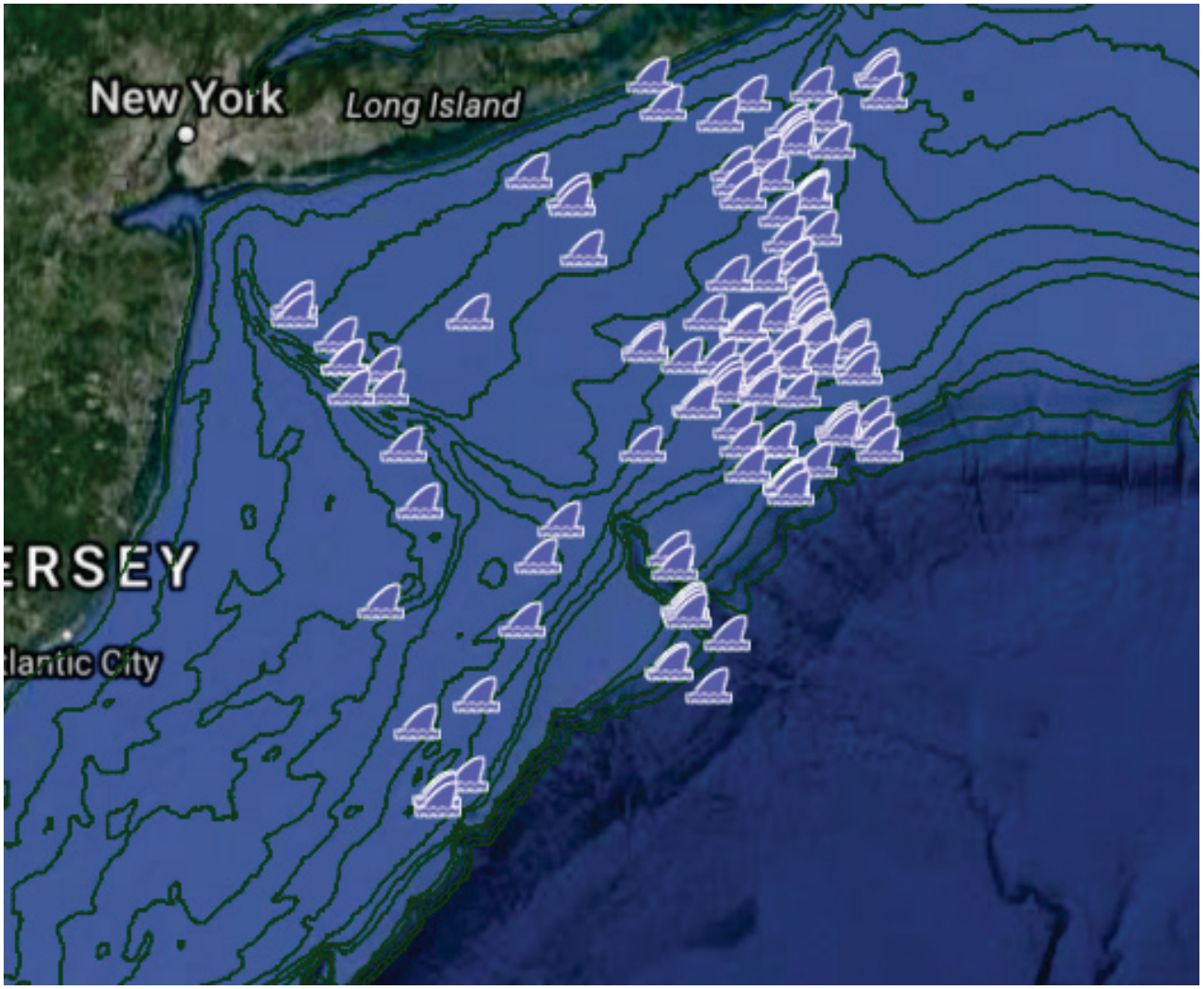
Locations of Scalloped Hammerhead Sharks



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Sharks in Association with Other Species

Sandbar Shark with Rays

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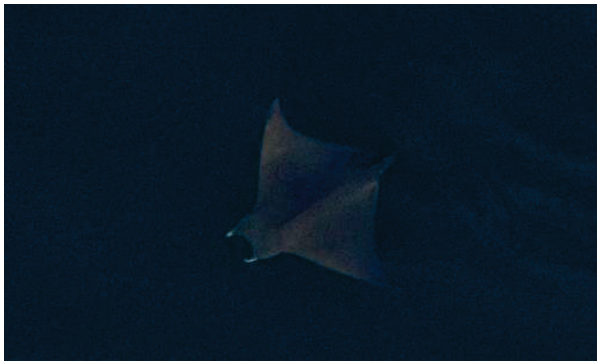
Survey Comparison (OPA)-Rays (Summer 2016 and Summer 2017)

Species	2016	2017
Bluntnose Stingray	1	0
Giant Manta Ray	375	123
Bullnose Ray	0	87
Cownose/Bullnose Ray	3460	1975
Cownose Ray	3275	4229
TOTAL	**8331**	**7623**



