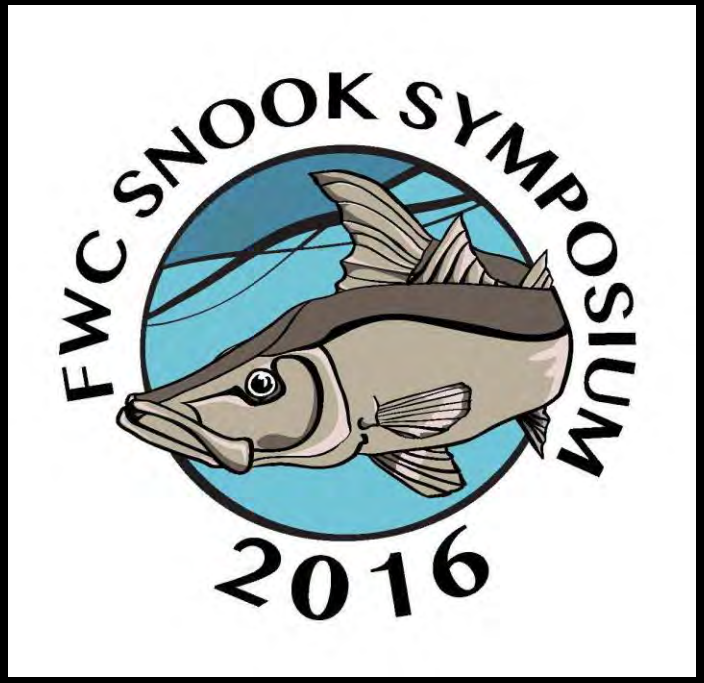


8:45 AM – 9:35 AM

Research Update

Distribution and Habitat Associations
Philip Stevens, Research Scientist, FWRI

Spawning Dynamics
Joy Young, Biological Scientist, FWRI

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

SPORT FISH RESTORATION

Research - Population/Behavioral traits

What is it that Snook do and why do they do it?

Habitat Use

Diet

Spawning

Movement

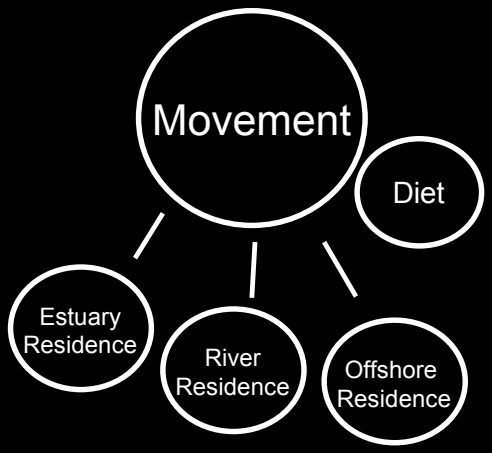
Phil Stevens

Joy Young

Common Snook habitat use and diet

Philip Stevens, Erick Ault, Dave Blewett, Ross, Boucek, Jenn Rehage, Alexis Trotter, Beau Yeiser, Joy Young, and Jim Whittington

Habitat use and diet

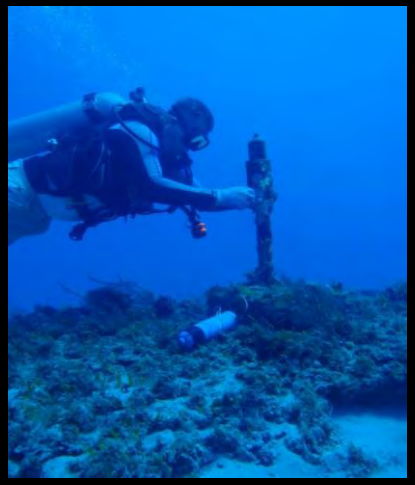


Data for Stock Assessment are largely centered on the estuary

What is going on in other habitats, namely offshore reefs and rivers?

To what extent do fish move between habitats and why do they move?

Offshore Reefs

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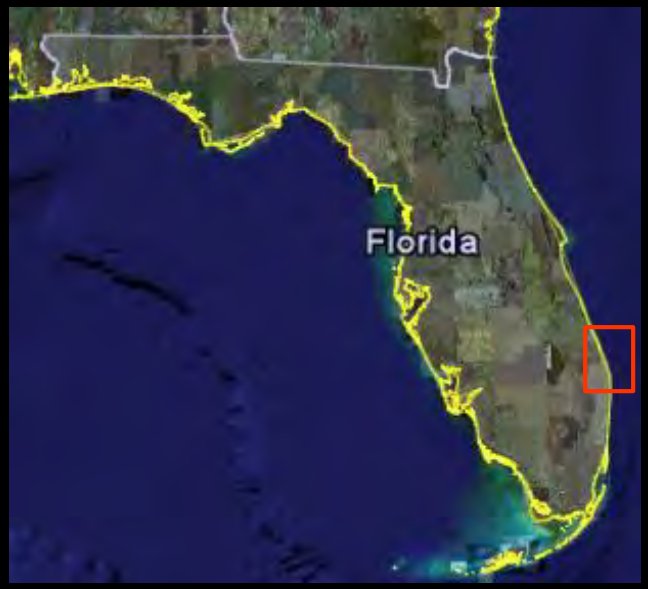
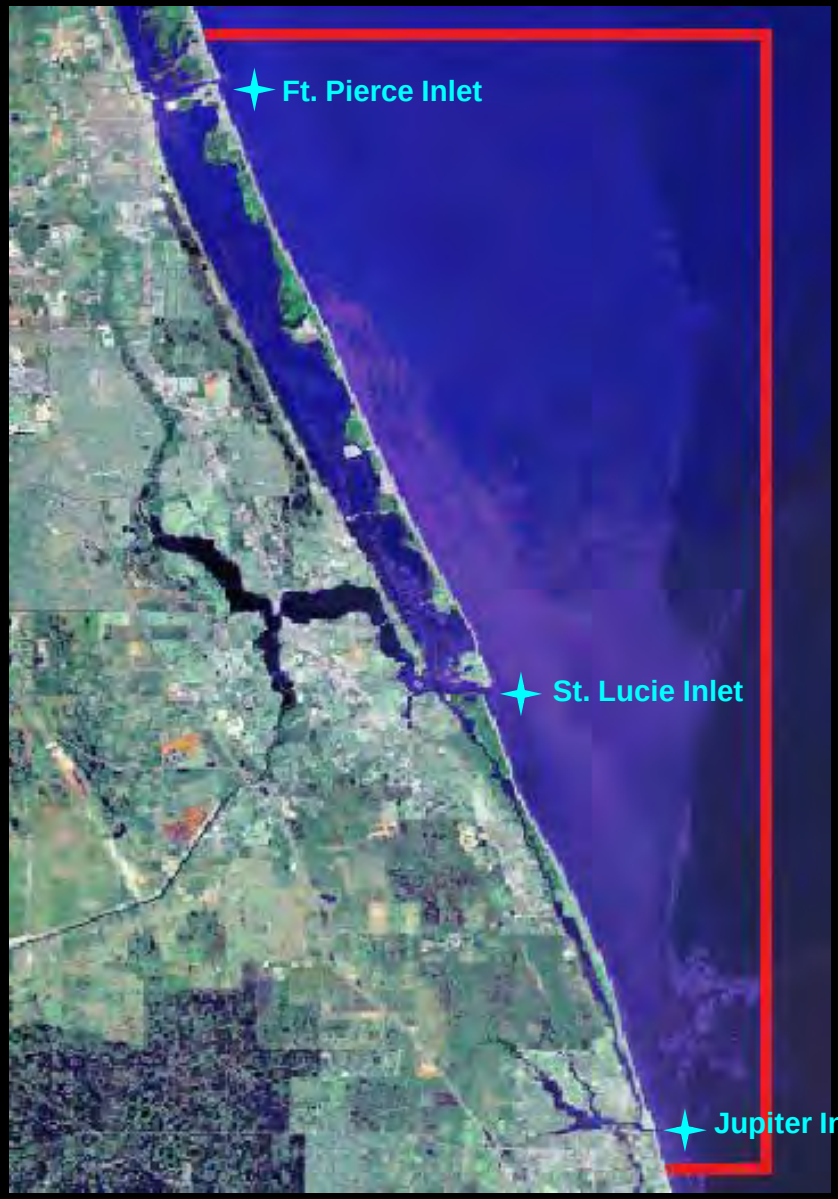
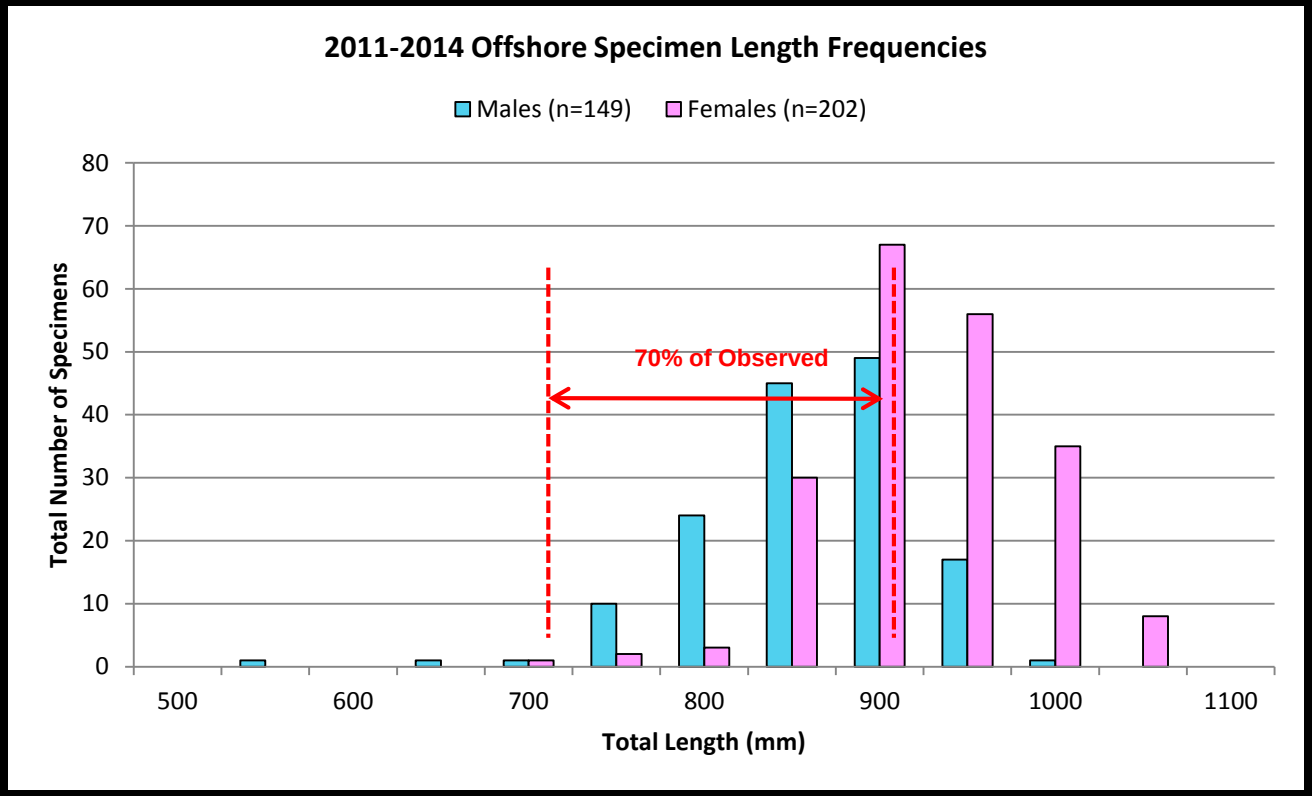
Study Sampling Area



- 65 Km (40 Miles) Coastline
- About 5-12 km (3-8 miles) offshore



Offshore Life History



Average TL = 949 mm (37 inches) for females and 885 mm (35 inches) for males

Maximum TL = 1093 mm (43 inches)

Age range = 4 -19 years; average ~10 years

Diet and genetics

Offshore Life History Cont.

