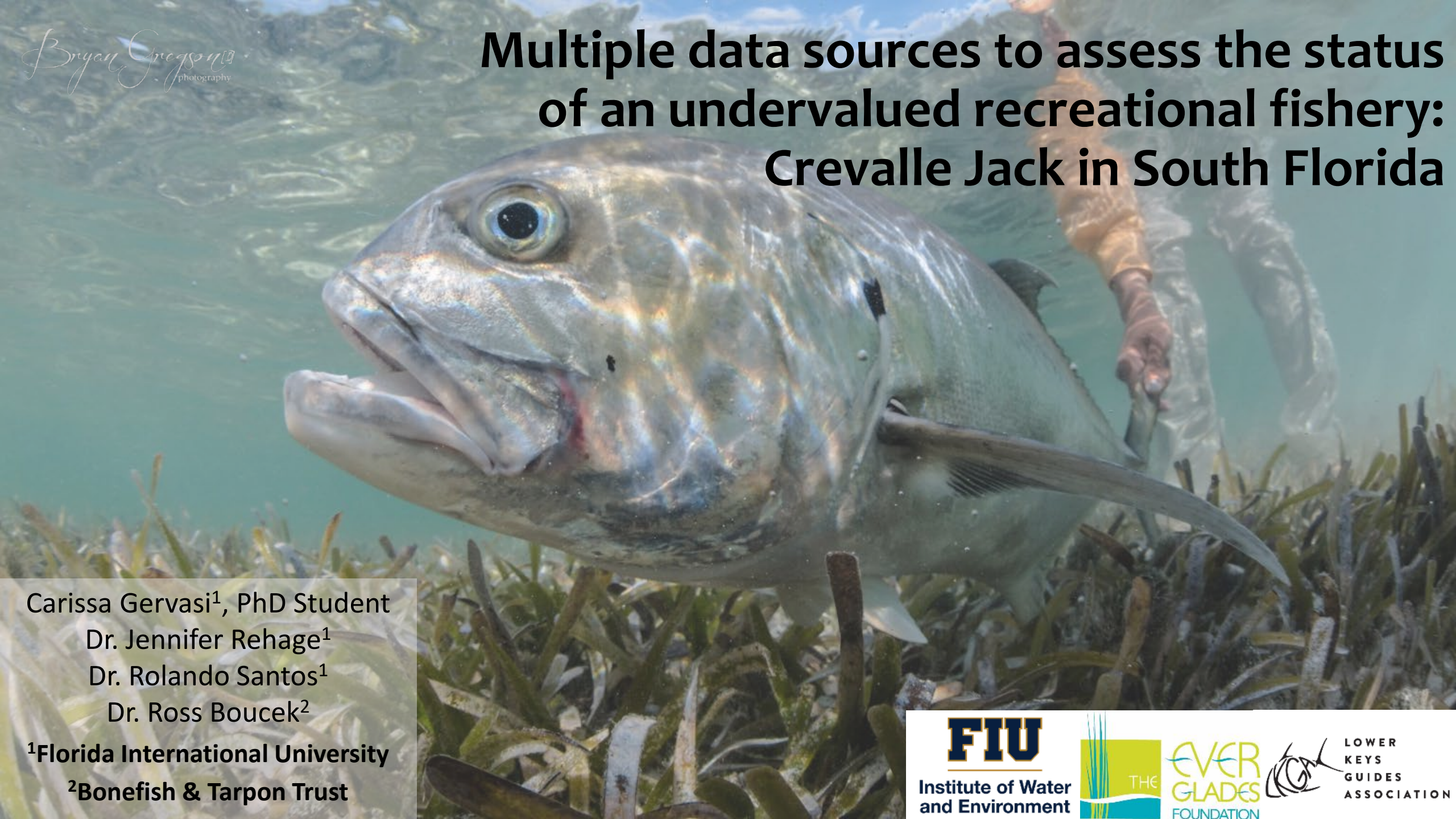

Multiple data sources to assess the status of an undervalued recreational fishery: Crevalle Jack in South Florida

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[2]Bonefish & Tarpon Trust

FIU Institute of Water and Environment

THE EVERGLADES FOUNDATION

LOWER KEYS GUIDES ASSOCIATION

“Conservation actions are heavily influenced by value judgements and cultural perceptions.”

Towns D.R. et al. (2016) In: Chapple D. (eds) New Zealand Lizards. Springer, Cham

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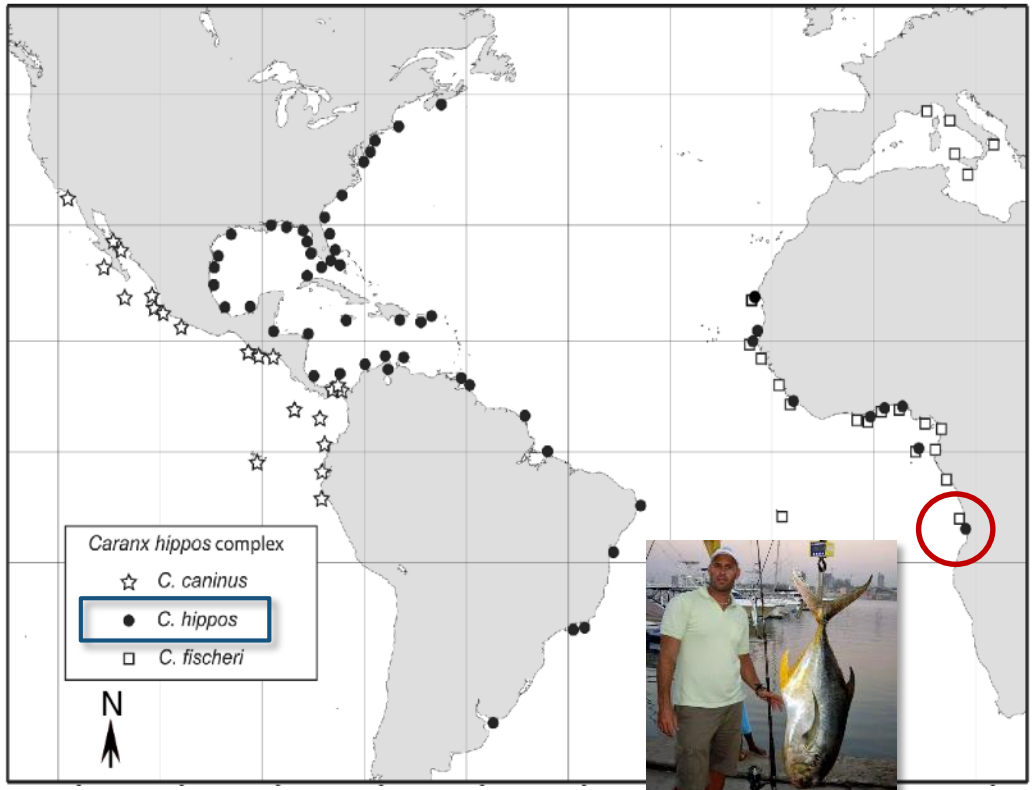
Crevalle Jack (*Caranx hippos*)

