



# Cobia Spatial Distribution and Movement

MATT PERKINSON, Stock ID workshop representative

# Group Members

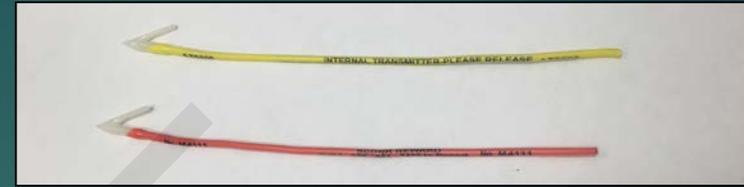
- ▶ Kevin Weng *Work Group Leader*: Virginia Institute of Marine Science
- ▶ John Graves/Douglas Jensen: Virginia Institute of Marine Science
- ▶ Susanna Musick: Virginia Institute of Marine Science
- ▶ Ken Brennan: NOAA SEFSC Beaufort, NC
- ▶ Steve Poland: North Carolina Division of Marine Fisheries
- ▶ Chris Wilson: North Carolina Division of Marine Fisheries
- ▶ Jeff Buckel: SAFMC/North Carolina State University
- ▶ Matt Perkinson: South Carolina Department of Natural Resources
- ▶ Chris Kalinowsky: Georgia Department of Natural Resources
- ▶ Jim Whittington: Florida Fish and Wildlife Conservation Commission
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- ▶ Jim Franks: Gulf Coast Research Laboratory, University of Southern Mississippi
- ▶ David Hanisko: NOAA SEFSC Pascagoula, MS

# Data Sources

- ▶ Presence/absence from independent surveys
- ▶ SEAMAP larval surveys-GOM
- ▶ Commercial catch data (logbooks)
- ▶ PSATs (VA)
- ▶ Acoustic telemetry: FL/GA/SC, NC, VA
- ▶ Conventional (dart) tagging



# Conventional Tagging



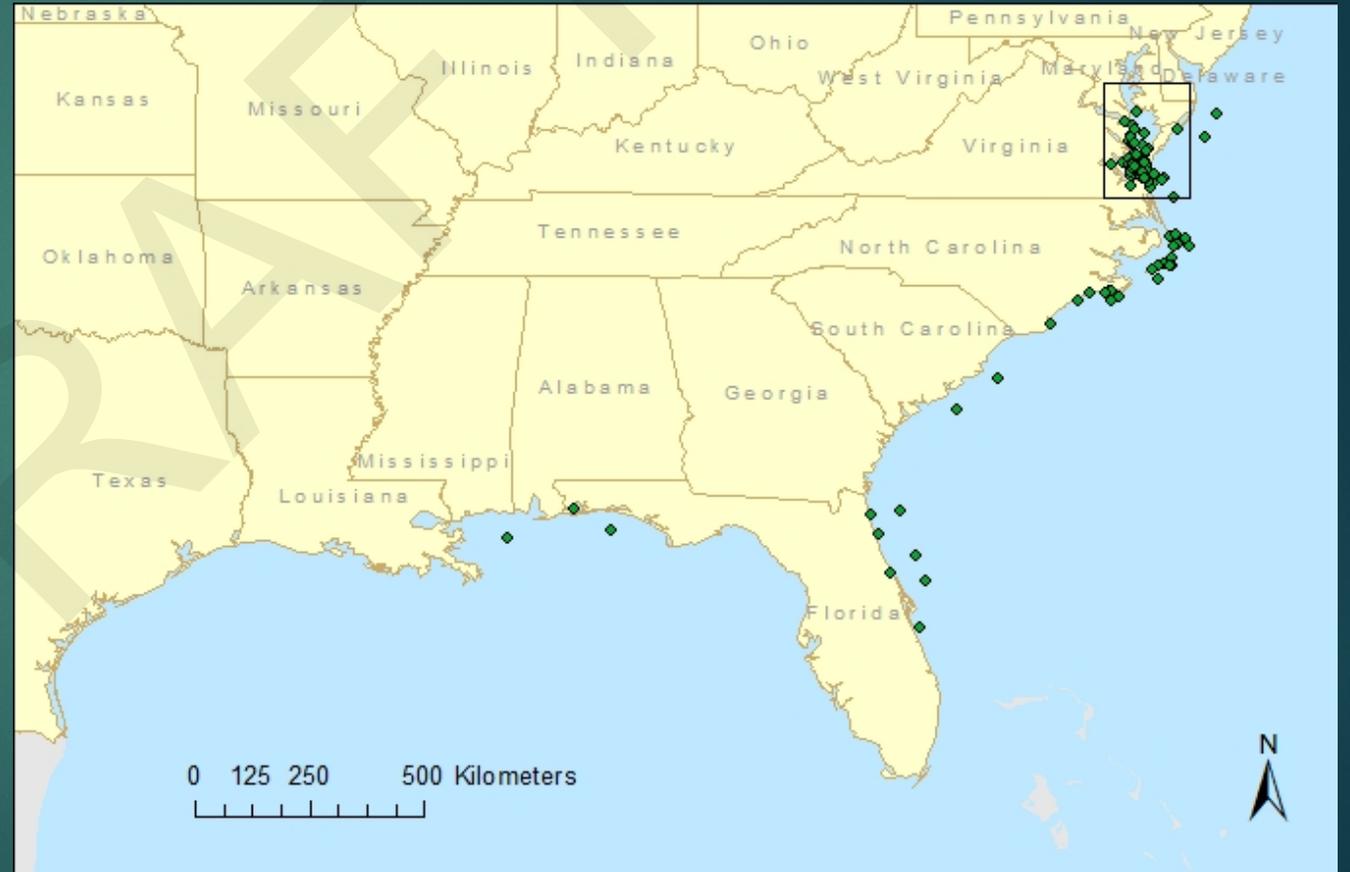
- ▶ Similar methods
- ▶ Focused on positive recapture data
- ▶ Data pooled from all sources for analysis
- ▶ Grouped by tag/recapture zones
- ▶ 30 days at large or more
- ▶ 25K tagged, 2K recaptures

Data Source	Total Tagged	Total Recaptured	Recapture %	Years Covered
VGFTP	3,899	433	11.1	1995-2017
NCDMF	73	5	6.8	2017
SCDNR	1,170	214	18.3	1990-2014
HHRF	95	14	14.7	2007-2012
SEFSC	1,557	159	10.2	1986-2014
MOTE	920	100	10.9	1991-2001
GFT	24	2	8.3	2015-2017
GCRL	18,129	1,197	6.6	1988-2017
<b>TOTAL</b>	<b>25,867</b>	<b>2,124</b>	<b>8.2</b>	<b>1986-2017</b>

# Conventional Tagging

Virginia: High site fidelity and exchange with NC. Some exchange with SC and FL.

