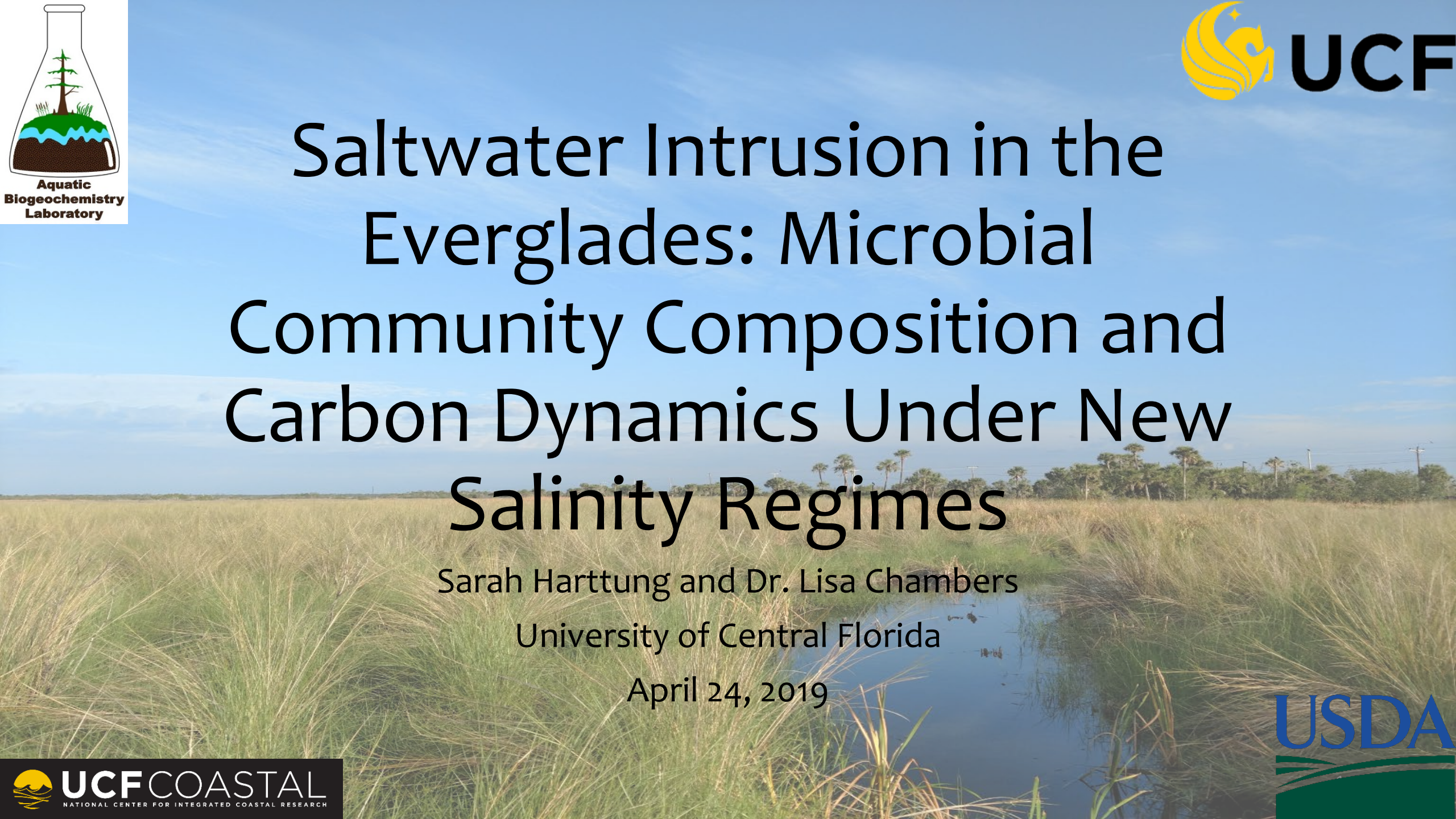


Saltwater Intrusion in the Everglades: Microbial Community Composition and Carbon Dynamics Under New Salinity Regimes