Crevalle ~ 'Cavalla' likely related to early name *Horse Mackerel*

- Pelagic schooling predator
- Prey to seabirds, weakfish, and marlin
- Spring / summer spawner
- Mature @ **55-66 mm (4-6 yrs)**
- Maximum size ~ **1240 mm (17 yrs)**
- Unregulated in 18 Gulf/Atlantic states
  - Default 2 fish or 100 lbs per person/day in FL



World record is 66 lbs Angola, 2010

Smith-Vaniz, WF, KE Carpenter. 2016. Fish Bull 105: 207-233

Concerns about Jacks

- Little is known about Jacks & fishery is unregulated
- But Jacks may have value as potential 'trip savers' in guided trips
- Exciting partnership with conservation goal

JACK CONSERVATION INITIATIVE

1. Are Crevalle Jack in decline?

2. Where should conservation efforts focus?

1. Are Jacks in decline?

2 methods:

a. Get input from fishing guides via key informant interviews on status & management needs

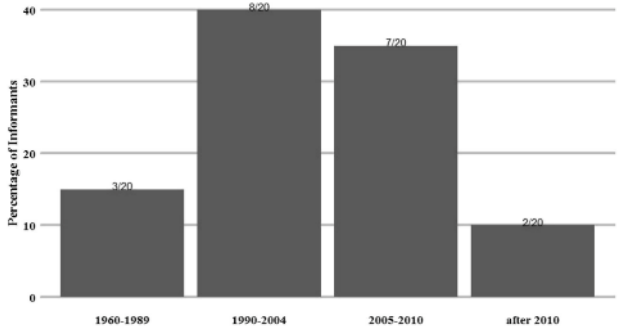
b. Analyze trends in fisheries-dependent and -independent datasets to figure out where Jacks are declining and when the decline began

Method 1 – Key Informant Interviews

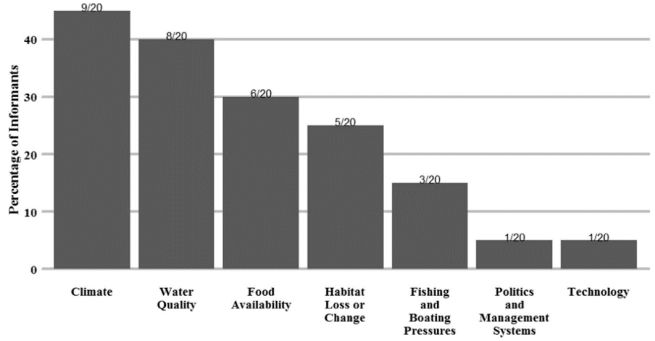
- Key informant surveys are a cornerstone technique for deriving local ecological knowledge (e.g., Shrestha-Acharya and Heinen 2006 Himalaya; Dongol and Heinen 2012 Env Mgmt).
- Highly-experienced fishing guides and anglers can provide vast amounts of information (Hind 2015 ICES J Mar Sci).

Surveys have been used successfully to study **Bonefish** populations in South Florida (Kroloff et al. 2018 Env Biol Fish)

Bonefish periods of decline identified



Most reported reasons for decline



We are using these interviews to derive hypotheses about:

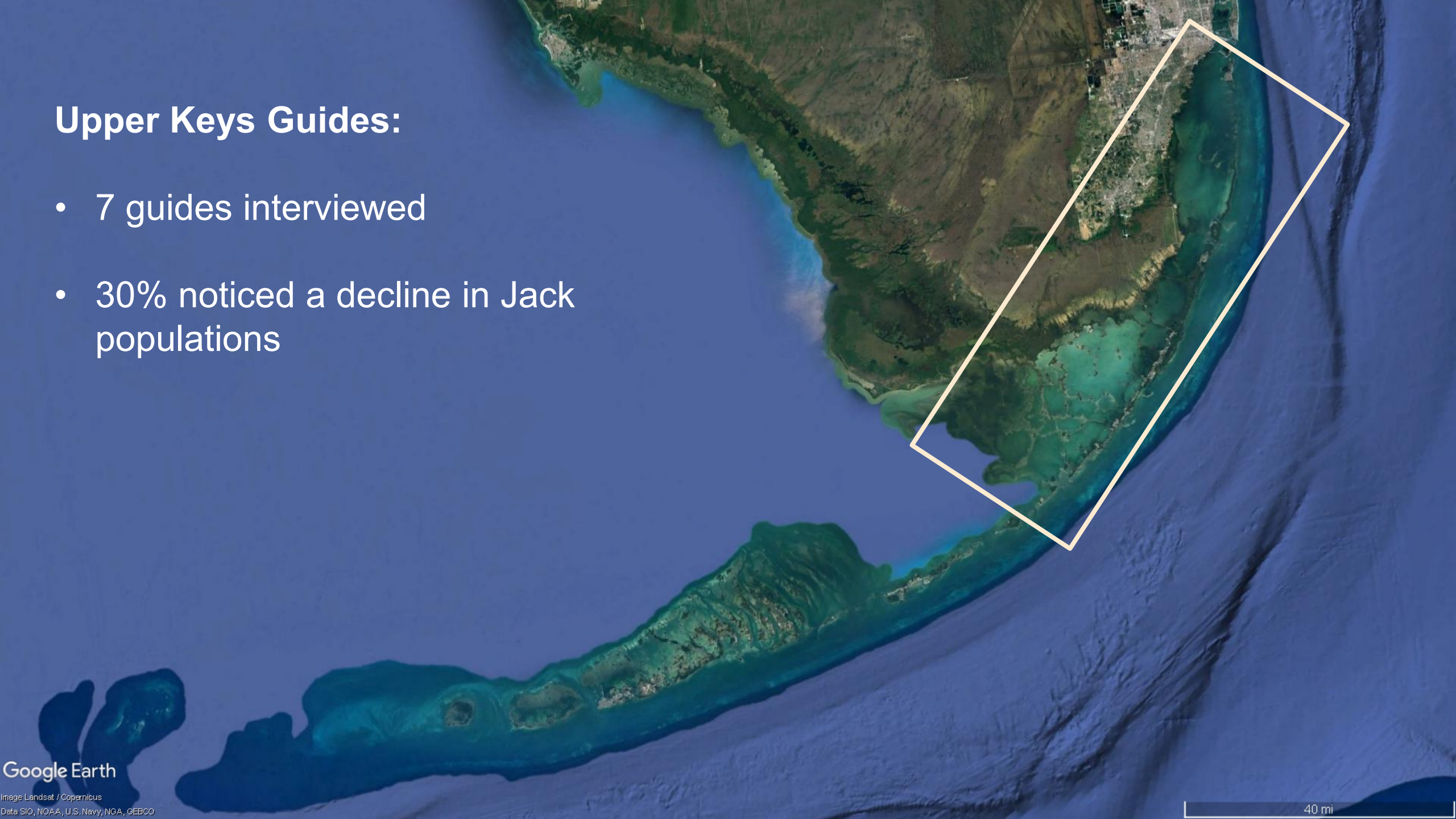
1. Patterns of Jack decline
2. Ecology in the Keys
3. Stakeholder concern and value

