Canal Restoration in Monroe County
Benthic Monitoring Report

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WATER QUALITY PROTECTION PROGRAM CANAL RESTORATION ADVISORY SUBCOMMITTEE
January 16th, 2015

Made possible by

Townships
Homeowner Organizations
Individuals

FIU
FLORIDA INTERNATIONAL UNIVERSITY
Miami's public research university

Seagrass Ecosystems Research Lab
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About Us

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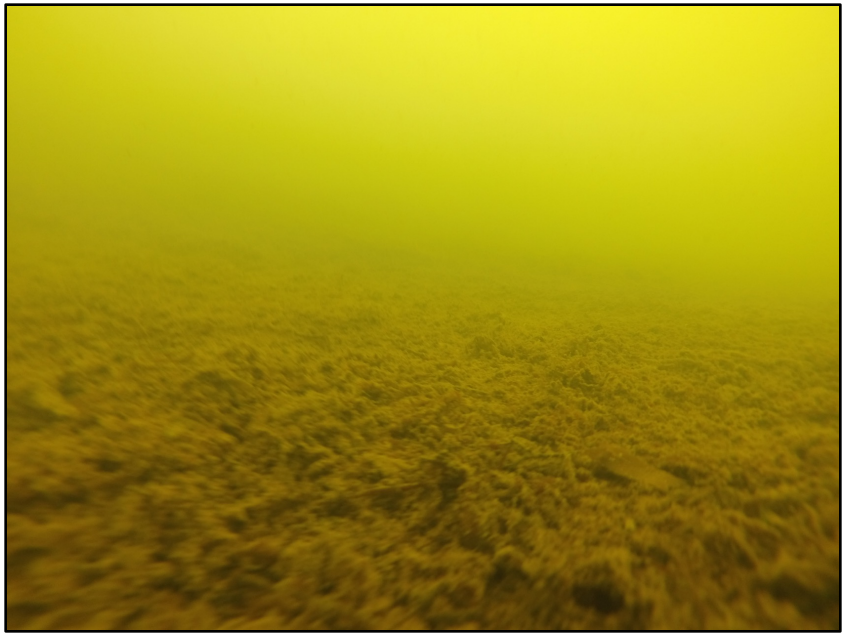
Seagrass Predominance in FL Keys

Influences
Fish and Animal Diversity
Water Clarity
Oxygen Concentration

Controlled by
Light
Nutrients
Water Chemistry

The Reality of the Canals

50 meters outside canal



25 meters inside canal

Presentation Roadmap

What we monitor

Seagrass and algae
Fish and swimming animals
Organisms on seawall
Sediment characteristics

Where and when we sample

Experimental Design
Sampling Schedule

Baseline Data

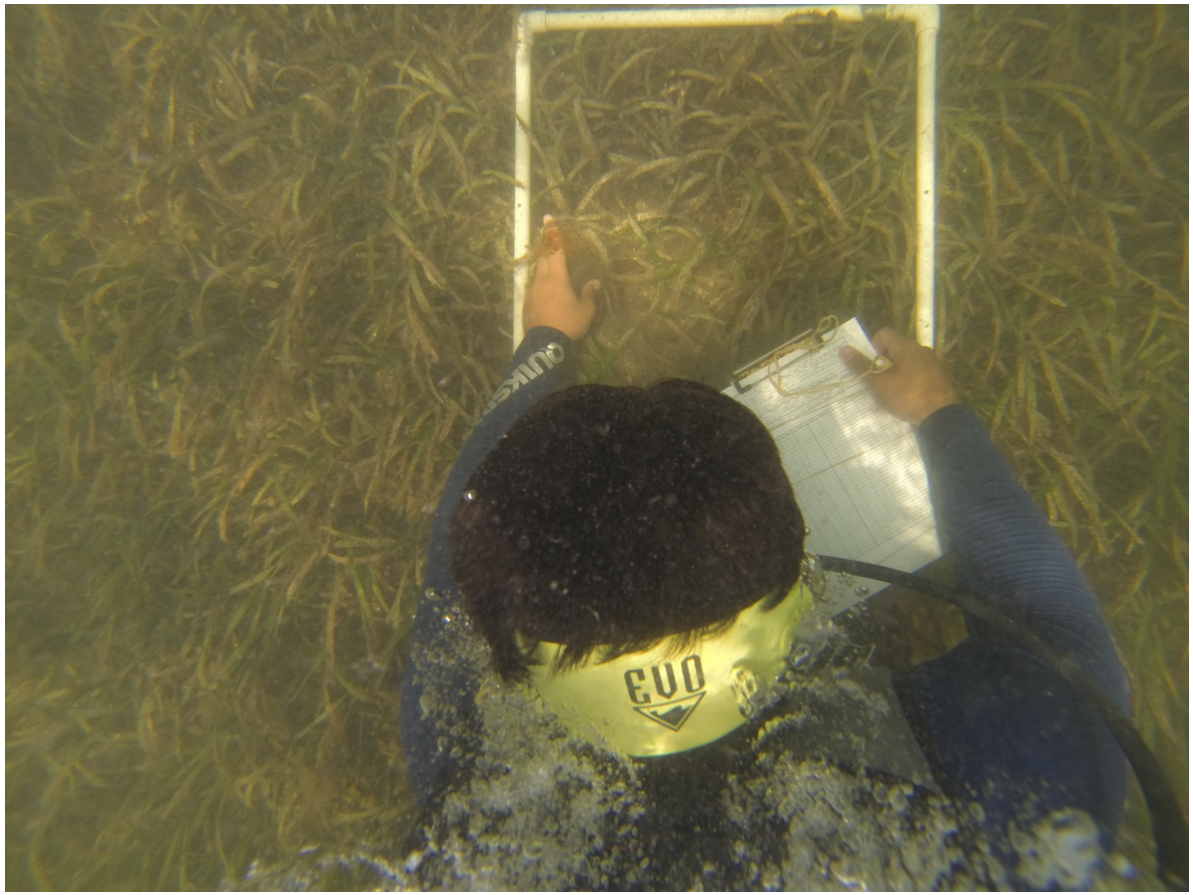
Seagrass/algae
Animals
Sea wall
Sediment

Benthic cover

Quantifying species of seagrass, algae, sponges, corals using Braun-Blanquet scoring

- Standard
- Rapid
- Non-destructive

<u>Scoring</u>
Single Indiv. = 0.1
<5 indiv. = 0.5
>5 indiv. and < 5% = 1
5 - 25% = 2
25 - 50% = 3
50 – 75%= 4
75 – 100% = 5



Animal Surveys

Animal surveys using the Roving Diver Technique
-diver swims freely around a central point