Underwater Observations

- Roving Count (Opportunistic)
- Group Size (Number of Fish)
- Length Distribution (TL)
- Regional Bias
- **Condition Limited**

2009 - 2014 Observation Data

Region	Group (Average)	Group (Maximum)	TL (mm) Avg	TL (mm) Max
Ft. Pierce	24	140	835	1150
St. Lucie	29	250	827	1150
Jupiter	18	50	759	1080

Offshore Movement Patterns

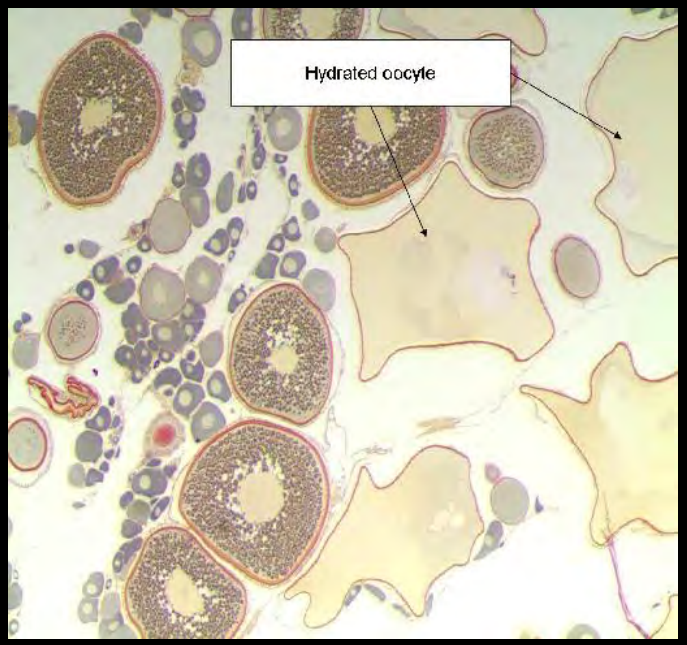
Acoustic Telemetry

Of snook originally tagged inshore (n=186), eleven moved offshore

Snook that were tagged offshore (n=61), mostly remained offshore (high residency to reef tract)

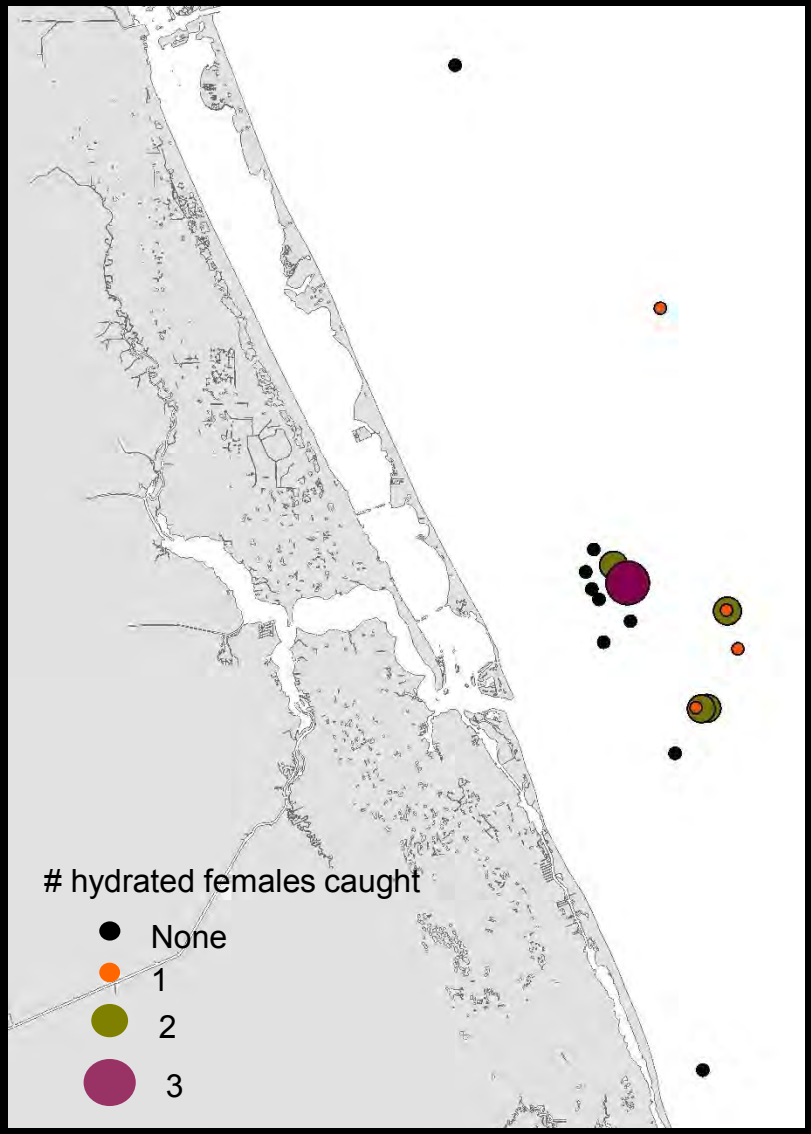
Once offshore, very little movement back to inlets and inshore waters (only 4 fish bounced back and forth)

Offshore Reproduction



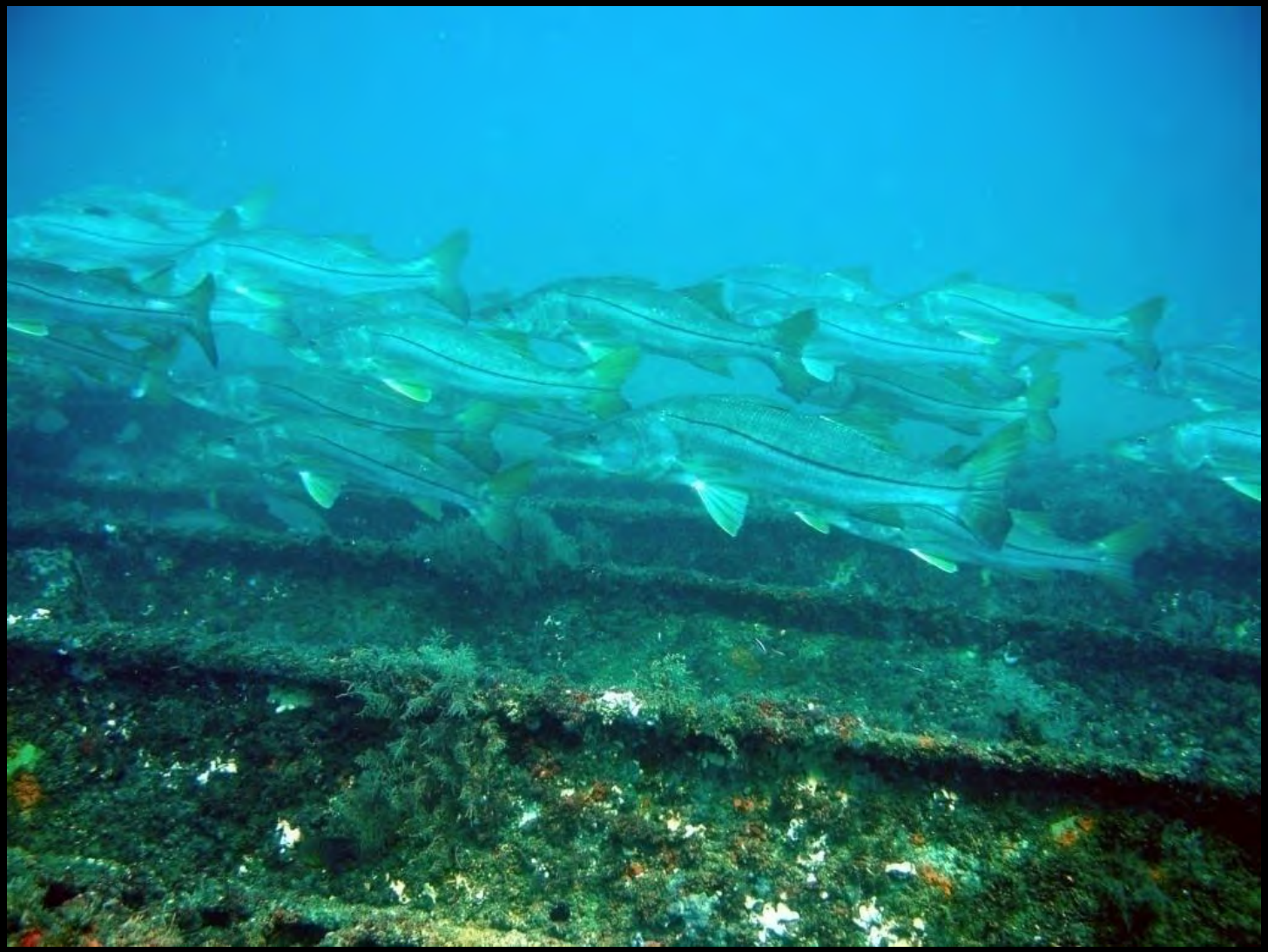
- Sampling occurred in evening hours when active spawning is known to occur
- 99% of females were spawning capable or regressing
- 11% of females had hydrated eggs (Imminent spawning)

Sampling and hydrated female locations




Ft. Pierce Inlet
St. Lucie Inlet
Jupiter Inlet

Use of offshore habitat has been documented throughout the state. Are these areas important at the population scale?