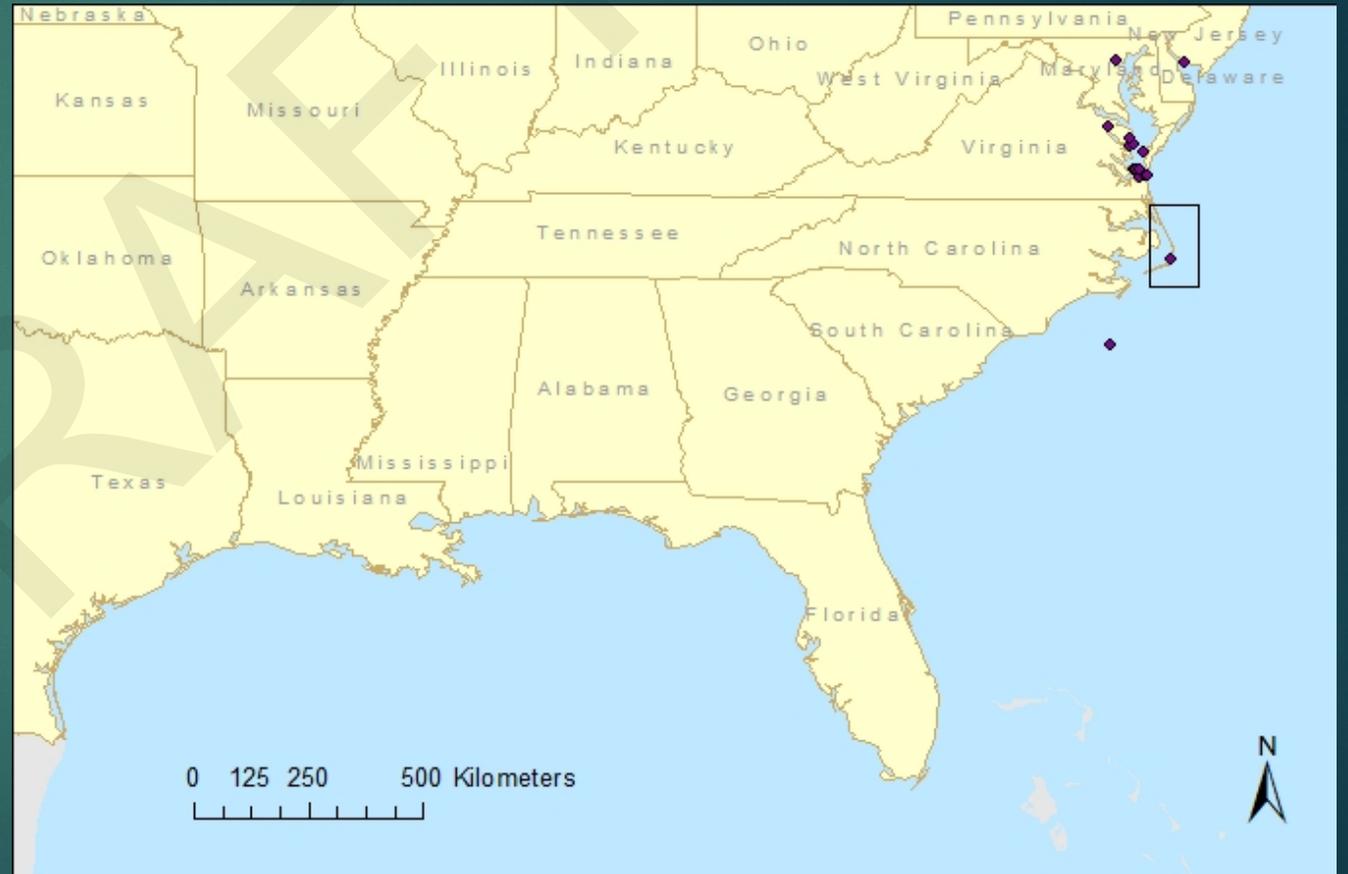
Recapture Zone	Number Recaptured	Percentage of Recaptures
North of Virginia	2	0.6
Virginia	293	<b>83.5</b>
North Carolina	42	<b>12.0</b>
South Carolina	2	0.6
Georgia	1	0.3
North of Brevard	7	2.0
Brevard	1	0.3
Gulf of Mexico	3	0.9
Total	351	



# Conventional Tagging

North Carolina: Almost exclusively recaptured in Chesapeake, but small sample size

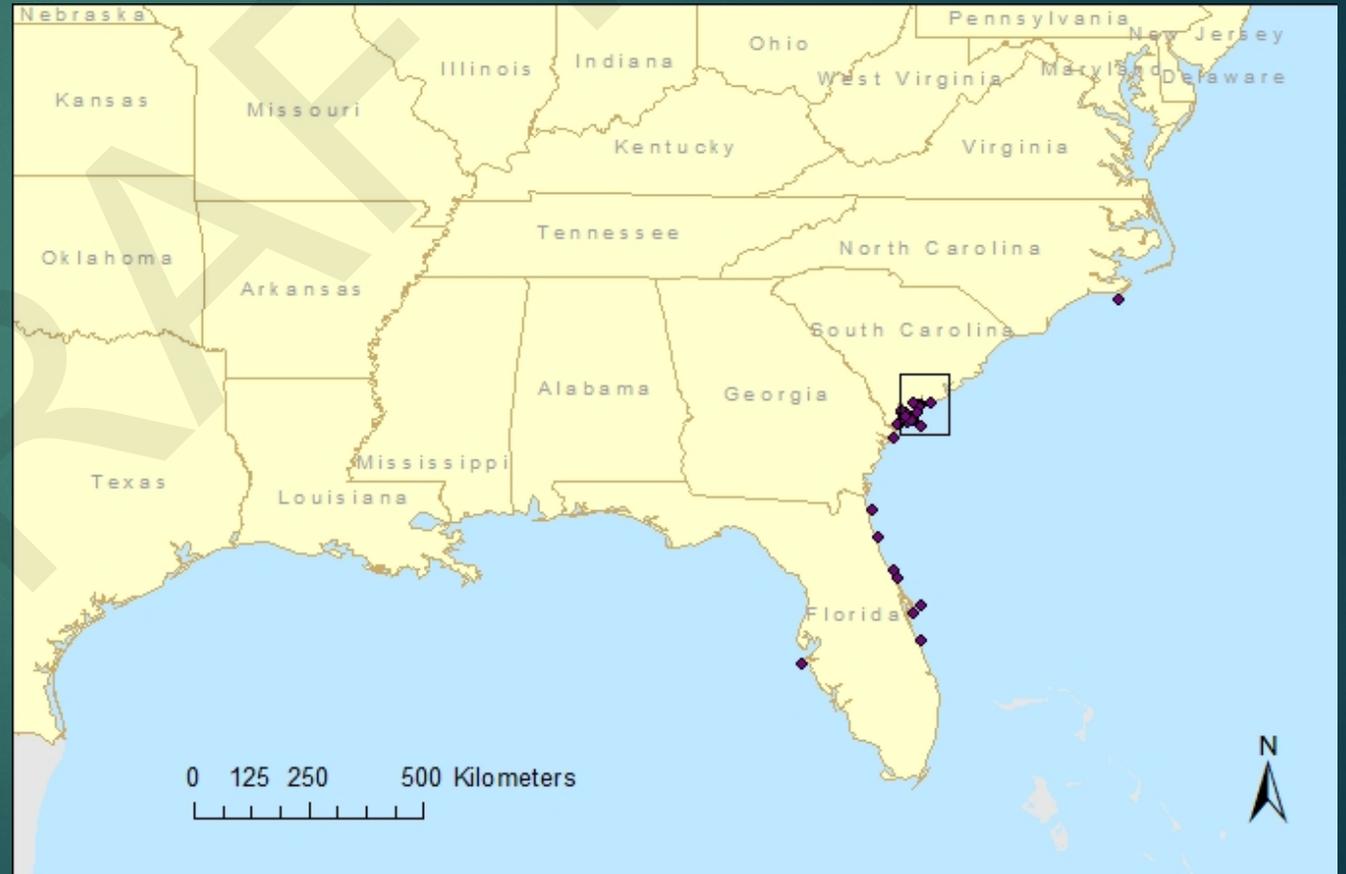
Recapture Zone	Number Recaptured	Percentage of Recaptures
North of Virginia	1	4.8
Virginia	18	<b>85.7</b>
North Carolina	1	4.8
South Carolina	1	4.8
Total	21	



# Conventional Tagging

South Carolina: High site fidelity to estuarine spawning grounds, some exchange with east coast of Florida

Recapture Zone	Number Recaptured	Percentage of Recaptures
North Carolina	1	0.8
South Carolina	112	<b>87.5</b>
North of Brevard	4	3.1
Georgia	1	0.8
Brevard	7	5.5
Florida (unspecified)	2	1.6
Gulf of Mexico	1	0.8
Total	128	