- Standard
- Rapid
- Non-destructive

All animal encounters are recorded

Seawall

Quantifying organisms on canal seawall using a modified Braun-Blanquet technique

- Standard
- Rapid
- Non-destructive

<u>Scoring</u>
Single Indiv. = 0.1
<5 indiv. = 0.5
>5 indiv. and < 5% = 1
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25 - 50% = 3
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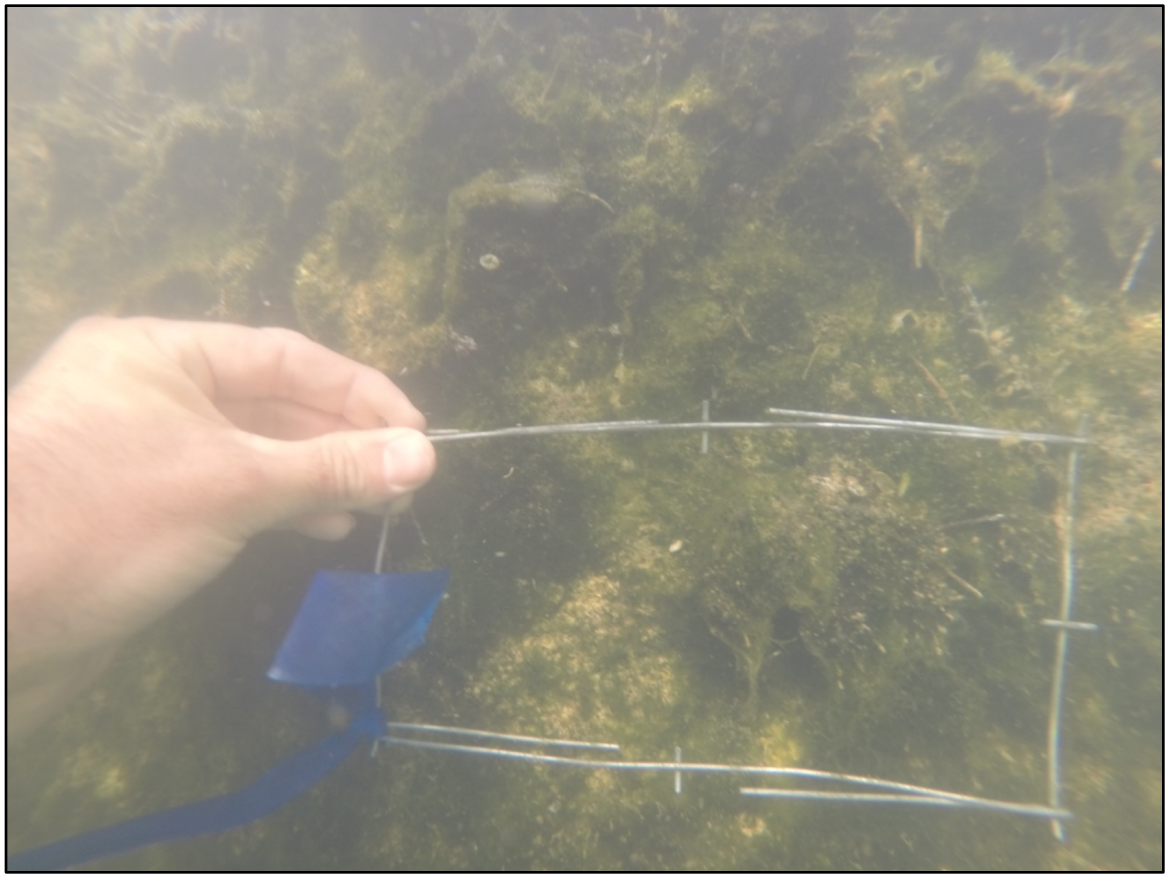


Sediment Characteristics

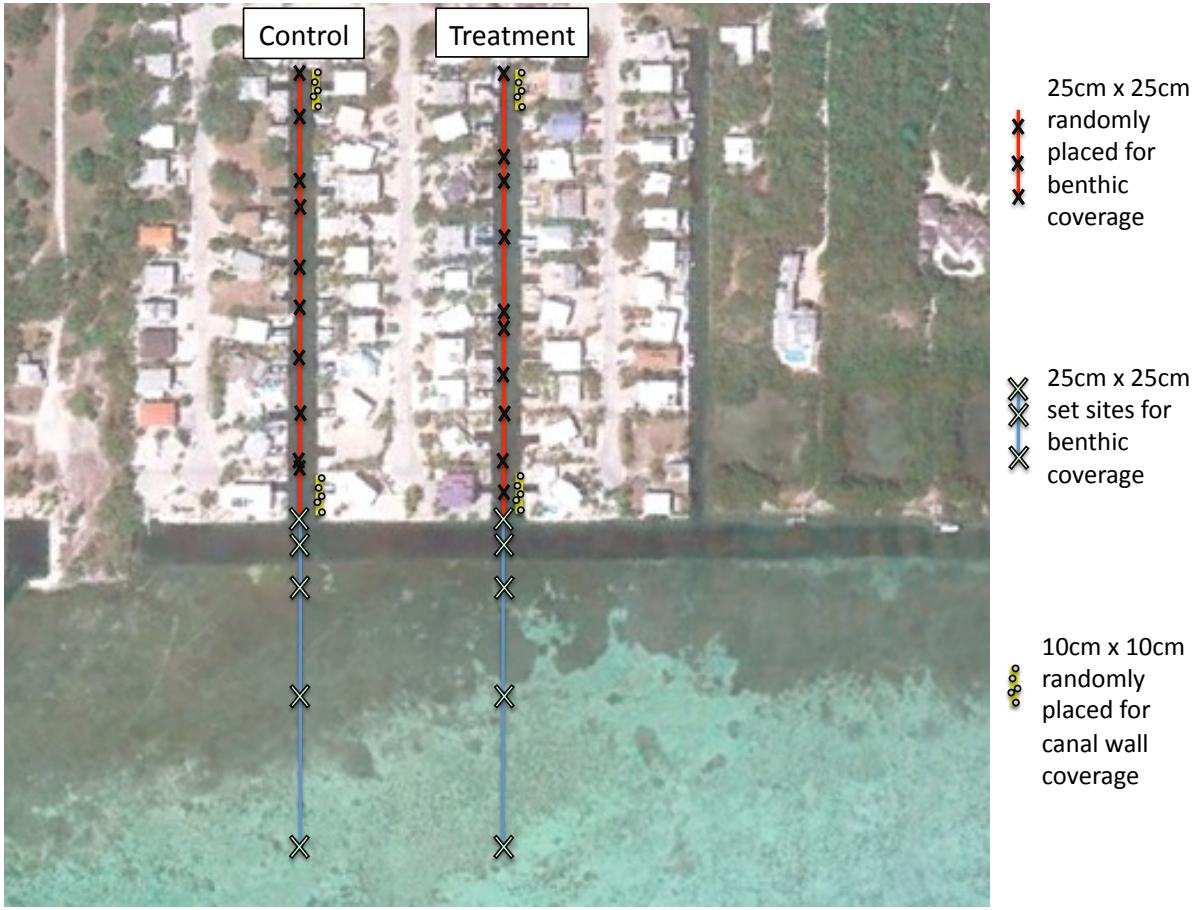
Tracking sediment depth and nutrient content in canals