Rivers


Mexico
Google earth


Mexico
Google earth


Florida
Gulf of Mexico
The Bahamas
Havana
Mexico
Cuba
Mexico City
Isla de Cozumel
Grand Cayman
George Town
Guerrero
Belmopan
Belize
Guatemala
Guatemala City
Honduras
Tegucigalpa
El Salvador
Nicaragua
Managua
San Jose
Costa Rica
Panama
© 2012 Europa Technologies
© 2012 INEGI
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2012 Google
17° 10.531' N 89° 3.156' W elev 294 ft
Eye alt 1307.75 mi
Google earth


Mexico
Google earth


Costa Rica
Google earth


Panama
Google earth


Spring-fed rivers
Tampa Bay
Charlotte Harbor
SE Florida
Everglades
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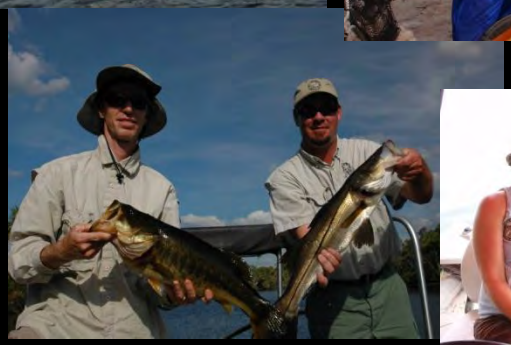
Acknowledgements

Luiz Barbieri, Jim Estes, Tom Champeau, Bill Johnson, Bill Pouder, and Ron Taylor












FWC St Pete, Charlotte Harbor, Lakeland, Gainesville, Melbourne, Everglades (FIU)

Southwest Florida Water Management District; State Wildlife Grant; Sport Fish Restoration

How do we sample rivers? - electrofishing

Stuns the fish – Allows researchers to take measurements and release


Charlotte
Harbor
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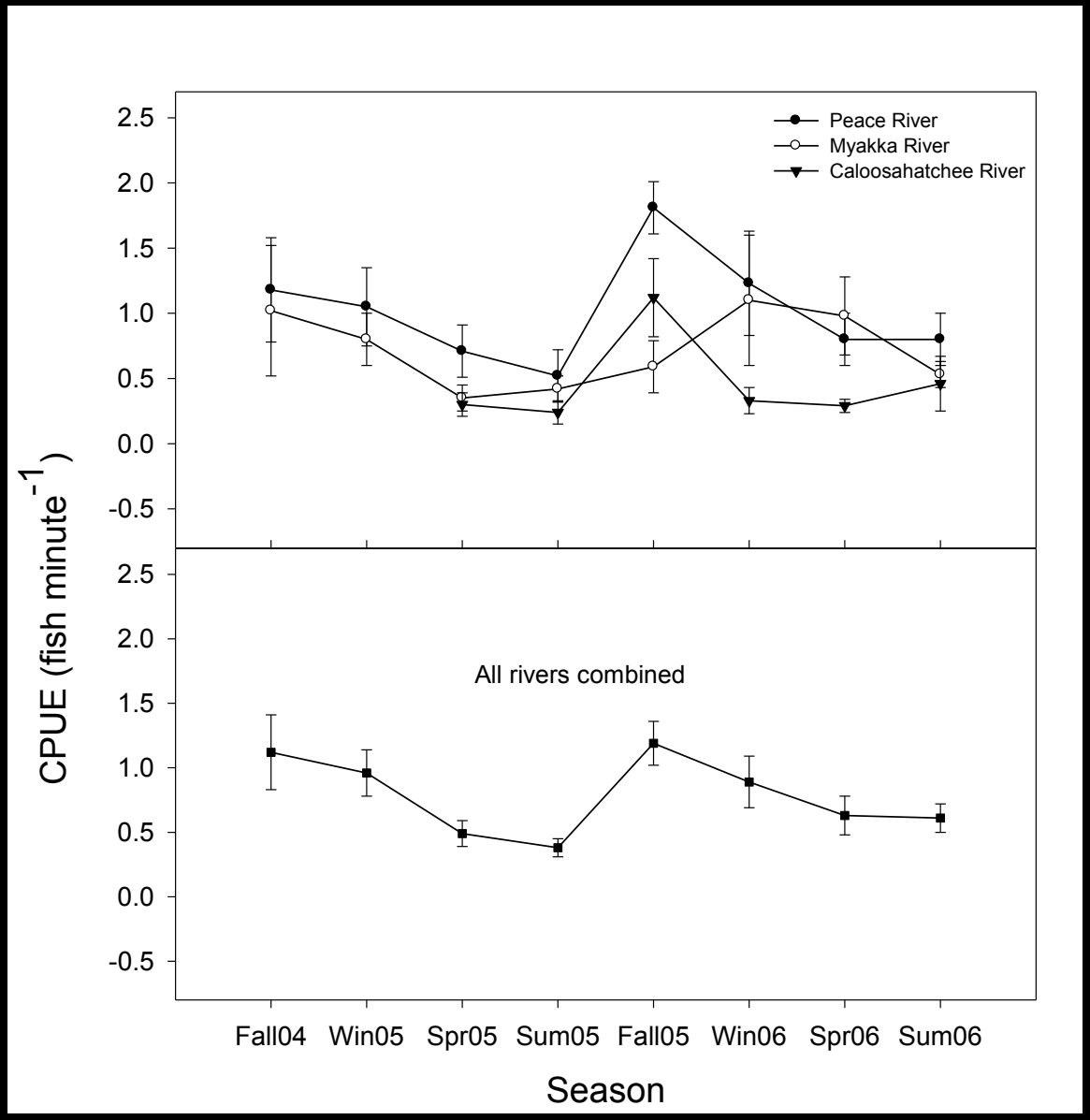
Electrofishing 2004-05

