

# Habitat Preferences and Migration Patterns of Federally-Managed Fish Species

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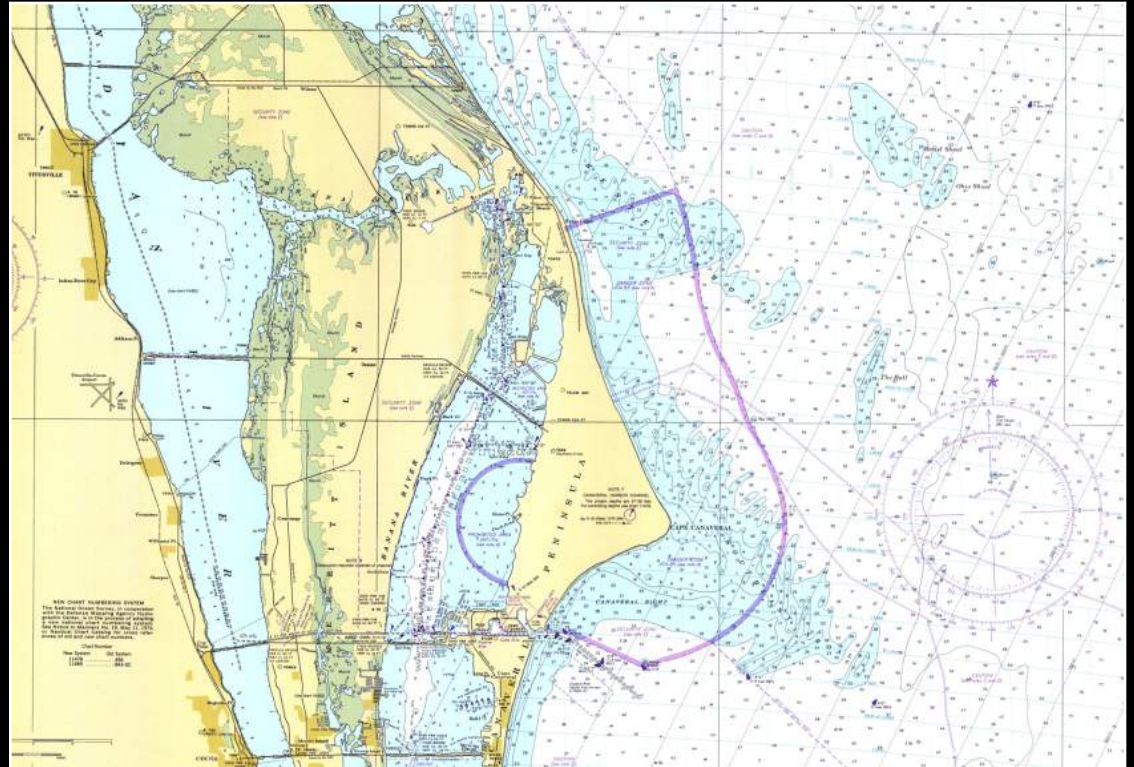
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Kennedy Space Center Ecological Program



# Goal: Determine presence of coastal species in sand shoal habitats

## ■ Canaveral offshore shoal habitat:

- Essential Fish Habitat
- Prominent ridge-swale features and shoal complexes



## ■ Data Gaps:

- Migratory coastal fish species
- Movements on local and regional scales
- Characterization and assessment of habitat value and function

