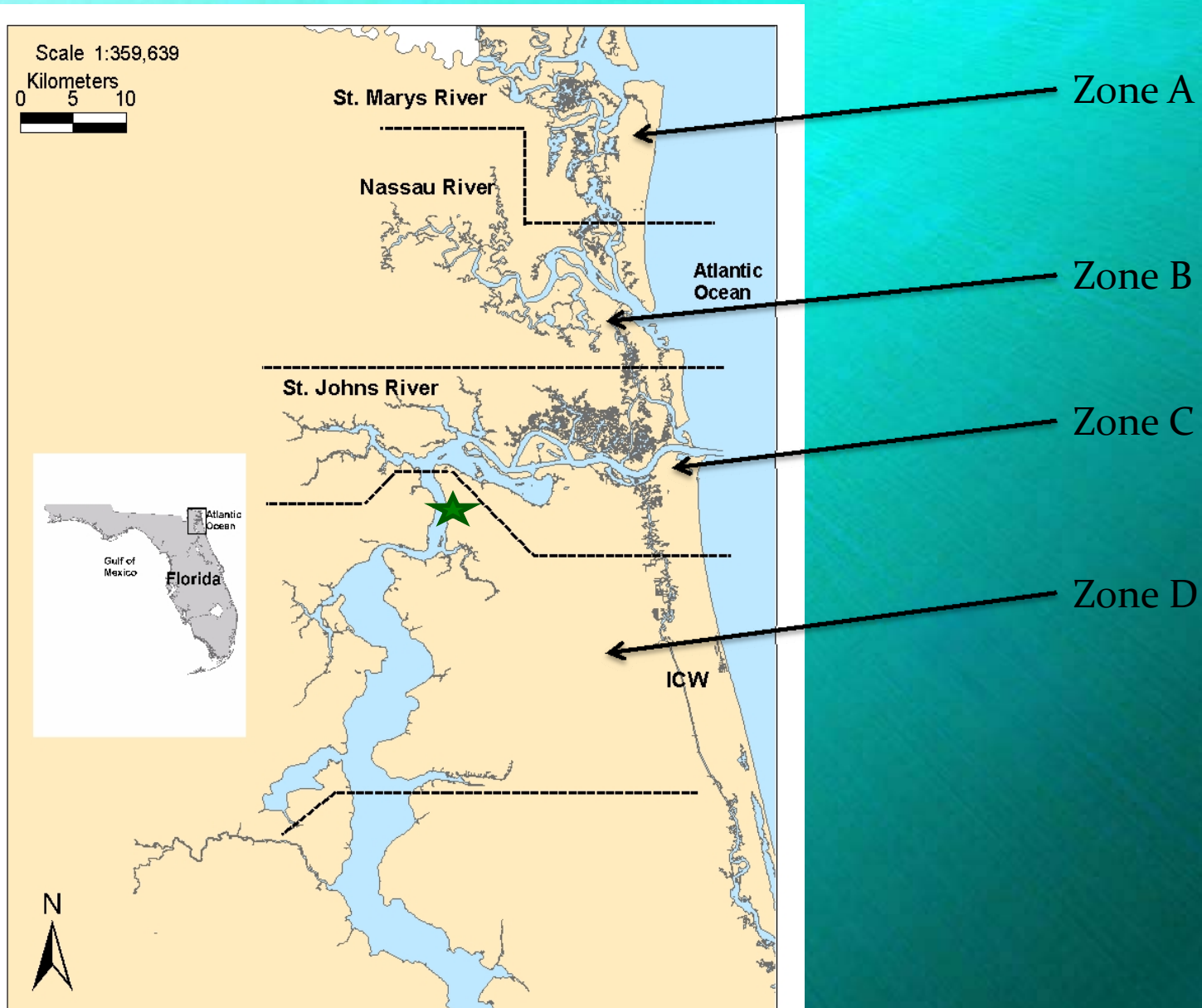


# Spatio-temporal relationships of abundance, recruitment, and habitat utilization of southern kingfish, *Menticirrhus americanus*, in northeast Florida.

Anthony L. DiGirolamo, FWRI/FIM Jacksonville Field Lab  
Marc Hanke, University of North Carolina at Wilmington  
Cameron Guenther, FWRI/FIM St. Petersburg

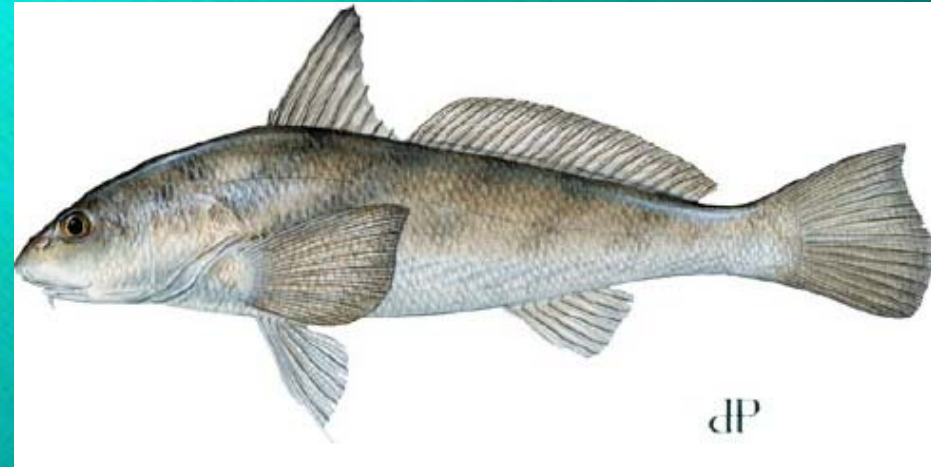


# NEFL Sampling Universe



# Southern kingfish (*Menticirrhus americanus*)

- Commonly known as whiting
- Demersal
  - Adults prefer sand bottoms, ocean beaches and mouths of bays/estuaries
  - Juveniles found in sand and mud habitats within estuaries
- Fishery Contribution
  - 74% recreational
  - Duval / Brevard dominate commercial Atlantic
- Complications
  - Not distinguished (commercially)





# Southern kingfish (*Menticirrhus americanus*)

- Growth
  - Harding and Chittenden (1987)
    - 22 cm / month mean growth
    - Maturity for males and females ~ Age-1
    - 135 mm SL smallest size at maturity in south Atlantic (Smith and Werner 1985)
- Feeding
  - Juveniles feed on copepods, bivalve siphons, mysids, polychaetes and cumaceans (FWC, 2008)
  - Adults feed on various crabs, isopods, fishes, and polychaetes (FWC, 2008)
  - McMichael and Ross (1987)
    - Shift at ~ 70 mm SL (teleosts)



# Southern kingfish (*Menticirrhus americanus*)

- Size Class 1 (EYOY)
  - 0 to 45 mm SL
- Size Class 2 (JUV)
  - 46 to 69 mm SL
- Size Class 3 (LYOY)
  - 70 to 134 mm SL
- Size Class 4 (Age1+)
  - $\geq$  135 mm SL



Juvenile southern kingfish, *Menticirrhus americanus*.  
(<http://dnr.maryland.gov/fisheries/juvindex/index.asp?page=species>)



# Procedures

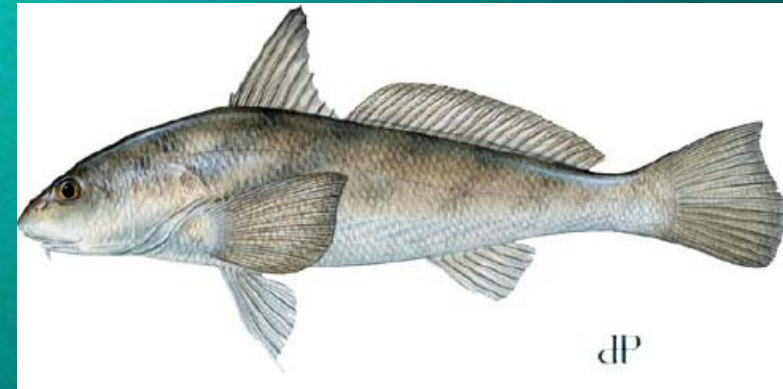
- FIM SRS Sampling
  - 2001 to 2009
- Length Frequency
  - Recruitment patterns
- Size Class Analysis
  - Index of Abundance (IOA)
  - ANCOVA
    - Habitat associations
- HotSpot Spatial Analysis
  - GIS / CPUE



