# TSS and Chl-a Survey in Tidal Marshes and Oyster Aquaculture

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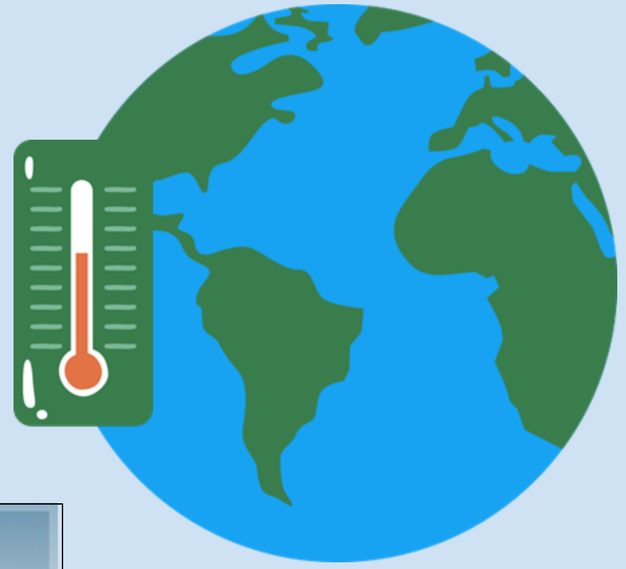
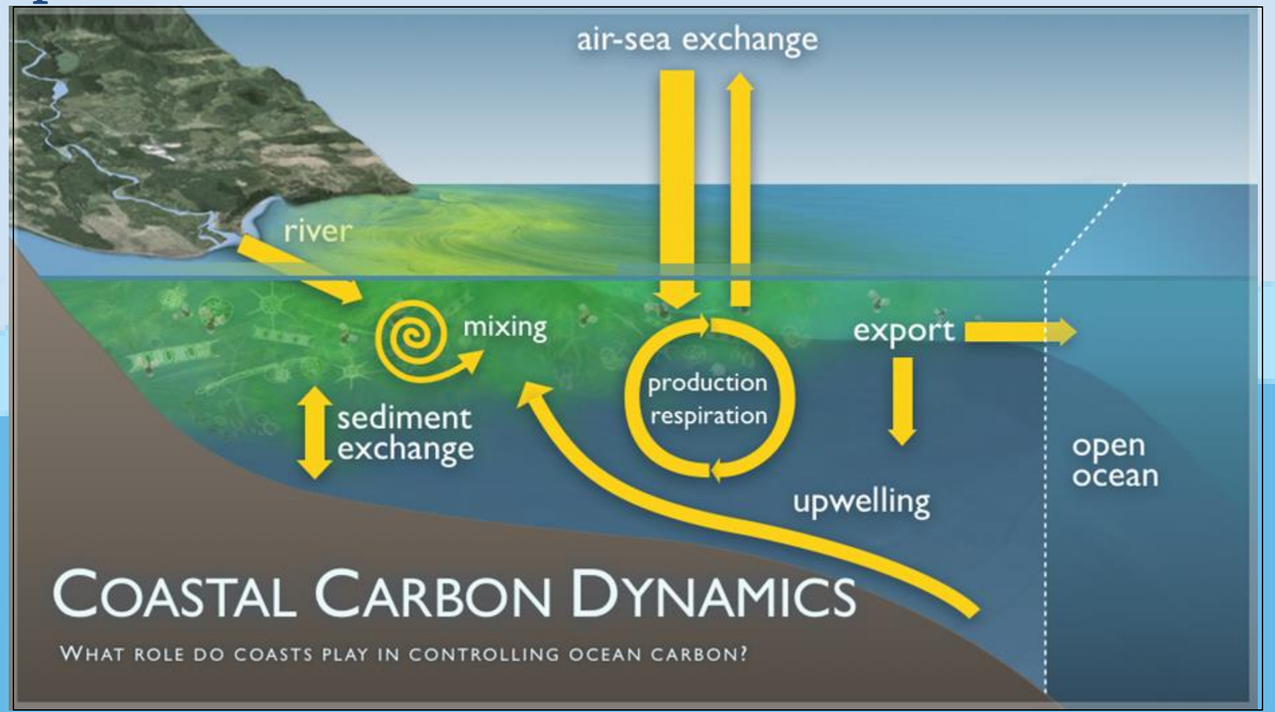
# Coastal Carbon Cycle



