Sharks & the Biscayne Bay HFA: Recent Updates & Future Plans

UNIVERSITY OF MIAMI
ROSENSTIEL SCHOOL of MARINE & ATMOSPHERIC SCIENCE

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SHARK RESEARCH & CONSERVATION

About Me

SOUTH AFRICA
POLOKWANE
RUSTENBURG
PRETORIA
NELSPRUIT
JOHANNESBURG
BLOEMFONTEIN
DURBAN
CAPETOWN
PORT ELIZABETH

CANADA

Florida

NOAA HABITAT BLUEPRINT
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

- **Program established in 2014**
- **Protect & restore critical habitats**
- **Recover threatened & endangered species**
- **Increase coastal resilience**
- **Increase tourism, access & recreation**
- **10 locations identified, including Biscayne Bay**

Sergy Mehterian 2017

Sharks & Biscayne Bay HFA

- **Long-lived, low-fecundity**
- **Ecologically important**
- **Threatened**
- **State & Federal protection**
- **Target of recreational & commercial fisheries**
- **Safety risk to tourism & recreational users**
- **Habitat use of Biscayne Bay HFA unknown**
- **Effects of urbanization unknown**

GRINDTV | in association with YAHOO! SPORTS | SURF | WELLNESS | SKIING | MORE

Tiger shark swims dangerously close to clueless swimmers; video

November 27, 2017 By David Strege

Professional photographer Kenny Melendez was filming on Miami Beach on Friday morning when he unexpectedly captured a tiger shark cruising among swimmers close to the shoreline. The swimmers were oblivious to its presence.

Melendez was showing two clients the workings of a camera drone. He zeroed in on a

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MIAMI BEACH

Watch drone footage of large shark swimming dangerously close to swimmers

BY CARLI TEPROFF
cteproff@miamiherald.com
NOVEMBER 28, 2017 08:21 PM
UPDATED NOVEMBER 29, 2017 05:50 AM

Kenny Melendez was out flying his drone over the weekend in South Beach when he saw a shadow next to a swimmer.

He panned in and saw a large shark — which he believed was a tiger shark — not far from shore.

CBS NEWS | NEWS | SHOWS | VIDEO

CBS NEWS / November 27, 2017, 10:08 AM

Video captures tiger shark swimming near beachgoers in Florida

INTERNATIONAL THE NEWS CN

Home | Latest | National

Thu December 07, 2017

TRENDING: PANAMA LE

Beachgoers have shocking close encounter with tiger shark

Listen

KENNY MELENDEZ
NEW VIDEO
Off Miami Beach
SHARK SPOTTED
CBSMiami.com

Urban Shark Project Objectives

- **Patterns of shark habitat use along an urbanized gradient in Biscayne Bay HFA**

- **Influence of urbanization on shark behavior and health**

Cooperative Biscayne Bay HFA Objectives (RSMAS & NOAA)

- To assist NOAA's HFA goals:
  - Recover threatened & endangered species
  - Increase tourism, access & recreation
- Documenting potential use of Biscayne Bay HFA by threatened & protected taxa (e.g. ESA Smalltooth sawfish, sea turtles) → inform management decisions (e.g. HAPC and/or critical habitat designations)
- Tracking gear deployment/retrieval supported by NOAA/SEFSC
  - Dr. Joan Browder
  - Tom Jackson
  - Derke Snodgrass

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UNIVERSITY
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50
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10
20

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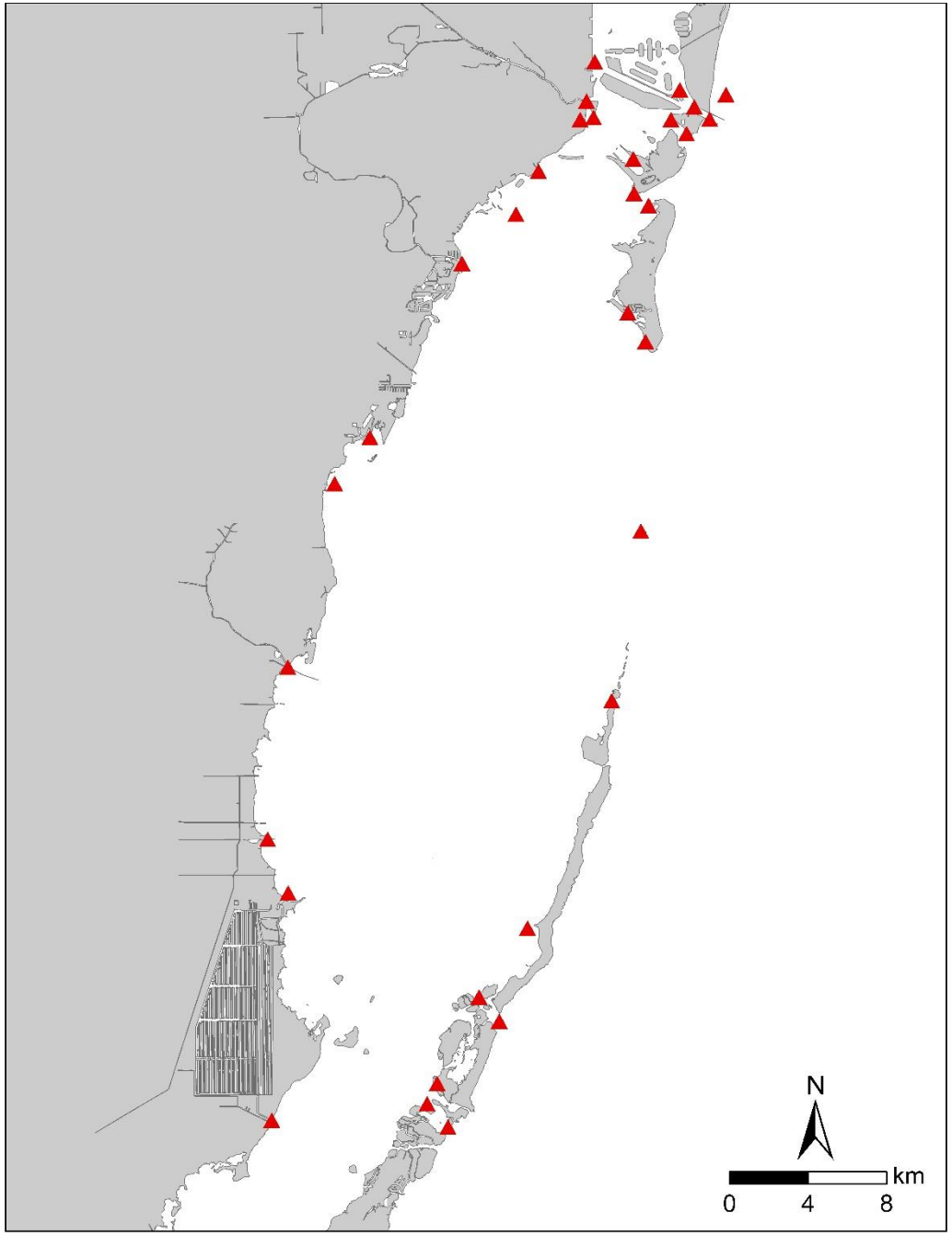
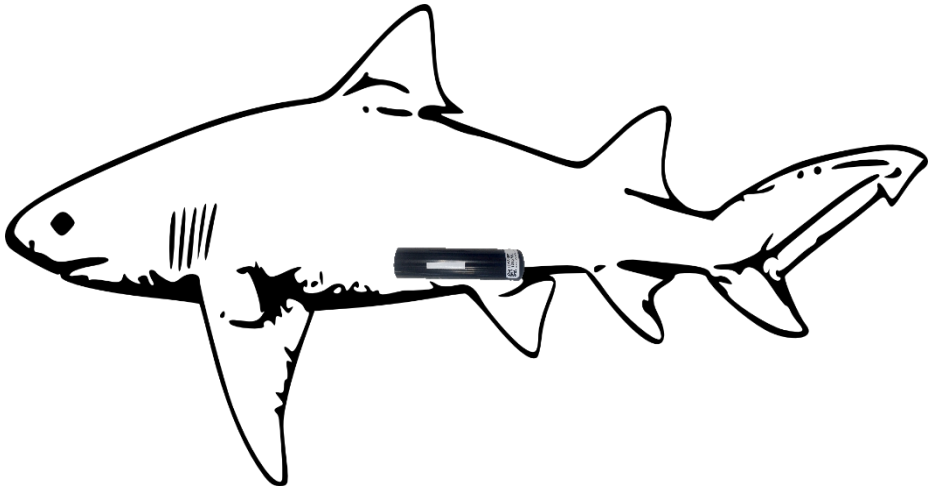
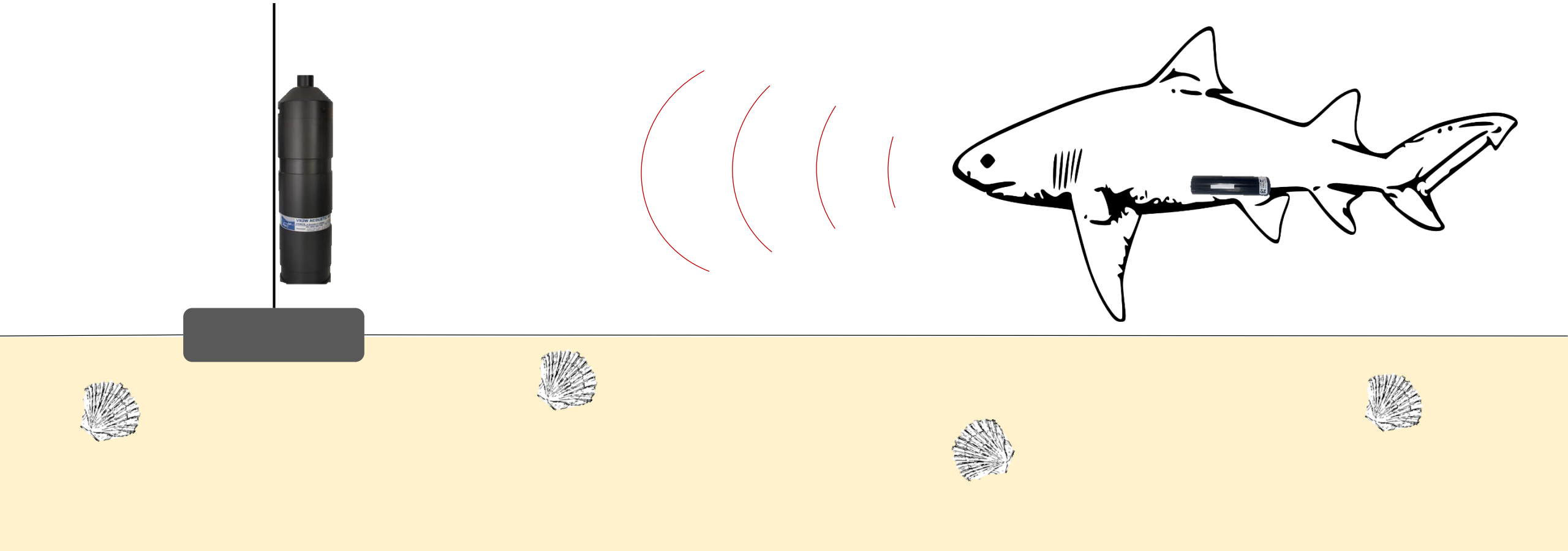
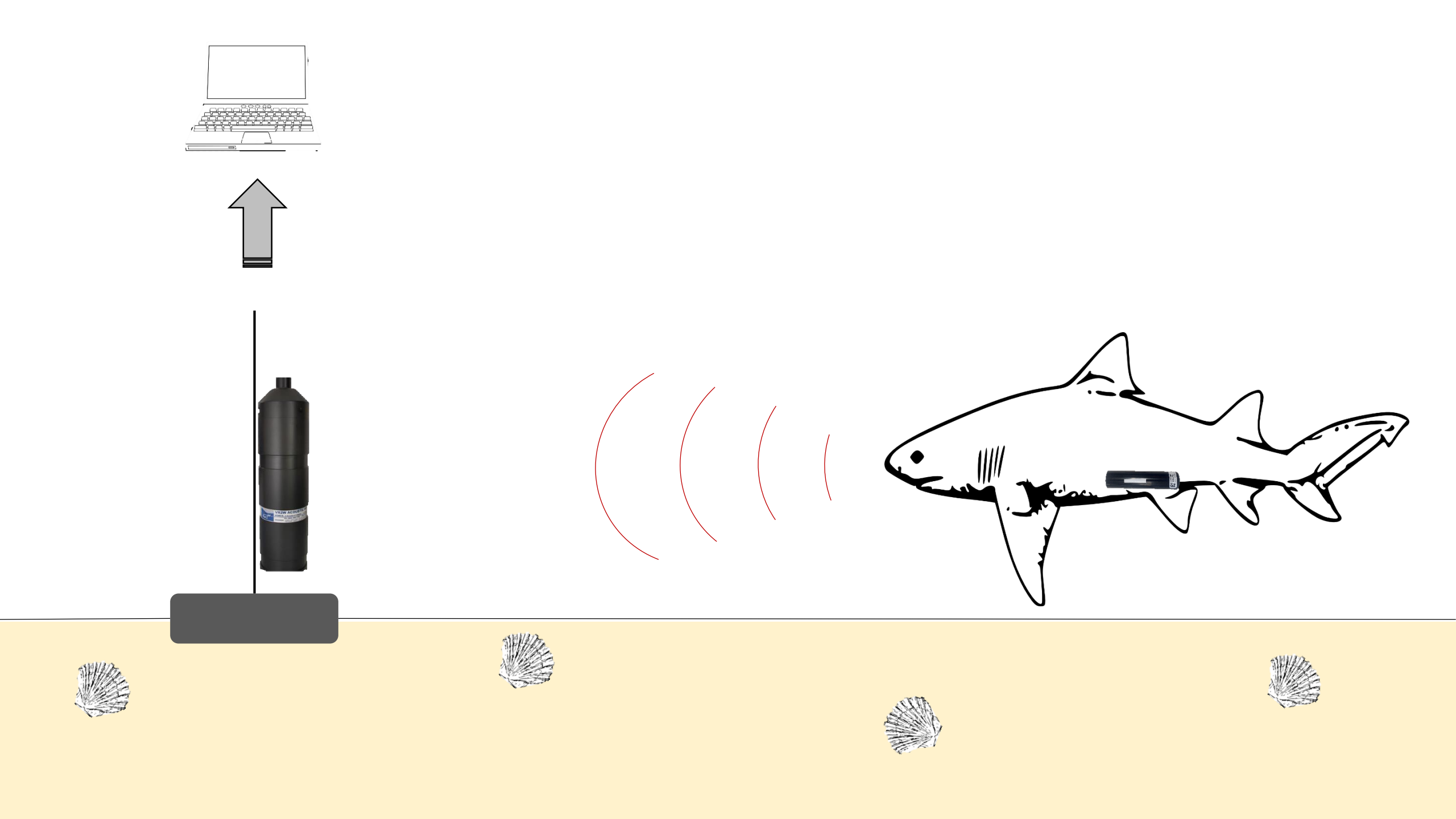
YOUR WATER
© sharktagging.com


