



SPAWNING DYNAMICS OF COMMON SNOOK

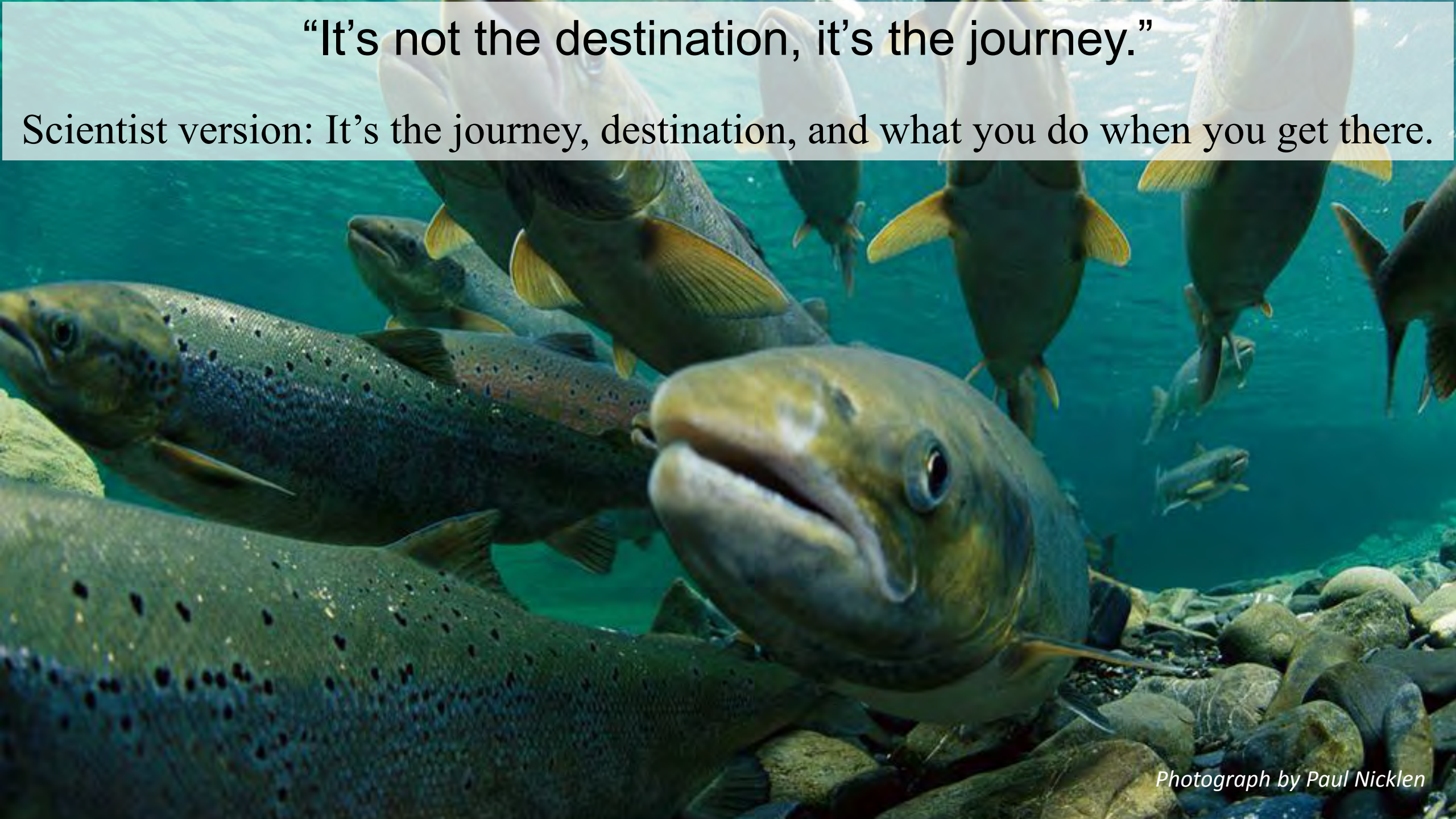


FL Fish and Wildlife Conservation Commission
Fish and Wildlife Research Institute

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“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?



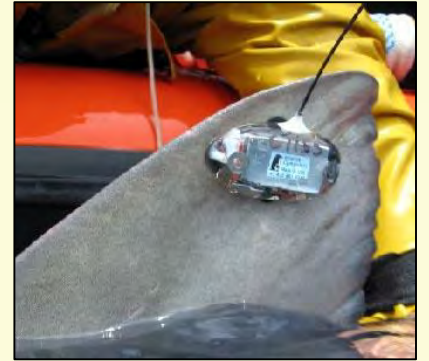
Coded tags



Radio tags



Data Storage (Archival) tags

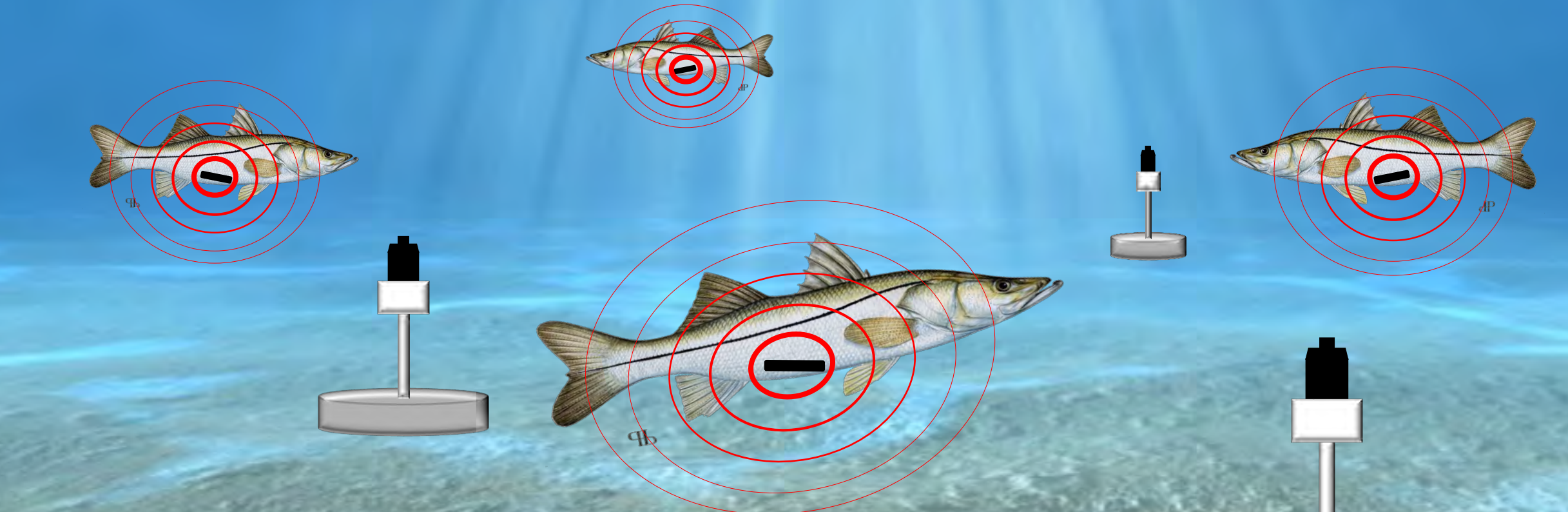


Satellite tags



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

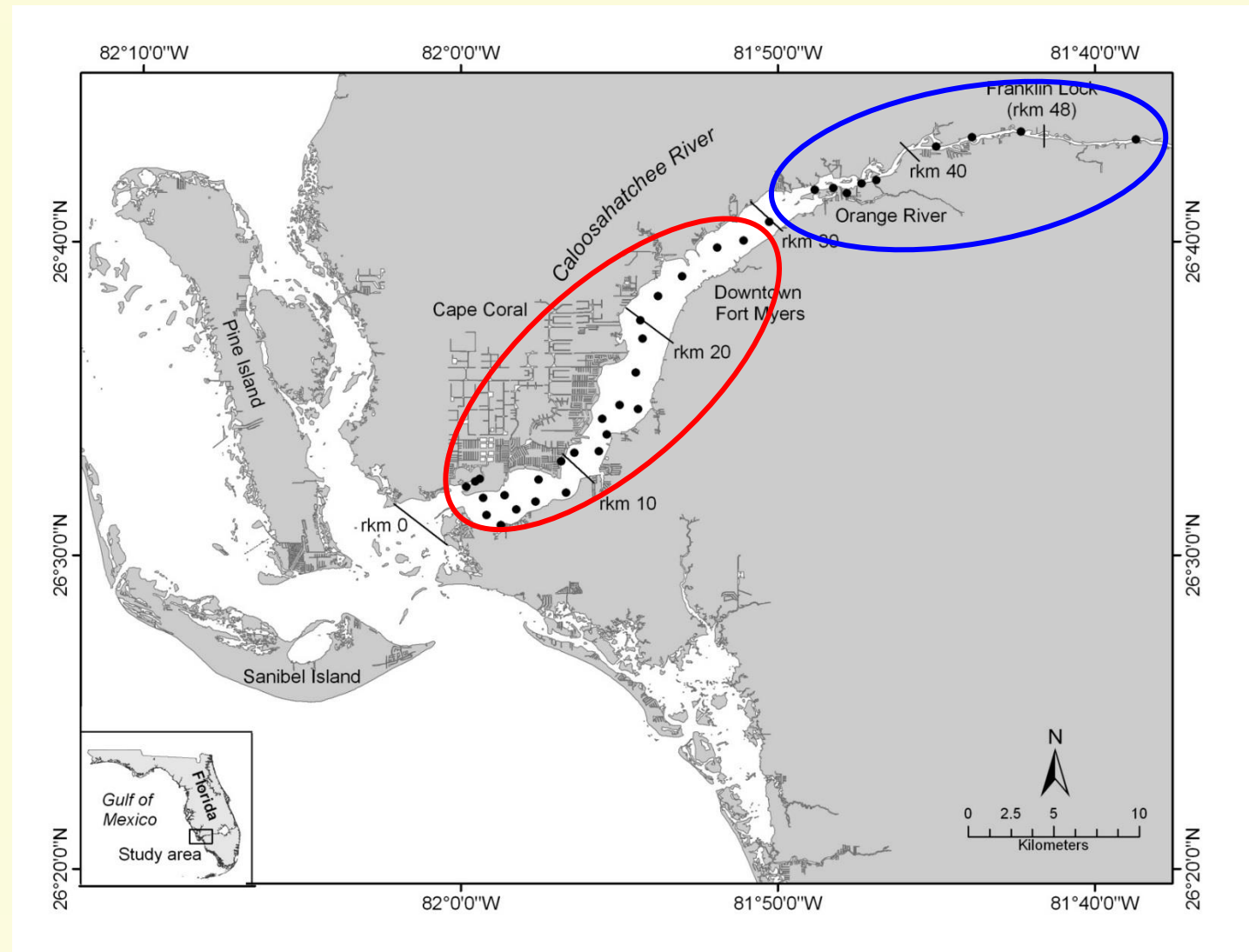
Number of snook tagged: 25

Size: 543 – 1085 mm TL

Tracked for: 3 years (2005-2007)

