



# SPAWNING DYNAMICS OF COMMON SNOOK

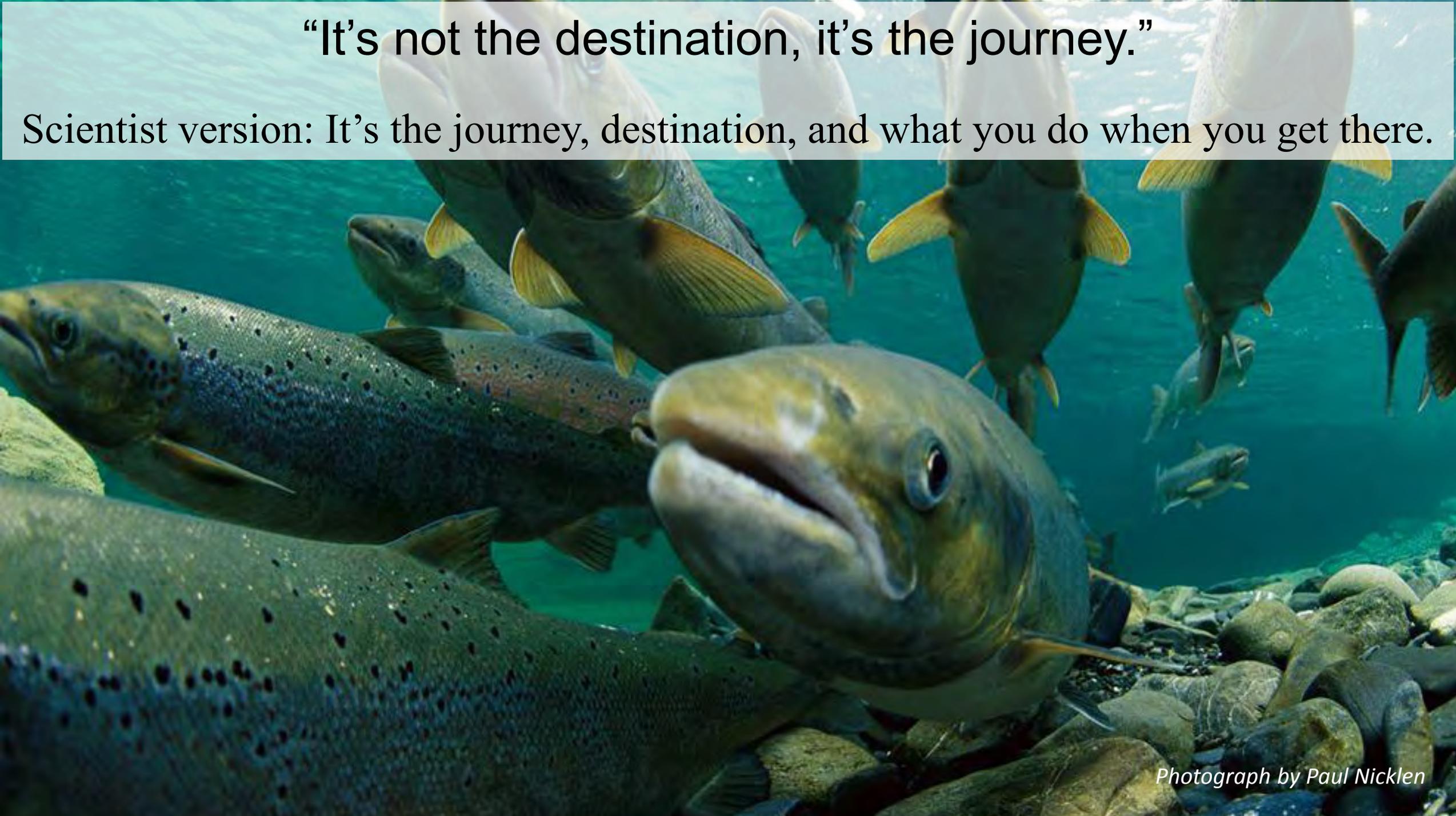


**FL Fish and Wildlife Conservation Commission  
Fish and Wildlife Research Institute**

*© Paul Dabill*

“It’s not the destination, it’s the journey.”

Scientist version: It’s the journey, destination, and what you do when you get there.



*Photograph by Paul Nicklen*



# COMMON SNOOK SPAWNING DYNAMICS

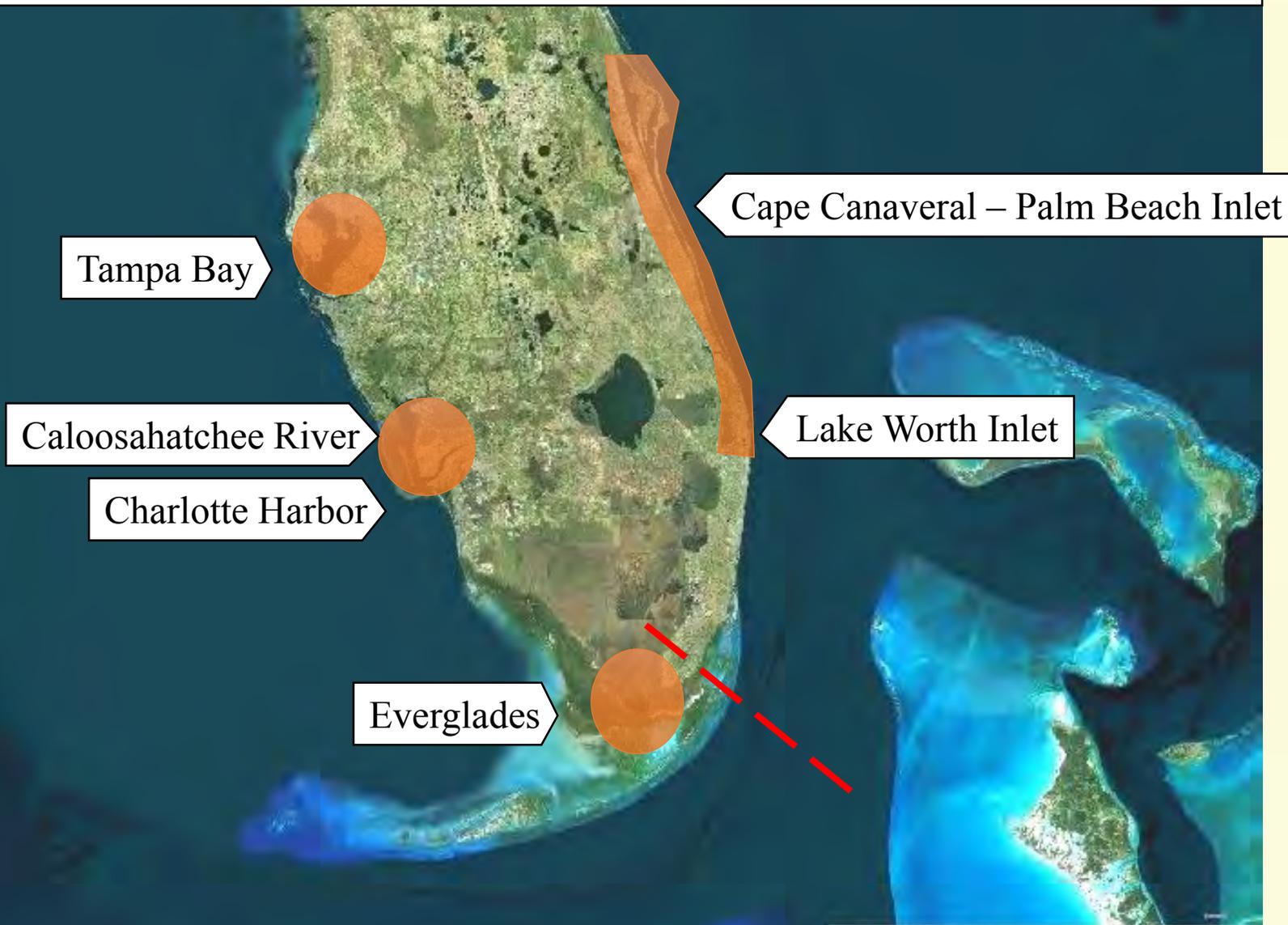
## Known

	West Coast	East Coast
Maturation	Males: 250 mm TL Females: 500 mm TL	same
Obligate Marine Spawners	Males: 35‰ Females: 24‰	same
Spawning season	150 – 180 days April to September	180 days April to October

## Assumed

- All females migrate annually
- Population is synchronous

# Recent studies on movements of Common Snook during the spawning season





# HOW DO WE TRACK?



Streamer/ Conventional / Visual tags



# HOW DO WE TRACK?



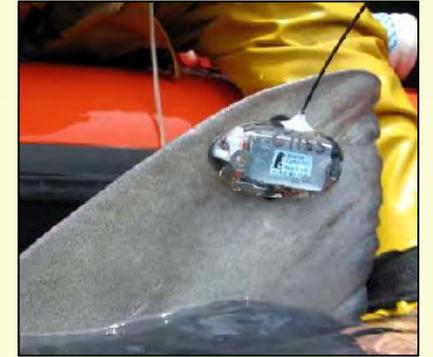
Coded tags



Radio tags



Data Storage (Archival) tags

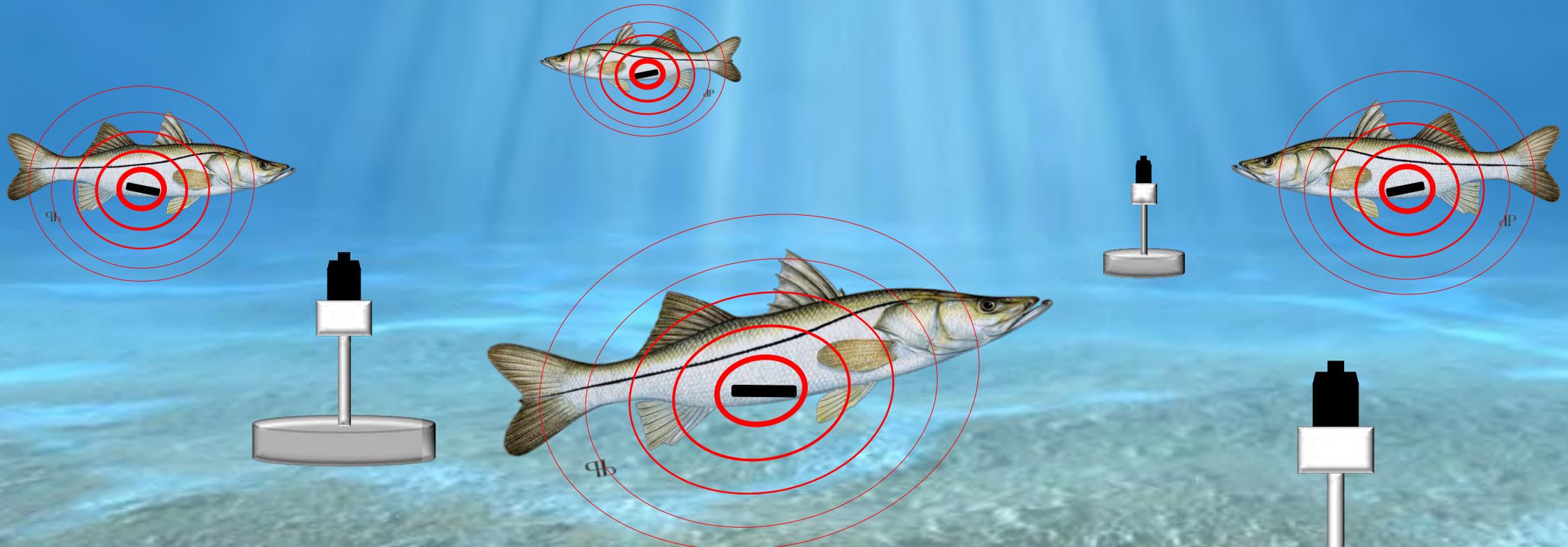


Satellite tags



Acoustic transmitters

# HOW DOES ACOUSTIC TELEMETRY WORK?



107 detections					
Date	Time	Code Space	ID	Receiver	Station
2013-07-17	20:14:30	A69-1303	48962	VR2W-107714	MR3A
2013-10-29	00:03:34	A69-1303	48962	VR2W-114392	TB5
2013-10-29	00:30:53	A69-1303	48962	VR2W-114392	TB5
2013-11-02	09:48:42	A69-1303	48962	VR2W-114392	TB5
2013-11-04	01:18:21	A69-1303	48962	VR2W-114392	TB5
2013-11-04	08:48:01	A69-1303	48962	VR2W-114392	TB5