N
km
0
4
8

V12W ACOUSTIC

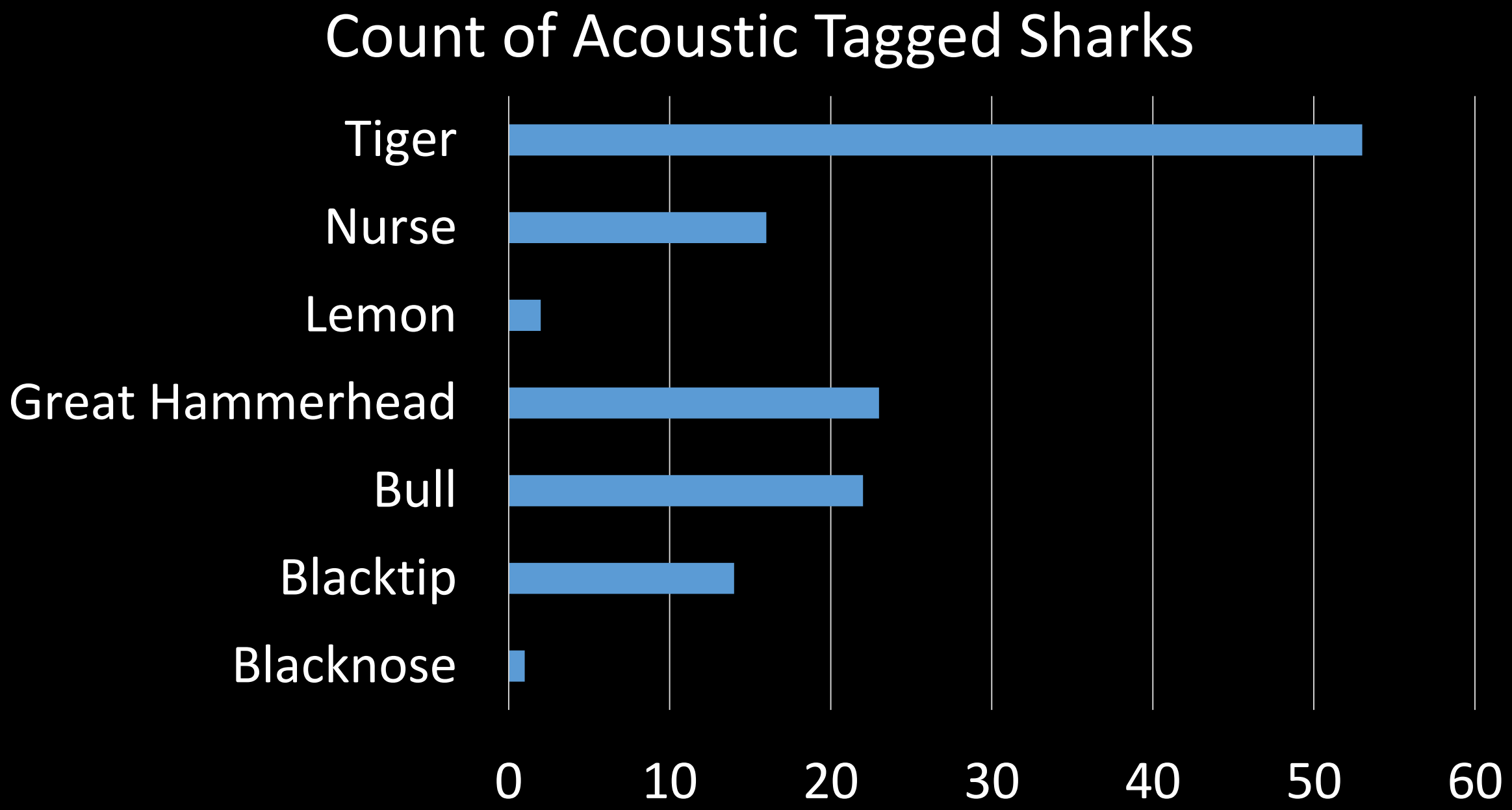





V12W ACOUSTIC

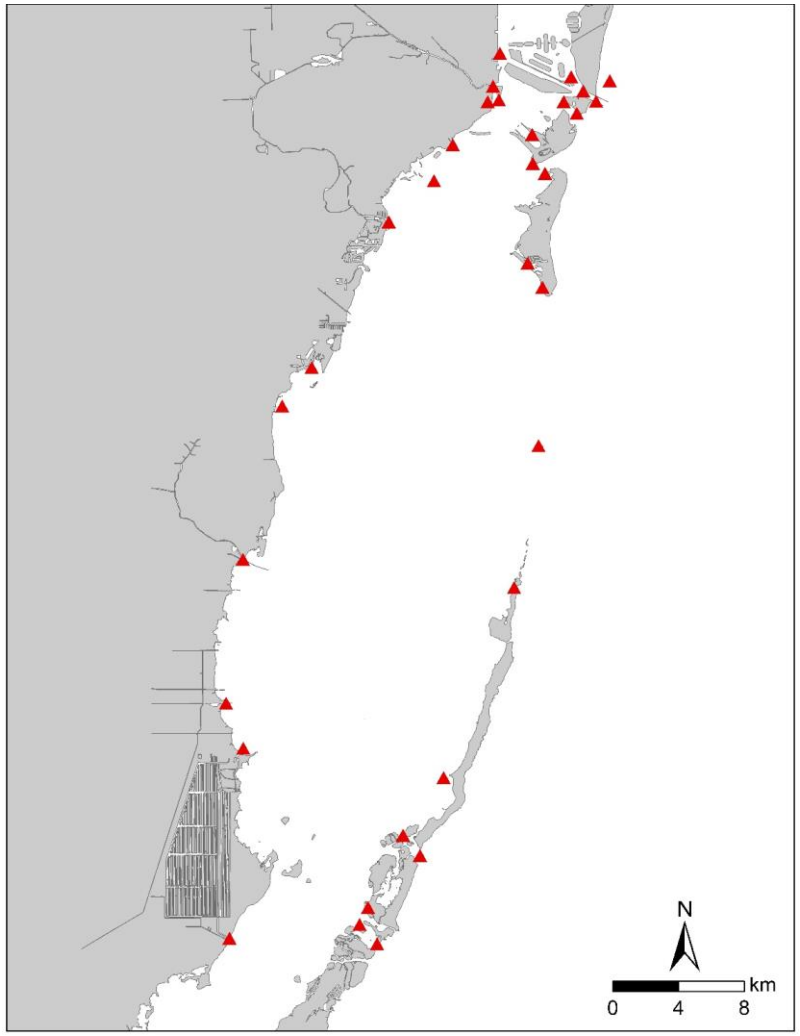
- Nurse*
- Blacktip*
- Bull*
- Great hammerhead*
- Tiger*
- Blacknose
- Atlantic sharpnose
- Lemon
- Bonnethead
- Sandbar

http://www.afridive.com

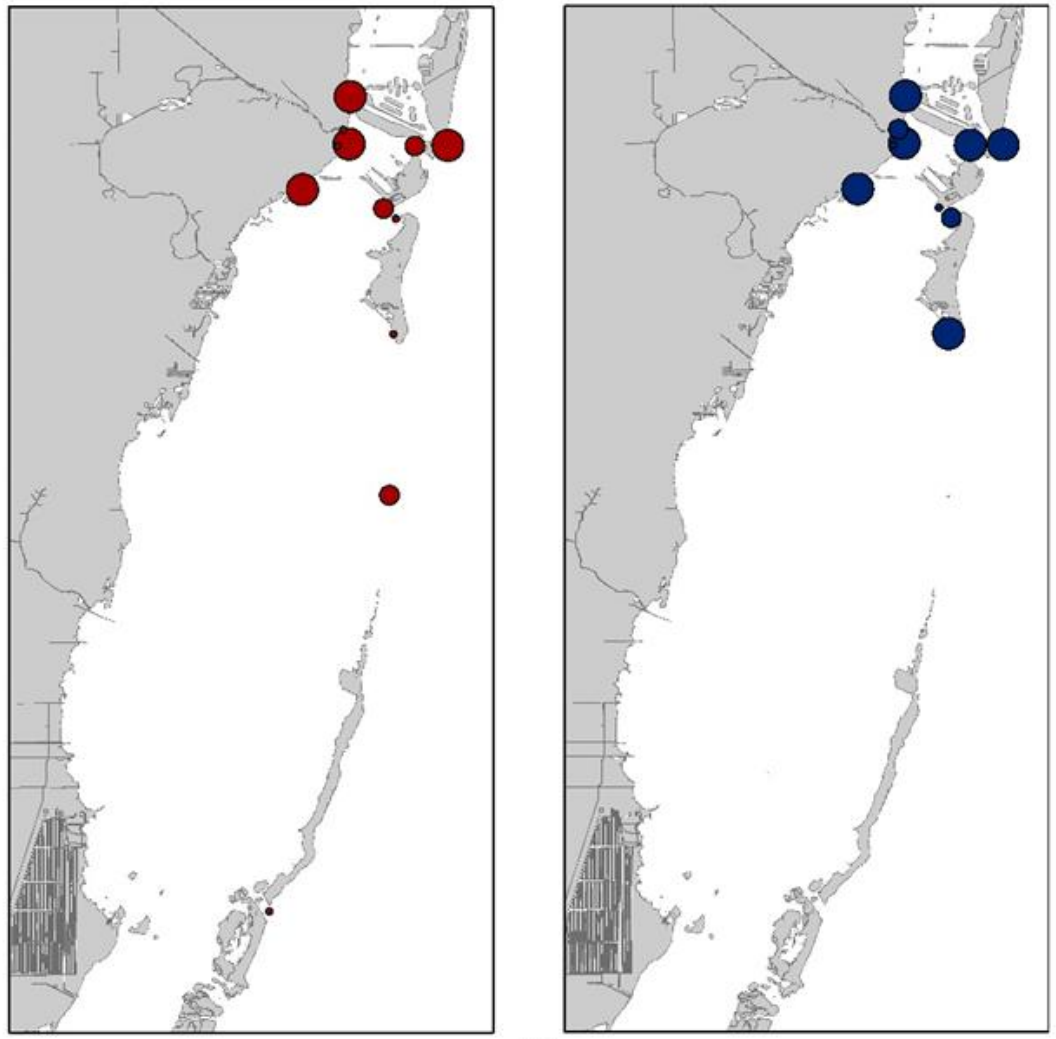

Count of Acoustic Tagged Sharks
Tiger
Nurse
Lemon
Great Hammerhead
Bull
Blacktip
Blacknose
0
10
20
30
40
50
60

