Sources of Enterococci to Park View Canal in Miami Beach

Presentation given by
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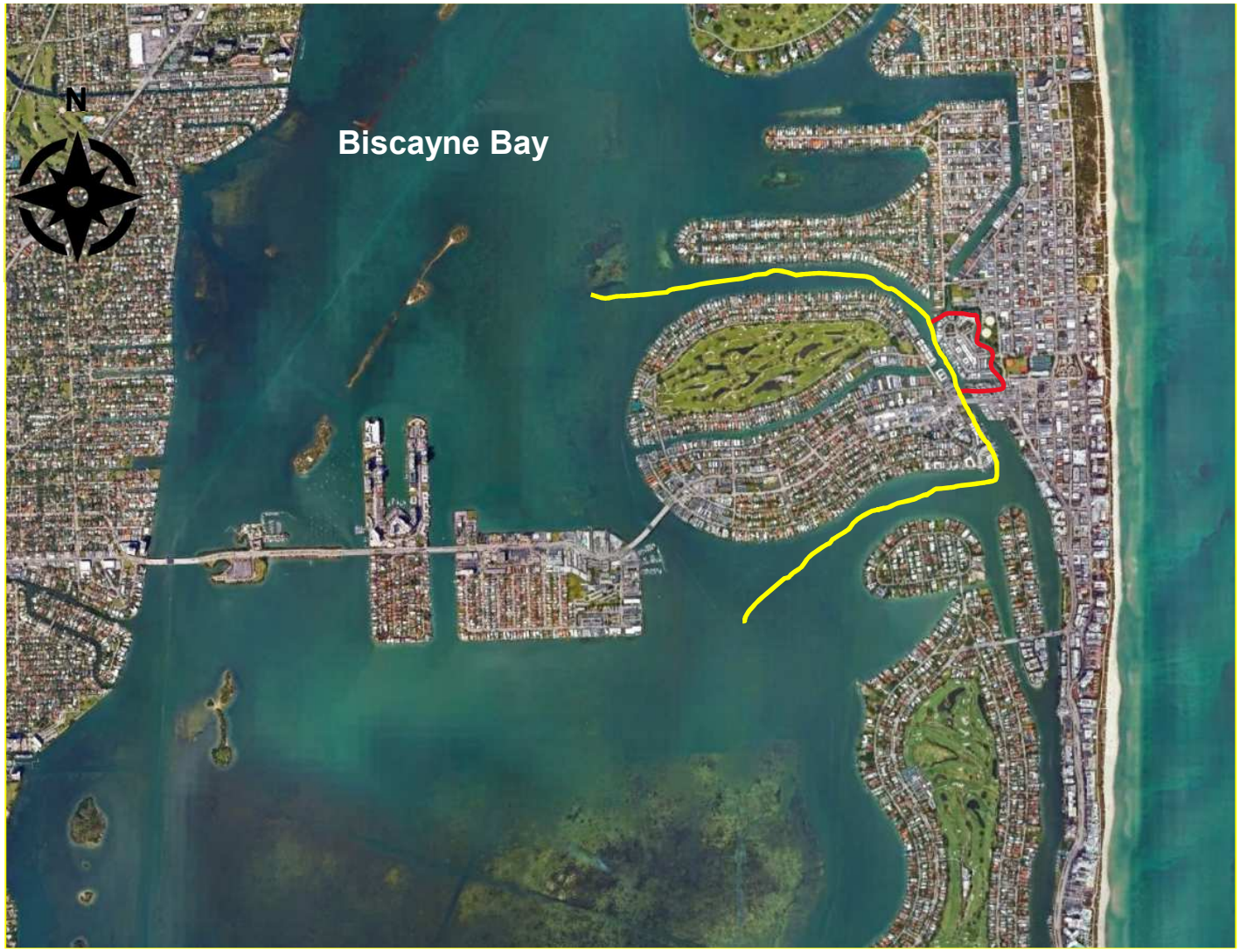
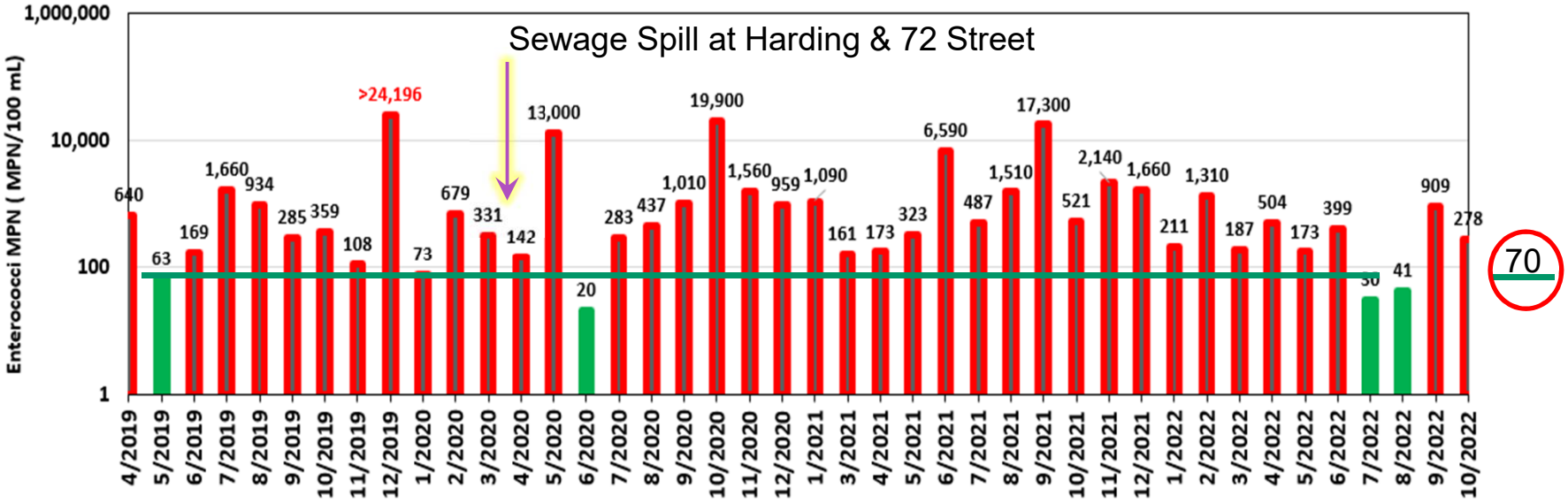