Sediment Depth
Sediment Density
% Organic Carbon
% Nitrogen
% Phosphorus

Isotopic Ratios of
Carbon and Nitrogen

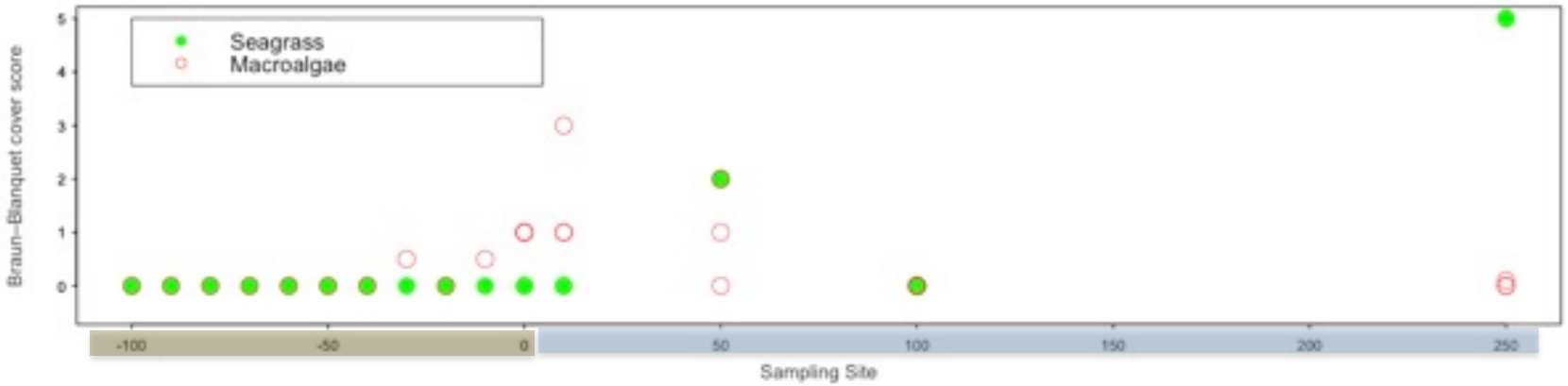
Canal Sampling

Nine experimental Pairs Five Technologies
Sampled 3 times/year

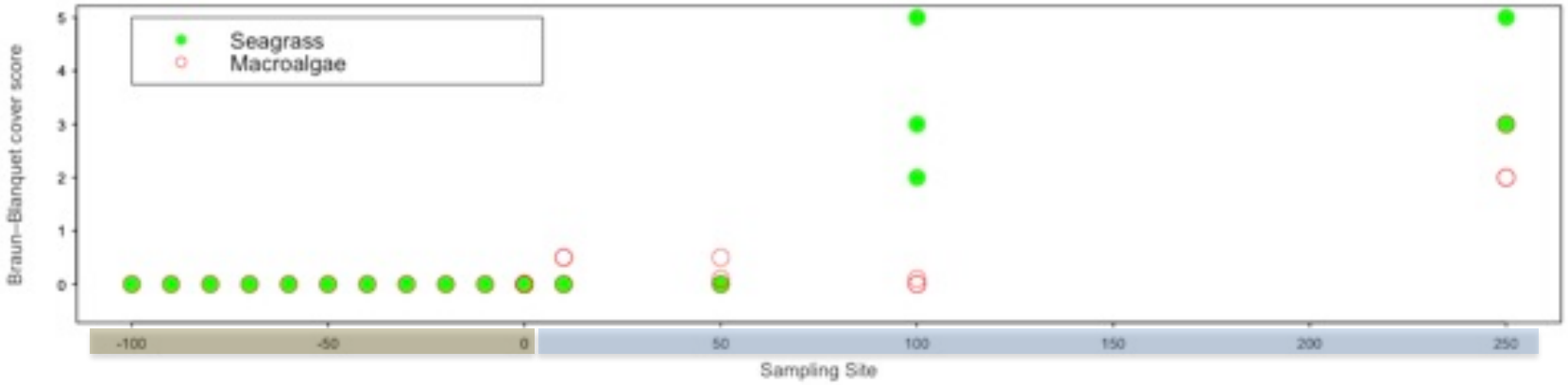


Results

Seagrass Coverage