# Conventional Tagging

Brevard (central FL): Fish moved both north and to south/GOM

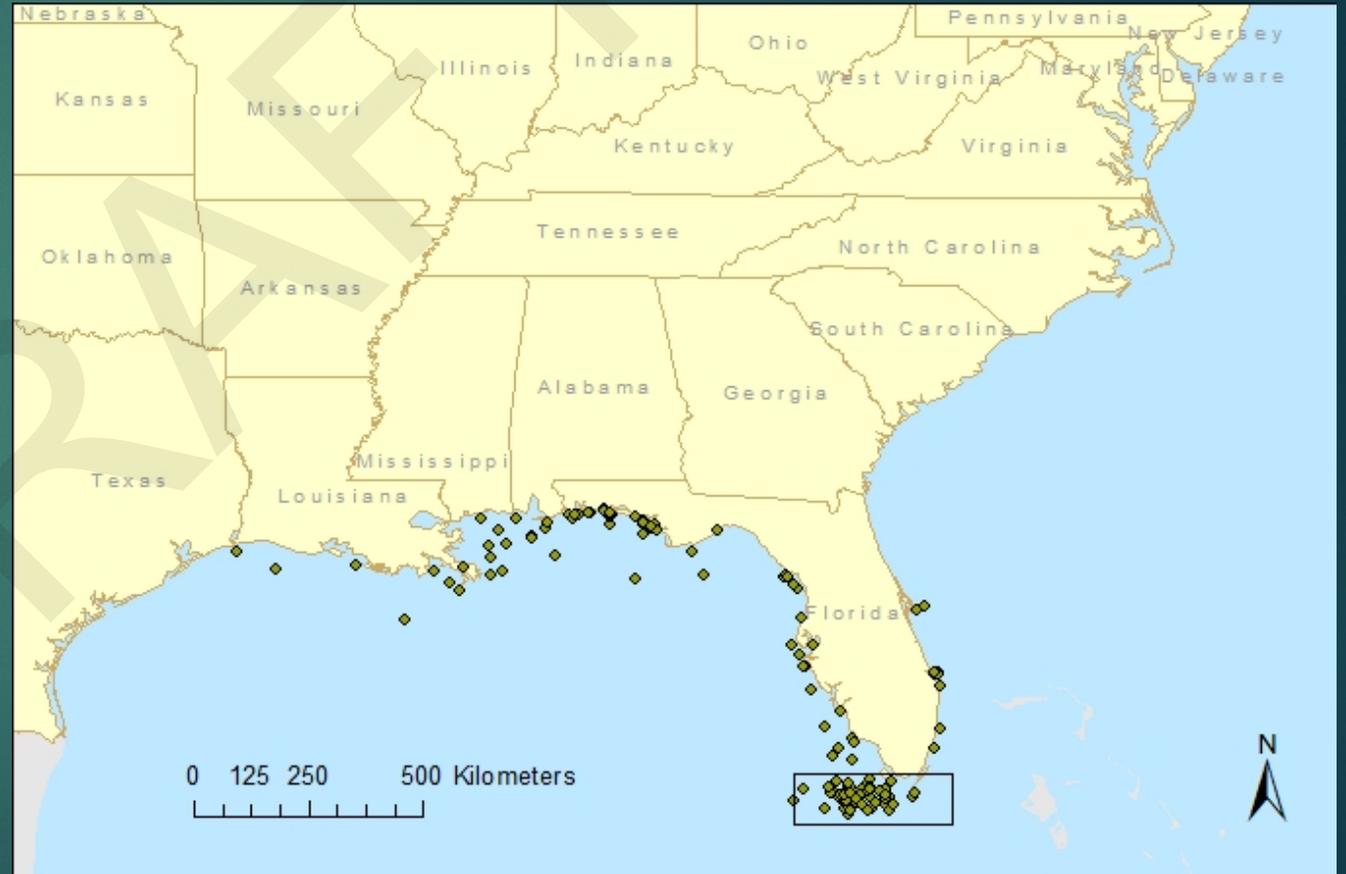
Recapture Zone	Number Recaptured	Percentage of Recaptures
North of Virginia	1	1.1
Virginia	5	5.6
North Carolina	4	4.4
South Carolina	1	1.1
Georgia	2	2.2
North of Brevard	10	11.1
Brevard	33	36.7
South of Brevard	9	10.0
Keys	5	5.6
Gulf of Mexico	20	22.2
Total	90	



# Conventional Tagging

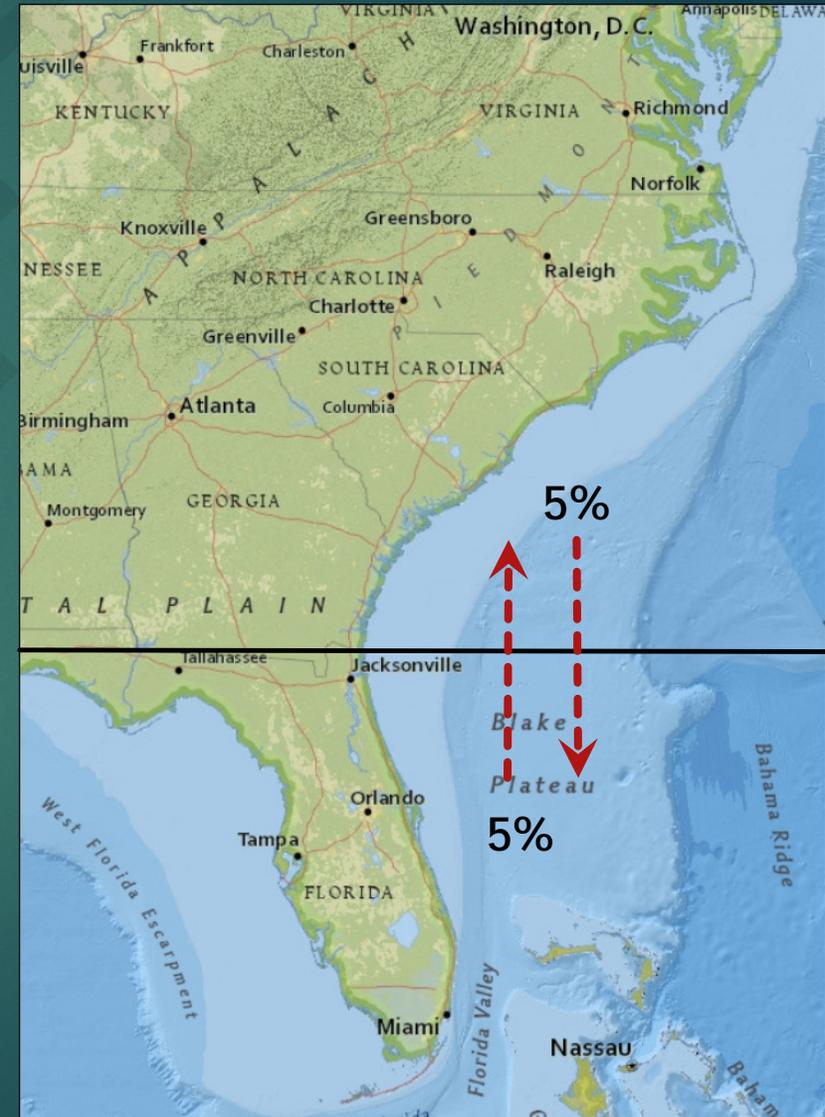
Florida Keys: Former stock boundary but no recaptures north of Cape Canaveral

Recapture Location	Number Recaptured	Percentage of Recaptures
Brevard	2	1.1
South of Brevard	8	4.4
Keys	104	57.5
Gulf of Mexico	67	37.0
Total	181	