So what are we learning…

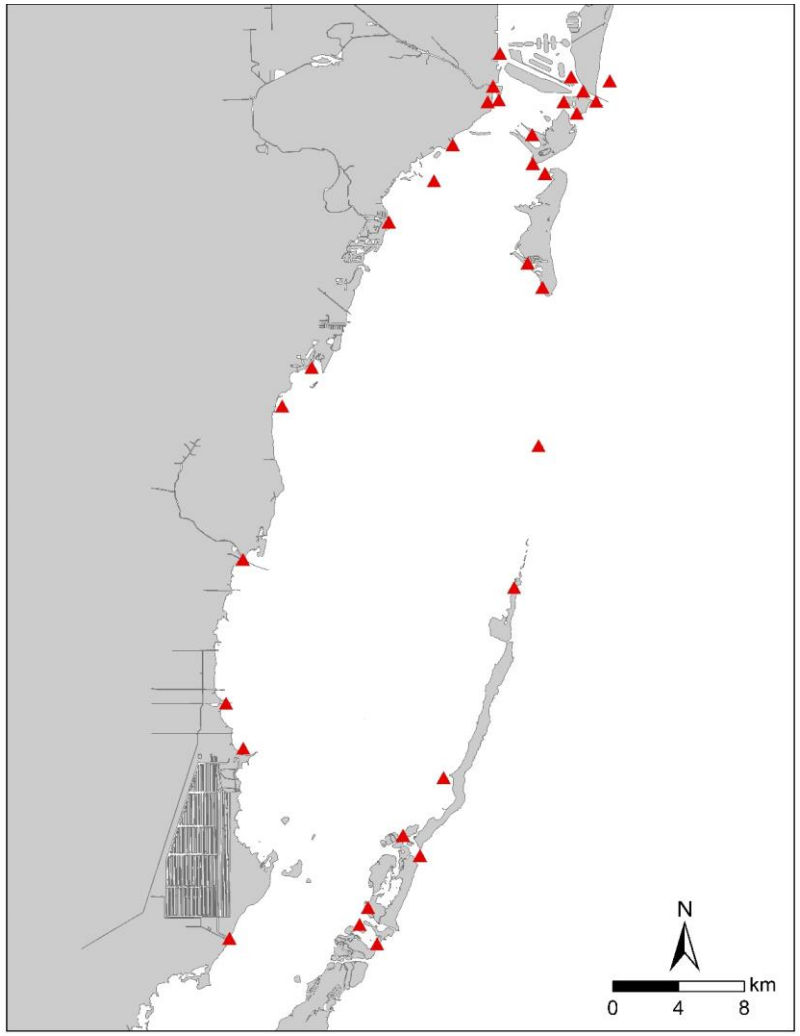
Average Detections per Hour: Nurse Sharks