# Northeast Florida: *Menticirrhus americanus*

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<i>Seines</i>				
<b>EYOY</b>	146	131	70	18
<b>JUV</b>	47	47	23	6
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<i>Trawls</i>				
<b>EYOY</b>	537	998	314	85
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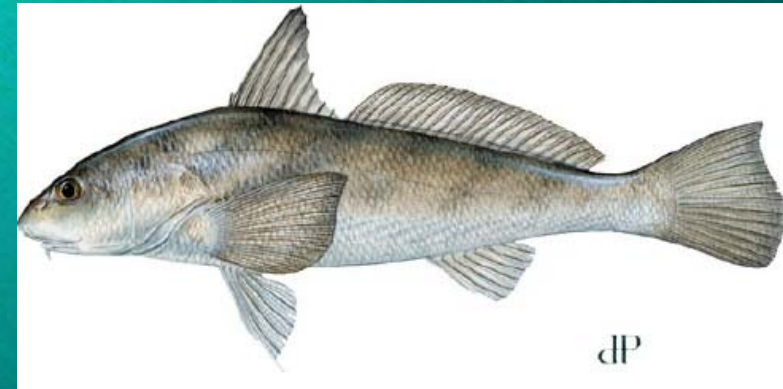




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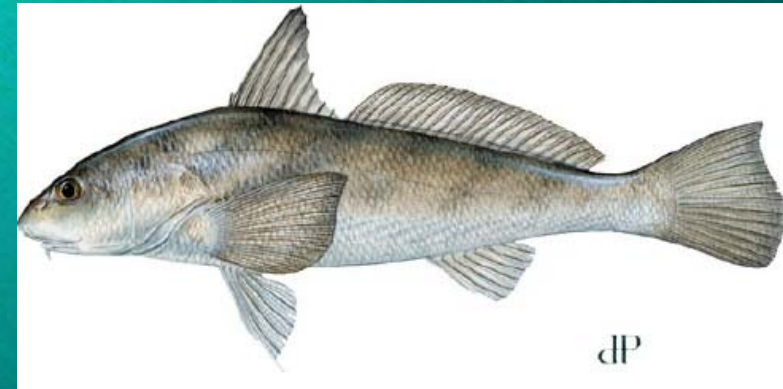




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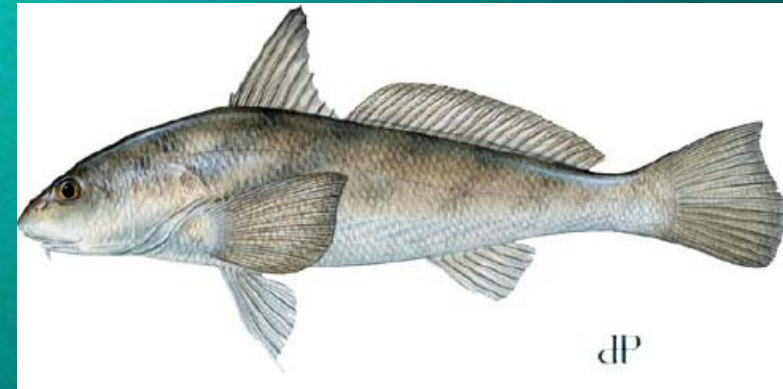
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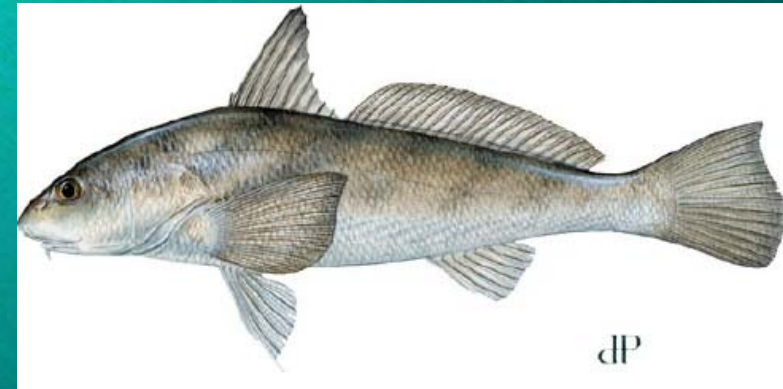




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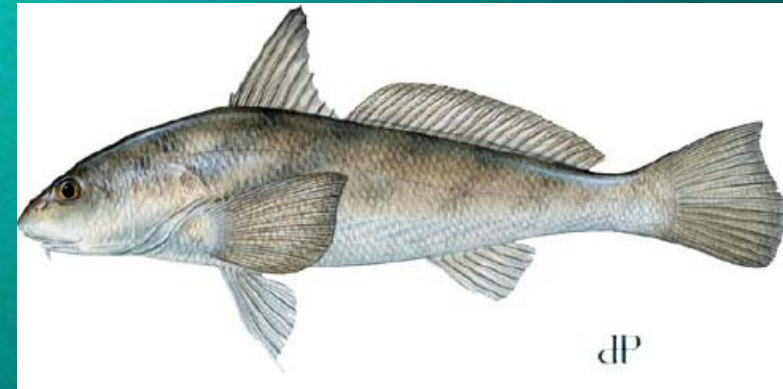
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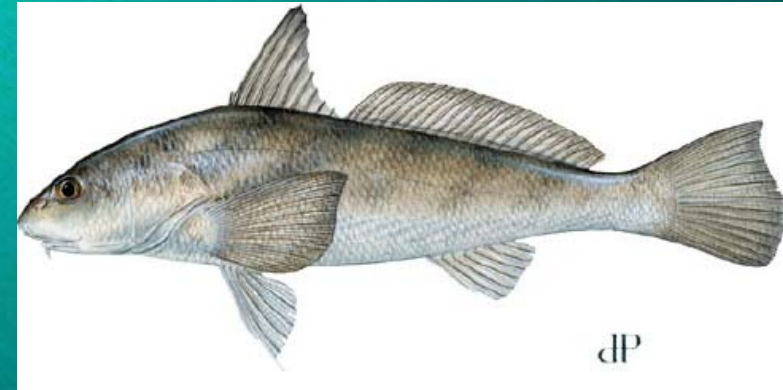




