



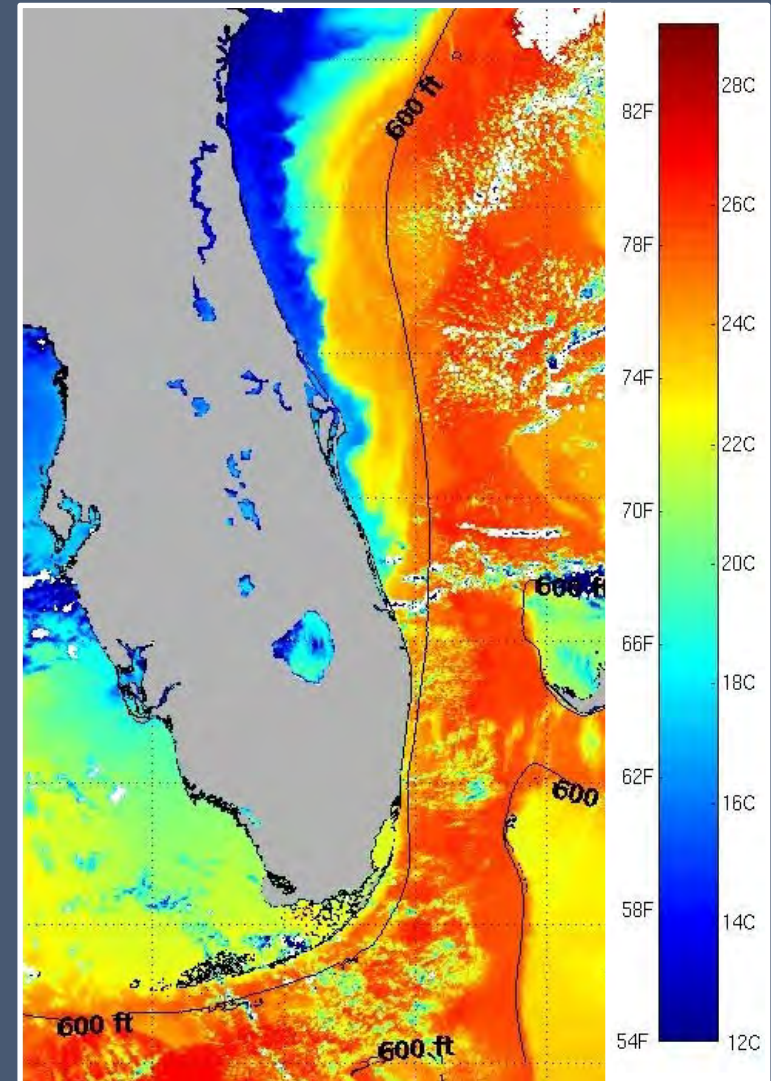
Acoustic Telemetry Research at Cape Canaveral: Projects & Perspectives