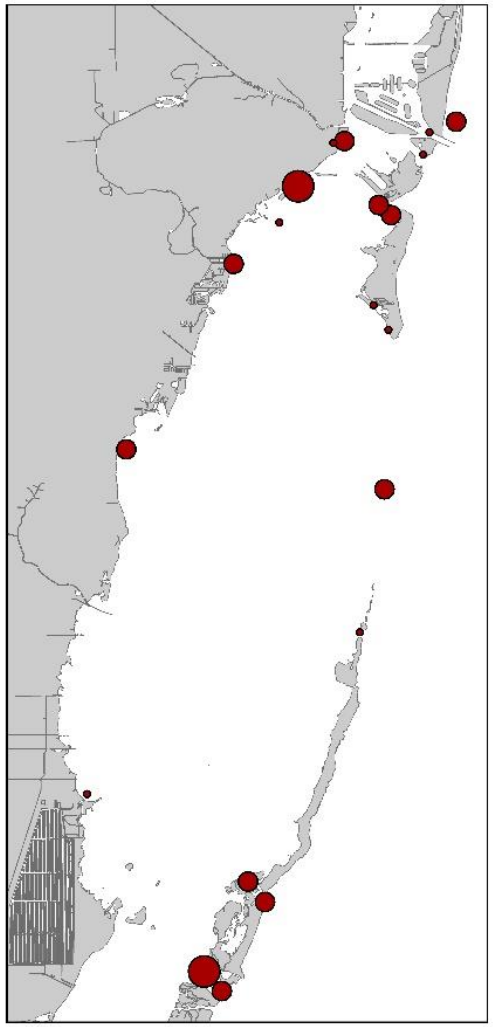


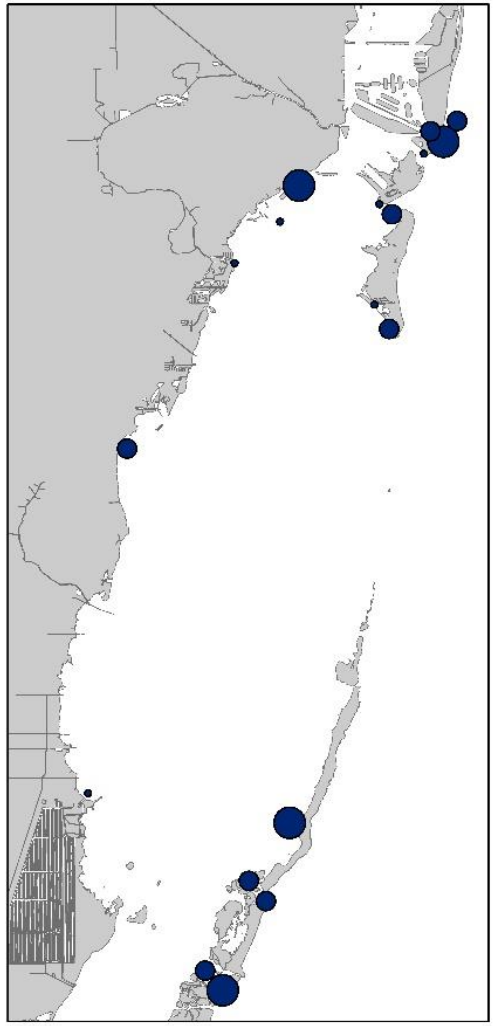
Data from Robbie Roemer, MS Thesis



Average Detections per Hour: Bull Sharks

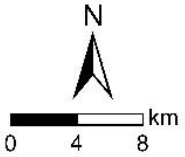






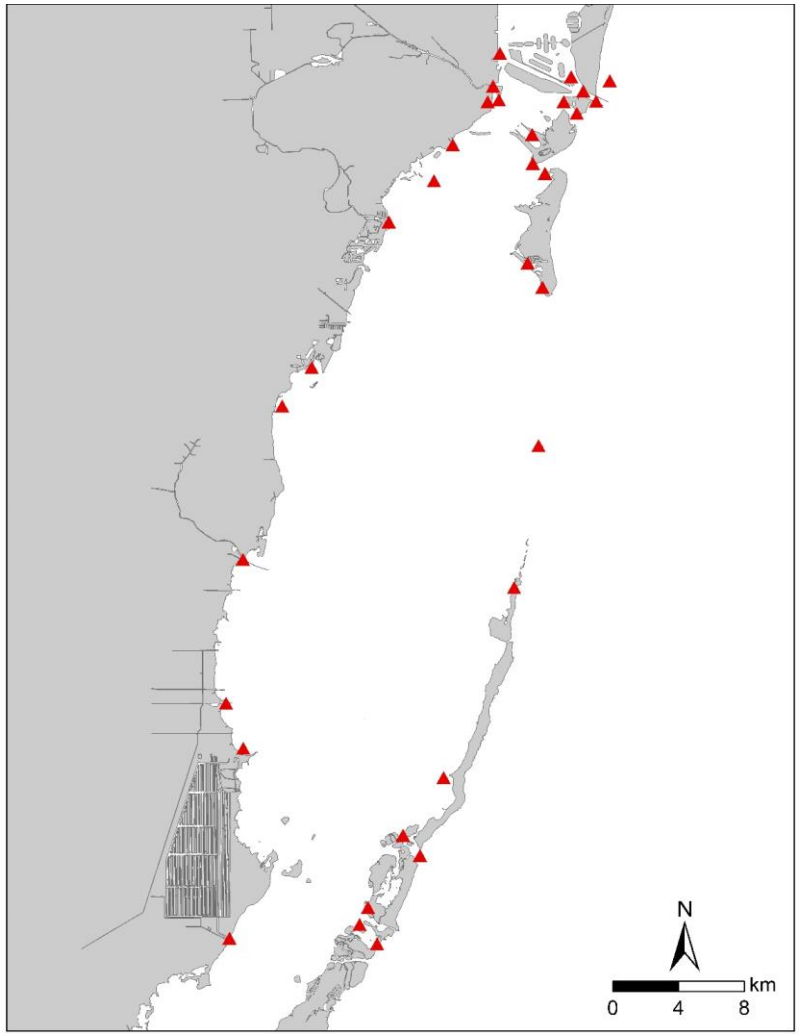
Data from Robbie Roemer, MS Thesis

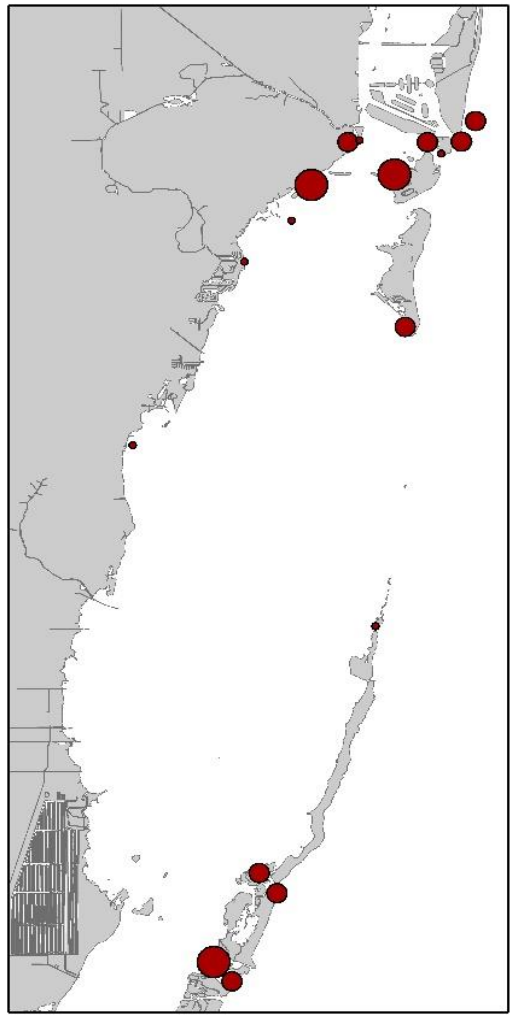
Dry

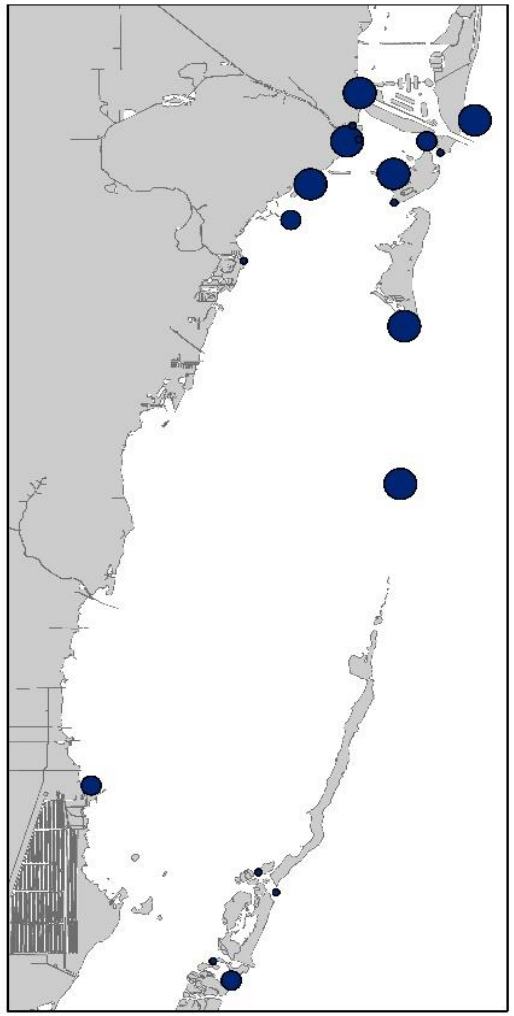


Wet

Average Detections per Hour: Great Hammerhead

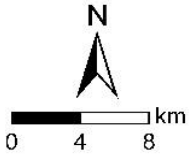






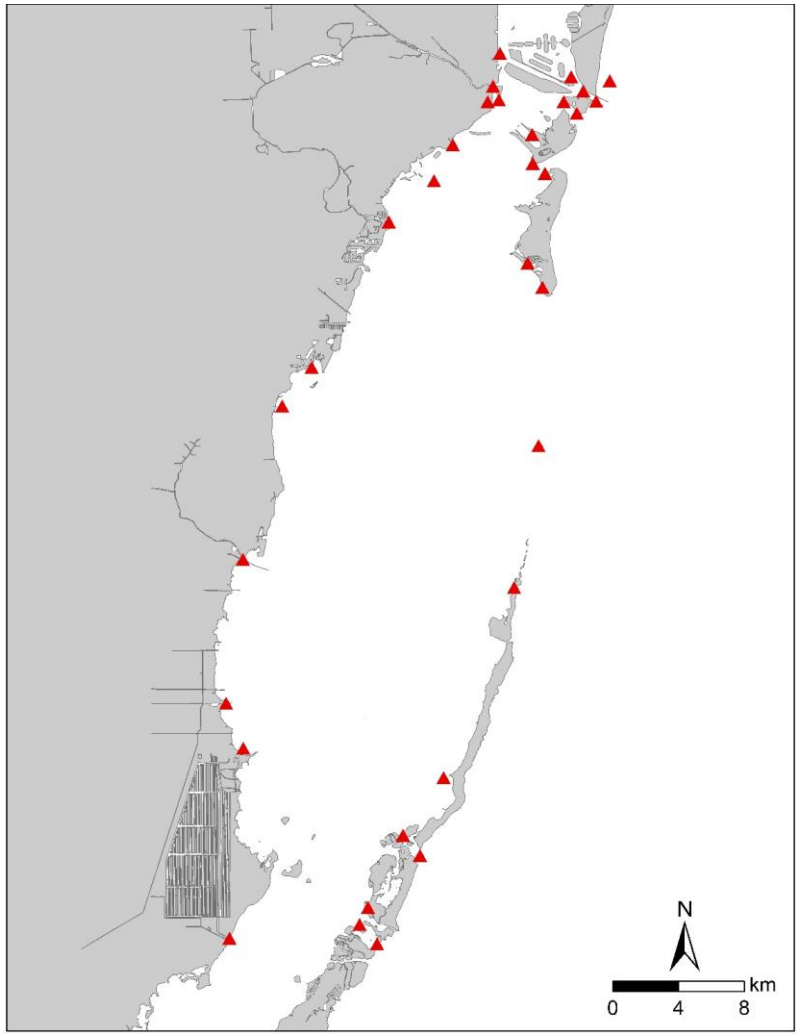
Data from Robbie Roemer, MS Thesis

Dry

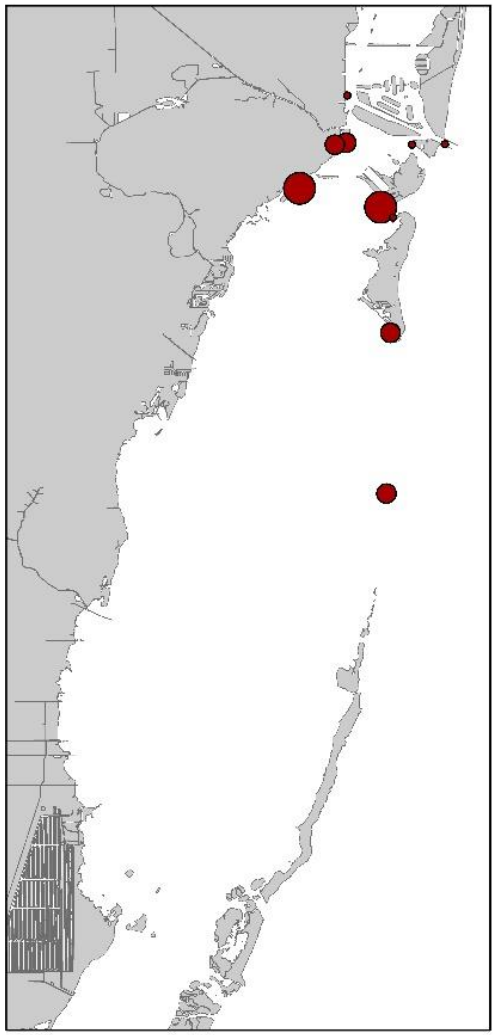


Wet

Residency: Nurse Sharks



Data from Robbie Roemer, MS Thesis



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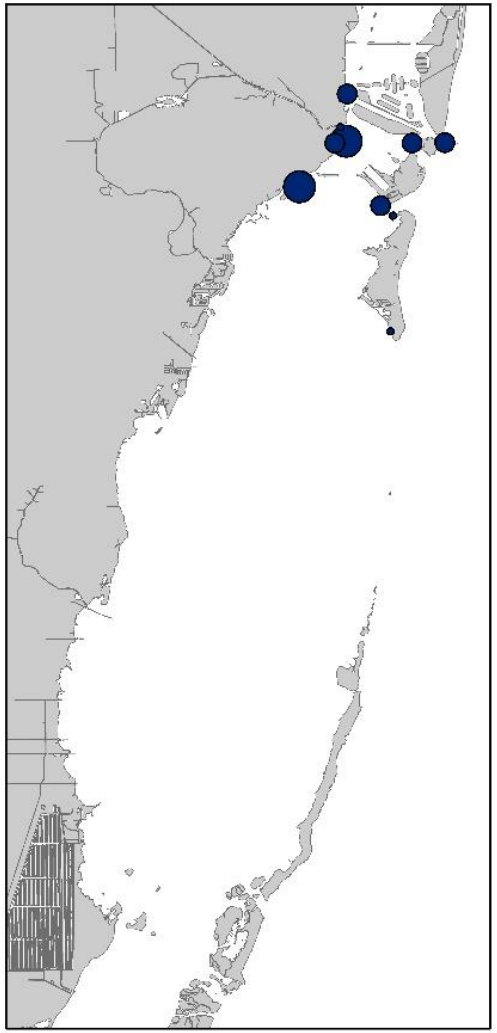
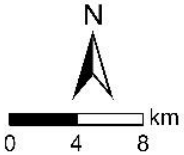
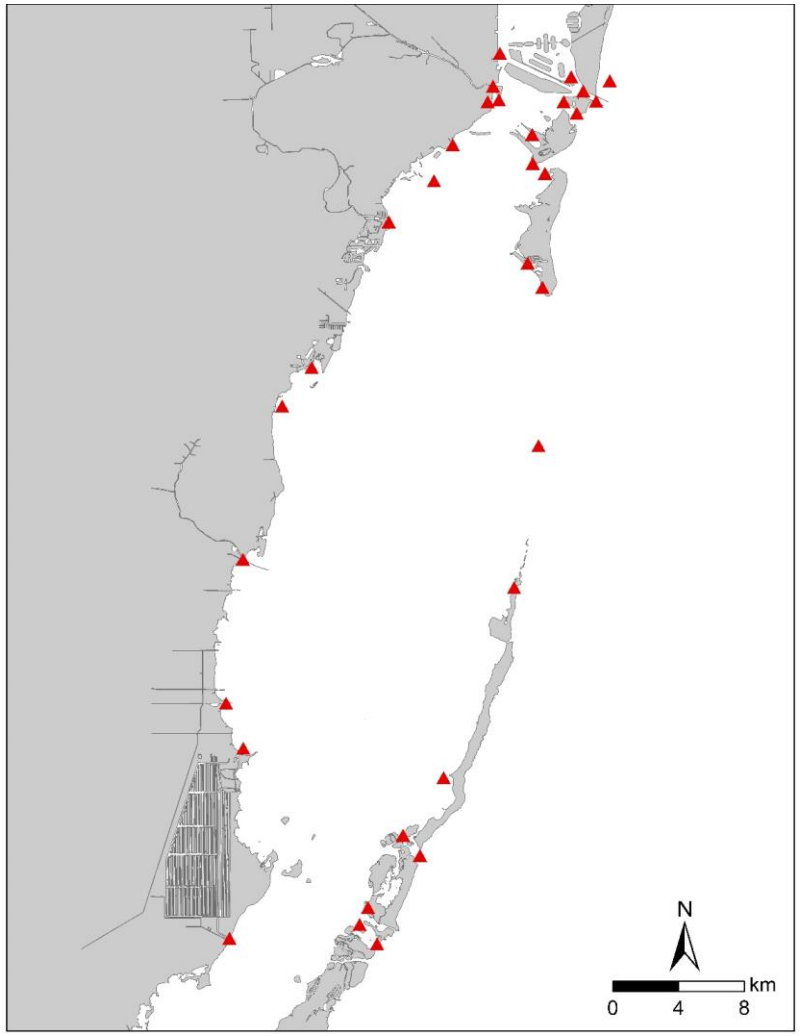
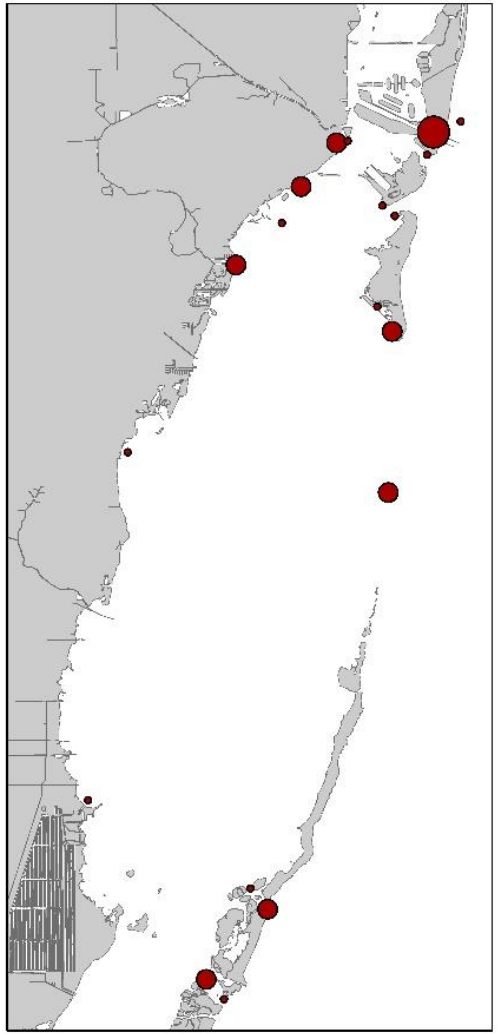