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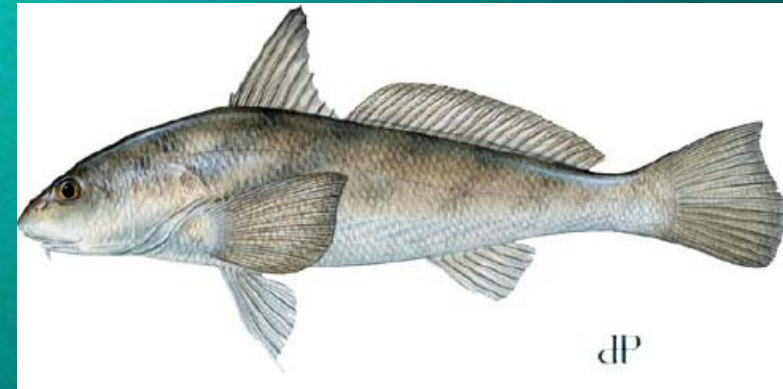
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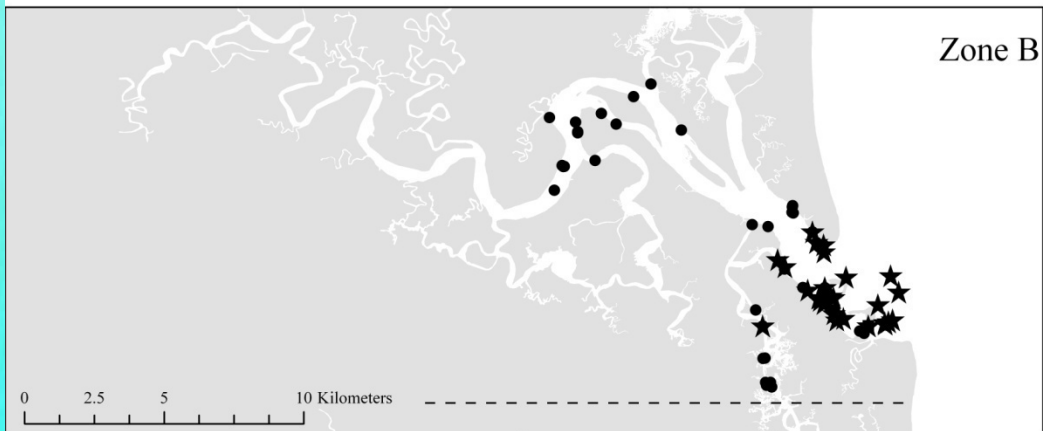
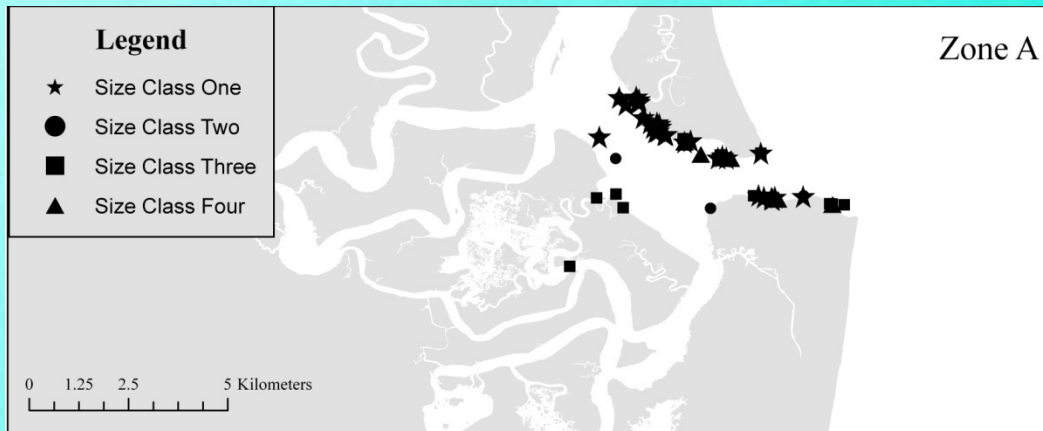


# ANCOVA Habitat Association

- Limitation
  - Low numbers of LYOY / Age1+
  - Restricted to EYOY / JUV
- Depth
  - Highest factor associated (21.3m seines)
    - EYOY ( $F = 11.7, P \leq 0.001$ )
    - JUV ( $F = 10.3, P = 0.001$ )
    - Mean depth = 3.7 m (*all zones/gears*)
- Zone
  - Highest factor associated (6.1m trawls)
    - EYOY ( $F = 28.9, P \leq 0.001$ )
    - JUV ( $F = 30.8, P \leq 0.001$ )
- Salinity
  - Strong in both gears / size classes
  - St. Johns River 10 ppt less (mean)



# Spatial HotSpot Analysis Northeast Florida *Menticirrhus* *americanus*

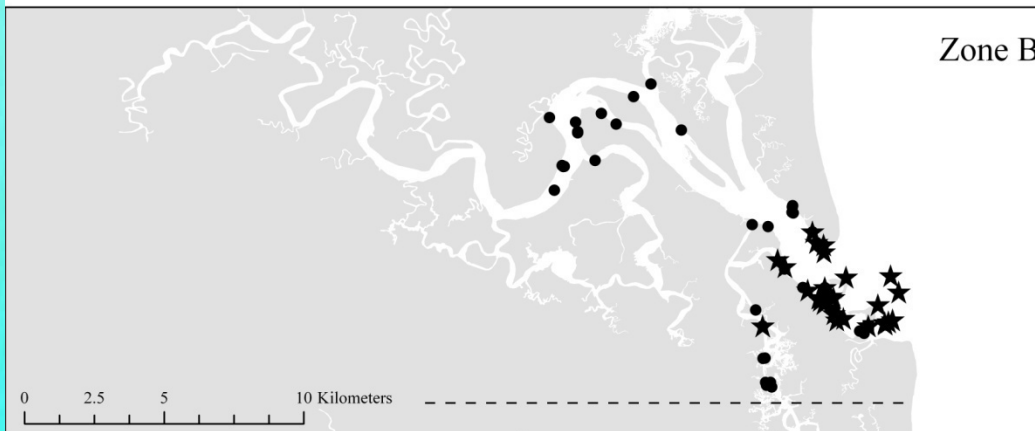
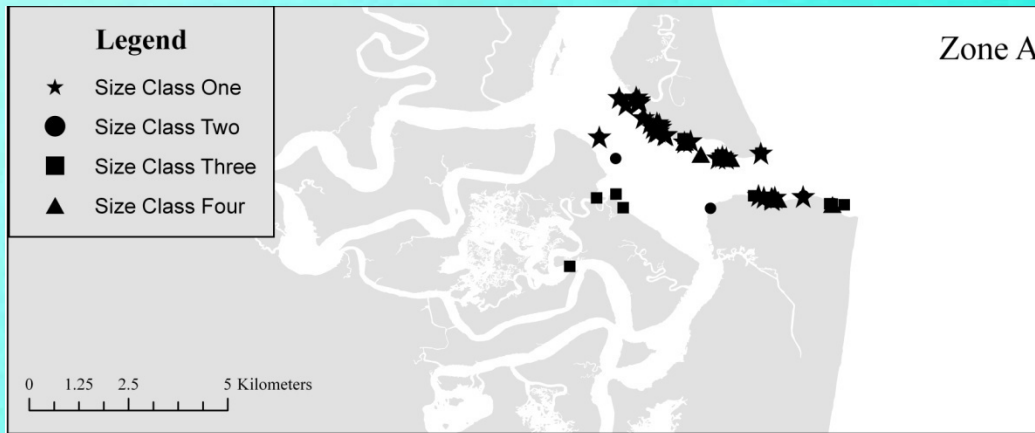