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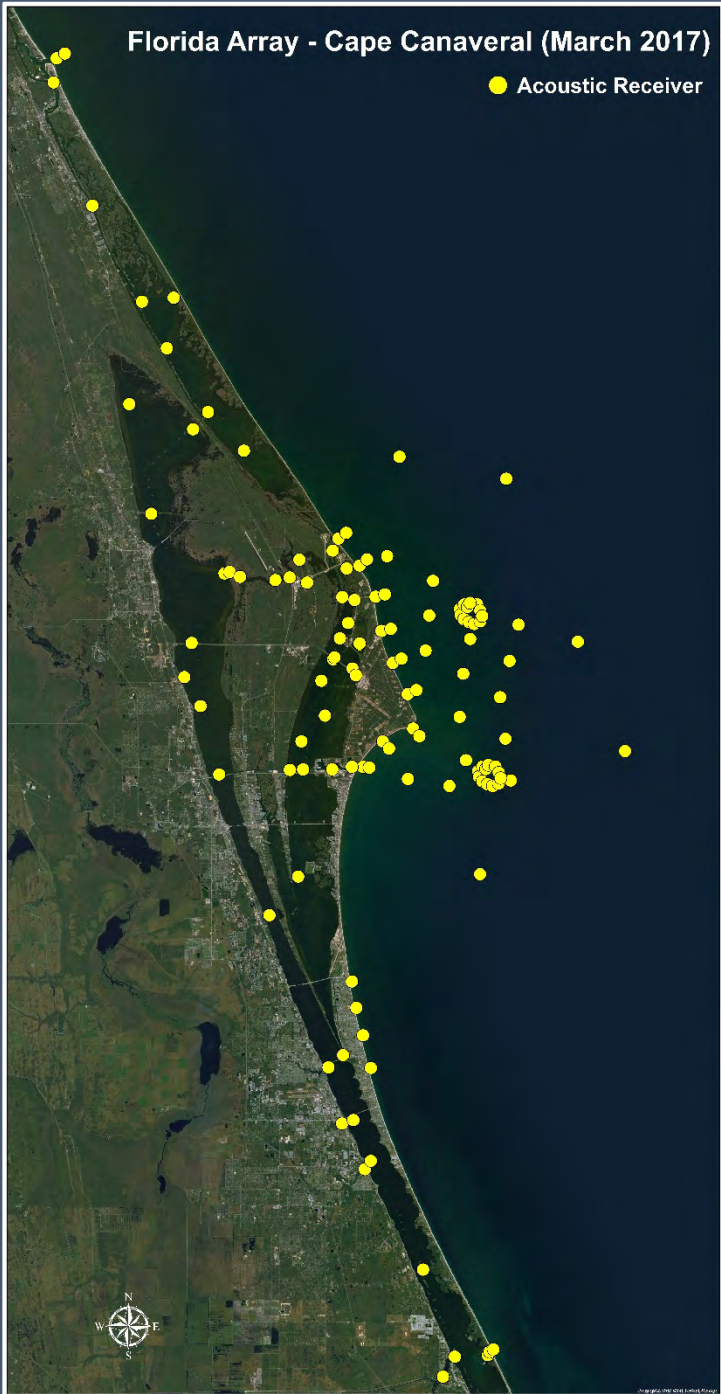
Acoustic Telemetry Needs at Cape Canaveral

- High Species Diversity
- Climactic Transition Zone
- Oldest Marine Reserve
- Robust Recreational & Commercial Fisheries
- Federal Agencies with Regulatory Needs:
NASA, USFWS, NPS, Navy,
USAF, BOEM



Florida Array - Cape Canaveral (March 2017)

● Acoustic Receiver



Our Background

- Joined FACT Network in 2008
- Partners with US Naval Undersea Warfare Center
- NASA & BOEM Funding
- 119 Receivers from Daytona Beach to Sebastian
- Multiple Estuarine & Offshore Habitat Types

Estuarine Tracking



Russell Lowers 10

Photo Credit: Russ Lowers

Red drum
(*Sciaenops ocellatus*)



Black drum
(*Pogonias cromis*)





Spotted Seatrout
(*Cynoscion nebulosus*)



Green Turtle
(*Chelonia mydas*)

Photo Credit: Blair Witherington

Univ. Florida Bull Shark Research



FWC Snook Research



Estuarine Tracking Summary

- Maintain 49 Indian River Lagoon Receivers
- Tagged 250 Fish & Turtles to Date (9 Species)
- Still Tagging Red Drum, Green & Loggerhead Turtles
- Support New Projects & Student Involvement



Coastal Tracking

Climate Change Threatens Vital NASA Launch Pads

- CBS News December 6, 2014

NASA Is Facing a Climate Change Countdown

- NY Times April 4, 2016

The Biggest Threat to NASA's Future Is the Ocean

- Gizmodo September 27, 2016



Photo Credit: Tim Kozusko



NASA Wallops Island Flight Facility

2012 Shoreline Renourishment

Bottom Longline Survey



Nearshore Acoustic Telemetry



Pompano

(*Trachinotus carolinus*)



Gulf Kingcroaker
(*Menticirrhus littoralis*)



Scalloped Hammerhead

(*Sphyrna* spp.)



Lemon Shark

(*Negaprion brevirostris*)



