

Update on Bruce Beach

Connecting the 'Current' Community to the 'Remaining' Natural Areas,
the 'Past' Cultures & Our 'Lost' Heritage

Barbara Albrecht



Good Water Quality is the basis of health and well being

Northwest Florida is in the Coastal Plain & hosts these characteristics:

- Highly erodible sandy soils
- Annual rainfall ~ 65"
- Groundwater is close to the surface
- Stormwater issues are difficult + aged infrastructure
- Incompatible recreational activities
- Many migrants and year-round visitors pass through the area



Bruce Beach is a neglected gem
which is returning to a healthy maritime forest



Bruce Beach has been identified as one of several catalytic projects
– ‘the jewel of the community’



Who uses Bruce Beach?

An entire community connected to nature, including: Audubon, Native Plant Society, paddlers, artists, various schools, the community, visitors, etc.

Bruce beach provides a landscape level laboratory for hands-on training and the transfer of knowledge

- Bruce Beach lends itself to exploration and further investigation in that the site has three distinctive water types (a man-made mitigation wetland, an underground creek which becomes daylighted within 300 meters of the bay, and the bayfront) and at least five upland habitat types. This waterfront park highlights the beauty and resulting conditions of sea-level rise and climate change on coastal systems and provides an opportunity to observe resiliency.



Bruce Beach Weekly Monitoring

1. Washerwoman Creek

2. Sandy Shoreline

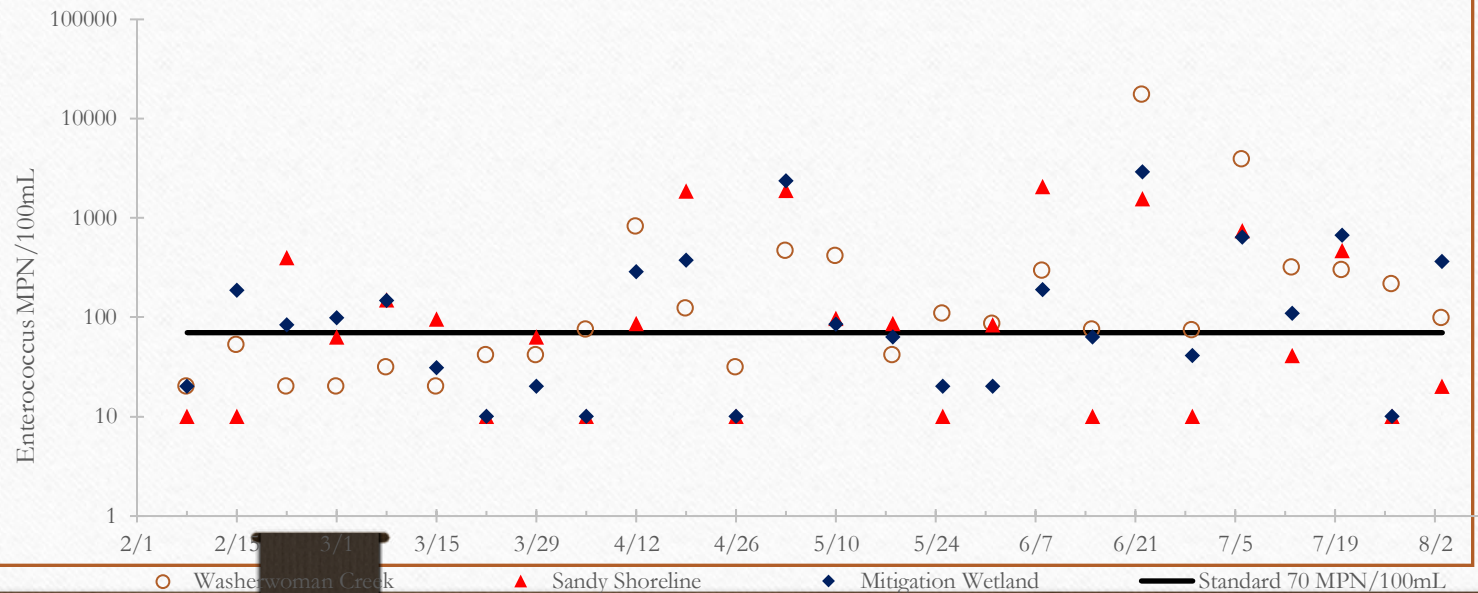
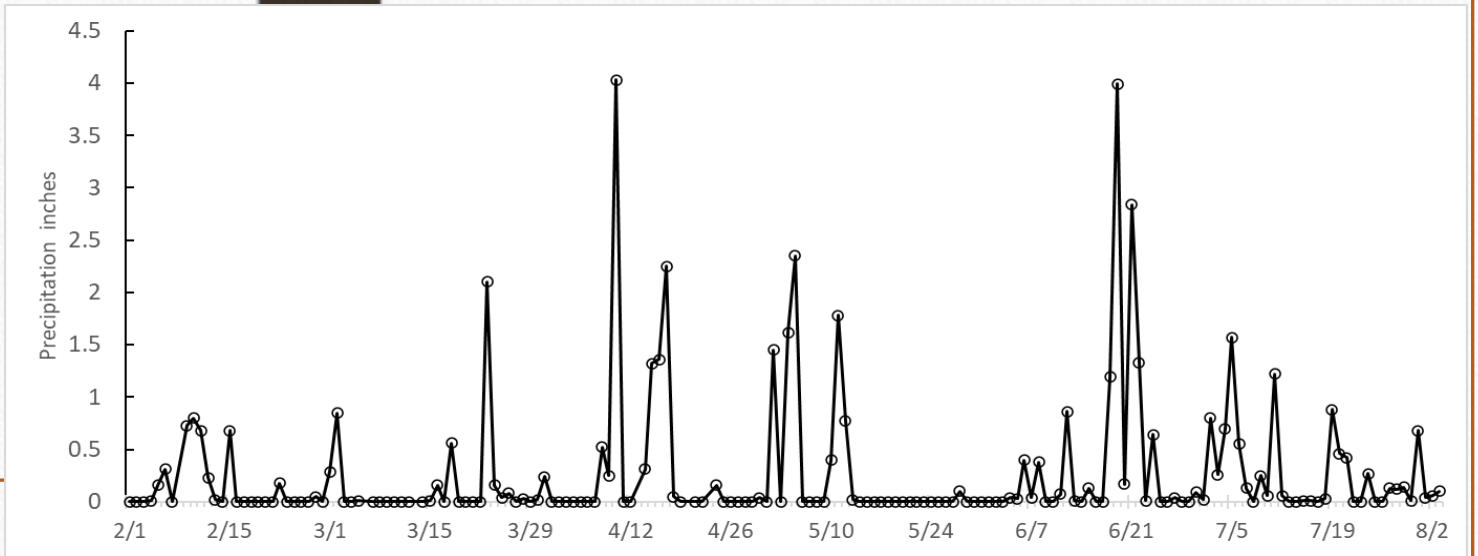
3. Mitigated Wetland