- Target Species – coastal pelagics



- Spawn in nearshore/estuarine habitats late summer to fall



- Migrate seasonally in coastal waters



- Migrate N in summer and S or offshore in winter

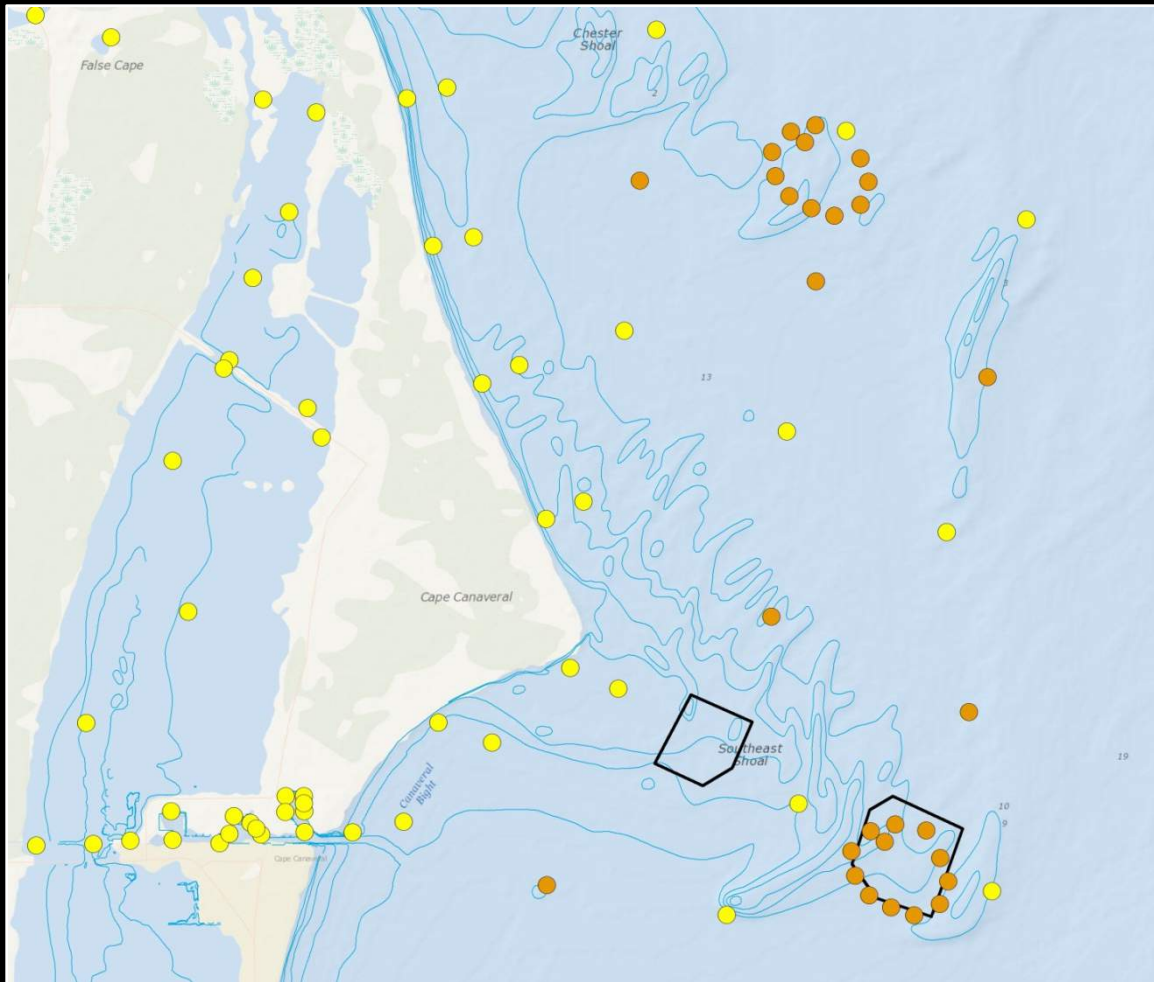


- Canaveral nursery 



# Methodology: Acoustic telemetry

- Vemco VR2W receivers
  - 57 in Canaveral waters

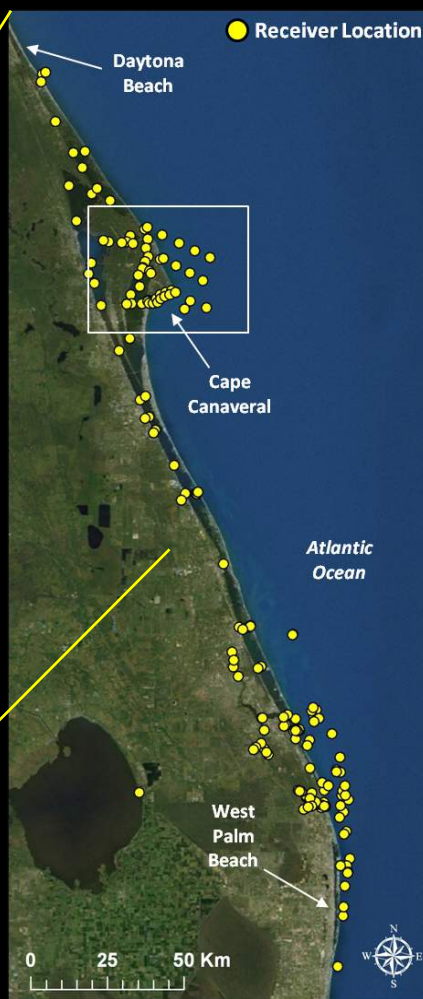
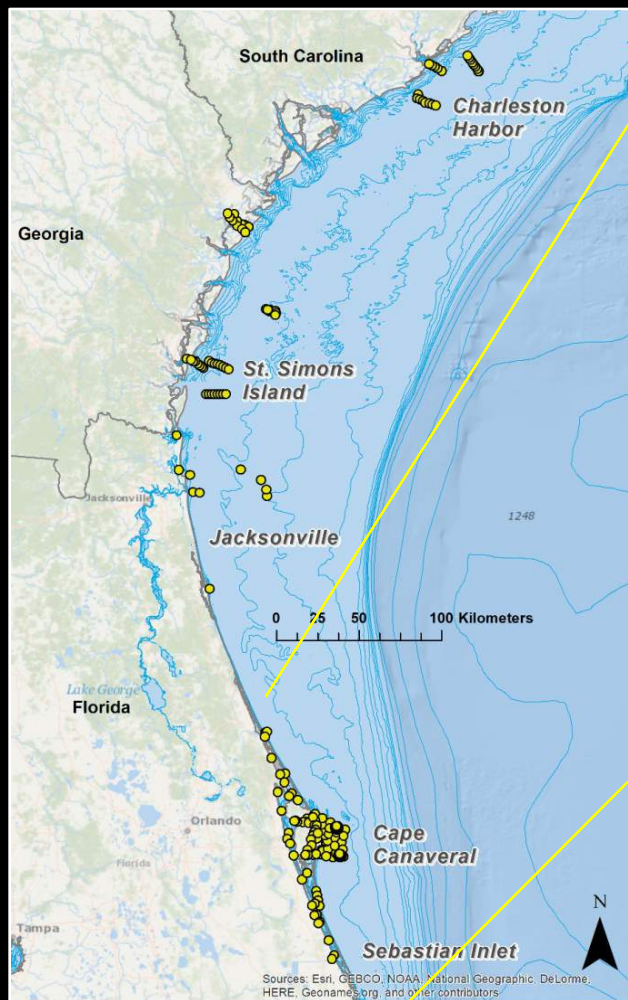


## Methodology: Acoustic telemetry

- Vemco V16 tags
  - 90 sec burst interval
  - 5-9.7 yr battery life
- Vemco V13 tags
  - 90 sec burst interval
  - 2.2 yr battery life



# Florida Atlantic Coast Telemetry (FACT) and Atlantic Cooperative Telemetry (ACT) arrays: Tracking regional movements



- Bimini Biological Field Station
- Cape Eleuthera Institute (Bahamas)
- Continental Shelf Associates
- East Coast Biologists
- Florida Atlantic University
- Florida Fish & Wildlife Conservation Commission
- Florida Institute of Technology
- Florida International University
- Florida Program for Shark Research
- Florida State Museum of Natural History
- Florida State University
- Georgia Department of Natural Resources
- Loxahatchee River District
- Pew Institute of Ocean Sciences
- Rosenstiel School of Marine and Atmospheric Science
- Savannah State University
- Shedd Aquarium
- South Carolina Dept. of Natural Resources
- United States Geological Survey
- University of Central Florida
- University of Florida
- University of Georgia
- University of North Florida