Lower Keys Guides:

- 11 guides interviewed
- 100% noticed a decline in Jack populations

Upper Keys Guides:

- 7 guides interviewed
- 30% noticed a decline in Jack populations



Method 2 – Long Term Datasets

Multiple lines of evidence from multiple data sources

1. Fisheries Independent Monitoring (FIM)

2. Everglades angler & guide surveys

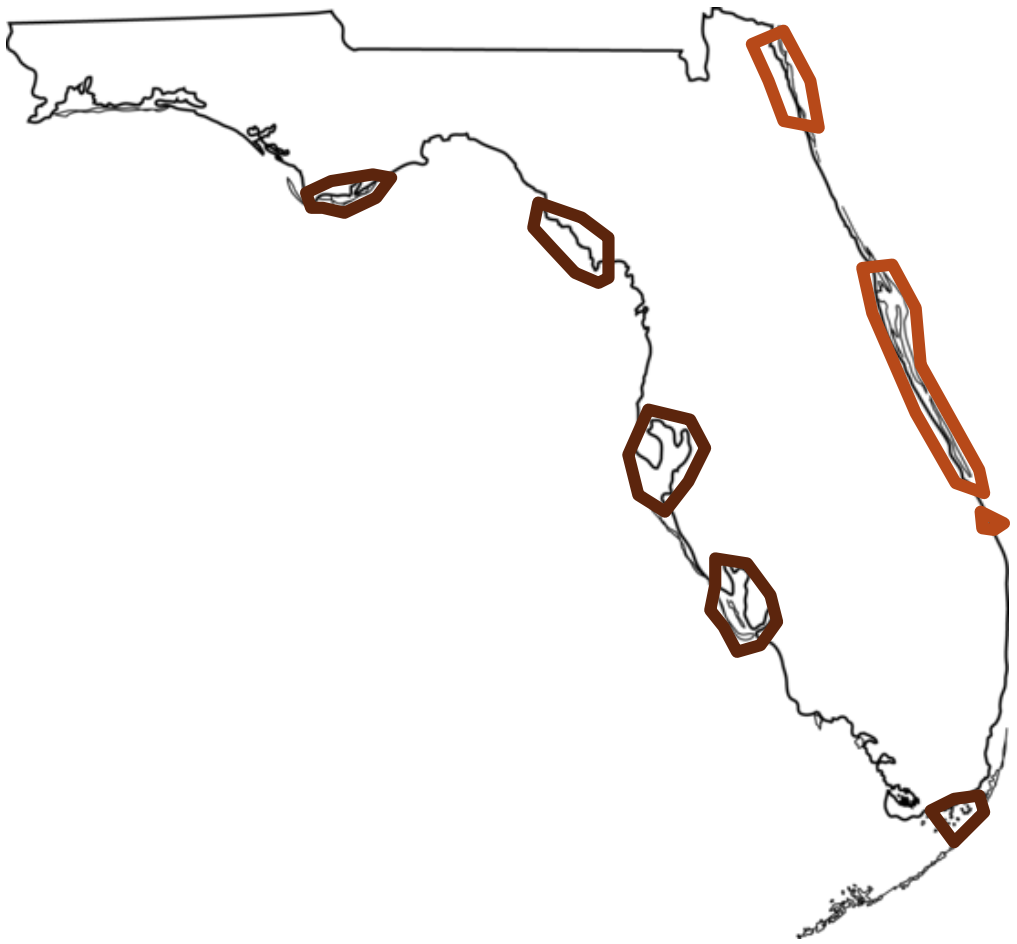
3. Statewide recreational landings

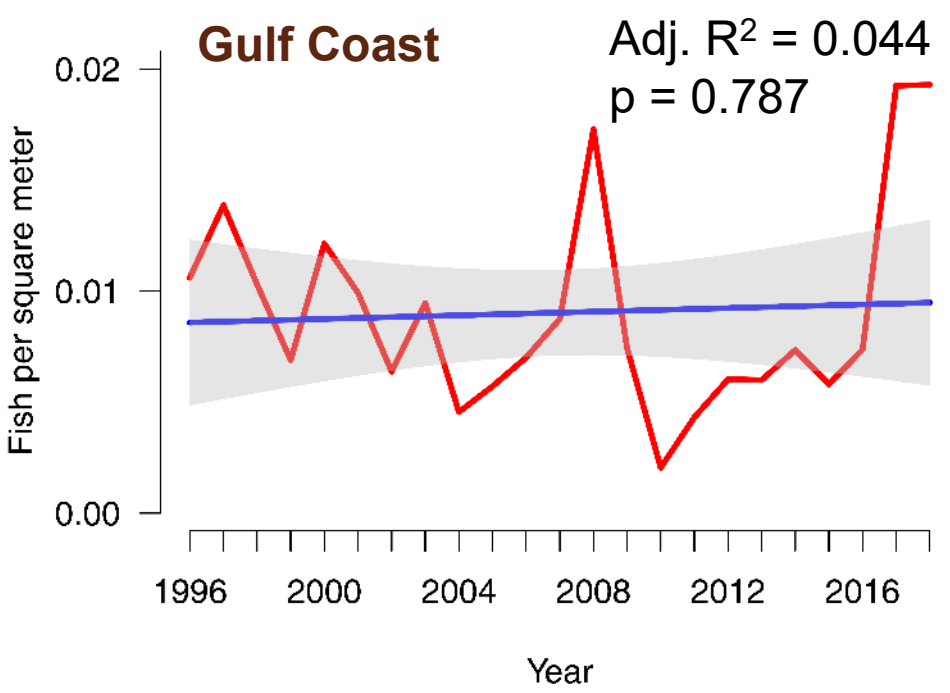
4. Statewide commercial landings

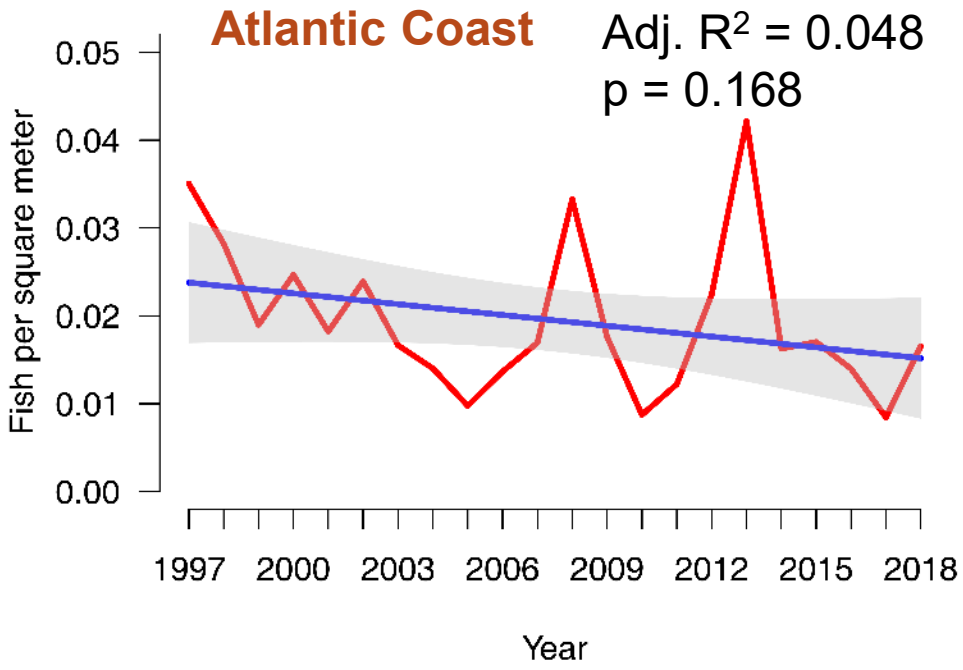
1. Fisheries independent monitoring

Gulf Coast: **NO decline**

Atlantic Coast: **NO decline**

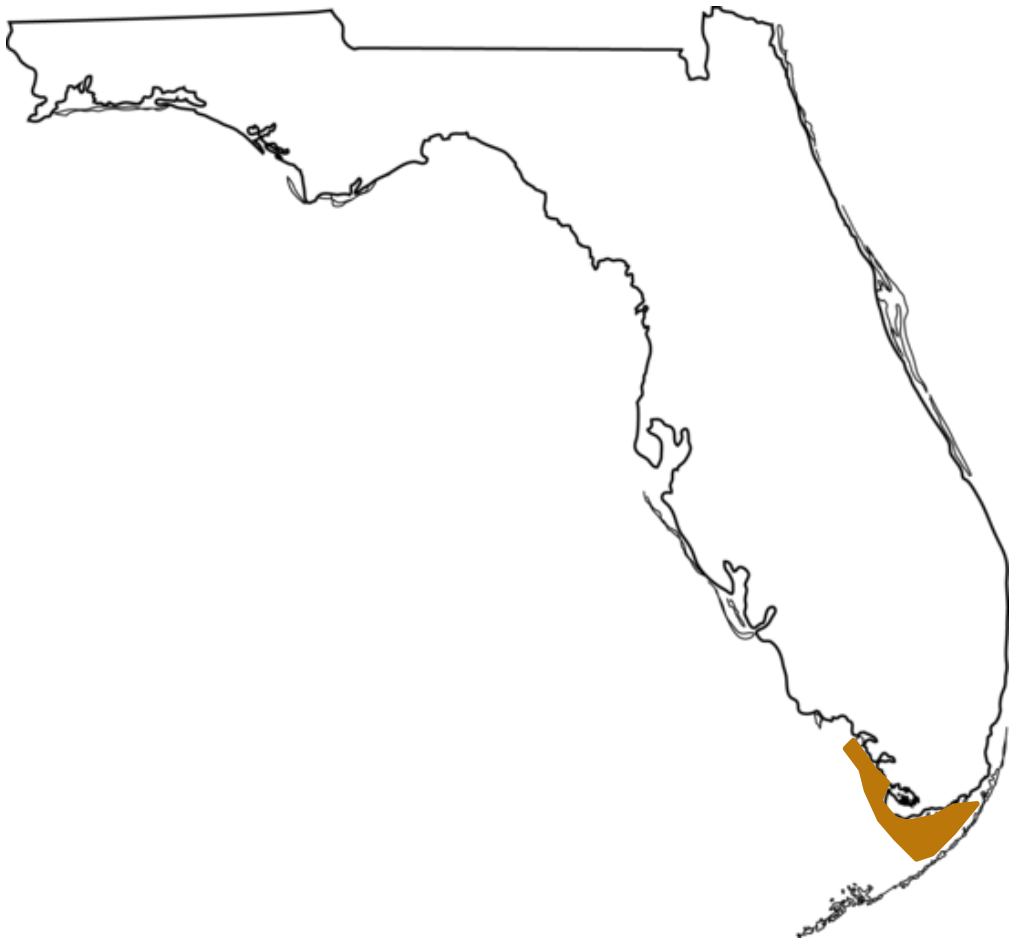




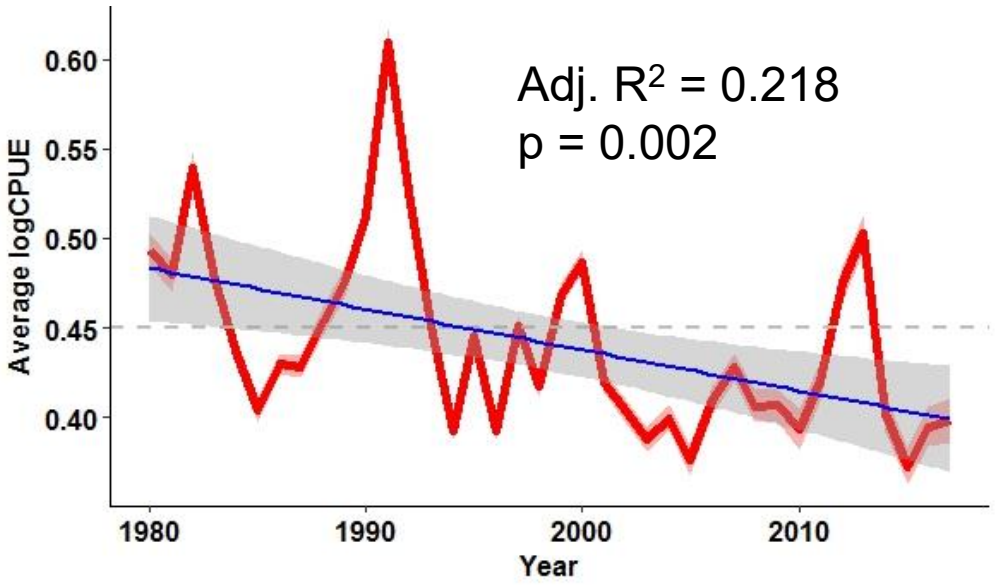


