

# Monitoring Fish and Invertebrates in the Southern Estuaries: Quantifying Variation and Reducing Uncertainty

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# **Outline**

**Southern Estuaries  
Nursery-Community  
Hypotheses**

**Species and Methods  
Overview**

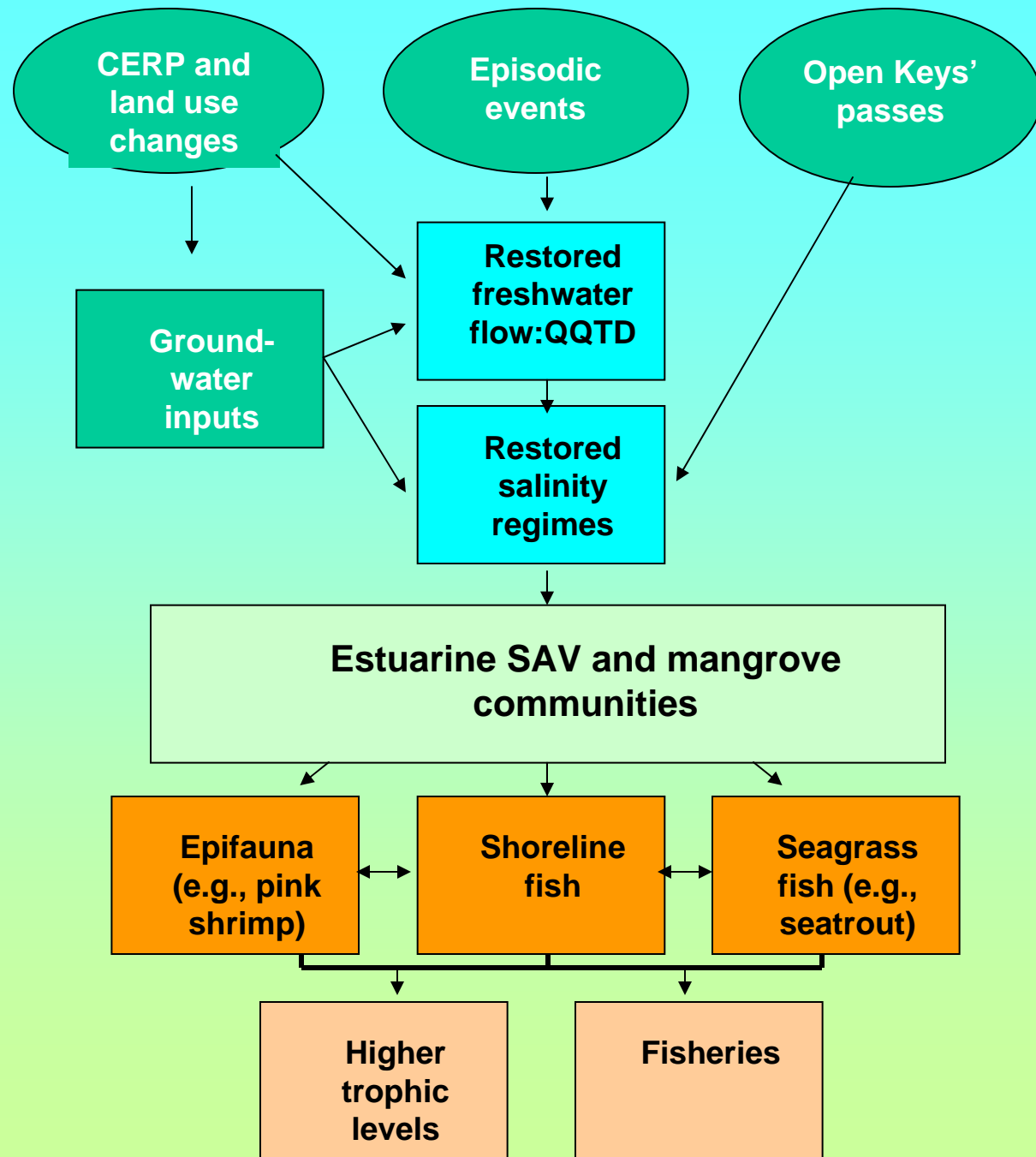
**Visual Survey**

**Trawl Survey**

**Throw-trap Survey**

**Lessons Learned**





# Nursery-Community Hypotheses

CERP will....

1. expand the salinity gradient along a greater shoreline length and reduce salinity fluctuation to natural estuarine conditions,
2. reduce the intensity, duration, and area of coverage of hypersaline conditions,
3. increase the area covered by patchy or heterogeneous seagrass habitat,
4. increase the length of shoreline receiving direct freshwater inflow and establish more persistent salinity gradients, and
5. increase the area of overlap of favorable salinities with favorable bottom habitats and shoreline features.