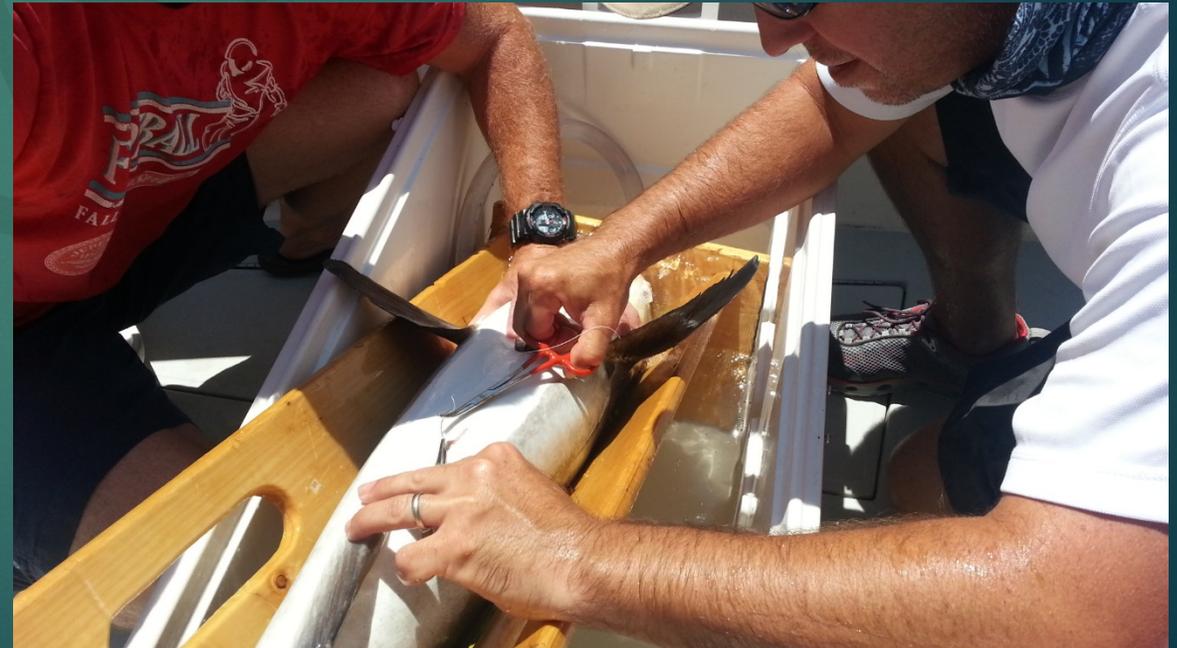


# Conventional Tagging

- ▶ Cobia tagged above FL/GA line were rarely recaptured below (5%)
- ▶ Cobia tagged below FL/GA line were rarely captured above (5%)
- ▶ High degree of site fidelity in VA/SC



# Acoustic Telemetry





# Acoustic Telemetry

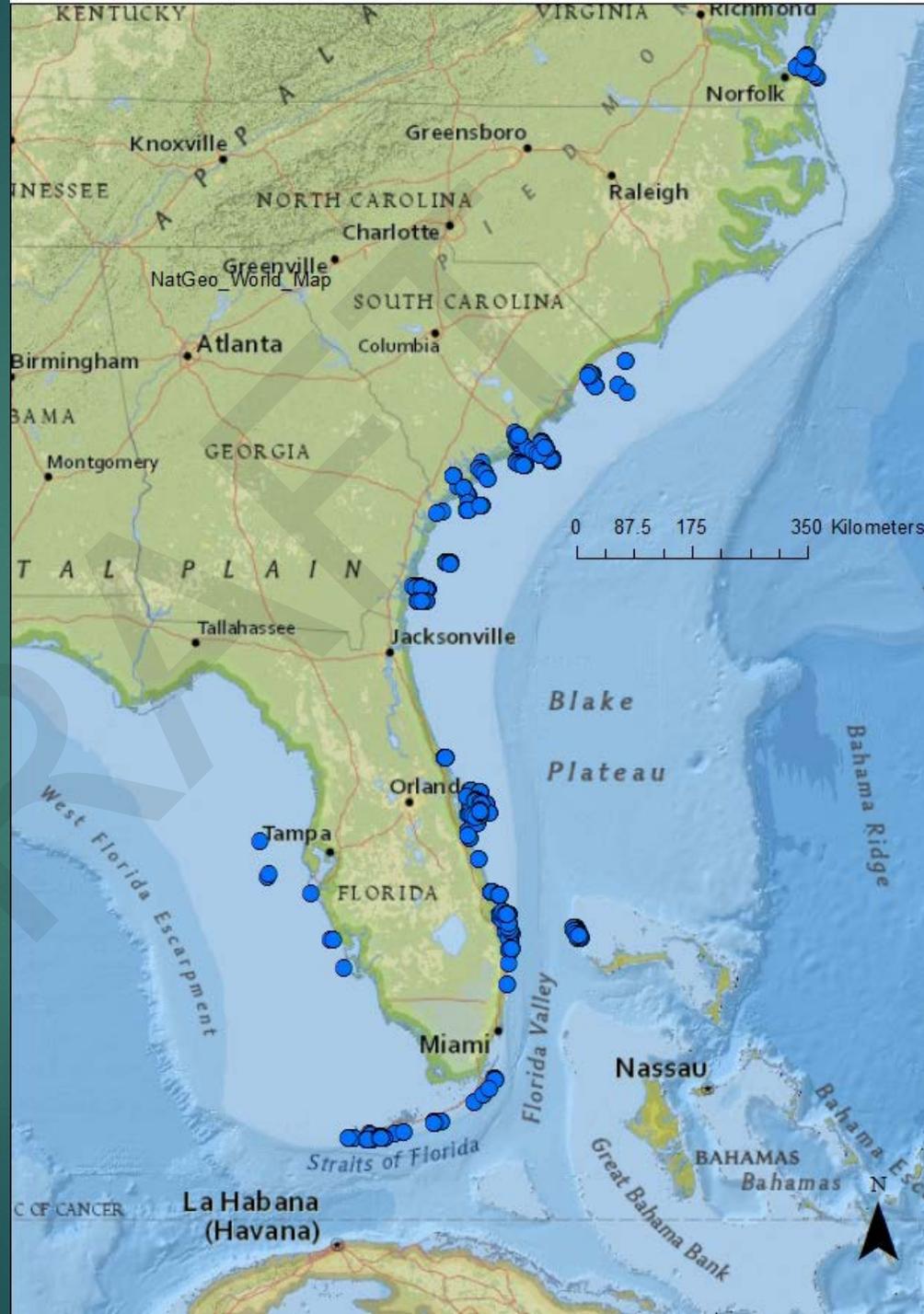
n=143  
(140 viable)