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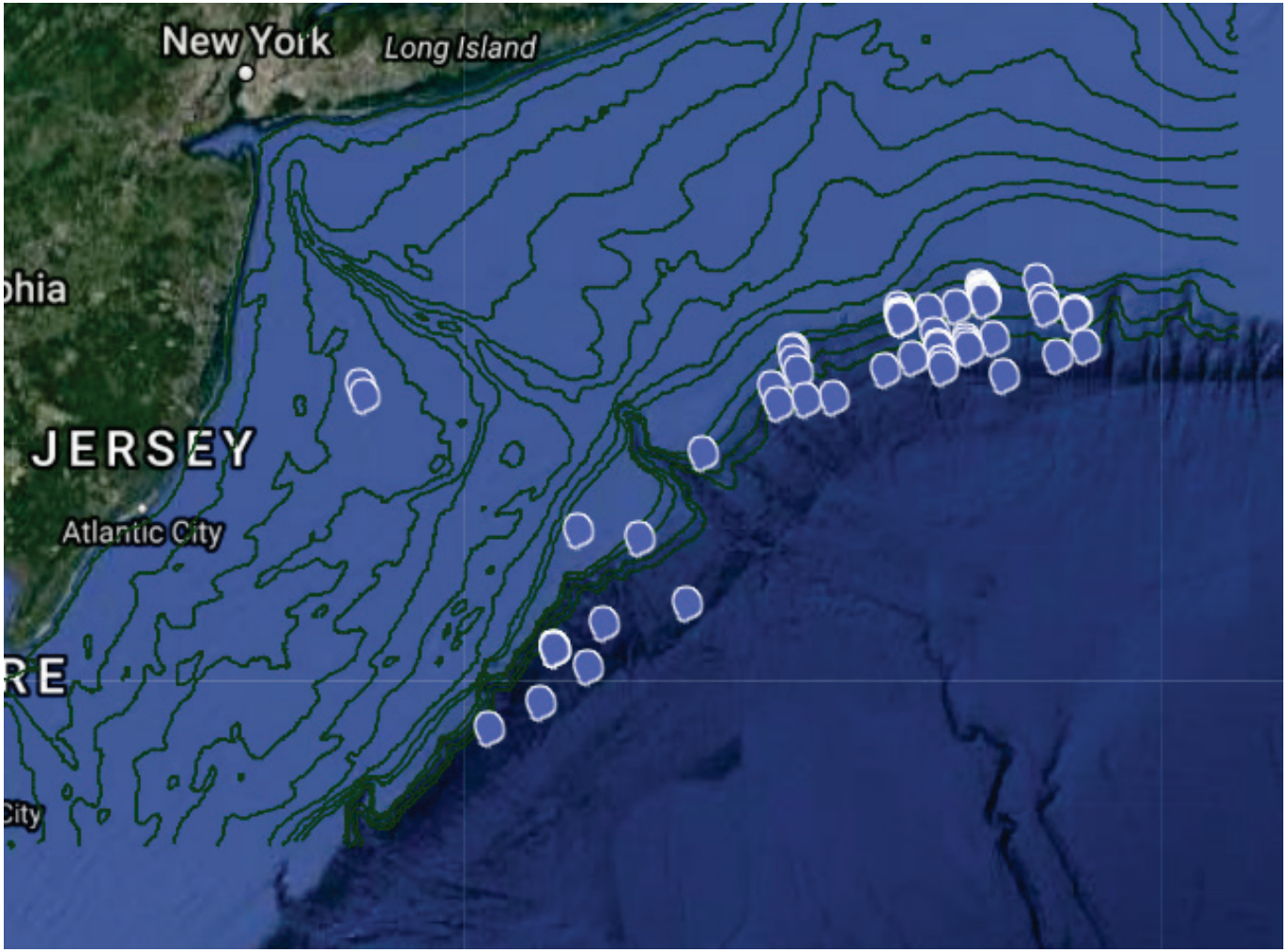
Location of Giant Manta Rays