- Coastal ecosystems are carbon sinks and sources
  - Important for reducing effects of climate change
  - Absorb and store carbon dioxide as they are a carbon reservoir

- Coastal carbon cycle processes include:
  - Photosynthesis
  - Decomposition
  - Respiration



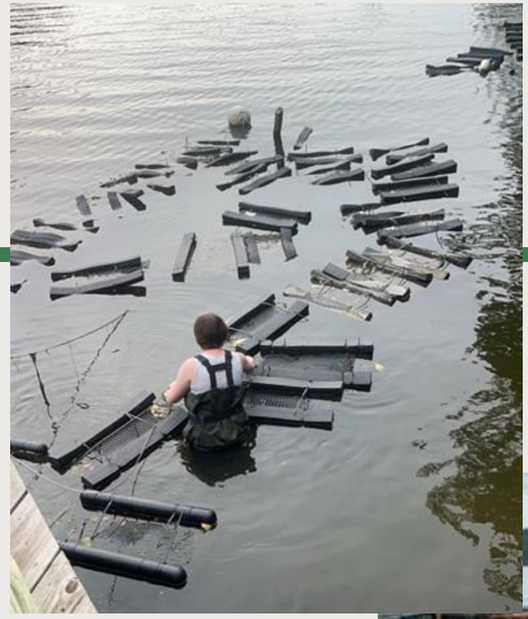
# The Importance of Tidal Marshes

- Produce, transform, and sequester carbon
- Blue carbon ecosystems
  - Can contain up to half of all organic carbon in ocean sediments.
- If lost, they may release all of their stored carbon into nearby bodies of water and into the atmosphere.

EPA

# Oyster Aquaculture

- One of the fastest growing food industries in the world.
- OA provides nutrient removal and reduces turbidity through filtration.
- To the carbon cycle Oysters act as
  - sinks
  - transformers
  - sources



Aquatic Network

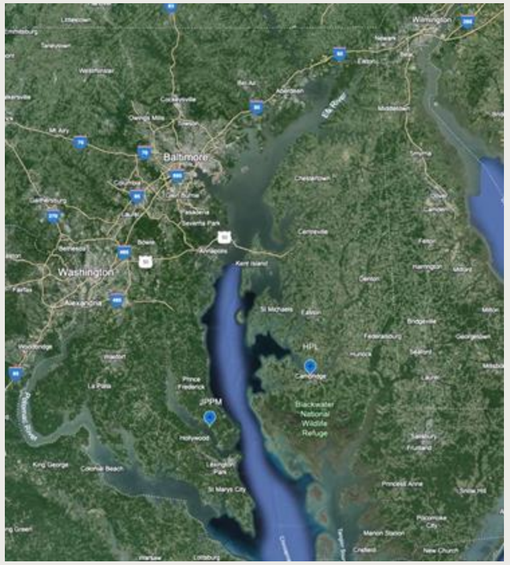
# ISCO Sampling and Filtering

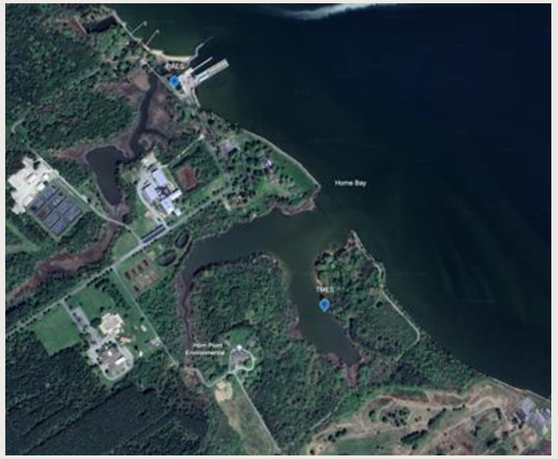
The sites are separated by location and type.