# WEST COAST – CALOOSAHATCHEE RIVER

## *Acoustic telemetry*

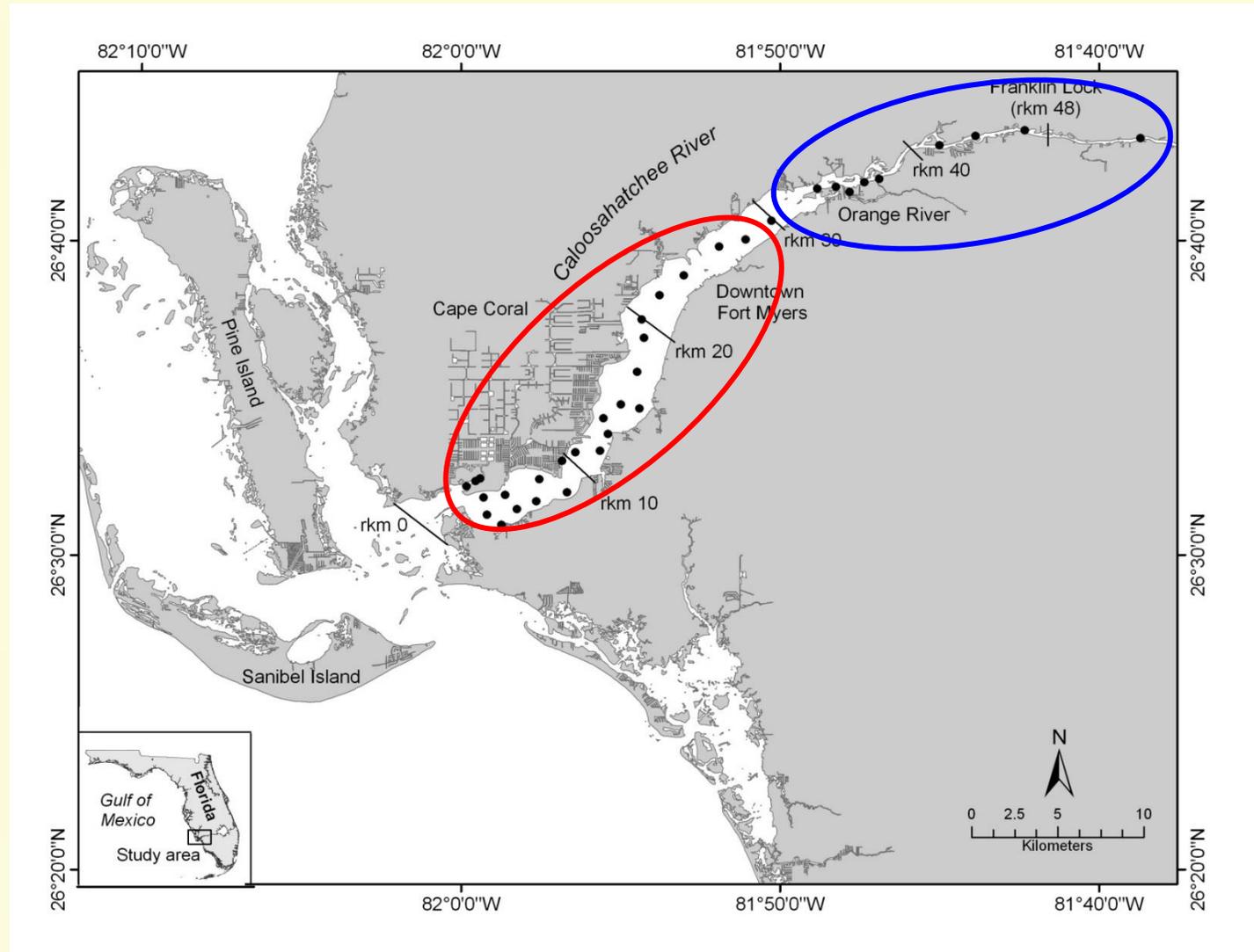
**Number of snook tagged: 25**

**Size: 543 – 1085 mm TL**

**Tracked for: 3 years (2005-2007)**

## **Purpose:**

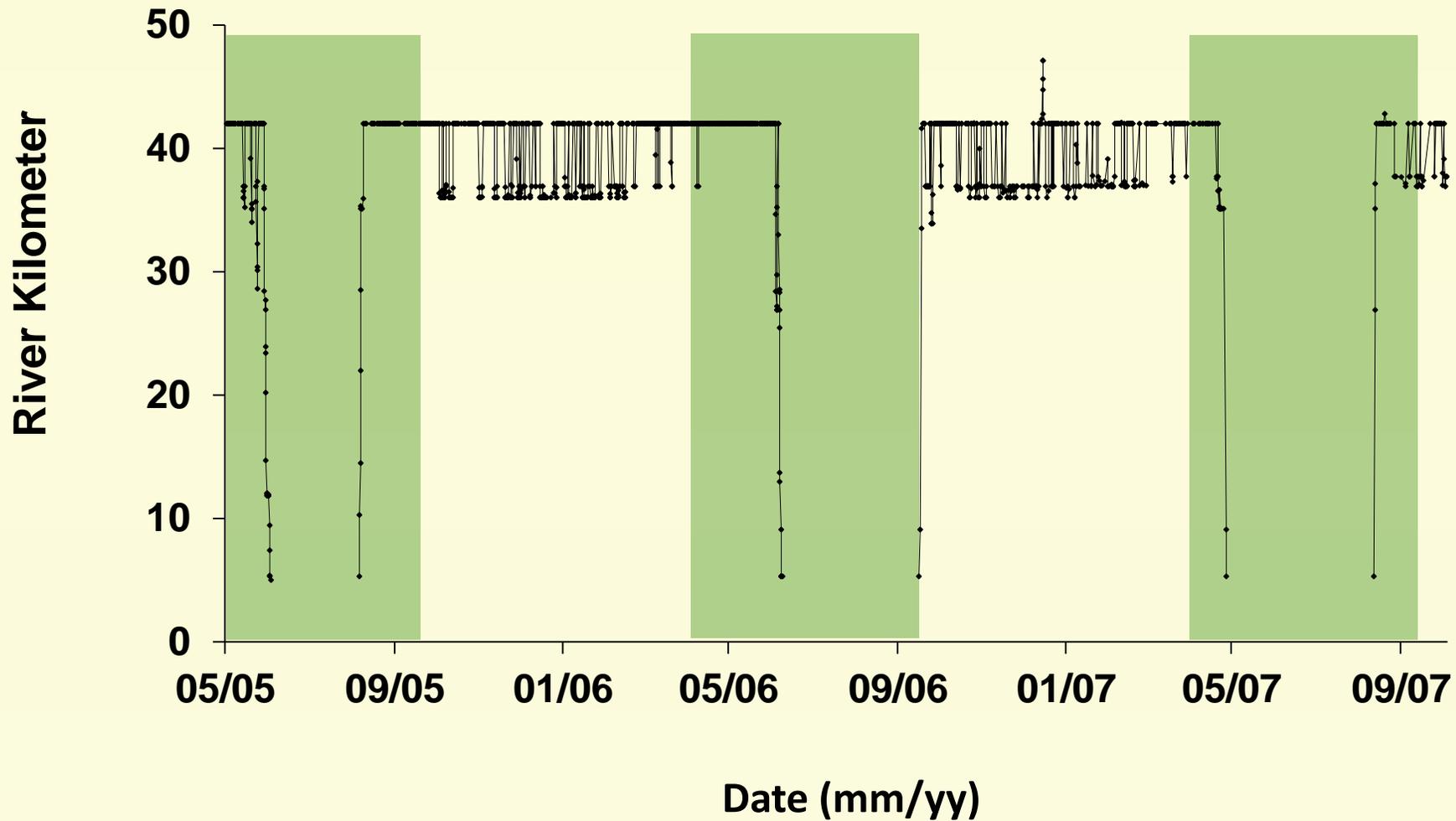
- 1) Identify areas used by snook within coastal rivers
- 2) To determine movement patterns and exchange rates of adult snook between river and the adjacent estuary.