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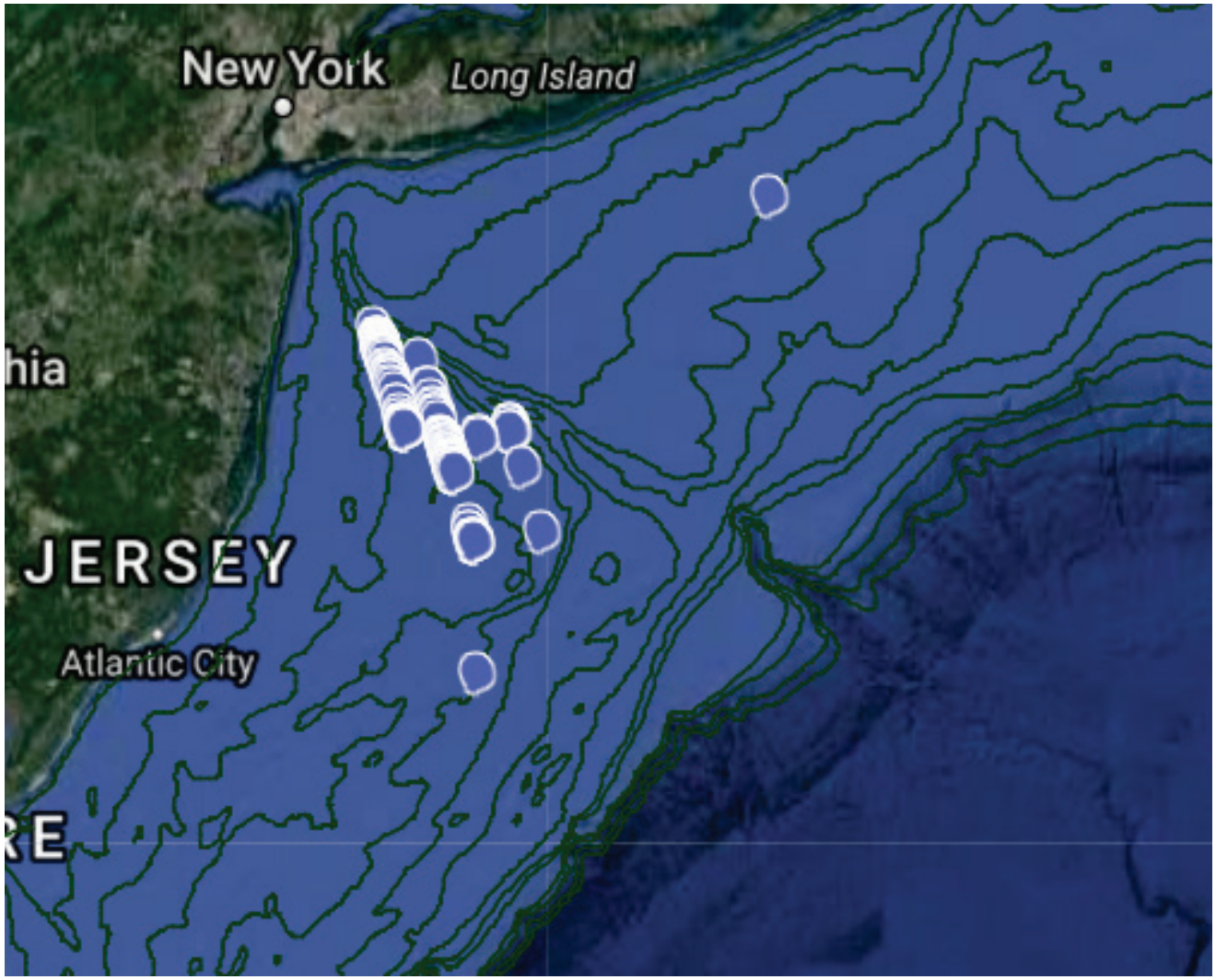
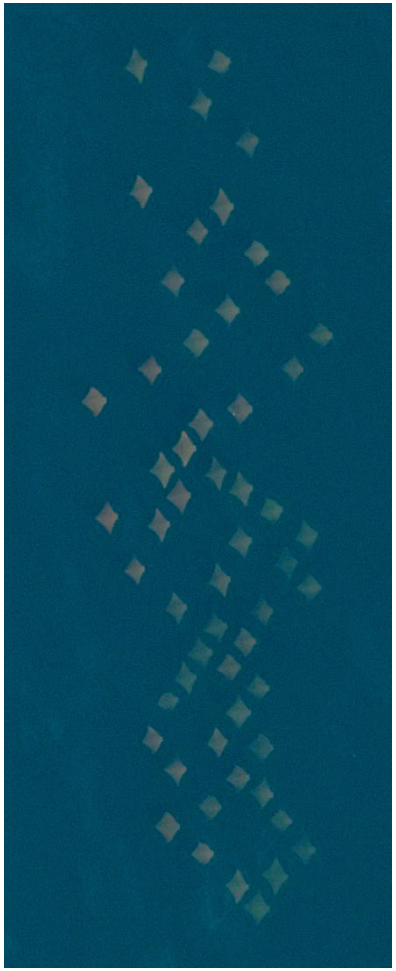
Location of Cownose and Bullnose Rays





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Large Bony Fish Observations