2. Everglades angler & guide surveys

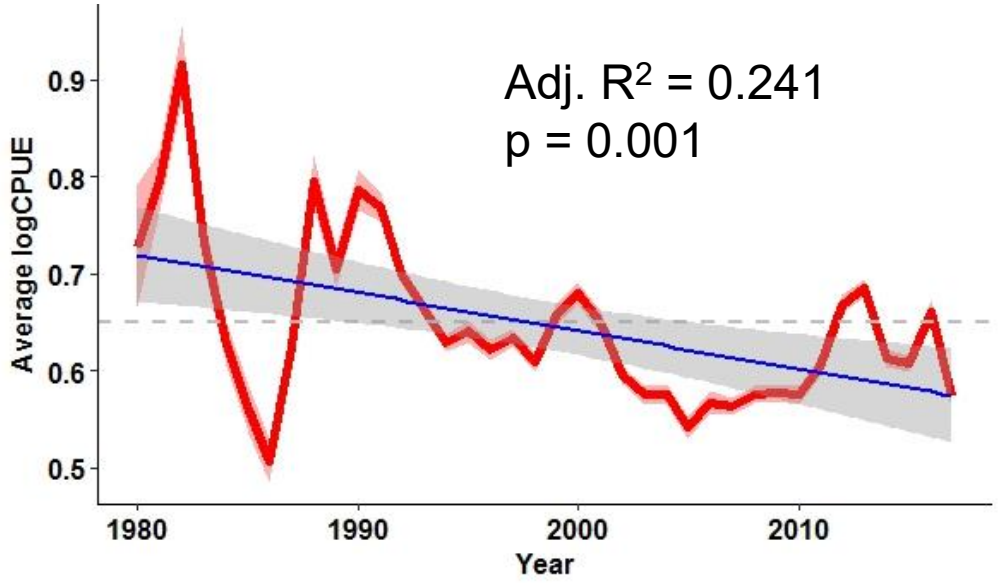
Everglades: **~ 20% decline**



Angler Reports



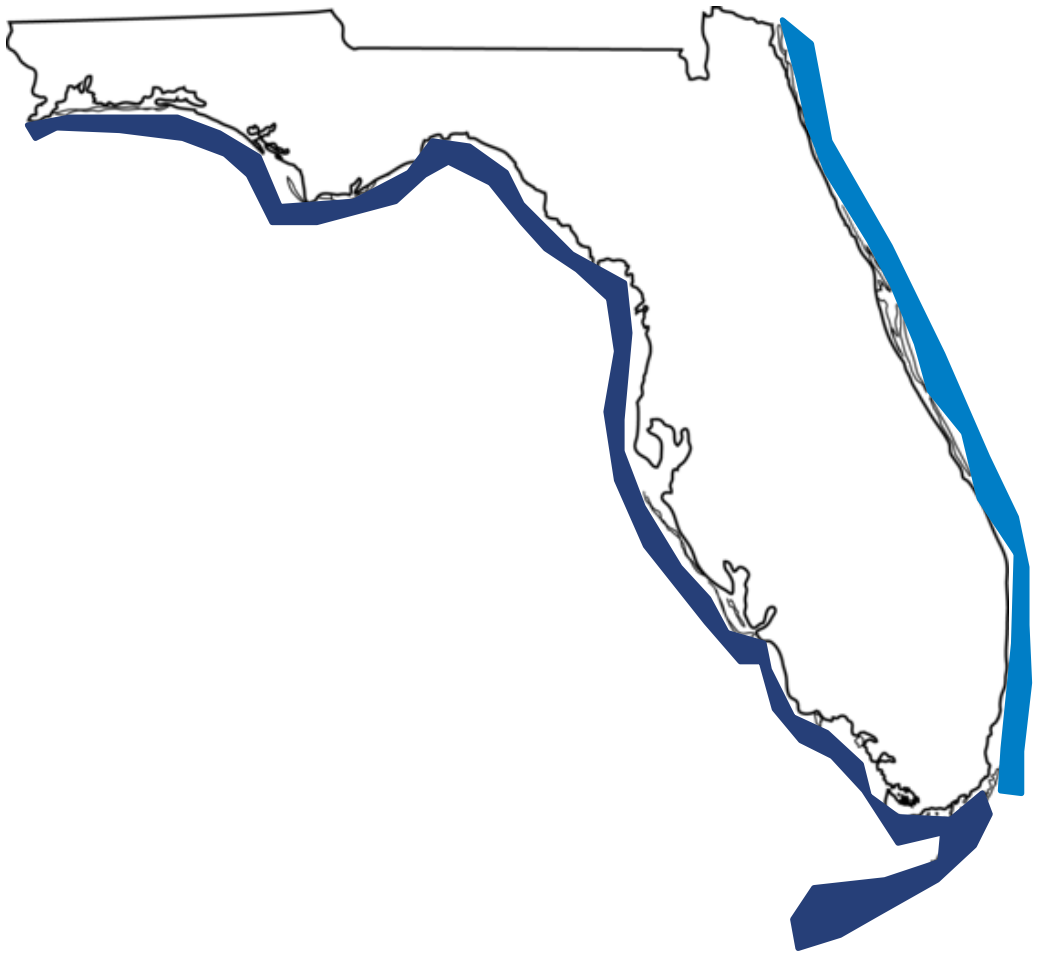
Guide Reports



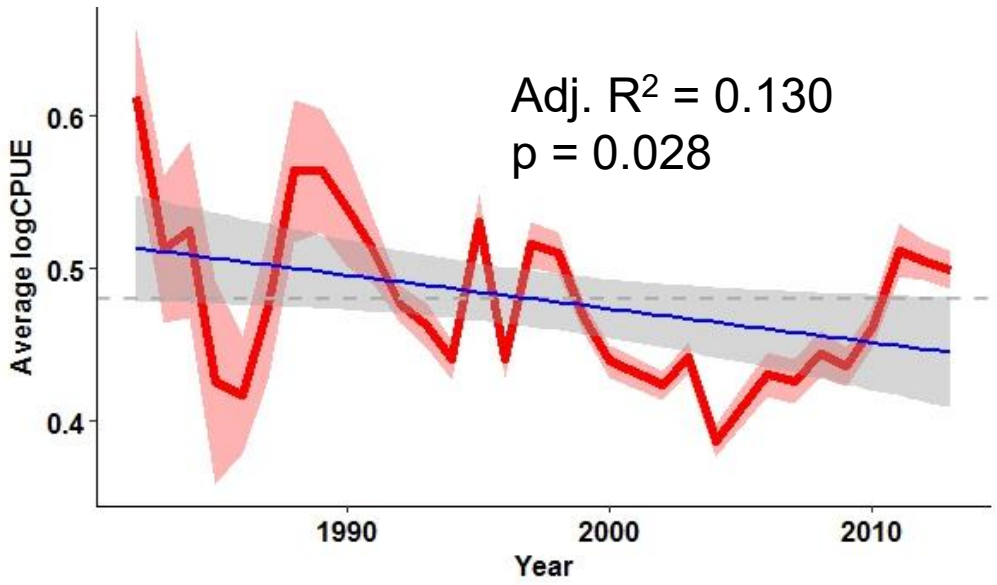
3. Statewide recreational landings

Gulf Coast: **~ 10% decline**

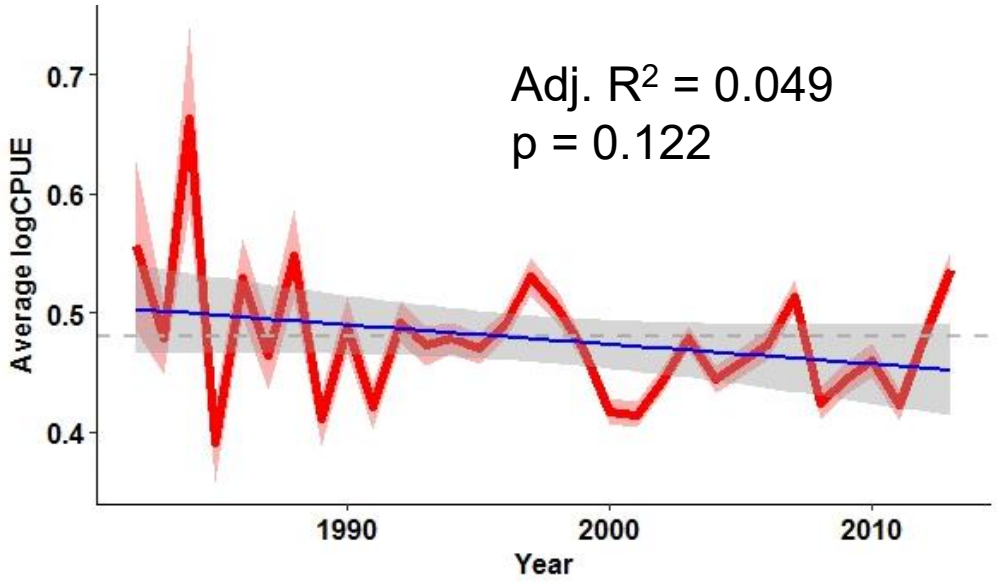
Atlantic Coast: **NO decline**