# WEST COAST – CALOOSAHATCHEE RIVER

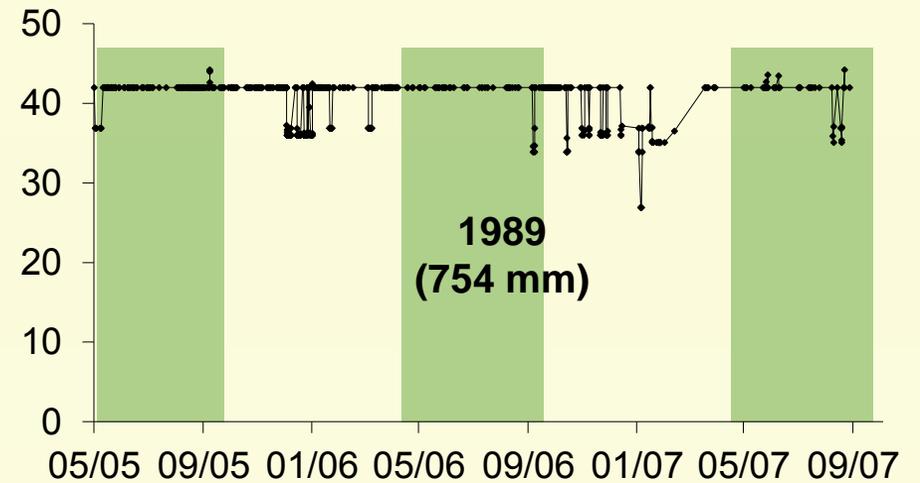
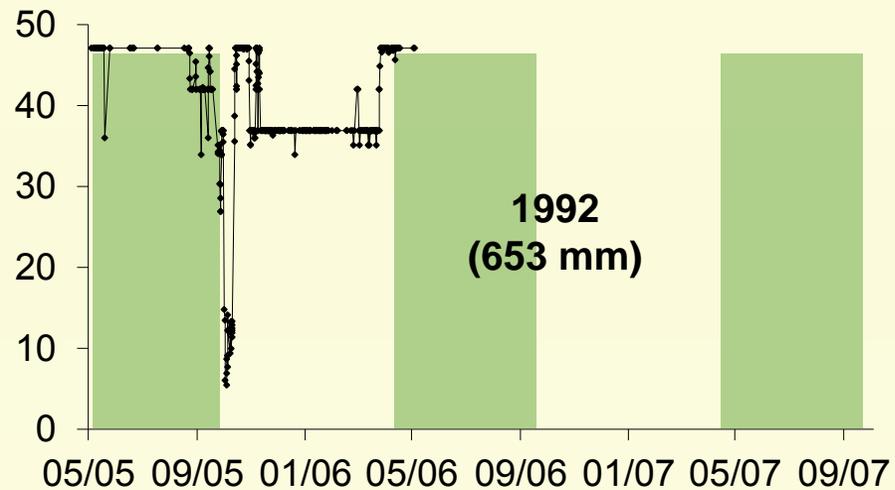
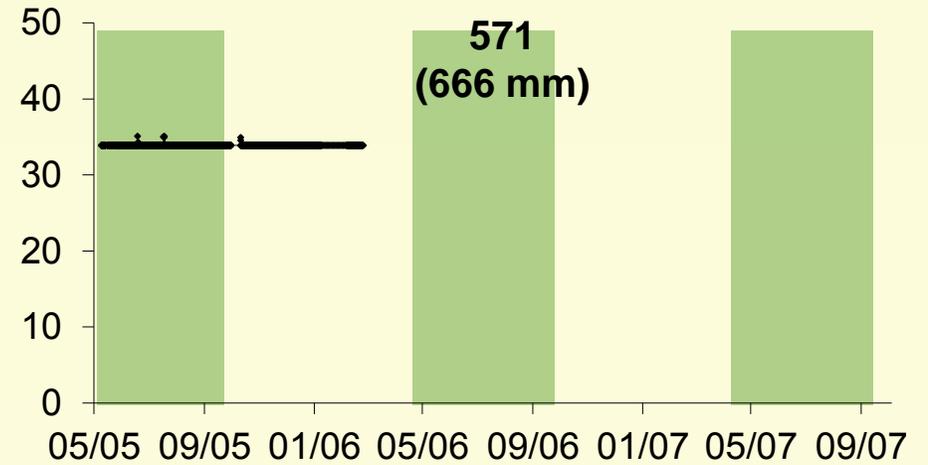
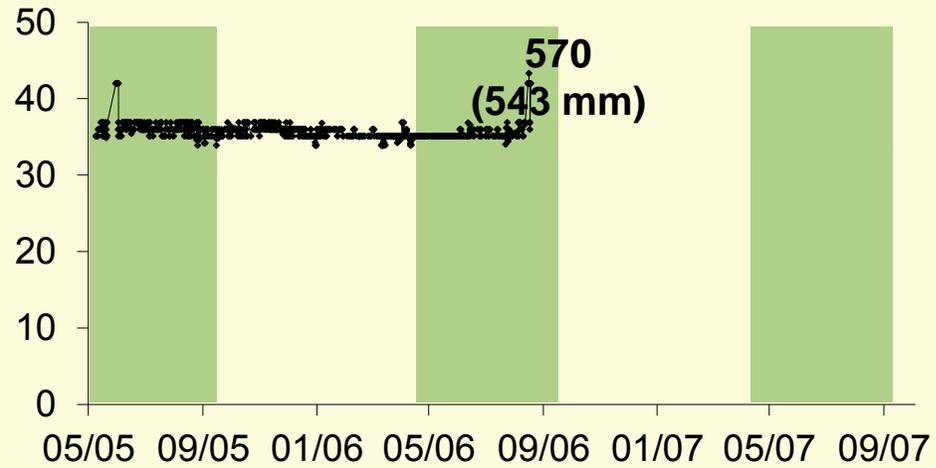
## Migration from the river to spawning sites





# WEST COAST – CALOOSAHATCHEE RIVER

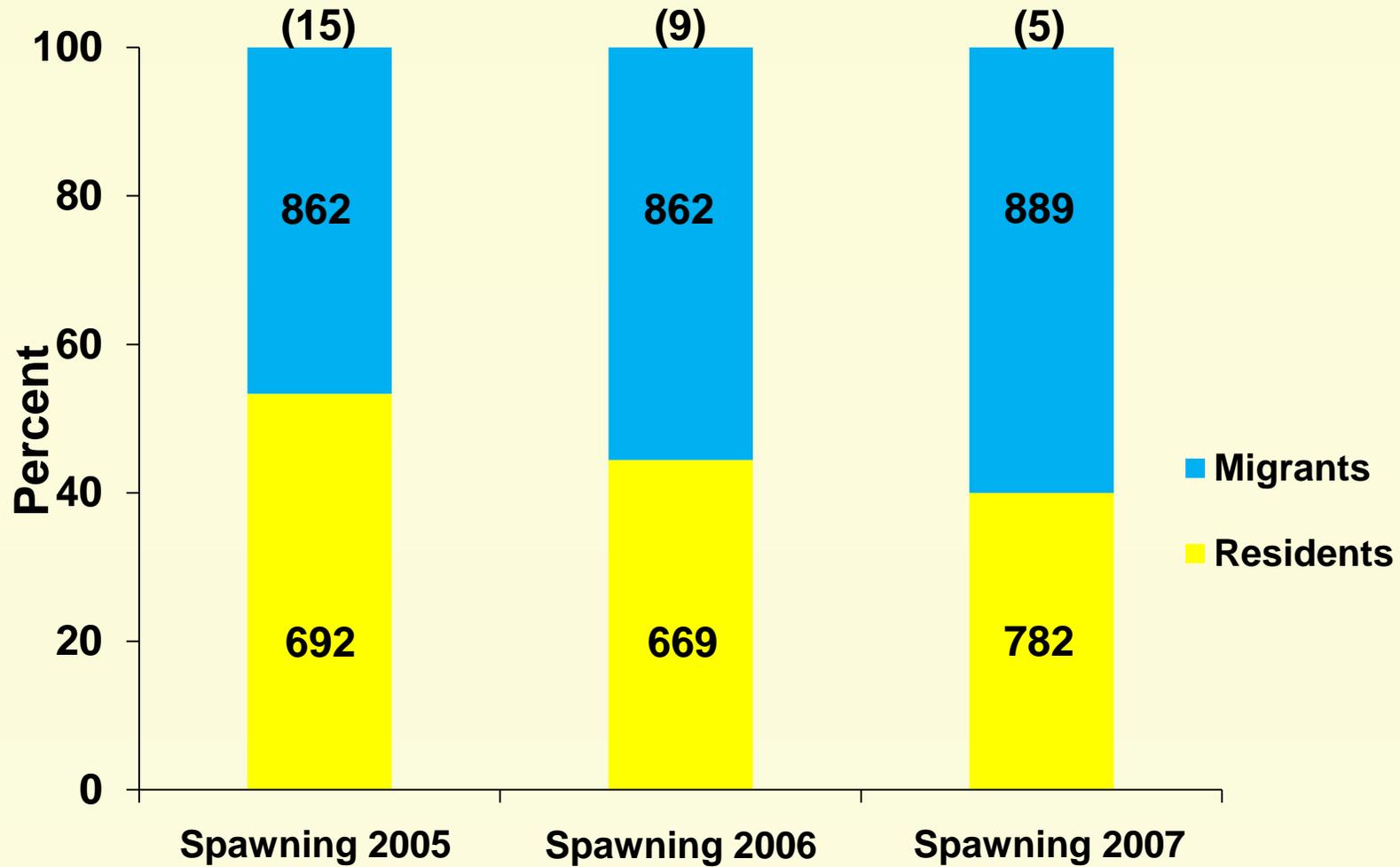
But not all fish migrated....





# WEST COAST – CALOOSAHATCHEE RIVER

Residents were smaller than migrating fish





# WEST COAST – CALOOSAHATCHEE RIVER

## *CONCLUSIONS*

	West Coast				East Coast
	Caloosahatchee River	Charlotte Harbor	Tampa Bay	Everglades	Cape Canaveral to Palm Beach
Intra-annual site fidelity	Y, non-sp site				
Inter-annual site fidelity	Y, non-sp site				
Skip spawning	Y, 40%				
Migration type	Single				
Behavioral contingents	Yes				
Spawning season length	78 (40-124 d)				
Mean spawning start date	June 1 <sup>st</sup>				



# WEST COAST – CHARLOTTE HARBOR

*Acoustic telemetry*

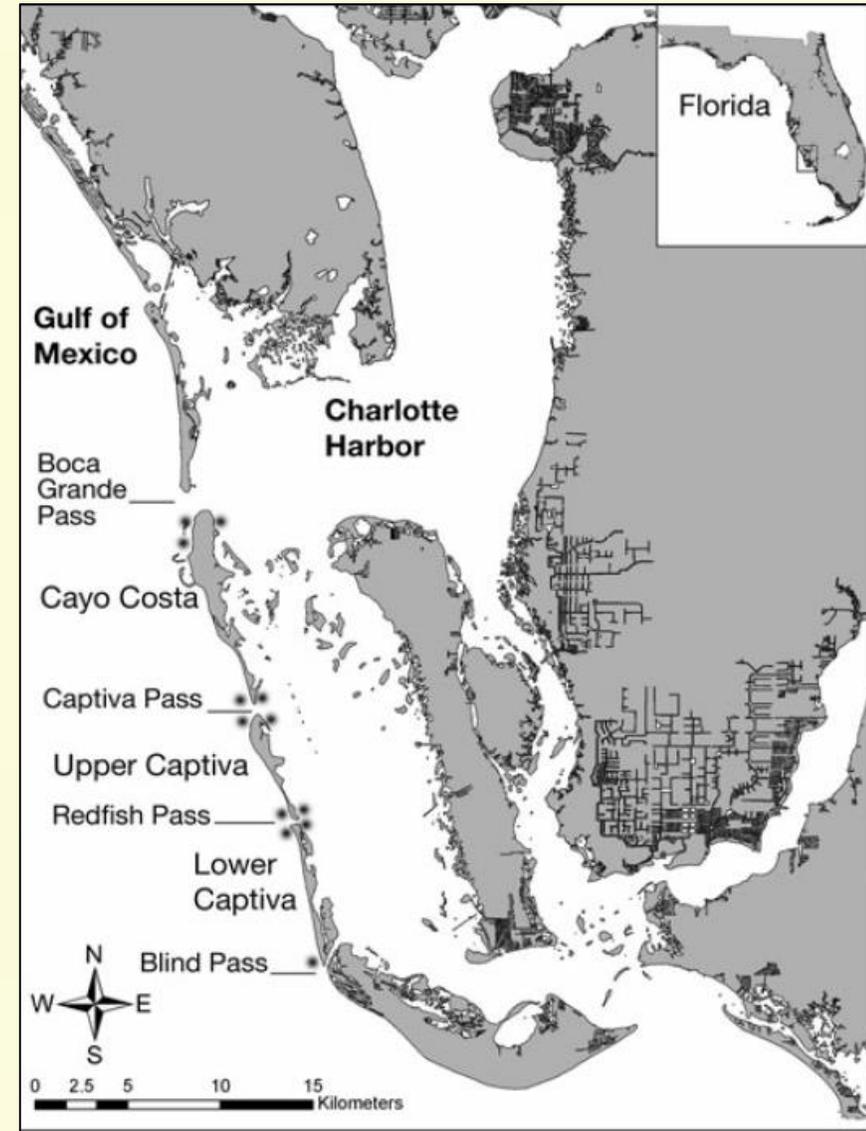
**Number of snook tagged: 30**

**Size: >450 mm SL**

**Tracked for: 2 years (2007-2008)**

**Purpose:**

- 1) To determine the degree to which snook show fidelity to spawning grounds.