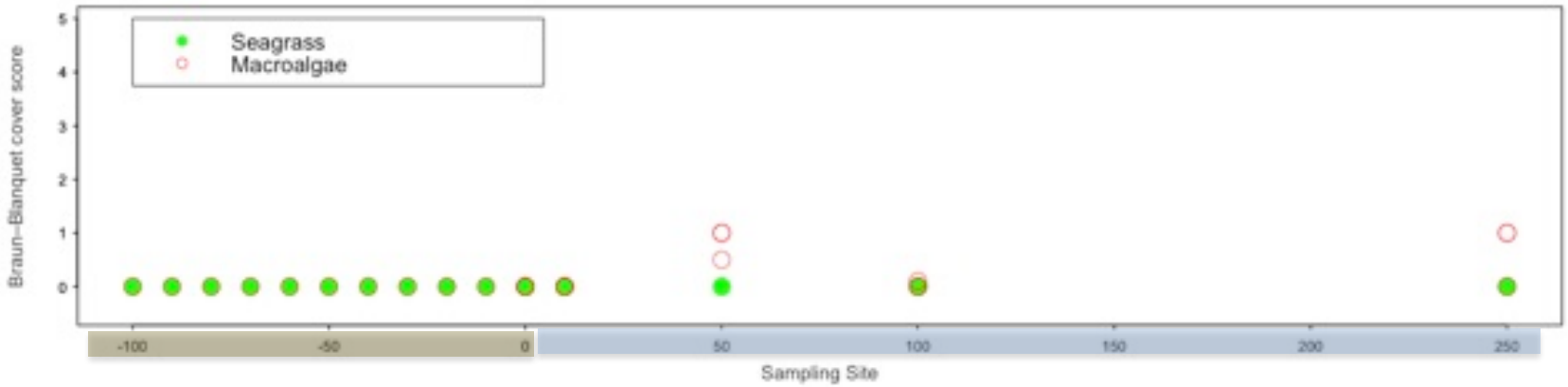


Canal 137 – Treasure Harbor
Plantation Key

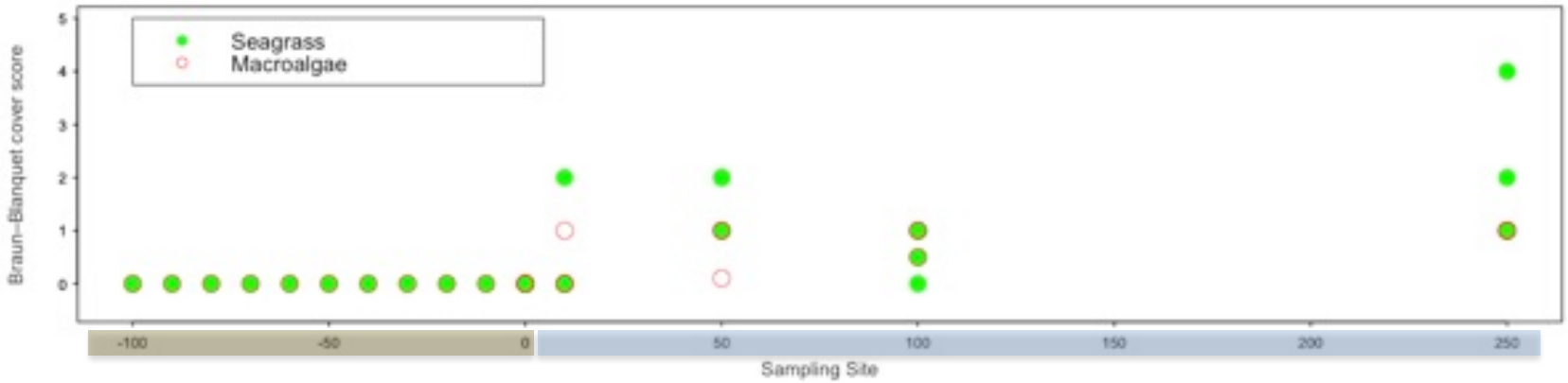


Canal 290 - Hollerich Subdivision
Big Pine

Seagrass Coverage

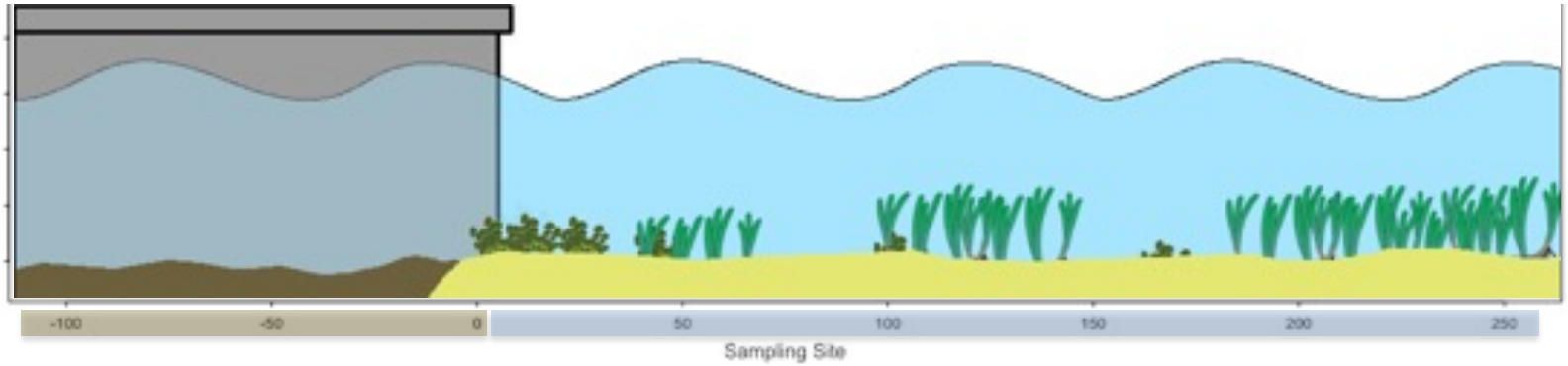


Canal 293– Between Avenue I and Avenue J
Big Pine

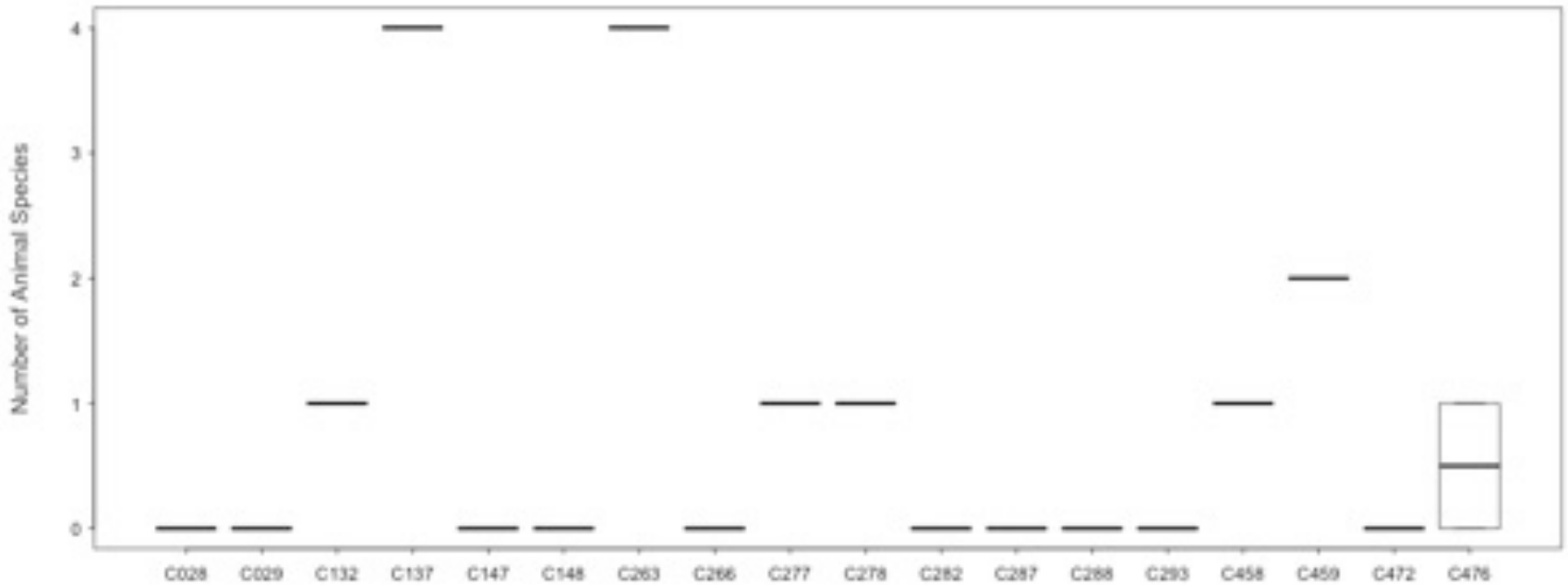