# Acoustic Telemetry

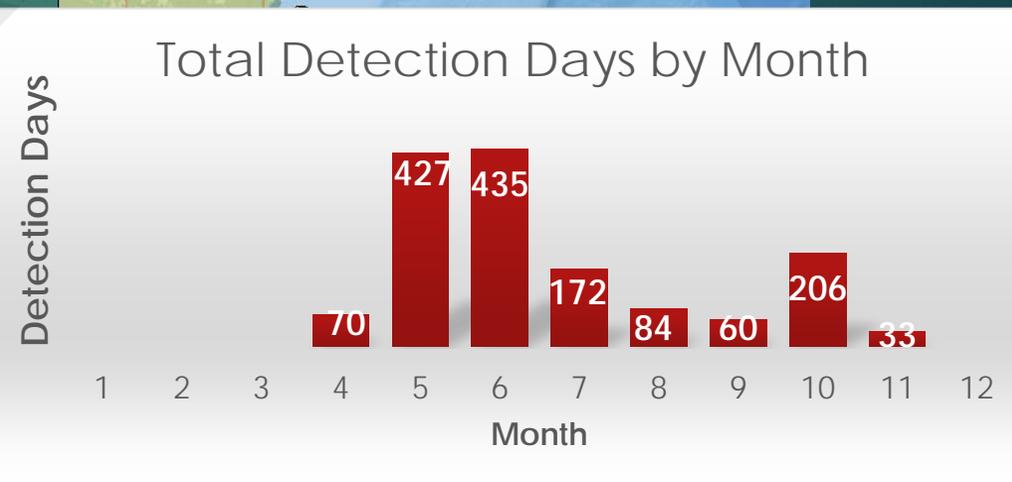
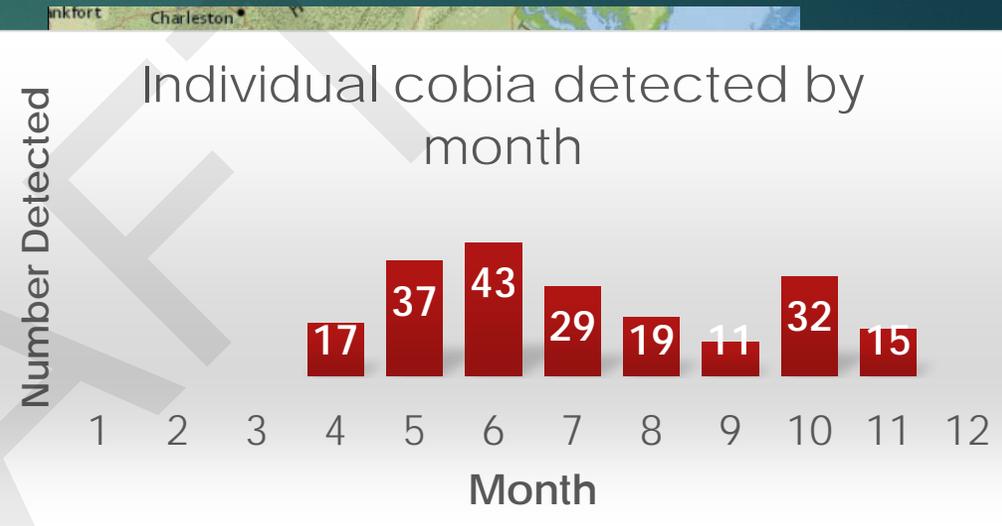
## Results

- ▶ 128 of 140 detected (91%)
- ▶ 90K+ total detections
- ▶ 4K+ total detection days
- ▶ 380 different receivers
- ▶ Up to 110 detection days



# South Carolina and Georgia

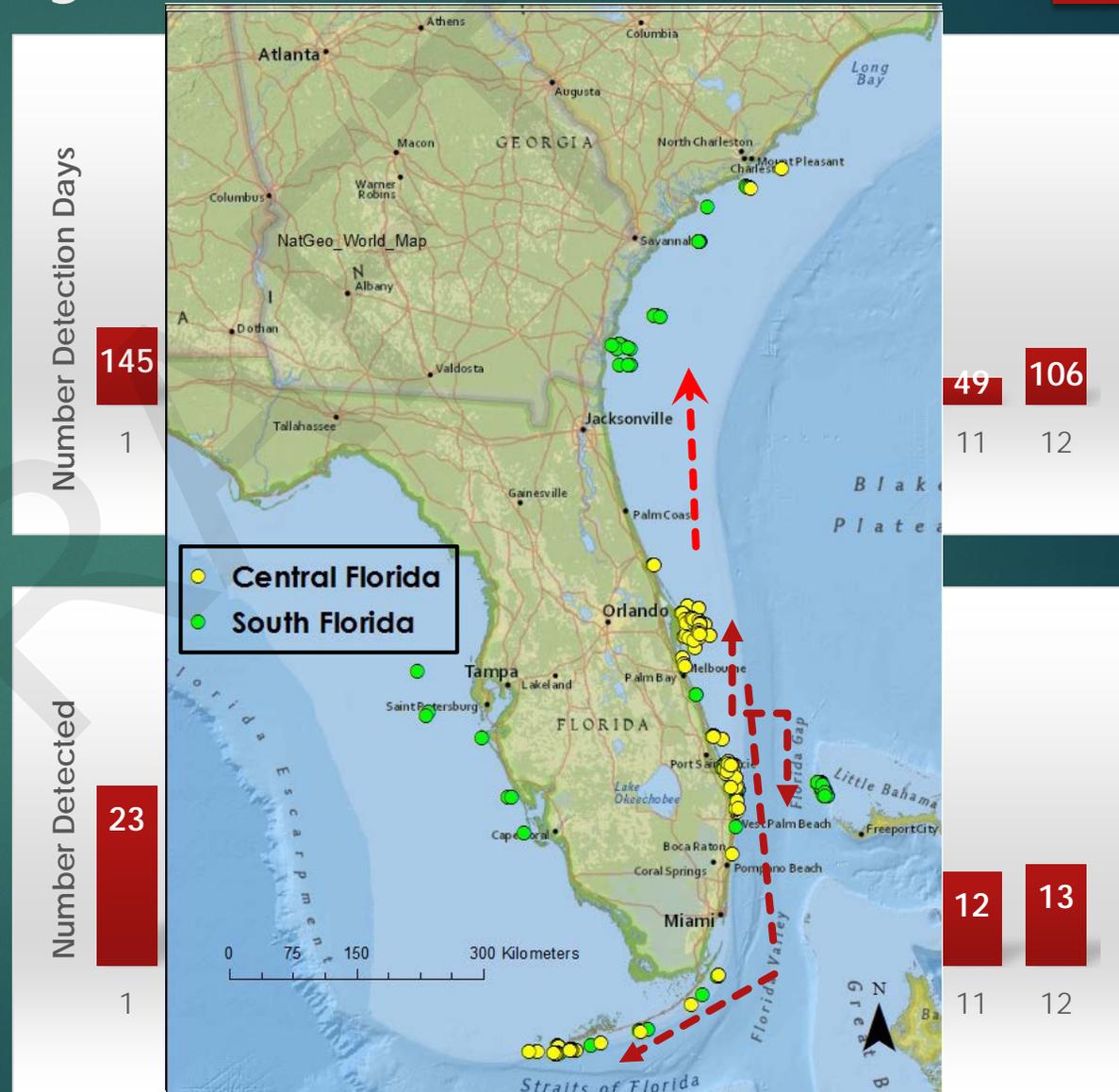
- ▶ Geographic extent of detections: 1,162 km
- ▶ Two cobia detected in Chesapeake Bay
- ▶ No detections in Florida
- ▶ Peak detections in May, June, October
- ▶ No detections during December-March