# Ultimate Hypothesis

- **By making these important habitat improvements, CERP will increase the distribution and abundance of a richer assemblage of species characteristic of estuaries.**



# **Southern Estuaries MAP**

## **Nursery-Community Purpose**

- **To quantify the abundance, distribution, size-structure, present and past, and salinity relationships of selected species.**
- **To characterize species assemblages, their variation in space and time, and relationships with salinity and other aspects of habitat.**
- **To develop and apply tools for assessing the success of CERP.**

# Focus of 2007 Assessment

- Four species that use estuarine nursery habitat : gray snapper (*Lutjanus griseus*), spotted seatrout (*Cynoscion nebulosus*), pink shrimp (*Farfantepenaeus duorarum*), and rainwater killifish (*Lucania parva*).
- First three are among the most ecologically and economically important species in the SE system.
- The fourth is the most abundant benthic fish in most estuarine nearshore areas.
- Responses to salinity observed in all four.

# **More than the four focus species are collected in MAP**

- **Each survey method (visual survey, trawl, and throw-trap) acquires data on many species.**
- **e.g., caridean shrimps, pipefishes, gobies, mojarras, blue crabs, and others**

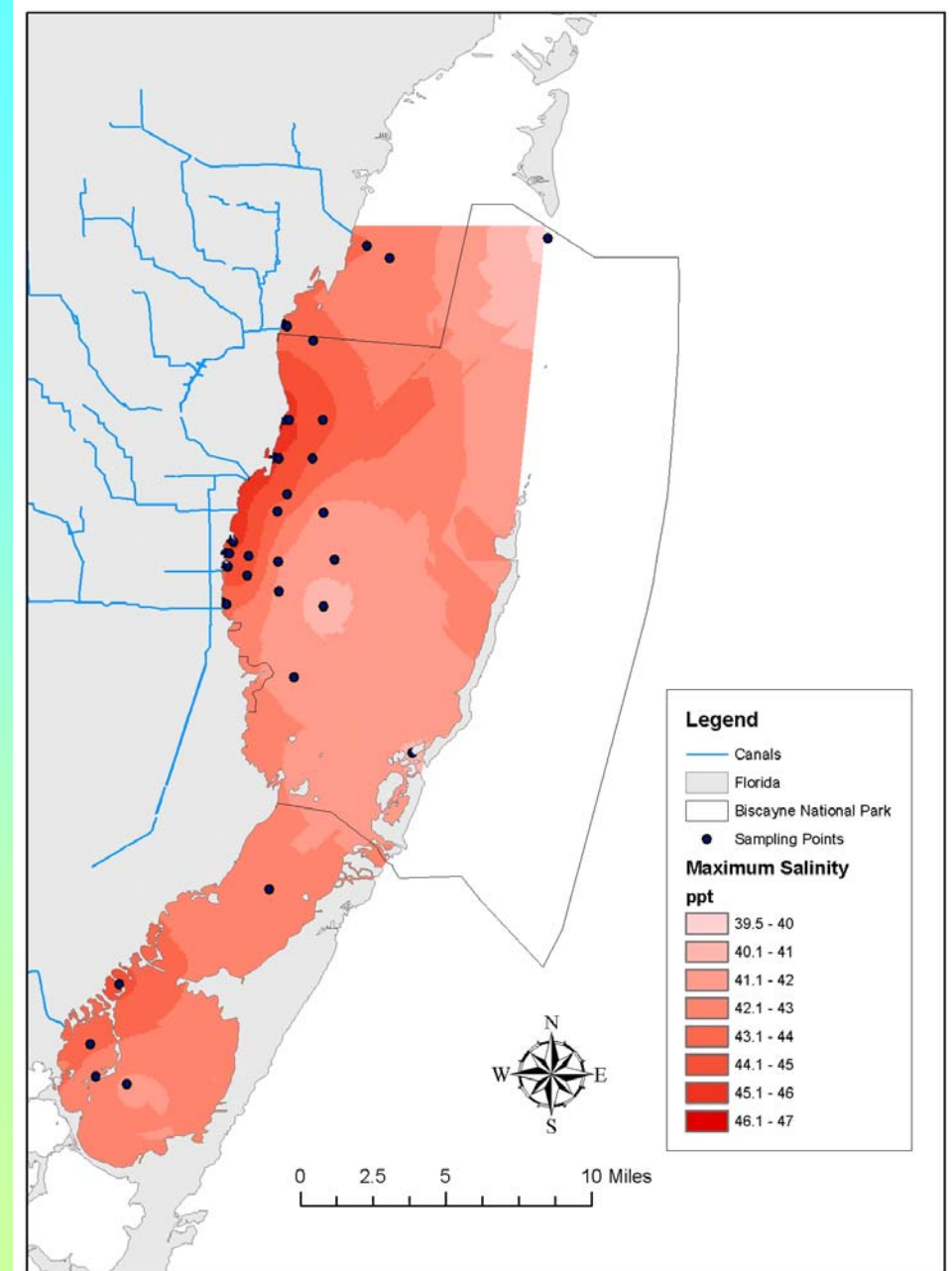


## Hypersalinity (>36 psu)

Reduction in FW quantities  
have resulted in increased:

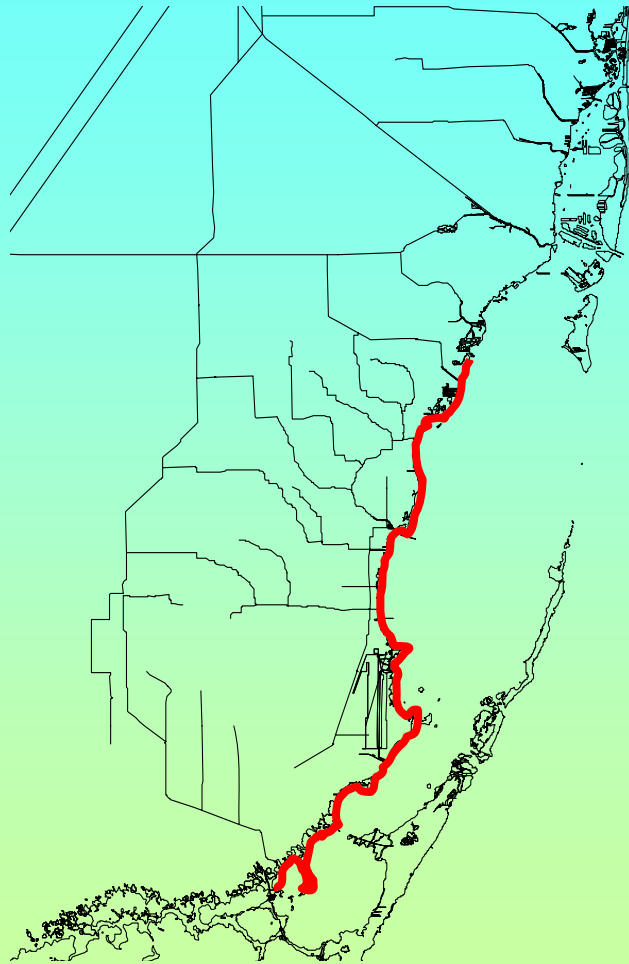
Frequency  
Severity  
Duration  
Areal extent

...of hypersaline conditions.