Purpose:

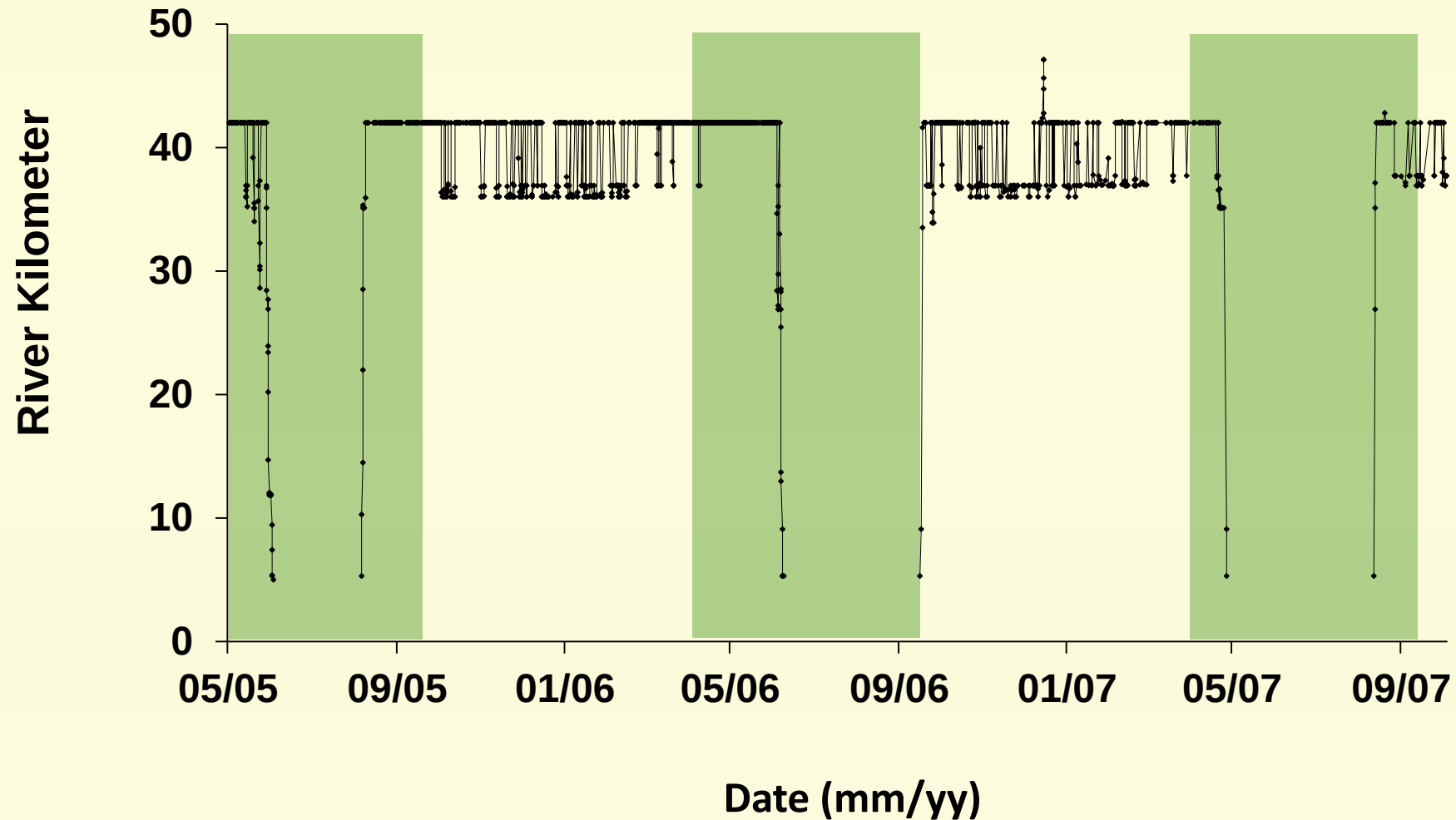
- 1) Identify areas used by snook within coastal rivers
- 2) To determine movement patterns and exchange rates of adult snook between river and the adjacent estuary.





WEST COAST – CALOOSAHATCHEE RIVER

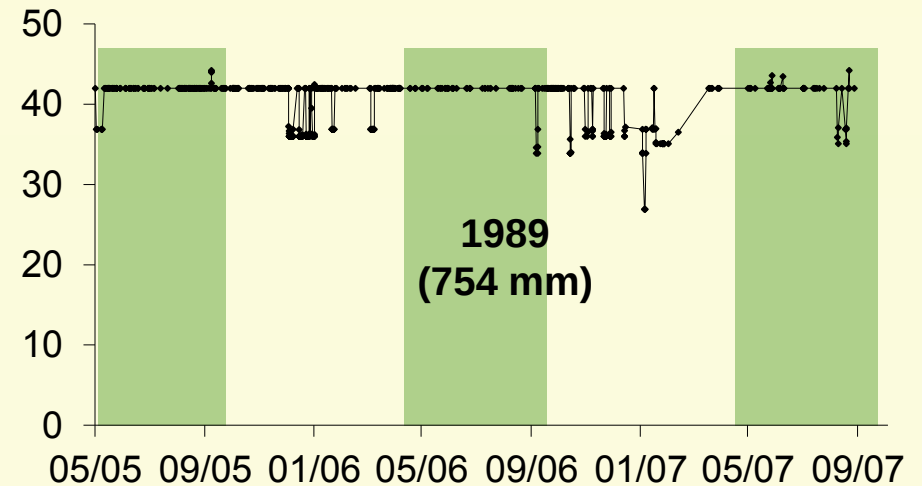
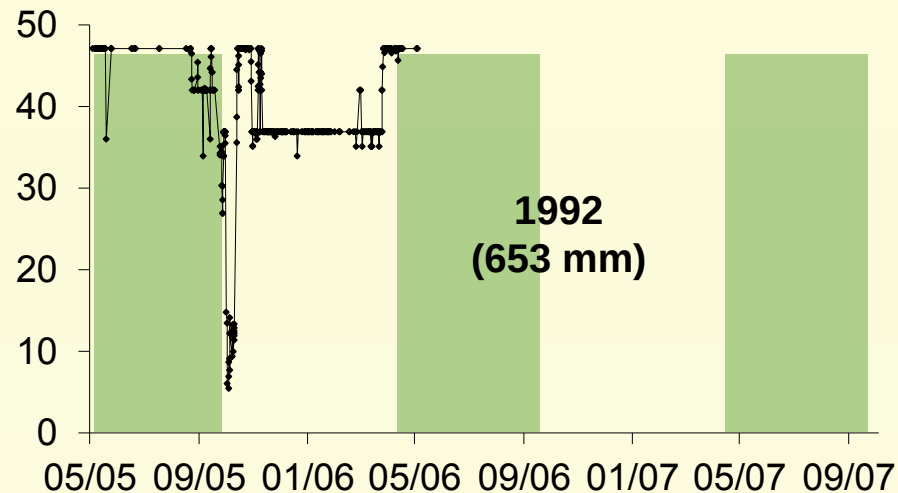
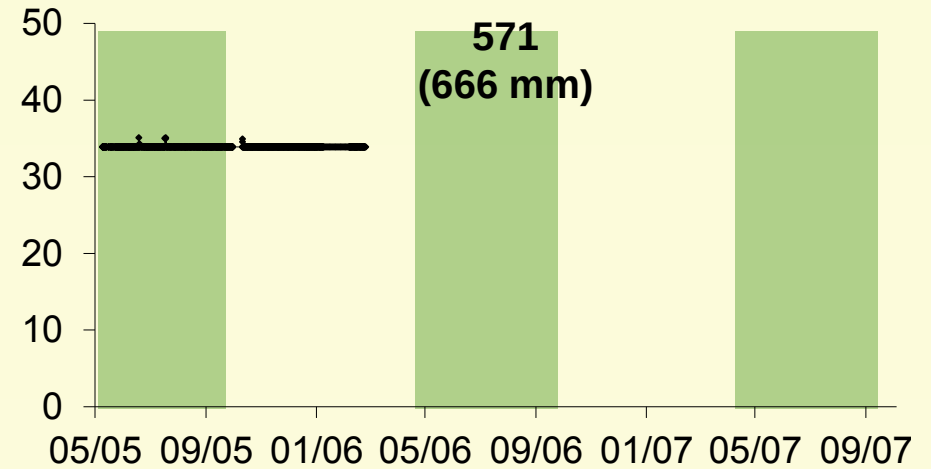
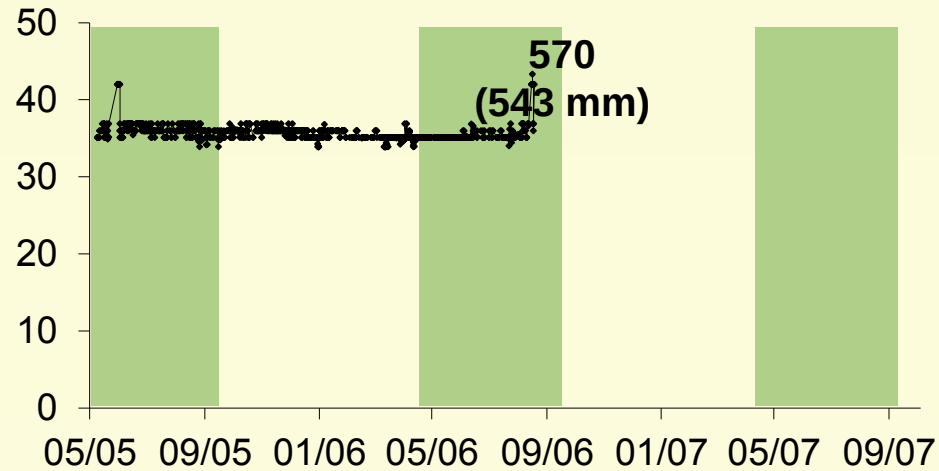
Migration from the river to spawning sites





