Surveying Estuary Responses to Freshwater InflowS (SERFIS): An Ecosystem Monitoring Tool For Rapid Assessment Of Estuarine Habitat Response To Freshwater Inflow Management

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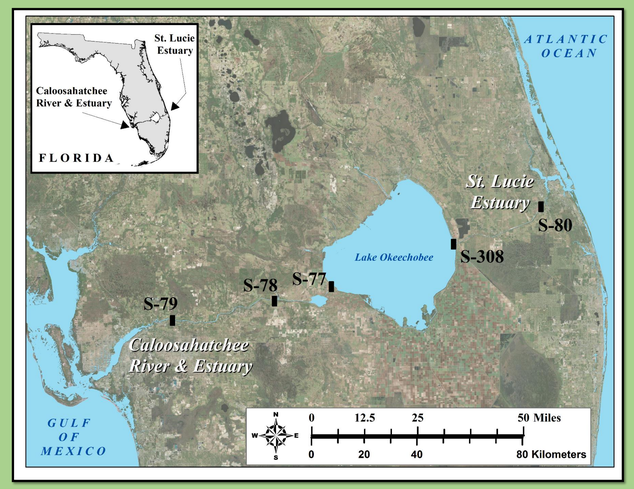
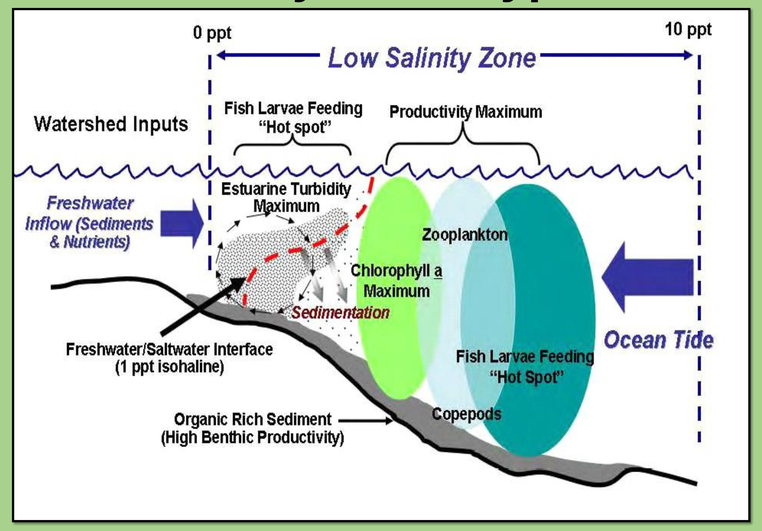
Introduction

As part of the Greater Everglades Ecosystem Restoration effort by the South Florida Water Management District (SFWMD), freshwater releases to the St. Lucie Estuary (SLE) and Caloosahatchee River Estuary (CRE) is a key element. It is important to understand how freshwater inflow affects estuarine health and critical nursery function.

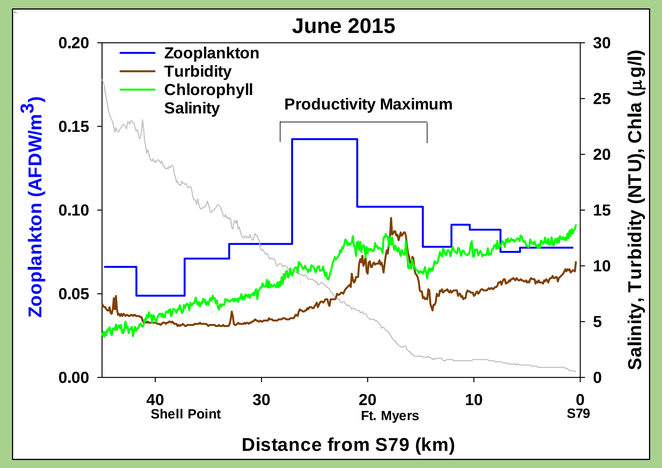


Low Salinity Zone Hypothesis



Freshwater inflows bring nutrients to the estuary creating areas of high primary and secondary productivity, resulting in fish larvae feeding zone "hot spots". The magnitude of freshwater inflow can impact if and how the high productivity areas are established.