# WEST COAST – CHARLOTTE HARBOR

- Exhibited high levels of intra and inter-annual site fidelity to spawning sites.
- Three levels of fidelity: one side of the island, whole island, more than one island.
- Of 19 fish, 10 were only detected on the island they were tagged.





# WEST COAST – CHARLOTTE HARBOR

## *CONCLUSIONS*

	West Coast				East Coast
	Caloosahatchee River	Charlotte Harbor	Tampa Bay	Everglades	Cape Canaveral to Palm Beach
Intra-annual site fidelity	Y, non-sp site	Y, sp site			
Inter-annual site fidelity	Y, non-sp site	Y, sp site			
Skip spawning	Y, 40%	NA			
Migration type	Single	Single?			
Behavioral contingents	Yes	Yes			
Spawning season length	78 (40-124 d)	NA			
Mean spawning start date	June 1 <sup>st</sup>	NA			



# WEST COAST – TAMPA BAY

*Acoustic telemetry and catch data*

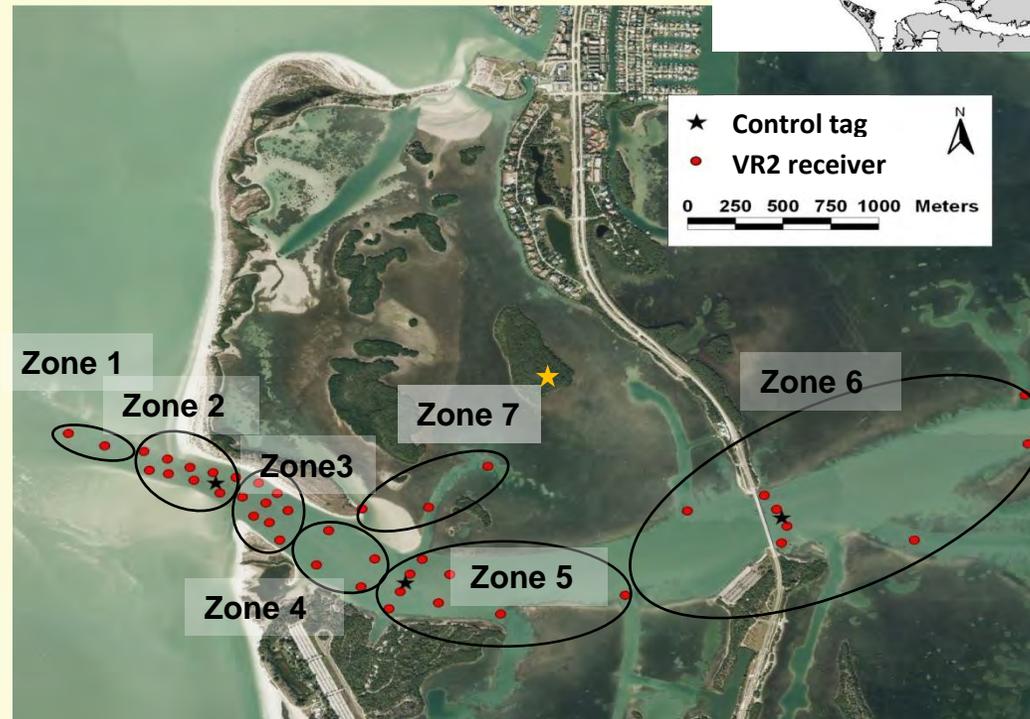
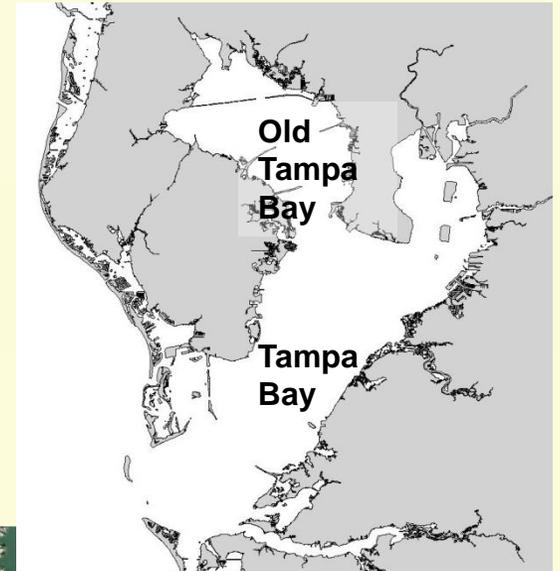
**Number of snook tagged: 31**

**Size: 495 – 792 mm TL**

**Tracked for: 3 years (2007-2009)**

**Purpose:**

- 1) To evaluate where Common Snook occurred in Tampa Bay and if it changed with the spawning season.
- 2) To determine fine scale movement at spawning sites.



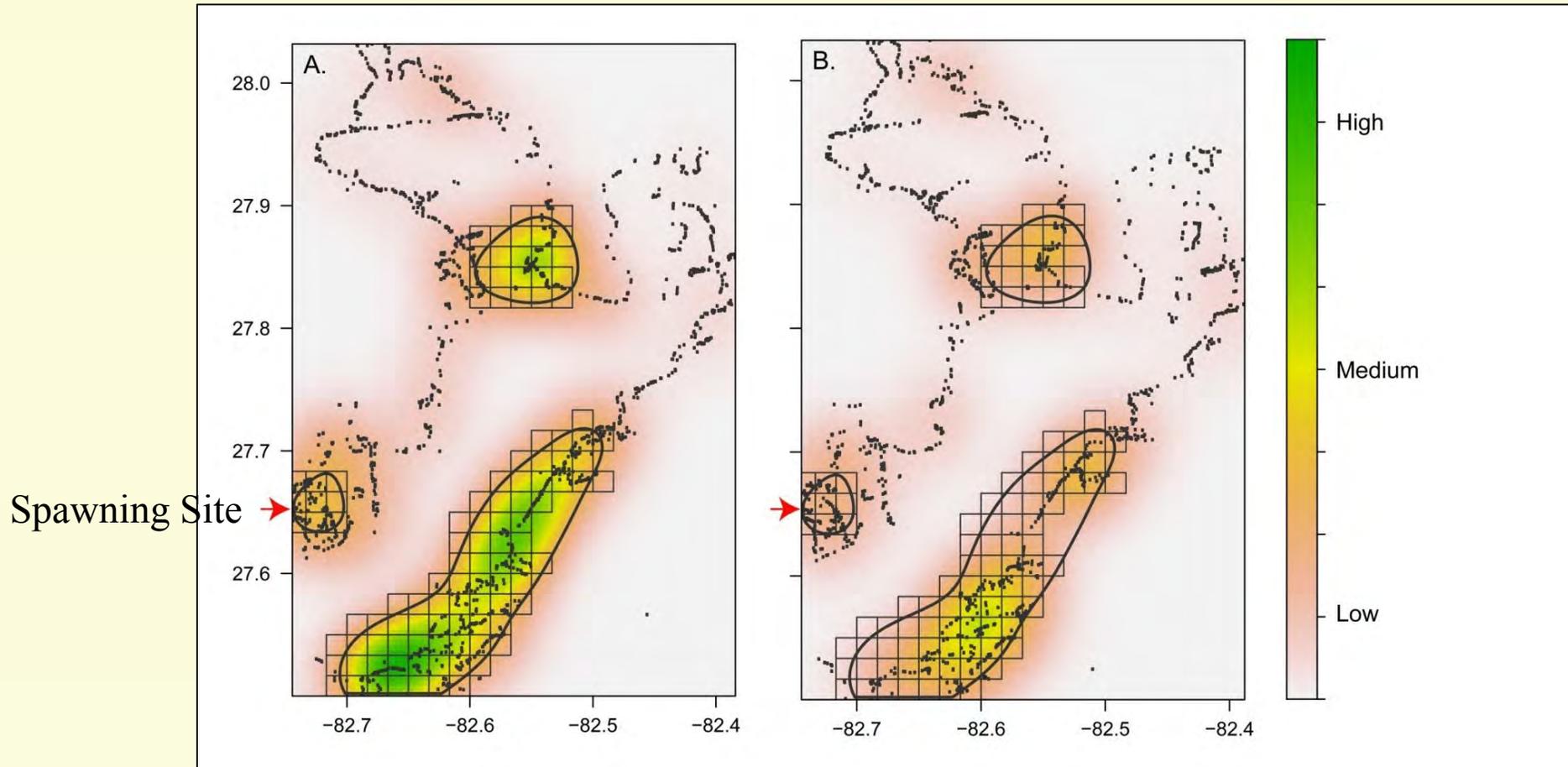


# WEST COAST – TAMPA BAY

## Density of Common Snook in Tampa Bay

Spawning Season

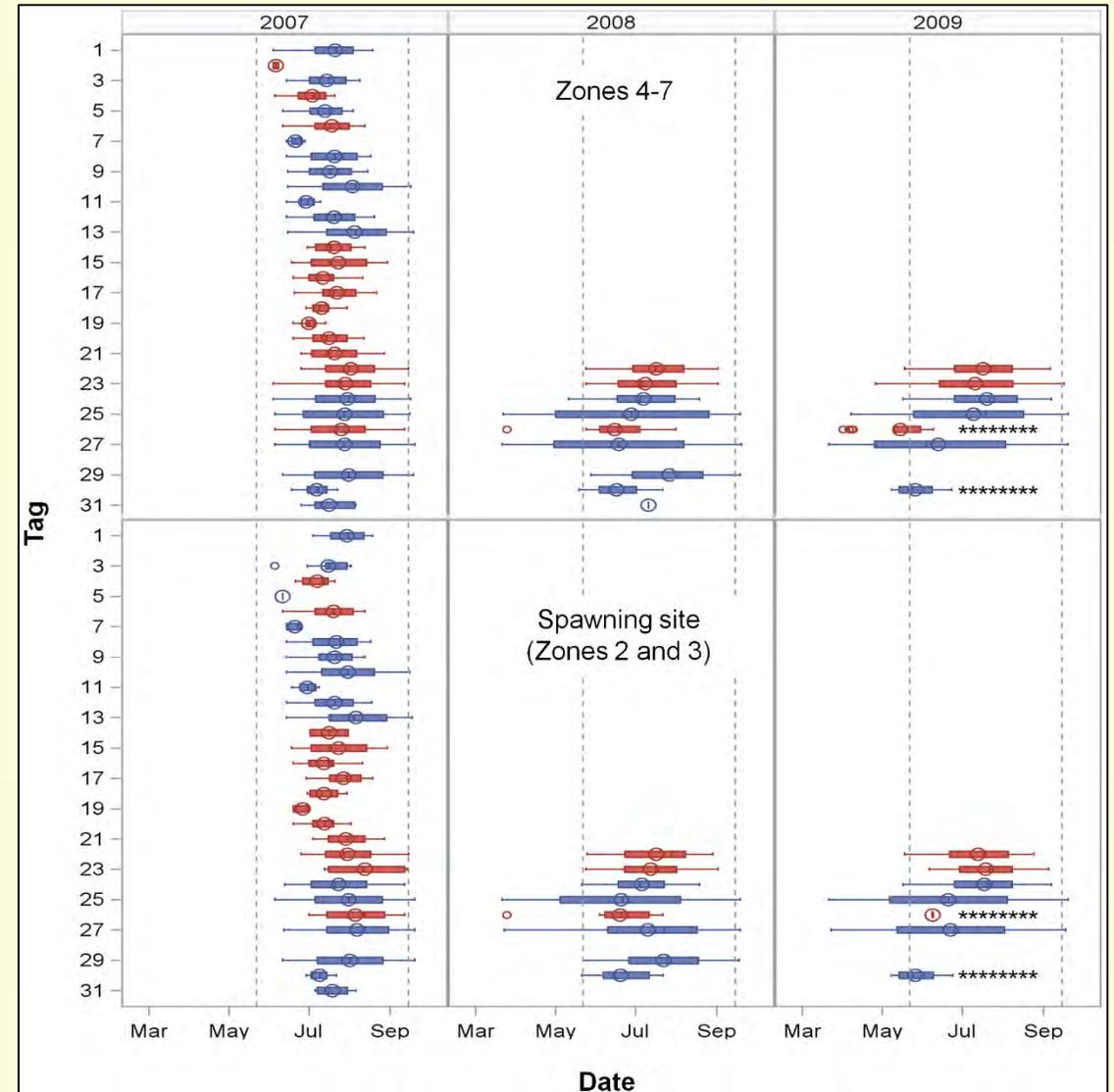
Non-spawning Season





# WEST COAST – TAMPA BAY

- Returned to same spawning within and between seasons.
- Spent an average of 39 days at spawning sites, but in less than 24 hr increments.