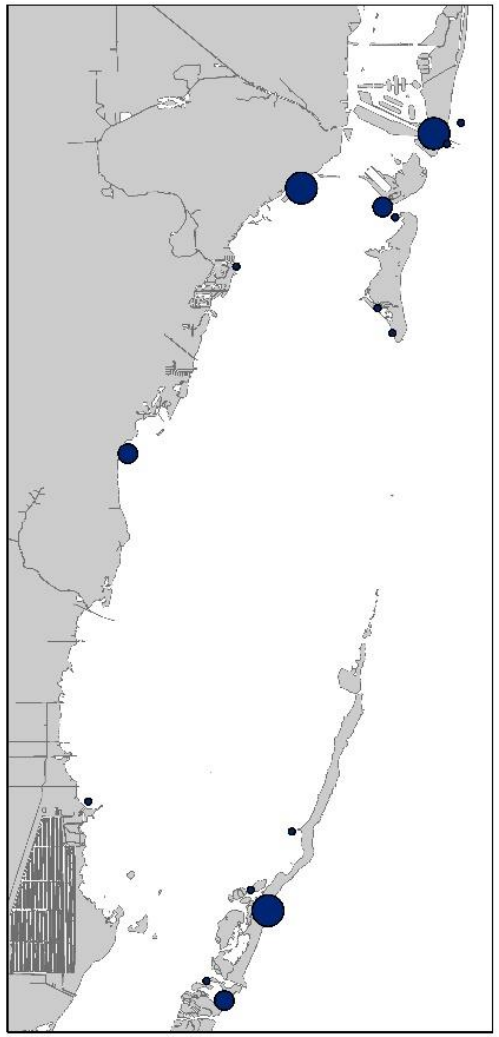
Wet



Residency: Bull Sharks







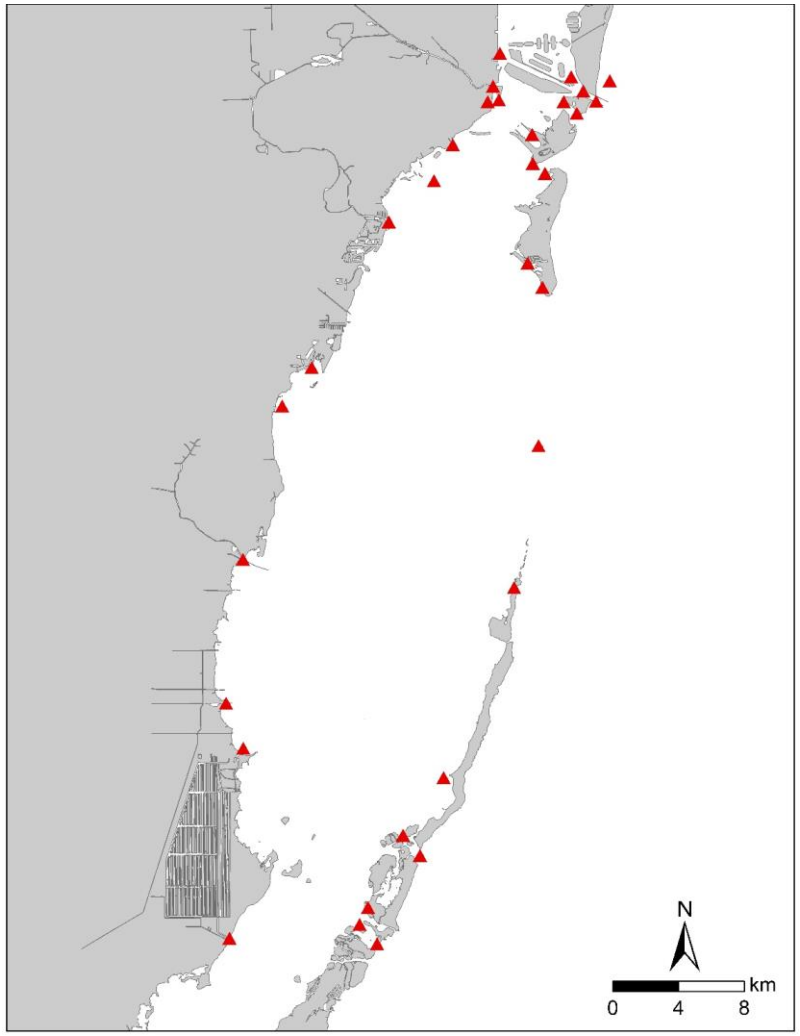
Data from Robbie Roemer, MS Thesis

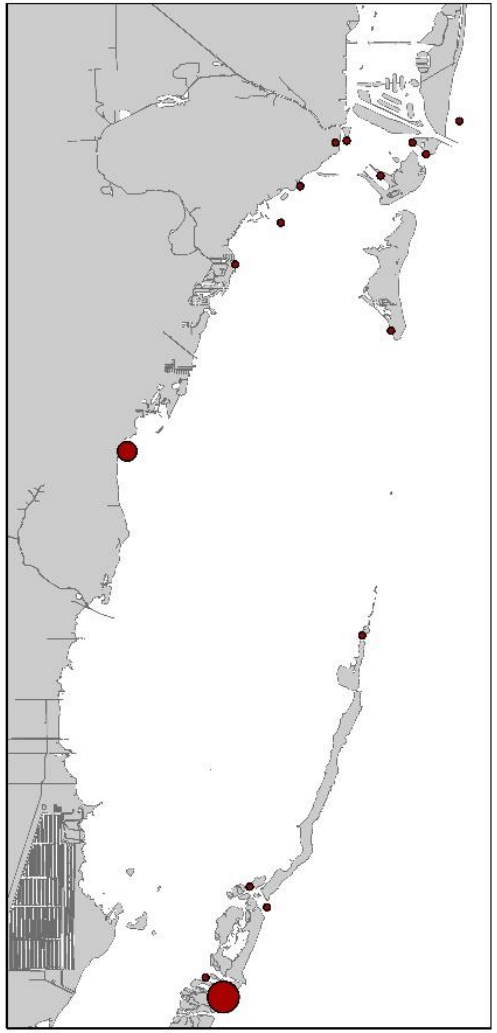
Dry

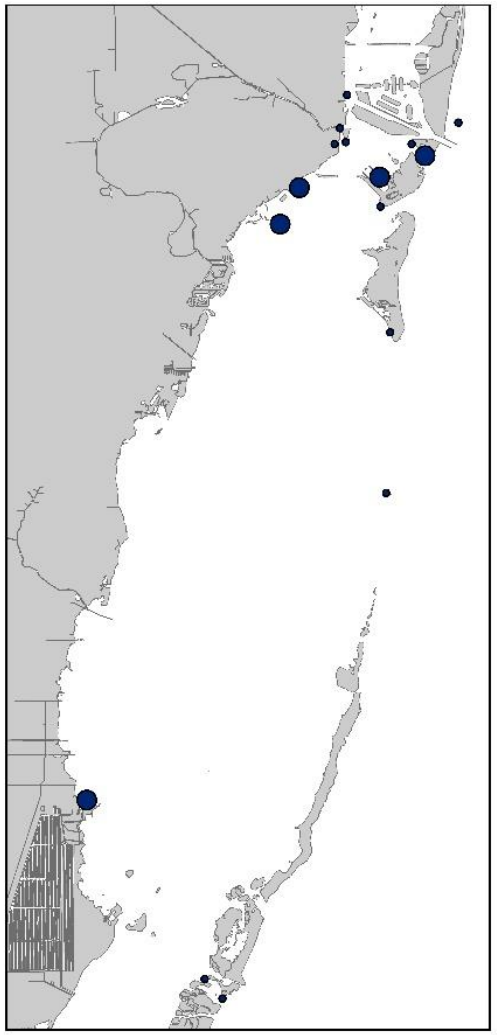
Wet

N
km
0 4 8

Residency: Great Hammerhead







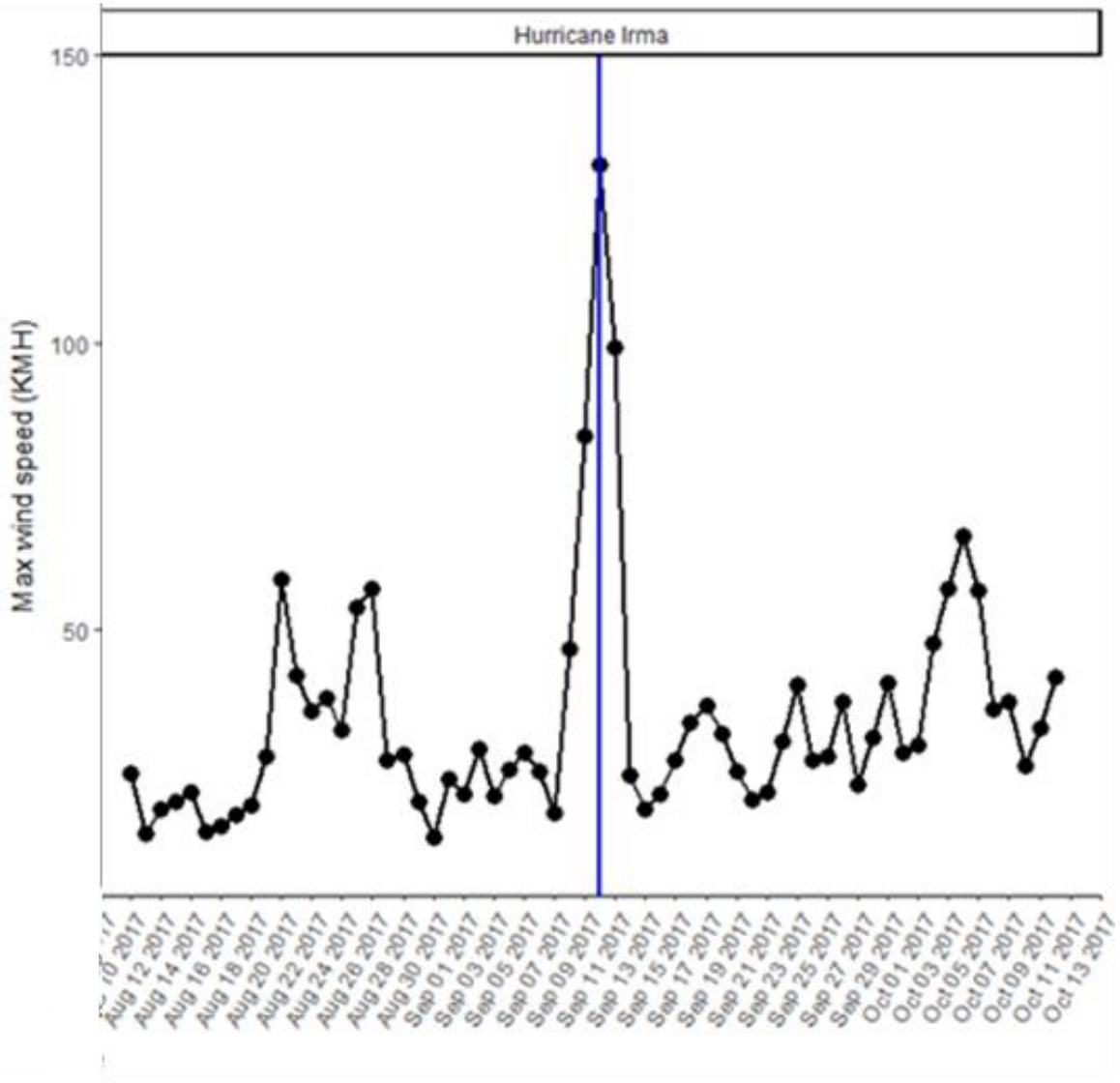
Data from Robbie Roemer, MS Thesis

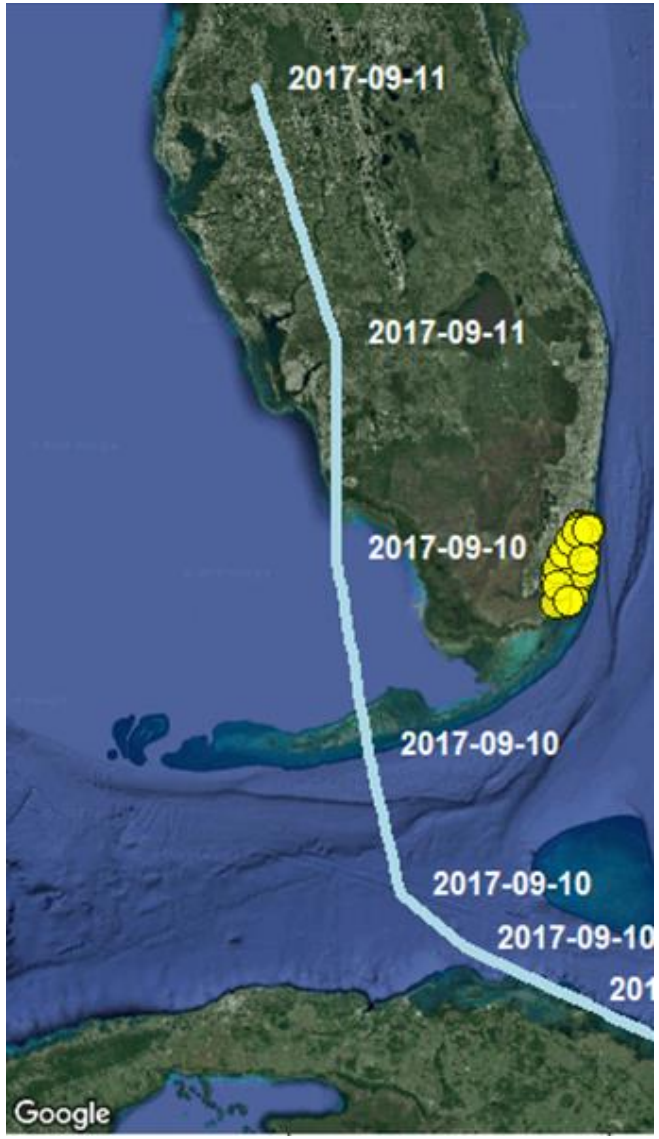