Hurricane Sandy

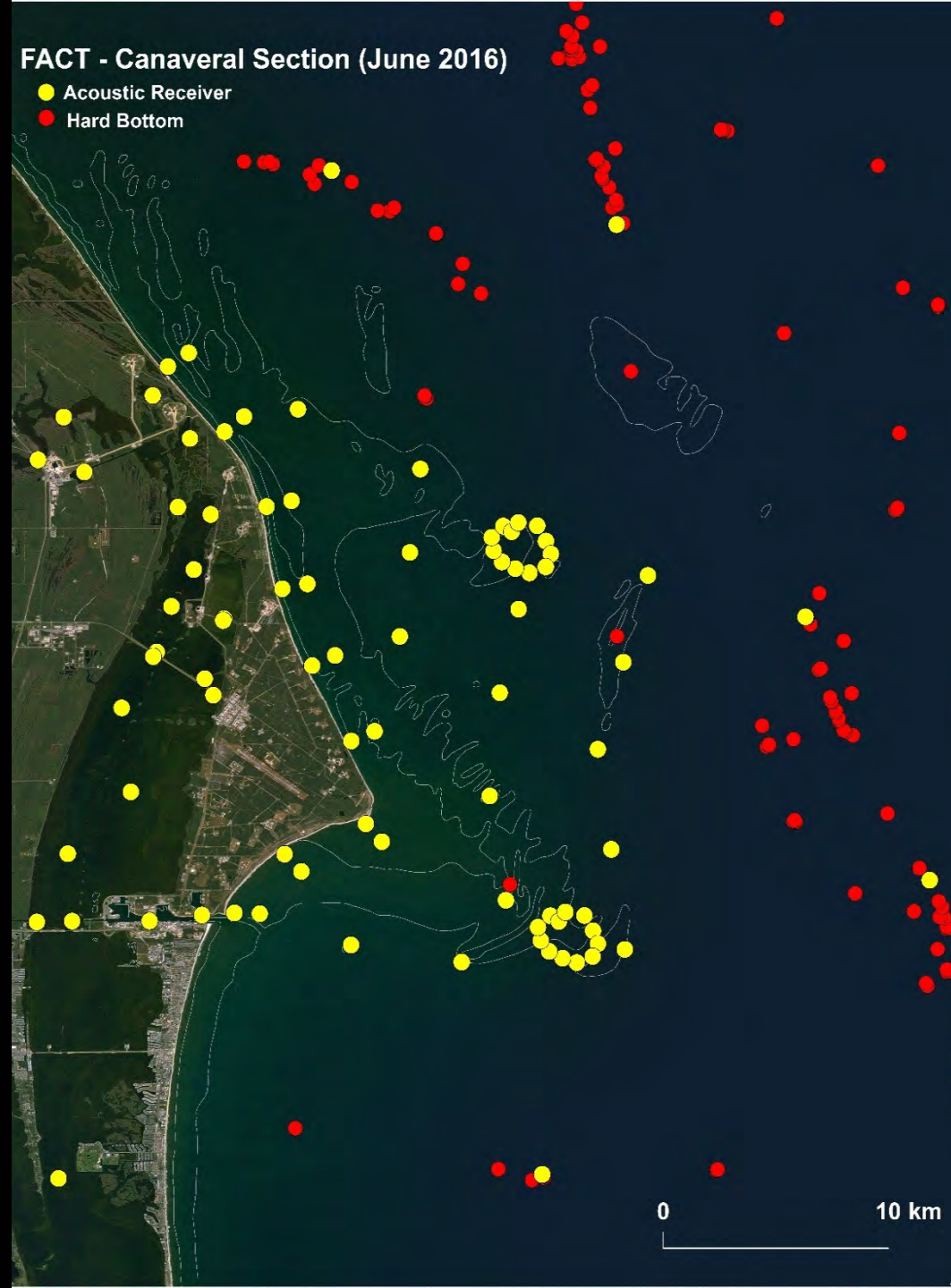
October 2012

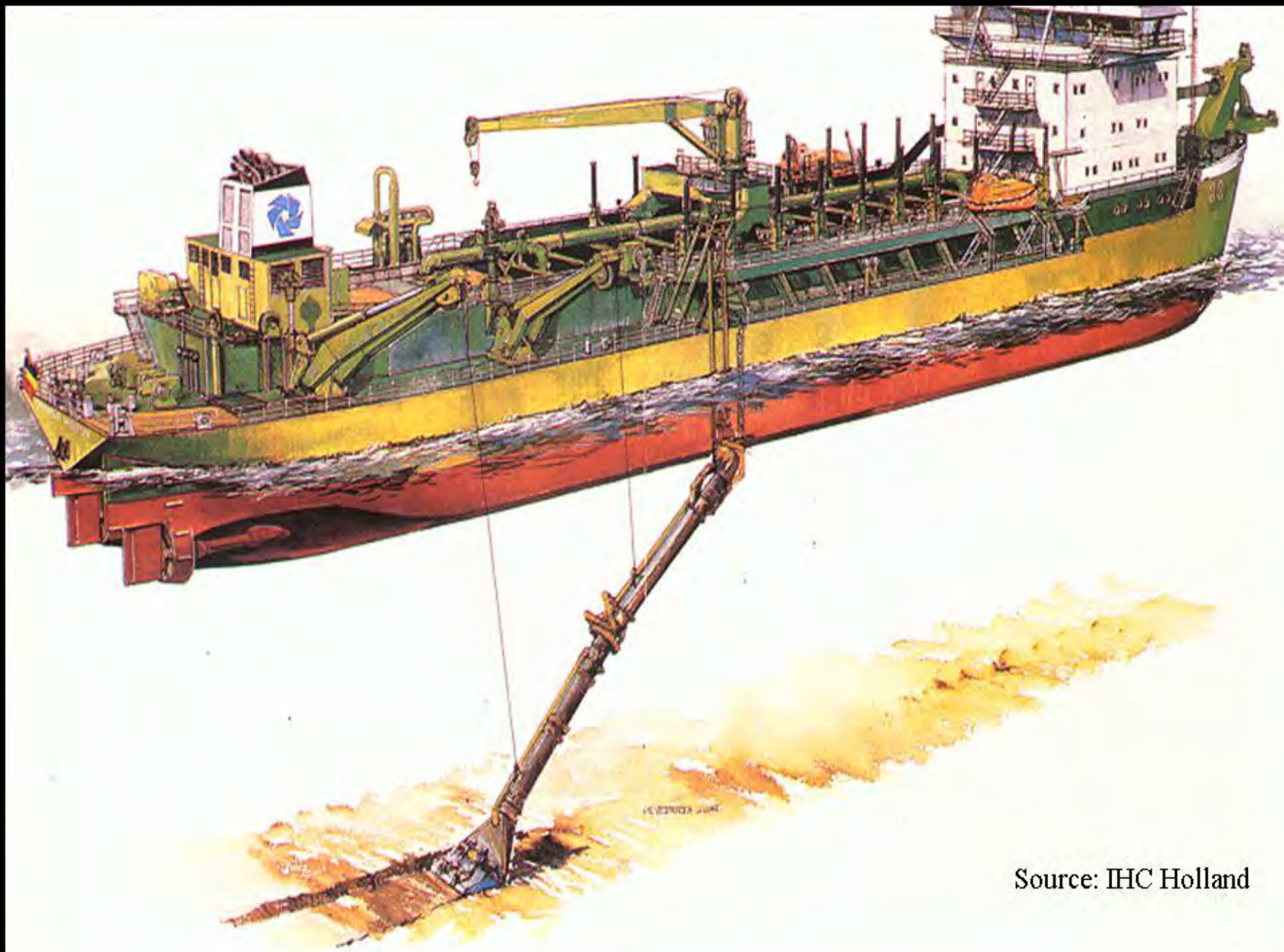


Photo Credit: NASA

BOEM MMP Support

- Extended Our Longline Survey
- Expanded Tracking Efforts:
 - Shoals as Fish Habitat
 - Behavior on Dredge vs. Control Sites
 - Shoal-Reef Exchanges





Source: IHC Holland

Red Drum

(Sciaenops ocellatus)



Finetooth Shark
(*Carcharhinus isodon*)



Blacknose Shark
(*Carcharhinus acronotus*)



Bluefish

(*Pomatomus saltatrix*)



King Mackerel

(*Scomberomorus cavalla*)



Cobia

(*R. canadum*)