WEST COAST – CALOOSAHATCHEE RIVER

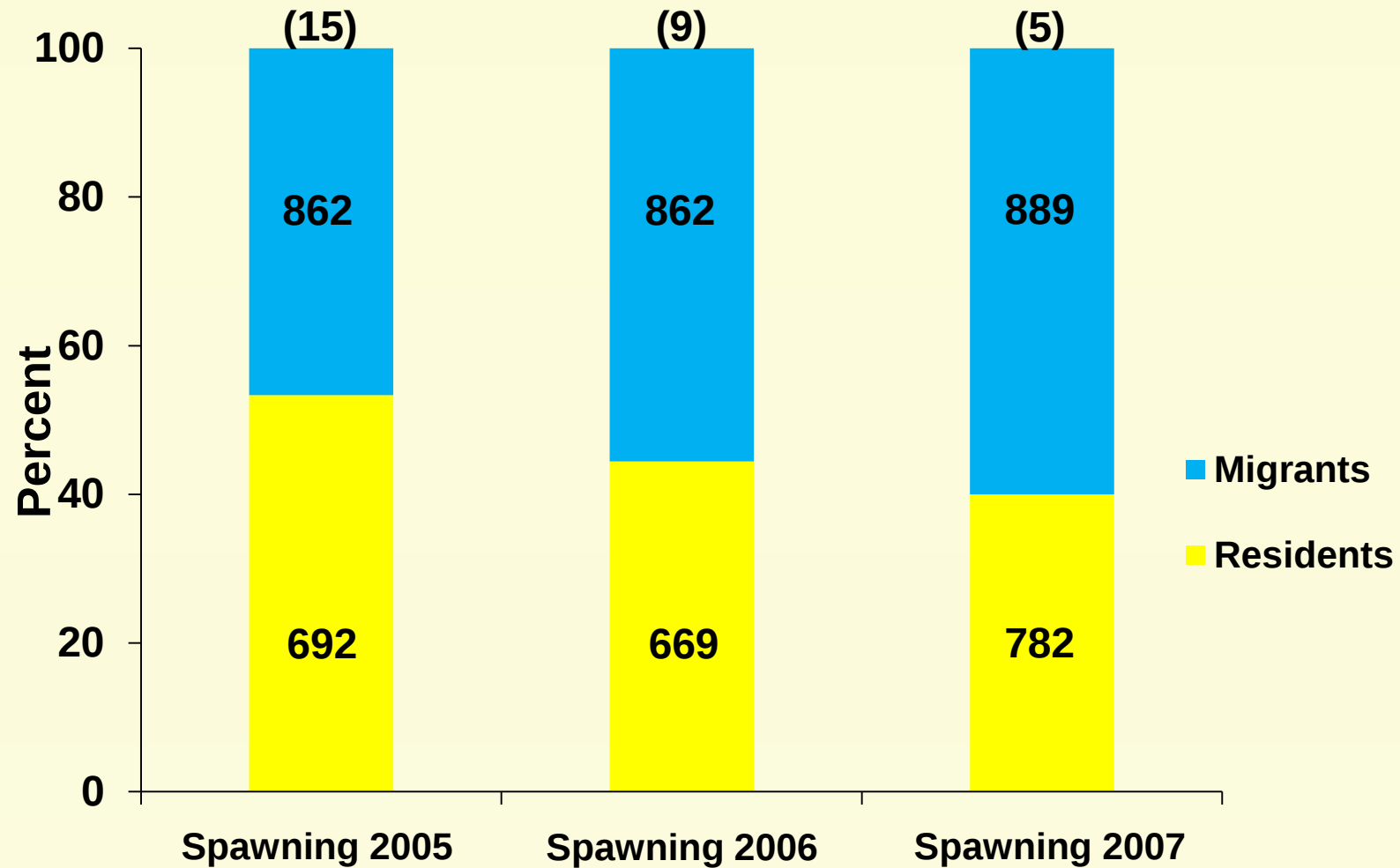
But not all fish migrated....





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 st				



WEST COAST – CHARLOTTE HARBOR

Acoustic telemetry

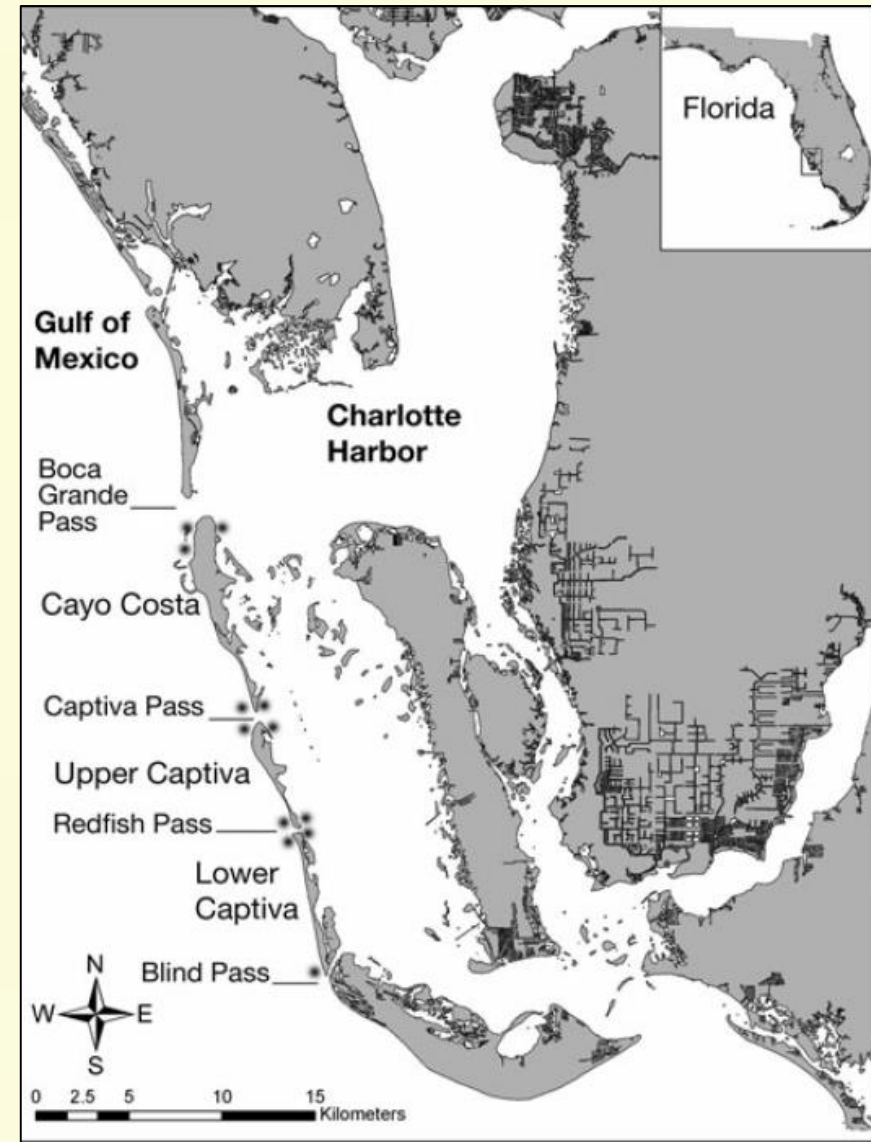
Number of snook tagged: 30

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 st	NA			



WEST COAST – TAMPA BAY

Acoustic telemetry and catch data

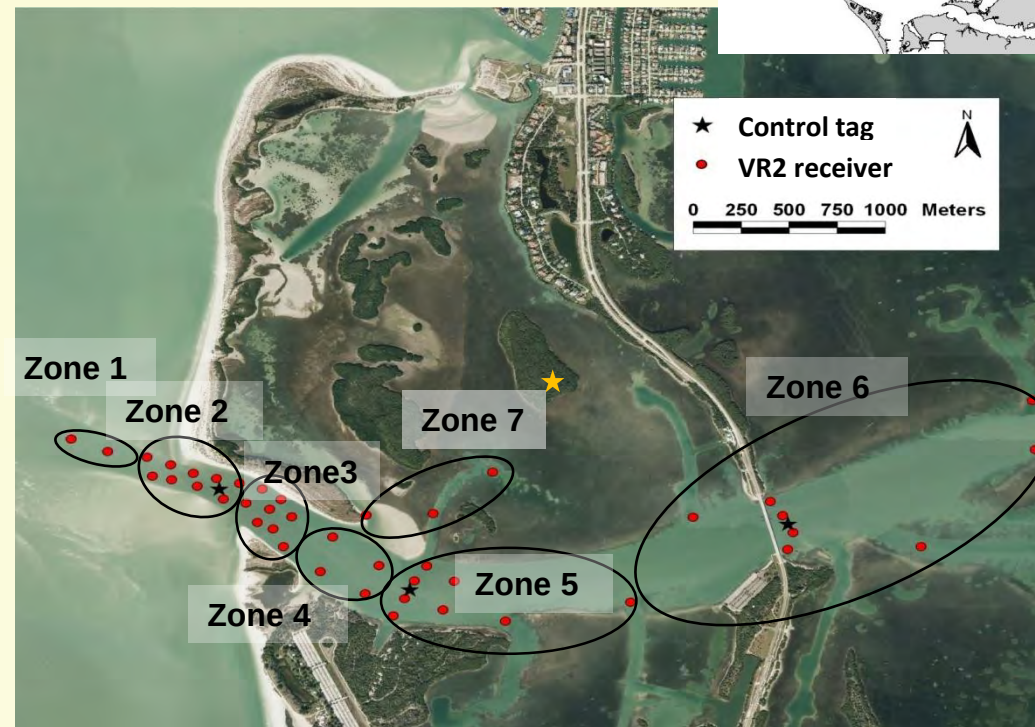
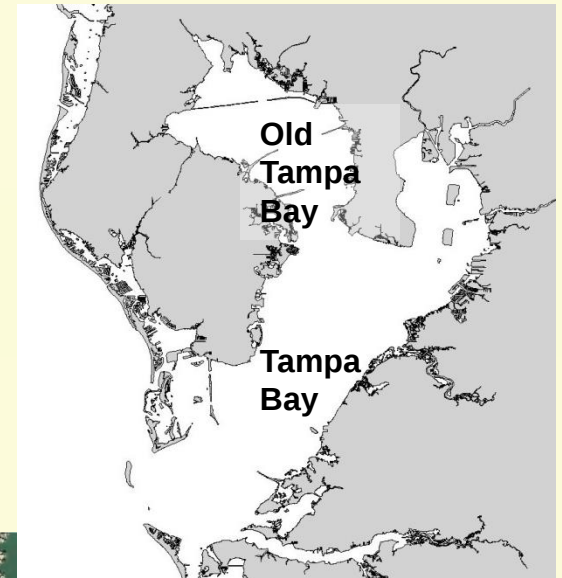
Number of snook tagged: 31

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.