JP- Jefferson Patterson
ES- Eastern Shore
TM- Tidal Marsh
OA- Oyster Aquaculture

At each site we set up the ISCO to collect water samples over the course of 25 hours

After water samples are collected we can run them through the vacuum filtration process in order to separate liquids from solids by creating a pressure differential.




# What are Chl-a, phaeo and TSS?

## Chlorophyll-a

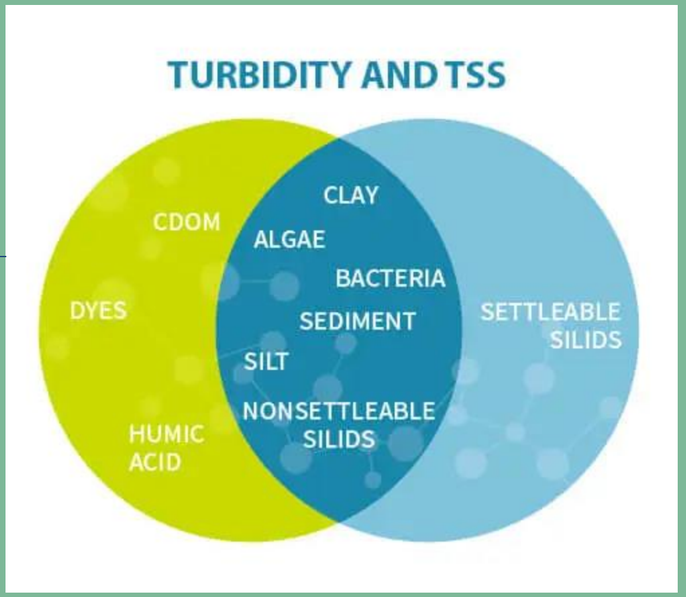
- A pigment in algae that allows for photosynthesis and gives algae the greenish color.
- Absorbs most energy from wavelengths of violet-blue and orange-red light.

## Phaeo

- A chemical compound found in chlorophyll commonly found after phytoplankton blooms.

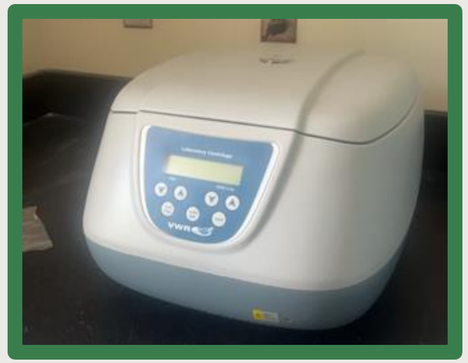
## TSS

- The non-dissolved solid particles found in water that are larger than 0.7 microns.



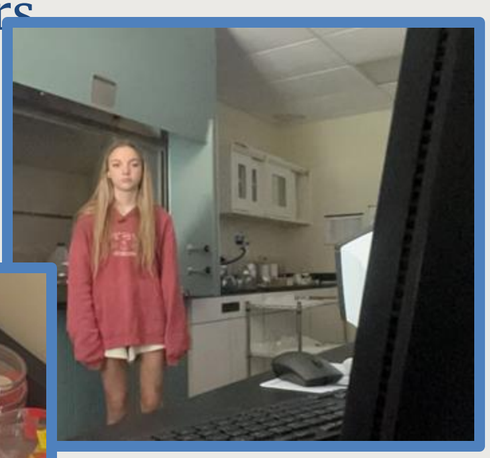
# Chl-a methodology

1. Place filters in tubes with 10 ml acetone
2. Refrigerate overnight and centrifuge for 30 min
3. Filter samples into cuvette
4. Run the shimadzu UV-1900i spectrophotometer
5. Samples are scanned in photometric mode
6. Add HCl and stir to measure phaeo
7. Run again
8. Rinse