Park View Canal (PVC) is a secondary canal with limited flow located within Biscayne Bay.

Historic Enterococci Concentrations in PVC Canal



Year	Number of Exceedances	Number of Measurements	% Exceed
2022	8	10	80%
2021	11	11	100%
2020	11	12	92%
2019	8	9	89%

Objectives

- From where are the enterococci coming from?
- How enterococci from humans, dogs, and birds enter the waterway?
    - Geographic area
    - Fresh versus marine water
    - Environmental conditions associated with elevated enterococci (rain, tide, sunlight)

Our Approach

- Evaluate Historical Records
  (Miami Beach has made considerable efforts)

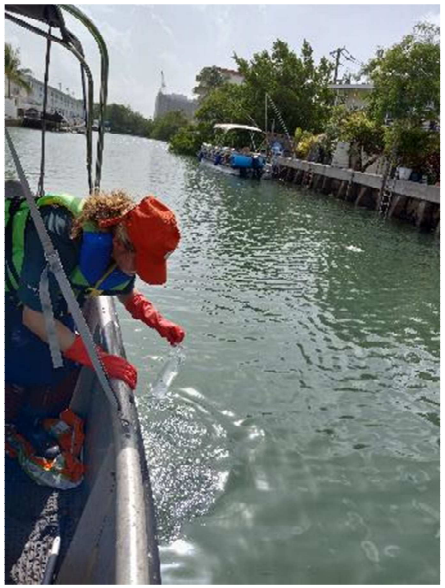
  Historical records show:
  enterococci associated with
  - Rainy days
  - Fresher waters