# Acoustic Telemetry

## Central and South Florida

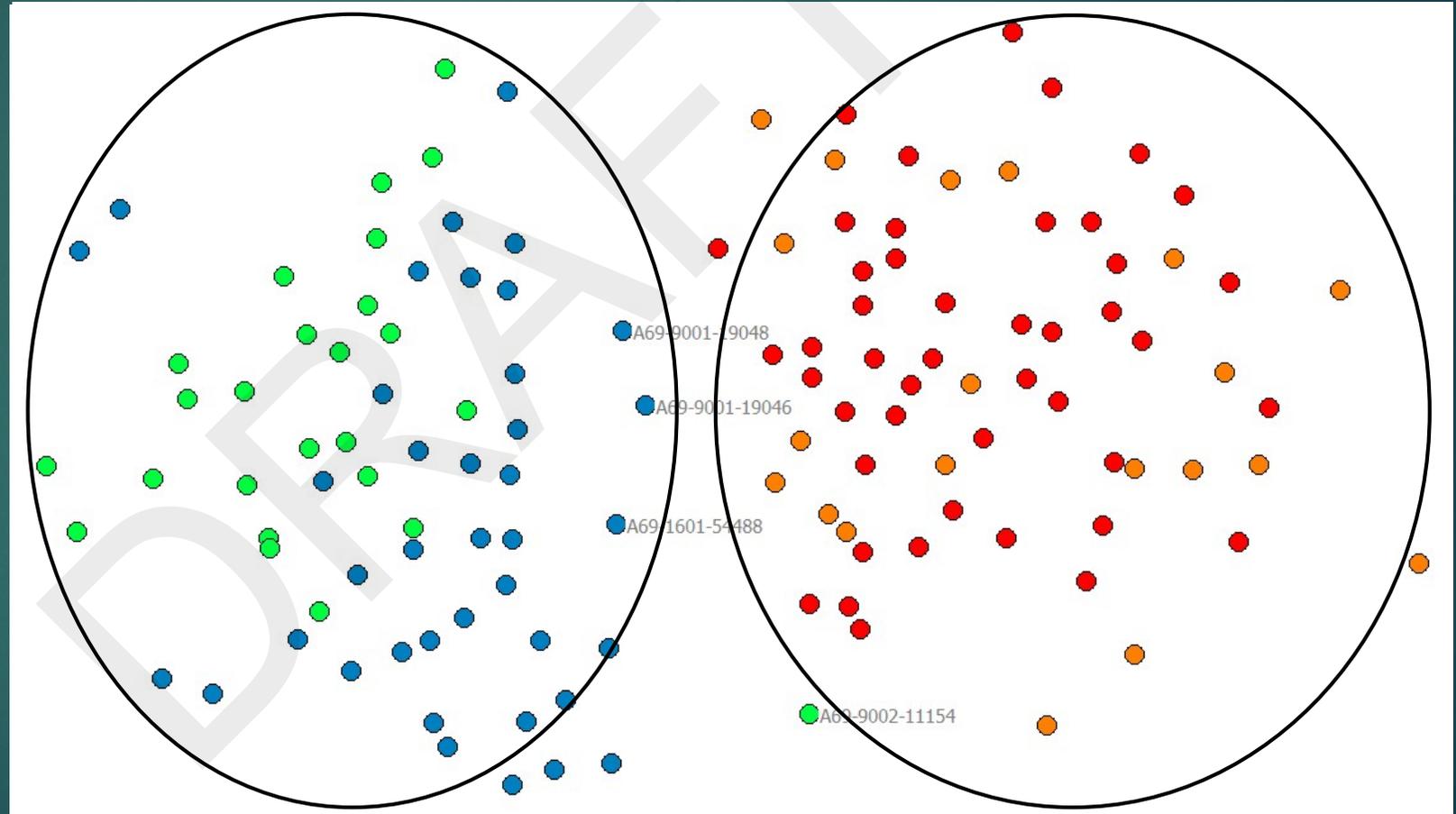
- ▶ Detections in every month
- ▶ Total extent 1,800 km
- ▶ 6 cobia moved to GA/SC
- ▶ “Resident” group in central/south Florida
- ▶ Migratory group Keys/Gulf