# Days at Liberty

2014: 43

2015: 19

2014: 32

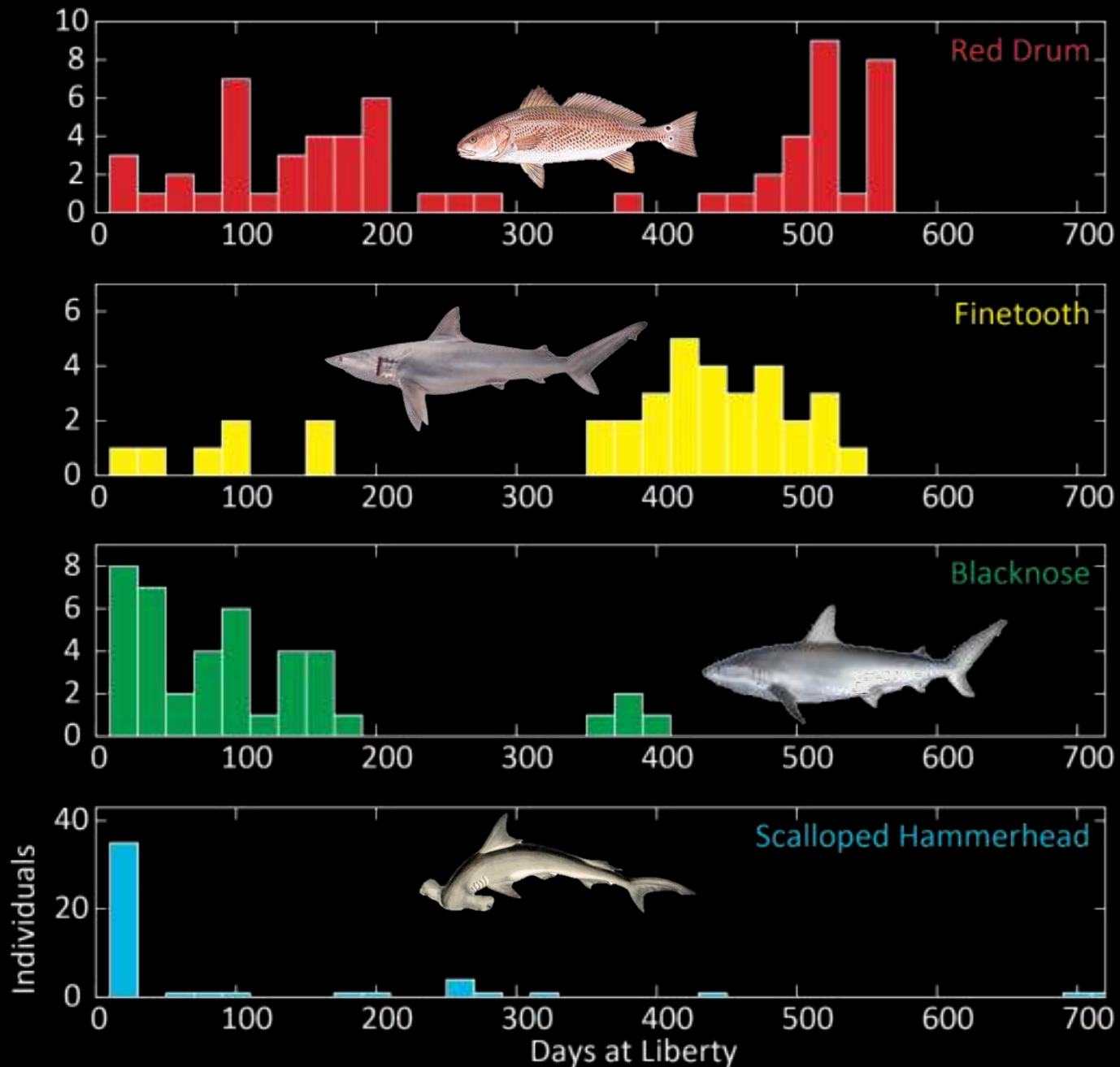
2015: 4

2014: 8

2015: 33

2013: 7

2014: 42



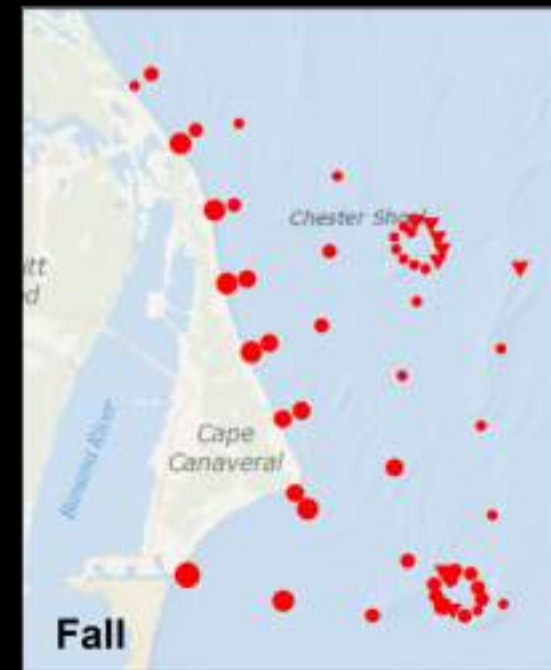
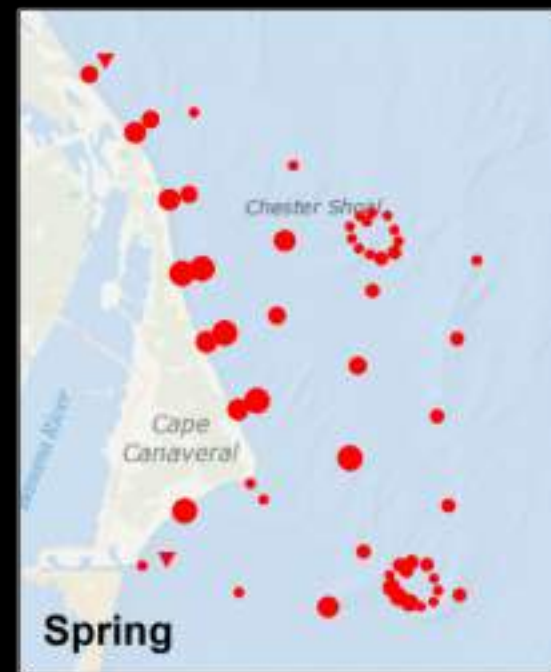
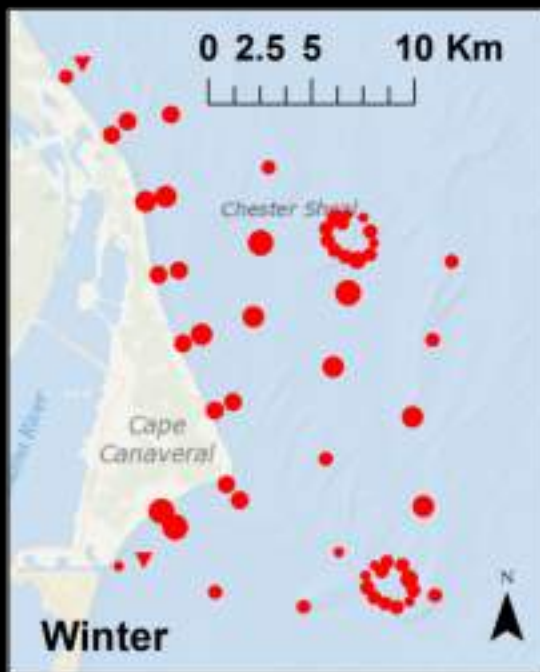
# Red Drum



No. Fish Detected

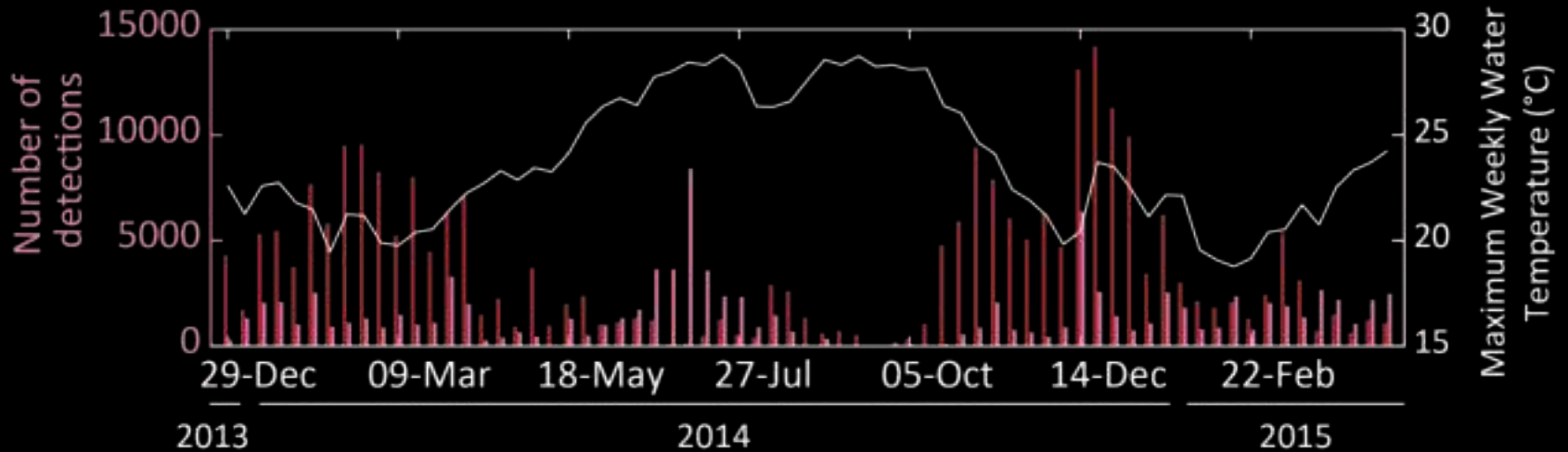
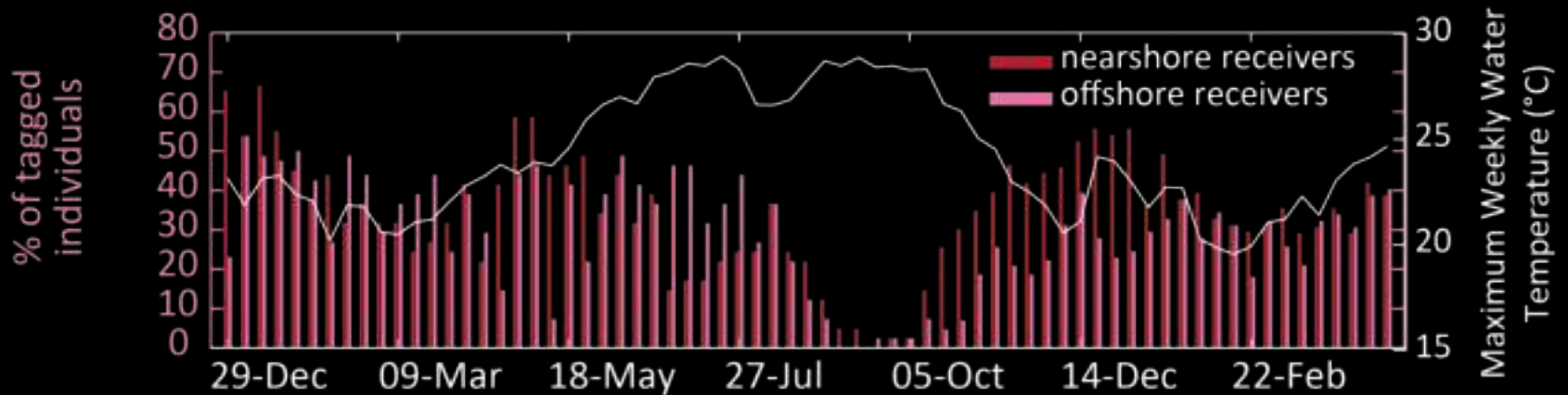
- ▼ 0
- 1 - 3
- 4 - 6