Canal 472- Geiger Mobile Homes Subdivision
Big Pine

Seagrass Coverage



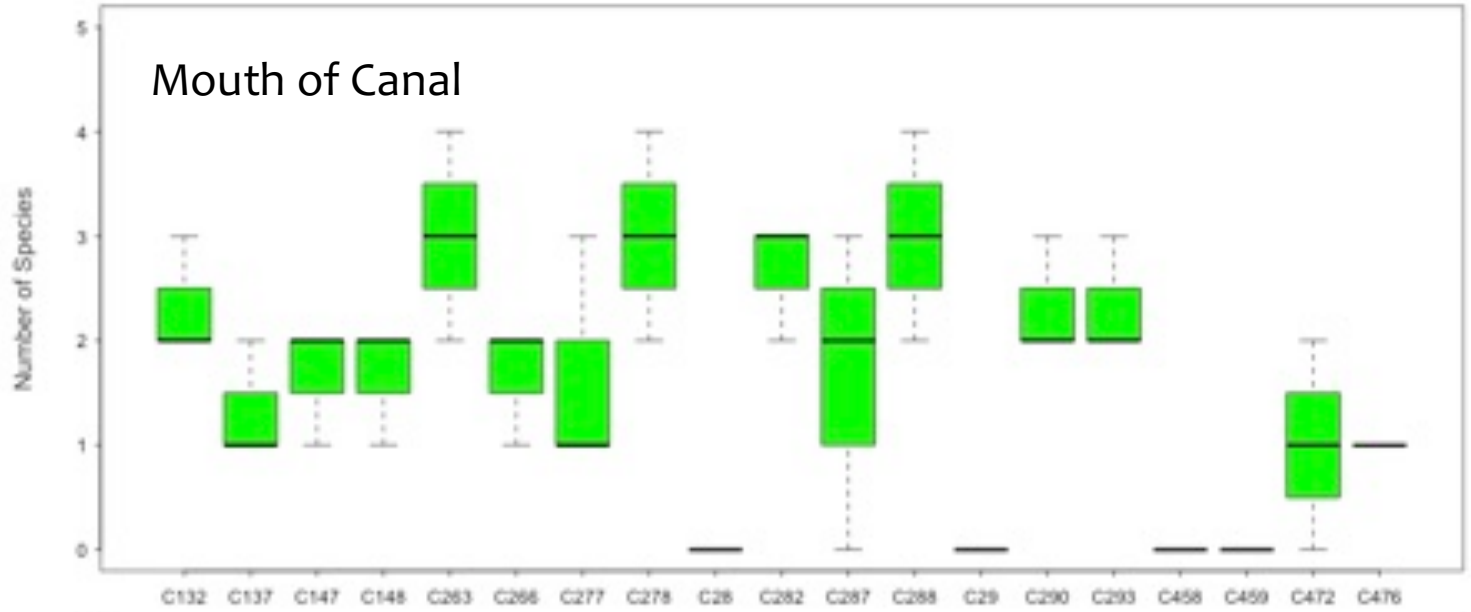
Fish and other Animals

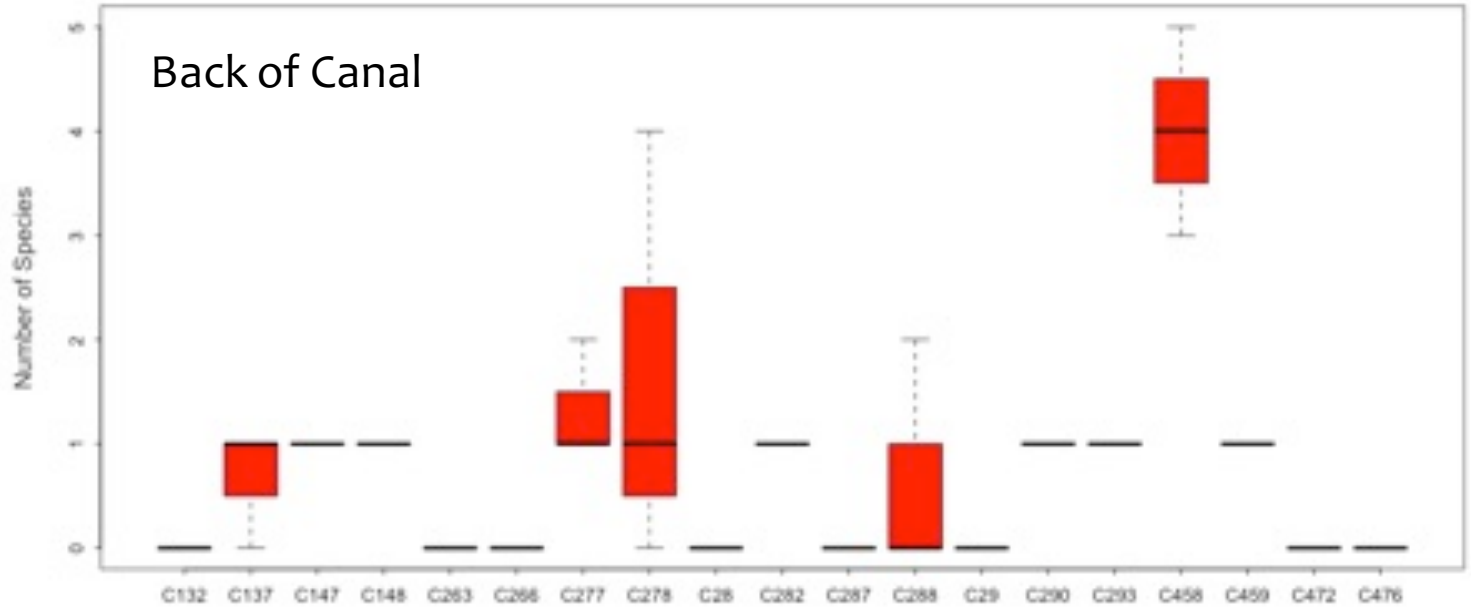


Species

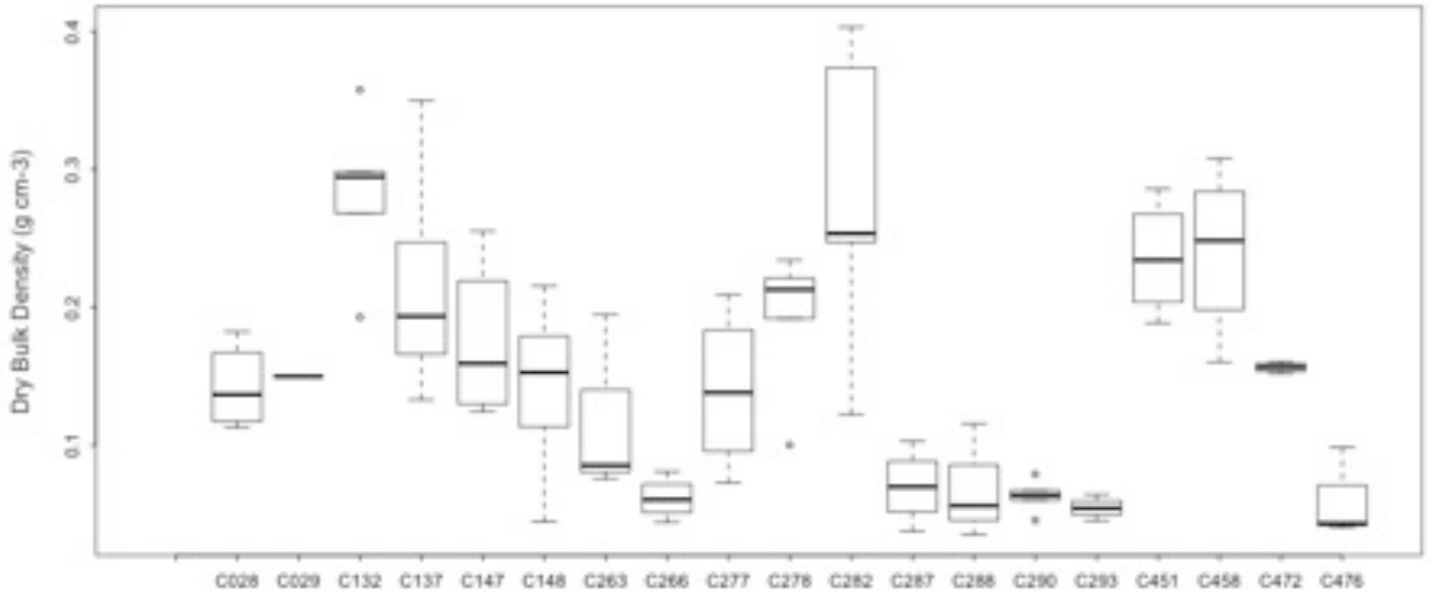
Mangrove Snapper
Sardines
Sgt Major
French Grunt
Barracuda
Manatee