# Spatial HotSpot Analysis

## Northeast Florida *Menticirrhus americanus*



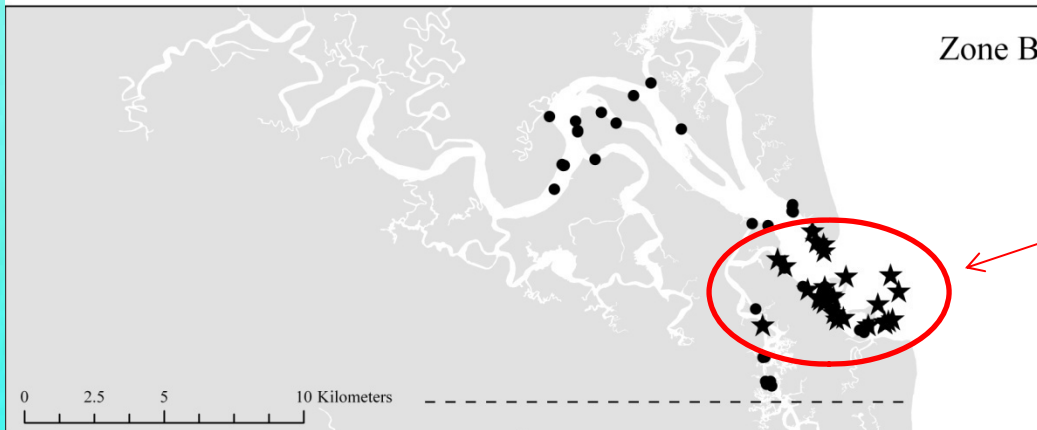
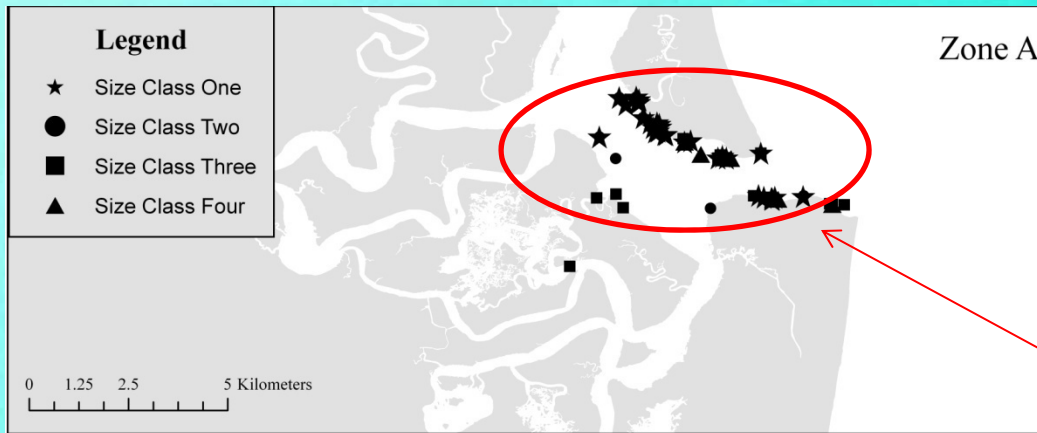
EYOY (0-45 mm SL)





# Spatial HotSpot Analysis

## Northeast Florida *Menticirrhus americanus*



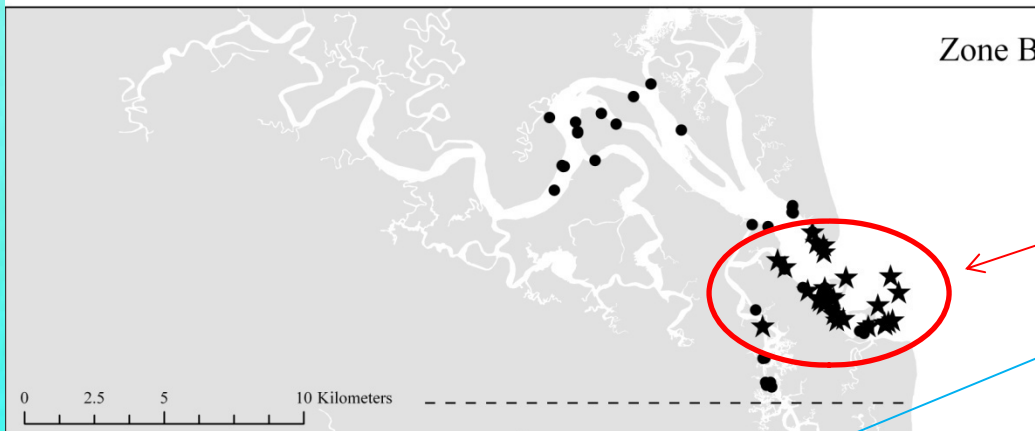
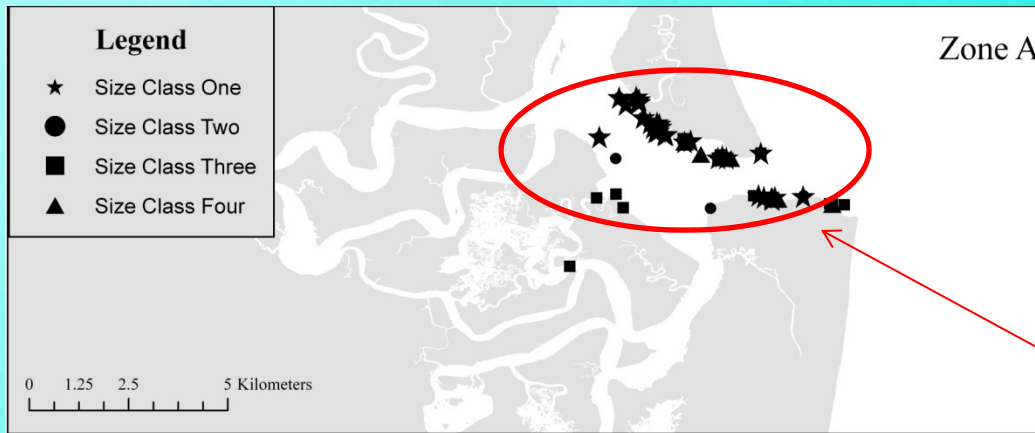
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# Spatial HotSpot Analysis

## Northeast Florida *Menticirrhus americanus*



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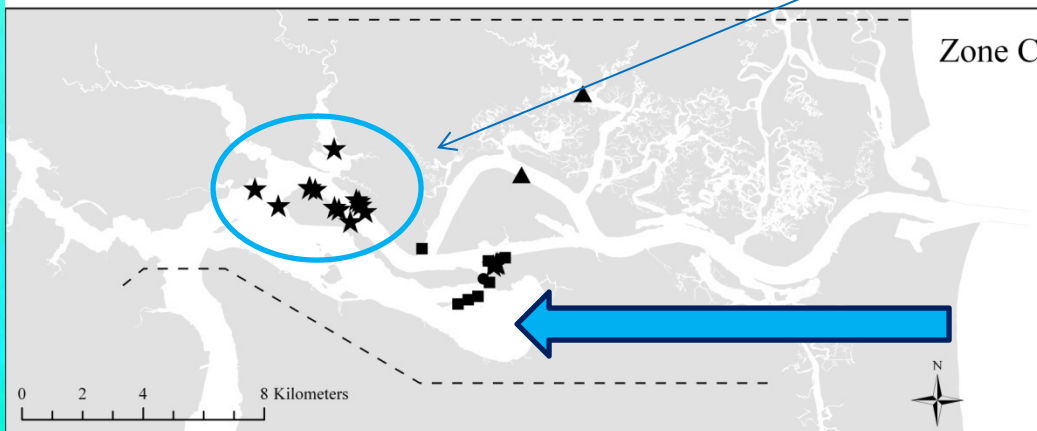
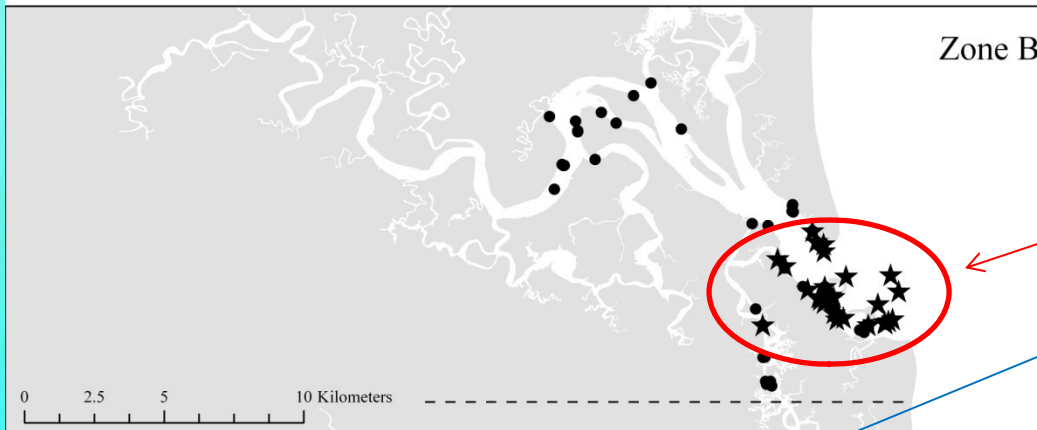
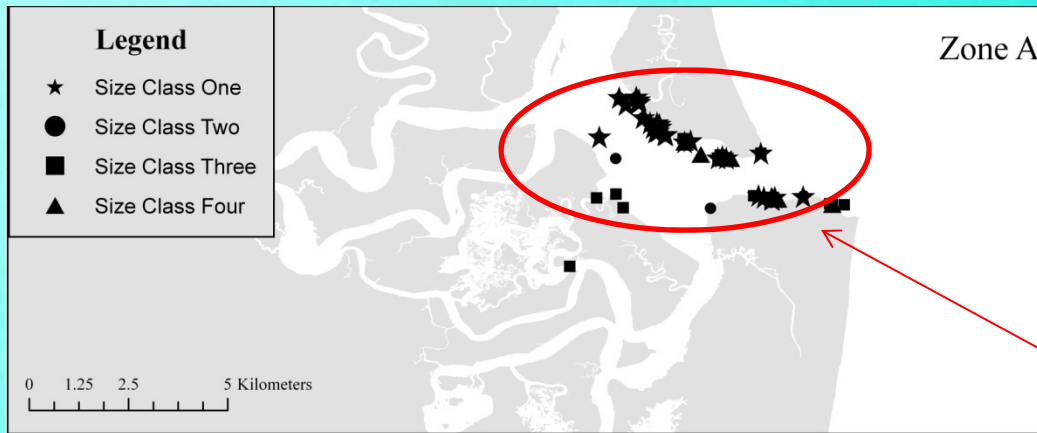