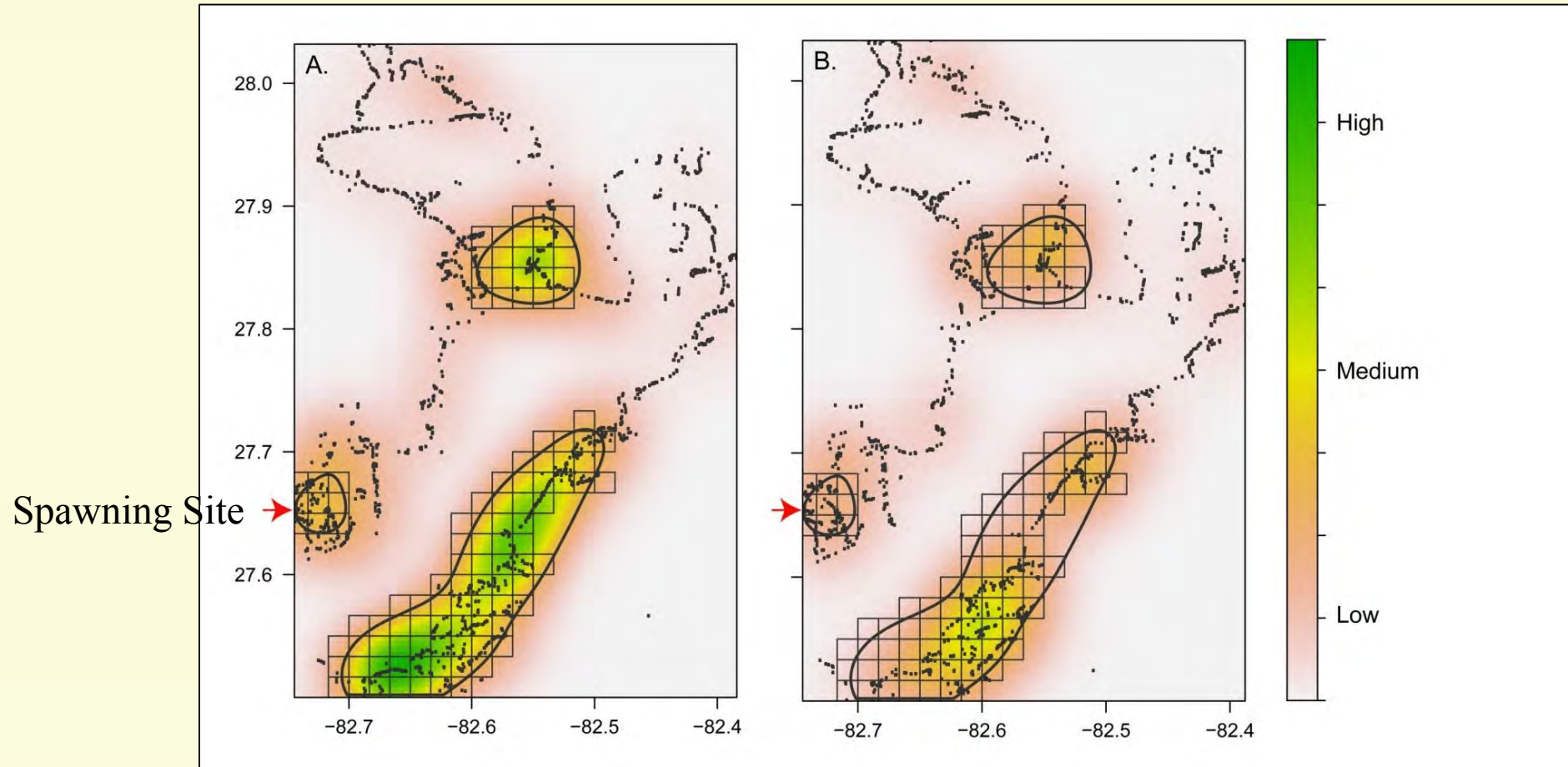


WEST COAST – TAMPA BAY

Density of Common Snook in Tampa Bay

Spawning Season

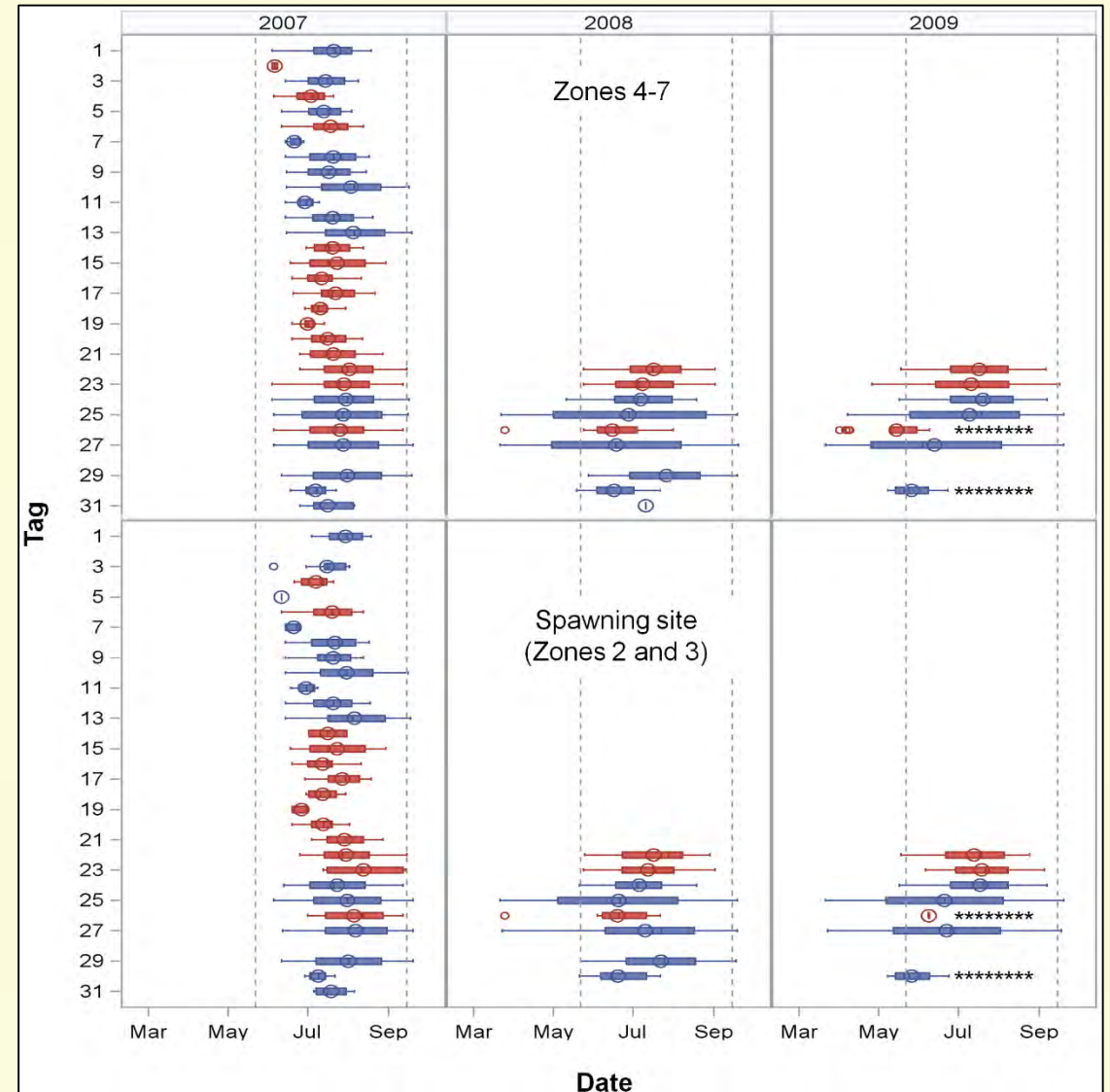
Non-spawning Season





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.