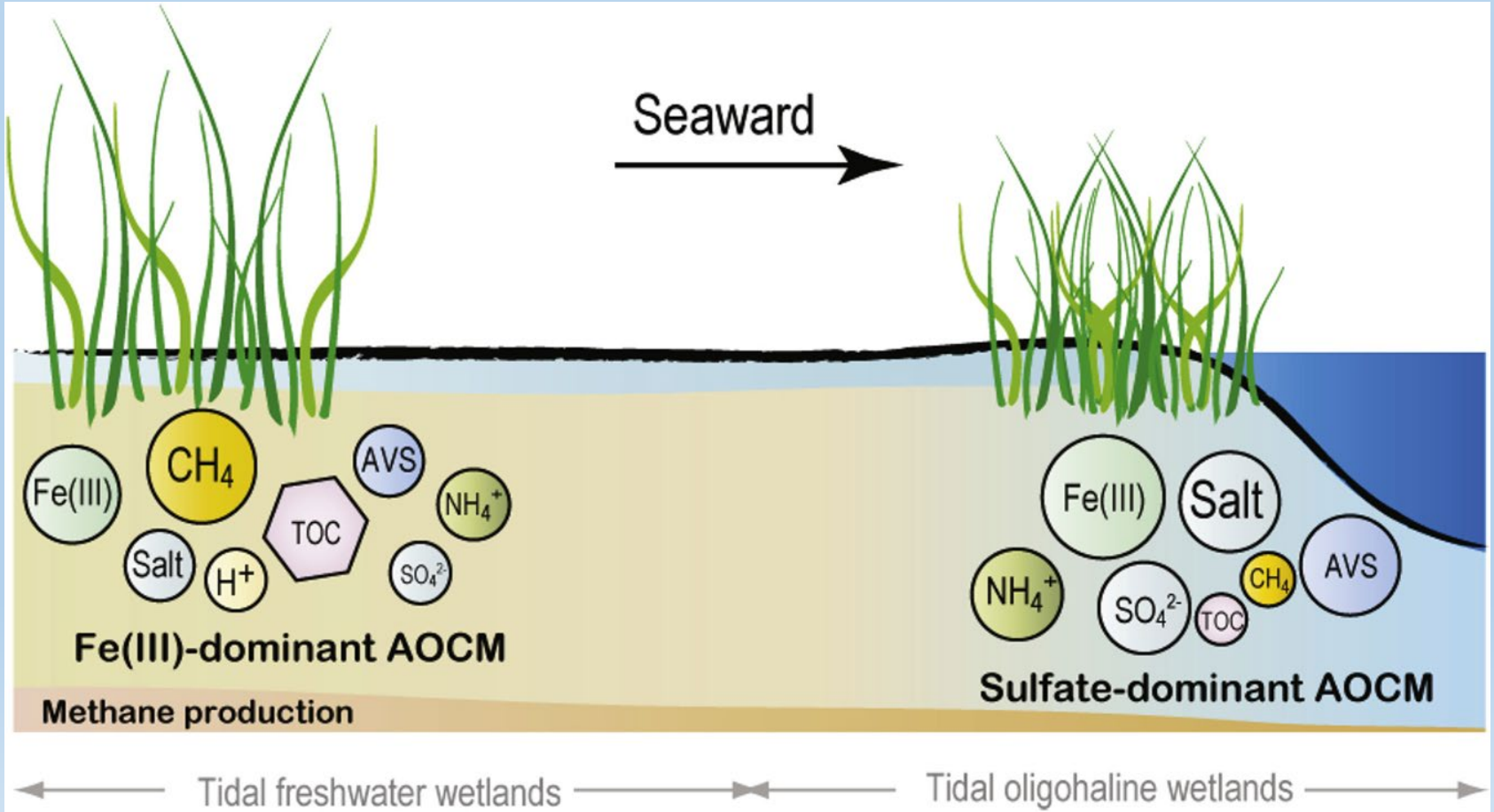
Sarah Harttung and Dr. Lisa Chambers

University of Central Florida

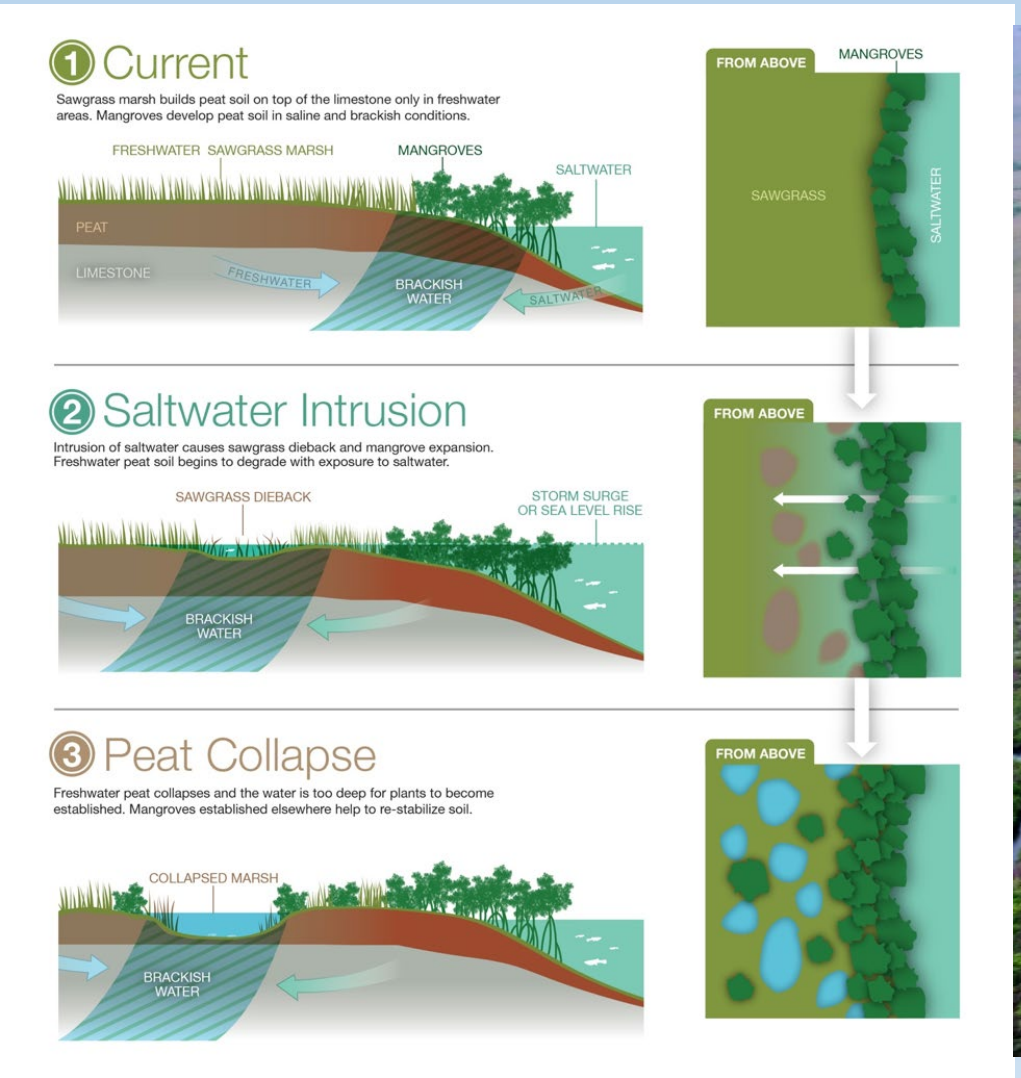