- Initiate Sampling Program

Sampling Efforts Included:

- Intense Spatial Sampling at the PVC
- Storm Water System
- Shoreline Sediments
- Intense Temporal Sampling
- Depth Sampling

Sampling Effort

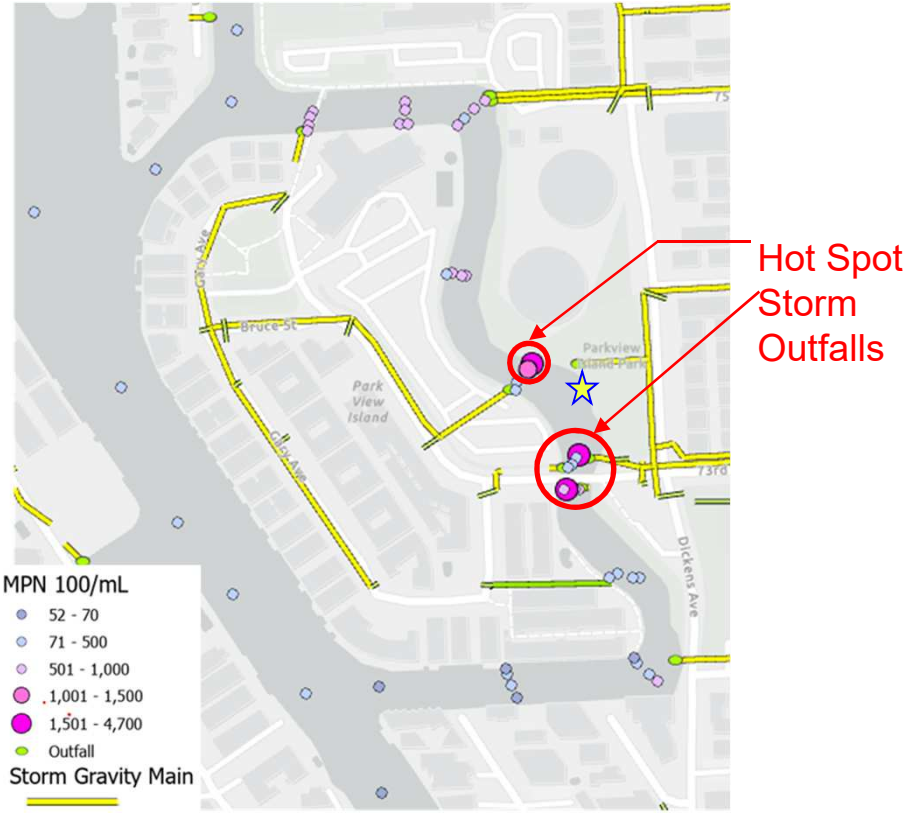


- Intense Spatial Sampling at the PVC
- Storm Water System
- Shoreline Sediments
- Intense Temporal Sampling
- Depth Sampling