Myakka River

Peace River

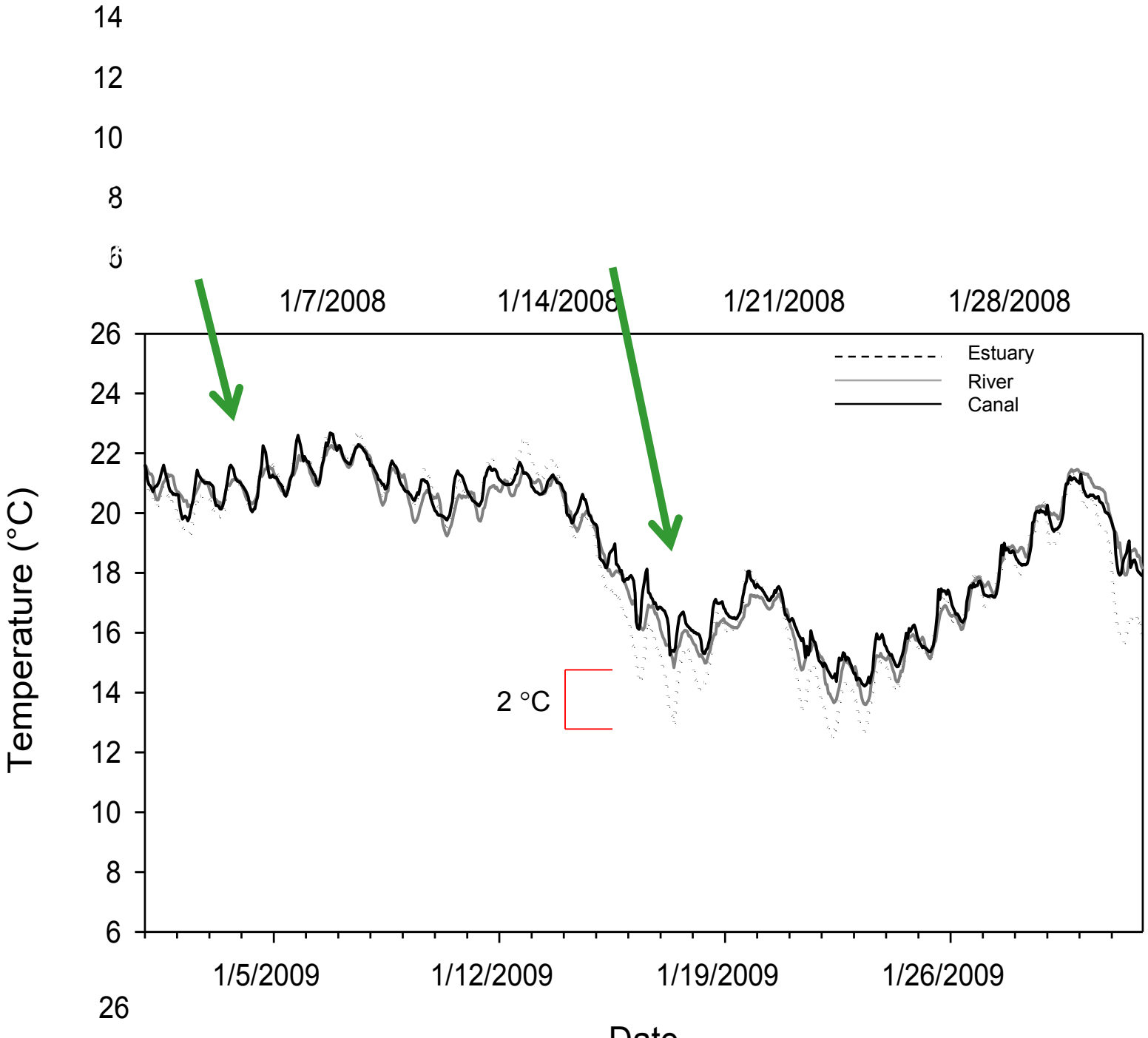
Caloosahatchee River

Charlotte Harbor Rivers - Seasonality

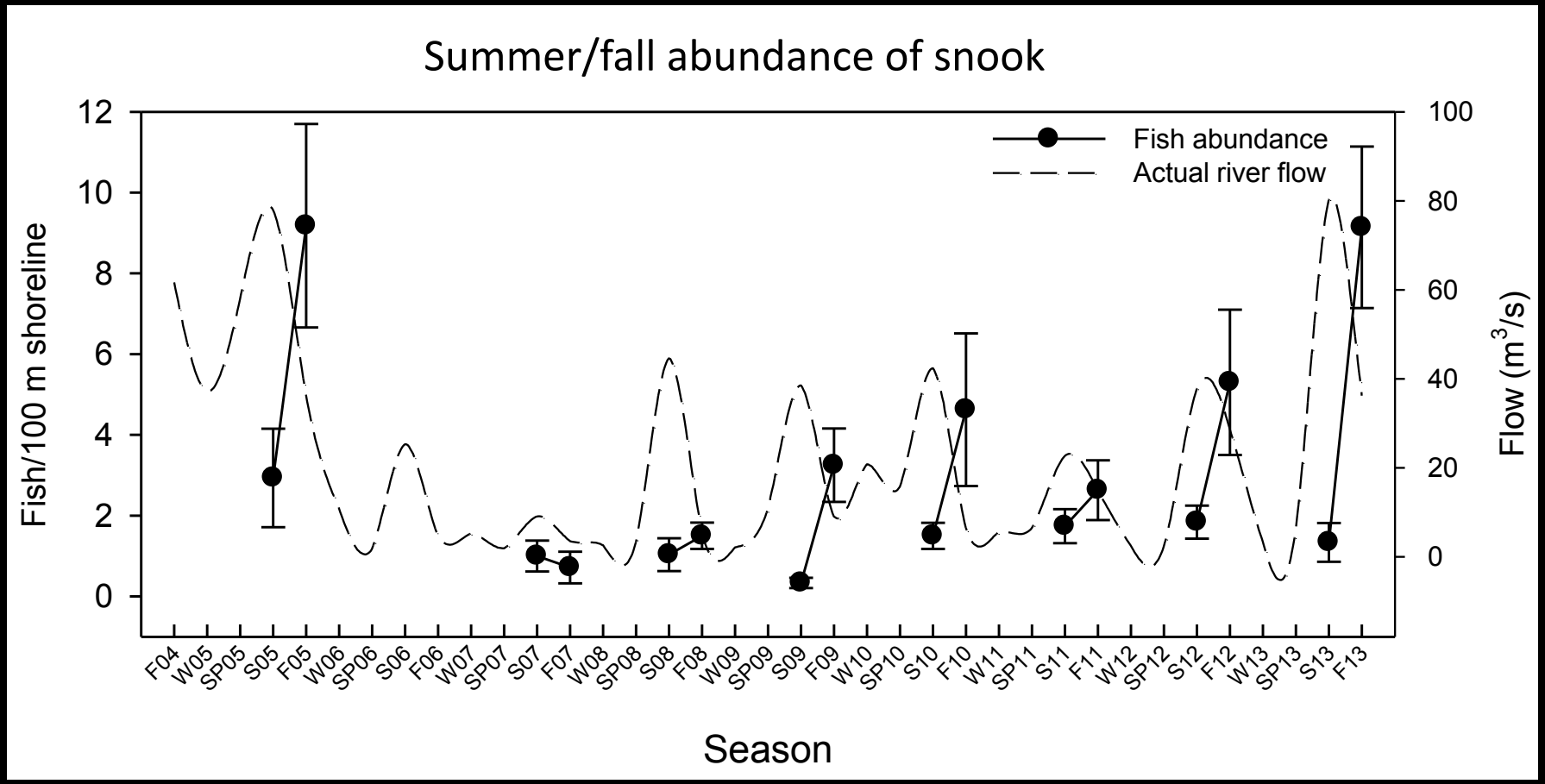


Blewett et al. 2009

What drives seasonal movements of snook into the rivers?

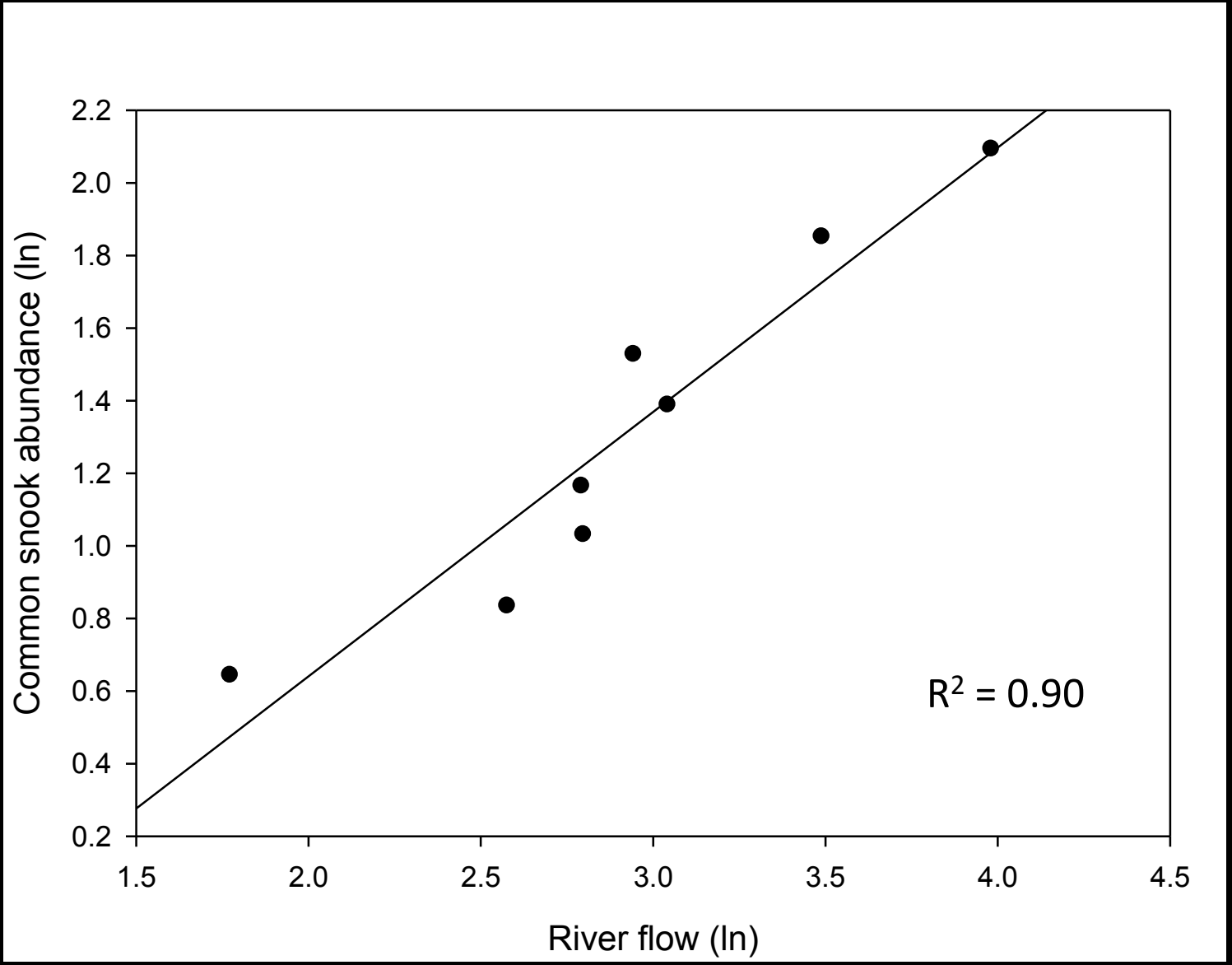

Temperature (°C)
Date
1/7/2008
1/14/2008
1/21/2008
1/28/2008
1/5/2009
1/12/2009
1/19/2009
1/26/2009
Estuary
River
Canal
2 °C