# Spatial HotSpot Analysis

## Northeast Florida *Menticirrhus americanus*



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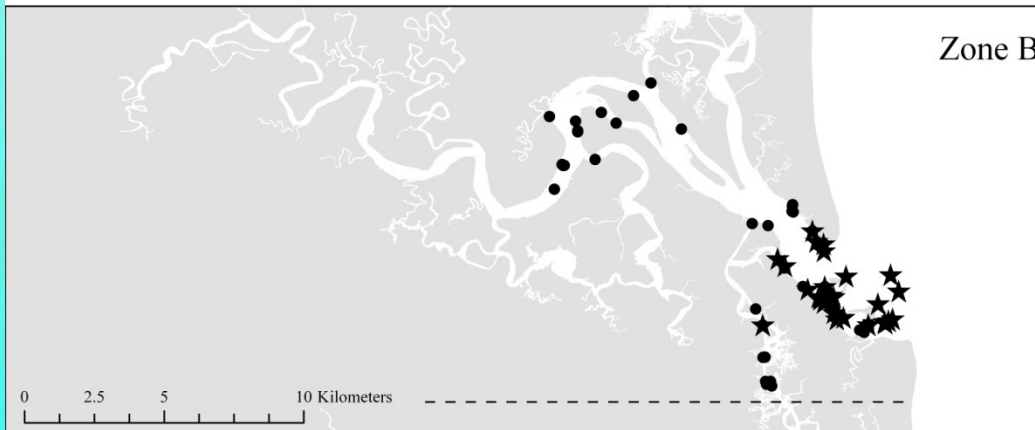
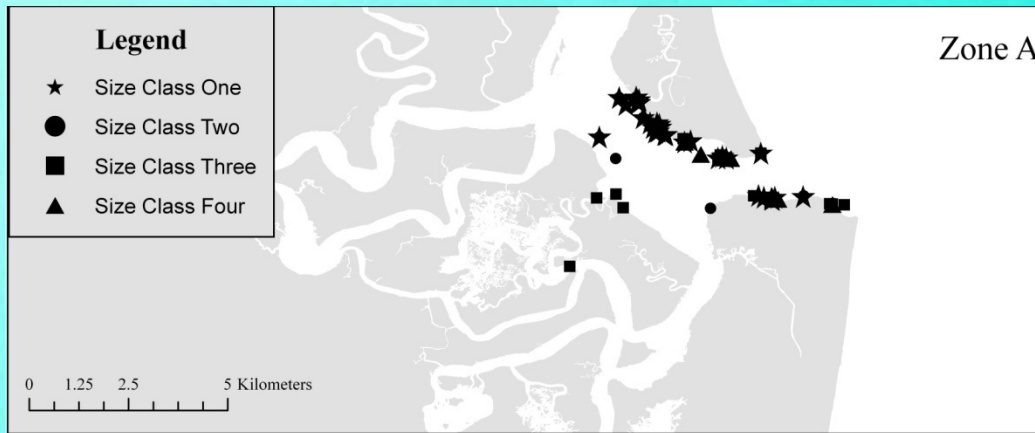


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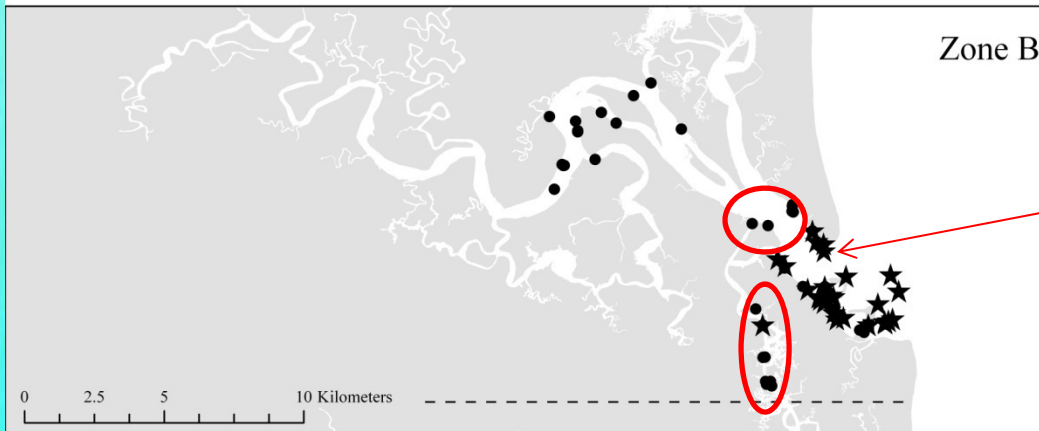
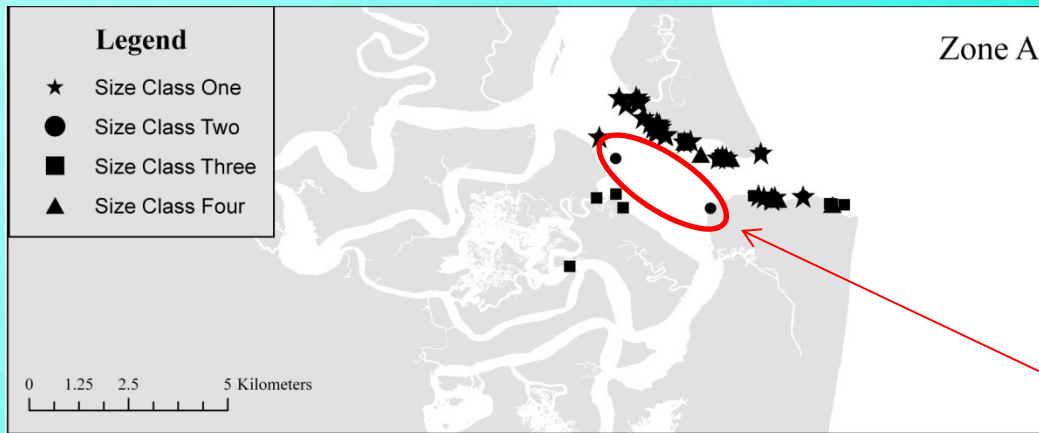
## Northeast Florida *Menticirrhus americanus*



JUV (46-69 mm SL)