- 7 - 9
- 10 - 12
- 13 - 15





# Red Drum



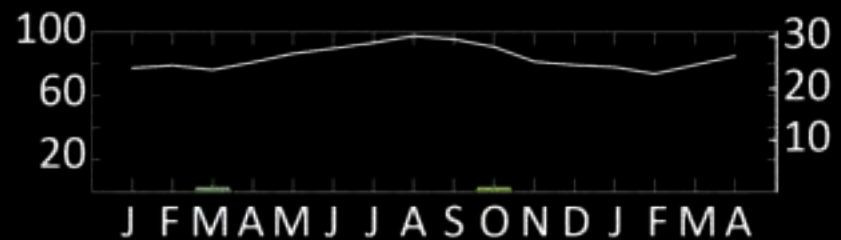
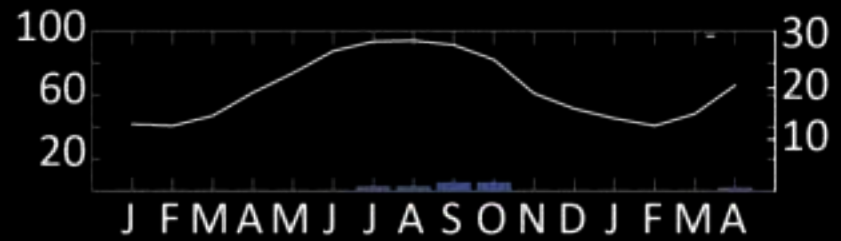
Nearshore: < 1.5 km from shore

Offshore: 1.5-15 km from shore

# Red Drum



Percent of tagged individuals



Average weekly water temperature (°C)

# Finetooth shark



No. Fish Detected

▼ 0

● 1 - 3

● 4 - 6

●

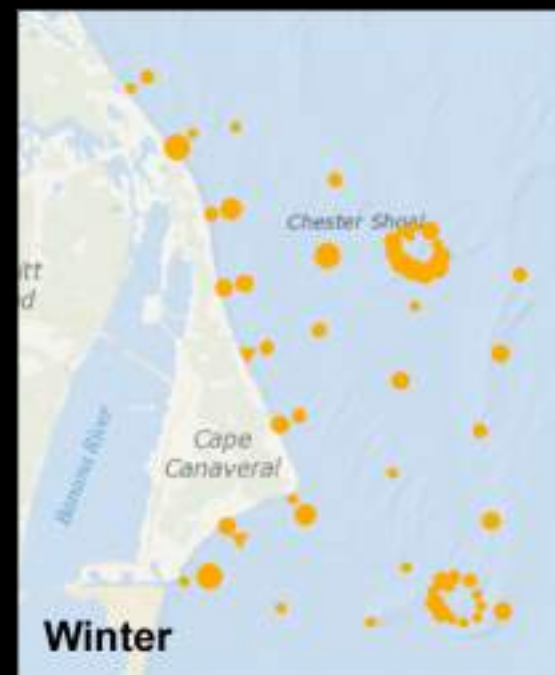
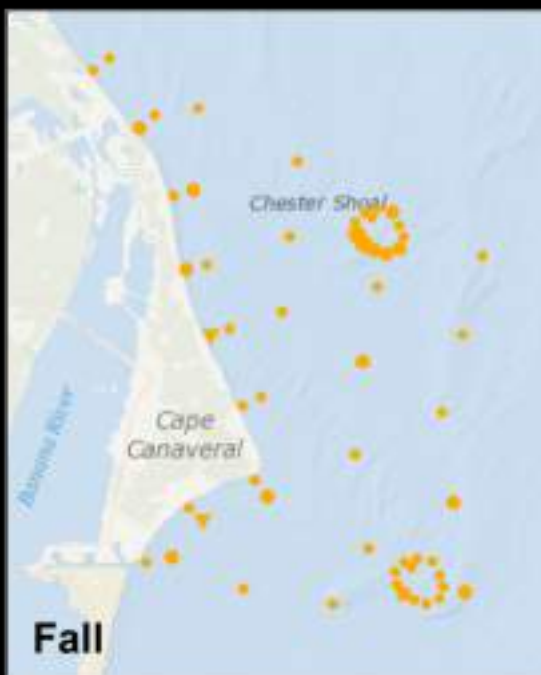
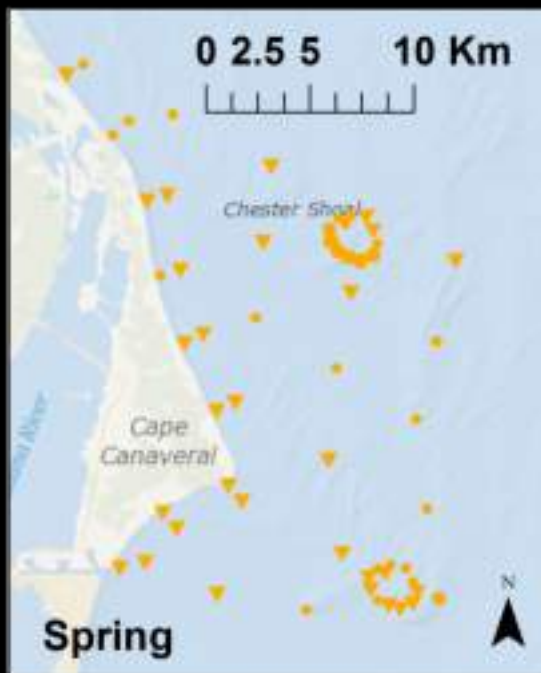
7 - 9