Appear to cue on river flow

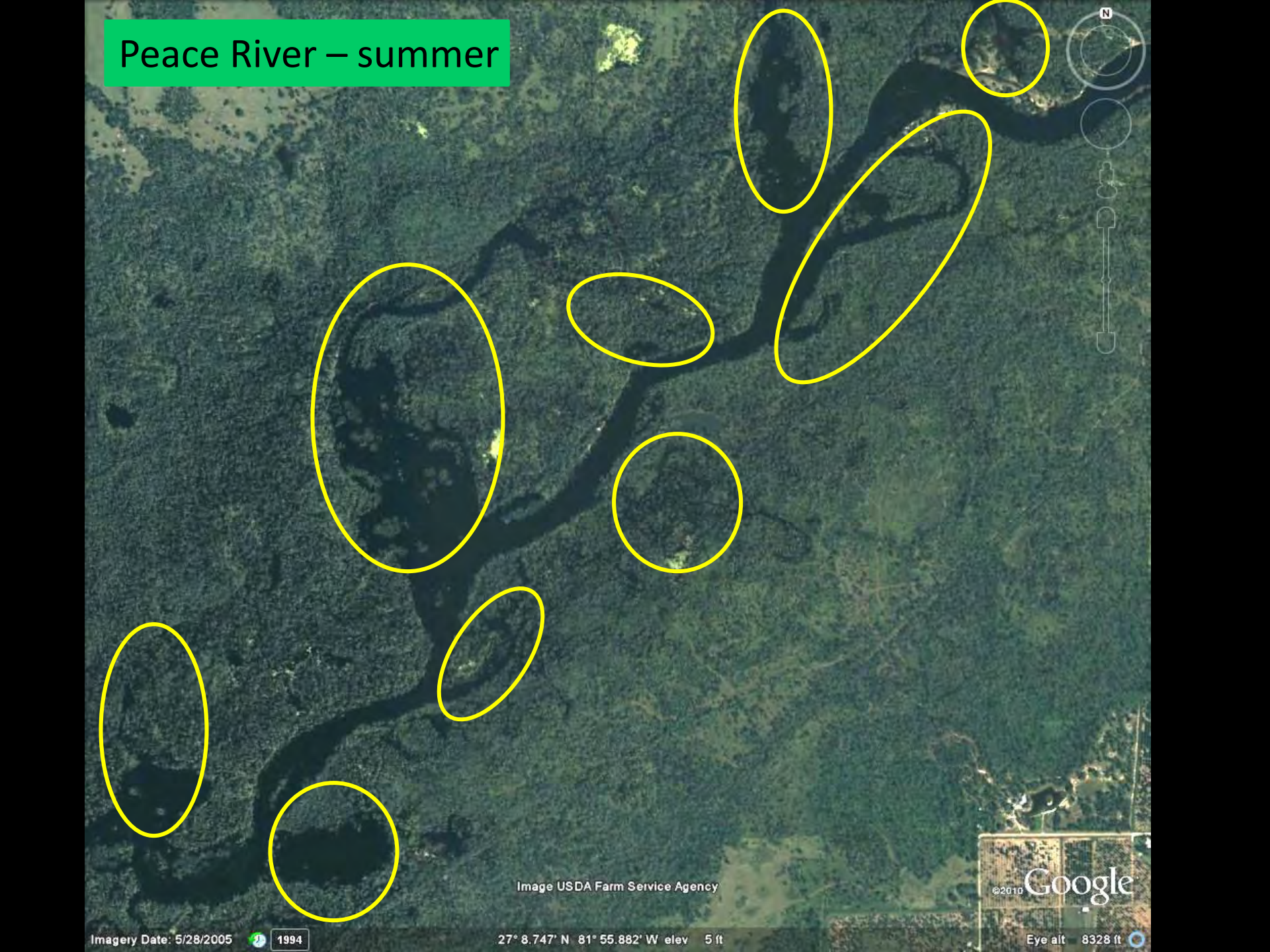


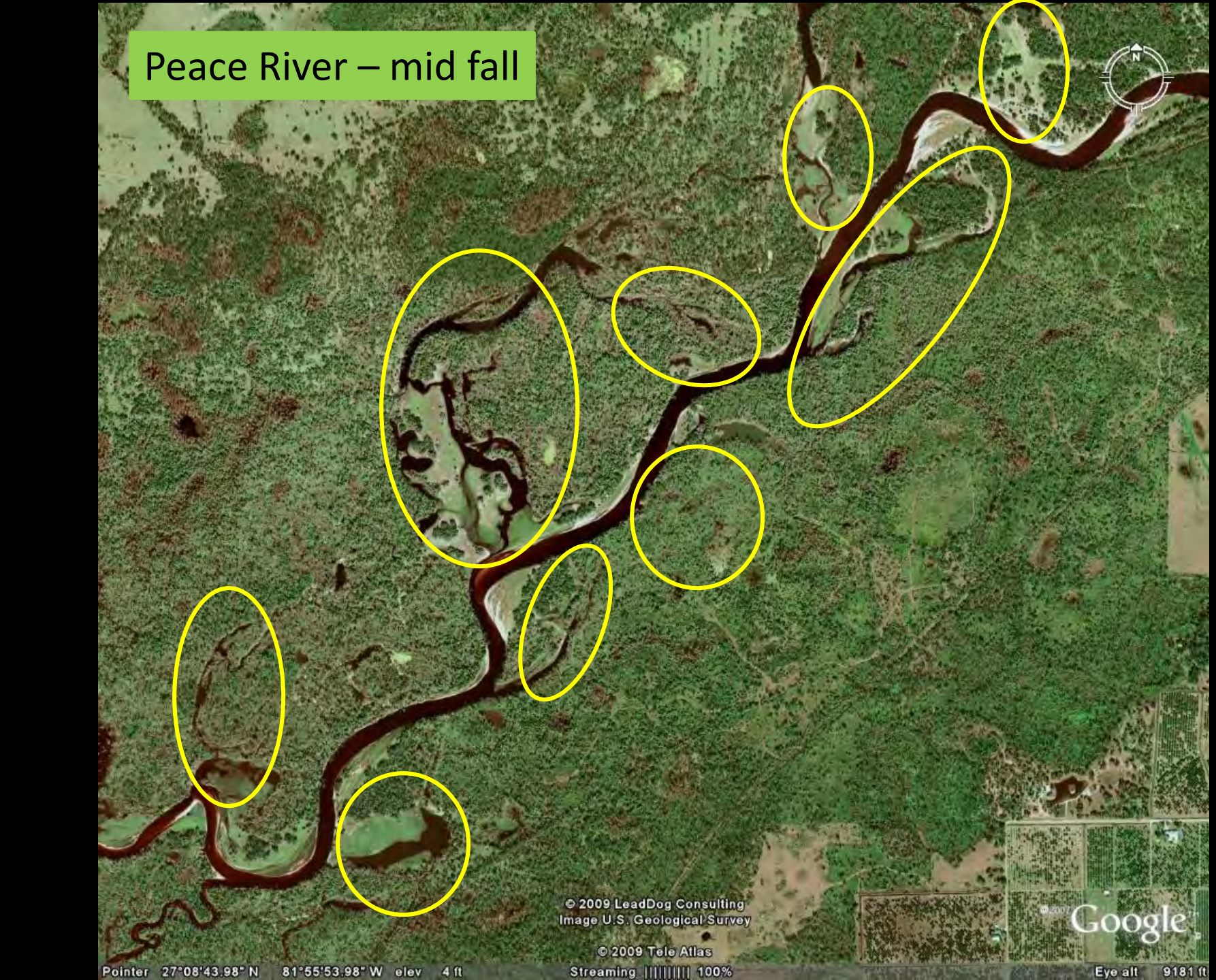
Estuary = 3 fish per haul in 183-m seine * gear efficiency of 30% = 10 snook/100m shoreline
Rivers (summer) = ~1.5 fish per 100m in electrofishing * gear efficiency of 15% = 10 snook/100m shoreline

Annual snook abundance vs. flow



More Flow = More Snook


Peace River – summer
Image USDA Farm Service Agency
©2010 Google
Imagery Date: 5/28/2005
1994
27° 8.747' N 81° 55.882' W elev 5 ft
Eye alt 8328 ft


Peace River – mid fall
© 2009 LeadDog Consulting
Image U.S. Geological Survey
© 2009 Tele Atlas
Google
Pointer 27°08'43.98" N 81°55'53.98" W elev 4 ft
Streaming 100%
Eye alt 9181 ft

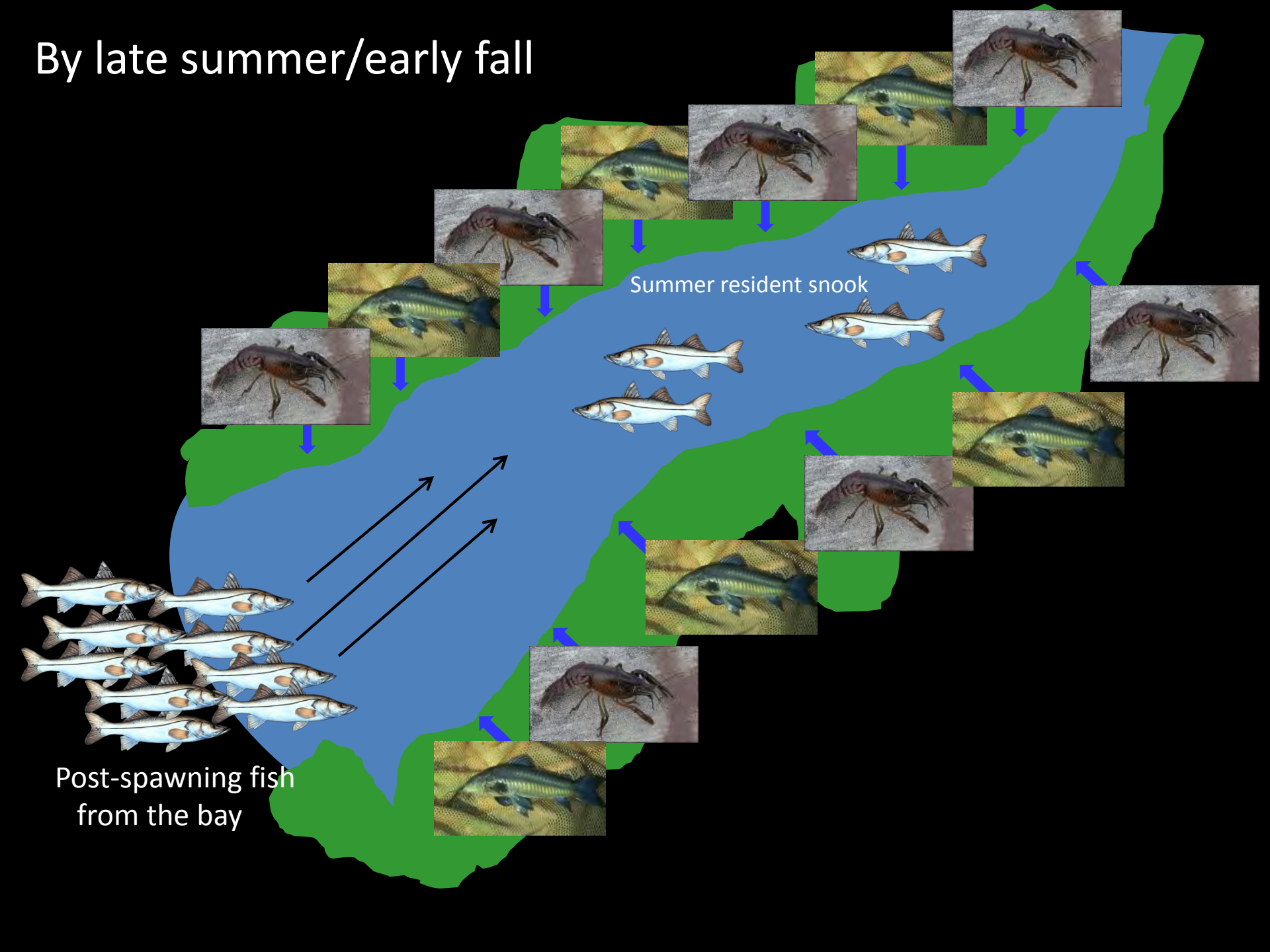
Estuary Prey

Blewett et al. 2006

River Prey

Stevens et al. 2010

By late summer/early fall




Everglades
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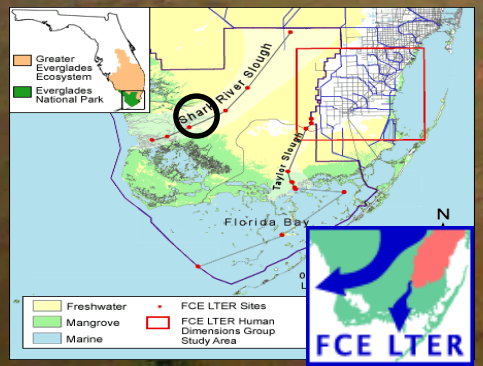
Study system: ecotonal sites in Everglades National Park