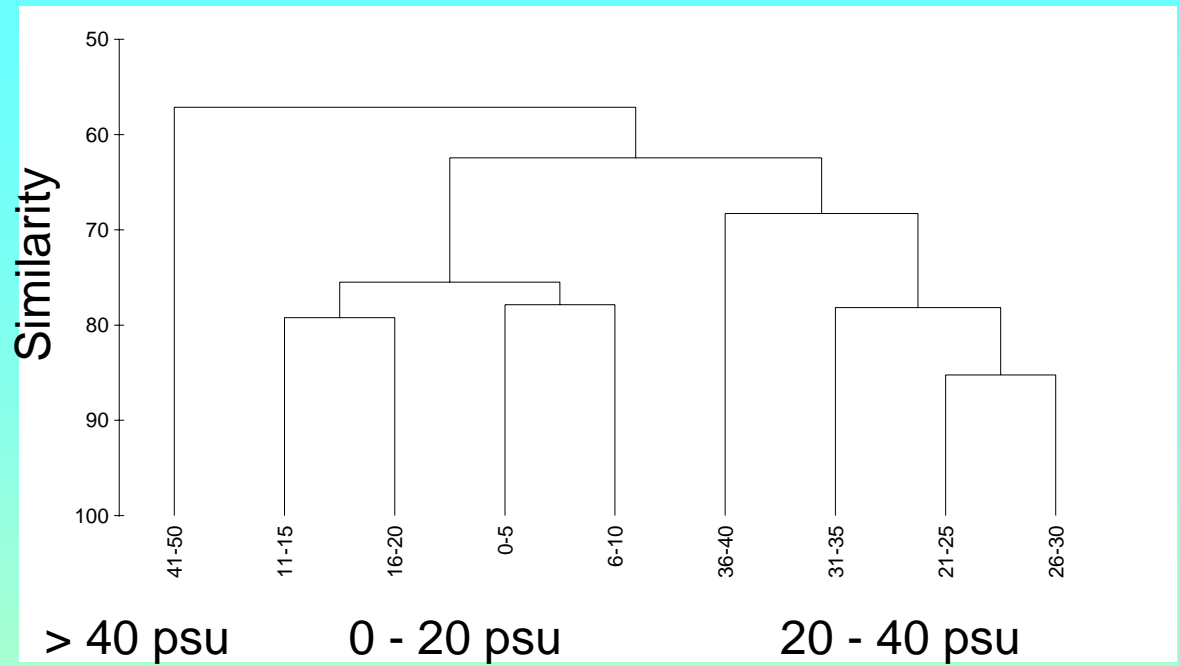


Source: S. Bellmund; Biscayne National Park

# Mangrove Fishes

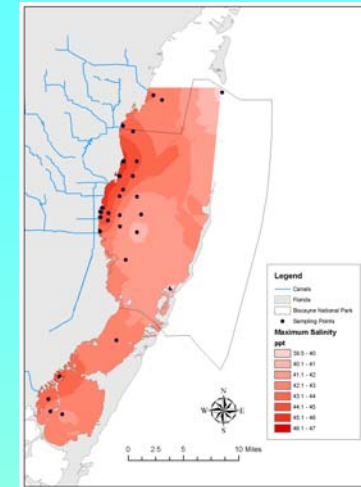


Serafy

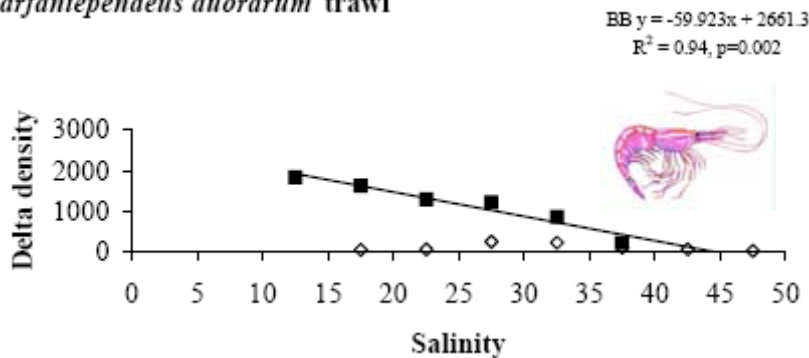


# Hypersalinity (> 36 psu)

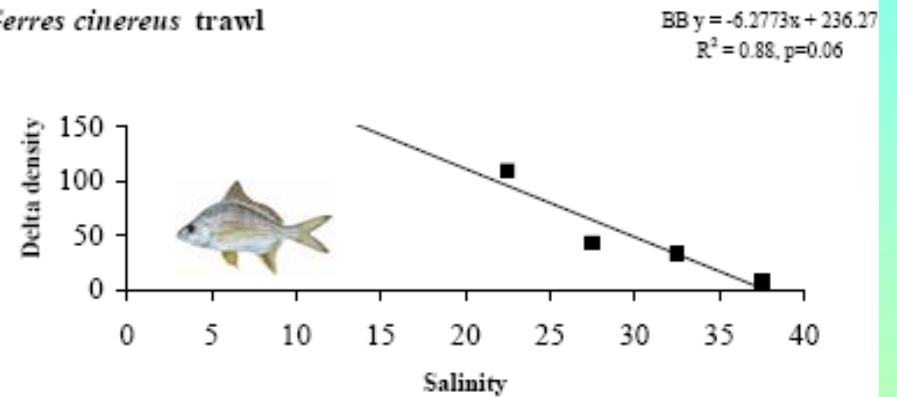
Reduced abundance of several critical forage fishes and invertebrates: pink shrimp, yellowfin mojarra, pinfish, gulf toadfish.