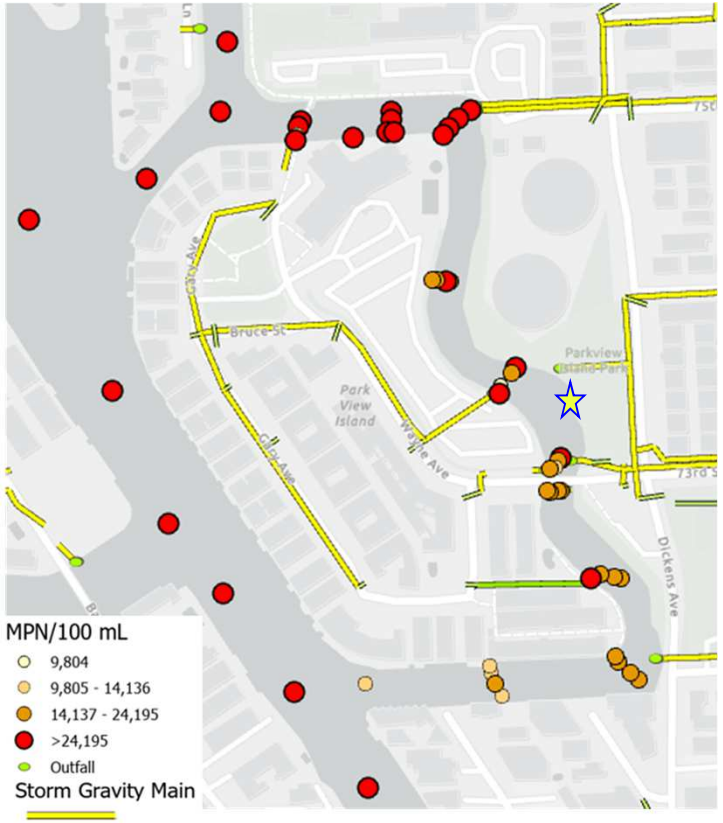
Spatially Intense Sampling

☆ Kayak Launch

High Tide, August 9 (dry)
(Saltier Water)



Low Tide, September 16 (wet)
(Fresher Water)



Sampling Effort

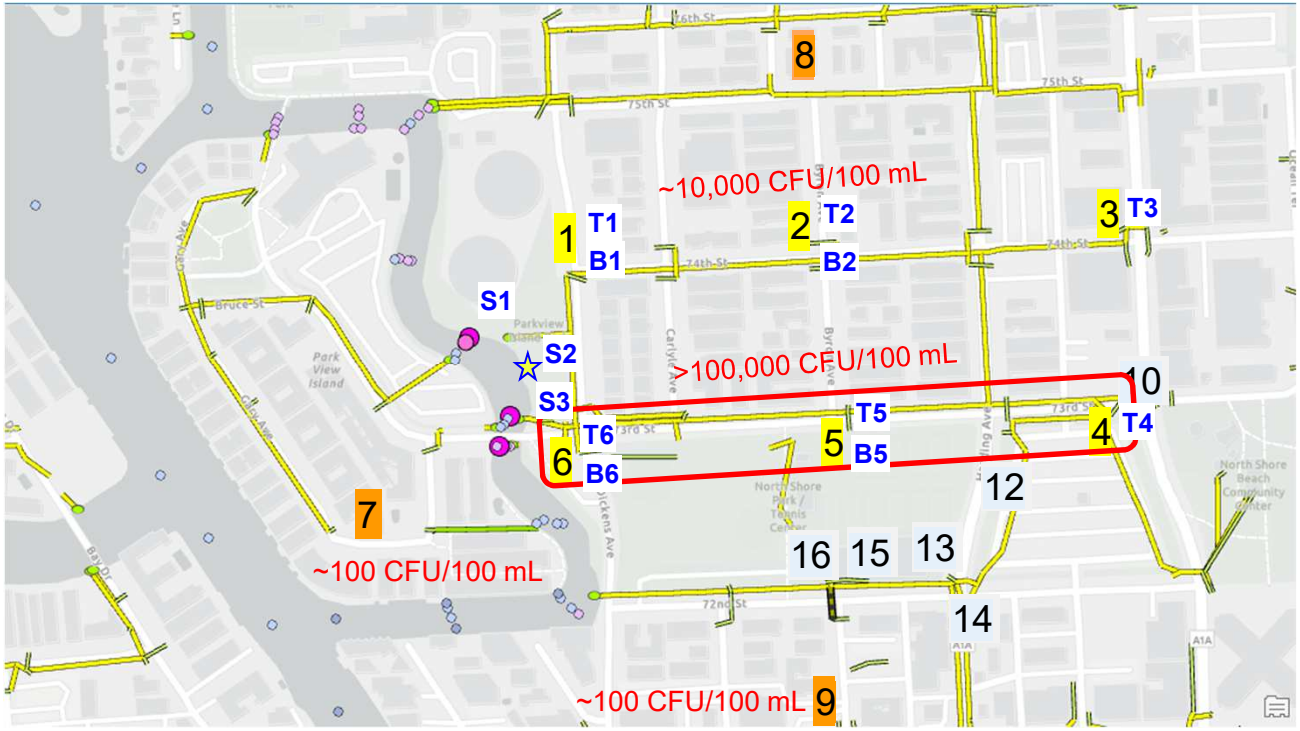
- Intense Spatial Sampling at the PVC
- Storm Water System
- Shoreline Sediments
- Intense Temporal Sampling
- Depth Sampling