Dry

N
km
0 4 8

Wet

Hurricane Irma

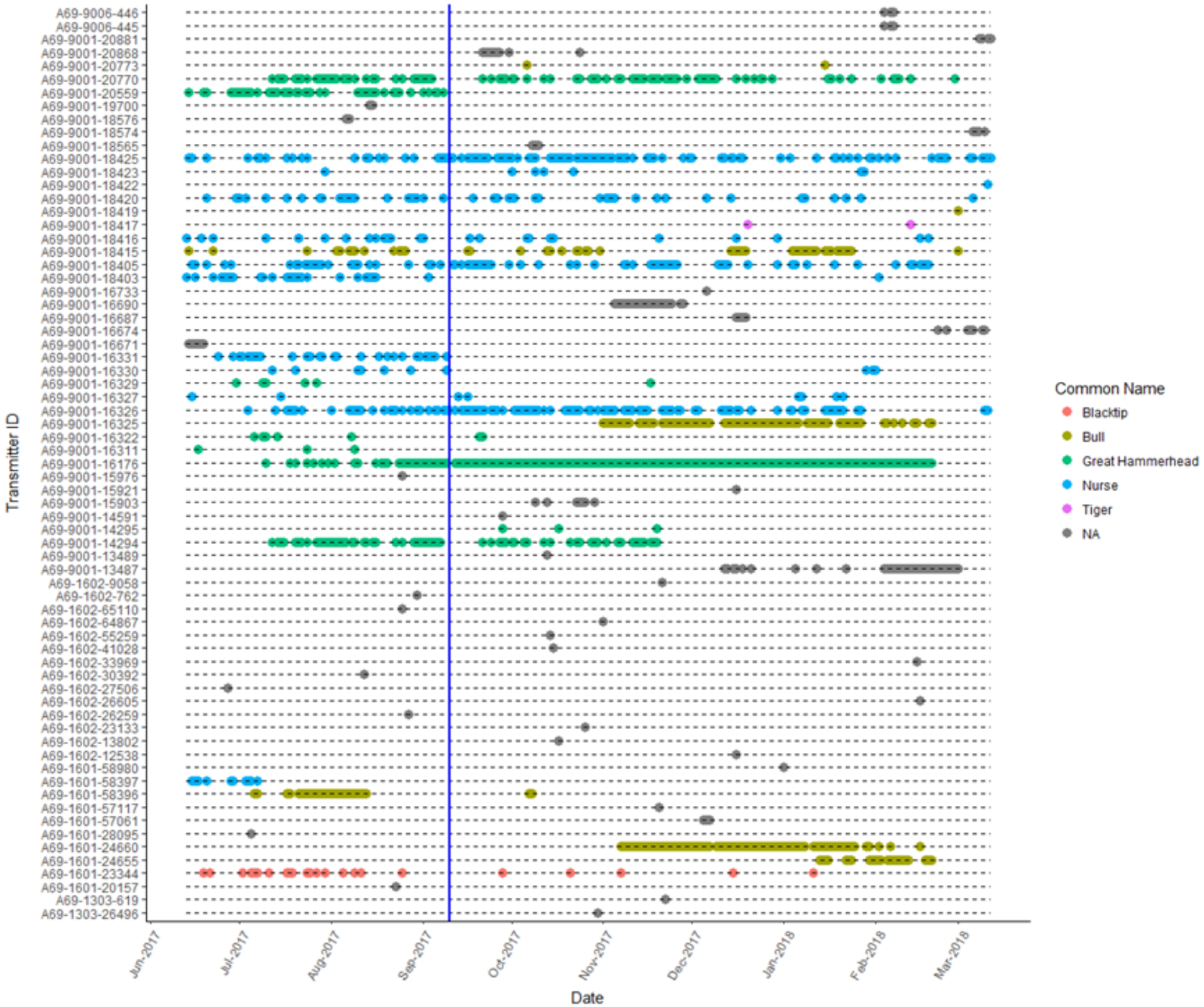


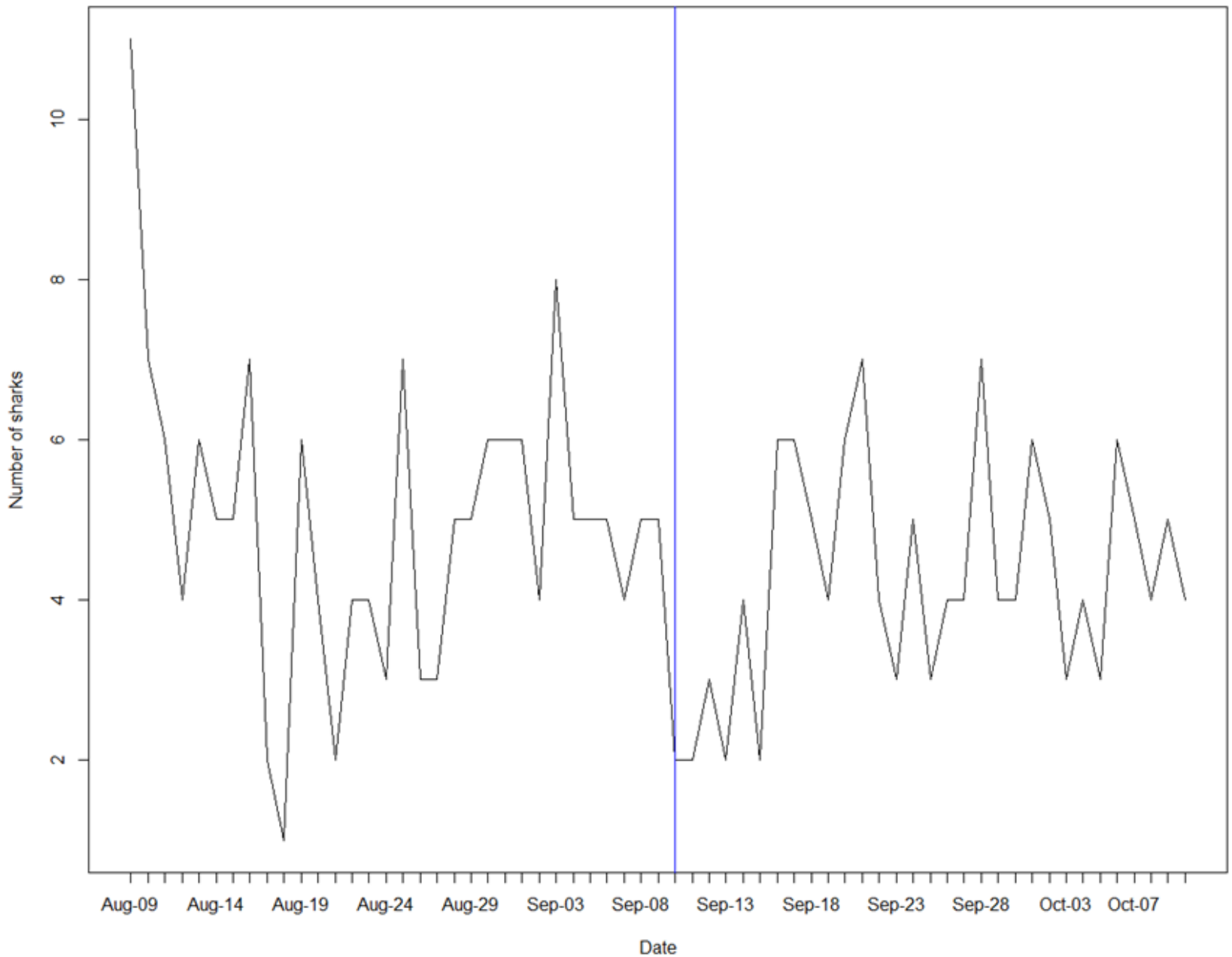


Data from Gutowsky et al. In Prep.

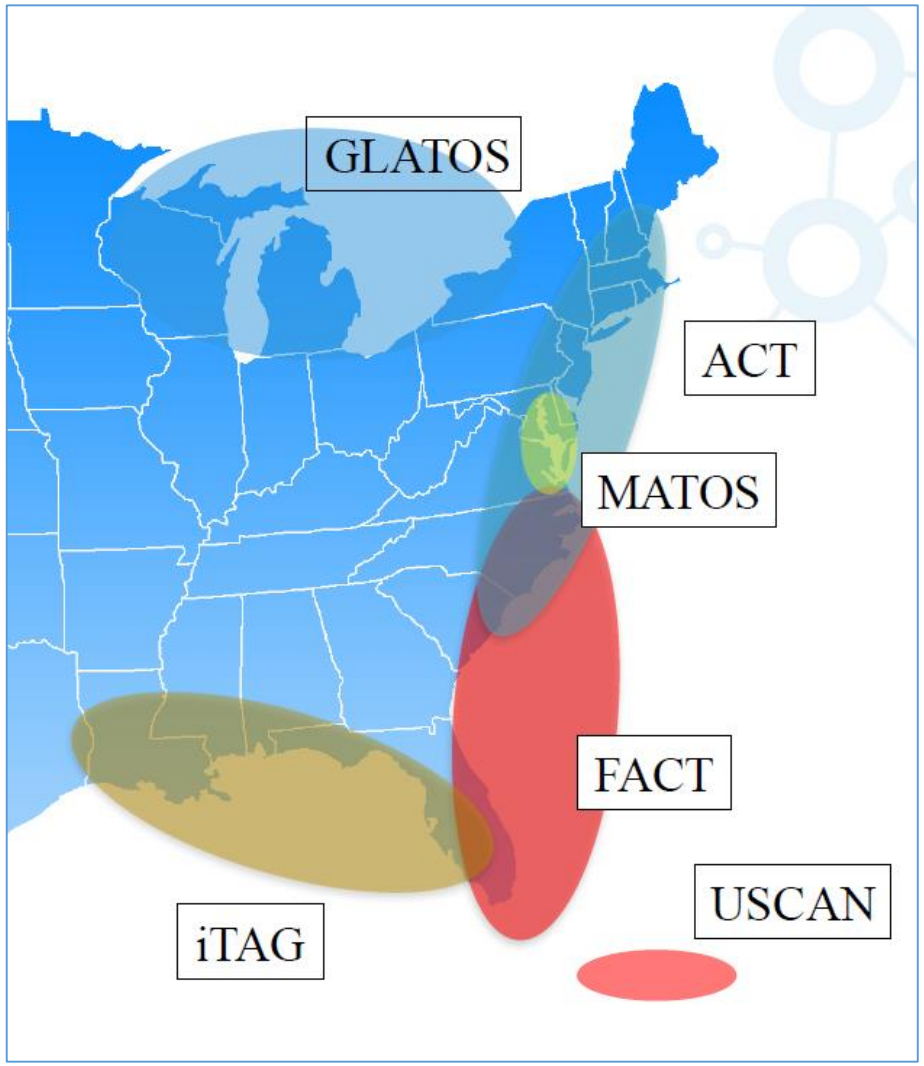
June 2017 – March 2018

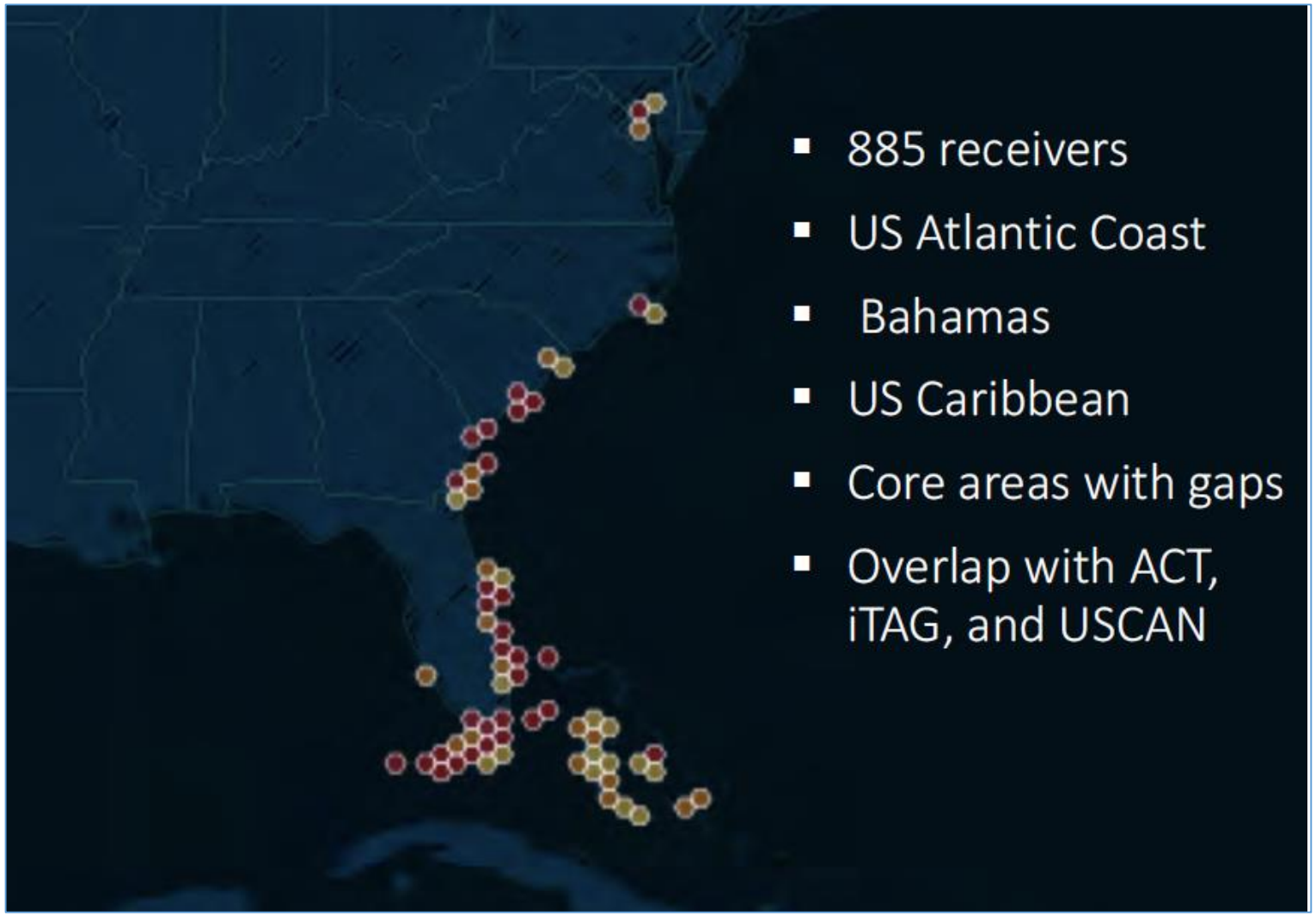
Irma = 10 Sept 2017




Number of sharks
2
4
6
8
10
Aug-09
Aug-14
Aug-19
Aug-24
Aug-29
Sep-03
Sep-08
Sep-13
Sep-18
Sep-23
Sep-28
Oct-03
Oct-07
Date