April 24, 2019

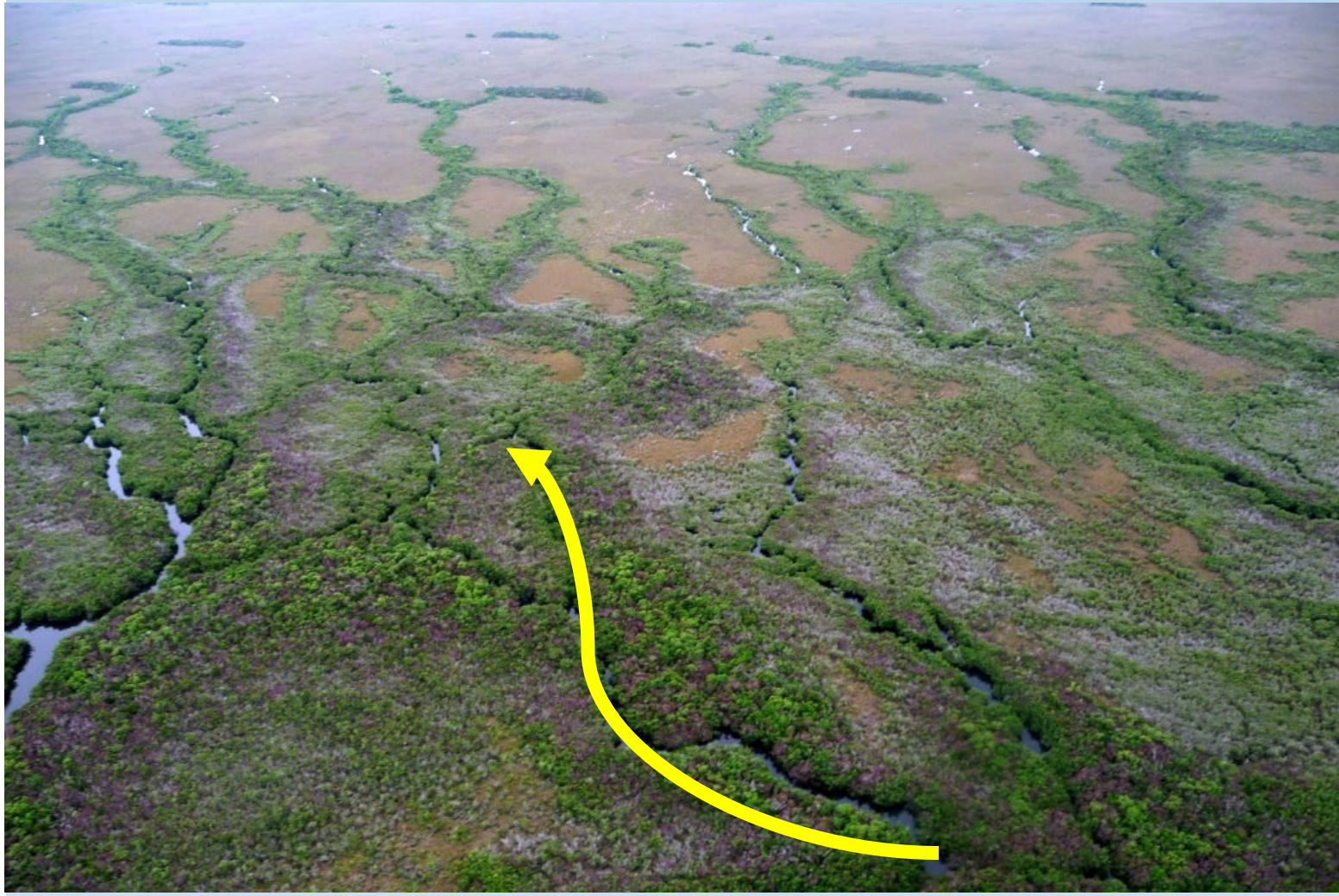
Saltwater intrusion drastically changes soil biogeochemistry.