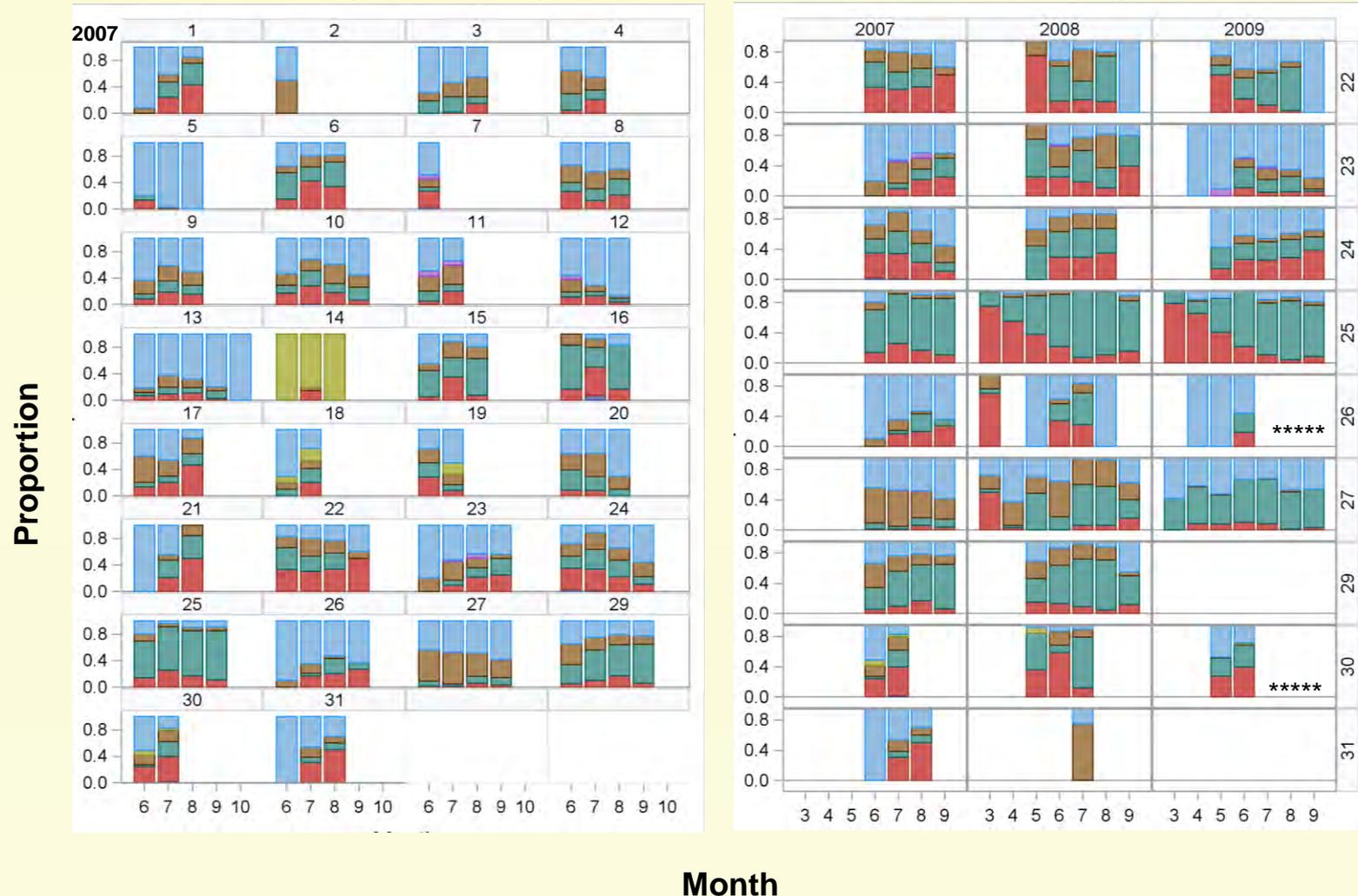
# WEST COAST – TAMPA BAY

zone 1 2 3 4 5 6 7

## Individual differences in behavior

Single Year Tags

Multi-year tags





# WEST COAST – TAMPA BAY

## *CONCLUSIONS*

	West Coast				East Coast
	Caloosahatchee River	Charlotte Harbor	Tampa Bay	Everglades	Cape Canaveral to Palm Beach
Intra-annual site fidelity	Y, non-sp site	Y, sp site	Y, sp site		
Inter-annual site fidelity	Y, non-sp site	Y, sp site	Y, sp site		
Skip spawning	Y, 40%	NA	Y, 6%*		
Migration type	Single	Single?	Bouncing		
Behavioral contingents	Yes	Yes	Yes		
Spawning season length	78 (40-124 d)	NA	39 (1-102 d)		
Mean spawning start date	June 1 <sup>st</sup>	NA	May 22 <sup>nd</sup>		



# WEST COAST - EVERGLADES

## *Acoustic telemetry*

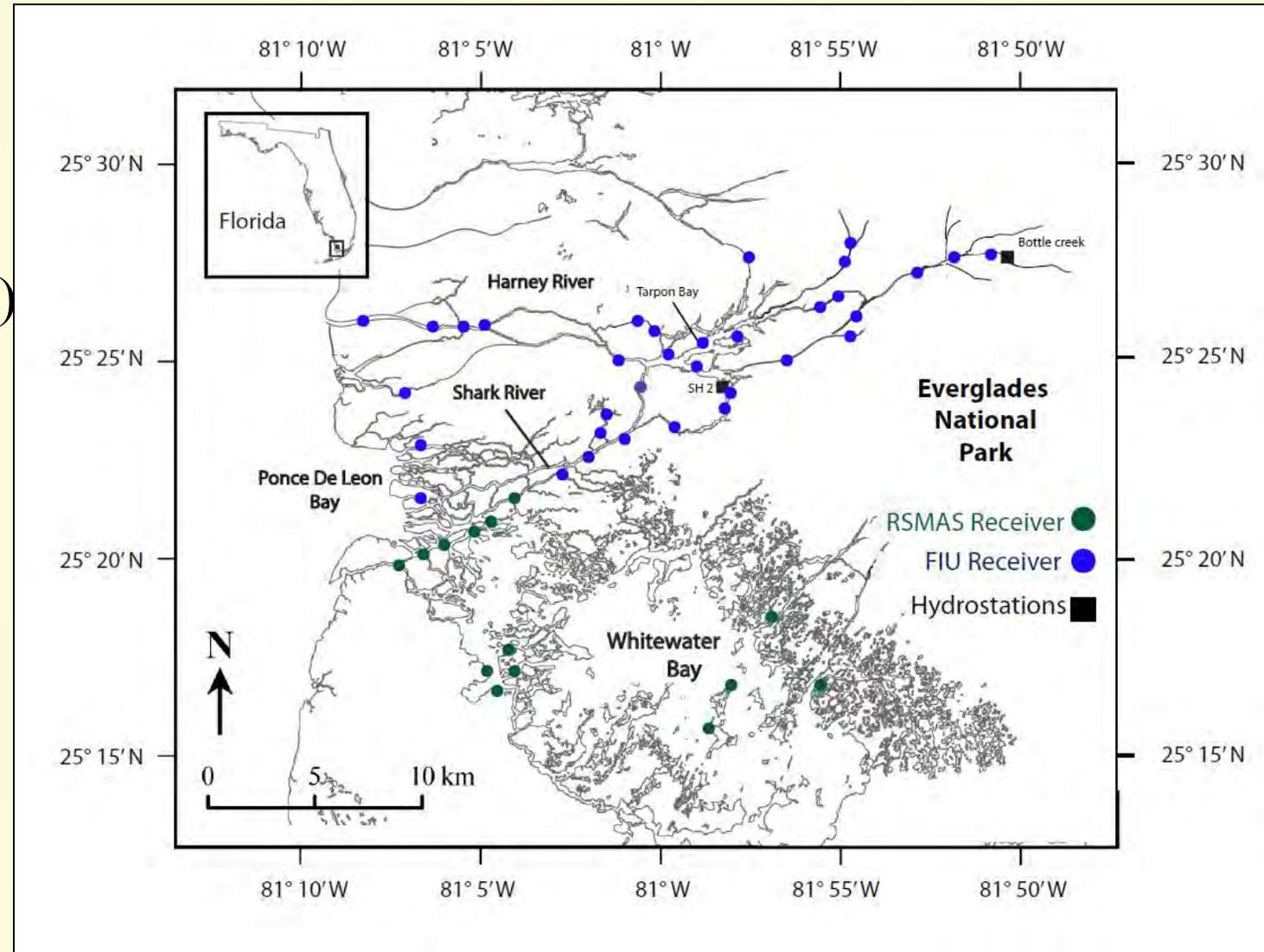
**Number of snook tagged: 53**

**Size: >600 mm TL**

**Tracked for: 3 years (2012-2014)**

## **Objective:**

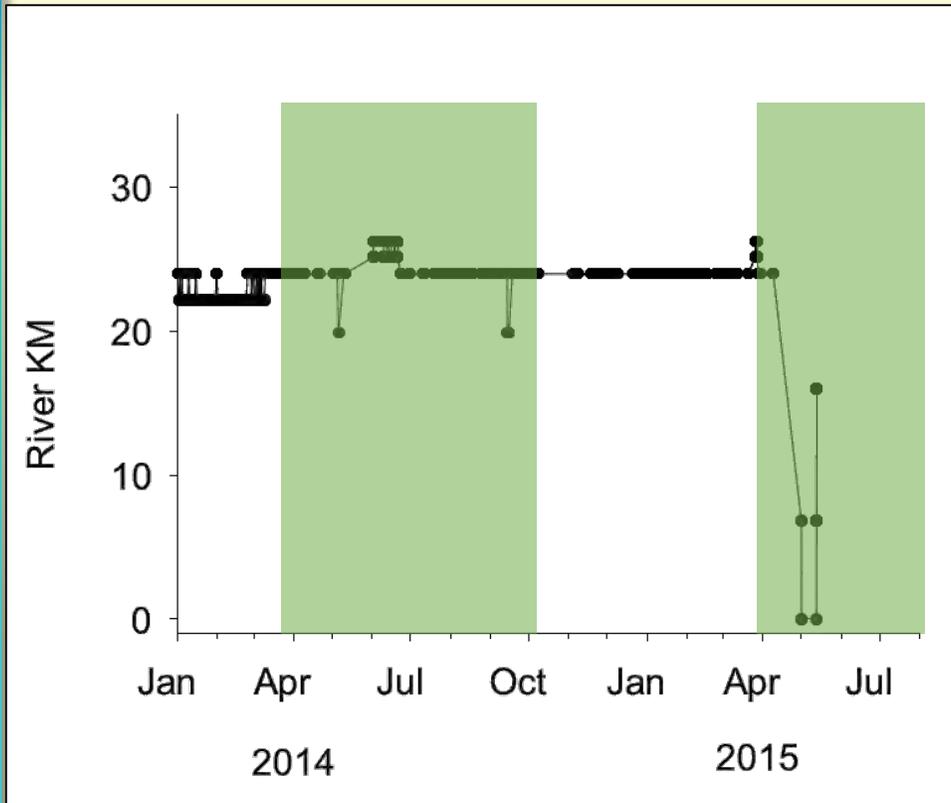
- 1) Do coastal river fish change movement tactics with freshwater flow?
- 2) Examine skip spawning in freshwater fish.