# Spatial HotSpot Analysis Northeast Florida *Menticirrhus americanus*



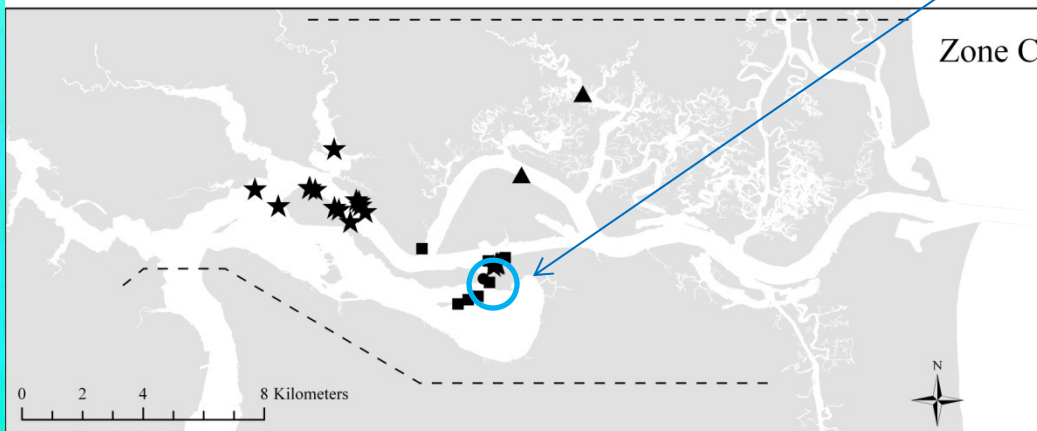
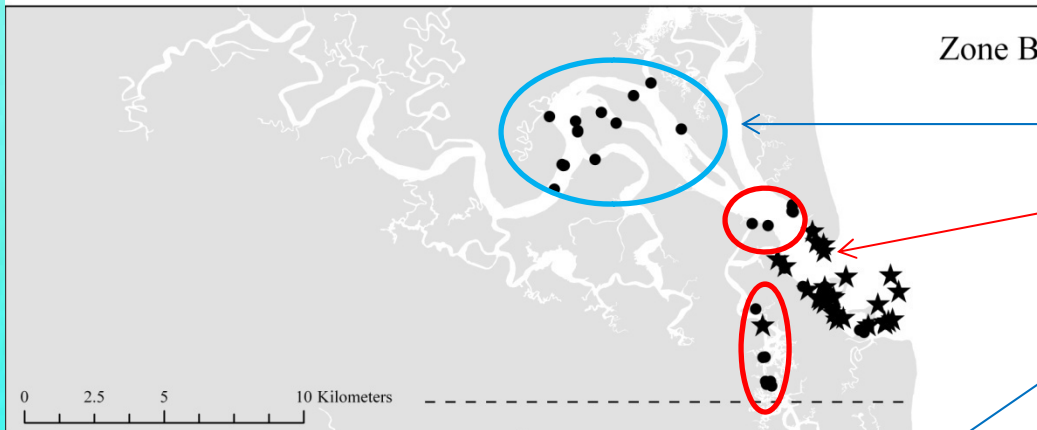
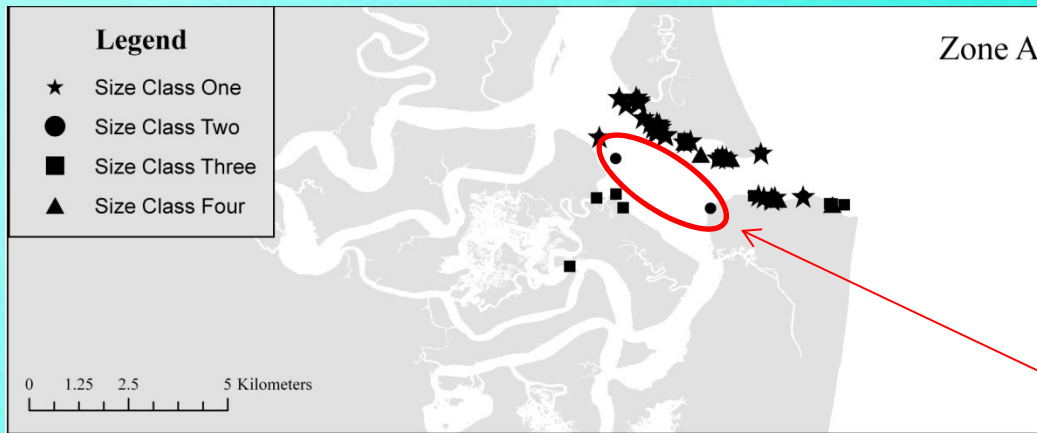
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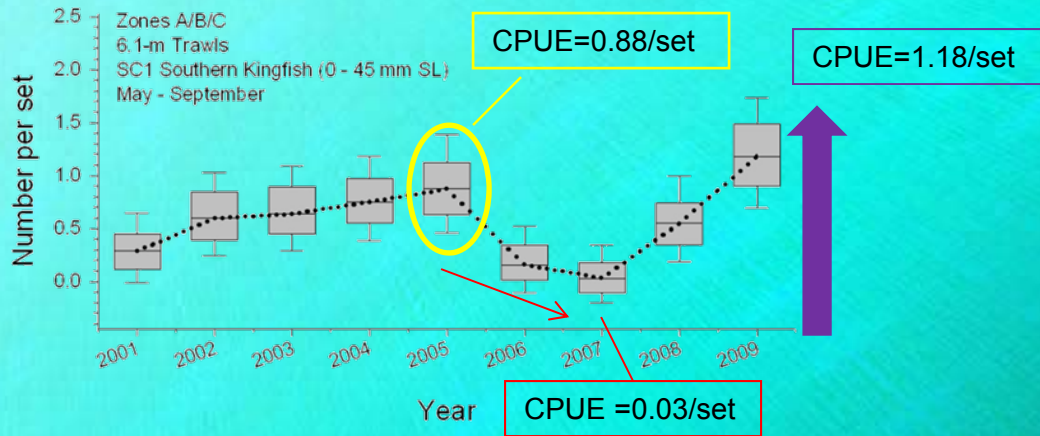


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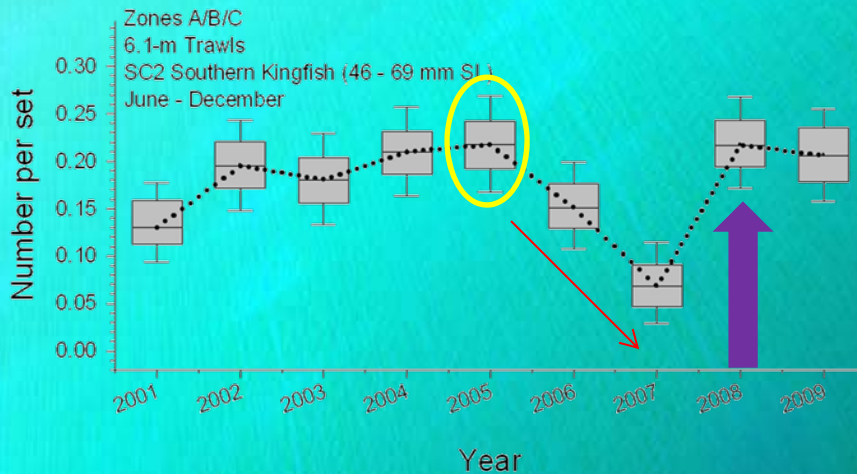




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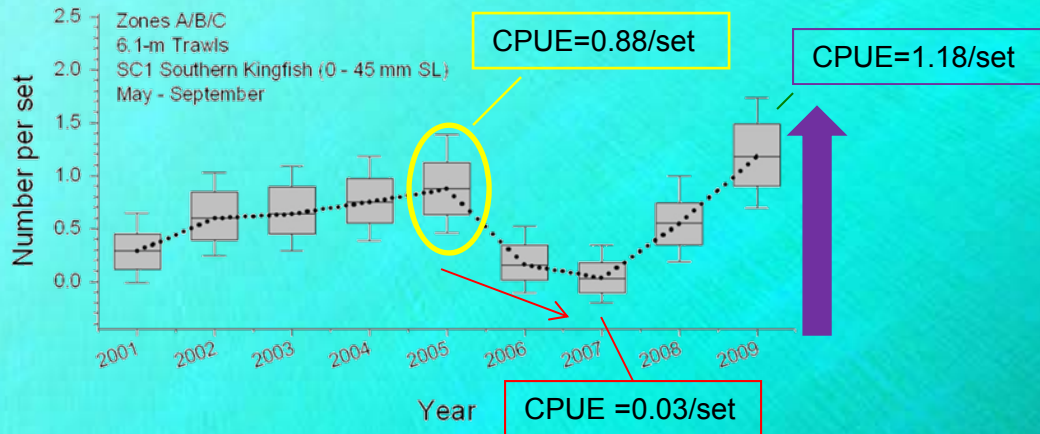