Intense Storm Water Conveyance and Sanitary Sewer Infrastructure

1 Initial Sites
7 Background Sites
10 Exploratory Sites

☆ Kayak Launch

T1,T2… Top sediments
B1,B2… Bottom sediments
S1,S2,S3 Waterway bank

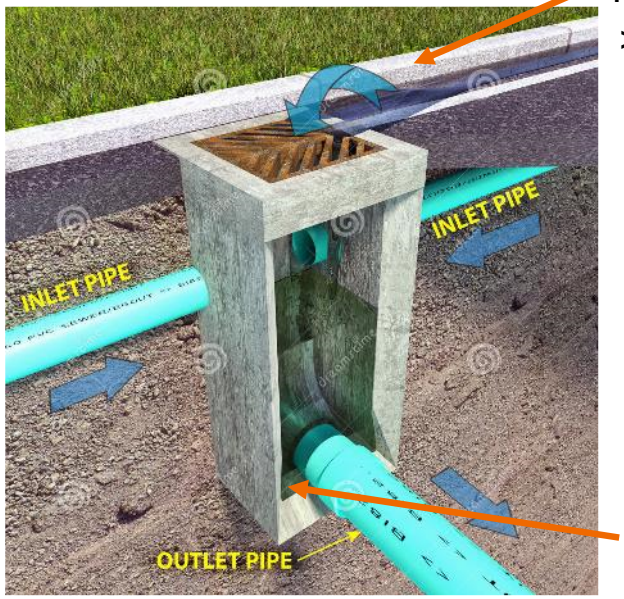


What Are Possible Contribution From Sediments

Shoreline Sediments