Collaborative Networks





http://secoora.org/wp-content/uploads/2017/06/Joy_Young_FACT_Network.pdf

Outside Detections in Biscayne Bay HFA

- Smalltooth Sawfish (4)
- Atlantic Tarpon (9)
- Great Hammerhead (1)
- Bull (2)
- Loggerhead Turtle (1)
- Cobia (1)

Next steps

Condition, Nutrition & Health Assessments

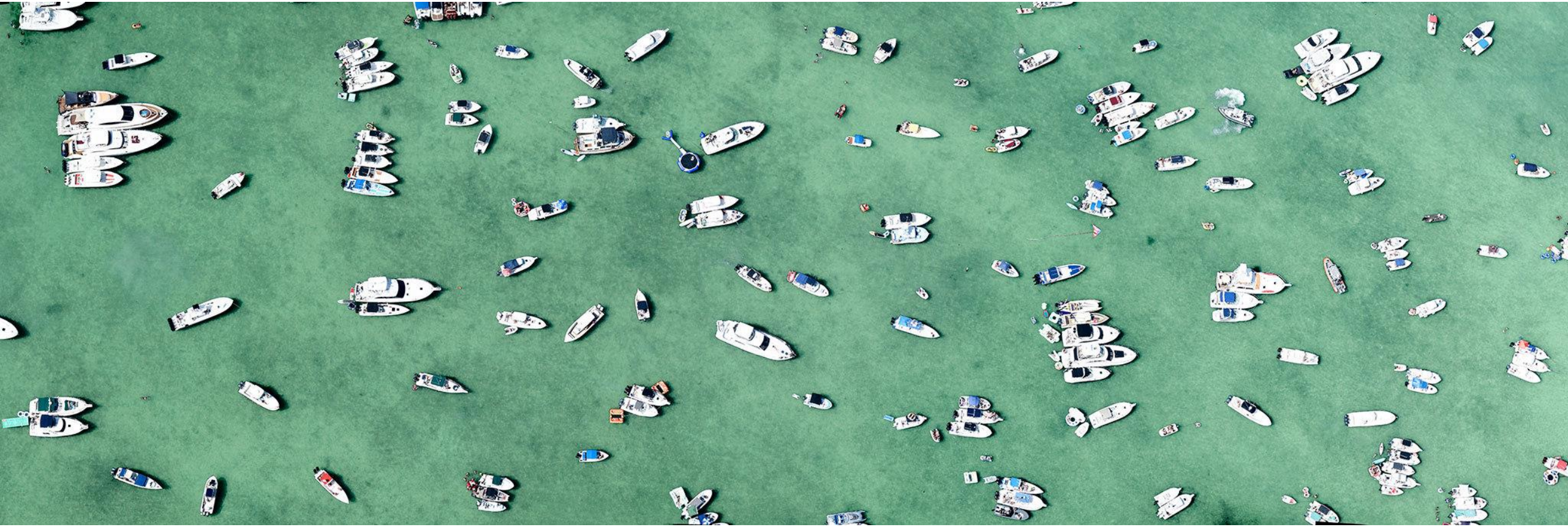
- Body & nutritional condition
  (MS: S. Moorhead)
- Fatty acid profiles
  (PhD: Bianca Rangel)
- Immune assessments
  (MS: L. Atallabenson, E. Rusnak; MPS: A. Fragola, C. Black)
- Collaborators:
  Dr. Liza Merly; Dr. Austin Gallagher

Documenting Sawfish Recovery in Biscayne Bay HFA?

- 04/11/2018
  - Chicken Key
  - 340 cm, female
  - Depth: 5 ft

- 06/11/2018
  - Offshore Miami Beach
  - 430 cm
  - Depth: 115ft

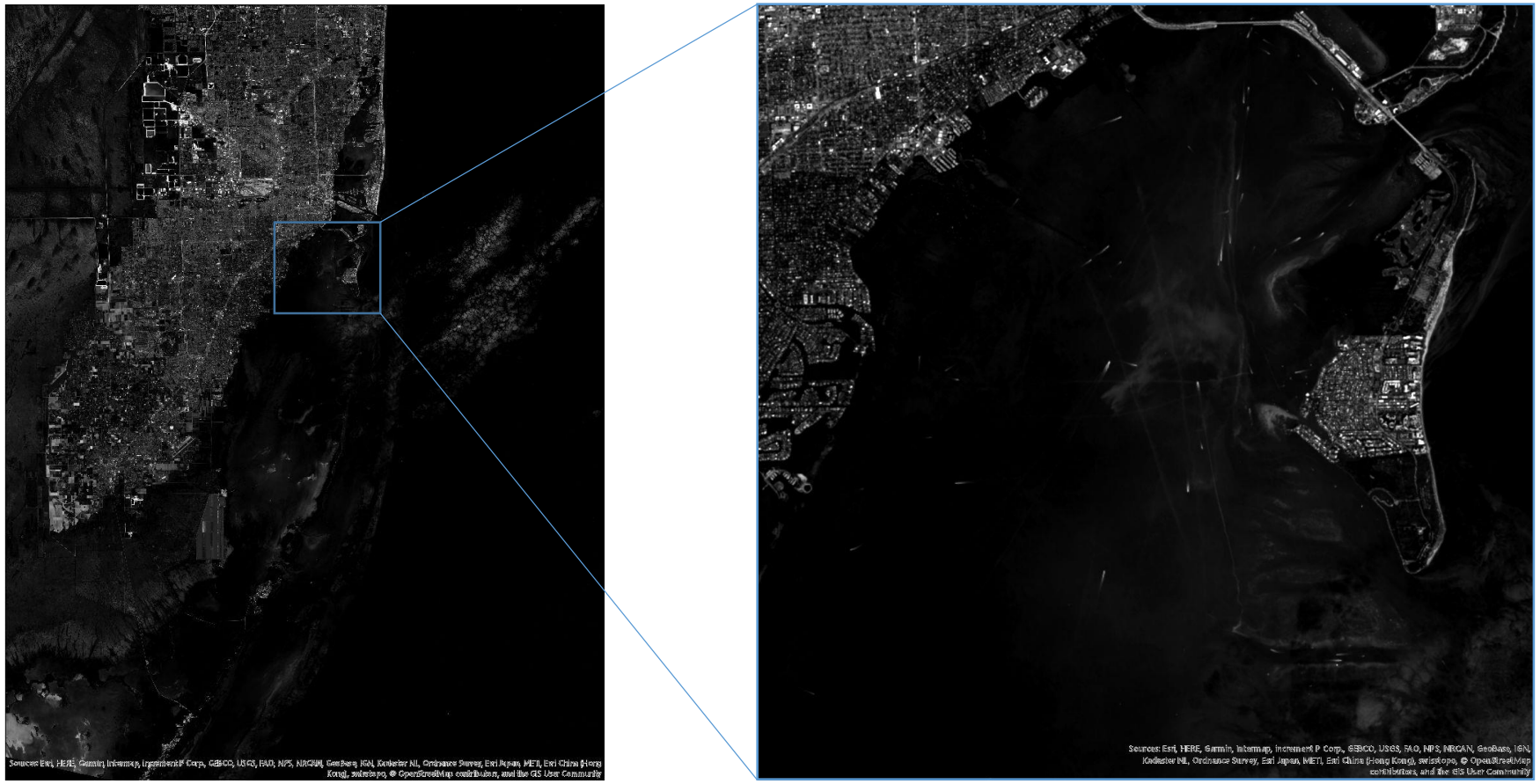
Effects of boat noise and traffic on shark habitat use