"chemical, physical, geological, and biological processes and reactions that govern the composition of the natural environment"

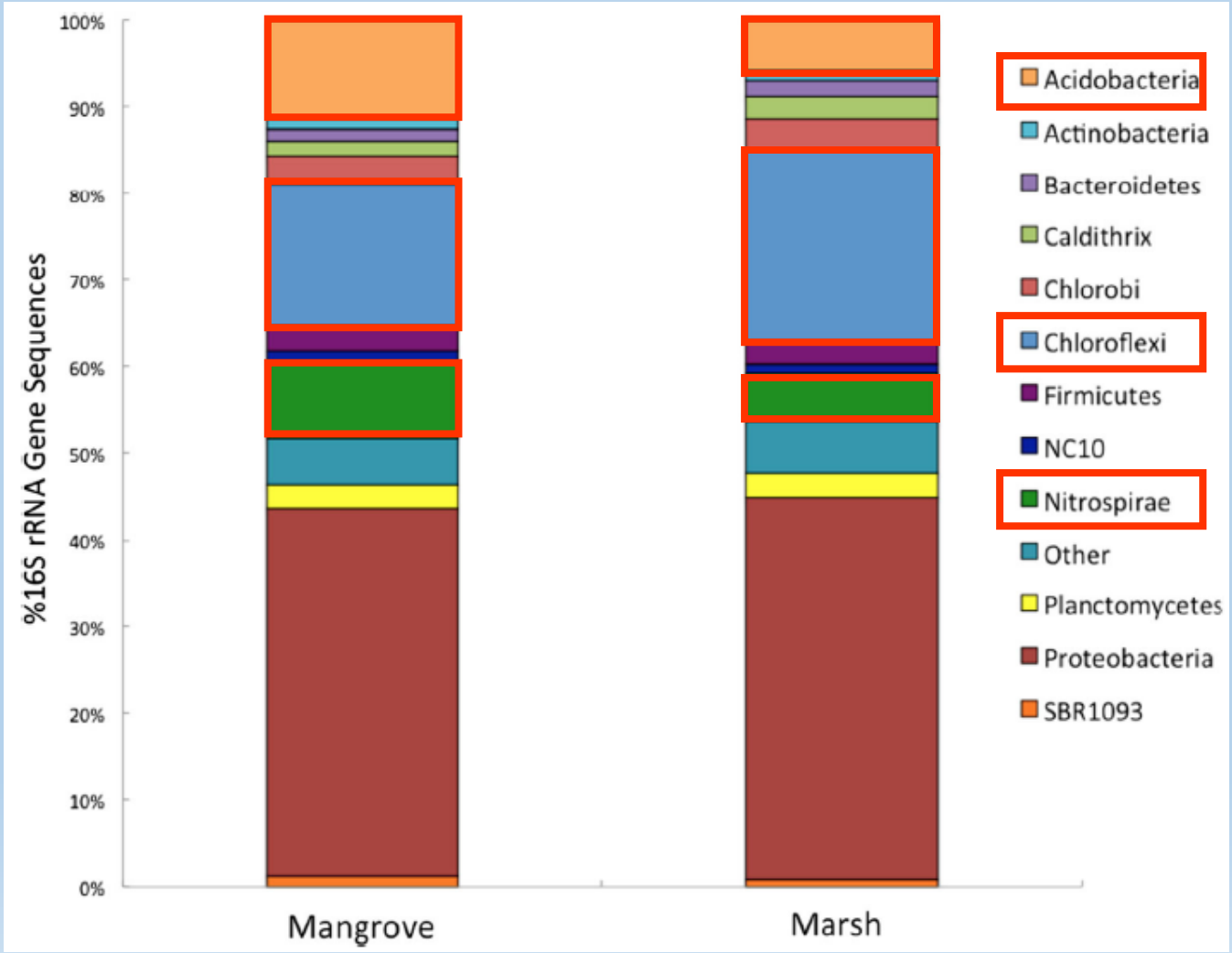


The Everglades are experiencing the effects of saltwater intrusion.





Microbial communities differ in marshes vs. mangroves.