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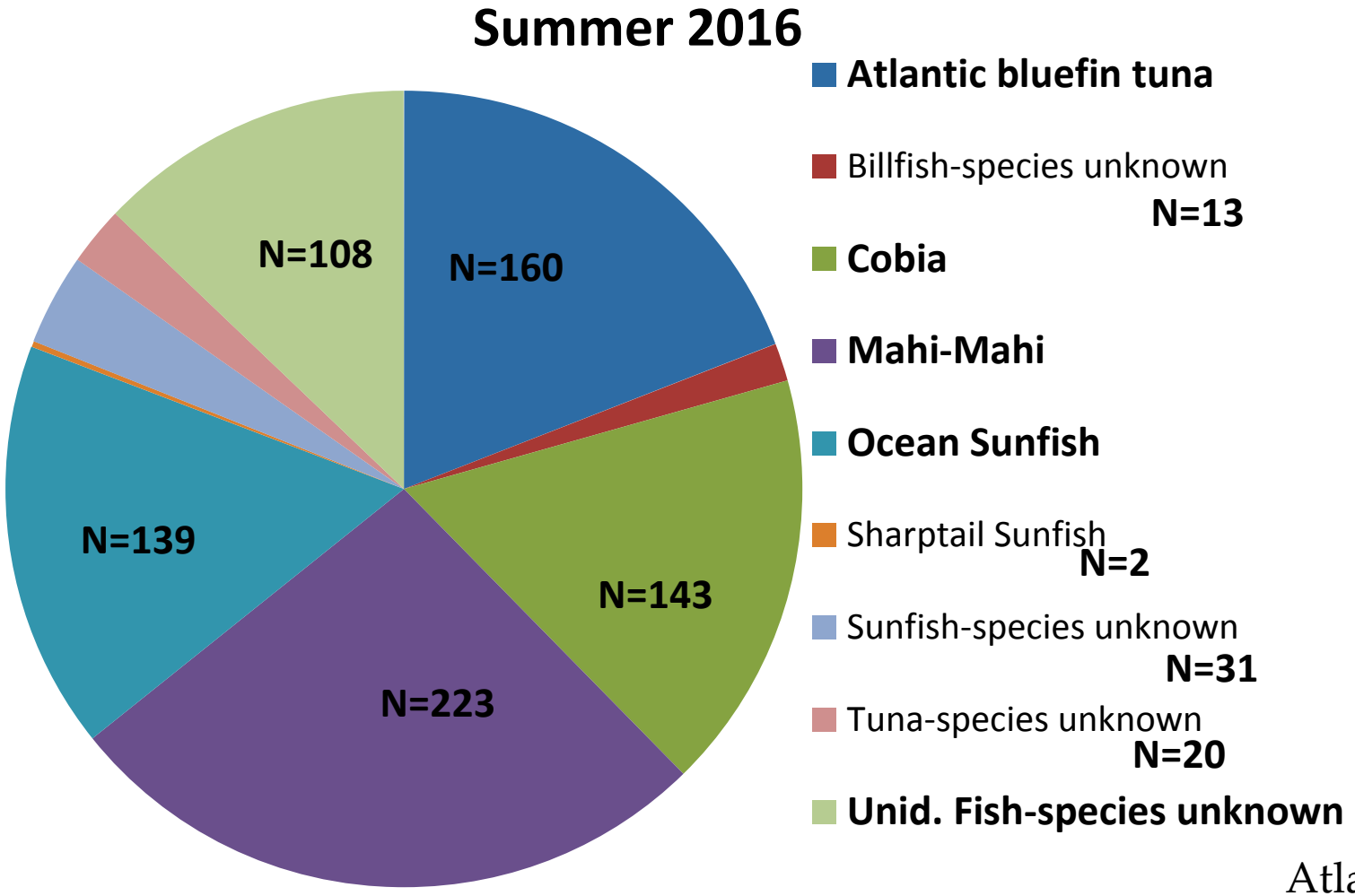
Large Bony Fish