- Collect: Hydrographic Data
- DO, pH, Conductivity, Salinity
- Total Suspended Solids
- *Chlorophyll a*
- Dissolved inorganic nutrients
- Total Bacteria
- Enterococcus



Rainfall events over six months compared to Enterococcus levels

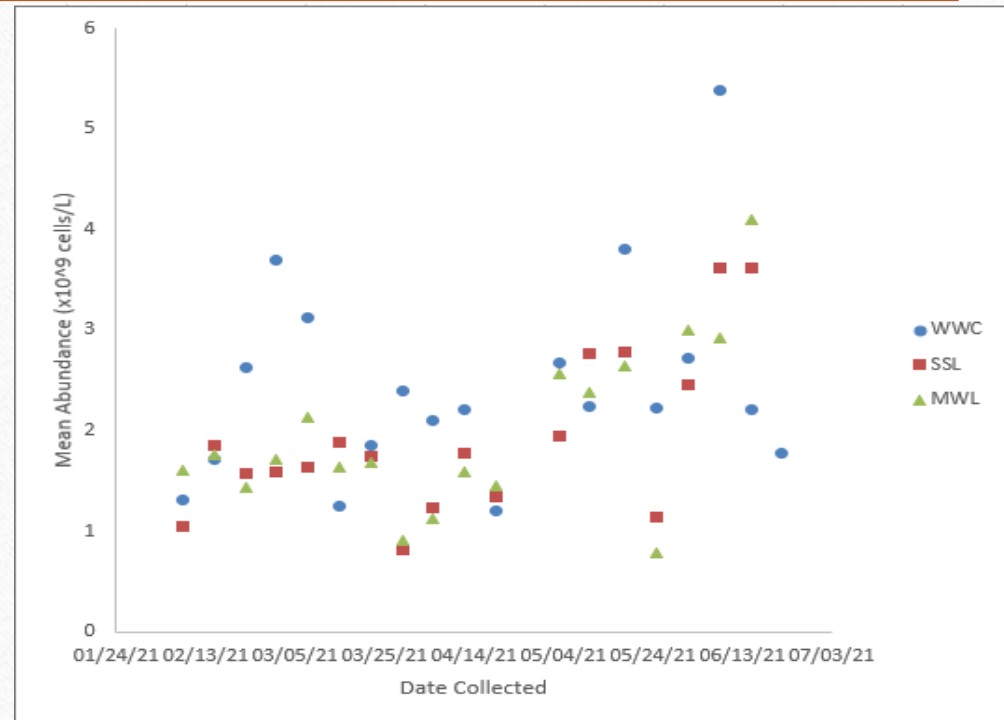
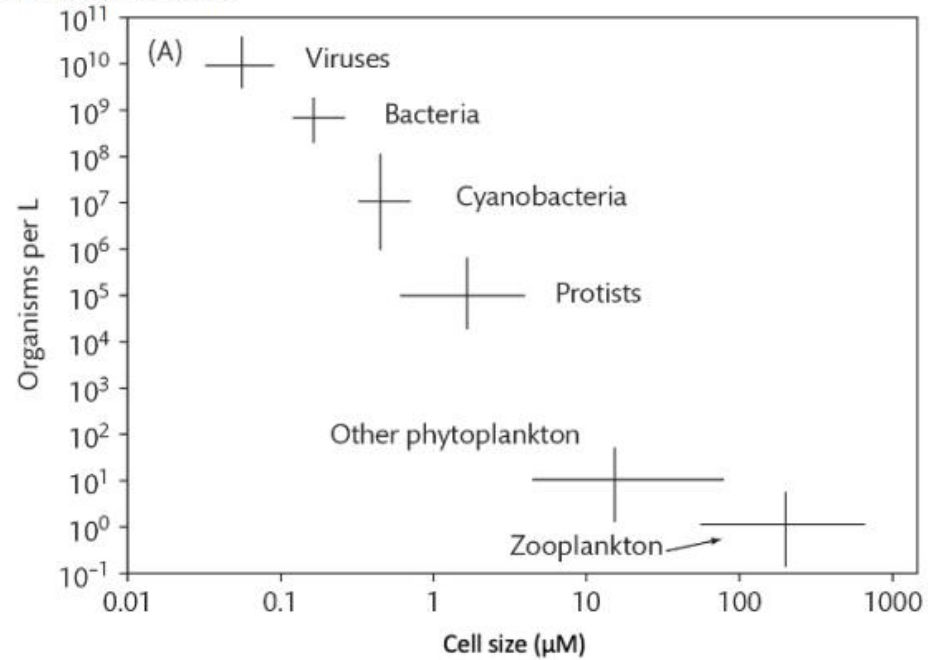
- Water Quality is impaired at Bruce Beach
 - Water Borne Pathogens are above DOH thresholds more than 50% of the monitoring period
 - Exposure may result in rashes, ear/nose/throat infections, diarrhea, antibiotic resistant infections, etc.
- When the public is informed; the public can make informed decisions.**



Total Bacteria

Bacterial Abundance and Production

Figure 1 Cell sizes of various microorganisms and their corresponding average abundances in typical aquatic ecosystems. “Bacteria” refers to the heterotrophic bacterial community [adapted from (Kirchman 2018)].



Heavy Metal Concentration in Local Watersheds

David Kawula, Joel Lukens, Karen W. Barnes, PhD.

Introduction

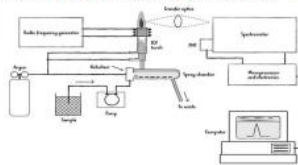
Heavy metals commonly found in water include manganese, lead, arsenic, chromium and copper.

Metals play an important role in stabilizing a healthy biochemical ecosystem; however, lead, chromium and arsenic are harmful and toxic when ingested.

Areas with a rich history of pollution have a higher probability of contaminated waters. Studying local watersheds can lead to identifying harmful metals and informing local public about the risk of using contaminated watershed for recreational use.

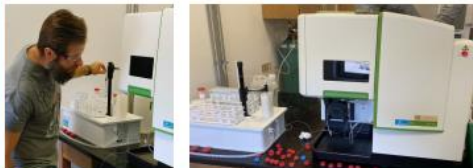
Instrumentation

Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES)



- A sample is transported into the instrument as a stream of liquid and converted into an aerosol by nebulization.
- The aerosol is transported to the plasma where it is atomized/ionized by the plasma.

- The excited atoms and ions emit their characteristic radiation which is collected by a device that sorts the radiation by wavelengths.
- Wavelengths and intensity of light can be measured by the spectrometer and provide concentration data for each element.