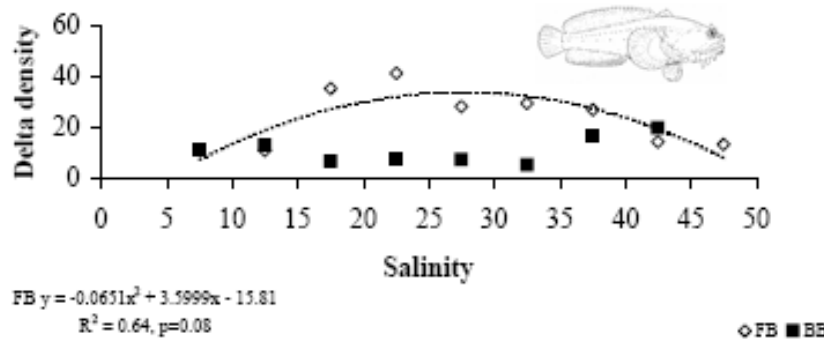
*Farfantepenaeus duorarum* trawl



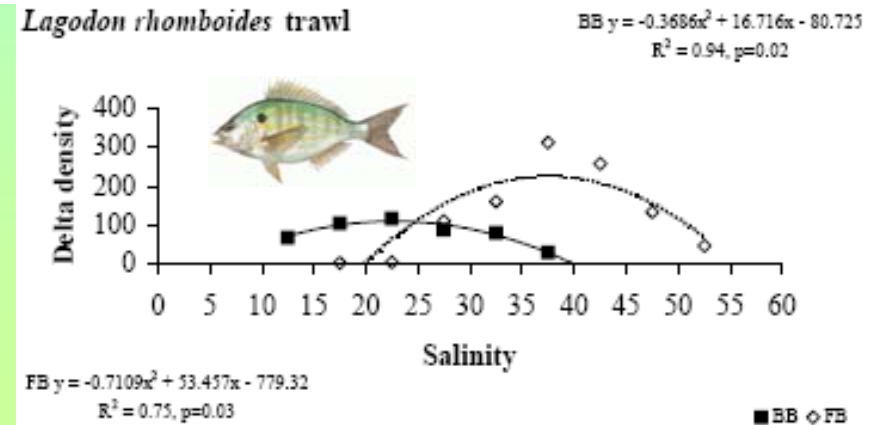
*Gerres cinereus* trawl