Boucek and Rehage 2013



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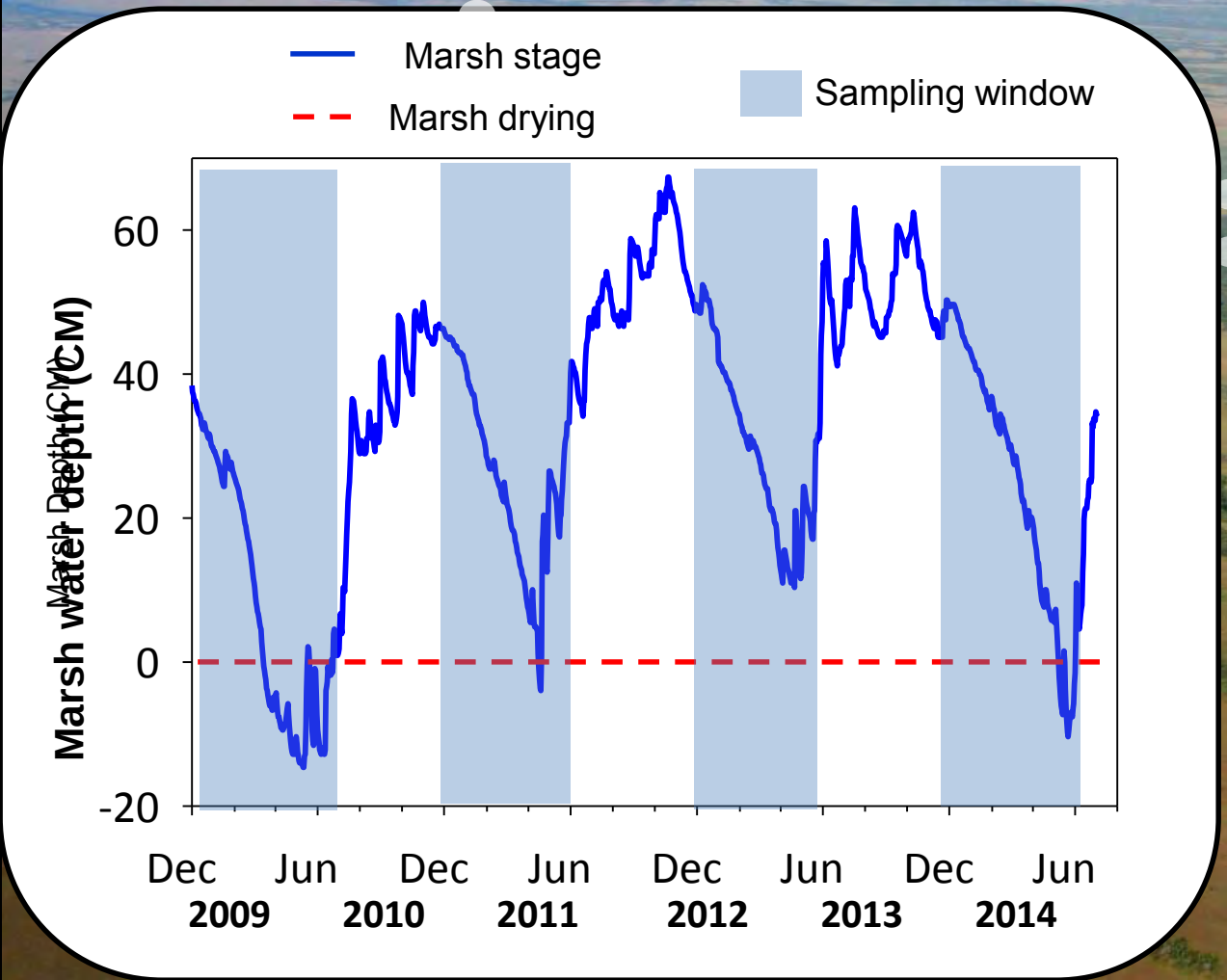
Study system: ecotonal sites in Everglades National Park



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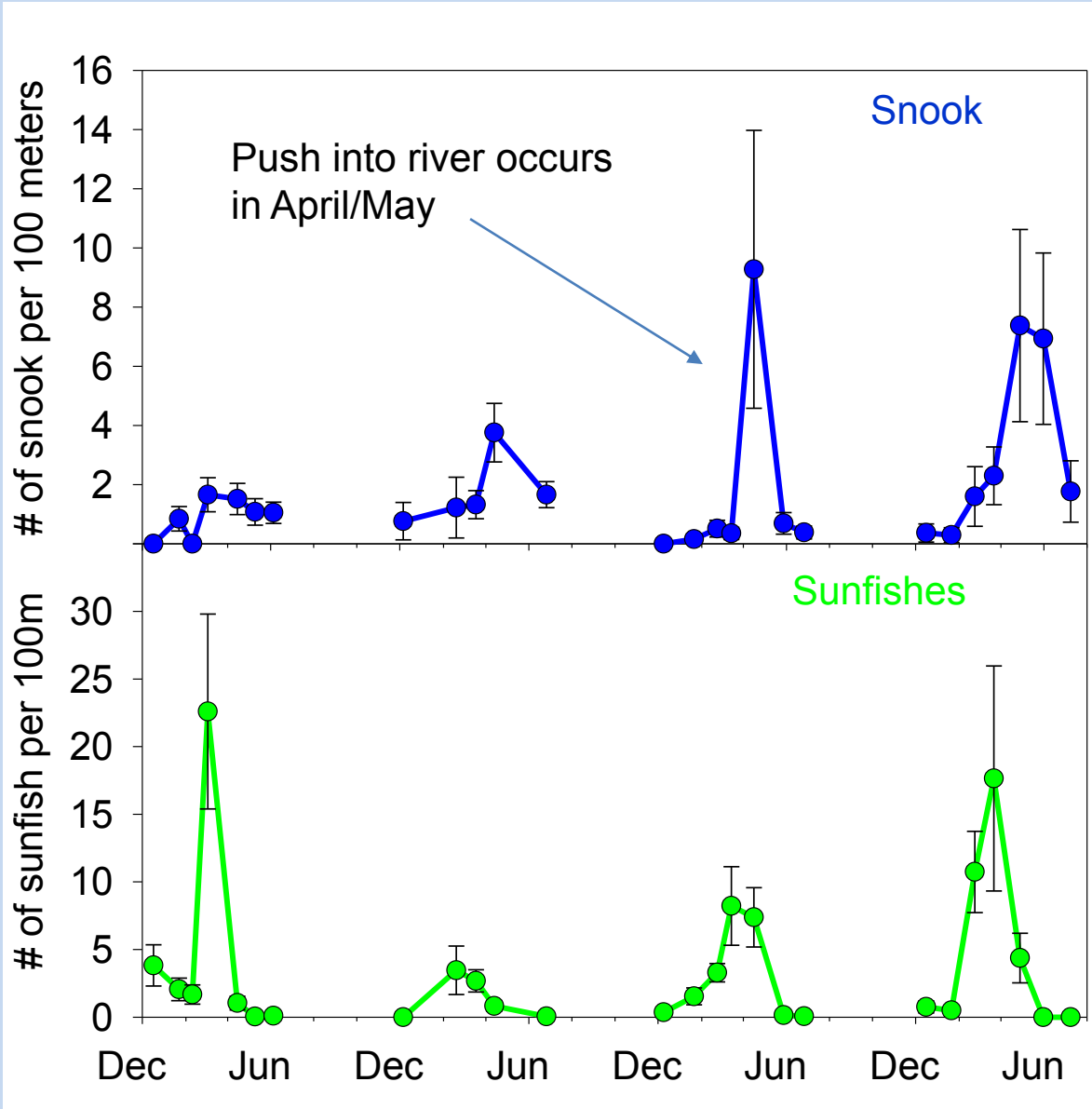
Sunfishes are the dominant prey items

Snook and sunfish abundance increases in the dry season, but varies across years



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Tampa Bay
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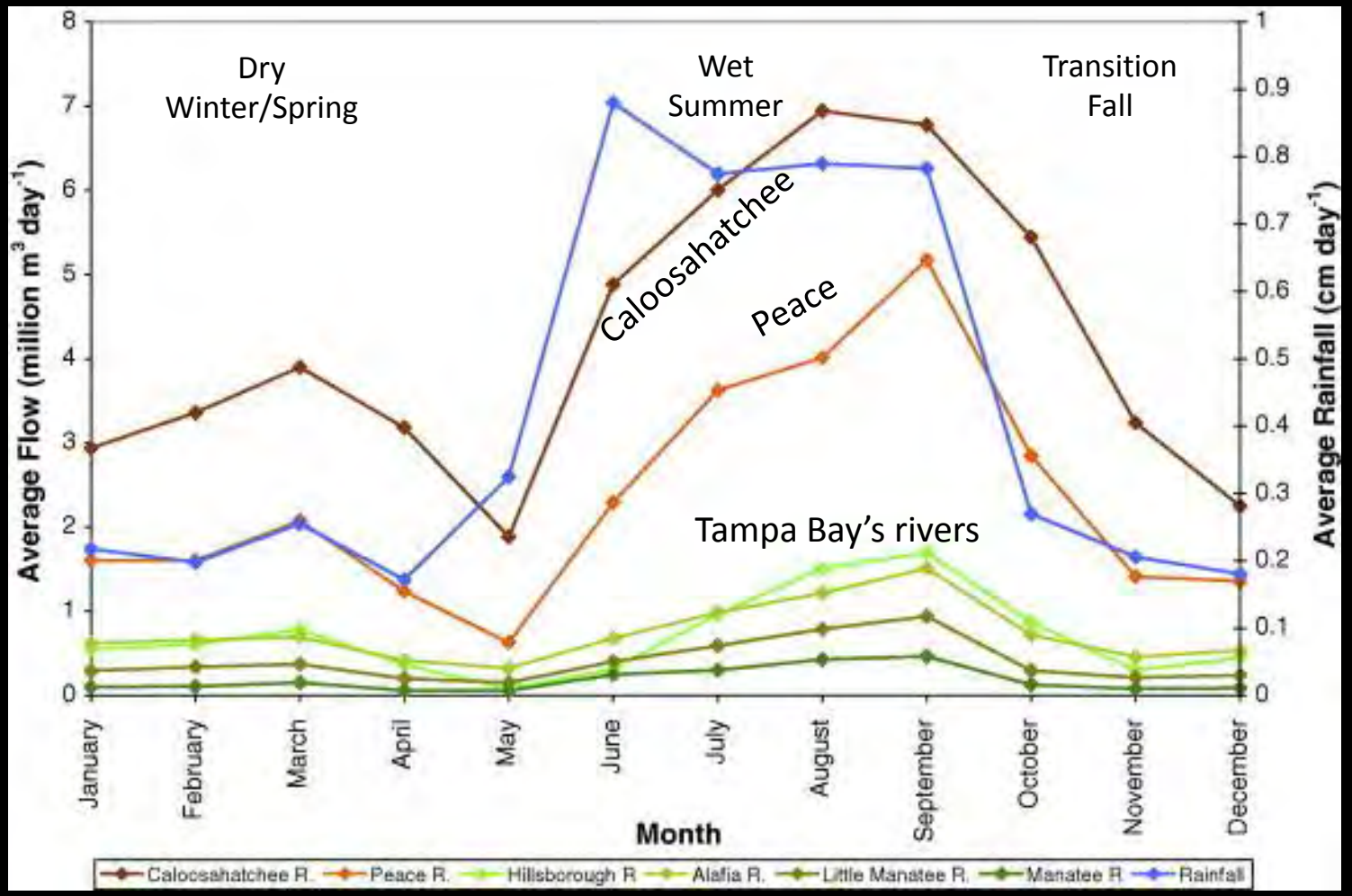
Southwest Florida Rivers

