SEEING THE FOREST THROUGH THE DEAD SEAGRASS

Christopher Kelble, Joan Browder, Lindsey Visser, Charline Quenee
• Why sportfish are important? And how are they used for Everglades Restoration?

• What do they tell us about the “health” of Florida Bay

• How did they respond to the seagrass die-offs

• Chris’ hypotheses
• Generates ~US $880 Million per annum and >6,000 jobs (Fedler et al. 2009)

• Spotted Seatrout (*C. nebulosus*) 2\textsuperscript{nd} most commonly caught fish in Florida Bay

• *C. nebulosus* spend entire life history in natal Bay
1. Physiology
2. Recruitment
3. Prey
4. Predators (and the ability to hide from them)
Methodology

- May-Oct
- Monthly
- Otter trawls
- Seagrass, T, S
- Stratified Random Sampling
- Optimized with power analysis

Performance Measure

Spotted Seatrout
HSI-water quality
August 2009

Spotted Seatrout
HSI-water quality
NSM August 1975
Salinity Effect

West

- Frequency
- Concentration

Rankin

- Frequency
- Concentration

Whipray

- Frequency
- Concentration

Crocodile Dragover

- Frequency
- Concentration

Salinity vs. Frequency of Occurrence

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Mathematical Model

- Frequency: $y = -0.020x + 1.00$, $R^2 = 0.63$
- Frequency: $y = -0.0392x + 1.95$, $R^2 = 0.55$
- Frequency: $y = -0.1413x + 8.31$, $R^2 = 0.54$
- Frequency: $y = -0.056x + 2.93$, $R^2 = 0.58$
- Frequency: $y = -0.105x + 6.13$, $R^2 = 0.60$
- Frequency: $y = -0.003x + 0.14$, $R^2 = 0.84$
- Frequency: $y = -0.012x + 0.56$, $R^2 = 0.81$

Density ($\# 1000m^{-2}$) & Concentration
Temperature Effect

**West**

- Frequency
- Concentration
- Density

- $y = 0.0201x - 0.3435$
- $R^2 = 0.67756$

**Rankin**

- $y = 0.0626x - 1.06$
- $R^2 = 0.61748$

**Whipray**

- Frequency
- Concentration
- Density

**Crocodile Dragover**

- Frequency
- Concentration
- Density

Density (1000 m$^{-2}$) & Concentration

Temperature

Frequency of Occurrence
Including the Die-off
Why?
Summary

• Less seagrass habitat in Rankin and West
  – May be offset by increased turbidity

• Lower physiological stress in 2016 compared to 2014 & 2015

• Hypothesis: Increased prey in 2016
  – increased phytoplankton
Next Steps

- Apply juvenile seatrout HSI models for 2014-2016 for water quality and seagrass
  - Interactive effects & validation of models
- Compare gut contents in 2016 versus 2014-2015
- Examine potential relationship to turbidity
- Predator abundance (Creel Survey)
• Statistical & Modeling Assistance
  – Kelly Kearney, Lindsey Visser, Patrick Pitts, Betty Huss, Allyn Powell, Don Deis, Frank Marshall

• Field Assistance
  – Lindsey Visser, Joseph Contillo, Timothy Cook, Michelle Harangoby, Geoffrey Cook, Mike Lacroix, Patrick Cope

• Lab Assistance
  – Betty Huss, Laura Petteway, Robin Cascioli, Lloyd Moore, Timothy Cook, Tom Jackson
Lower salinities and higher seagrass percent cover correspond to higher seatrout Frequency of Occurrence.