Seawall

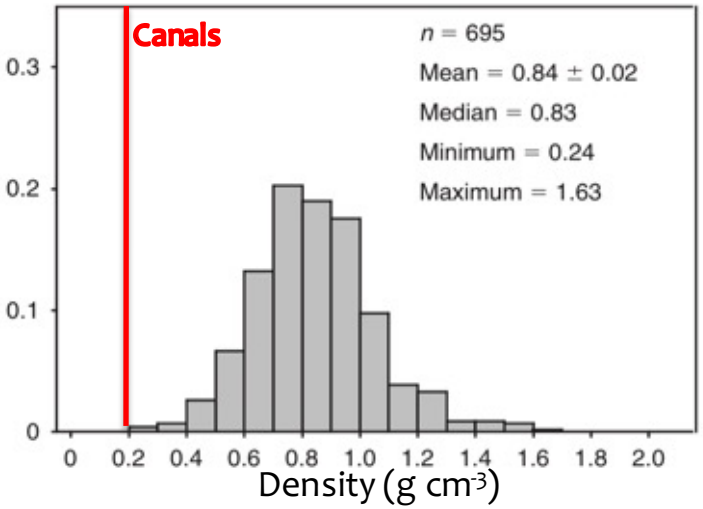

Mouth of Canal
Number of Species
0
1
2
3
4
5
C132
C137
C147
C148
C263
C266
C277
C278
C28
C282
C287
C288
C29
C290
C293
C458
C459
C472
C476


Back of Canal
Number of Species
0
1
2
3
4
5
C132
C137
C147
C148
C263
C266
C277
C278
C28
C282
C287
C288
C29
C290
C293
C458
C459
C472
C476