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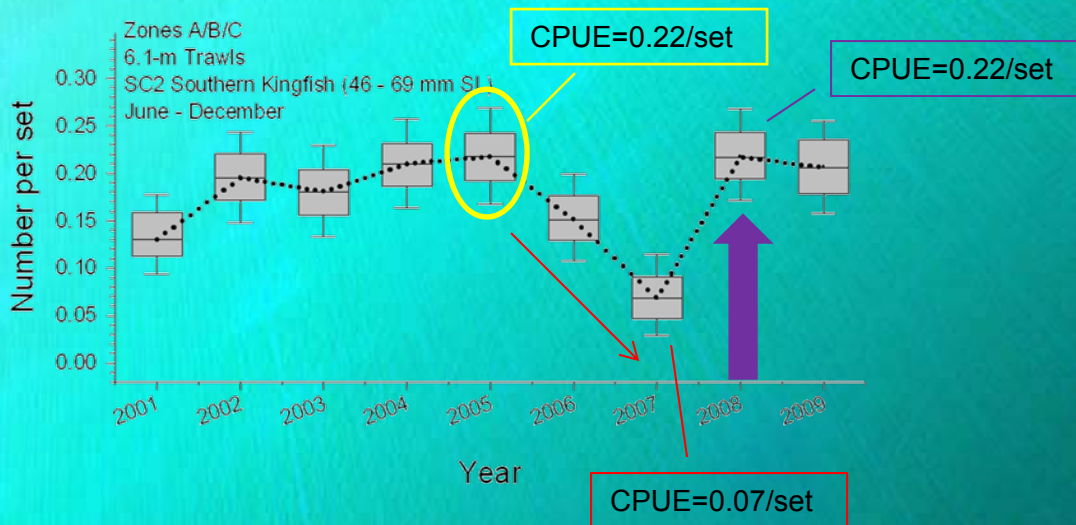


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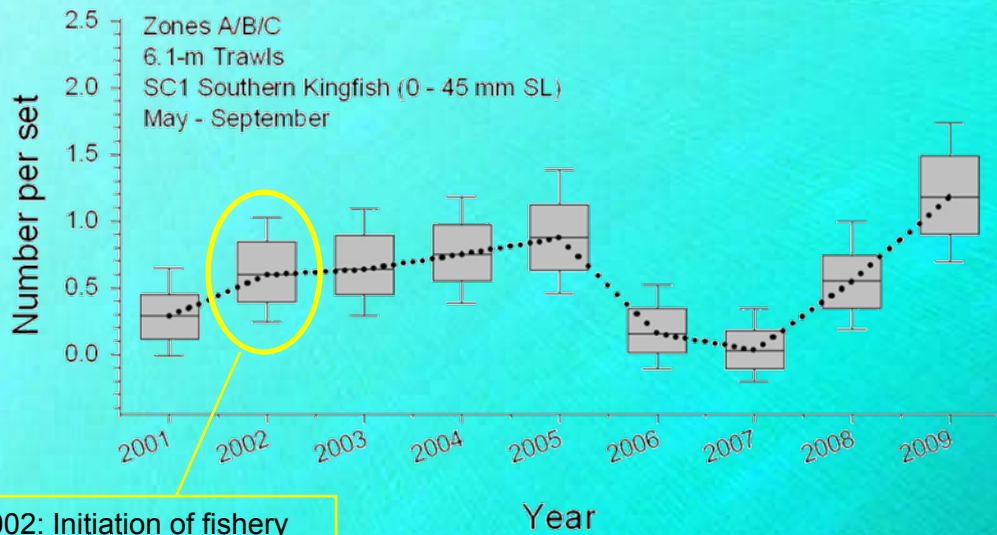


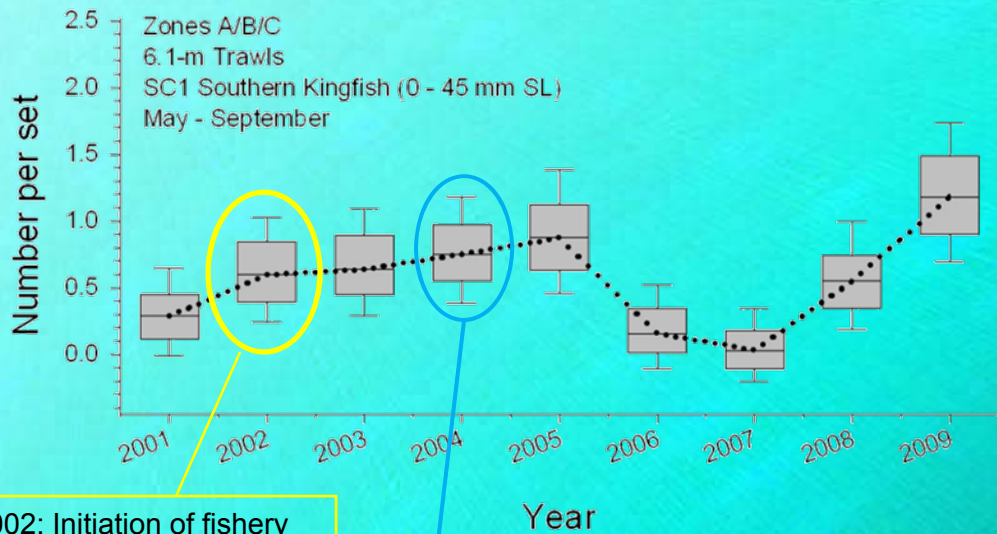
# Fishery Impact

- Levesque (2009) *Marine Policy*
  - Sink gillnet fishery
  - Migrated to Florida 2002
    - Fully integrated by 2004
  - Right Whale mortality in 2006 (Jacksonville)
    - NOAA/NMFS investigates
    - Fishery strongest during migration season
    - Links mortality potentially w/gillnet fishery
  - Closure of fishery
    - October of 2007