> 360,000 CFU/g

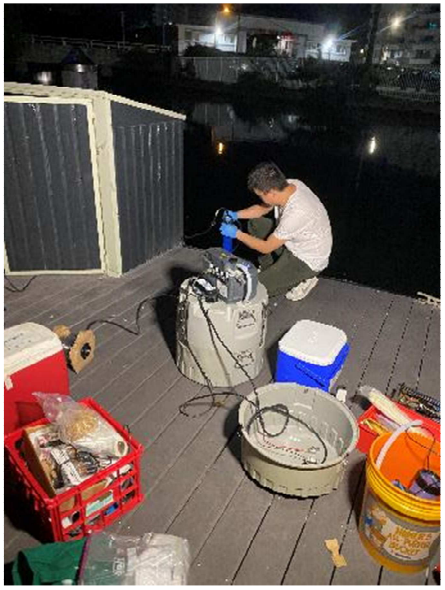
Storm Water Inlet



Top Sediments
> 650,000 CFU/g

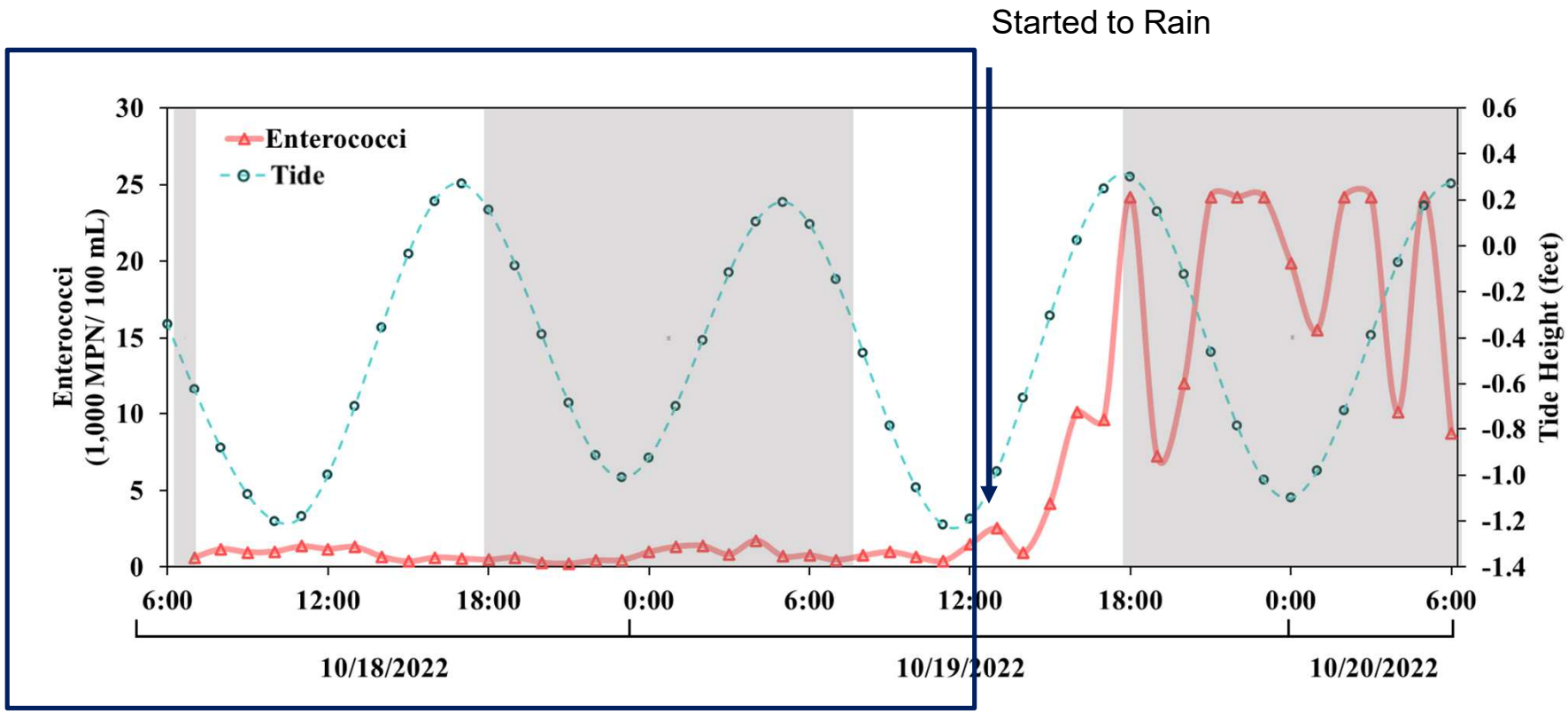
Bottom Sediments
> 790,000 CFU/g

Sampling Efforts



- Intense Spatial Sampling at the PVC
- Storm Water System
- Shoreline Sediments
- Intense Temporal Sampling
- Depth Sampling