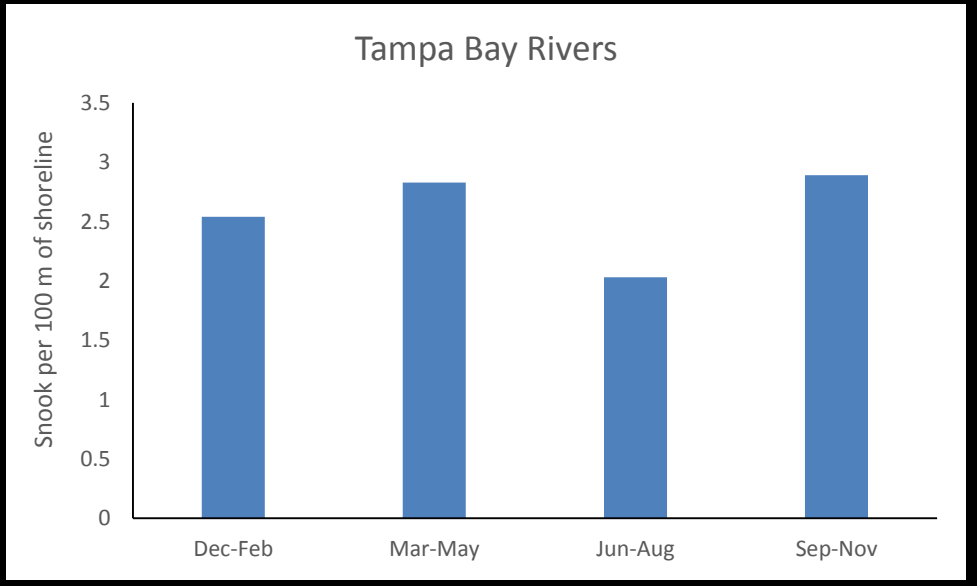



Tampa Bay Rivers
Hillsborough River
Tampa
Alafia River
St Peterburg
Little Manatee River
Manatee River
N
Bradenton

Tampa Bay Rivers

Year-round occurrence; no seasonal changes apparent.

The rivers in TB appear to be an extension of the estuary habitat



There are about 15 snook per 100m of shoreline (the length of a football field) in both estuary and river habitats

Estuary = 5 fish per haul in 183-m seine * gear efficiency of 30%
Rivers = 2.6 fish per 100m shoreline in electrofishing * gear efficiency of 15%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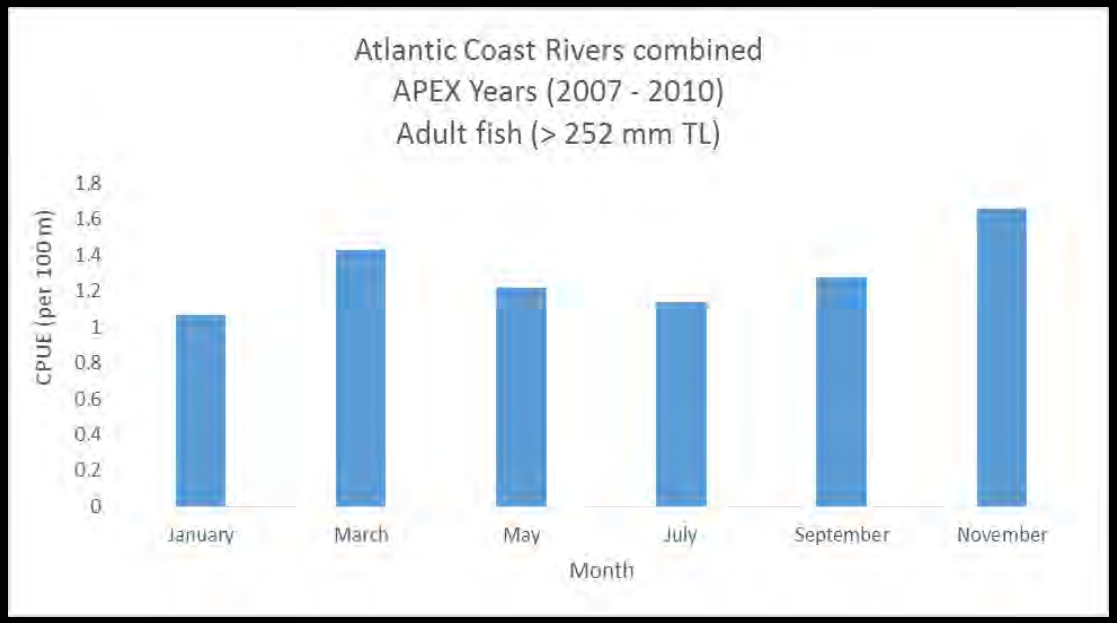
Indian River Lagoon Rivers



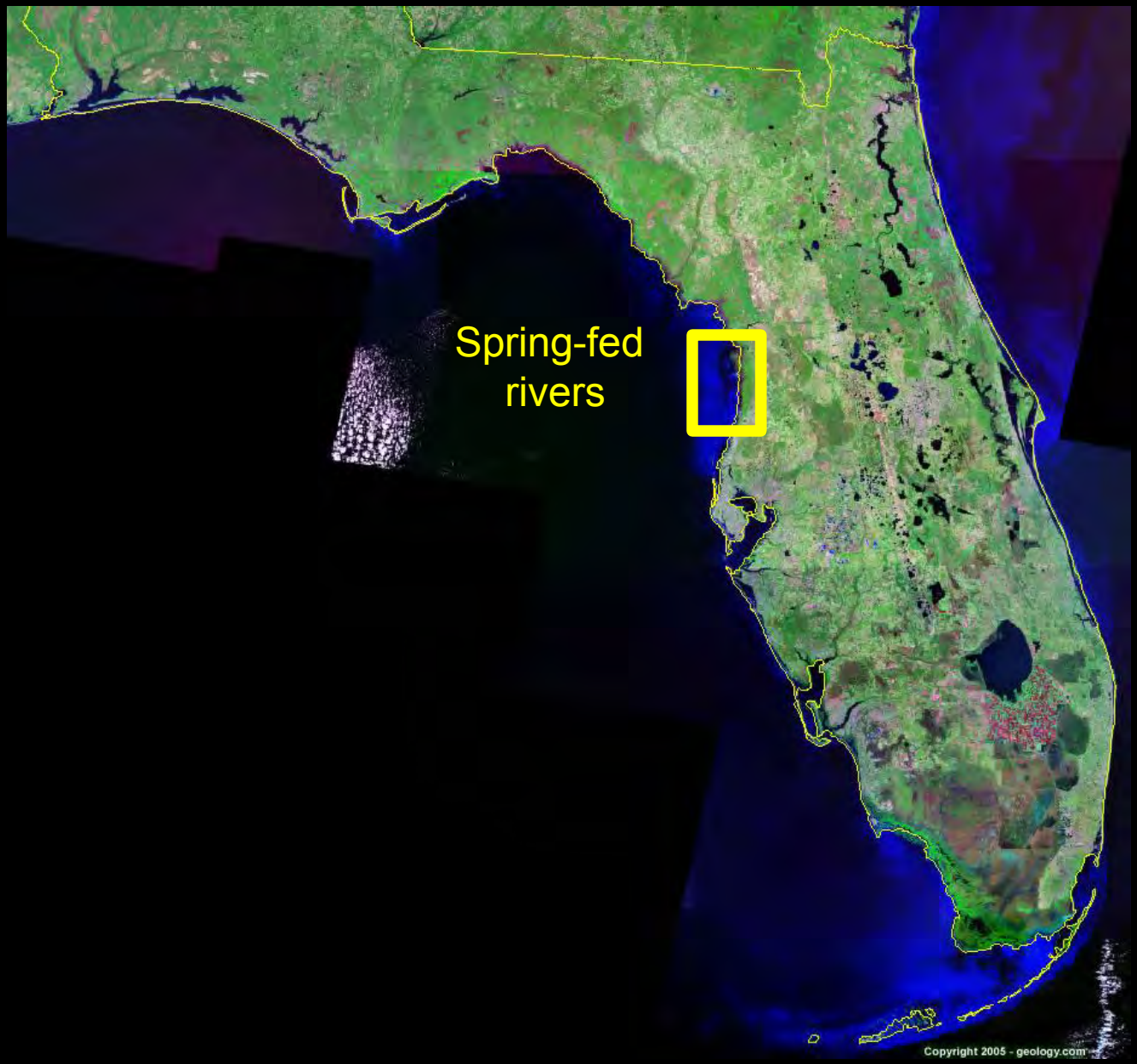
Year-round occurrence; no seasonal changes apparent.

The rivers in IRL appear to be an extension of the estuary habitat

There are about 15 snook per 100m of shoreline (the length of a football field) in the estuary and 9 snook per 100m in the rivers.

However, other snook species (e.g., fat snook) boost numbers of “snook” per 100m of shoreline to that comparable to the estuary.