*Opsanus beta* trawl

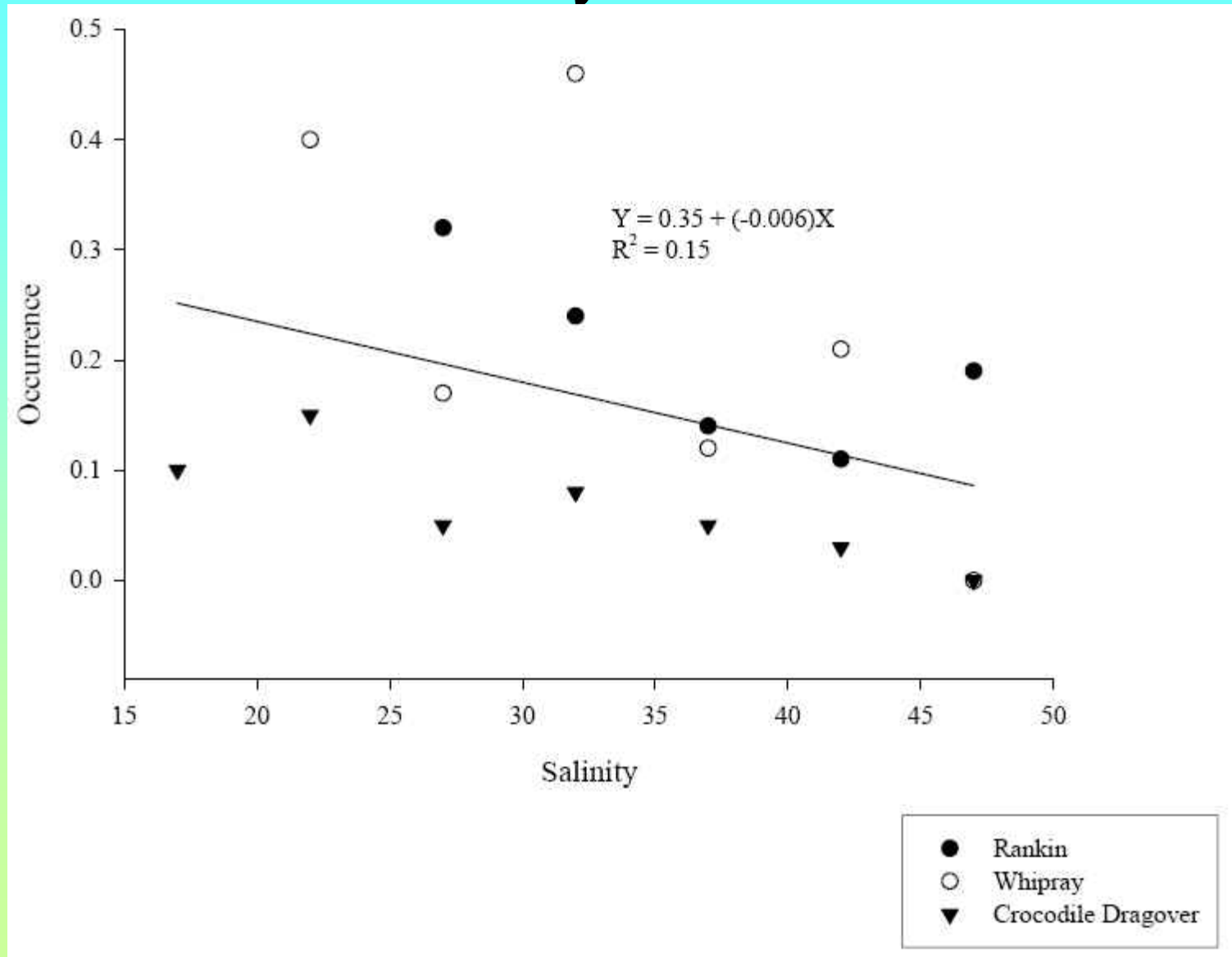


*Lagodon rhomboides* trawl

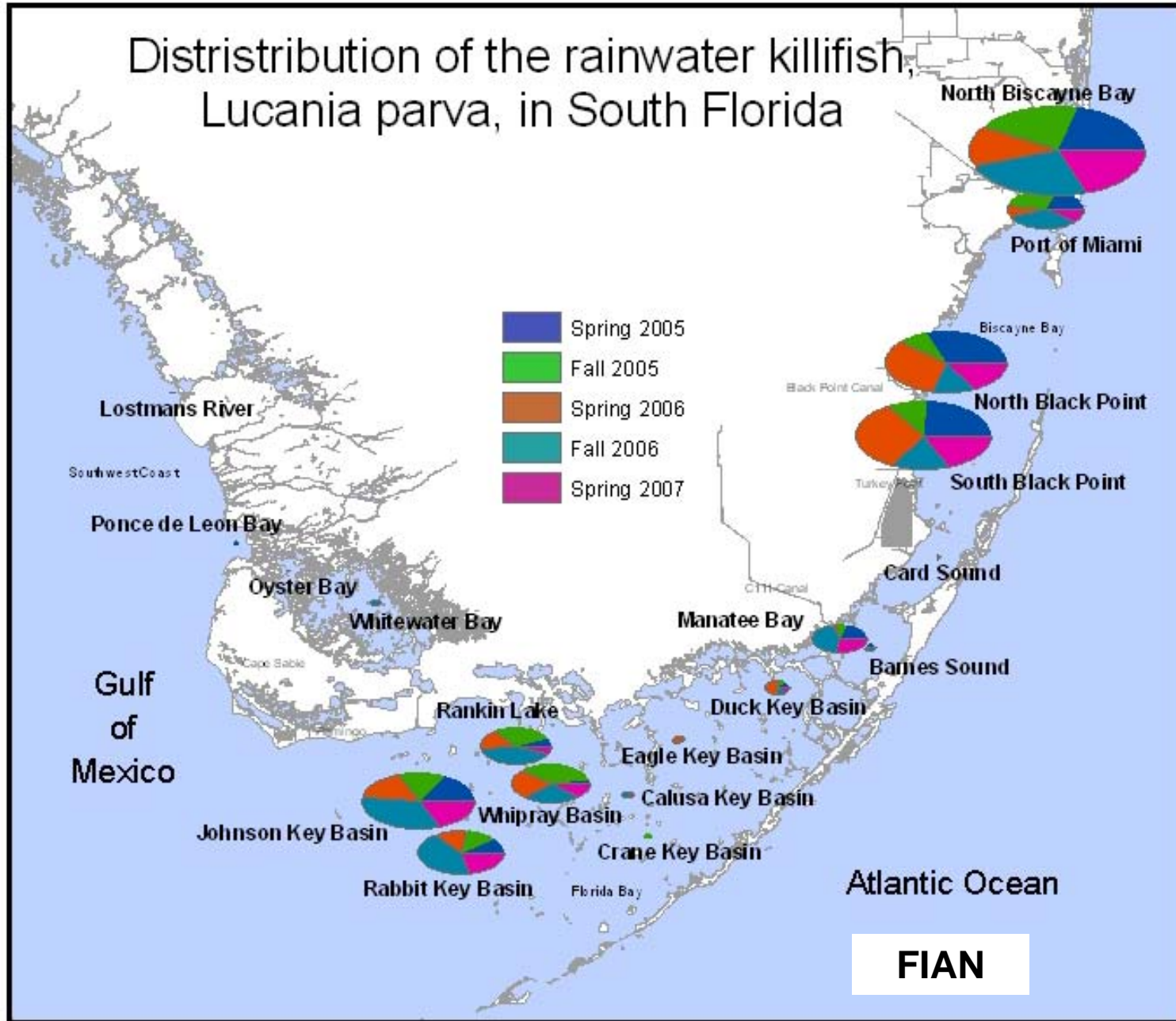