●

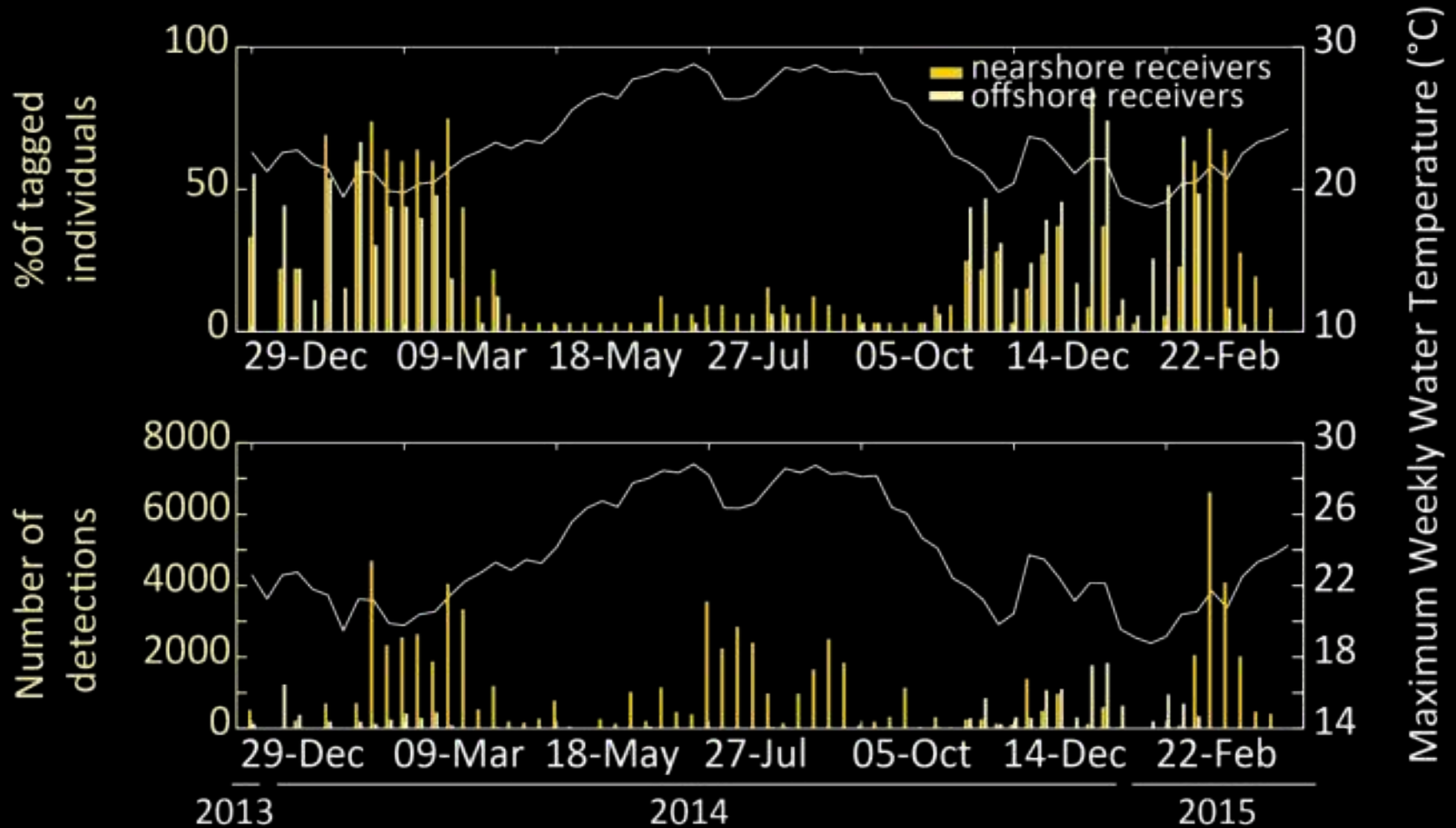
10 - 12

●

13 - 15



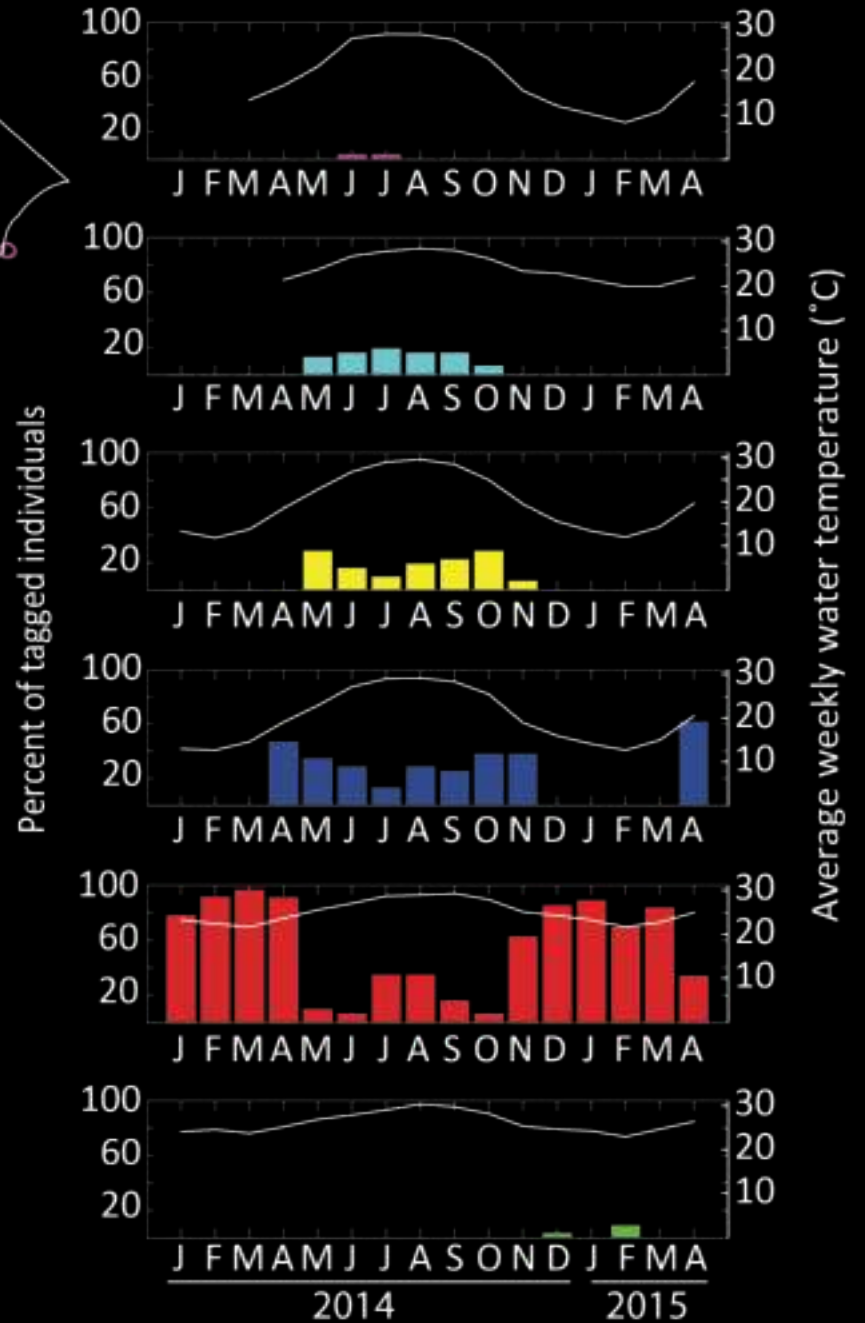
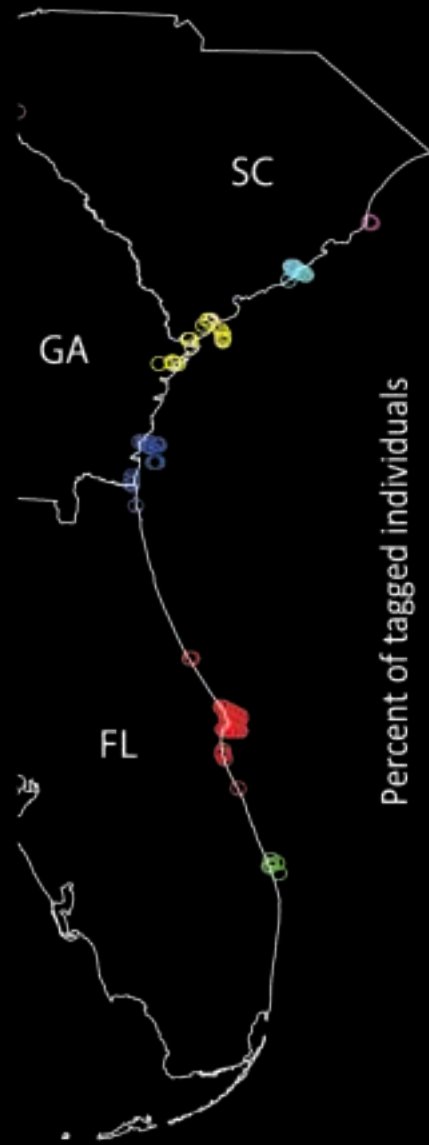
# Finetooth shark