Gulf Coast



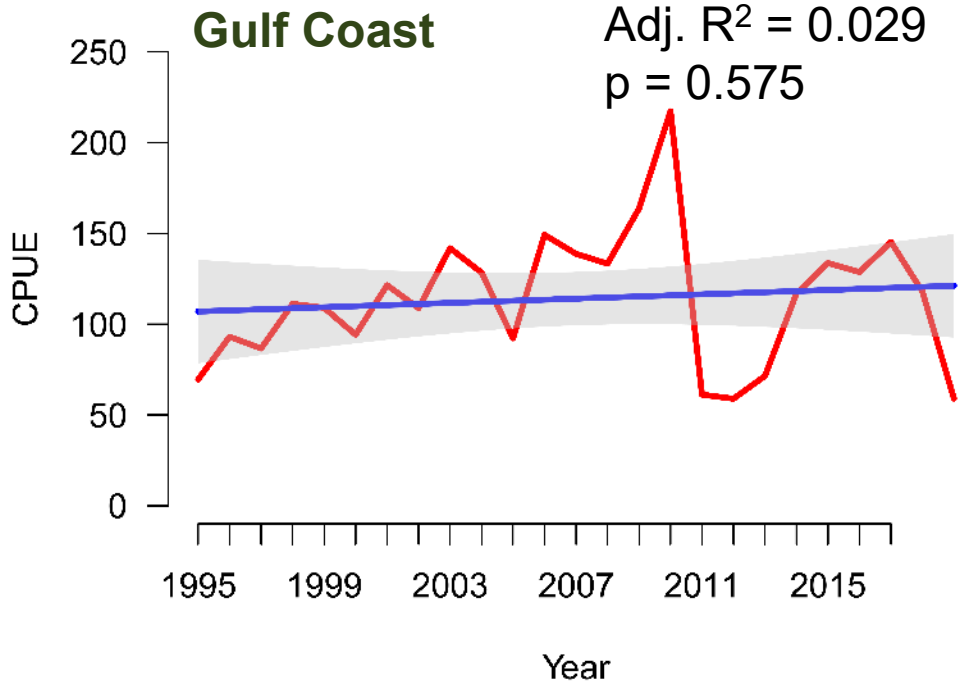
Atlantic Coast

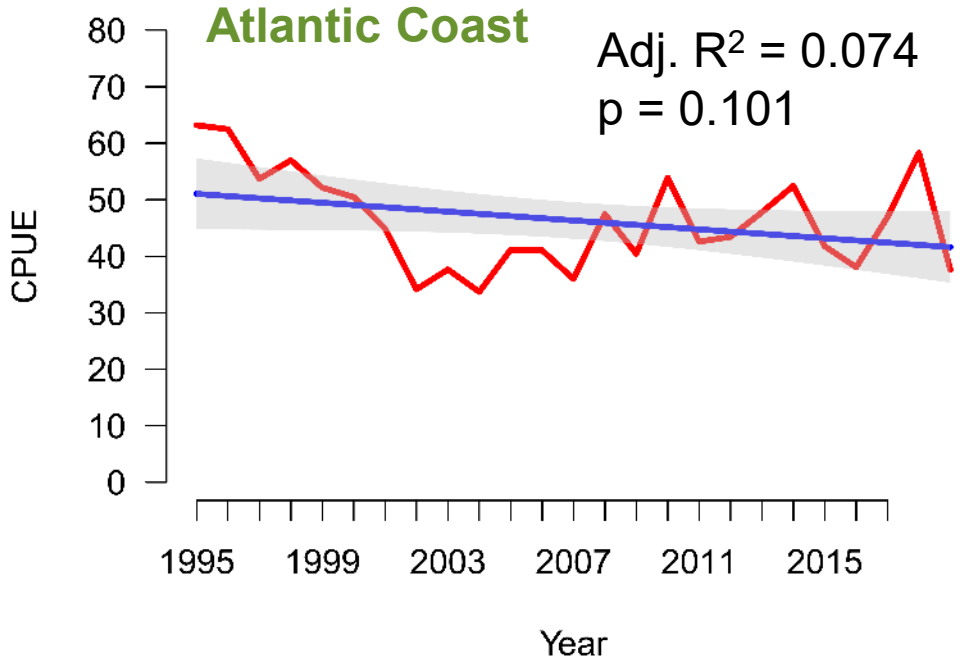


3. Statewide commercial landings

Gulf Coast: **NO decline**

Atlantic Coast: **NO decline**



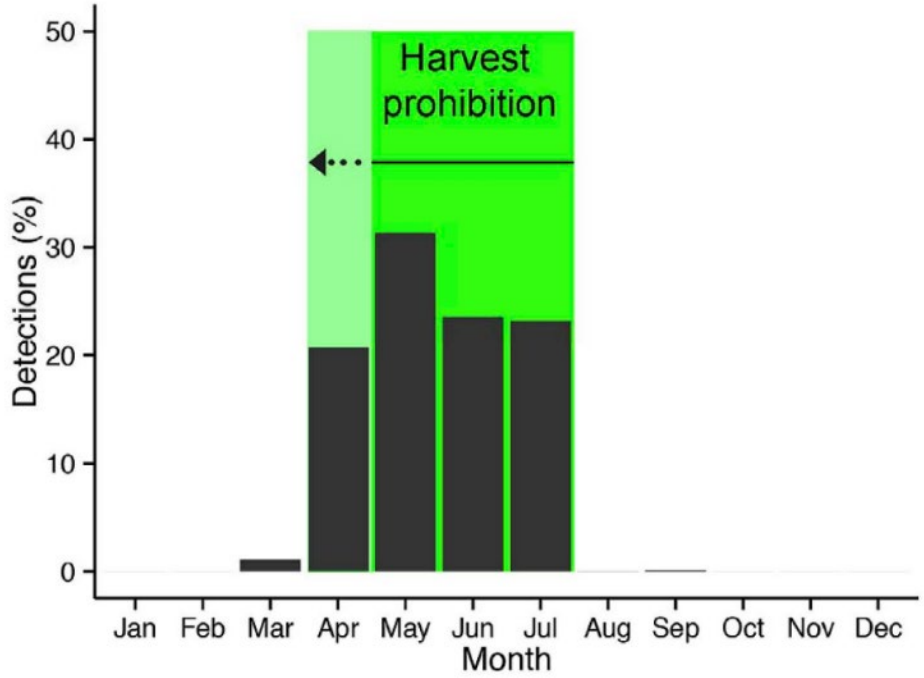


2. Where should conservation efforts focus?