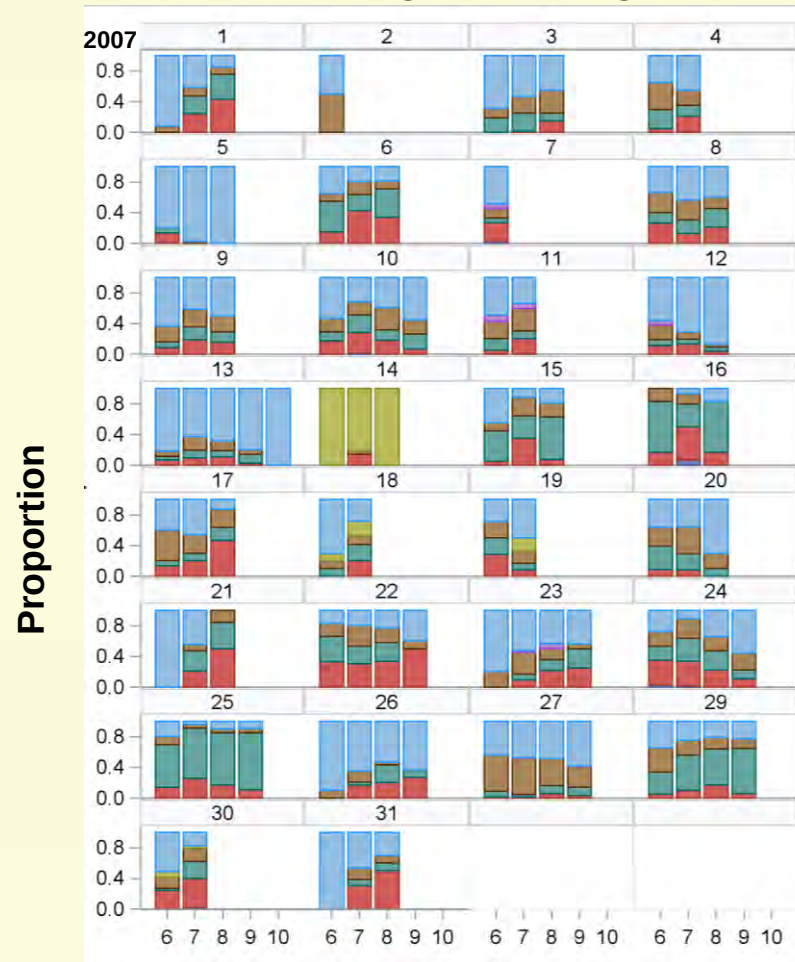


WEST COAST – TAMPA BAY

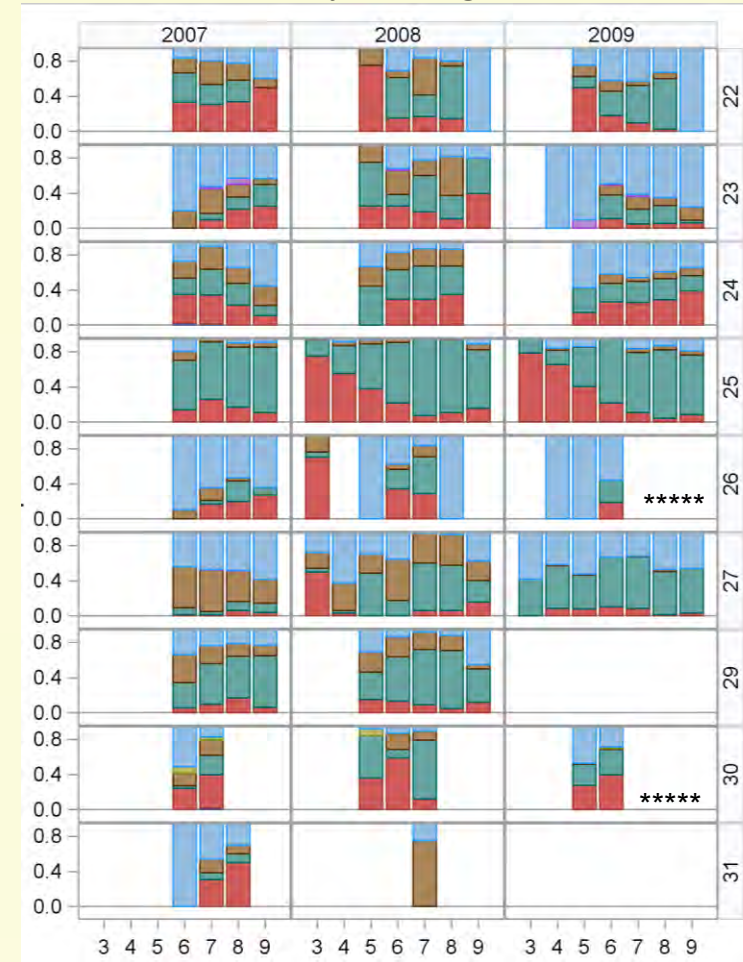
zone 1 2 3 4 5 6 7

Individual differences in behavior

Single Year Tags



Multi-year tags



Month



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 st	NA	May 22 nd		



WEST COAST - EVERGLADES

Acoustic telemetry

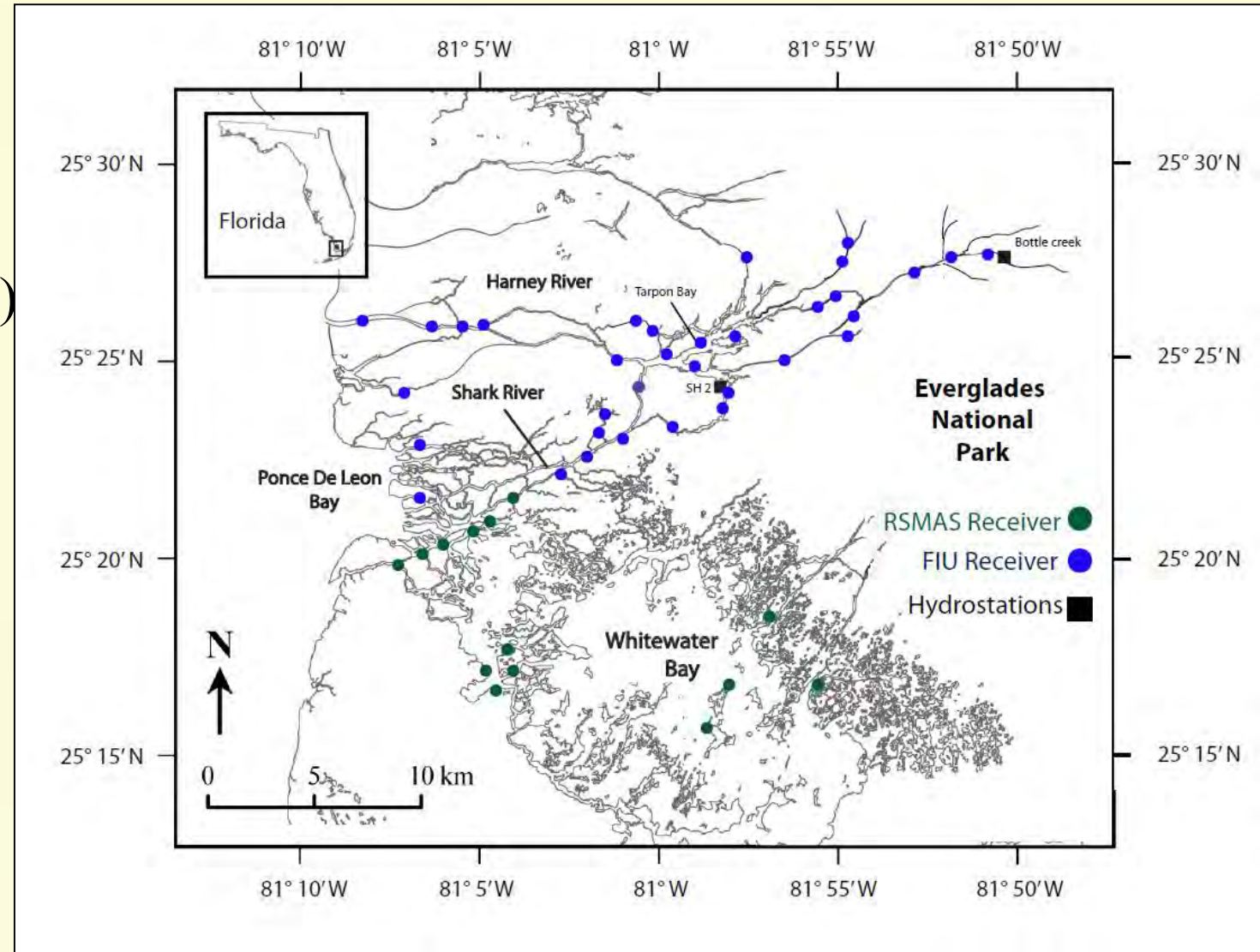
Number of snook tagged: 53

Size: >600 mm TL

Tracked for: 3 years (2012-2014)

Objective:

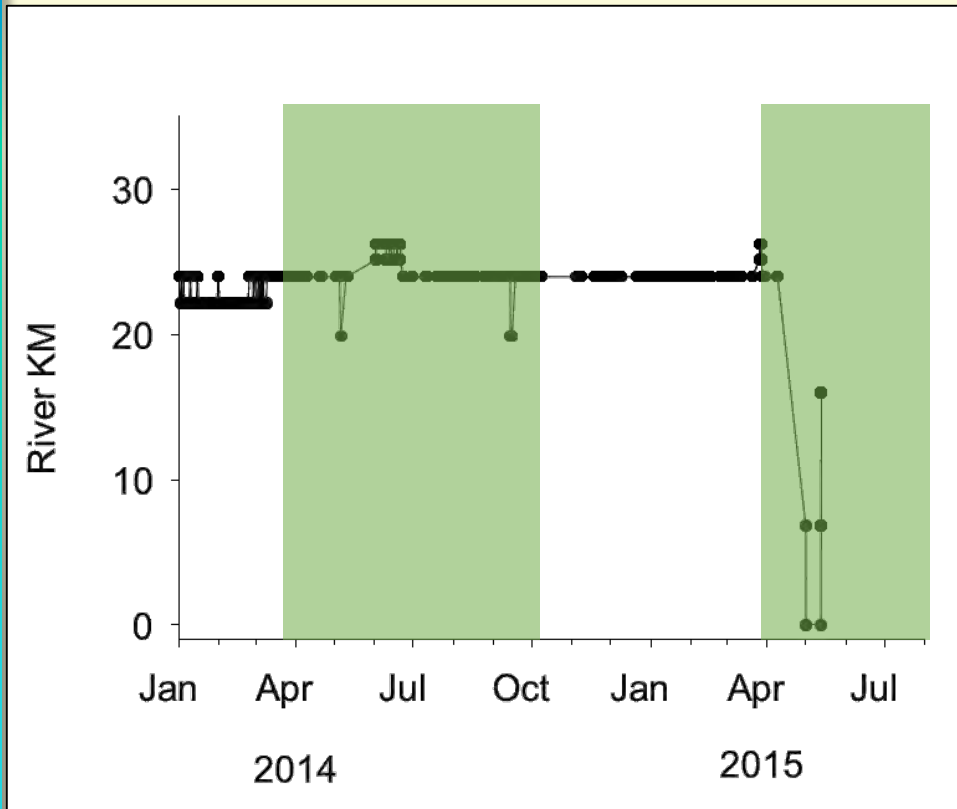
- 1) Do coastal river fish change movement tactics with freshwater flow?
- 2) Examine skip spawning in freshwater fish.