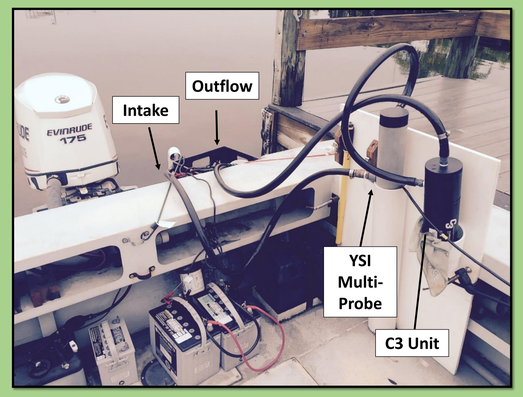
Spatial Analysis (i.e. CRE)



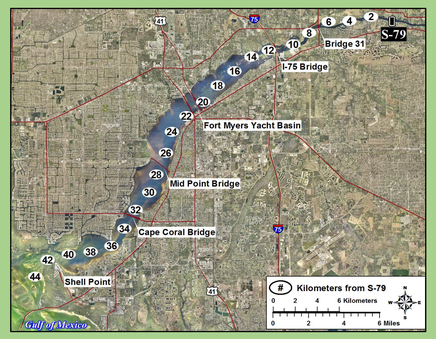
- **Spatial gradients of salinity, turbidity, chlorophyll, and zooplankton in the CRE from 6/11/2015**
- **Provides integrative snapshot of conditions**
- **Distributions similar to hypothesis**
- **Maximum concentrations centered ~20 km downstream**
- **Can compare location of concentration maxima for many different cruises**

Methods

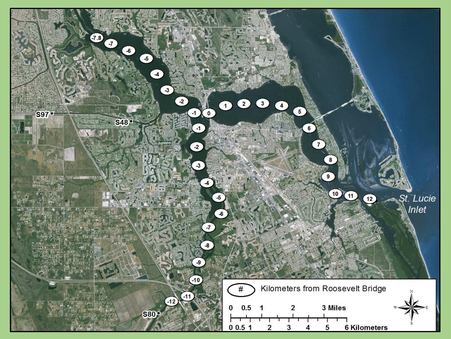
- **Continuous surface water sampling while underway in order to sample entire estuary in a day**
- **Temperature (˚C), salinity, turbidity (NTU), chlorophyll (µg L^{-1}), pH, dissolved oxygen (mg L^{-1}), color, and zooplankton biomass (mg m^{-3})**
- **Analyze spatial and/or temporal patterns**
- **Data by kilometers from S-79 (CRE) and Roosevelt Bridge (SLE)**



CRE



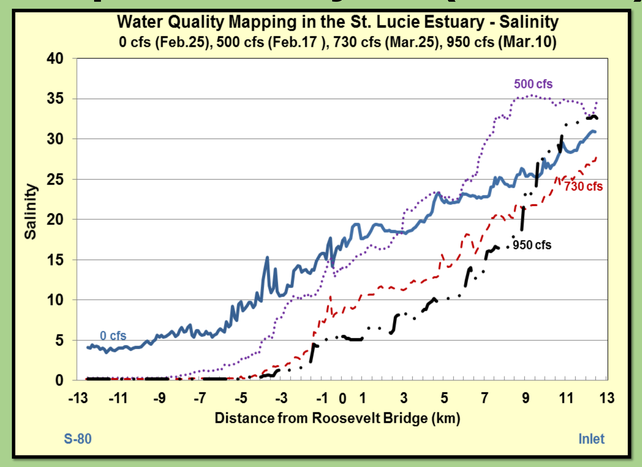
SLE



Water Management Relevance

Results from this study will provide baseline data for the CRE and SLE under different freshwater inflow and climatic conditions to help guide Lake release recommendations and understand the success of SFWMD projects.

Temporal Analysis (i.e. SLE)



- **Spatial salinity gradients in the SLE for multiple cruises**
- **Salinity patterns respond to variations in freshwater inflow and can change rapidly in the SLE**
- **Implications for the recommended freshwater releases to support water quality and important estuarine biota (e.g. oyster and seagrass beds)**