# Network Analysis

- South Florida
- Georgia
- Central Florida
- South Carolina

- ▶ Very little exchange between South Carolina/Georgia and Florida



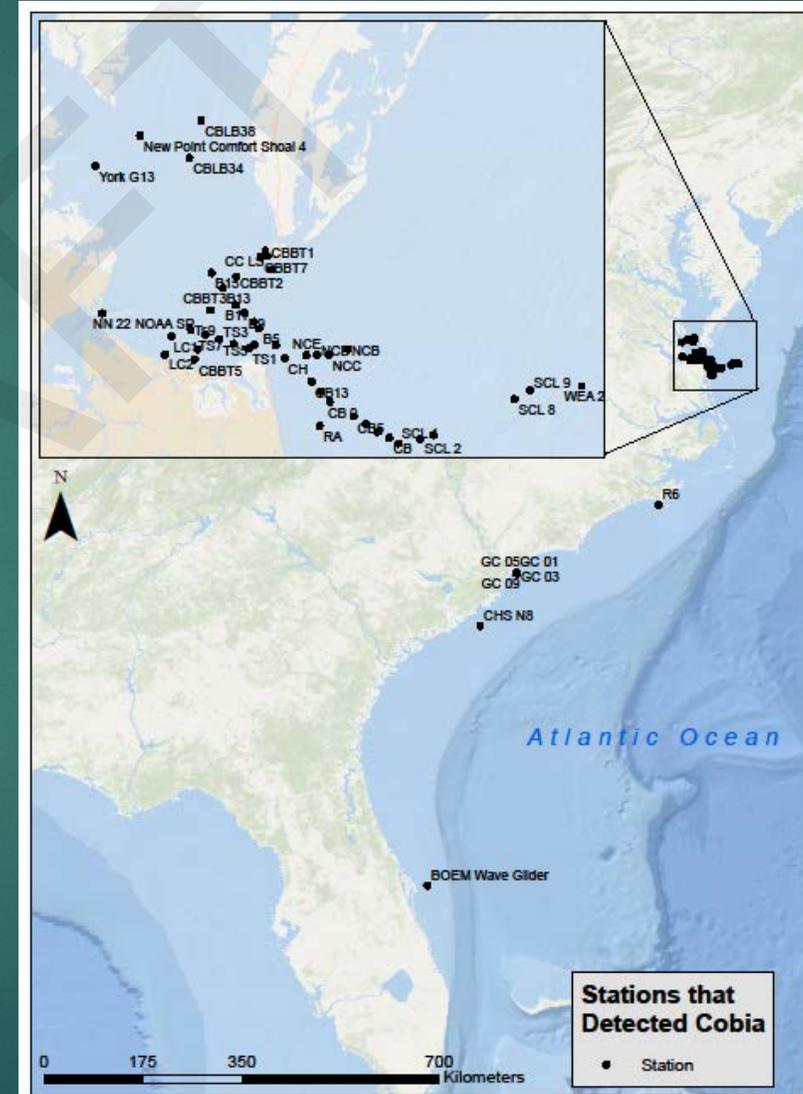
# Acoustic Telemetry-VA and NC

## Virginia

- ▶ 13 cobia tagged in 2017
- ▶ VA to NC, SC, and Cape Canaveral FL

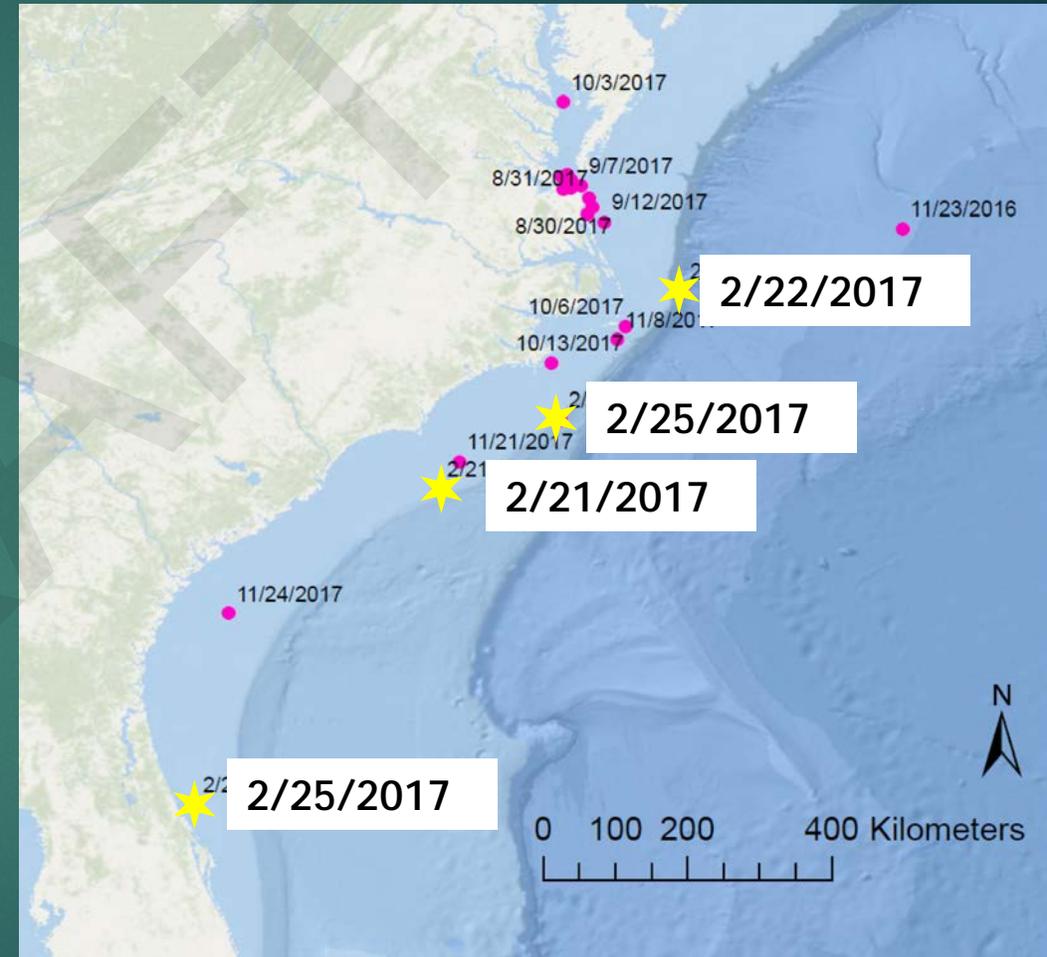
## North Carolina

- ▶ Three cobia tagged in 2017
- ▶ Two fish detected off NC Outer Banks and inside/outside of Chesapeake Bay



# Pop-up Satellite Archival Tags (PSAT)

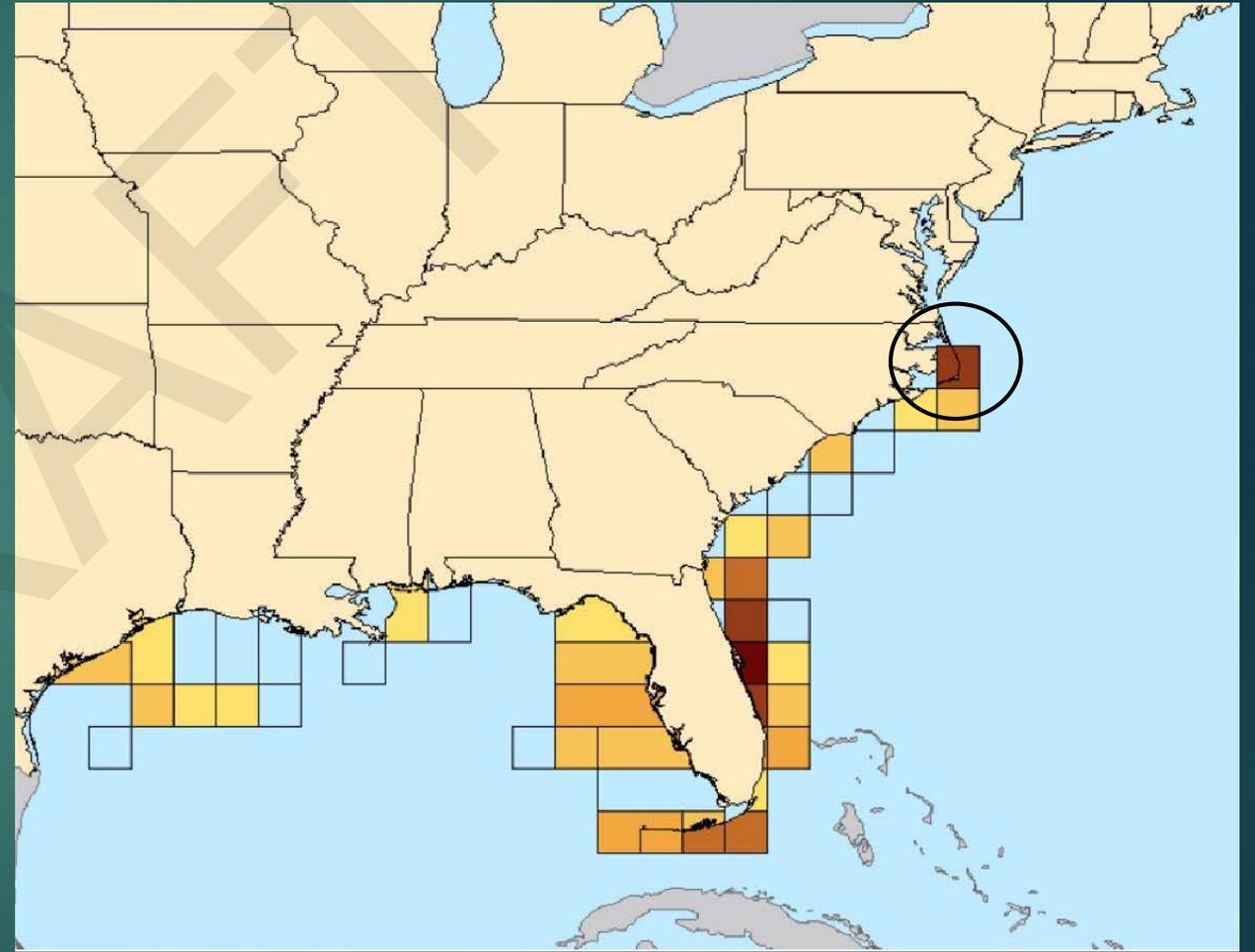
- Individuals tagged within Chesapeake Bay in summer 2017
- Tags programmed to pop up at predetermined times
- Accurate within 0.5 km
- One cobia offshore of Daytona in winter
- Three on shelf offshore of NC/SC



Pop-up locations of individual cobia fitted with PSATs in Chesapeake Bay

# Commercial logbook data

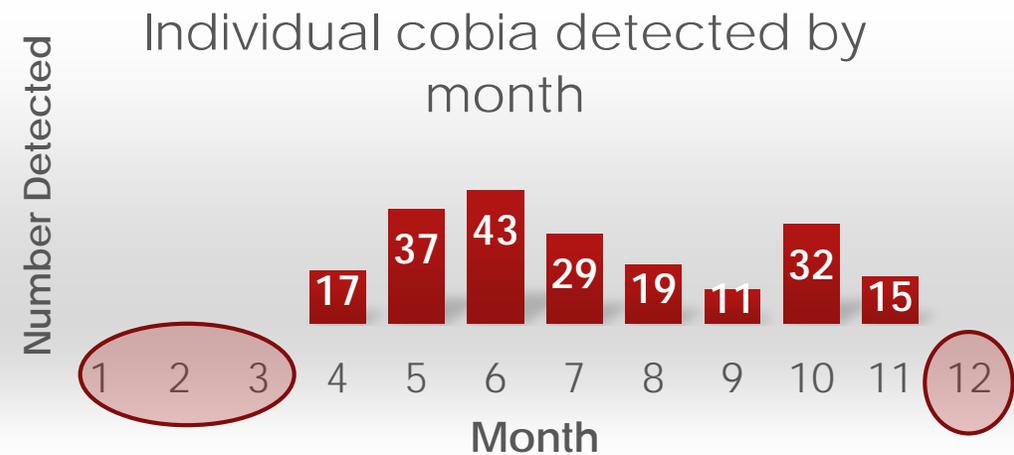
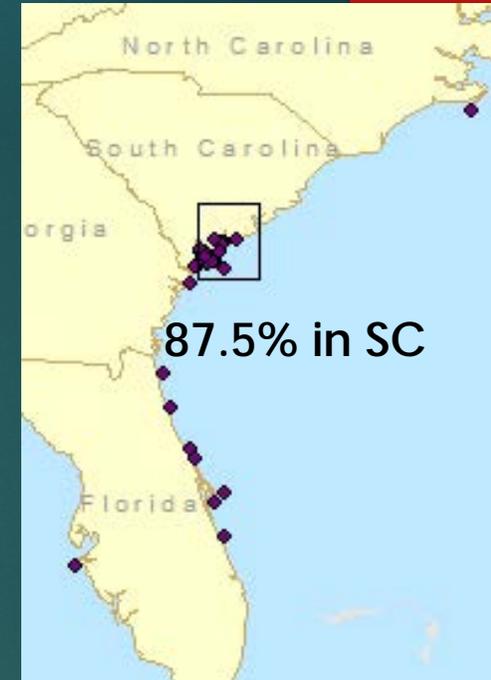
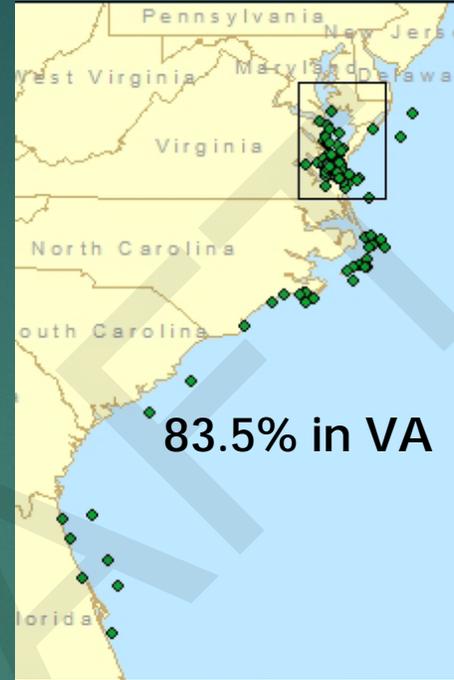
- ▶ Course resolution (1x1 degree)
- ▶ Commercial bycatch offshore of NC during January
- ▶ 1,697-2,751 pounds
- ▶ Catch likely occurring in deeper shelf waters in proximity to Gulf Stream