Cobia

Atlantic Bluefin Tuna

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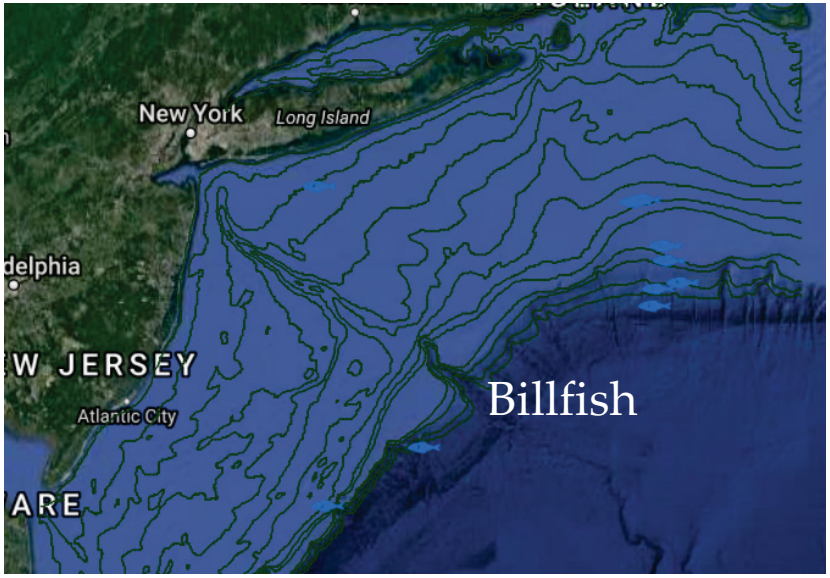
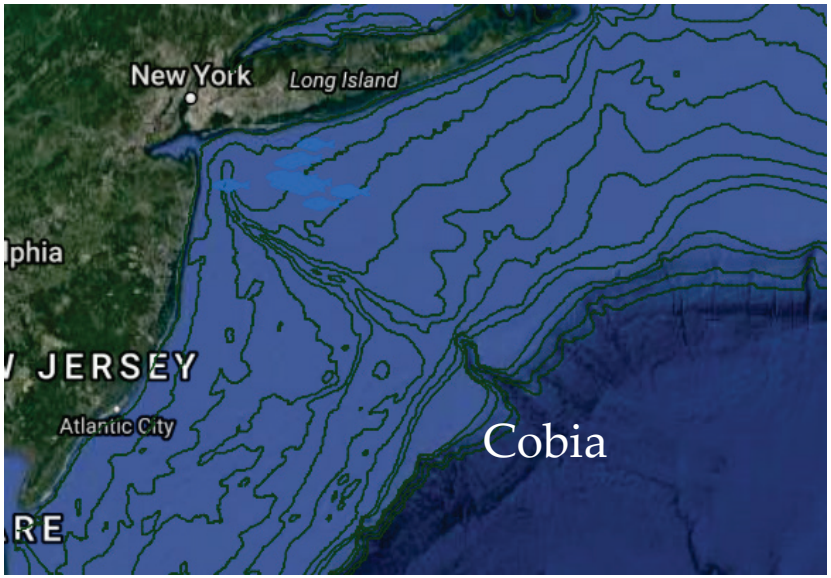
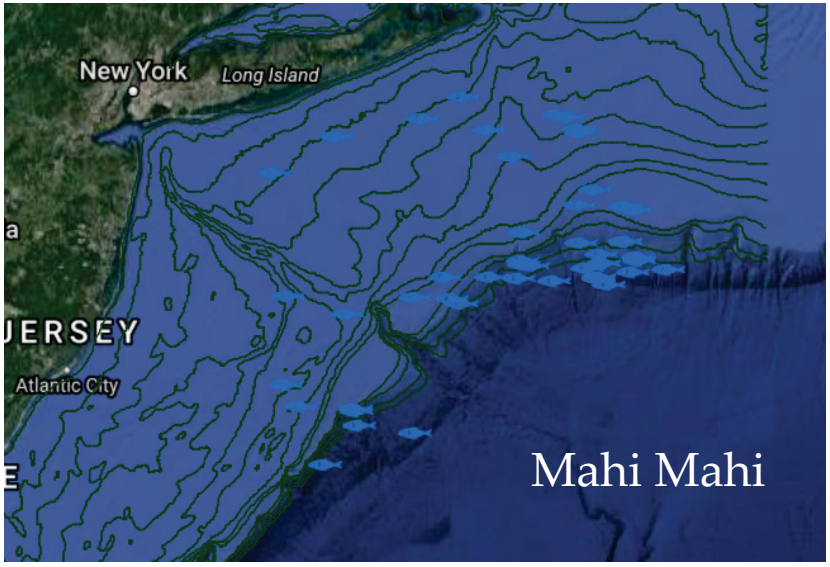
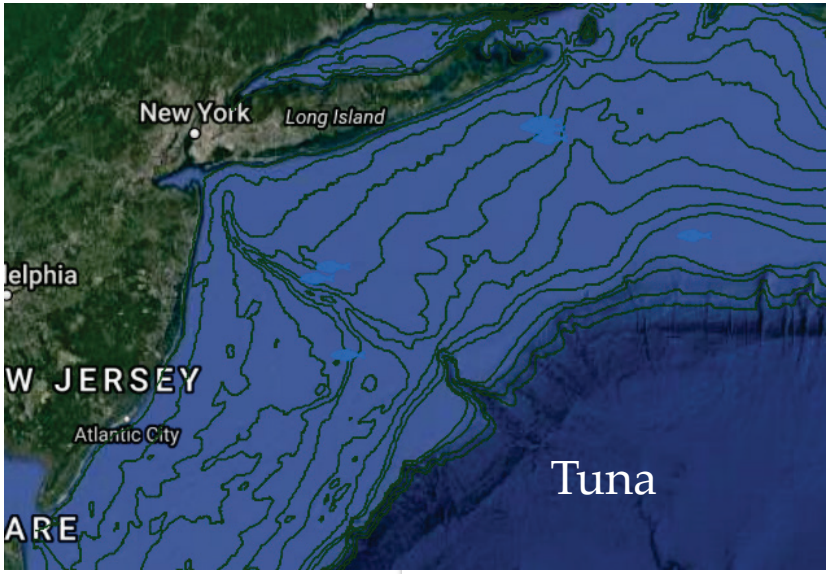
Large Bony Fish