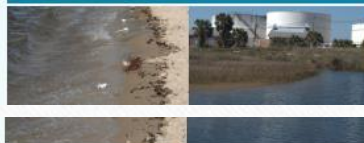
Aerial View



Site A (Creek) / B (Estuary)



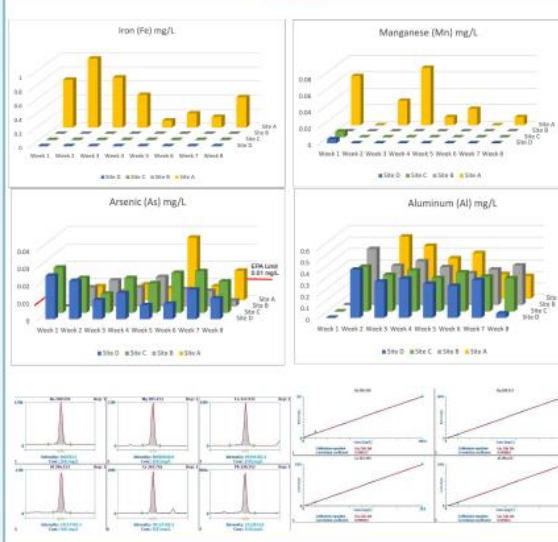
Site C (Shore) / D (Remediated Wetland)



The Future of Bruce Beach



Results



Conclusions

- Site A was the only site that showed levels of Iron (Fe), Manganese (Mn) and Copper (Cu).
- All sites contained trace levels of Arsenic (As), which is harmful when ingested or absorbed through the skin.

Future work: Identifying heavy metals from surface water samples indicates presence of harmful metals. Testing the sites for additional pollutants will provide accurate information to the public about the quality of the water.

Acknowledgements

We would like to thank the US Department of Education Strengthening Institutions Program for providing the grant for the ICP-OES, Office of Undergraduate Research, Department of Chemistry and the Department of Biology. Thanks are also due to Dr. Jane Caffrey, Hope Ebert and Dr. Barbara Albrecht.

Various Departments within UWF & other schools have utilized Bruce Beach as a Living Laboratory for their student interests.

They include:

Dept of Chemistry;

Dept of Biology;

Center for
Environmental
Diagnostics and
Bioremediation;

Dept of Archaeology

INTRODUCTION

Algae can be used for fuel, agricultural feed, and human food.
It can also cause respiratory distress and harmful toxins that can kill organisms that cannot escape the algae. Red tide is an example of a dangerous algae.
Better understanding of algal proliferation and fitness can lead to managing the growth or limiting its spread.
This work explores the impact of pollution such as heavy metals and ammonia, and nutrients in the form of phosphates and nitrates on algal blooms.

INSTRUMENTATION

Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES)



- Argon gas is ionized and produces high temperature plasma
- Cations are excited and emit radiation
- Intensity of emission is proportional to concentration

YSI – Handheld Multi Parameter Water Quality Meter



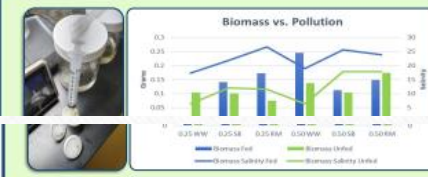
- Measures:
- Salinity
 - Conductivity
 - Dissolved Oxygen
 - Temperature

WATER SELECTION AND SETUP



	Dinoflagellate Medium	Dino Nutrients	Special Water	Distilled Water
Washier Woman Creek	25%	25%	50%	0
Bruce Beach	25%	25%	50%	0
Remediated Wetland	25%	25%	50%	0
Washier Woman Creek	25%	25%	25%	25%
Bruce Beach	25%	25%	25%	25%
Remediated Wetland	25%	25%	25%	25%
Washier Woman Creek	25%	0	50%	25%
Bruce Beach	25%	0	50%	25%
Remediated Wetland	25%	0	50%	25%
Washier Woman Creek	25%	0	25%	50%
Bruce Beach	25%	0	25%	50%
Remediated Wetland	25%	0	25%	50%