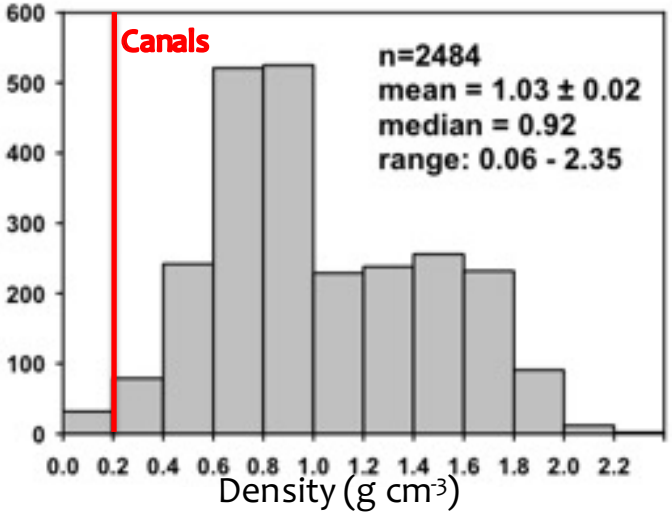
Sediment Density



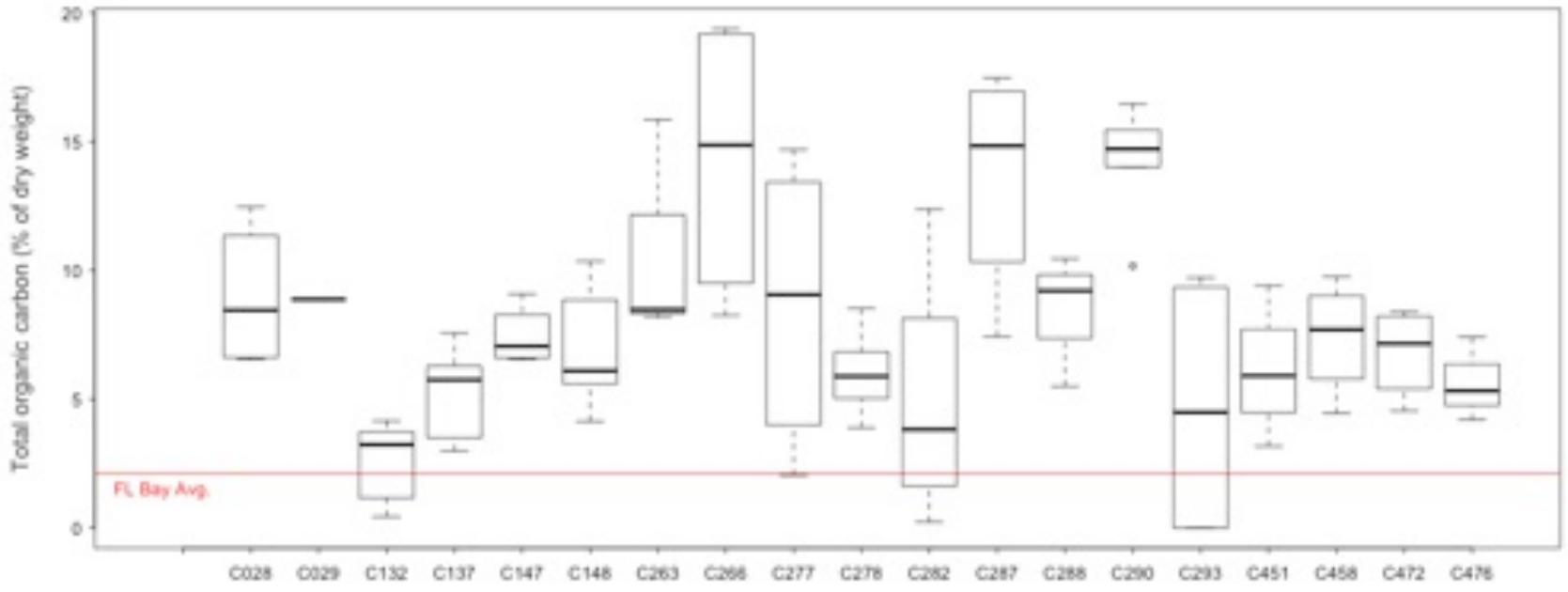
Florida Bay Seagrass Sediment



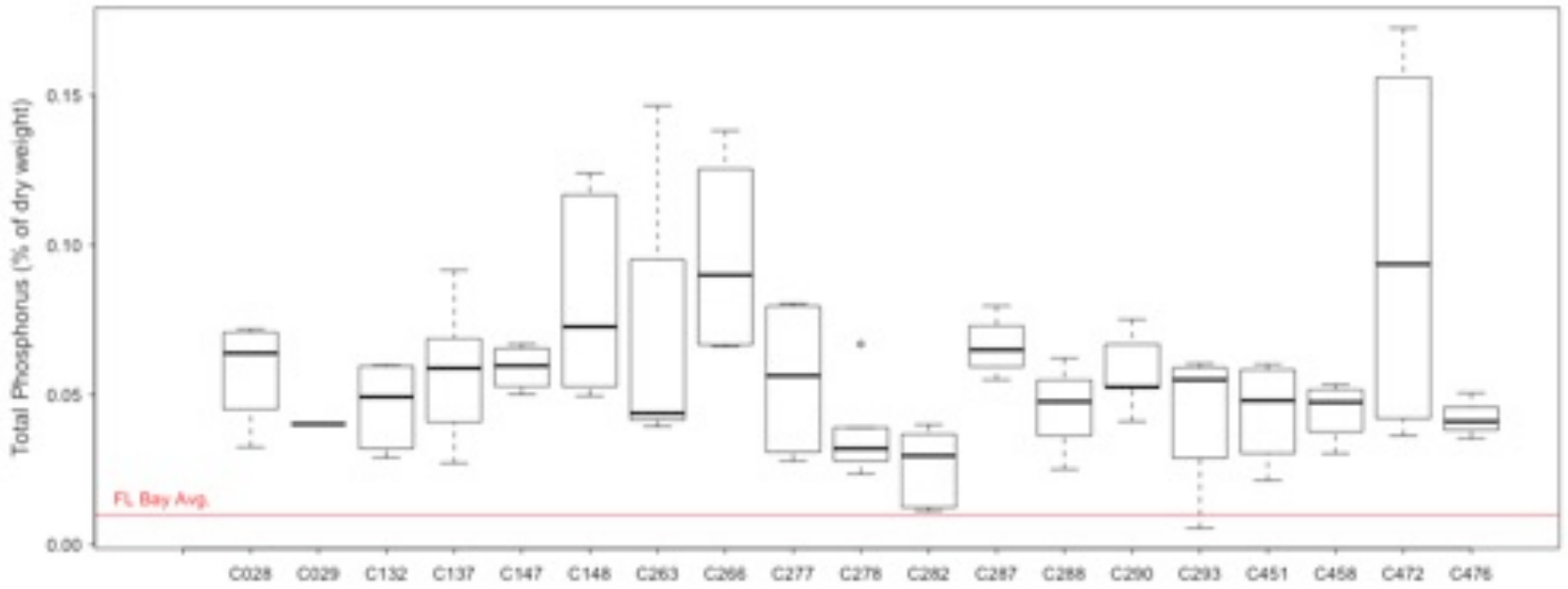
Global Seagrass Sediment



Sediment Organic Carbon



Sediment Phosphorus



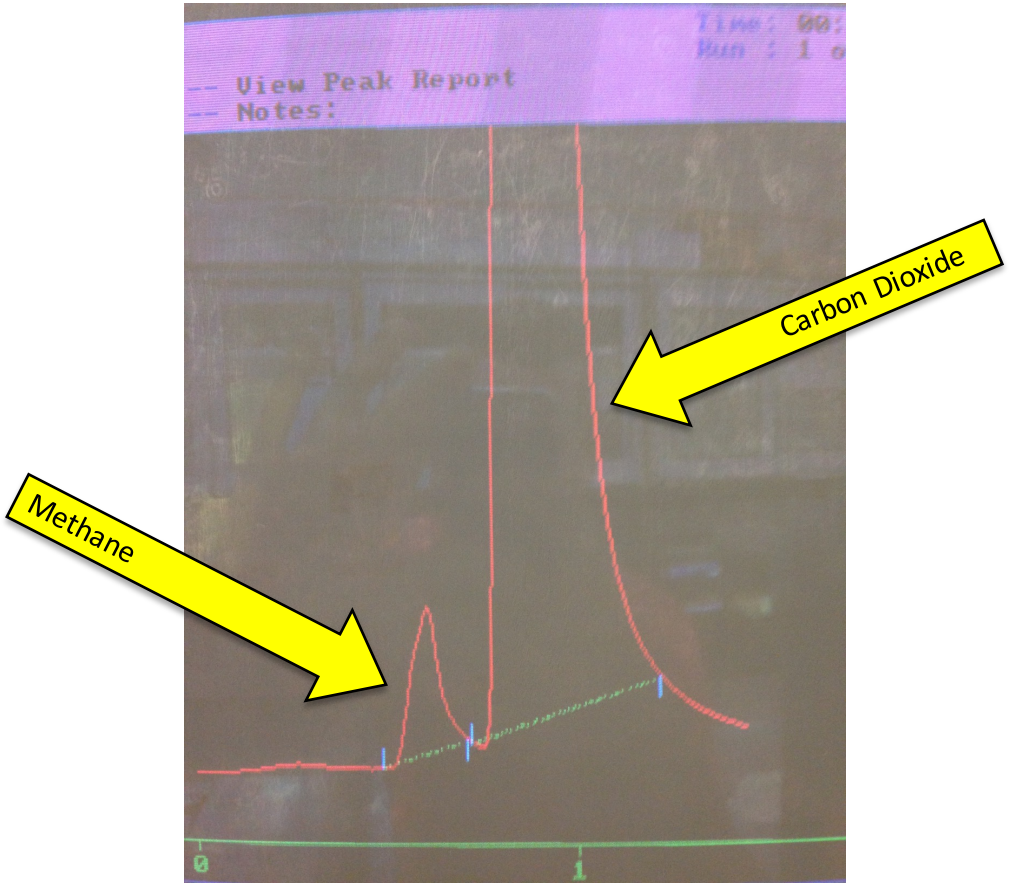
Summary

Canal sediment is: light
rich in organic material
rich in phosphorus
deep

Resulting in:
Lower animal diversity
Absence of benthic seagrasses and algae
Low density on seawalls