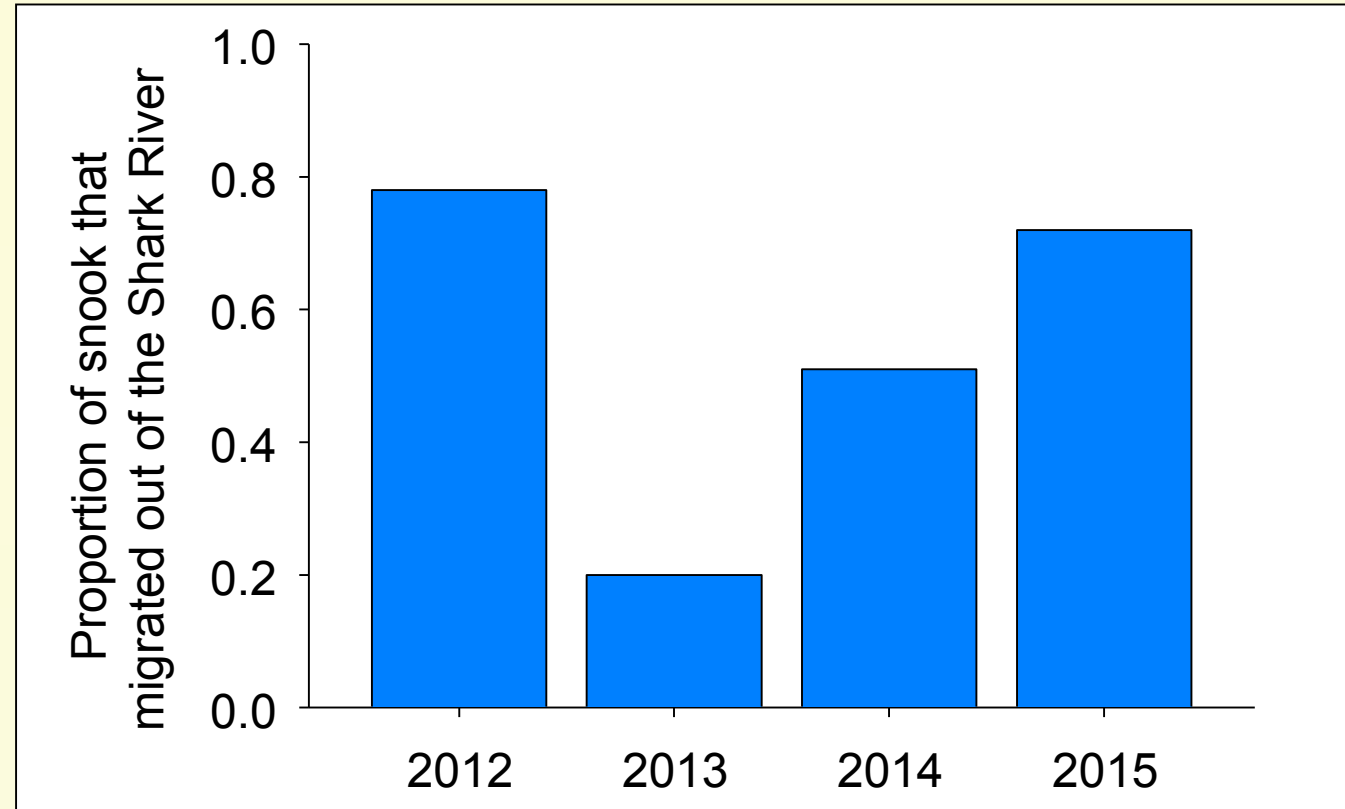


WEST COAST – EVERGLADES

Migration to spawning sites



Proportion of population that left the river

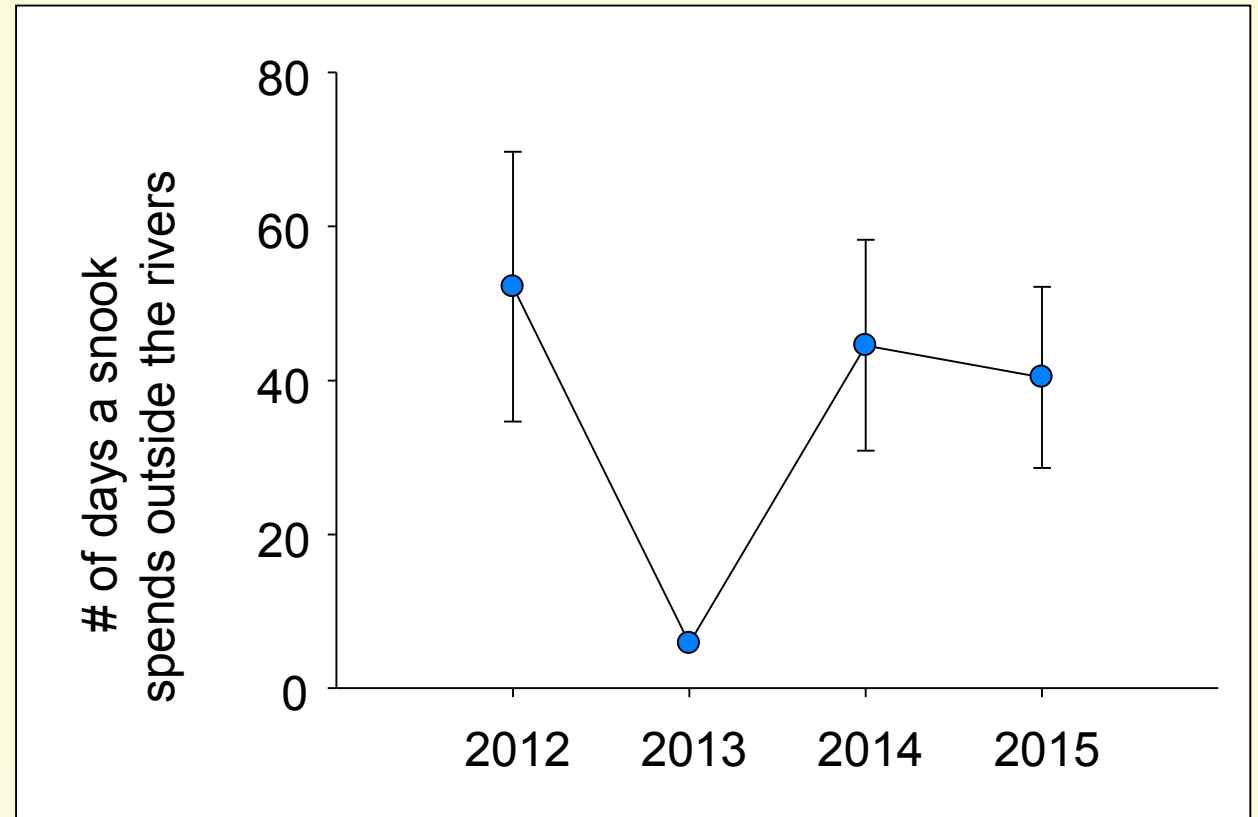




WEST COAST - EVERGLADES

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.