Use a movement ecology approach to determine the spatiotemporal extent of management needed to conserve Crevalle Jacks:

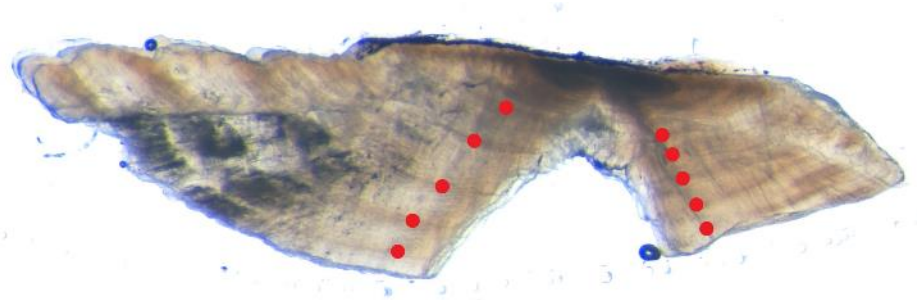
a. **Otolith stable isotope analysis**
b. **Acoustic telemetry**

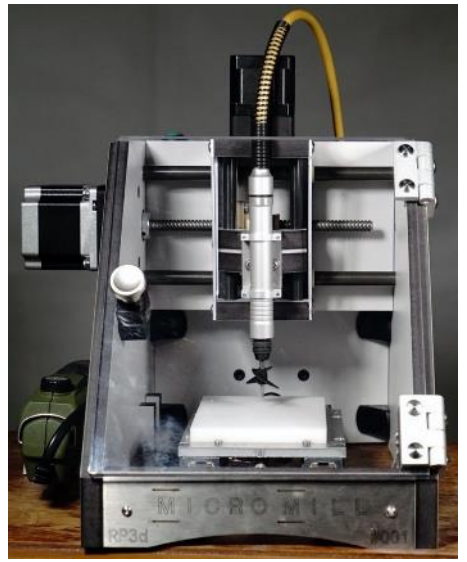
Acoustic telemetry results have led to a change in the closed season for Permit in the Florida Keys (Brownscombe et al. 2019 Marine Policy)