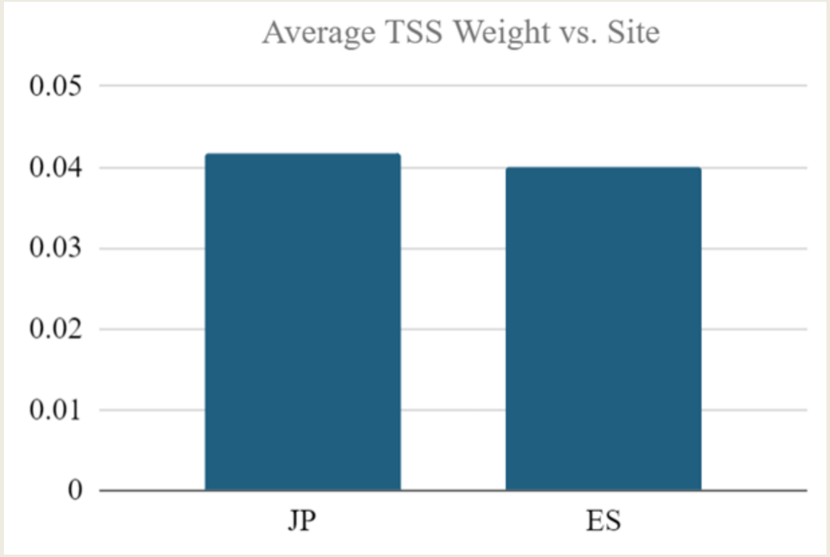
# TSS Methodology

1. Weigh filters prior to sample filtration
2. Dry filters in an oven at 100 ºC for 24 hours
3. Weigh filters after drying
4. Wait 1 hour
5. Re-weigh filters



# Results: TSS

## Difference in location

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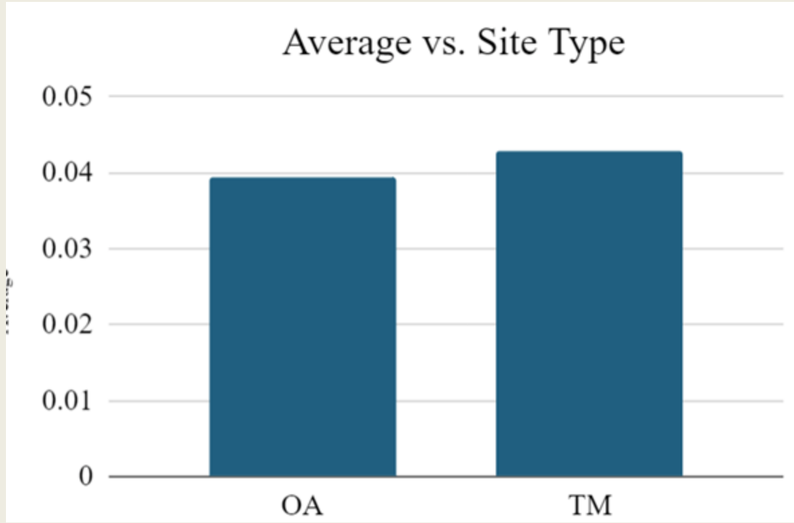
## Difference in type of site

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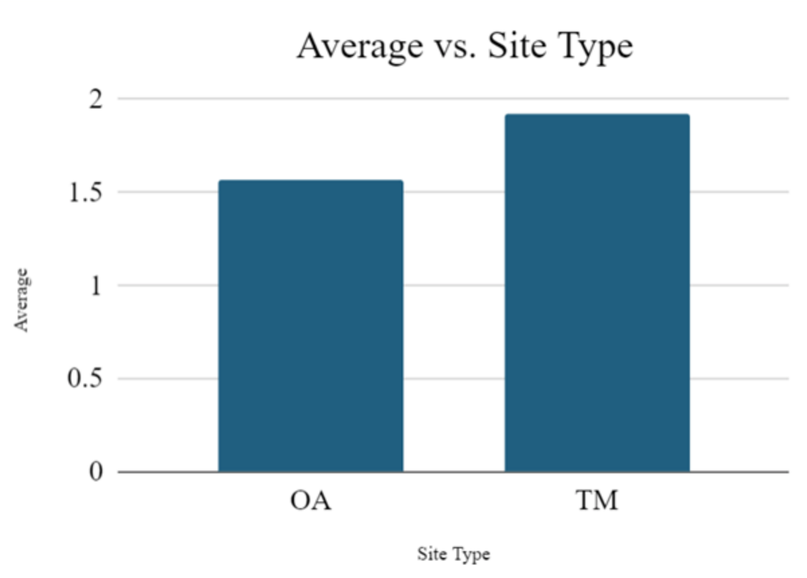
# Results: Phaeo