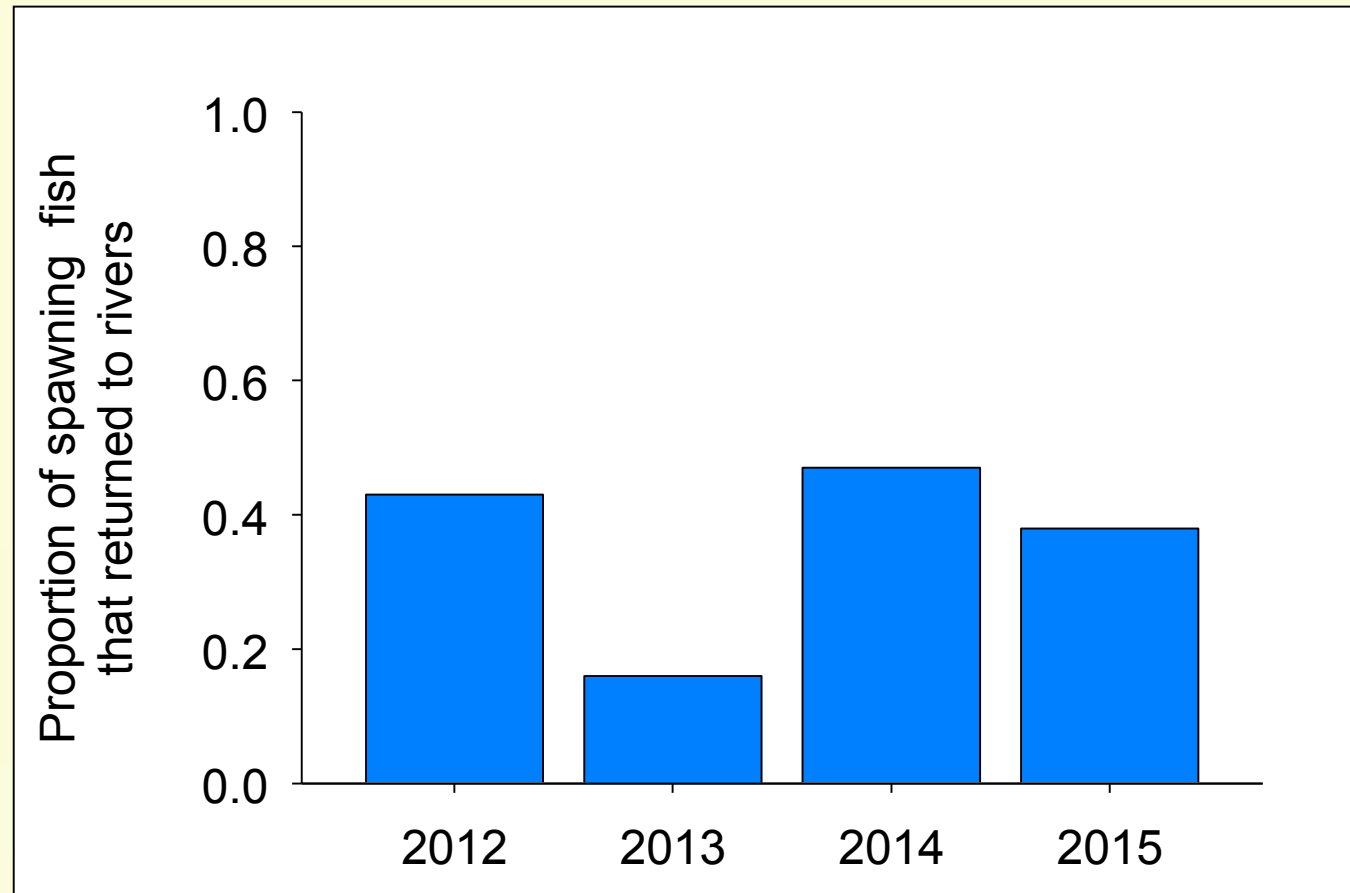




WEST COAST - EVERGLADES

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 st	NA	May 22 nd	April 2 nd	



EAST COAST – CANAVERAL TO PALM BEACH

Acoustic telemetry

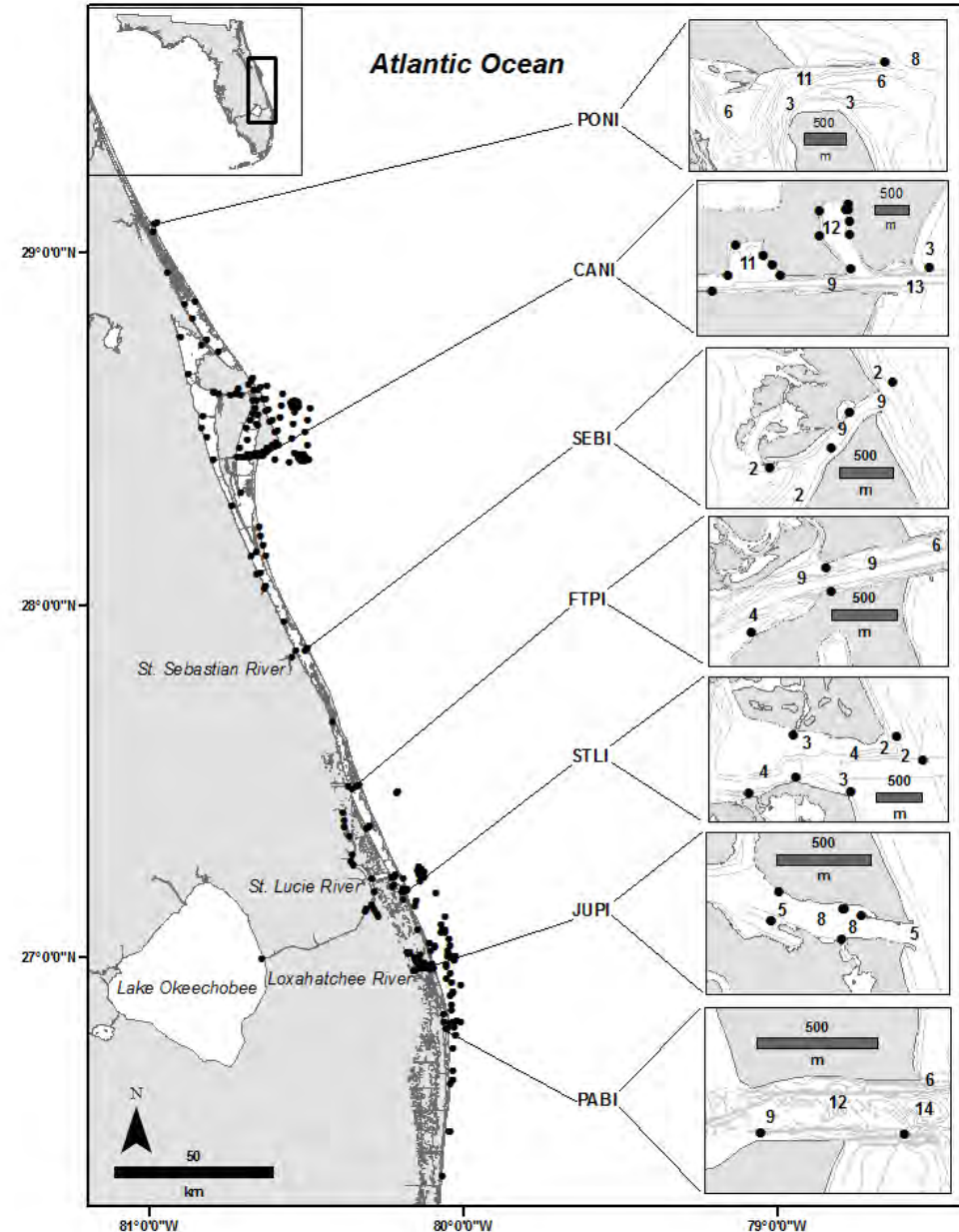
Number of snook tagged: 280

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

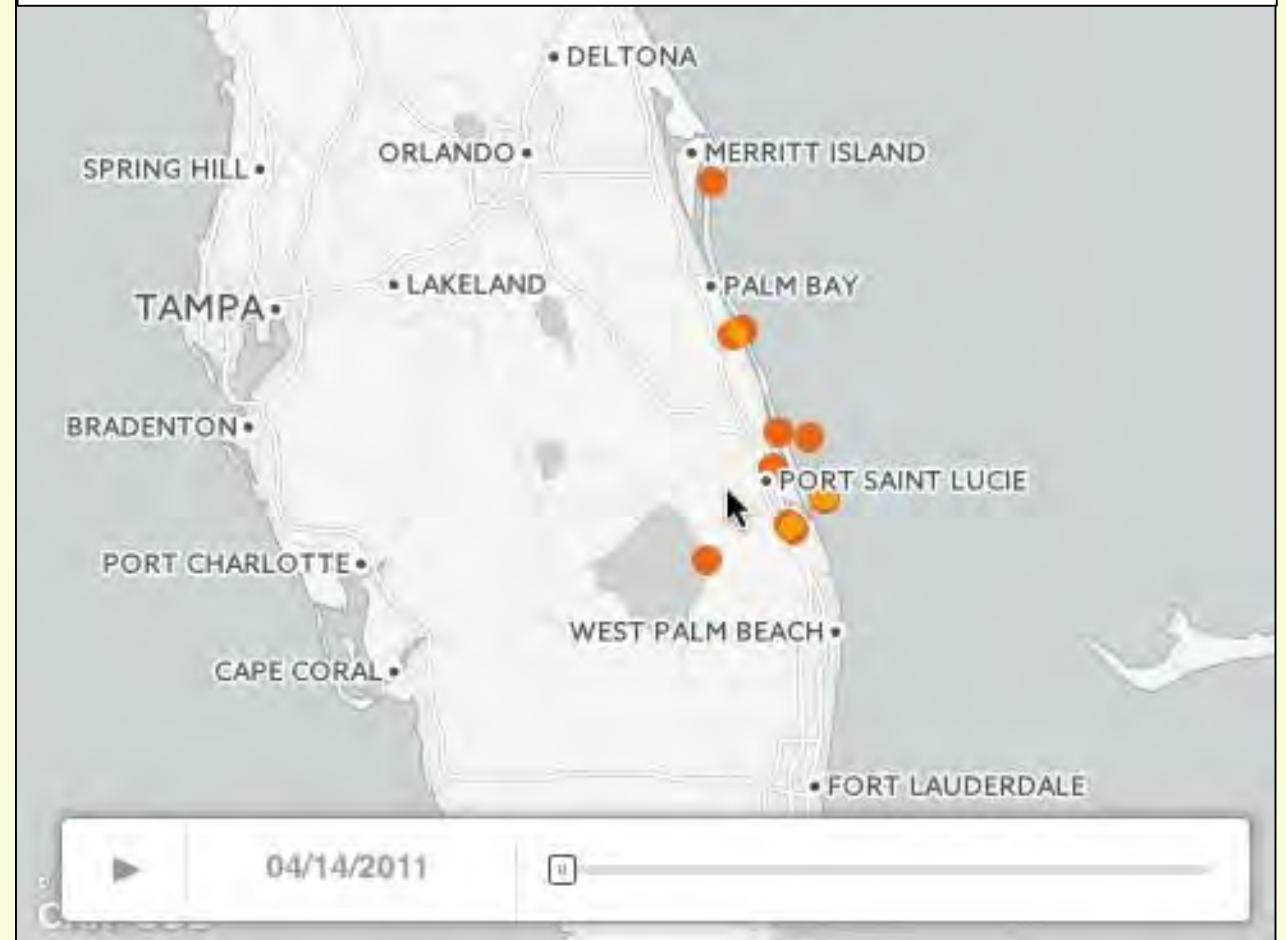




EAST COAST – CANAVERAL TO PALM BEACH

- 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

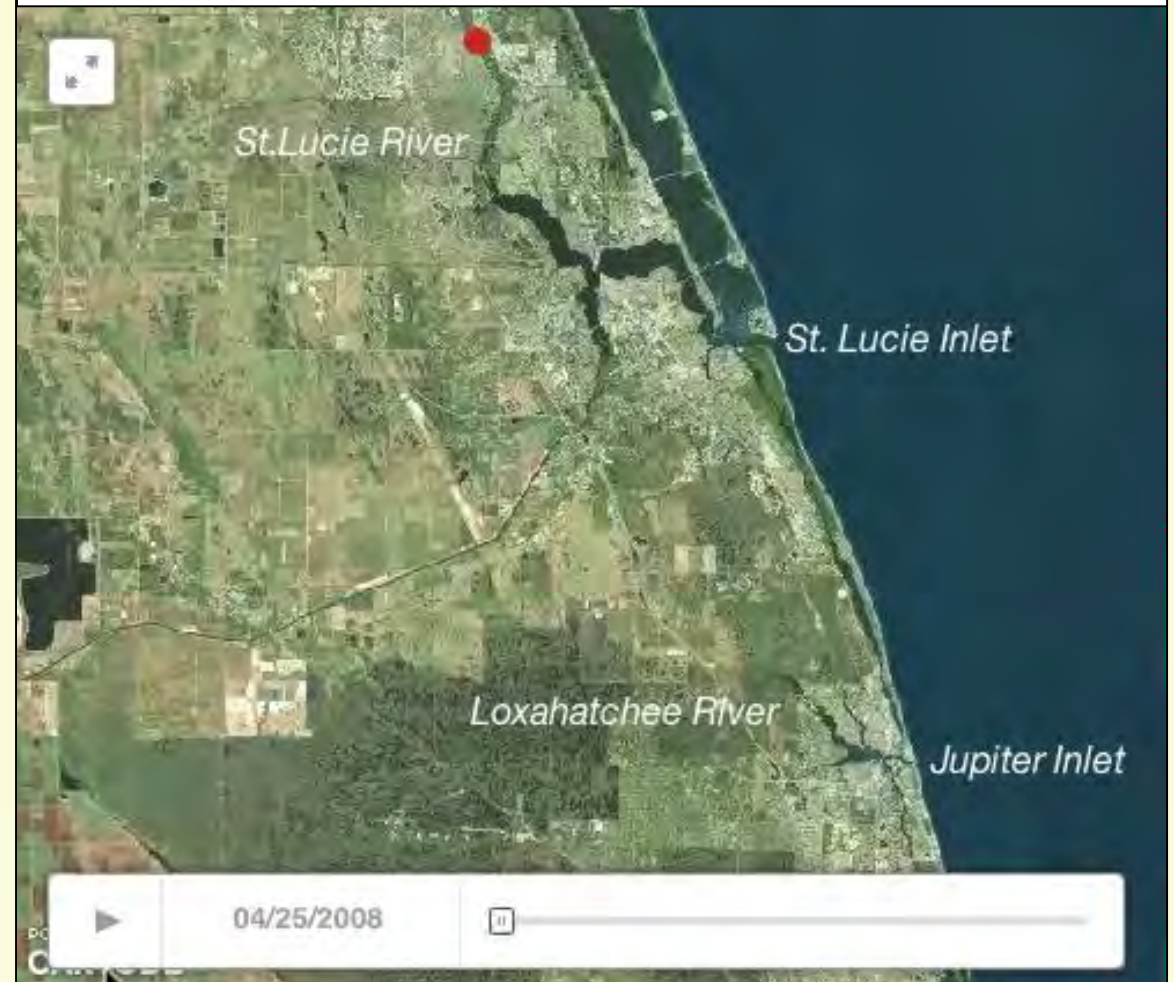




EAST COAST – CANAVERAL TO PALM BEACH

- 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.