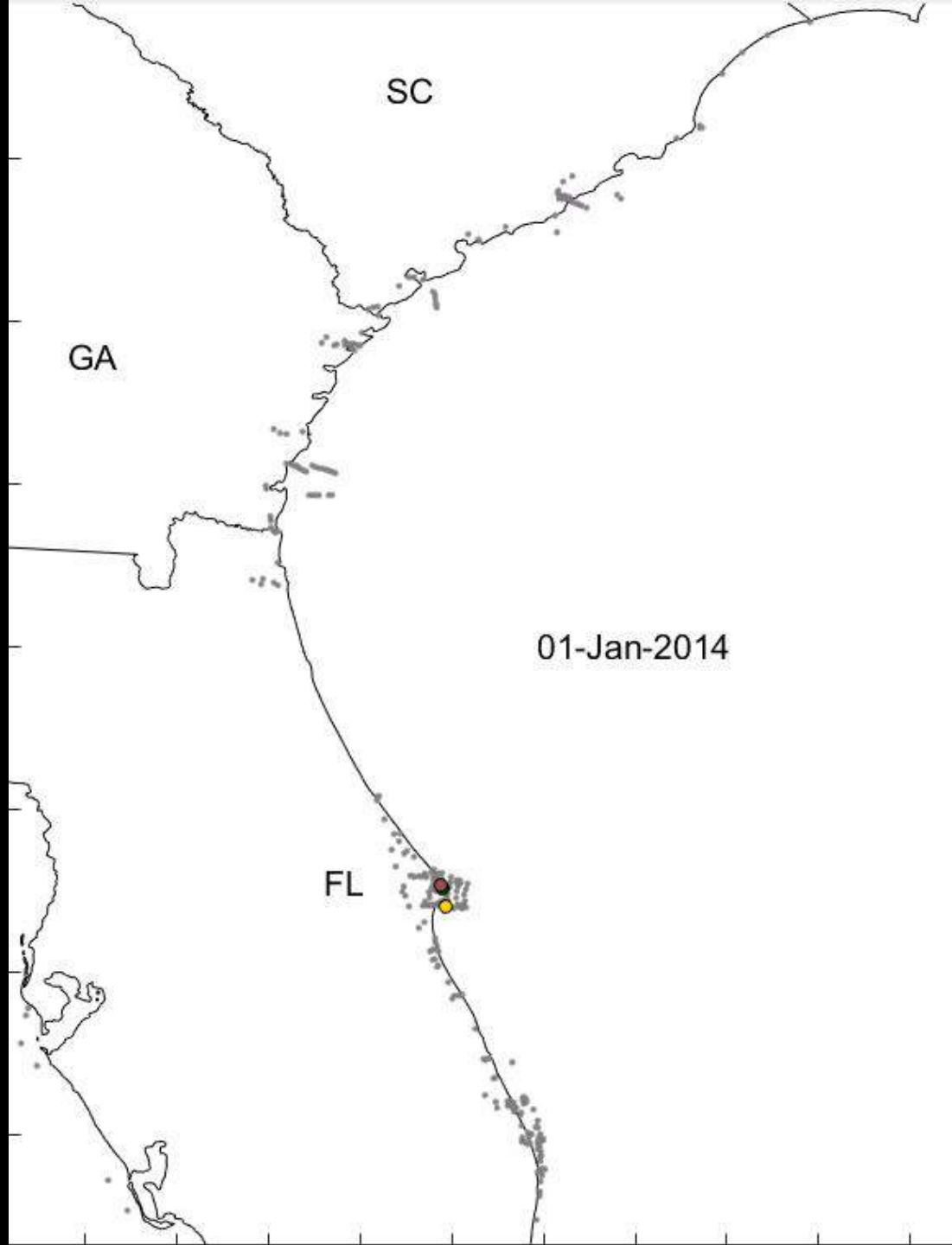


Nearshore: < 1.5 km from shore

Offshore: 1.5-15 km from shore

# Finetooth sharks

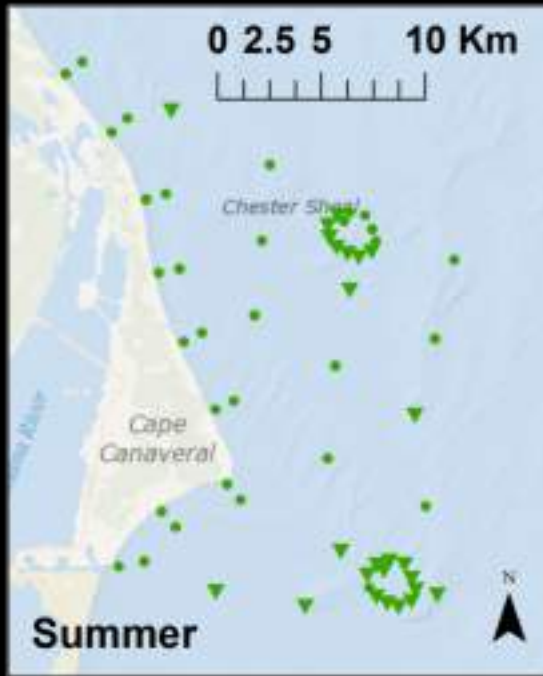




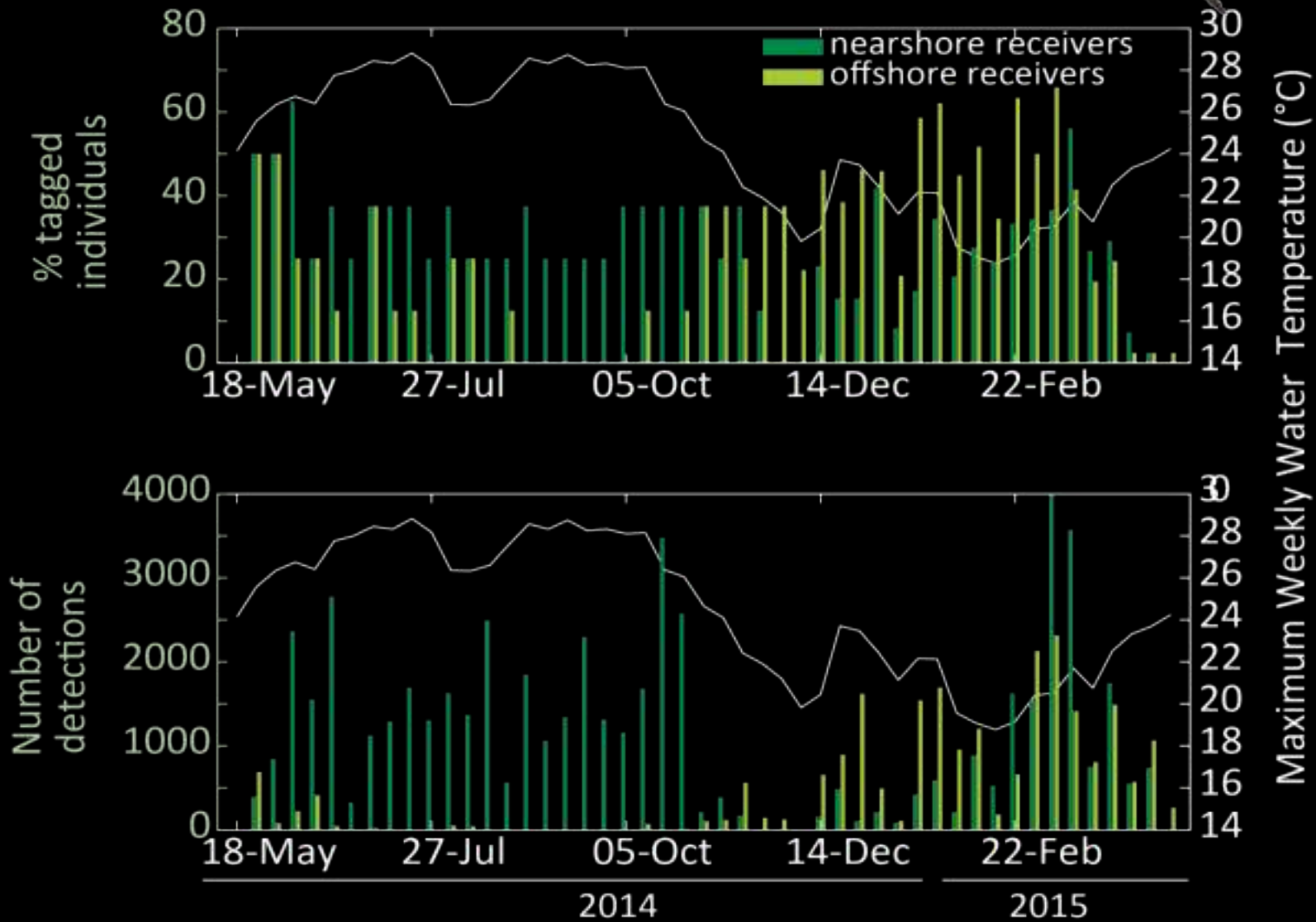