Barreto et al. 2018

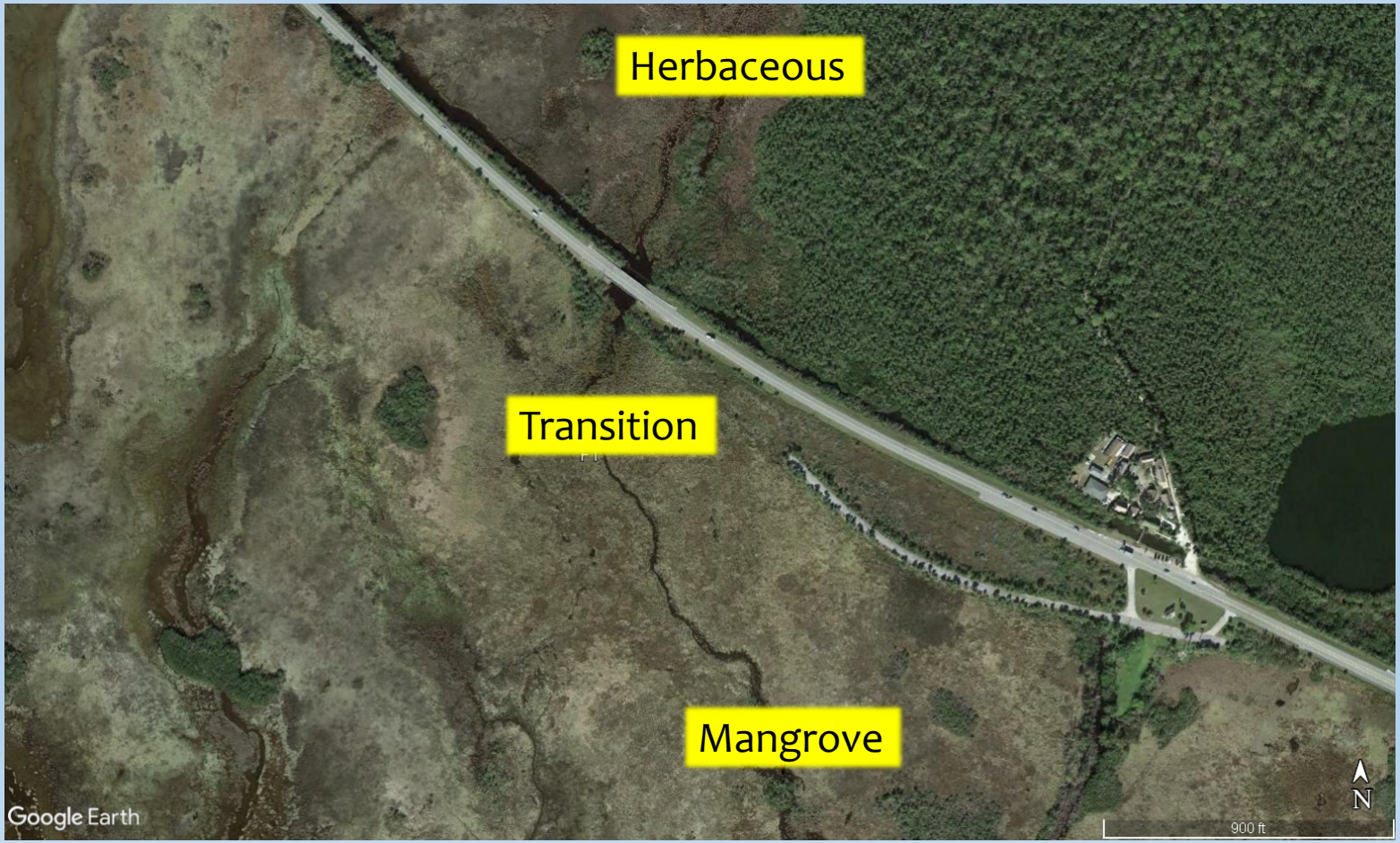
Question and hypotheses

Question: Does the response of soil microbial communities to increases in salinity depend on original vegetation community?

H_o: All soil microbial communities will respond the same to increases in salinity regardless of original vegetation community.

H_A: Microbial community response to increases in salinity will differ based on place of original vegetation community.

Study location – Fakahatchee Strand Preserve State Park



Soil biogeochemistry was assessed before the 2.5 month incubation.

August 2018