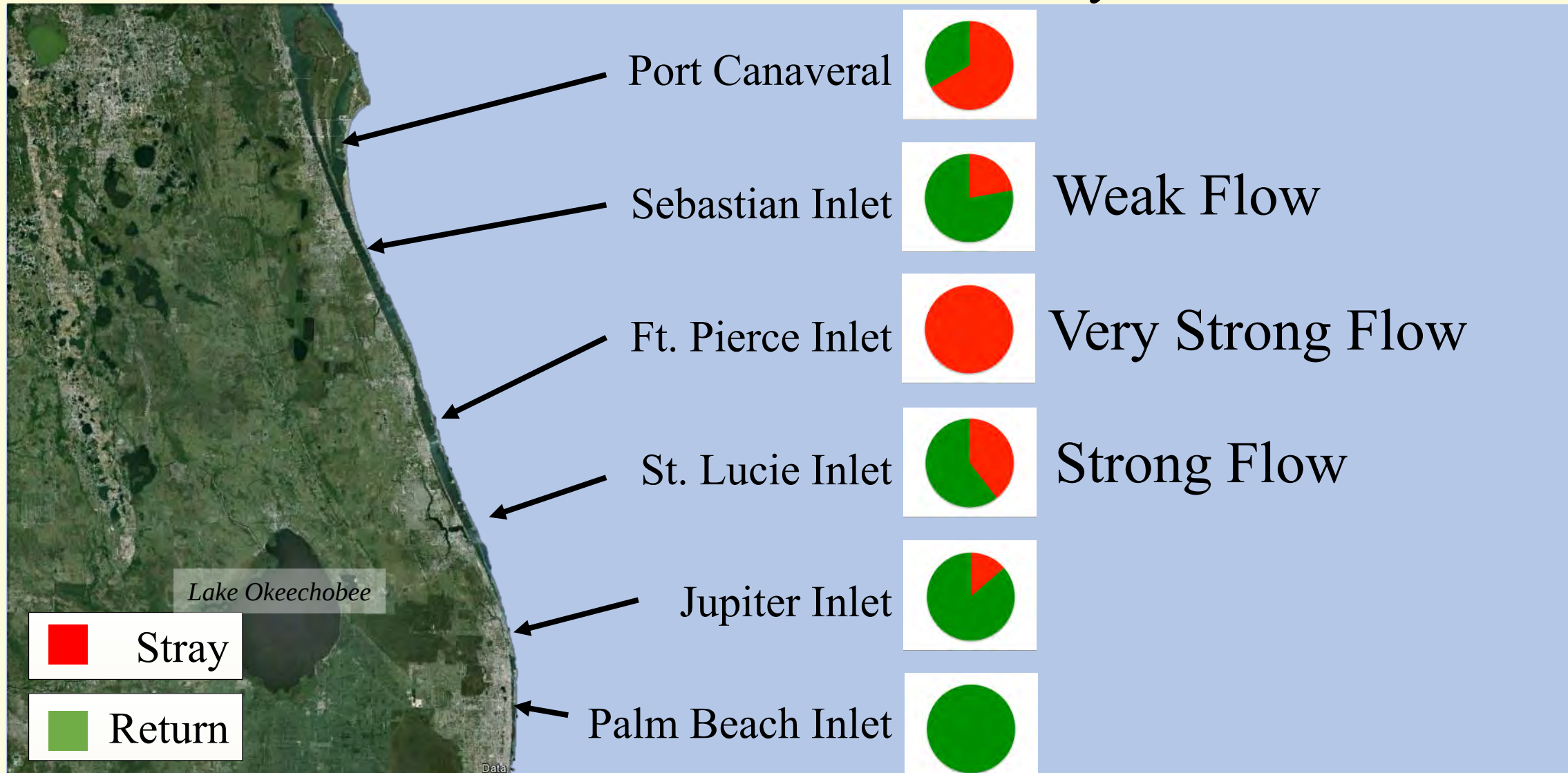
43 in. (1100 mm) TL female during the 2008 spawning season





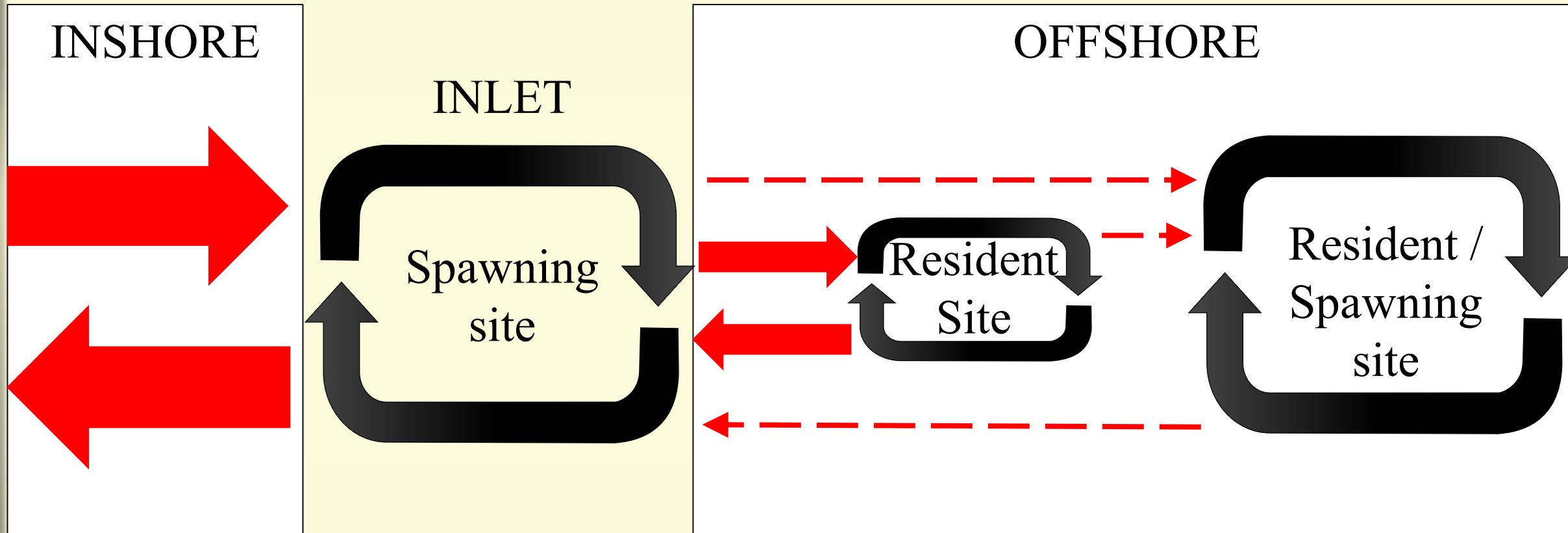
EAST COAST – CANAVERAL TO PALM BEACH

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	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 st	NA	May 22 nd	April 2 nd	July 15 th



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)
Naval Undersea Warfare Center (NUWC)
NOAA, Gray's Reef
USGS Gainesville and Miami
Florida Fish and Wildlife Conservation Commission
(St. Pete, Marathon, Tequesta labs)
Georgia Department of Natural Resources (GADNR)
South Carolina Department of Natural resources (SCDNR)
Texas Parks and Wildlife
Delaware State University (DSU)
Florida Atlantic University (FAU)
Florida Institute of Technology (FIT)
Florida International University (FIU)
Florida State University (FSU)
Rosenthal Marine School (RSMAS)
Savannah State University (SSU)
University of Georgia (UGA)
University of North Florida (UNF)
University of Florida/Florida Program for Shark Research
Stony Brook University
Cape Eleuthera Institute (CEI)
Bimini Biological Field Station (BBFS)
Loxahatchee River District (LRD)
Mote Marine Lab - Summerland Key TRL
Riverhead Foundation
Shedd Aquarium
CSA Ocean Services, Inc.
East Coast Biologists
Kennedy Space Center Ecological Program
Southeast Coastal Ocean Observing Resources (SECOORA)
Ocean Tracking Network (OTN)
Atlantic Coast Telemetry network (ACT)
Integrated Tracking of Aquatic Animals in the Gulf of Mexico (iTAG)

Non- FWRI Cited paper authors and institution

David Villegas-Rios (Institute of Marine Research, Spain)
Jynessa Dutka-Gianelli (UF)
Jennifer Rehage (FIU)
Ross Boucek (FIU)
Thomas Frankovich (FIU)
K Gastrich (FIU)
Michael Heithaus (FIU)
C Madden (FIU)
Phil Matich (FIU)
R Santos (FIU)
Aaron Adams (Mote Marine)
Kirby Wolfe (Mote Marine)
Nicholas Barkowski (Mote Marine)
Dana Overcash (Villanova University)

FWRI Cited paper authors

Susan Lowerre-Barbieri
Sarah Walters
Joel Bickford
Wade Cooper
Robert Muller
Alexis Trotter
David Blewett
Ronald Taylor
Philip Stevens
Jim Whittington
Beau Yeiser
Erick Ault

Funding Sources

FWRI / FWCC

Department of the Interior, US Fish and Wildlife Service,
Federal Aid for Sportfish Restoration.

**Extended staff of the Fish Bio section of
FWRI and the Tequesta field lab and
volunteer anglers.**

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