January commercial logbook landings, 2012-2017

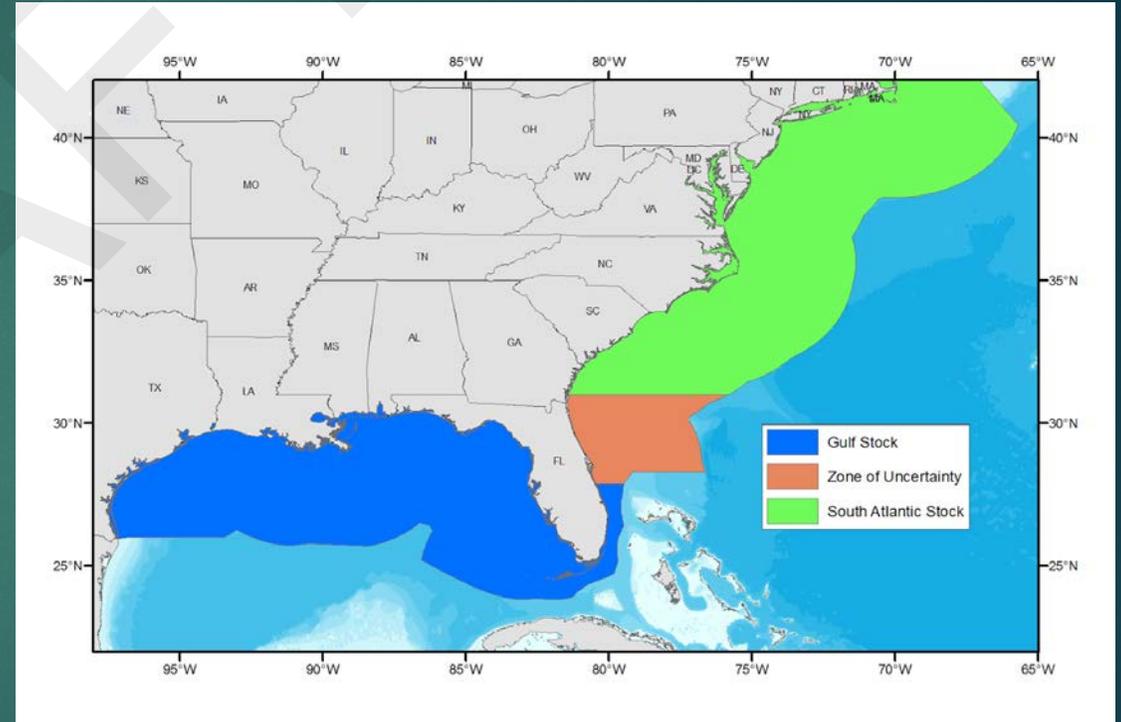
# Overwintering?

- Cobia conventionally tagged in VA and SC were recaptured back in tagging locations at high rate
- Indication that they may overwinter in areas that are not subject to heavy fishing pressure (i.e., deeper waters)
- Cobia acoustically-tagged in SC and GA were not detected during winter



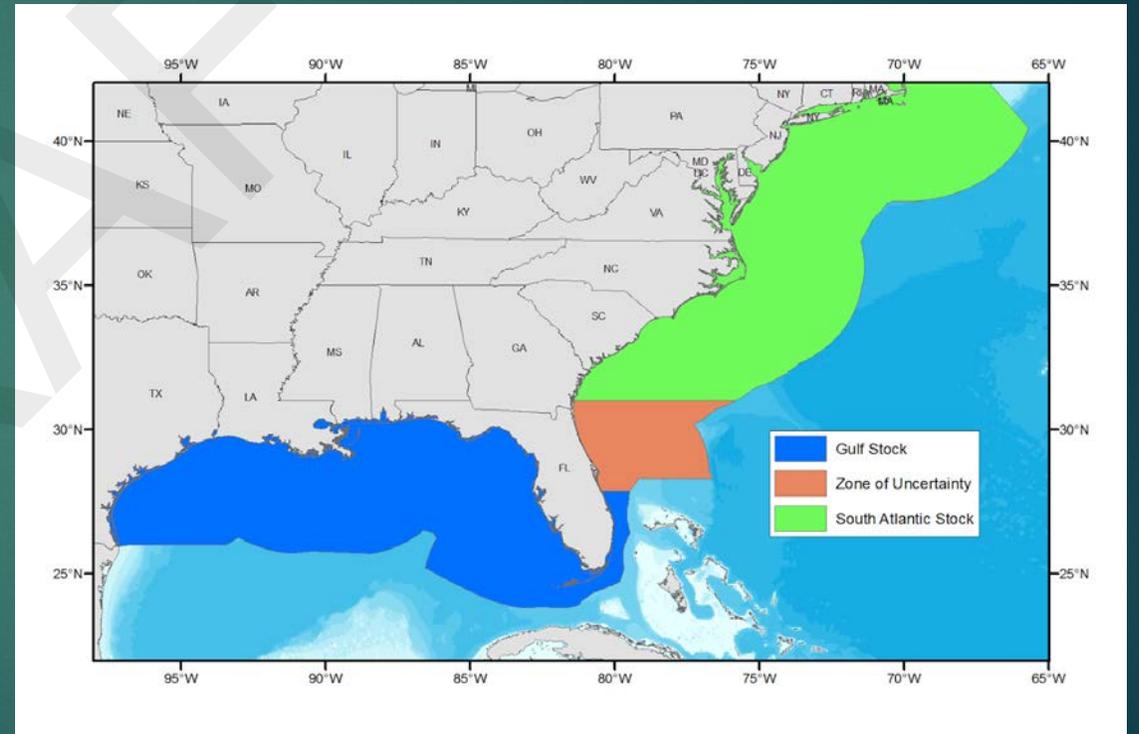
# Consensus Statements

- At least two distinct stocks: GOM from Brevard County south and SA from Georgia to North
- Lack of data in "zone of uncertainty"
- Evidence for substructure/behavioral groupings:
  - VA/NC (conventional tags)
  - SC inshore (conventional tags)
  - SC/GA nearshore/offshore (telemetry)
  - Resident/migratory groups along east coast of FL (telemetry)



# Conclusions

- Regional stock separation between Brevard County, FL and Brunswick, GA
- Current boundary (GA/FL) falls within this zone
- Cannot further refine with available data



# Abacus plot: cobia tagged in SC/GA

X=tag date