Bioavailable nutrient pools

NH_4^+

PO_4^{3-}

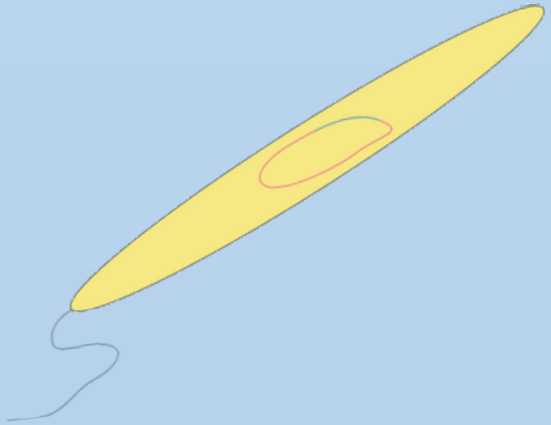
NO_3^-

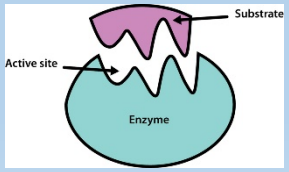
Total nutrient pools

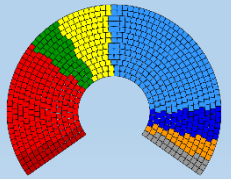
TN

TP

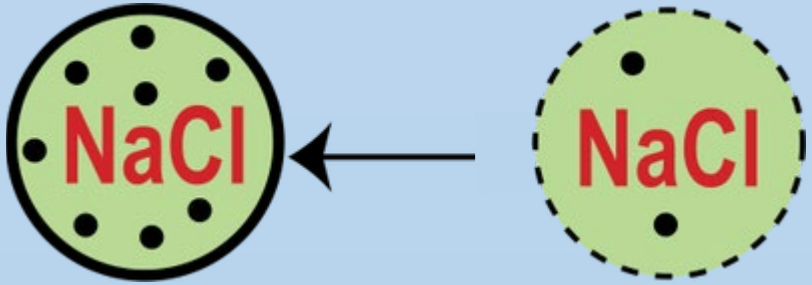
Microbial characteristics



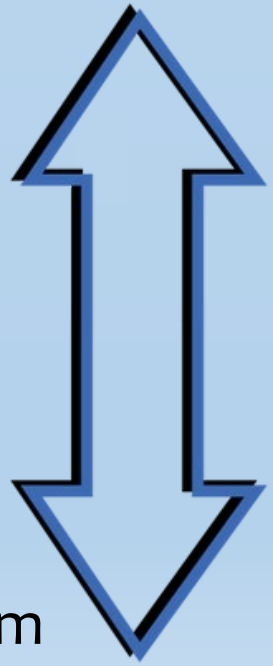




During the incubation, salinity was increased and CO_2 flux was measured biweekly.



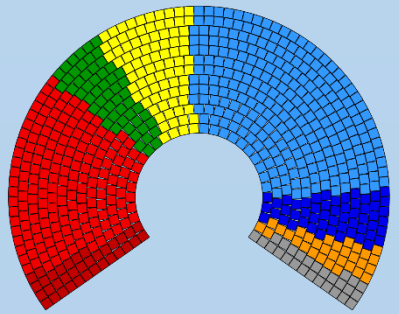
High tide = 5 cm



Low tide = 0.5 cm

August - October 2018

CO_2



All of the same parameters were measured after incubation as before.