# Blacknose shark



<b>No. Fish Detected</b>	●	4 - 6
▼	0	7 - 9
●	1 - 3	10 - 12



# Blacknose shark

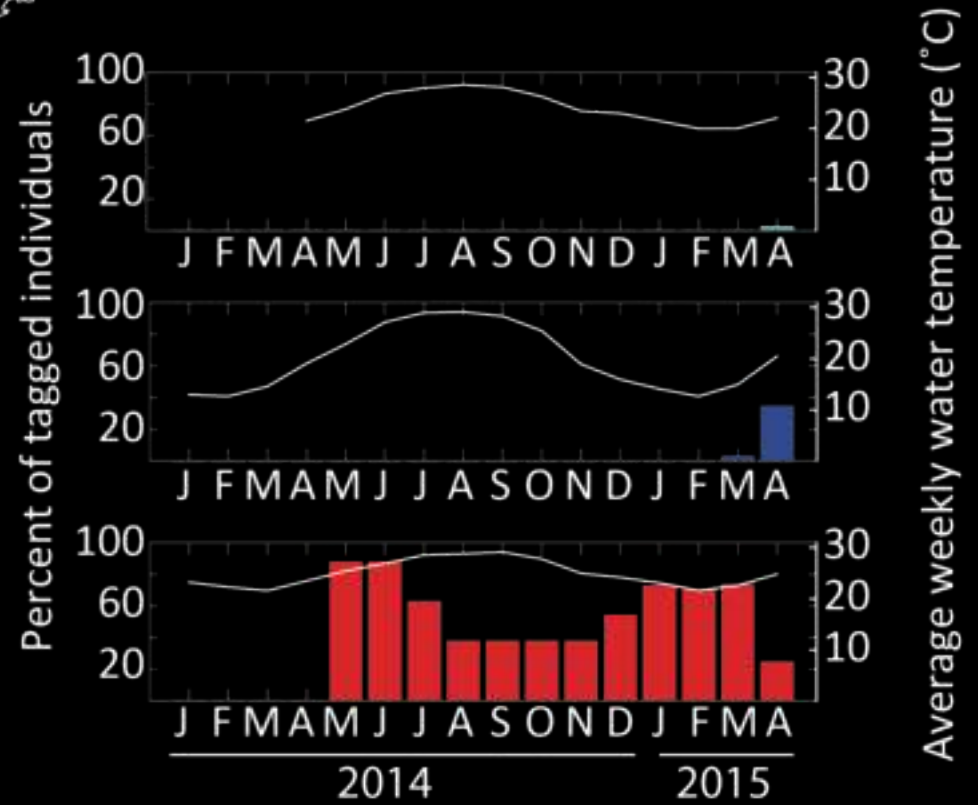
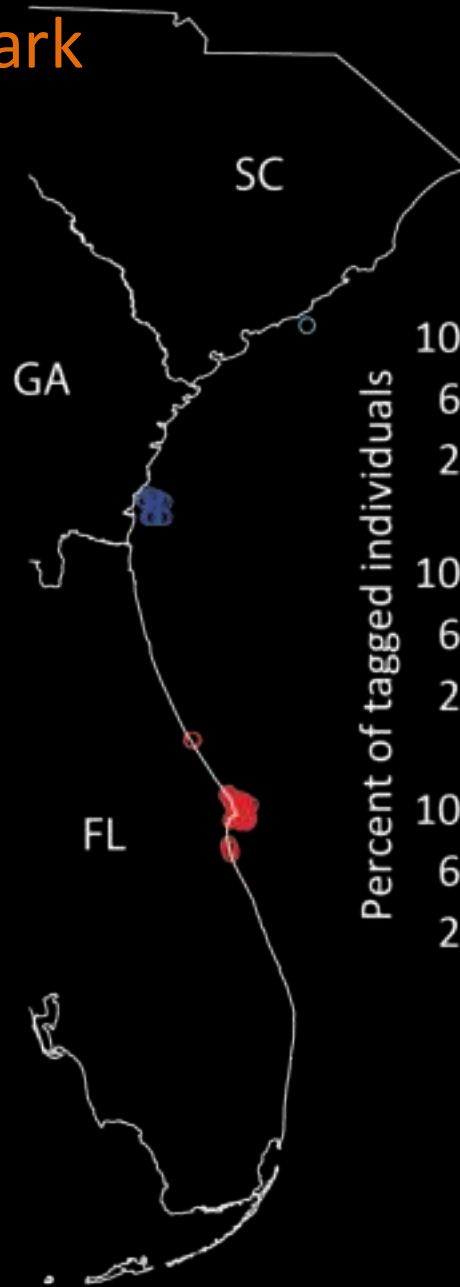