Estuary = 5 fish per haul in 183-m seine * gear efficiency of 30%
Rivers = 1.3 fish per 100m shoreline in electrofishing * gear efficiency of 15%


Spring-fed
rivers
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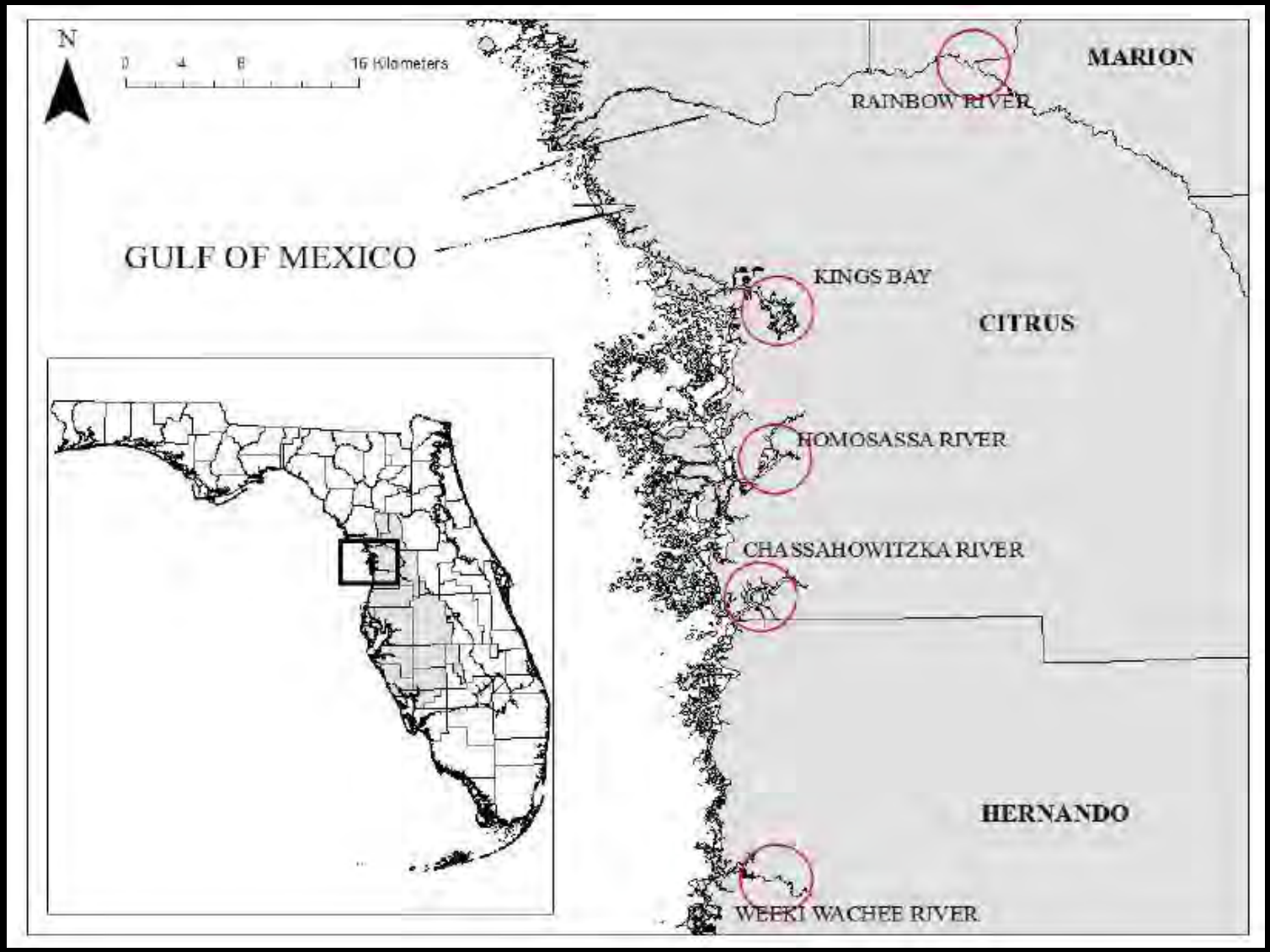
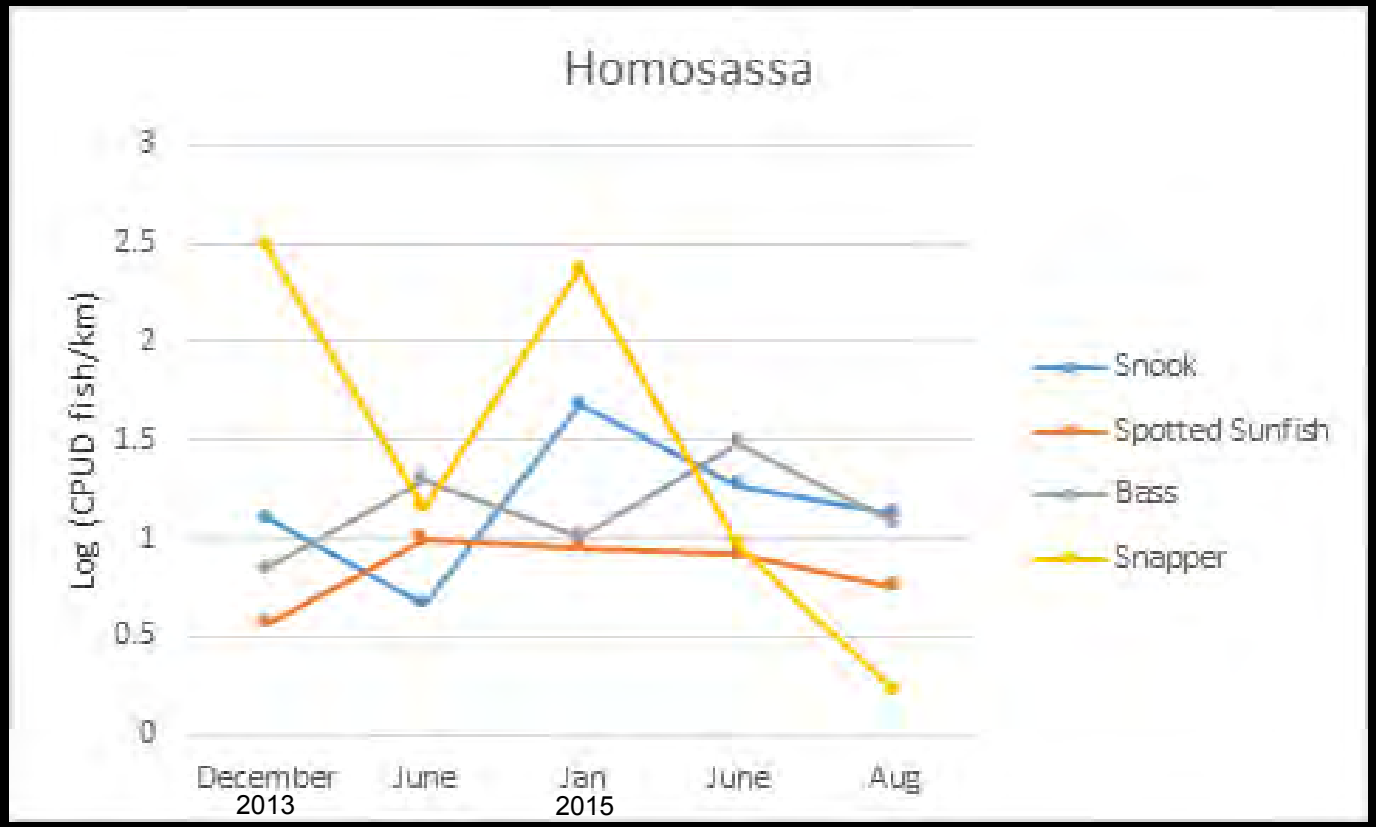

N
0
4
8
16 Kilometers
MARION
RAINBOW RIVER
GULF OF MEXICO
KINGS BAY
CITRUS
HOMOSASSA RIVER
CHASSAHOWITZKA RIVER
HERNANDO
WEEKI WACHEE RIVER

Overwintering is apparent at this latitude

(Picture from observation bubble at Homosassa Springs)

<50 deg F Gulf temp vs. 72 deg F spring temp

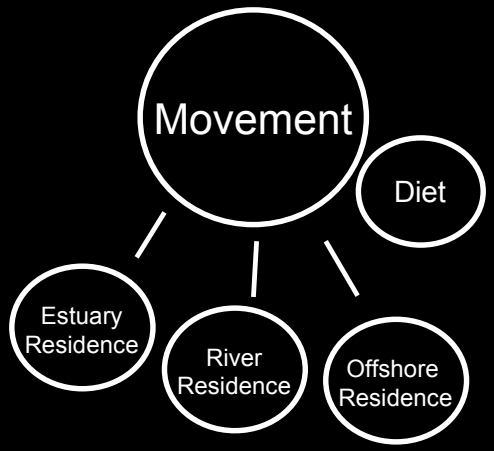


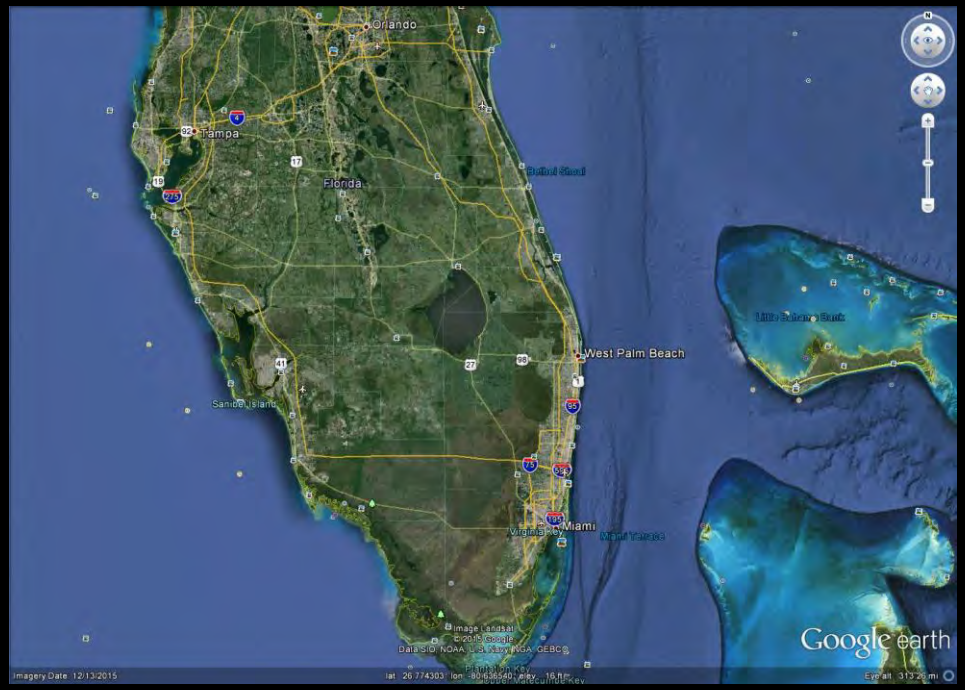
Abundance in rivers less than half that of lower latitudes

0.2-0.6 snook/100m * gear efficiency of 15% =<4 snook/100m

Conclusions

Population traits will vary based on the size and shape of the estuary, habitat types, and prey presented to the species






Thank you!