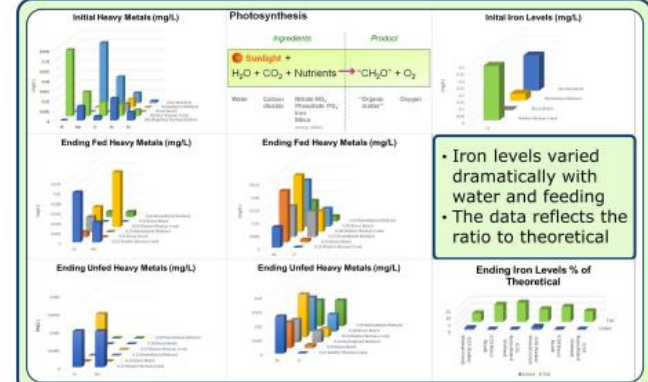
BIOMASS



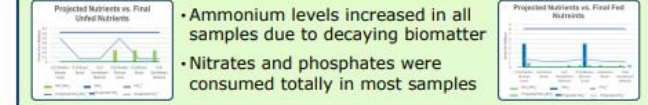
QUADRAT SAMPLING



HEAVY METAL DATA



OTHER NUTRIENTS



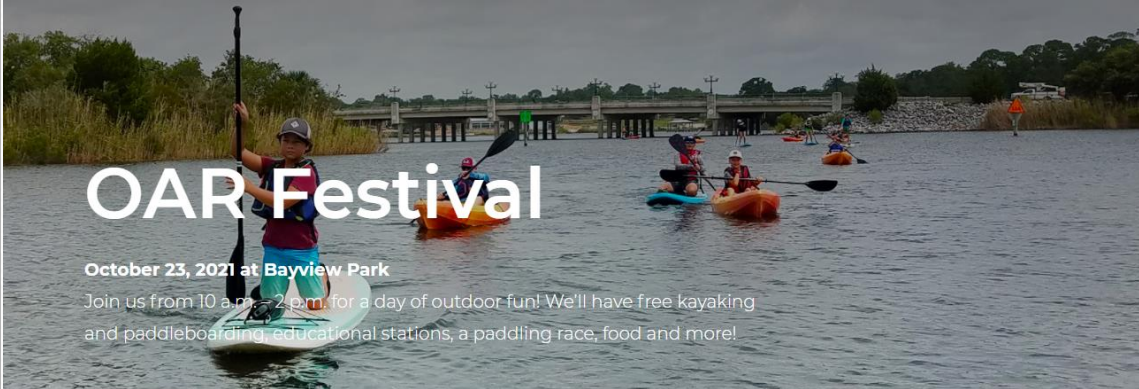
RESULTS AND CONCLUSIONS

- Quadrat sampling shows a population boom on week two.
- Salinity played a crucial role with species competition and realized niches in a controlled environment as biodiversity declined.
- Generally, higher levels of heavy metal pollution enhanced biomass.
- Phosphate consumption appears to correlate with biomass.

ACKNOWLEDGMENTS

We would like to thank the US Department of Education Strengthening Institutions Program for providing the grant for the ICP-OES, Office of Undergraduate Research, Department of Chemistry and the Department of Biology. Thank you to Dr. Jane Caffrey, Hope Ebert, and Barbara Albrecht.

New Paddling Trails



OAR Festival

October 23, 2021 at Bayview Park

Join us from 10 a.m. - 2 p.m. for a day of outdoor fun! We'll have free kayaking and paddleboarding, educational stations, a paddling race, food and more!