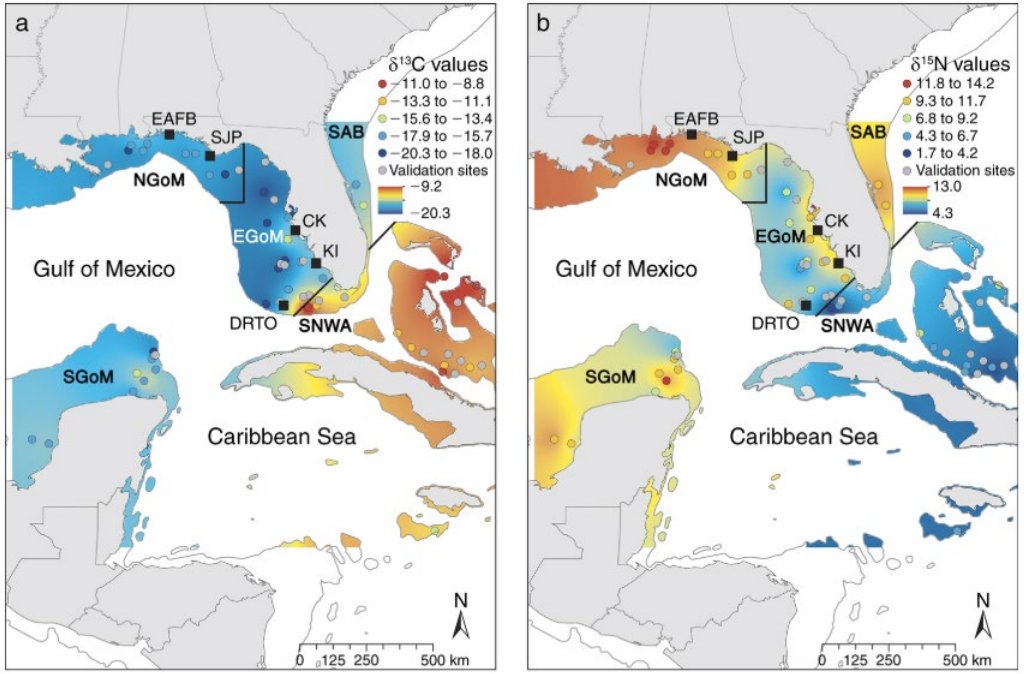


Otolith Stable Isotopes

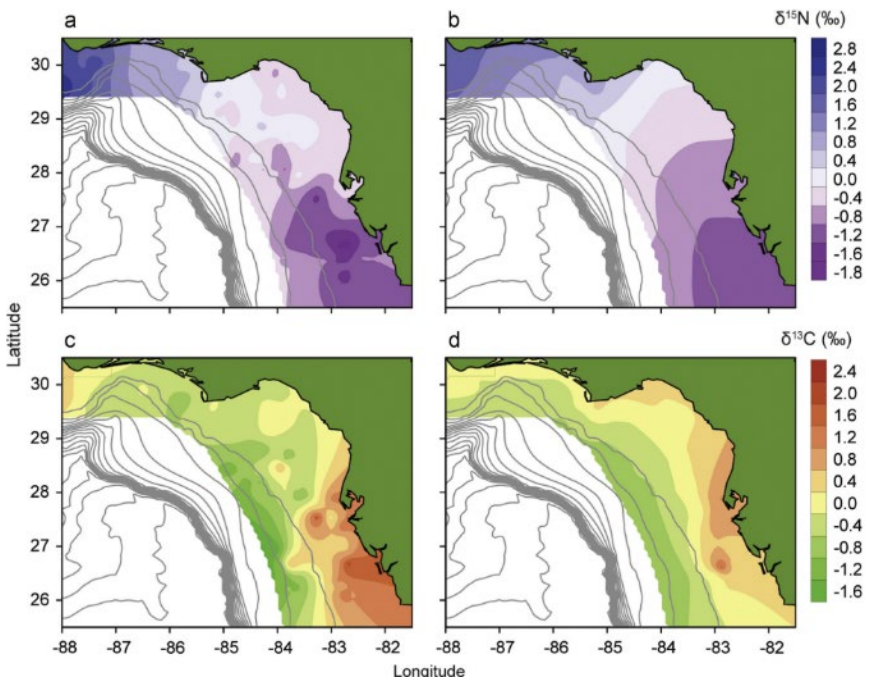
Stable isotopes in summer vs. winter bands of otoliths to track **long range migration over a fish's lifetime**







Vander Zanden et al. 2018 Ecol. App.



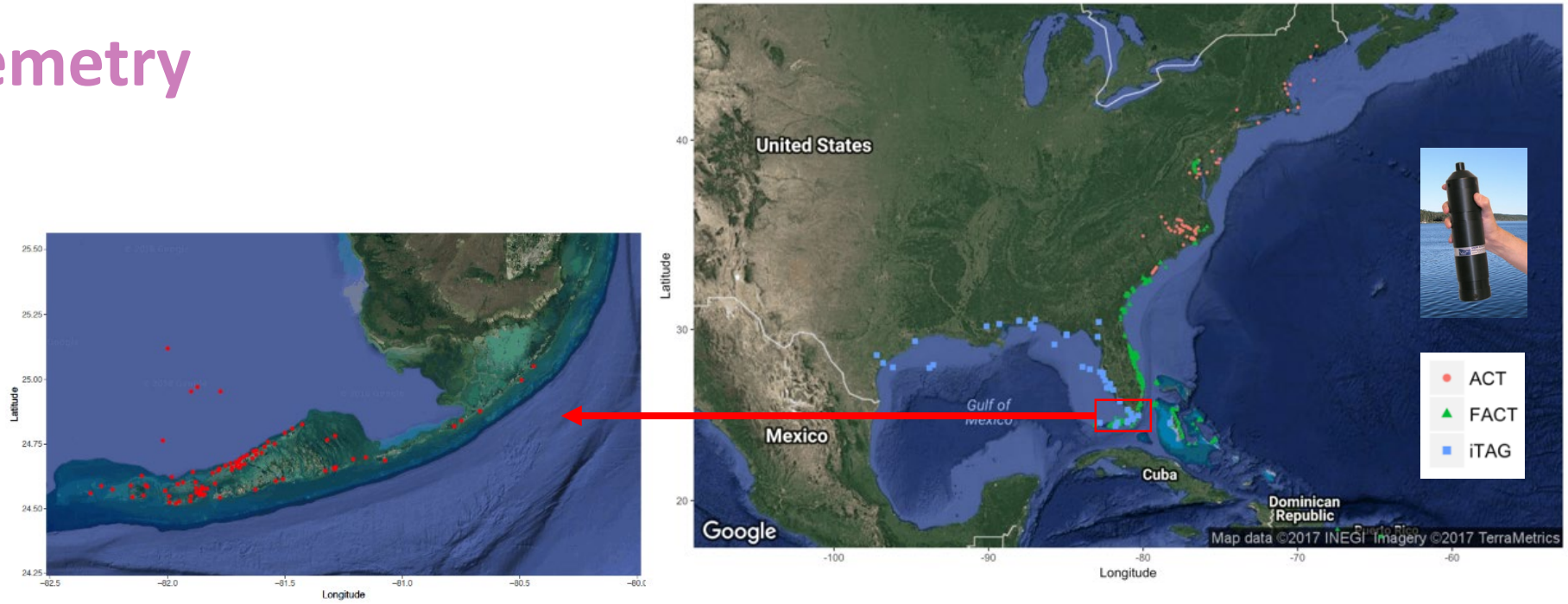
Radabaugh et al. 2014 Cont. Shelf Rsch.

Benefits:
Quick, inexpensive way to determine if Jacks are migrating

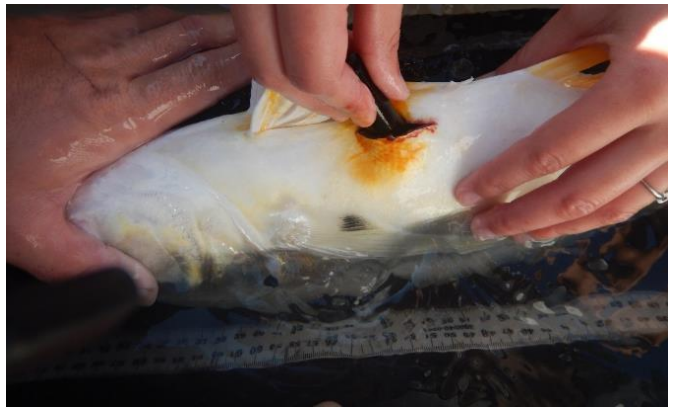
Limitations:
Cannot determine exactly where Jacks migrate to

Acoustic Telemetry

Collaboration with receiver networks to track **Jacks implanted with acoustic tags** - exact movement patterns on daily and seasonal scales



ACT, FACT, and iTAG acoustic receiver network locations



Benefits:

Can determine exactly where fish go, home ranges, & population connectivity

Limitations:

Can only tag a limited number of fish & follow them for a relatively short time period

FACT Fish Move.

Aquatic Animals in the GOM
Integrated Tracking of
iTAG

The Atlantic Cooperative Telemetry Network

Project outcomes

Decline: we will know

- Where, when decline began
- Possible reasons for decline

Movement: we will know

- Whether Jacks make annual long-distance migrations
- Where exactly Jacks are migrating to

Relevance to management:

- Jointly these data will allow us to identify management needs
- Data will tell us where management needs to be focused (local vs. statewide)

Acknowledgements

Funding:

LOWER KEYS GUIDES ASSOCIATION

EVERGLADES FOUNDATION

I.W.F.A. SCHOLARSHIP TRUST
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- The Nelson lab (LSU)
- The Swart Lab (UM)
- The Age and Growth Lab at FWRI St. Petersburg
- The many Florida Keys fishing guides who have provided assistance and critical knowledge

Thank you!

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