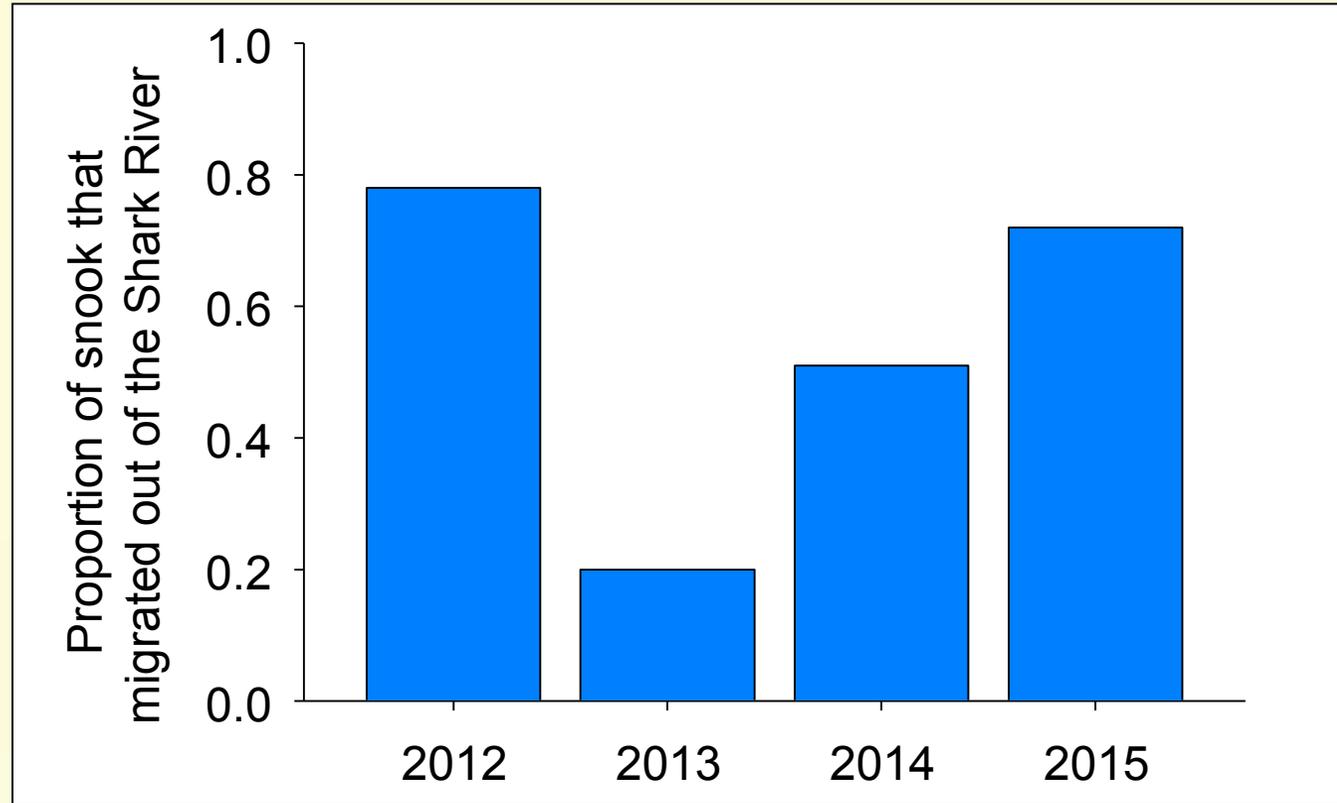


# WEST COAST – EVERGLADES

## Migration to spawning sites



## Proportion of population that left the river

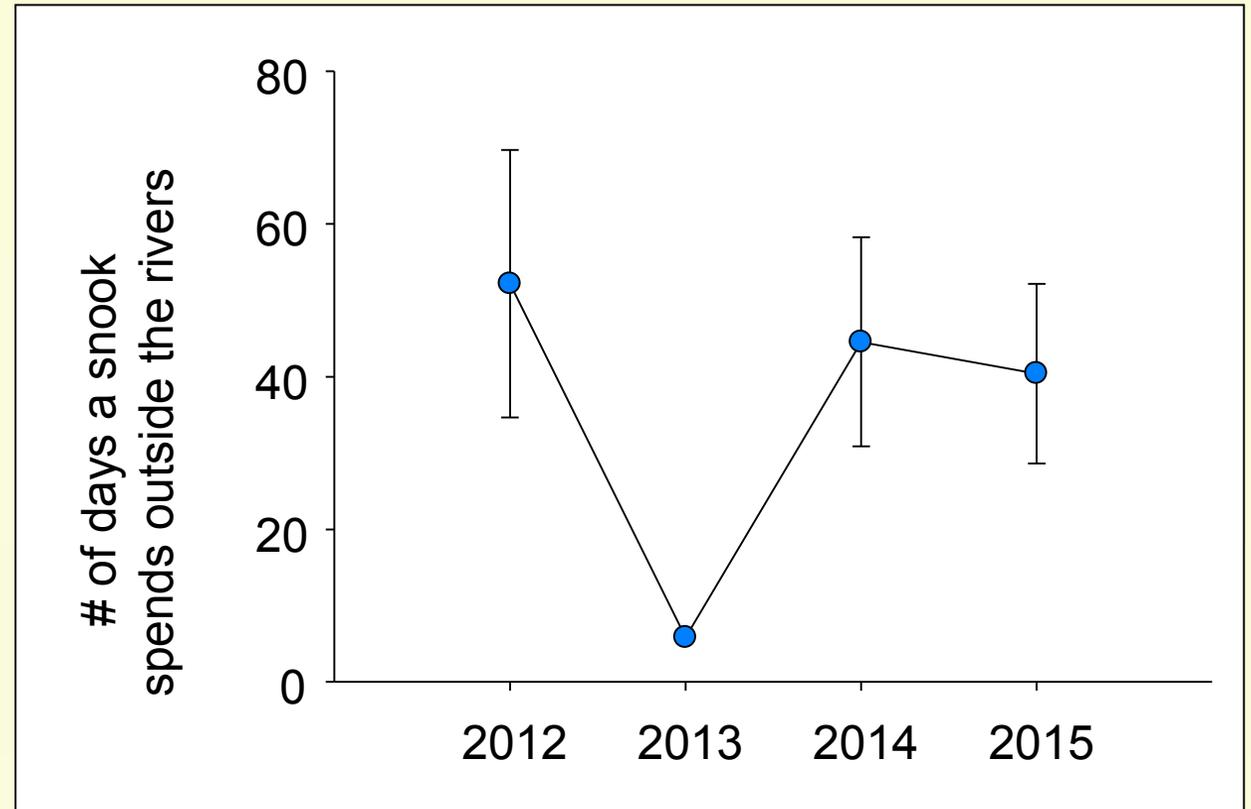




# WEST COAST - EVERGLADES

## Number of days spent out of the river

- Fish migrated out of the river beginning of April.
- Spent an average of 40 days outside the river.

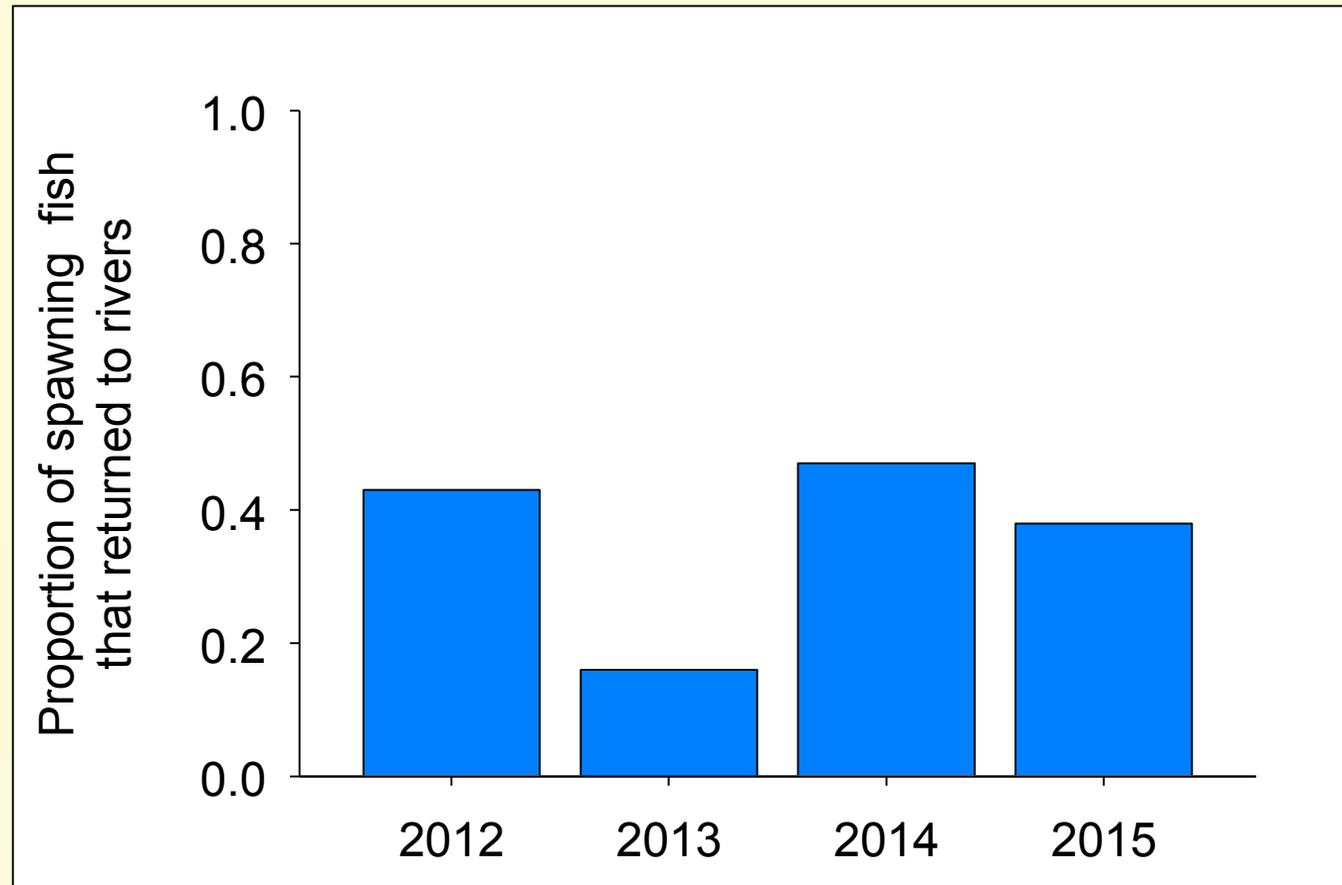




# WEST COAST - EVERGLADES

## Site Fidelity

Some fish returned to Shark River after presumably spawning





# WEST COAST – EVERGLADES

## *CONCLUSIONS*

	West Coast				East Coast
	Caloosahatchee River	Charlotte Harbor	Tampa Bay	Everglades	Cape Canaveral to Palm Beach
Intra-annual site fidelity	Y, non-sp site	Y, sp site	Y, sp site	Y, non-sp site	
Inter-annual site fidelity	Y, non-sp site	Y, sp site	Y, sp site	Y, non-sp site	
Skip spawning	Y, 40%	NA	Y, 6%*	Y, 40%	
Migration type	Single	Single?	Bouncing	Bouncing?	
Behavioral contingents	Yes	Yes	Yes	Yes	
Spawning season length	78 (40-124 d)	NA	39 (1-102 d)	40 (2-114 d)	
Mean spawning start date	June 1 <sup>st</sup>	NA	May 22 <sup>nd</sup>	April 2 <sup>nd</sup>	