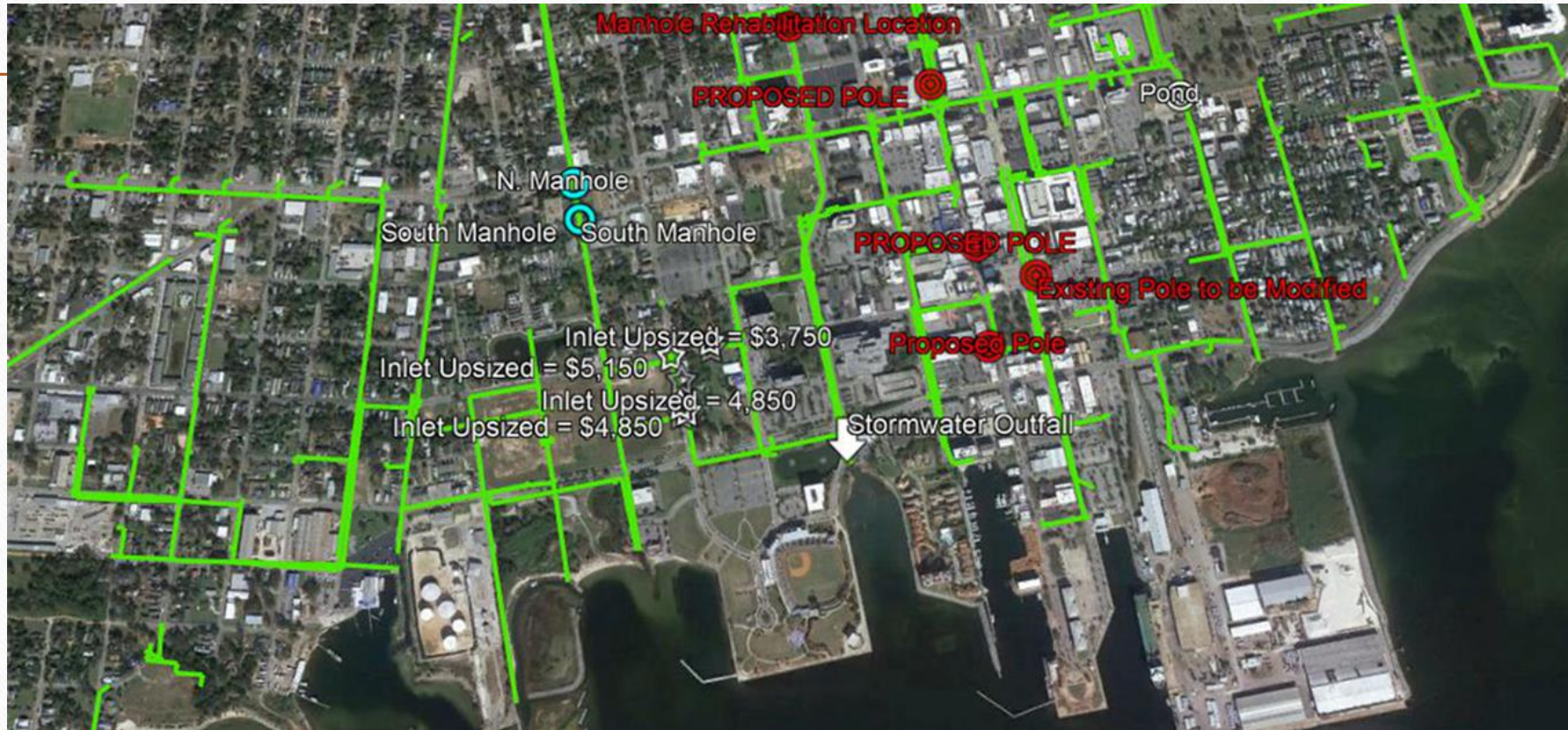
BAYVIEW OUTDOOR PURSUITS RENTAL PRICING

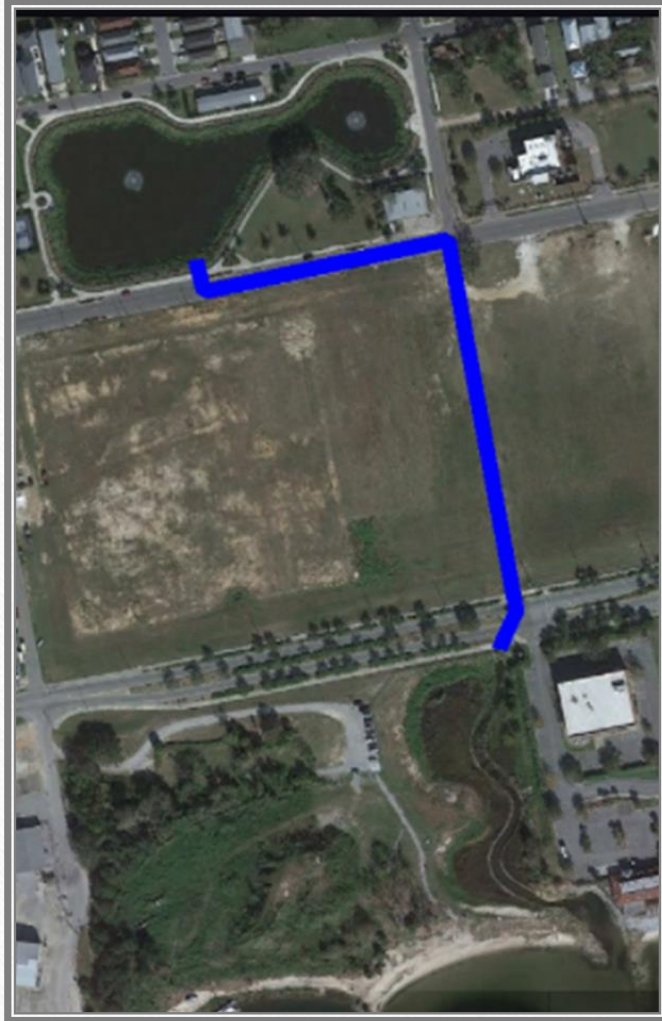
	Per Hour	1/2 Day	Full Day	5 Day
Single Kayak	\$10	\$35	\$50	\$200
Tandem Kayak	\$15	\$40	\$60	\$250
Touring Kayak (Blige Pump)	\$15	\$40	\$60	\$250
SUP	\$15	\$35	\$50	\$200
Pedal Boat	\$20	\$40	\$70	
Beachcruiser Bike	\$10	\$15	\$20	\$75
Hammock	\$5	\$5	\$10	

Watersport Equipment Pricing



What is the source of these Pathogens?