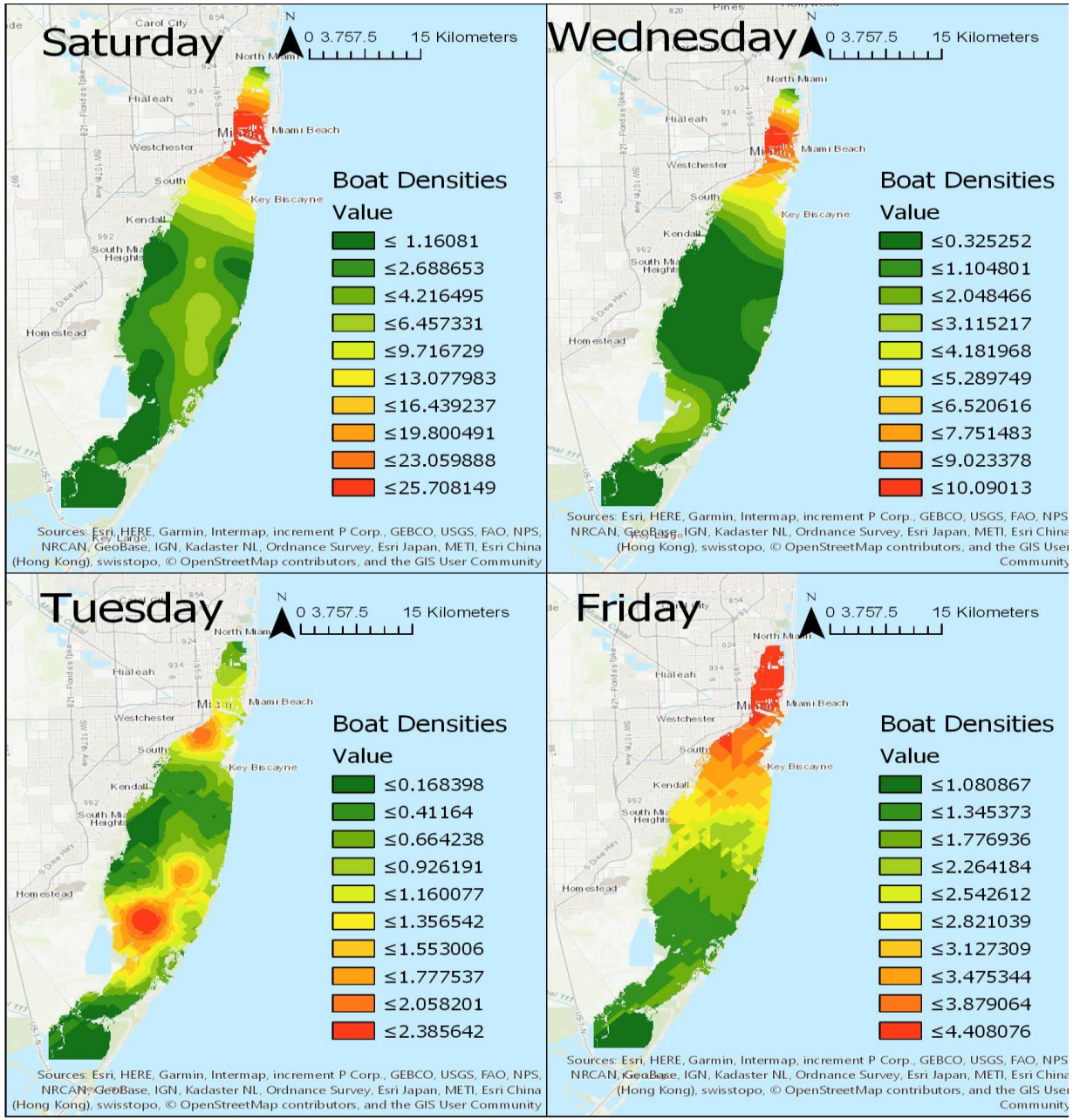


- MS: Mitchel Rider

www.reddit.com

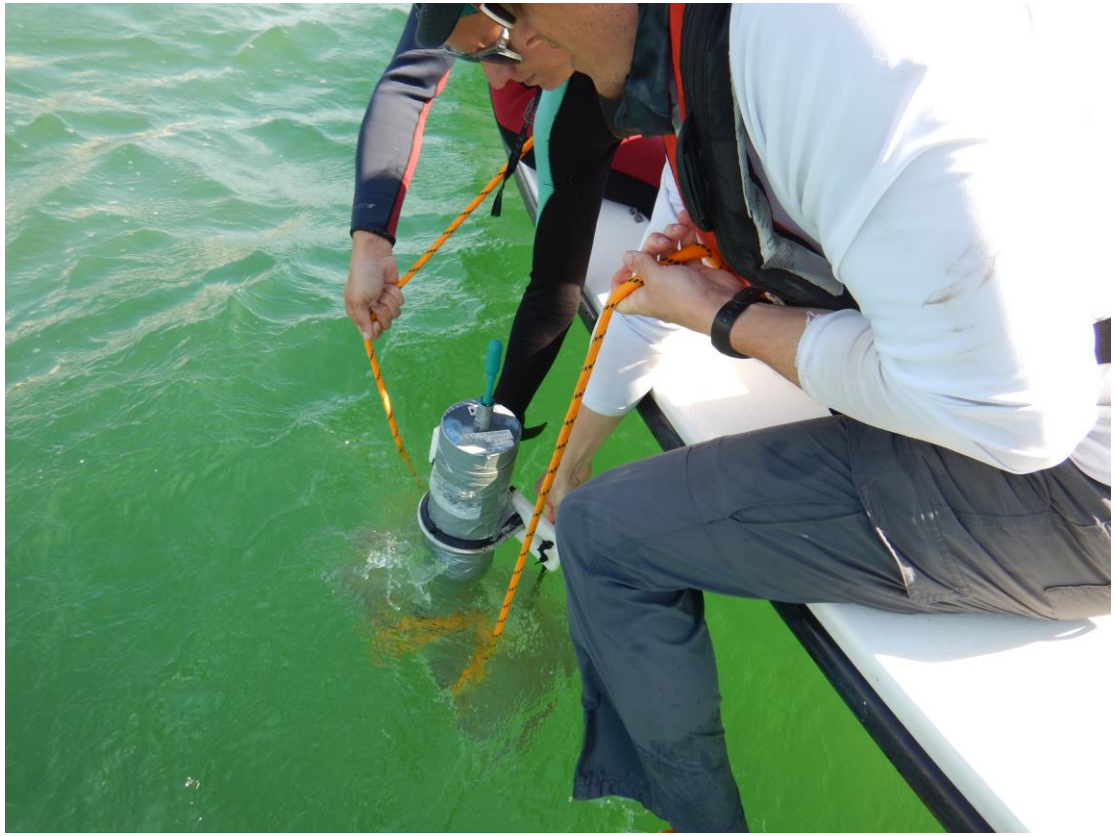
Satellite Data or Aerial Data

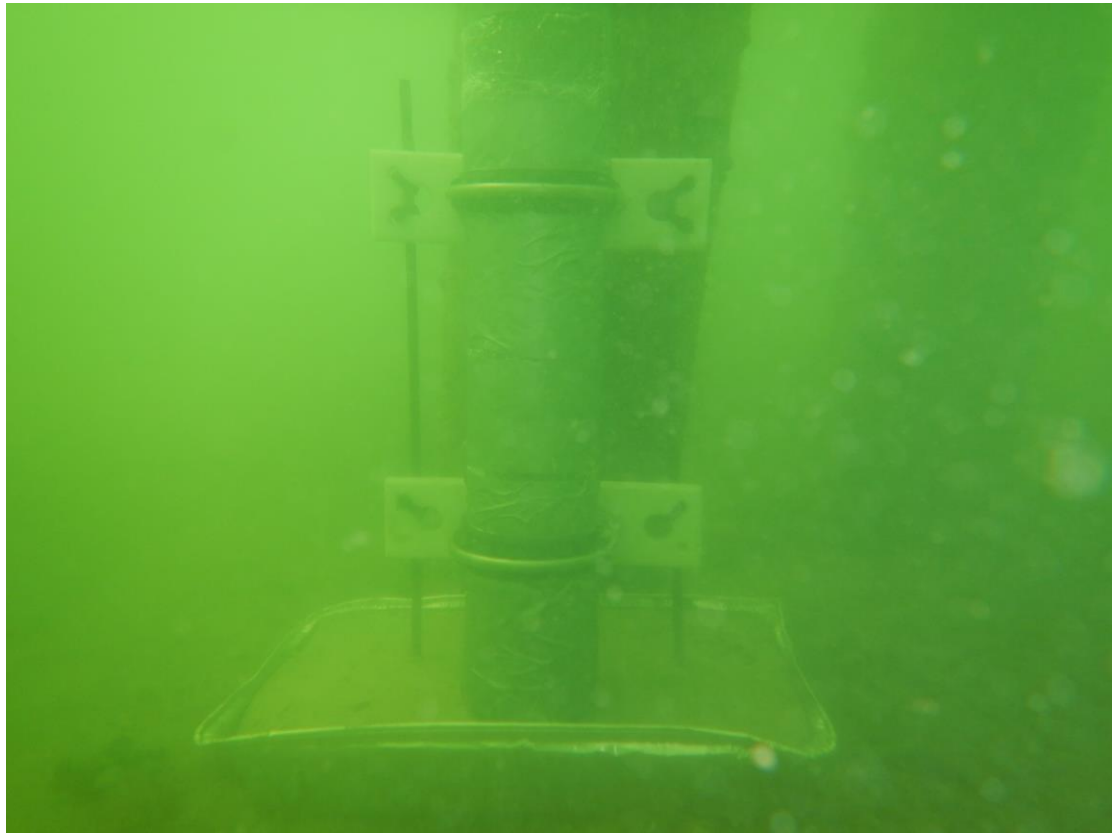



Saturday
0 3.757.5 15 Kilometers
Boat Densities
Value
≤ 1.16081
≤2.688653
≤4.216495
≤6.457331
≤9.716729
≤13.077983
≤16.439237
≤19.800491
≤23.059888
≤25.708149
Wednesday
0 3.757.5 15 Kilometers
Boat Densities
Value
≤0.325252
≤1.104801
≤2.048466
≤3.115217
≤4.181968
≤5.289749
≤6.520616
≤7.751483
≤9.023378
≤10.09013
Tuesday
0 3.757.5 15 Kilometers
Boat Densities
Value
≤0.168398
≤0.41164
≤0.664238
≤0.926191
≤1.160077
≤1.356542
≤1.553006
≤1.777537
≤2.058201
≤2.385642
Friday
0 3.757.5 15 Kilometers
Boat Densities
Value
≤1.080867
≤1.345373
≤1.776936
≤2.264184
≤2.542612
≤2.821039
≤3.127309
≤3.475344
≤3.879064
≤4.408076
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

Data: M. Rider

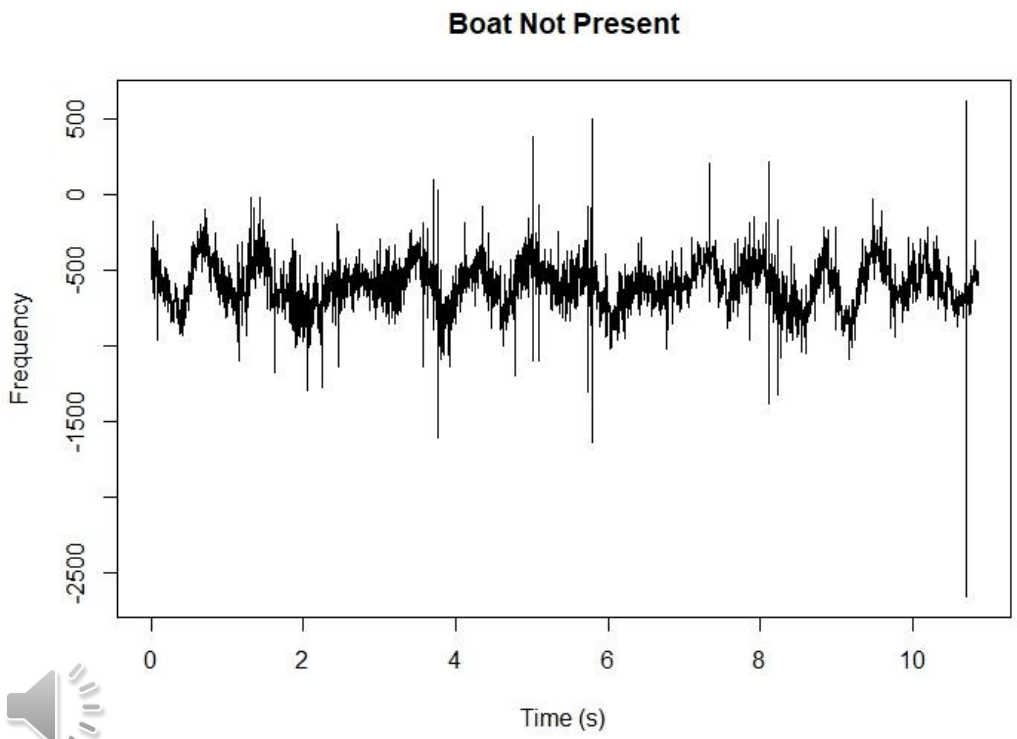
Hydrophones

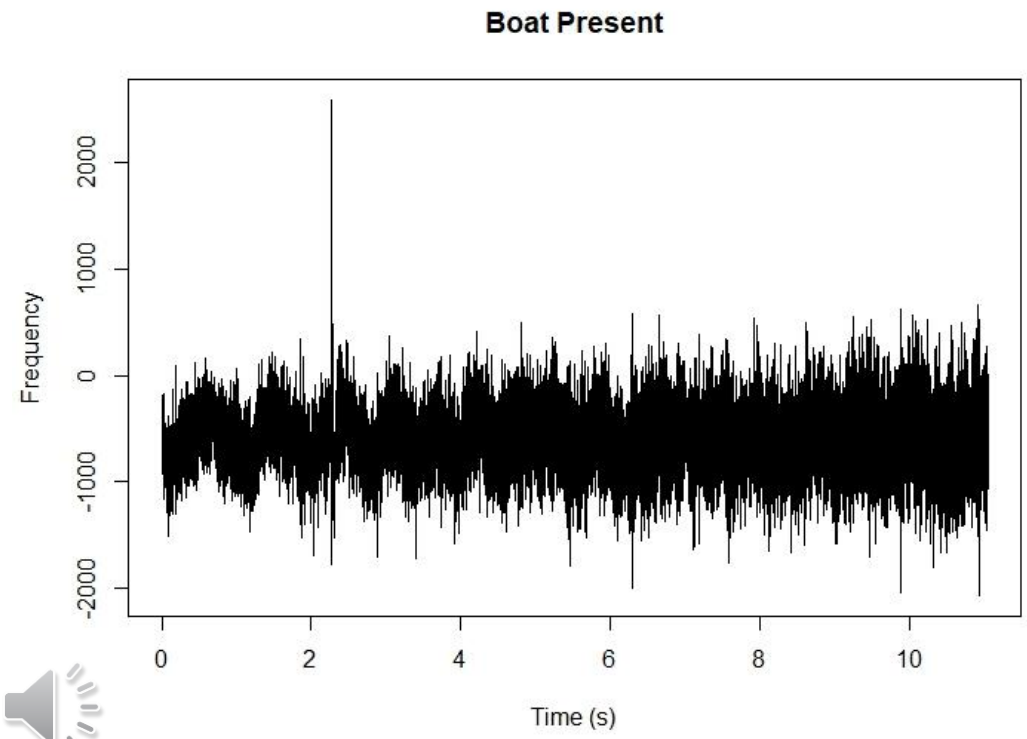




- Collaborators: Austin Gallagher (BTW), Erica Staaterman (NOAA)

Hydrophone Data





Outreach & Citizen Science

R/V ENDSLEY

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Ah!

Thank You

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

save our seas
foundation

Disney
WORLDWIDE
CONSERVATION
F U N D

Thank You

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t / IG: @DrNeilHammer

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