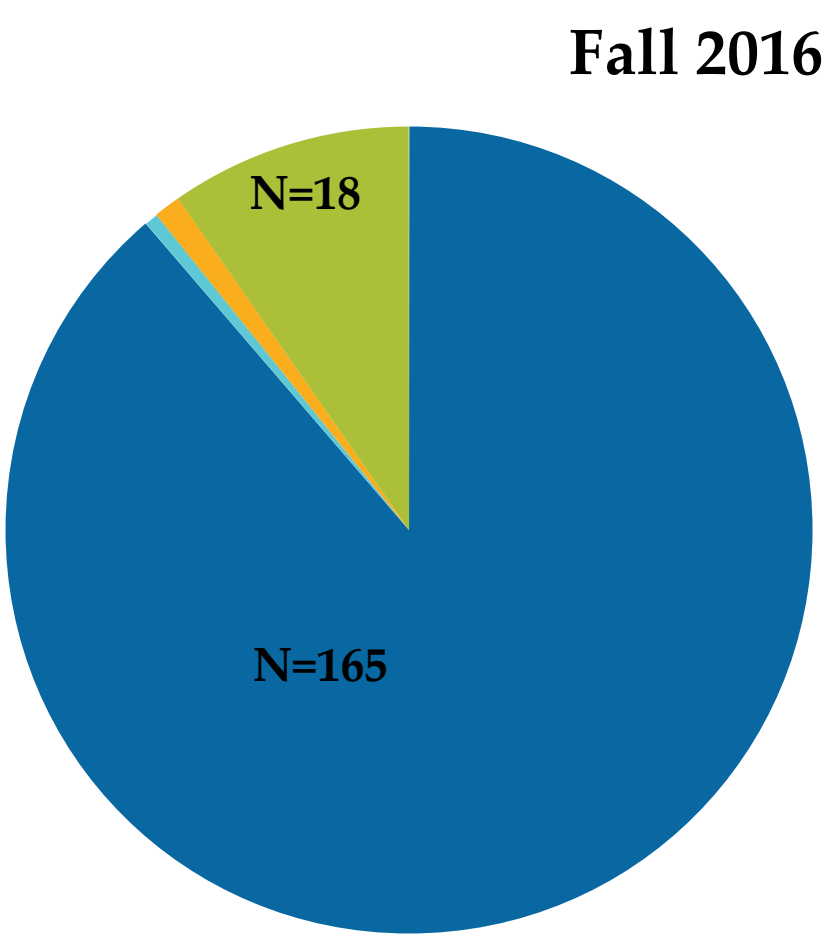








Large Bony Fish



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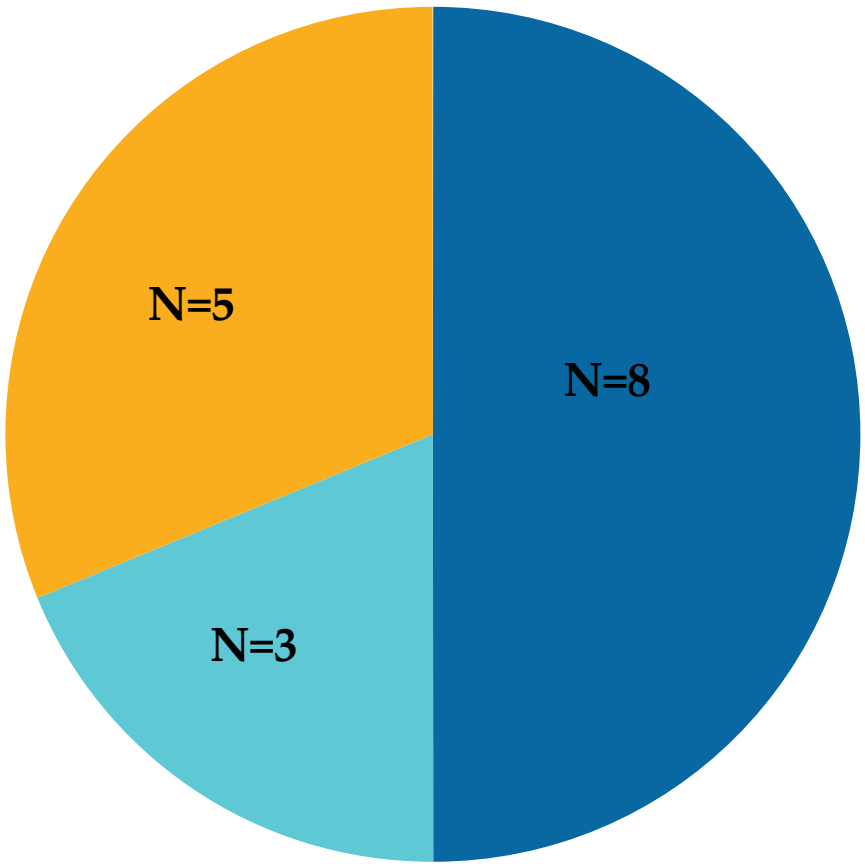
Large Bony Fish