## Differences in type of site

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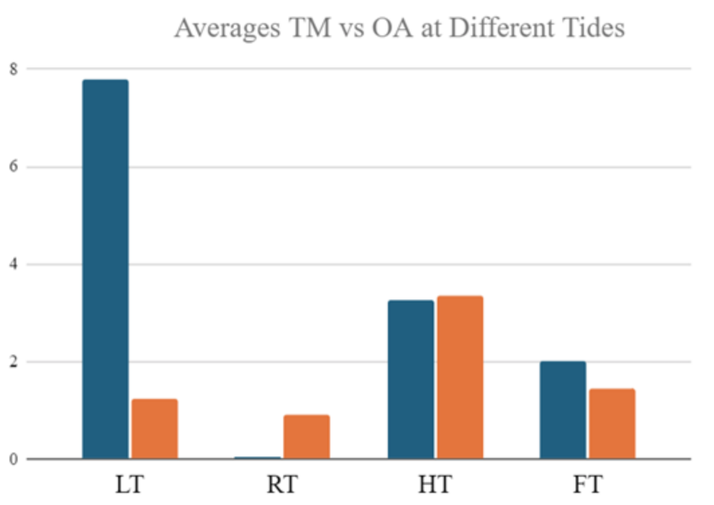
## Differences in tidal stage and type of site

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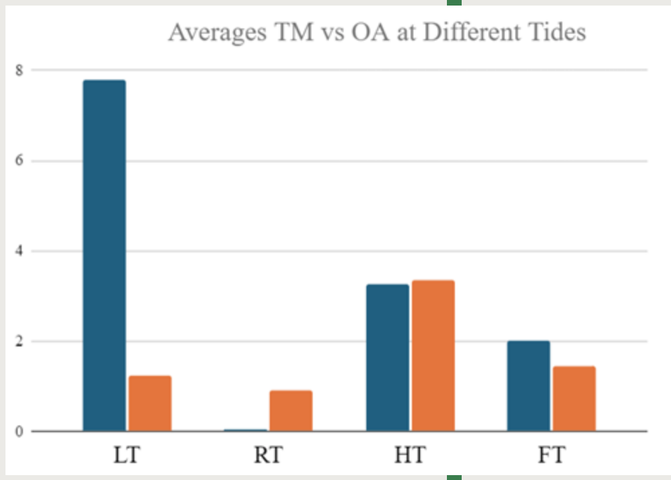
# Discussion

- Both TSS and Phaeo averages were higher at Tidal marsh sites compared to Oyster aquaculture.
  -Oyster filtration at OA

- Phaeo concentrations were significantly higher at low tide in Tidal marshes compared to Oyster Aquaculture.
  -more remineralization/degradation of organic matter in marshes

- Phaeo concentrations were much higher at low tides vs rising tides
  -estuarine flow during rising tides
  -water is less nutrient dense

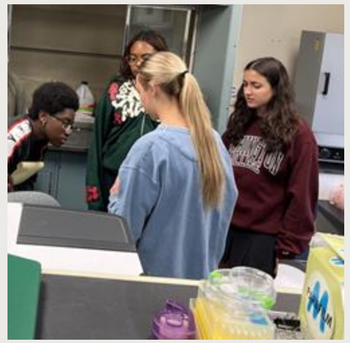


# Research to come

- This is just the beginning of research studying the coastal carbon cycle at different locations and types of sites.
  - Future analysis could involve more locations and testing during the different seasons.

- From this study we can see how fluxes in TSS and Phaeo could contribute to carbon distribution by comparing my data to that of Imani’s and Halina’s.

- Future studies will help determine how to handle these fluctuations and advance climate change research.

# Acknowledgments

-Congressionally Directed Spending 2023 (Earmark) "Morgan State University's PEARL Lab Student Research Enhancements."

-Dr. Amanda Knobloch as well as Halina and Imani

The lab experience and lessons I learn here I will take on with me and keep in mind throughout all of my future work! It was incredibly rewarding to learn so much about the area i grew up in!

Thank you PEARL!