# EAST COAST – CANAVERAL TO PALM BEACH

## *Acoustic telemetry*

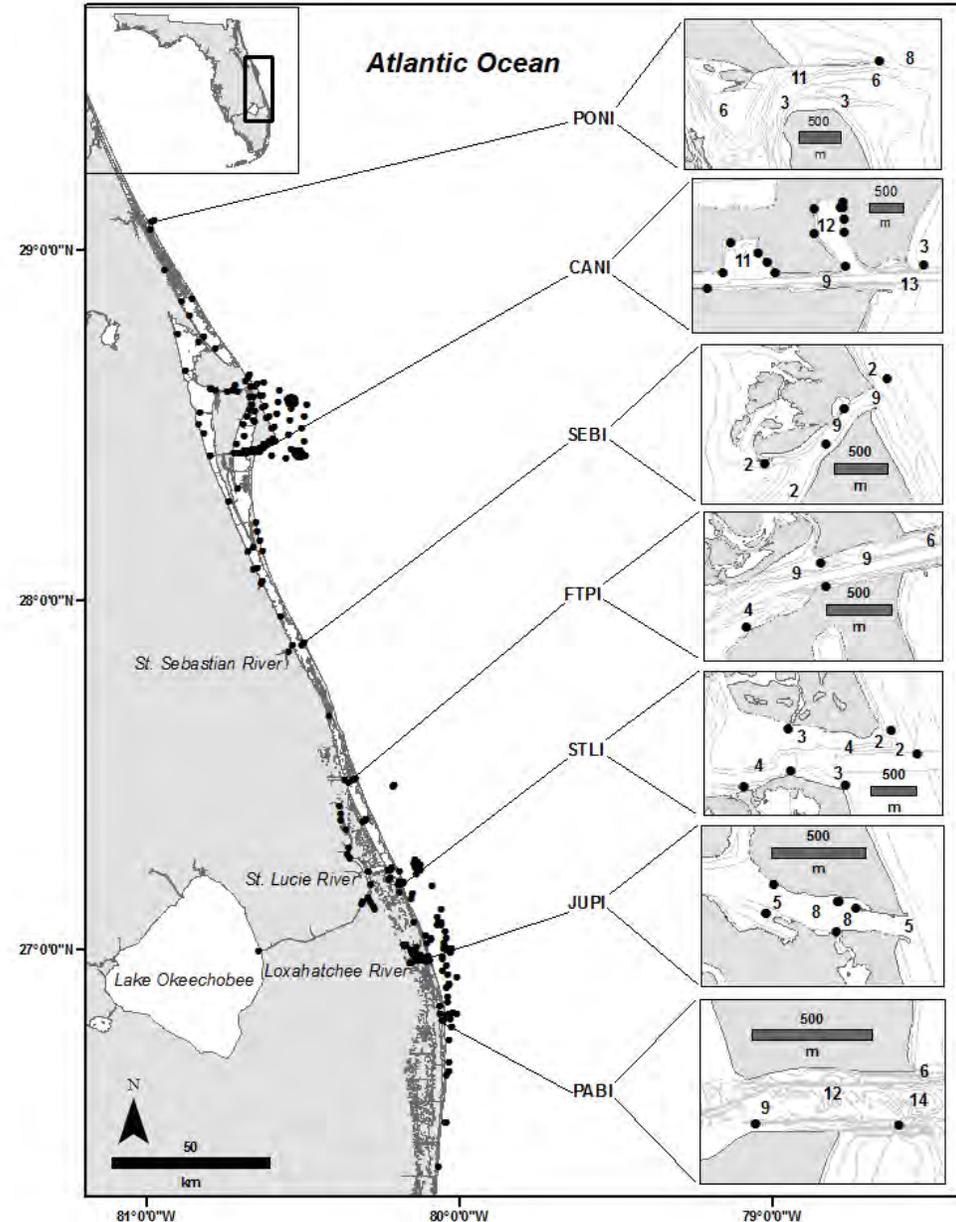
**Number of snook tagged: 280**

**Size: 538 – 1109 mm TL**

**Tracked for: 7 years (2008-2014)**

## **Objective:**

- 1) Spawning traits
- 2) Site fidelity





# EAST COAST – CANAVERAL TO PALM BEACH

## FACT collaborative network

752 receivers

Southeastern U.S., Bahamas, and  
the U.S. Caribbean

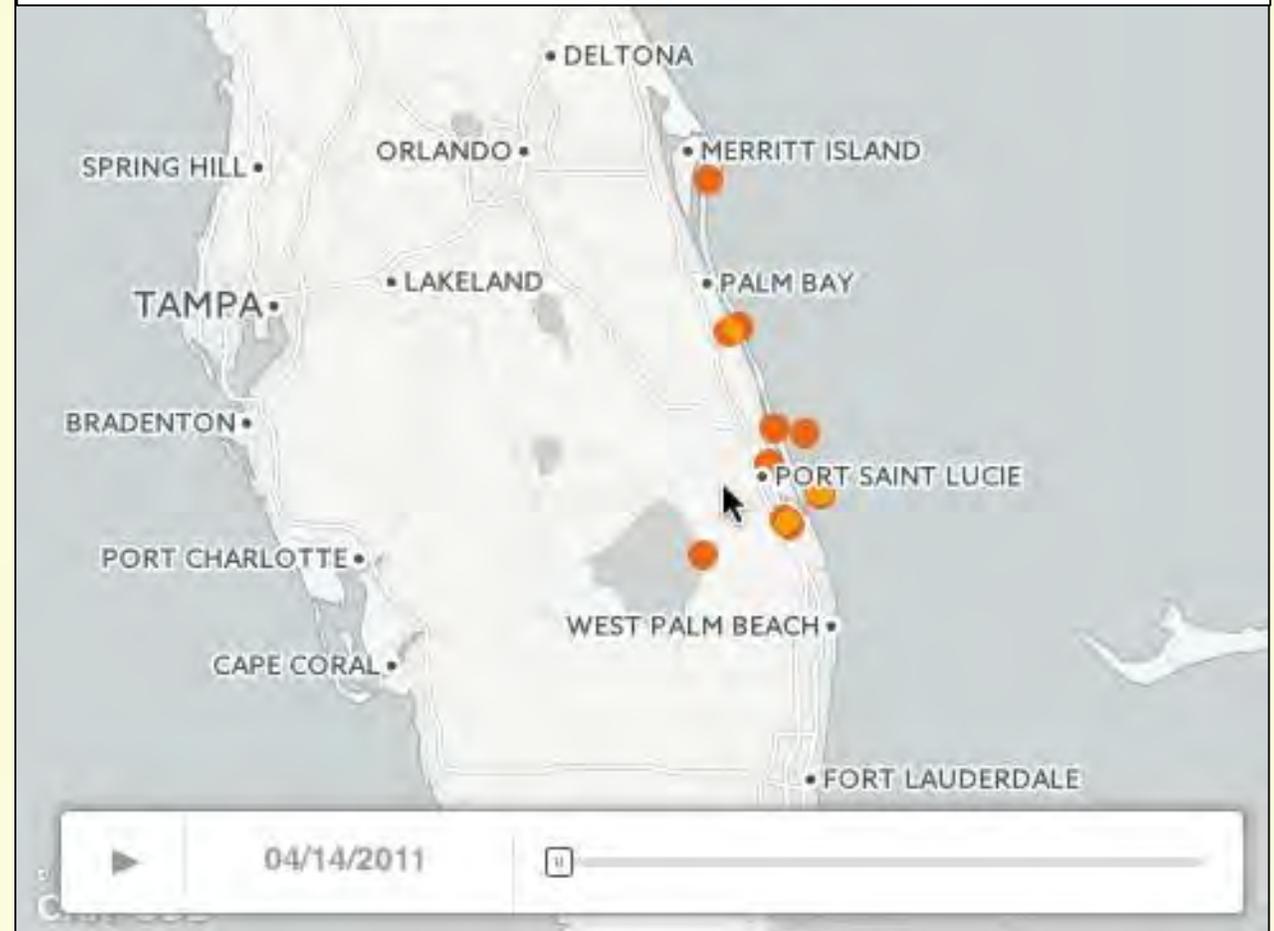




# EAST COAST – CANAVERAL TO PALM BEACH

- Over 12 million detections
- Detected in ALL habitats
- 7 inlets monitored
- Highest densities in Sebastian, St. Lucie, and Jupiter Inlets.