Bioavailable nutrient pools

NH_4^+

PO_4^{3-}

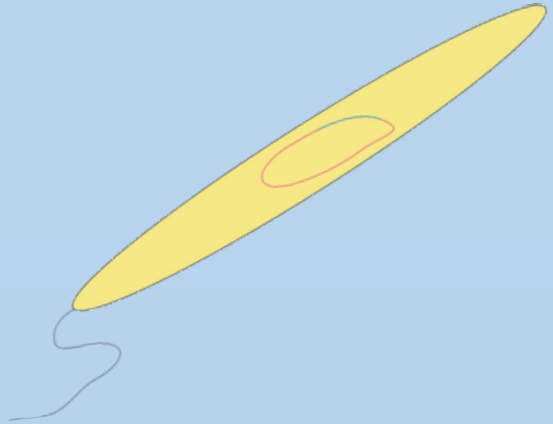
NO_3^-

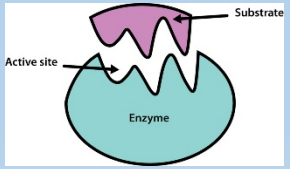
Total nutrient pools

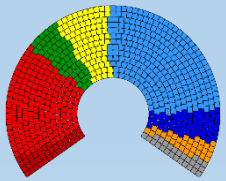
TN

TP

Microbial characteristics







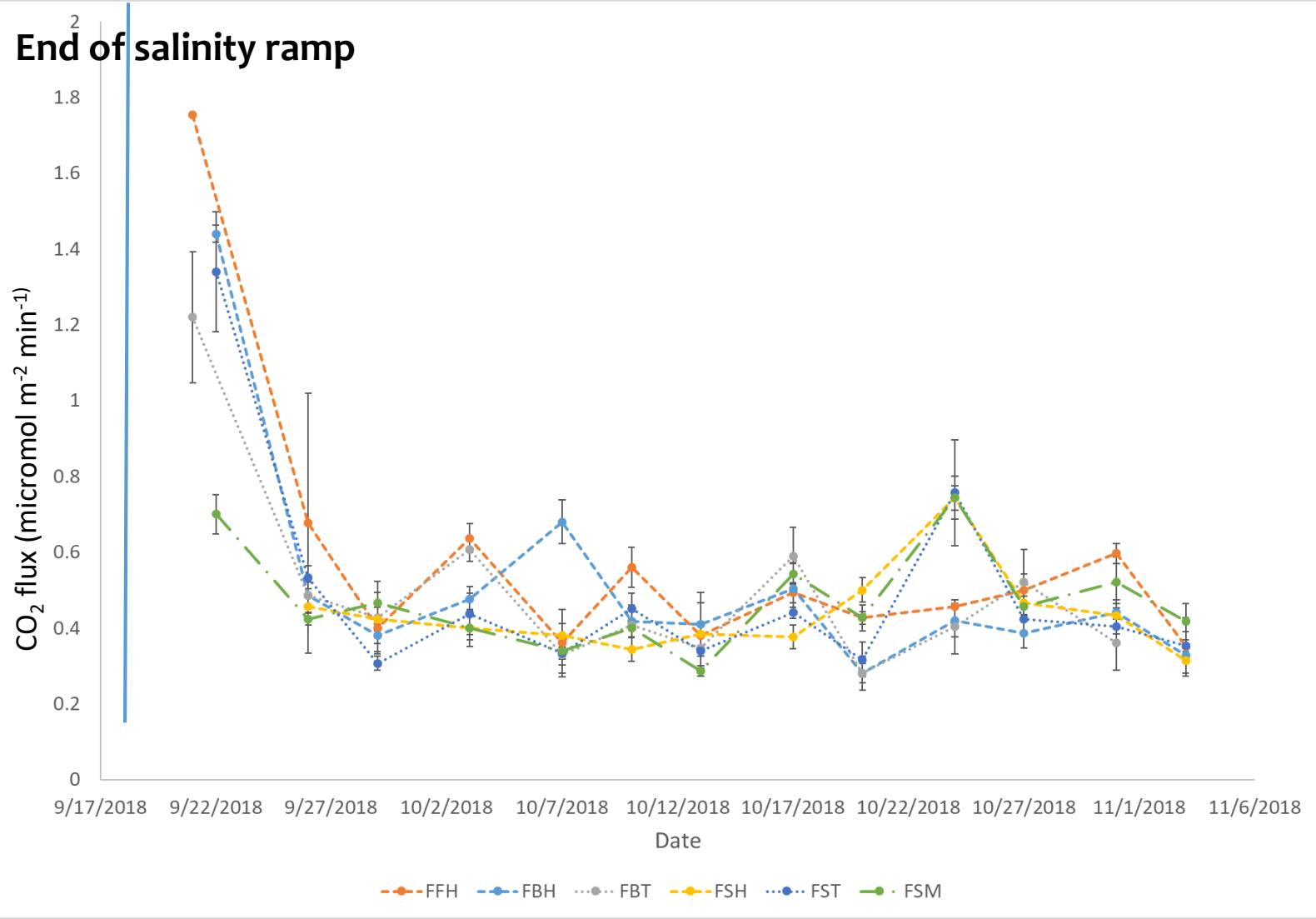
November 2018

Did the salinity treatments change anything?