Nearshore: < 1.5 km from shore

Offshore: 1.5-15 km from shore



# Blacknose shark



# Scalloped Hammerhead shark



No. Fish Detected

● 1 - 3

▼ 0

● 4 - 6



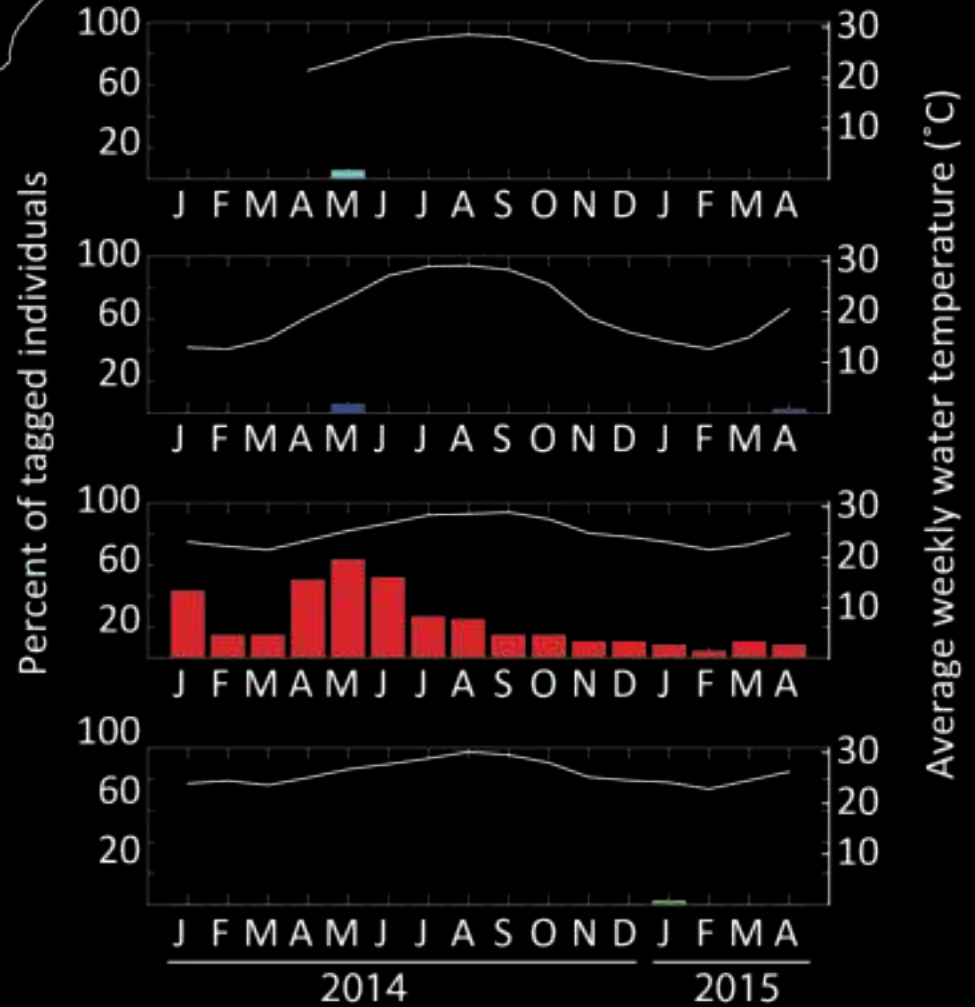
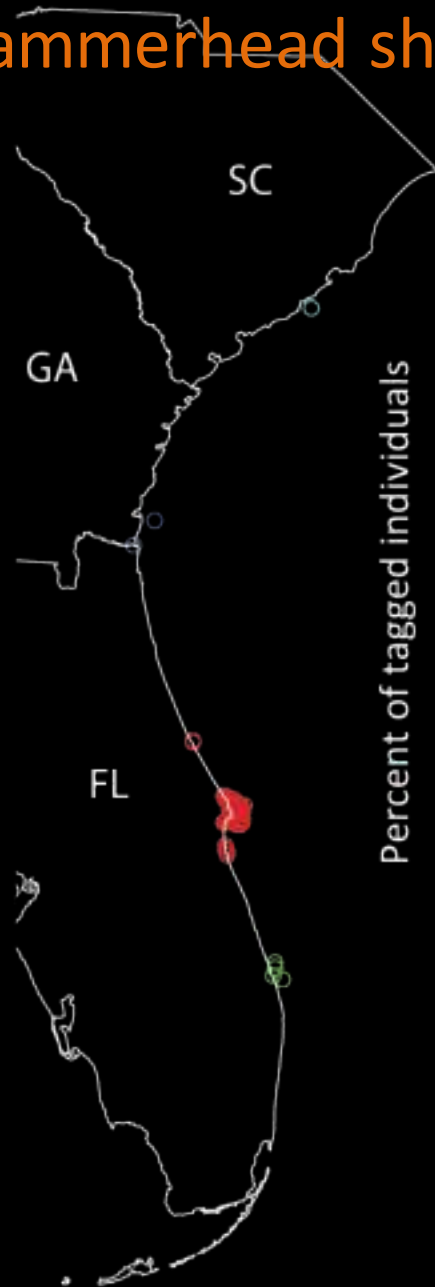
# Scalloped hammerhead shark



Nearshore: < 1.5 km from shore

Offshore: 1.5-15 km from shore

# Scalloped hammerhead shark



## Discussion

- Fish show consistent annual movements
- **Red Drum**
  - Use variety of water depths (3-20 m)
  - Detection at estuaries in GA
  - Disappearance from Canaveral array coincides with spawning
- **Finetooth sharks**
  - Spread in movements as temperatures increase
  - Detections in estuaries in GA, SC; none in Canaveral
  - Most move N March – October, some return in July



# Discussion



- **Blacknose sharks**
  - Fewer individuals detected outside of Canaveral
  - Individuals detected outside Canaveral in Spring
  - More consistent year round presence
- **Scalloped hammerhead sharks**
  - Coastal nursery
  - Highly mobile – likely not shoal associated
  - Subadults may return in spring

# Thank you

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Lydia Wilson Florida Institute of Technology

Mike Arendt, Elizabeth Miller, Bryan Frazier South Carolina Department of Natural Resources

Mike McCallister University of North Florida

Fish collection and tagging under NMFS Biological Opinion (Permit F/SER/2011/05647) and the State of Florida Special Activity License SAL-12-0512A-SR, and protocols reviewed by KSC Institutional Animal Care & Use Committee (Protocol GRD-06-049)