Serafy Visual Survey

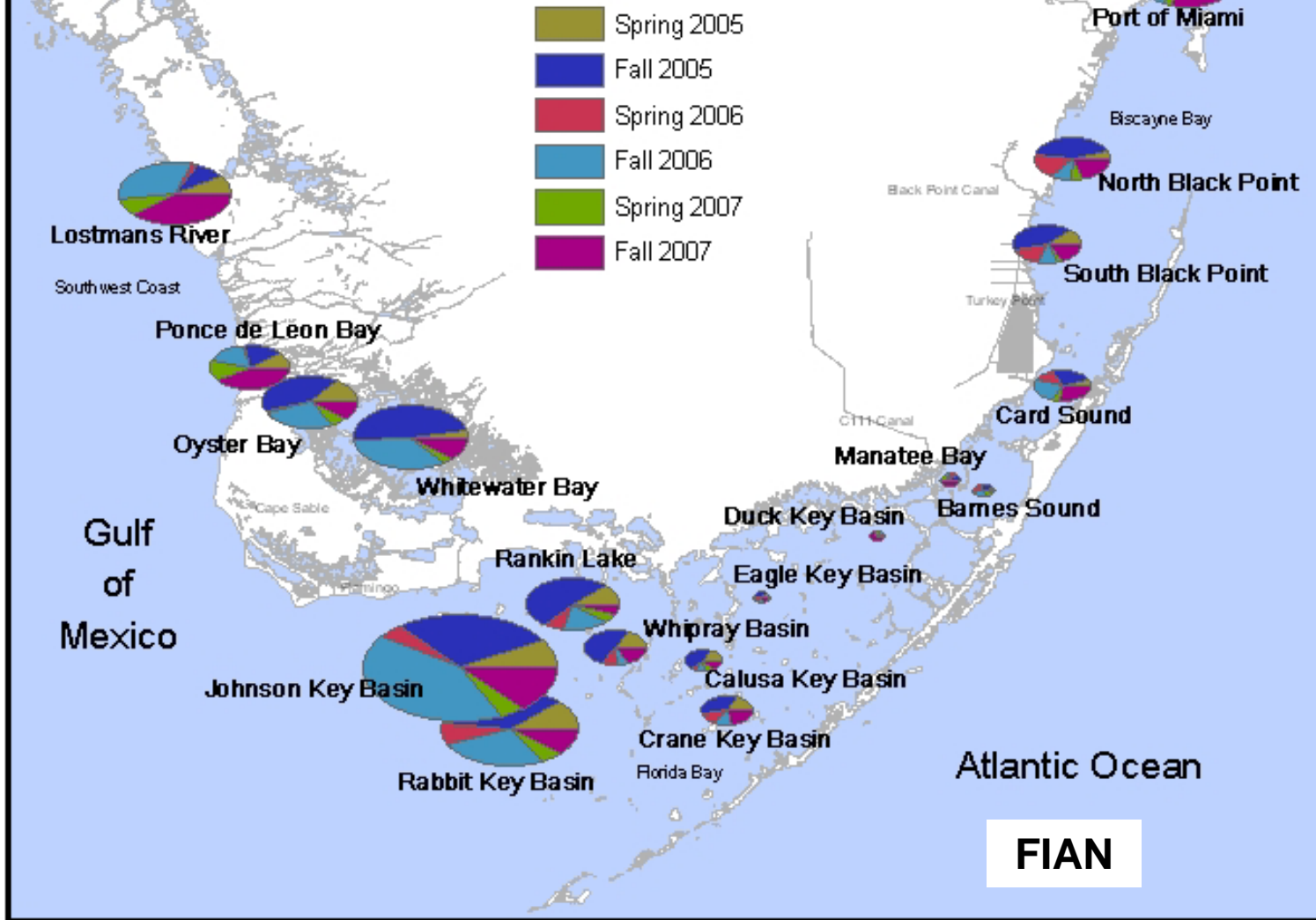
# Juvenile Spotted Seatrout Density as a Function of Salinity, by Area