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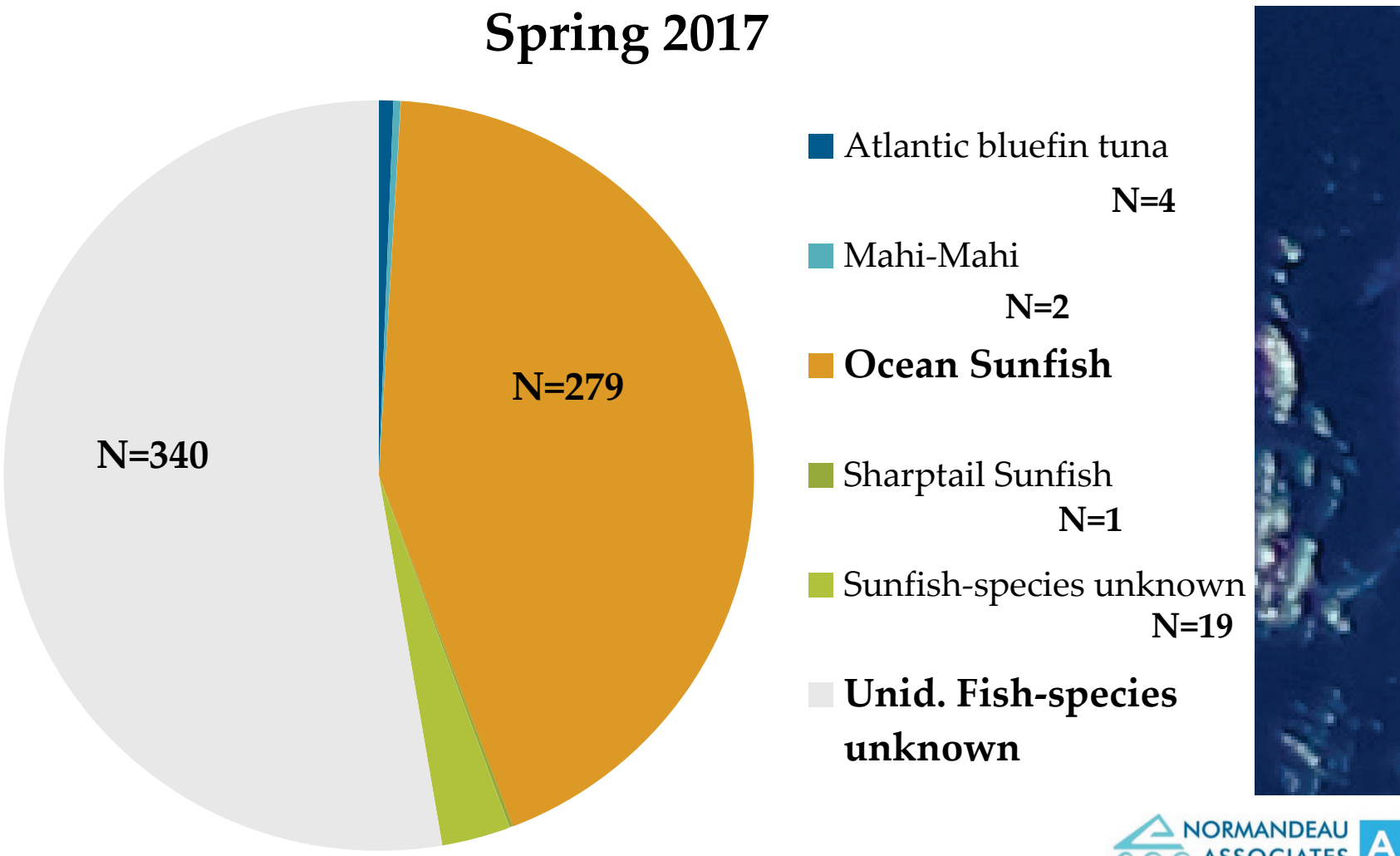
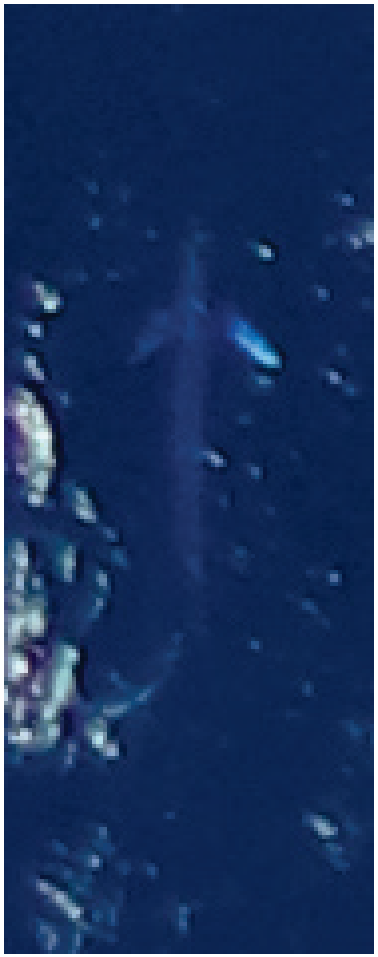
Large Bony Fish