## Daily detections of Common Snook during the summer of 2011

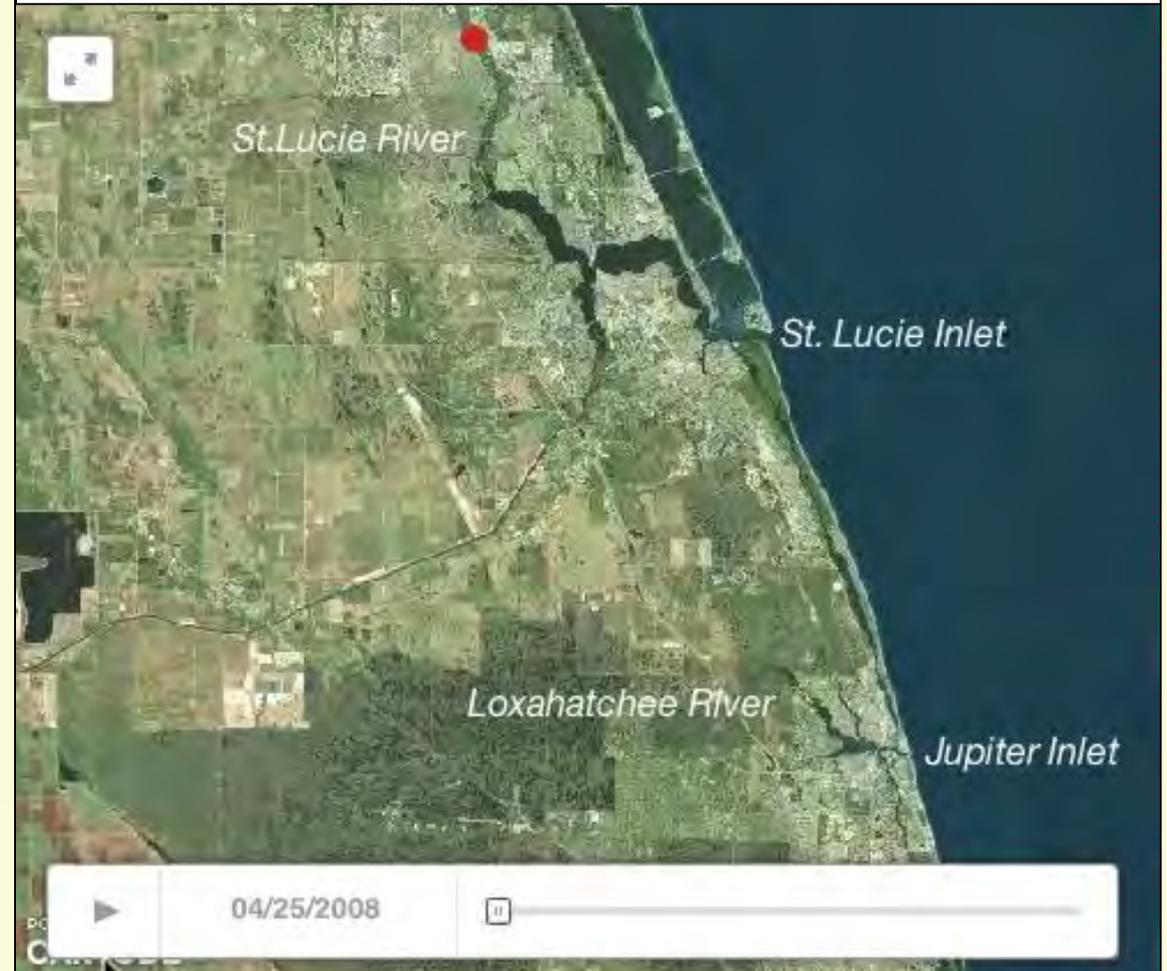




# EAST COAST – CANAVERAL TO PALM BEACH

- Asynchronous migration
- Single and multiple inlets
- Primary inlet used 6 times more often.
- Primary inlet is within 40km and southeast of resident habitat
- Aggregation is a revolving door
- Whole spawning period 38 days.

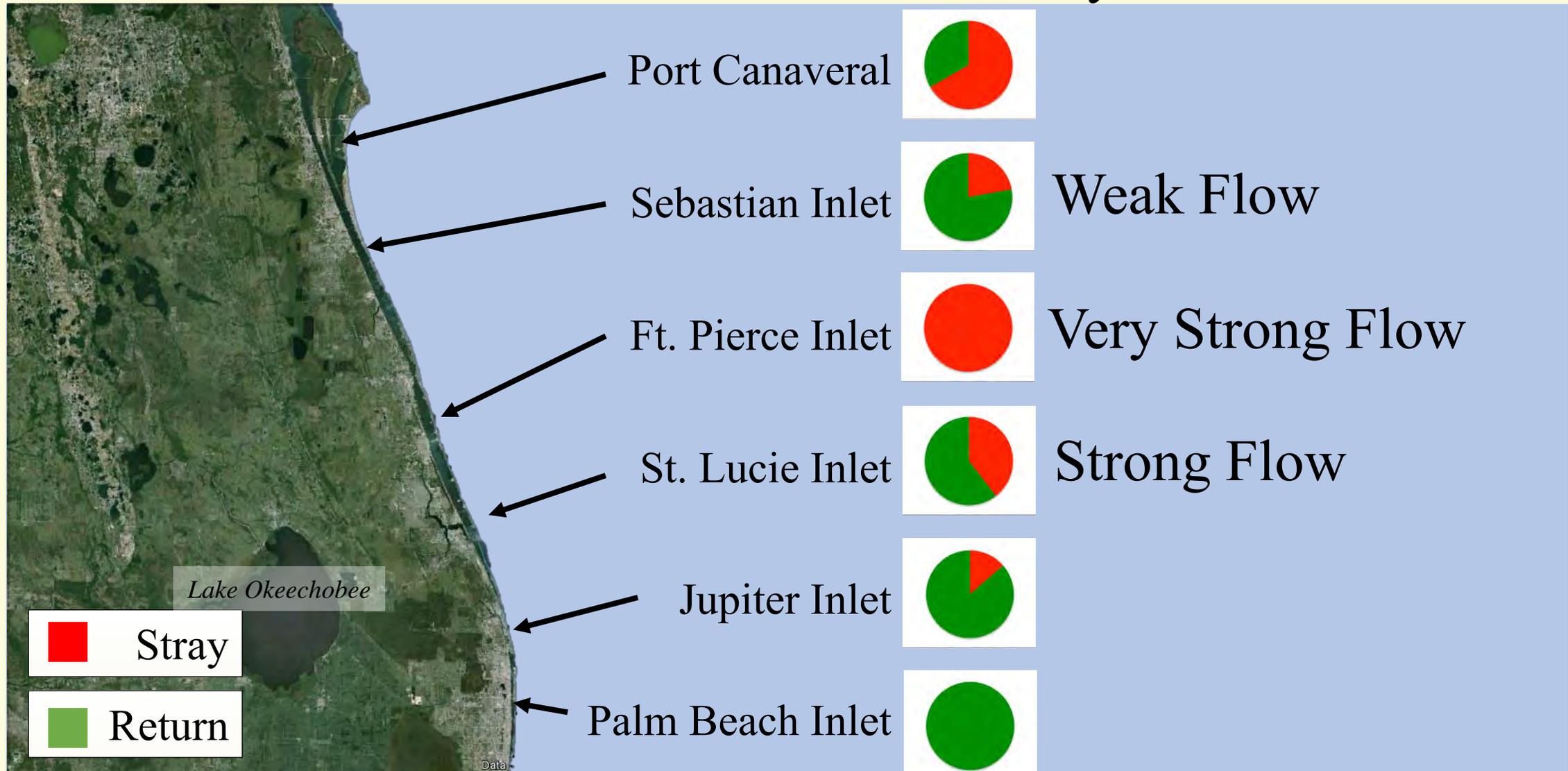
43 in. (1100 mm) TL female during the 2008 spawning season





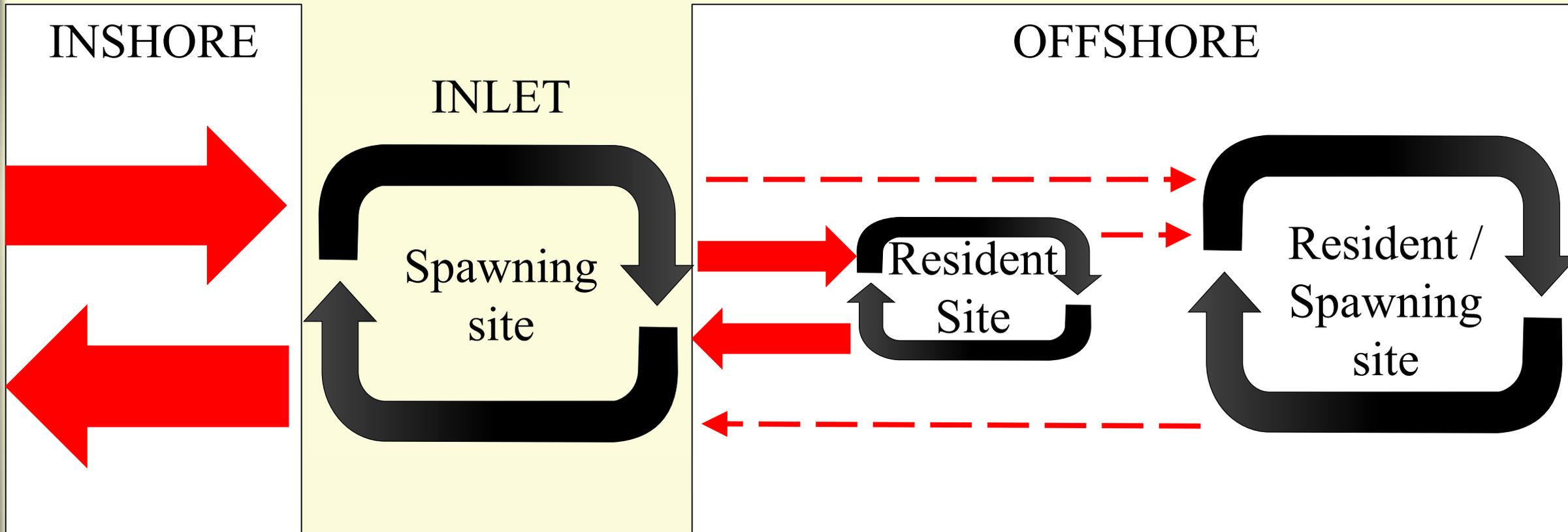
# EAST COAST – CANAVERAL TO PALM BEACH

## Site Fidelity





# EAST COAST – CANAVERAL TO PALM BEACH





# EAST COAST – CANAVERAL TO PALM BEACH

## Number of fish detected during the spawning season

Year	Total n	Assumed spawning		Possible spawning	Did not spawn?
		Inlet 24-36.2 ppt	Offshore Full seawater	Estuary 0.6-35.6 ppt	River 0-27.5 ppt
2008	88	69	0	5	14
2009	133	92	20	14	7
2010	95	66	17	8	4
2011	81	53	24	2	2
2012	66	46	17	1	2
2013	27	20	7	0	0
2014	8	5	3	0	0



# EAST COAST – CANAVERAL TO PALM BEACH

## *CONCLUSIONS*

	West Coast				East Coast
	Caloosahatchee River	Charlotte Harbor	Tampa Bay	Everglades	Cape Canaveral to Palm Beach
Intra-annual site fidelity	Y, non-sp site	Y, sp site	Y, sp site	Y, non-sp site	Y, both
Inter-annual site fidelity	Y, non-sp site	Y, sp site	Y, sp site	Y, non-sp site	Y, both
Skip spawning	Y, 40%	NA	Y, 6%*	Y, 40%	Y, 4%
Migration type	Single	Single?	Bouncing	Bouncing?	Bouncing
Behavioral contingents	Yes	Yes	Yes	Yes	Yes
Spawning season length	78 (40-124 d)	NA	39 (1-102 d)	40 (2-114 d)	39 (1-181 d)
Mean spawning start date	June 1 <sup>st</sup>	NA	May 22 <sup>nd</sup>	April 2 <sup>nd</sup>	July 15 <sup>th</sup>



# IN SUMMARY

We are:

- ...documenting, quantifying, and explaining aspects of Common Snook spatial ecology that user groups already know.
- ...expanding our current understanding of the spawning dynamics of Common Snook.
- ...learning what how the behavior of Common Snook may contribute to population resilience.
- ...applying these results to management.

# ACKNOWLEDGMENTS

## FACT members

Bureau of Ocean Energy Management (BOEM)  
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South Carolina Department of Natural resources (SCDNR)  
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Savannah State University (SSU)  
University of Georgia (UGA)  
University of North Florida (UNF)  
University of Florida/Florida Program for Shark Research  
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Atlantic Coast Telemetry network (ACT)  
Integrated Tracking of Aquatic Animals in the Gulf of Mexico (iTAG)

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