# Distribution of the rainwater killifish, *Lucania parva*, in South Florida

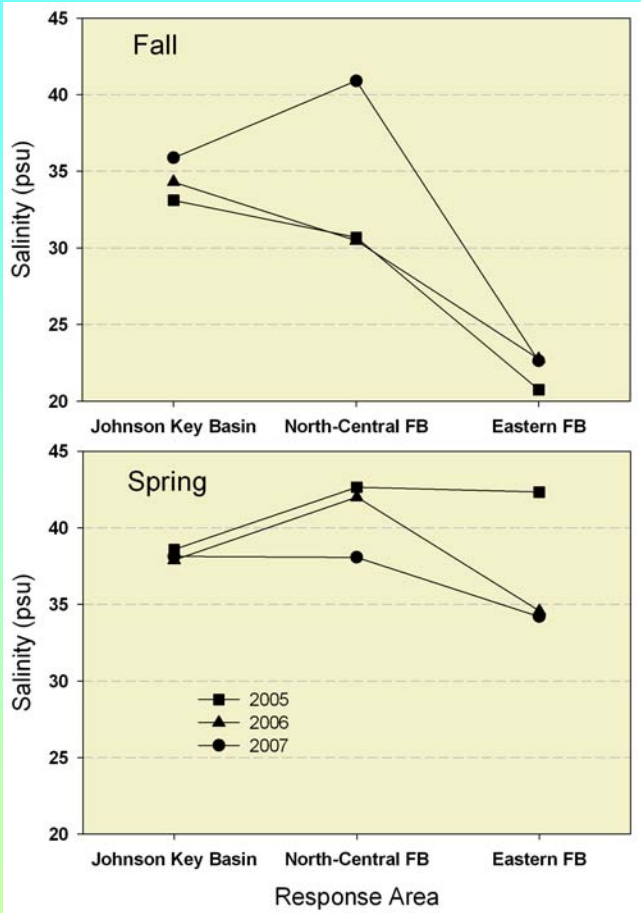


# Distribution of Pink Shrimp, *Farfantepenaeus duorarum*, in South Florida



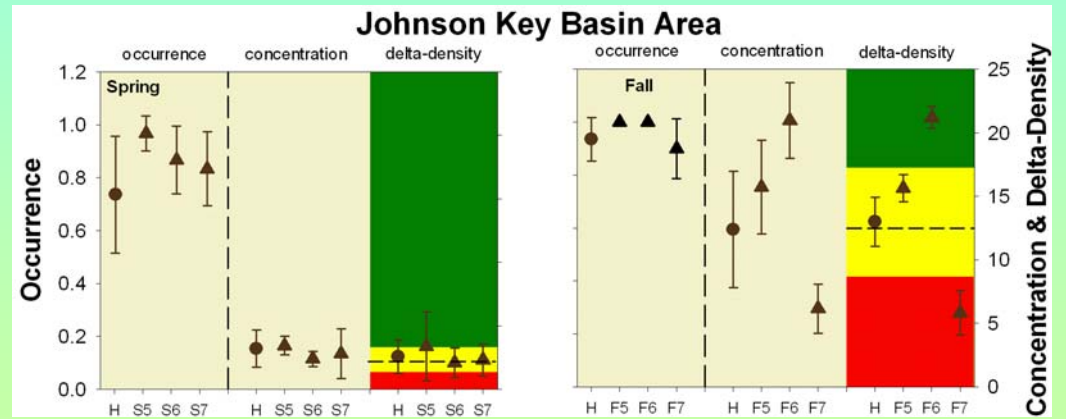


2006 was an exceptionally good year for juvenile pink shrimp and 2005 also was a good year.



In contrast, 2007 was a poor year -- lowest in a historic series dating back to 1984.

Was the negative salinity gradient in 2007 the reason for the low density of juvenile pink shrimp in 2007?



**Salinity gradient from western to eastern Florida Bay, as viewed by pink shrimp**

**Pink shrimp occurrence, concentration, and density: historic and MAP years 2005, 2006, and 2007.**

**Other projects, not yet included in assessments, add new information.**

- **Biscayne Bay Coastal Wetland Fishes**
- **Biscayne Bay Nearshore Epifaunal Communities**
- **Oysters**

# Lessons Learned

- **No shortchanging the process—time means power.**
- **Existing historical data may not be adequate for establishing meaningful success criteria.**
- **MAP, if continued, will provide the best baseline.**