SALTY TOO

Unique chemistry for scientists



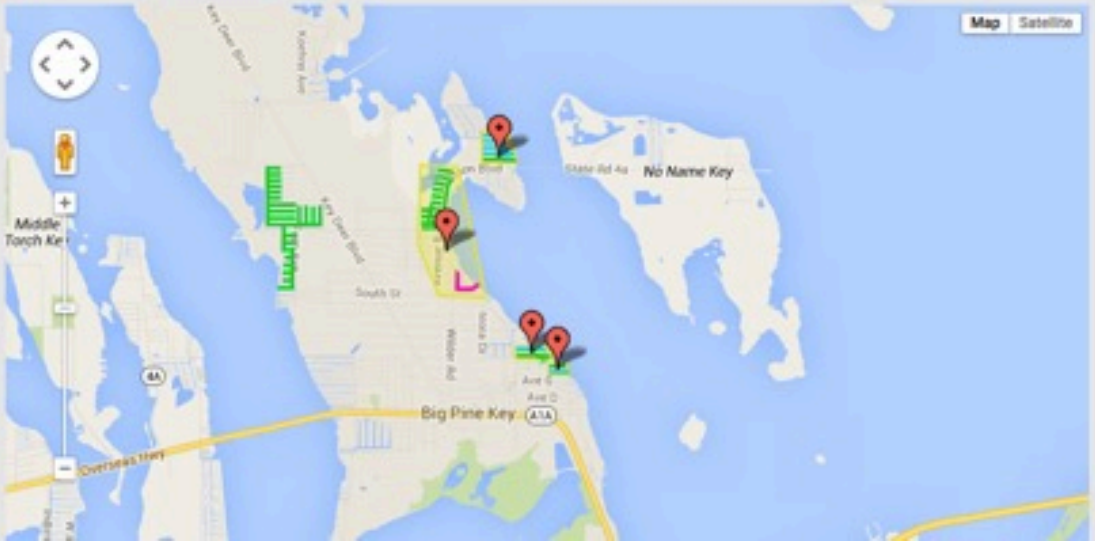
Canal Data on the Internet

seagrass.fiu.edu

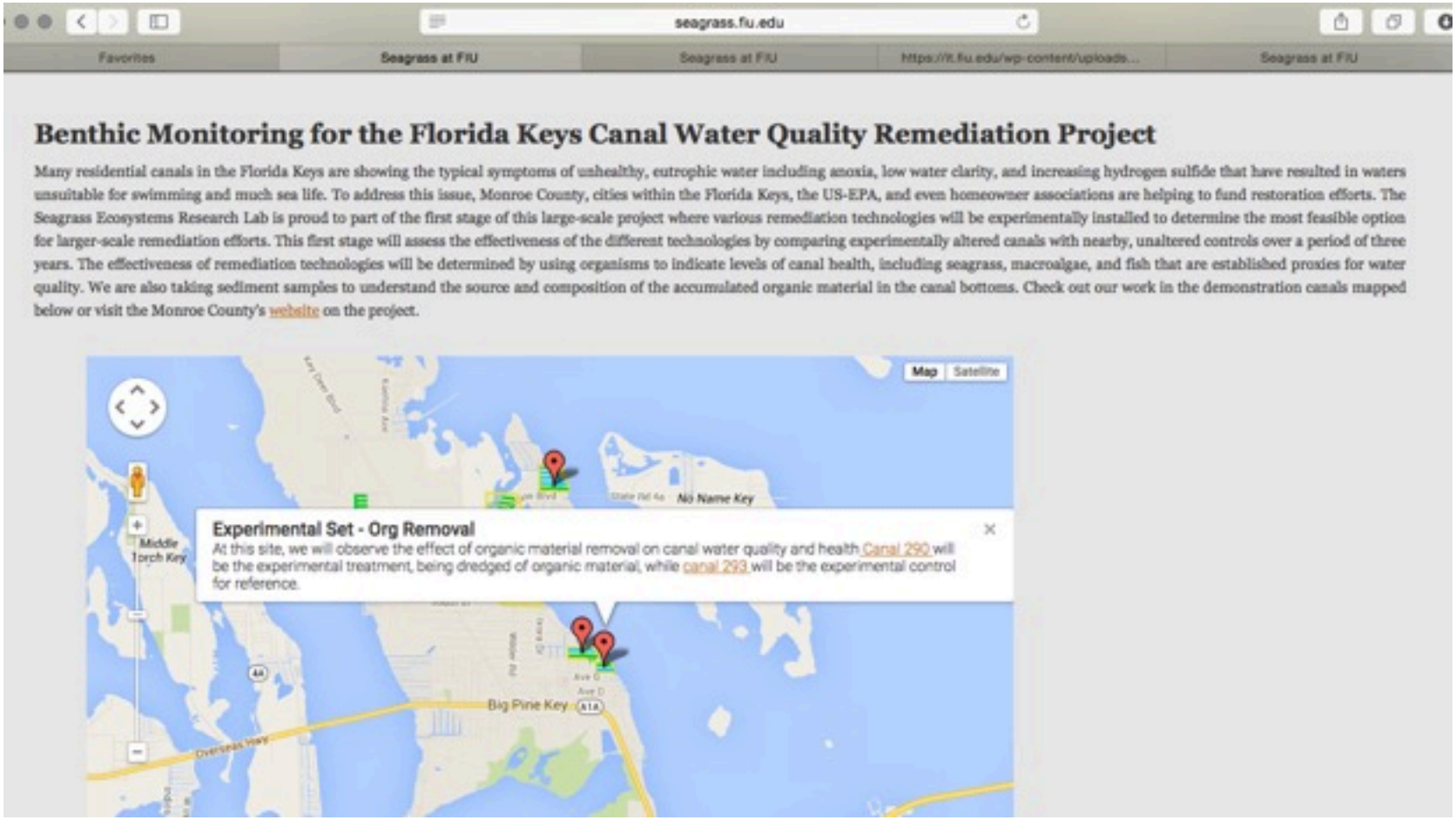
Favorites | Seagrass at FIU | Seagrass at FIU | https://lt.fiu.edu/wp-content/uploads... | Seagrass at FIU

Benthic Monitoring for the Florida Keys Canal Water Quality Remediation Project

Many residential canals in the Florida Keys are showing the typical symptoms of unhealthy, eutrophic water including anoxia, low water clarity, and increasing hydrogen sulfide that have resulted in waters unsuitable for swimming and much sea life. To address this issue, Monroe County, cities within the Florida Keys, the US-EPA, and even homeowner associations are helping to fund restoration efforts. The Seagrass Ecosystems Research Lab is proud to part of the first stage of this large-scale project where various remediation technologies will be experimentally installed to determine the most feasible option for larger-scale remediation efforts. This first stage will assess the effectiveness of the different technologies by comparing experimentally altered canals with nearby, unaltered controls over a period of three years. The effectiveness of remediation technologies will be determined by using organisms to indicate levels of canal health, including seagrass, macroalgae, and fish that are established proxies for water quality. We are also taking sediment samples to understand the source and composition of the accumulated organic material in the canal bottoms. Check out our work in the demonstration canals mapped below or visit the Monroe County's website on the project.



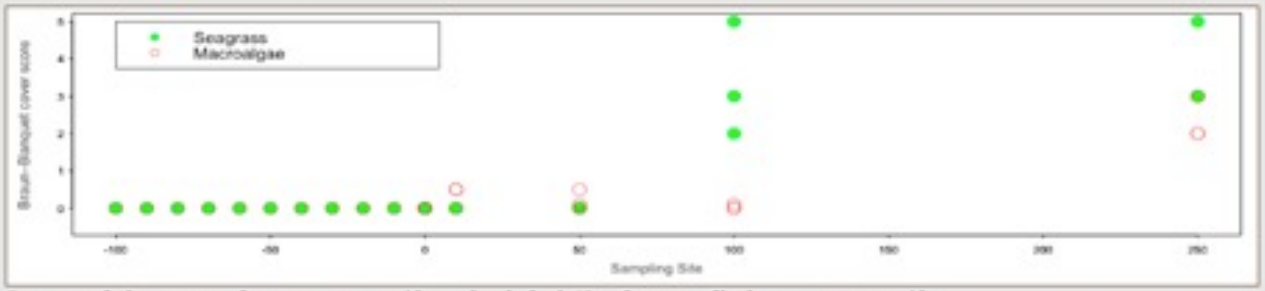
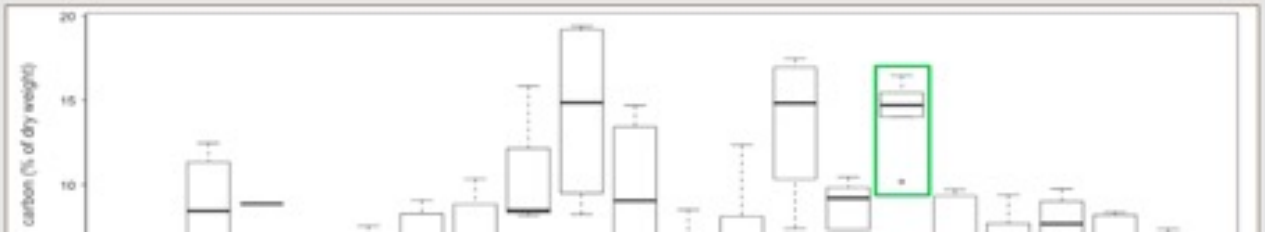
Canal Data on the Internet



Canal Data on the Internet

Canal Data on the Internet

Seagrass is abundant outside canal. There is NO living seagrass within canal 290.



Seagrass and Algae coverage from 250meters outside canal to the back. Note decreases of both at 100 meters outside