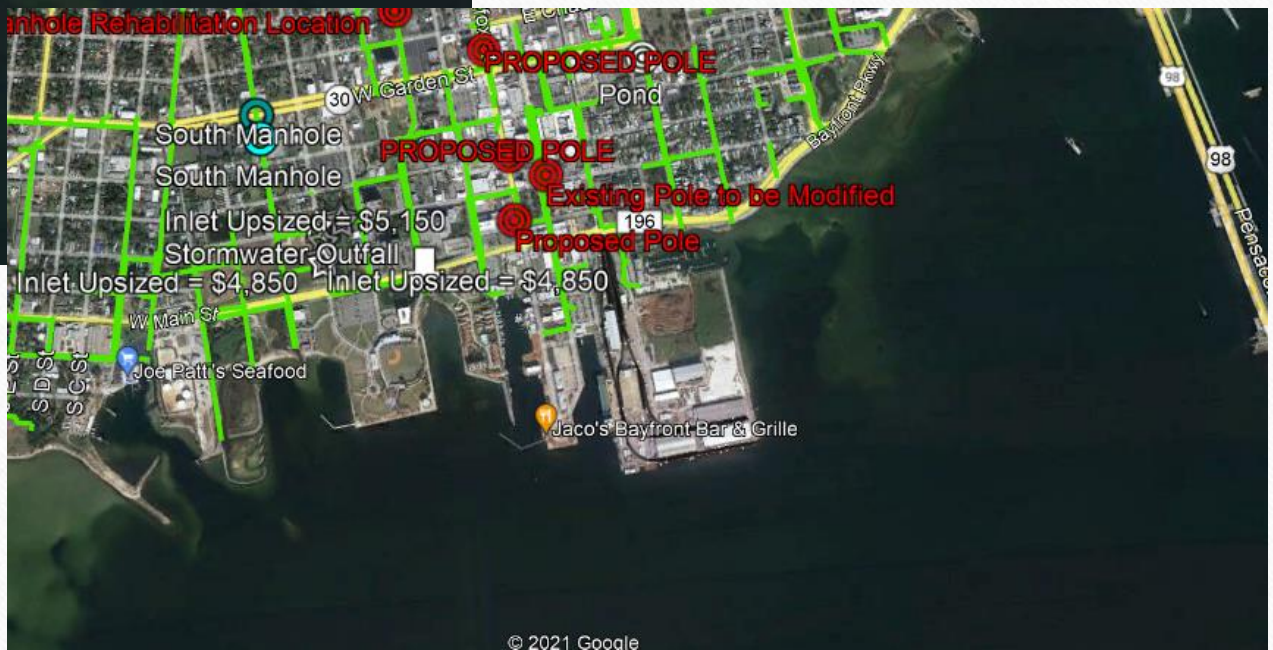
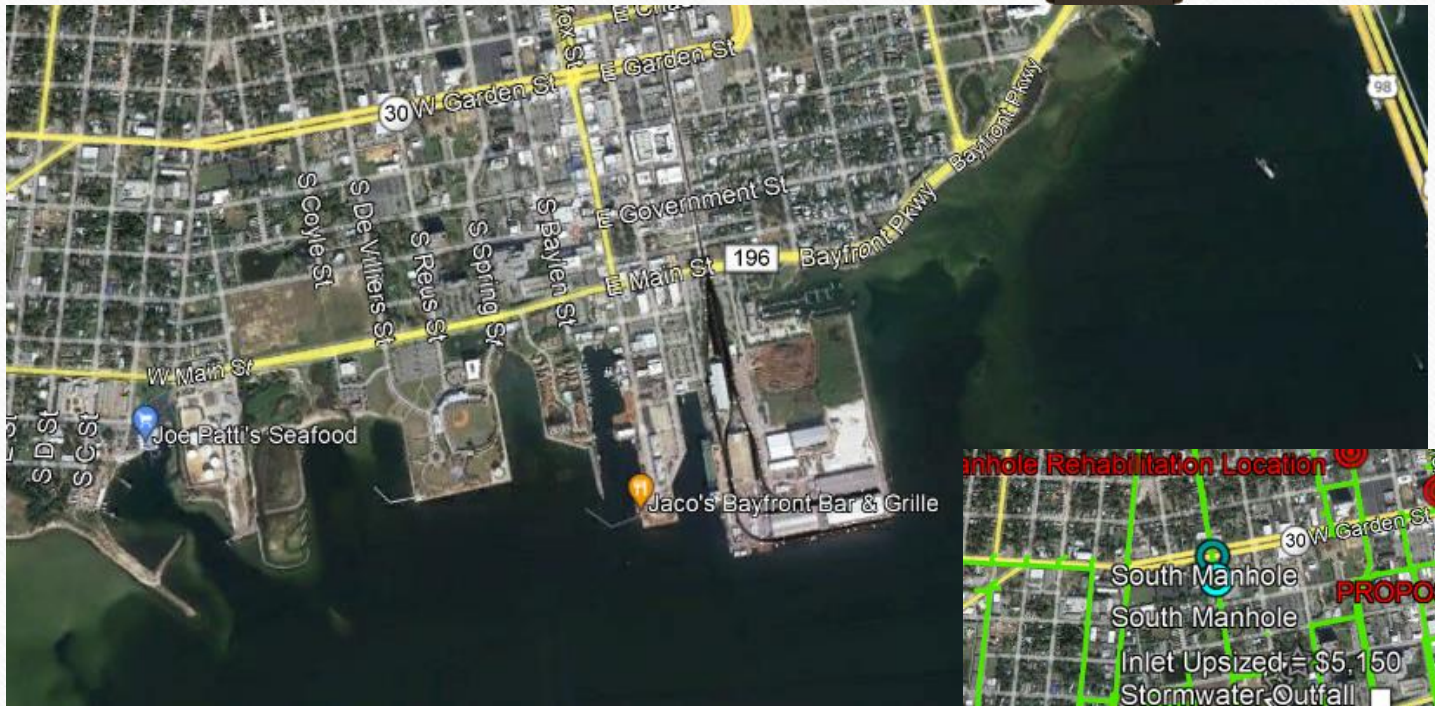