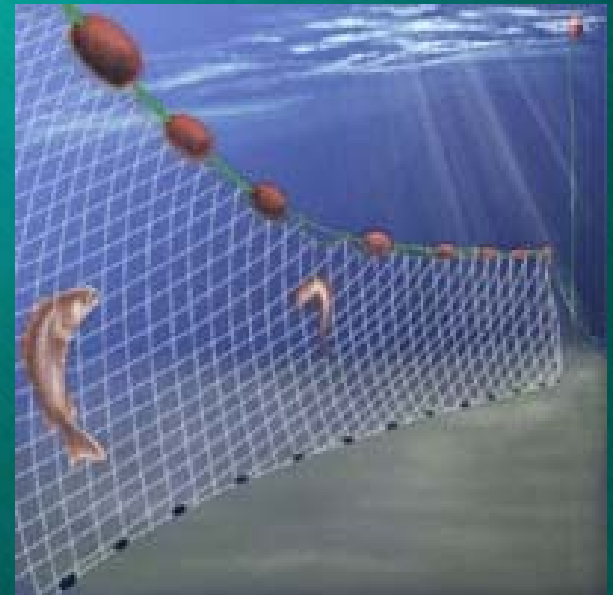


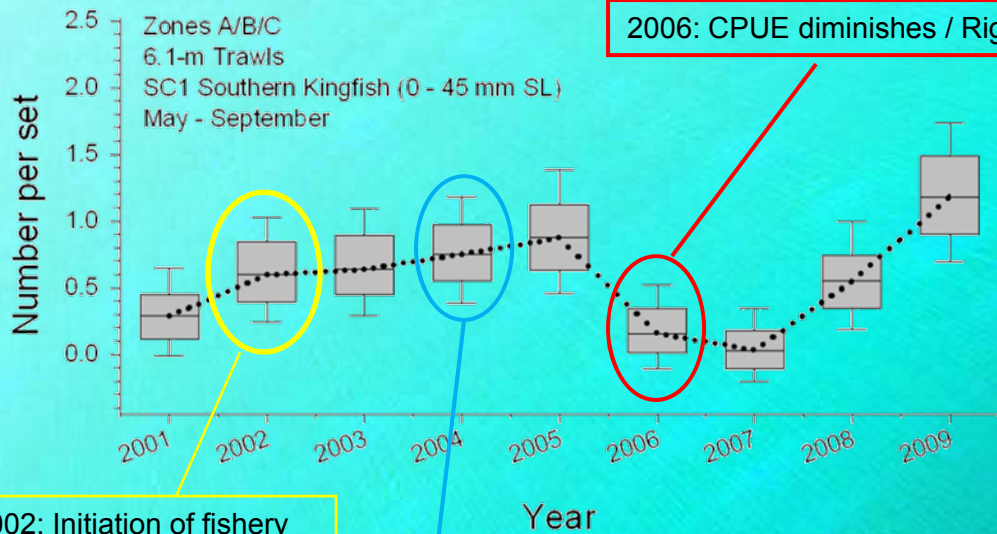




2002: Initiation of fishery

2004: Fishery fully established





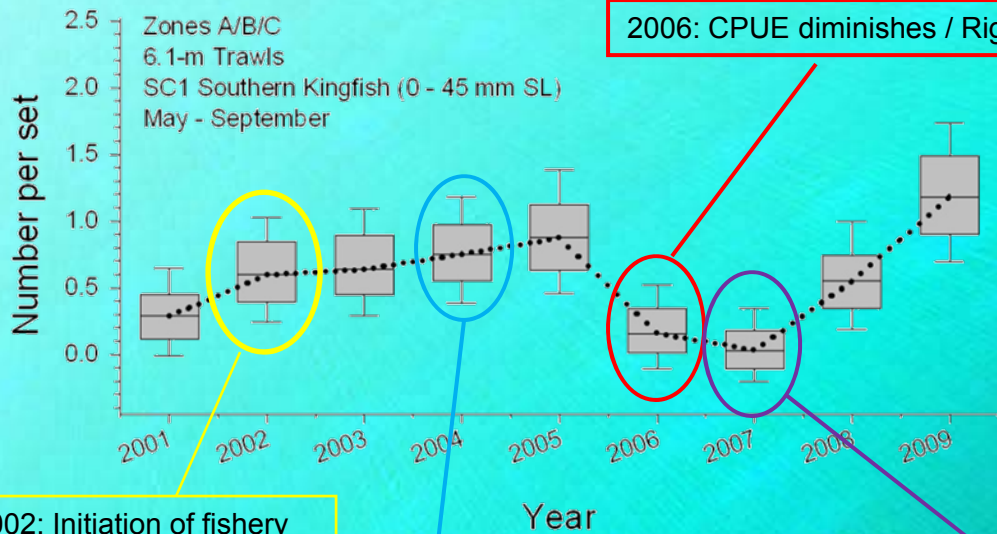
2006: CPUE diminishes / Right Whale mortality

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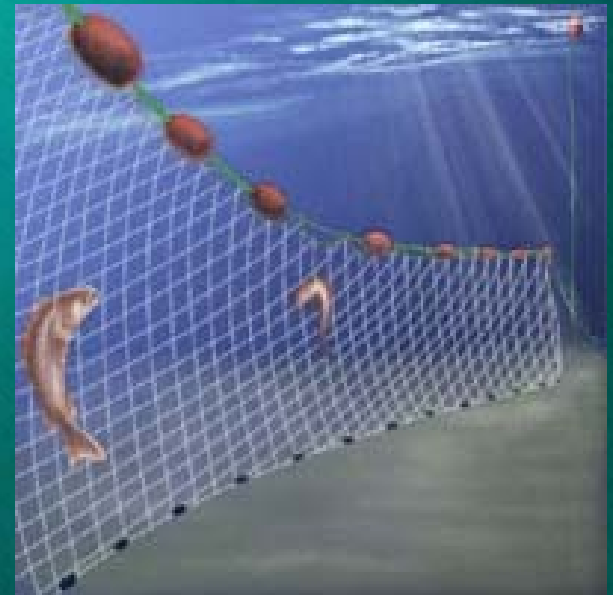


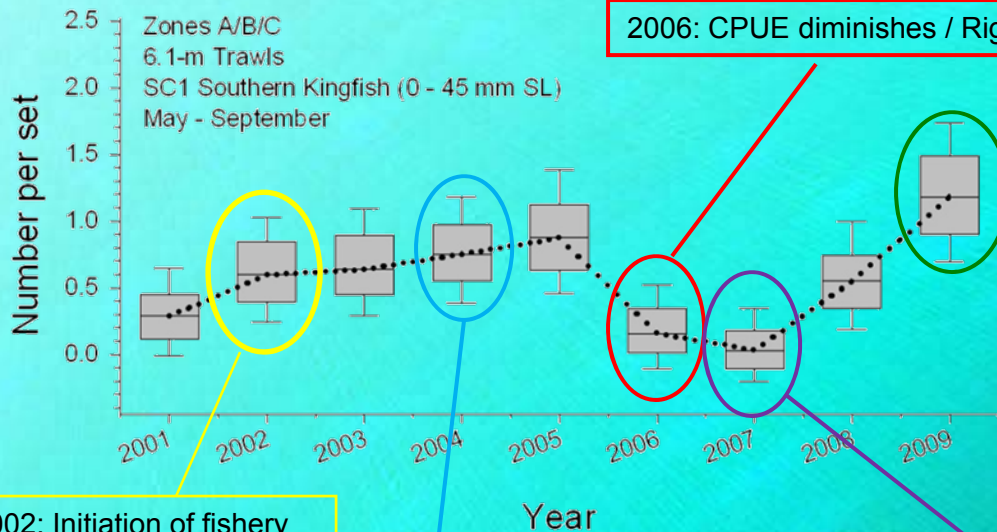
2002: Initiation of fishery

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2002: Initiation of fishery

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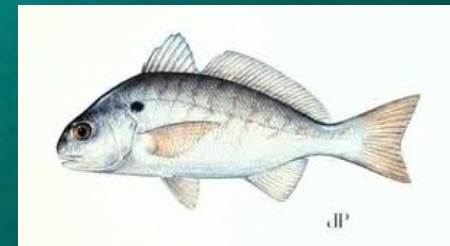
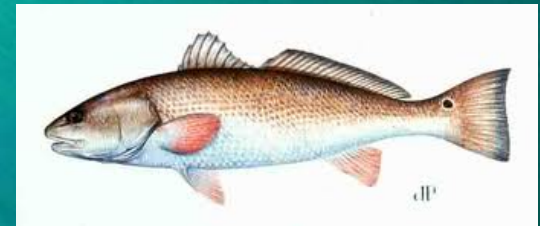
2009: 2-year closure / highest CPUE on record





# Further Research

- Major sciaenids of NEFL
  - Red drum (*Sciaenops ocellatus*)
  - Spotted seatrout (*Cynoscion nebulosus*)
  - Spot (*Leiostomous xanthurus*)
  - Croaker (*Micropogonias undulatus*)
- Major roles for SJR
  - Red Drum
    - SJR dominant habitat in region
  - Spot
    - Dominant sciaenid in region





# Acknowledgements

- Russ Brodie and the rest of the JAX FIM Staff
  - Justin Solomon
  - Matt Watkins
  - Julia Lyons
  - Amy Hulse
  - Chris Swanson
- Nate Gargas for reviewing early drafts



Thanks for Listening! : )