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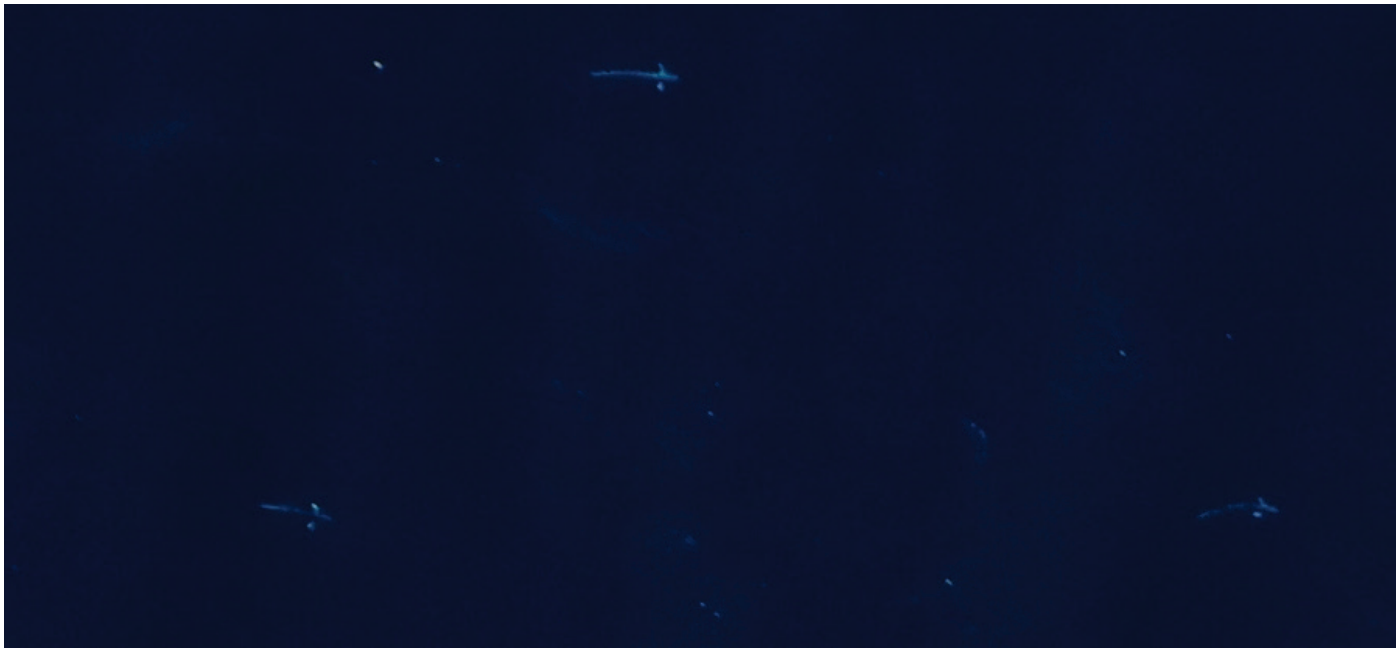
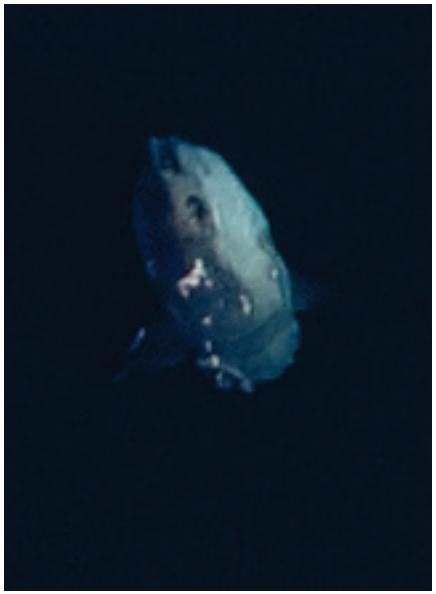
Large Bony Fish

Species	# Summer 2017
Needs id	1398
Sunfish	394





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Large Bony Fish

Species	Total
Atlantic bluefin tuna	164
Billfish-species unknown	13
Cobia	143
Ocean Sunfish	602
Sharptail Sunfish	4
Sunfish-species unknown	438
Tuna-species unknown	20
Mahi-Mahi	225
Unid. Fish-species unknown	471
Needs id	1398
TOTAL	**3478**

Season	Total
Summer 2016	839
Fall 2016	186
Winter 2017	16
Spring 2017	645
Summer 2017	1792

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Fish-Shoal Observations

Fish shoals for first year of survey are being analyzed

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Fish-Shoal Observations

Associated predators include sharks and large bony fish, and appear to drive some shoal formations

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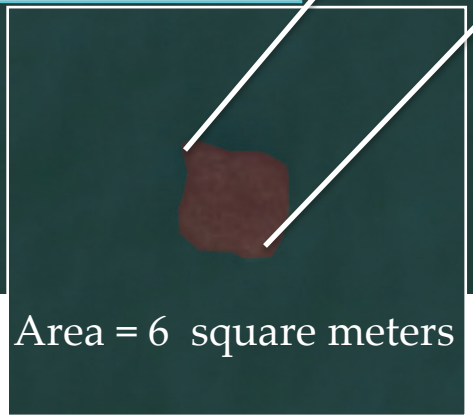
Fish-Shoal Observations

Fish shoals are identified, measured for areal extent, and mapped. Seasonal differences and spatial patterns are emerging.

Survey	# Shoals
Summer 2016	3684
Fall 2016	83
Winter 2016/2017	1
Spring	42
Summer 2017	740



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Thank You

- Discussion?

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