What is the source of these Pathogens?

Stormwater?
Sewer? Septic?
Aged Infrastructure?

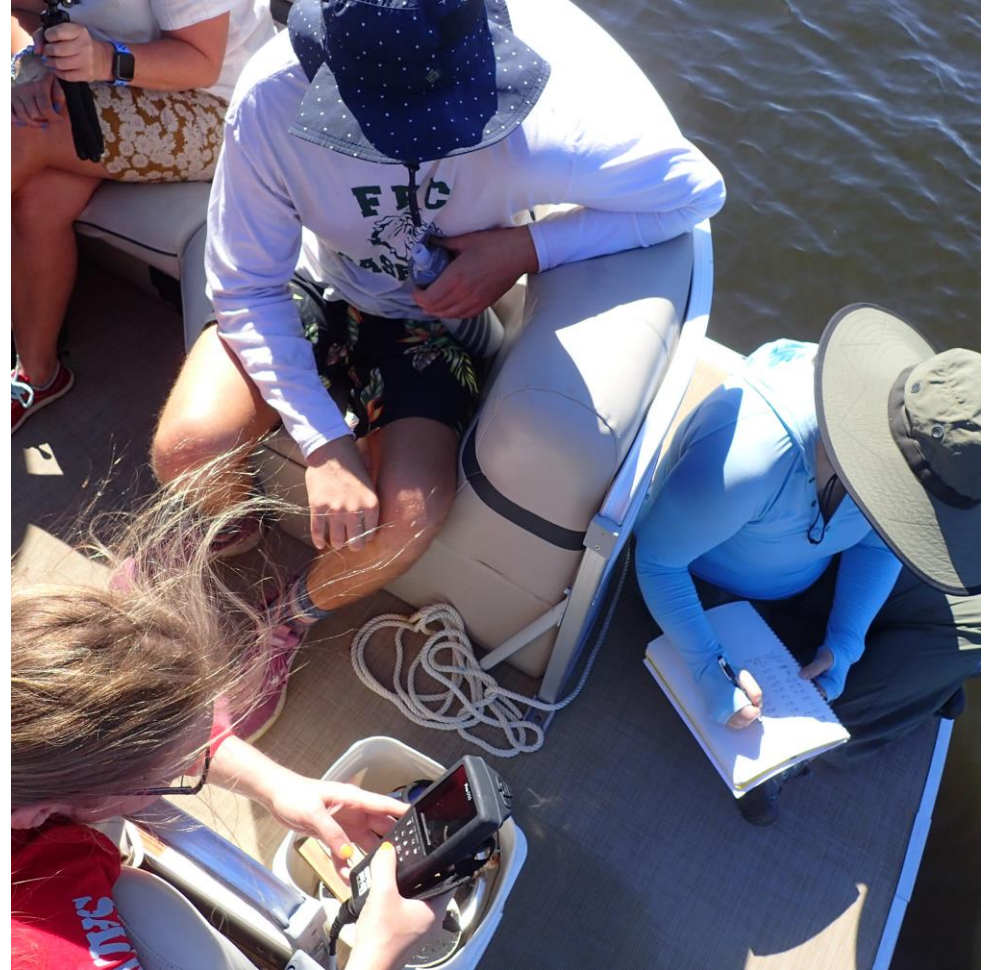






And we went on a Three-hour Tour...







To look at the Coast from the Water





All this to see if the paddling trail would be safe for access & egress and assess the coastal condition.