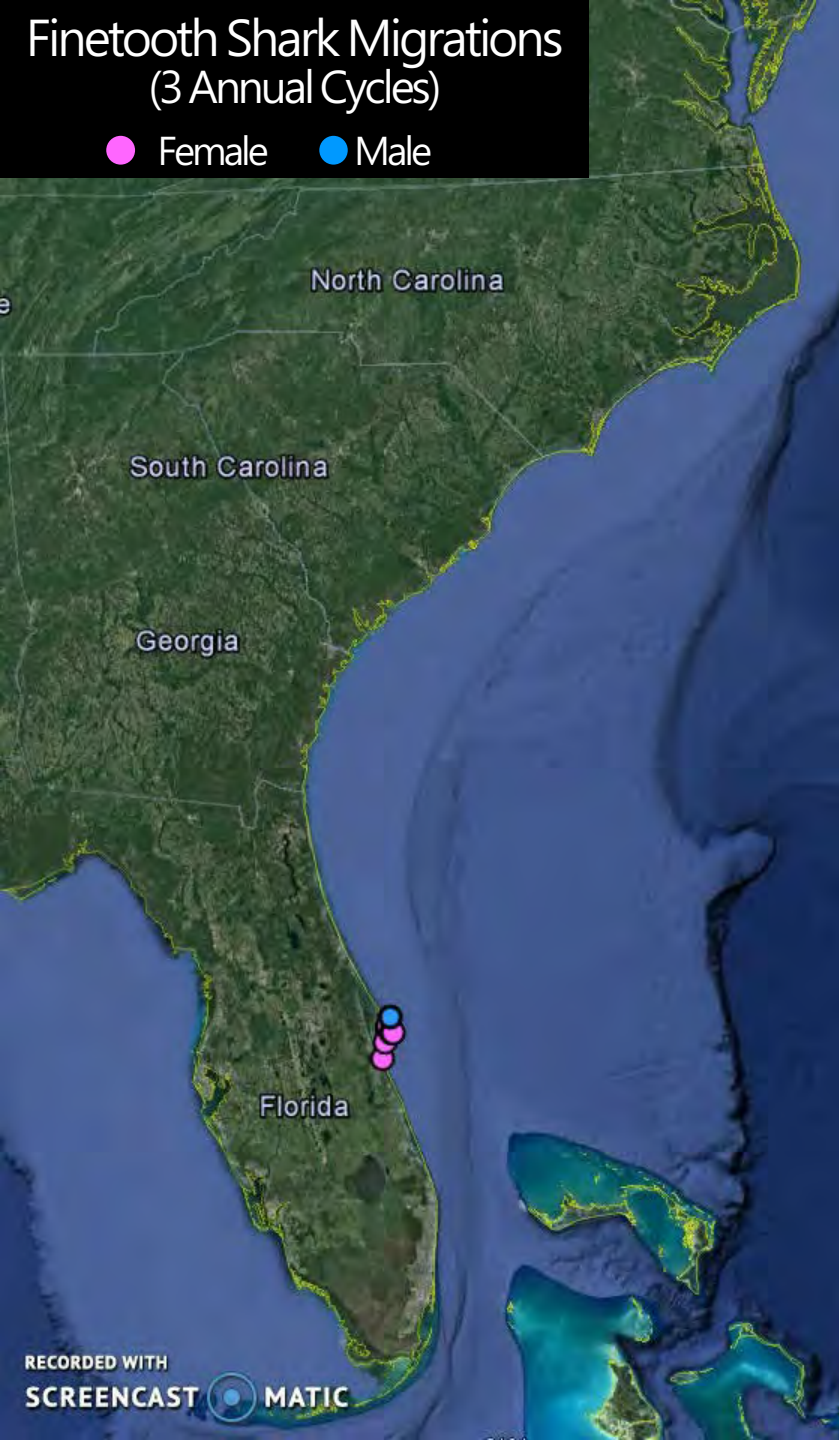
Coastal Tracking Summary

- Maintain 70 Coastal Receivers
- Tagged 800 Fish to Date (16 Species)
- Now Tagging Sharpnose Shark & Cobia
- Upcoming:
 - Red Snapper
 - Green & Loggerhead Turtles (Acoustic & Satellite)



Finetooth Shark Migrations (3 Annual Cycles)

● Female ● Male



Value of Collaboration

- Our Fish: 14 Species Visited
300 Sites from GOM to NJ
- 22 Species Tagged from W.
Florida to MA (20 Groups)
- Enhanced Dialogue with
Other Researchers
- Spurred New Tracking
Studies (e.g. Cobia Study)



BOEM Wave Glider Ops (2017-2018)





Science Payload

- Mobile Acoustic Receiver
- Passive Acoustic Module
- Water Temperature
- Dissolved Oxygen
- Fluorometer

Water Depth

Animal Movement In Context

- Habitat Covariates Tell Us WHY Animals Behave in Certain Ways
- Habitat Datasets Often Difficult to Find, Query, & Format
- Result? Studies May Have Less Predictive Power During Period of Rapid Coastal Change
- SECOORA Data Portal Seeks to Organize These Datasets in One Location