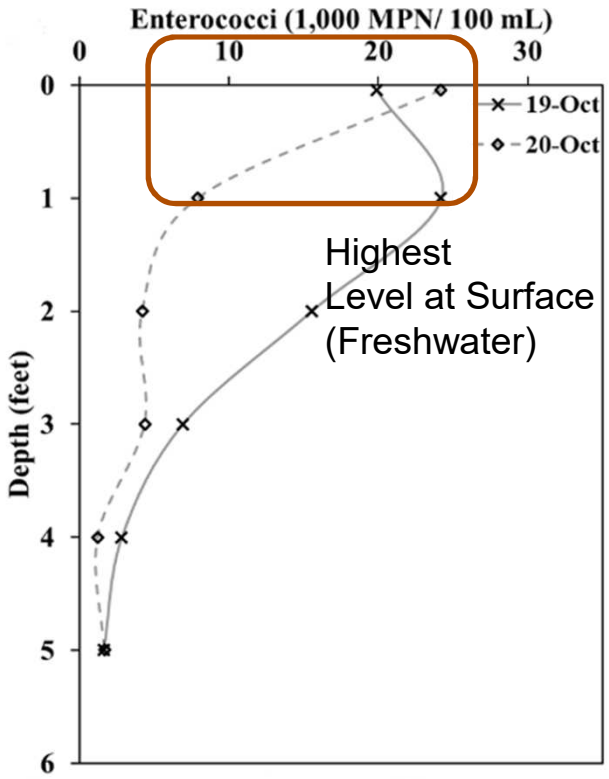
Time Intense Sampling

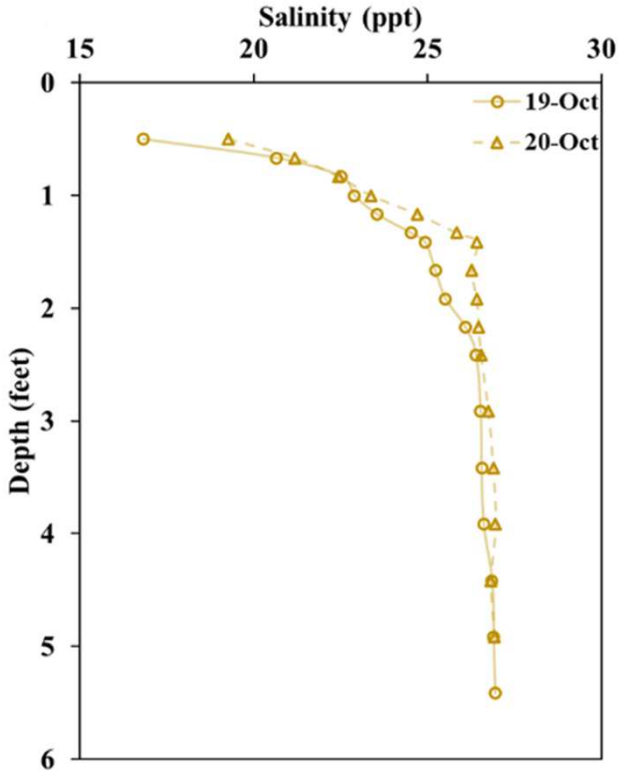


Depth Intense Sampling

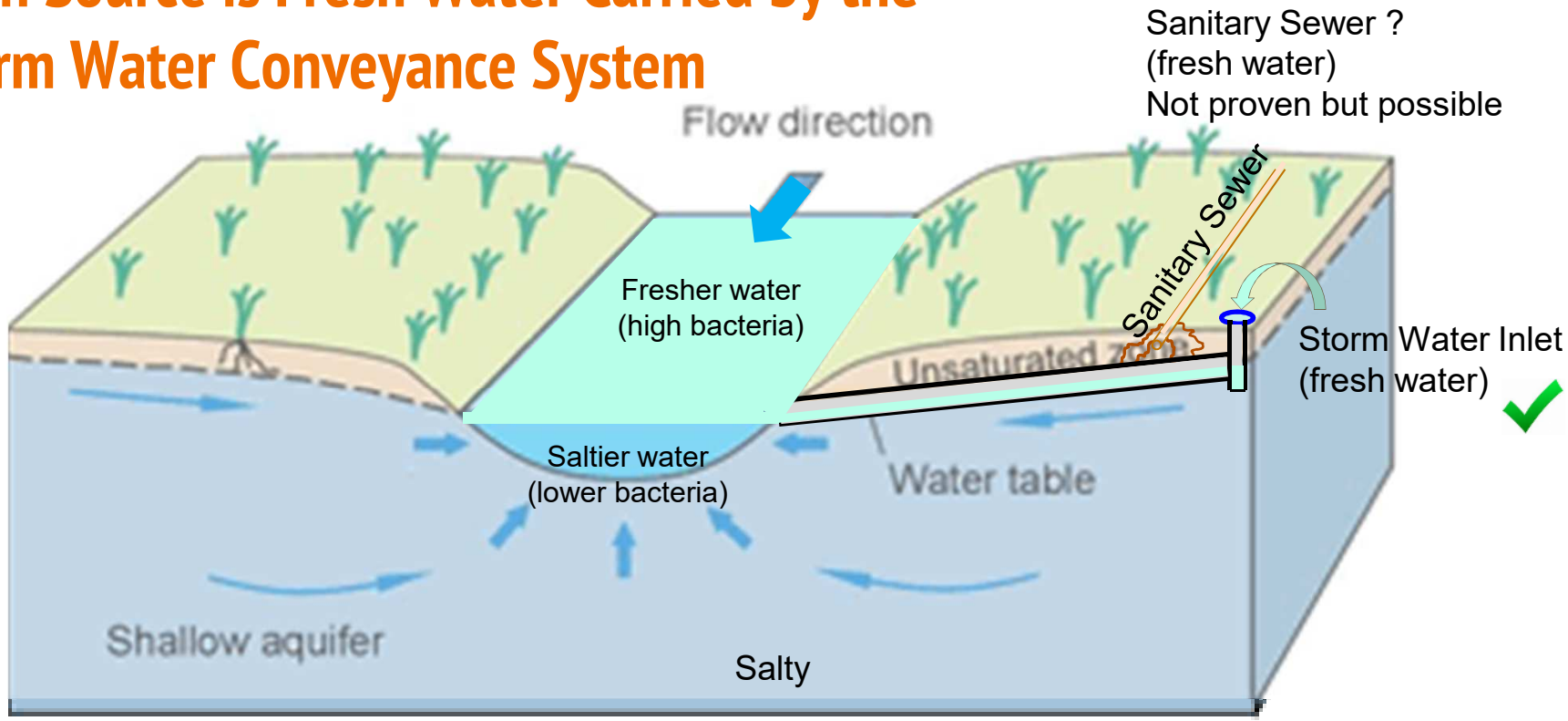
Measurements in the vertical direction within the water column at:

0, 1, 2, 3, 4, and 5 feet.





Main Source is Fresh Water Carried by the Storm Water Conveyance System



Long term impactful solutions: Upgrade storm water conveyance system (treat first flush)
Upgrade sanitary sewer system

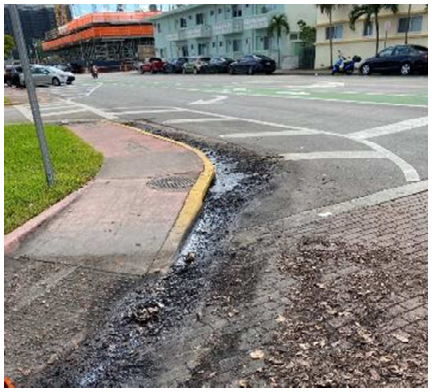
Short term items

Garbage Bins

Animal Feces

Dogs
Iguanas
Racoons
Birds

More Frequent Cleaning



Homeless

Conclusions/Summary

Enterococci is:

- Associated with freshwater and this freshwater floats on canal surface
- Enters during storm events through stormwater conveyance system
- Source to stormwater includes:
  - Animal feces (domestic and feral)
  - Homeless without access to sanitation
  - Leaking garbage bins
  - Trash
- Cannot discount sanitary sewage. When sewage backs up and overflows it enters the stormwater conveyance system and contaminates the streets including all sediments
- Need to further investigate underground sewage leaks. Such leaks can possibly impact the stormwater conveyance system.

Key Take-aways

- Short term. Housekeeping on streets (initiated by City during course of study)

- Long term. Investments needed in upgrading
  - the **stormwater conveyance system** and
  - the **sanitary sewer system**.

Thank you. **hmsolo@miami.edu**