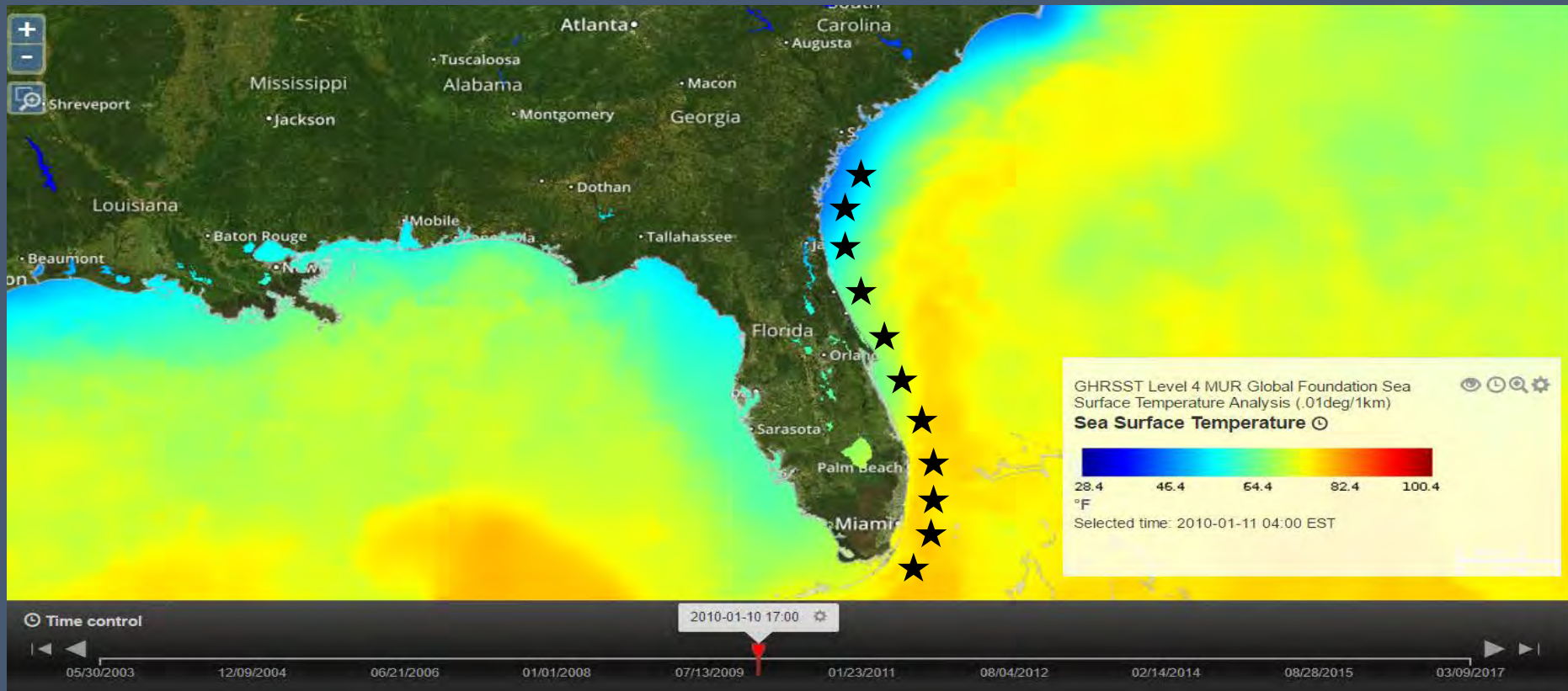
Q1: How Can SECOORA Data Portal & Services Advance Tracking Efforts

- FACT Network Website to Promote Outreach & Data Exchange (In Development)
 - Growing Numbers of Partners, Animals, & Locations Makes Data Sharing Challenging
 - Many Smaller FACT Partners Have Limited Means to Disseminate Findings Online
- NDBC Wave Buoys for Water Temp & Sea State
- Canaveral High Frequency Radar Site (Proposed)

Q2: Future Data, Assets & Models?

(= What Do We Want But Not Yet Have)

- Baseline Acoustic Telemetry Infrastructure (ATN)
- Query Tool for Site-Specific Temp & Chl Imagery



So Many to Thank.....

- KSC Ecological Program Staff
- FACT Network Partners
- KSC Env. Mgmt. Branch
- Jennifer Bucatari (BOEM)
- Angy Chambers (USAF)
- Mike Legare (Merritt Is. NWR)
- Funding Support From:
 - US Bureau of Ocean Energy Mgmt.
 - NASA
 - Naval Undersea Warfare Center
 - 45th Space Wing



A close-up, high-angle shot of a shark's head floating in dark, choppy ocean water. The shark's mouth is wide open, revealing a dense array of sharp, white, conical teeth. The interior of the mouth is a fleshy, pinkish-red color. The shark's skin is a light, mottled greyish-brown. A small, dark, circular mark is visible on the shark's snout. In the upper right corner, a white speech bubble with a black outline contains the word "QUESTIONS?" in a bold, black, sans-serif font.

QUESTIONS?