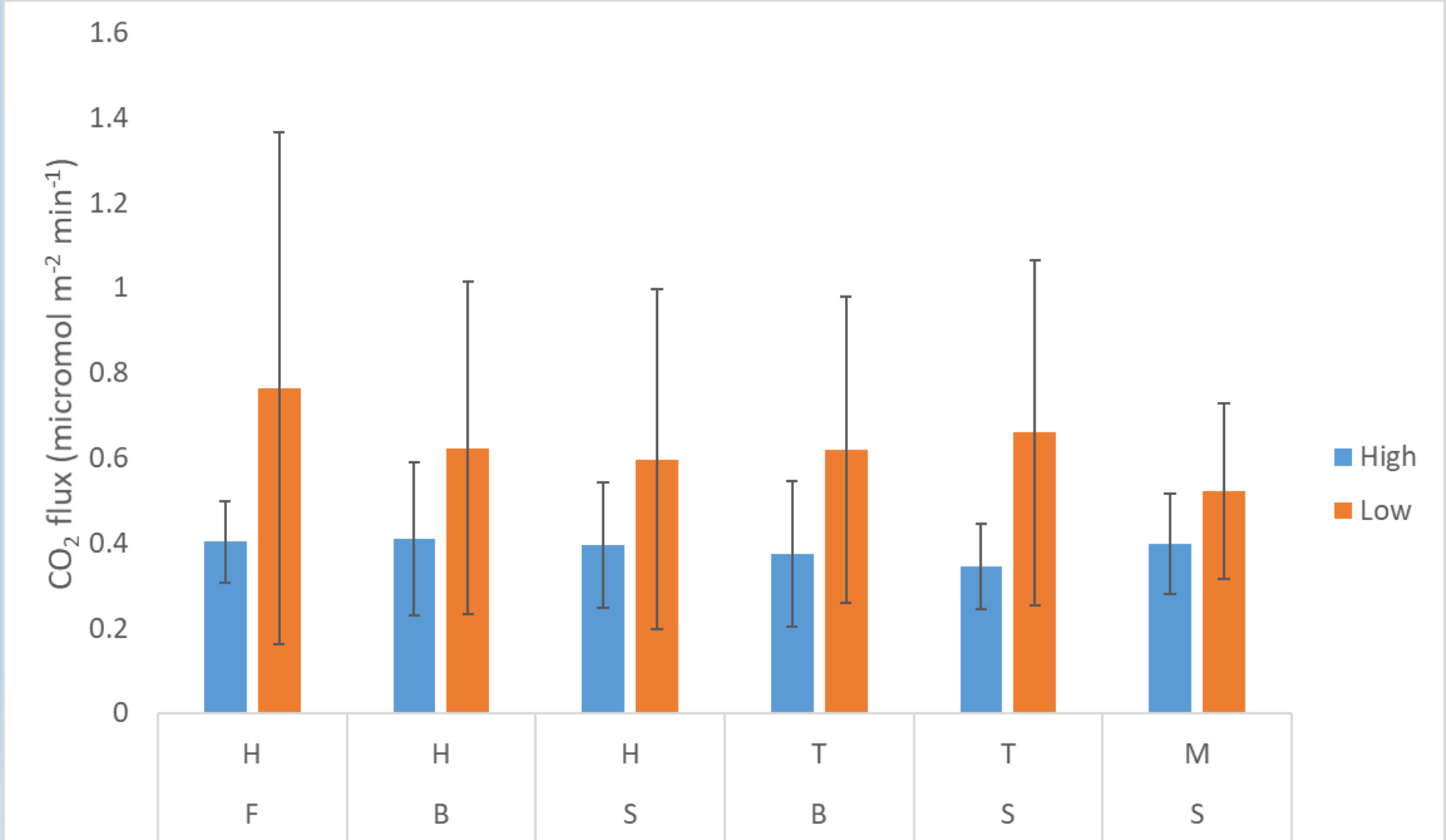
As of yet, no

Elevation, organic matter, microbial biomass carbon all decreased but responses were not different with treatment

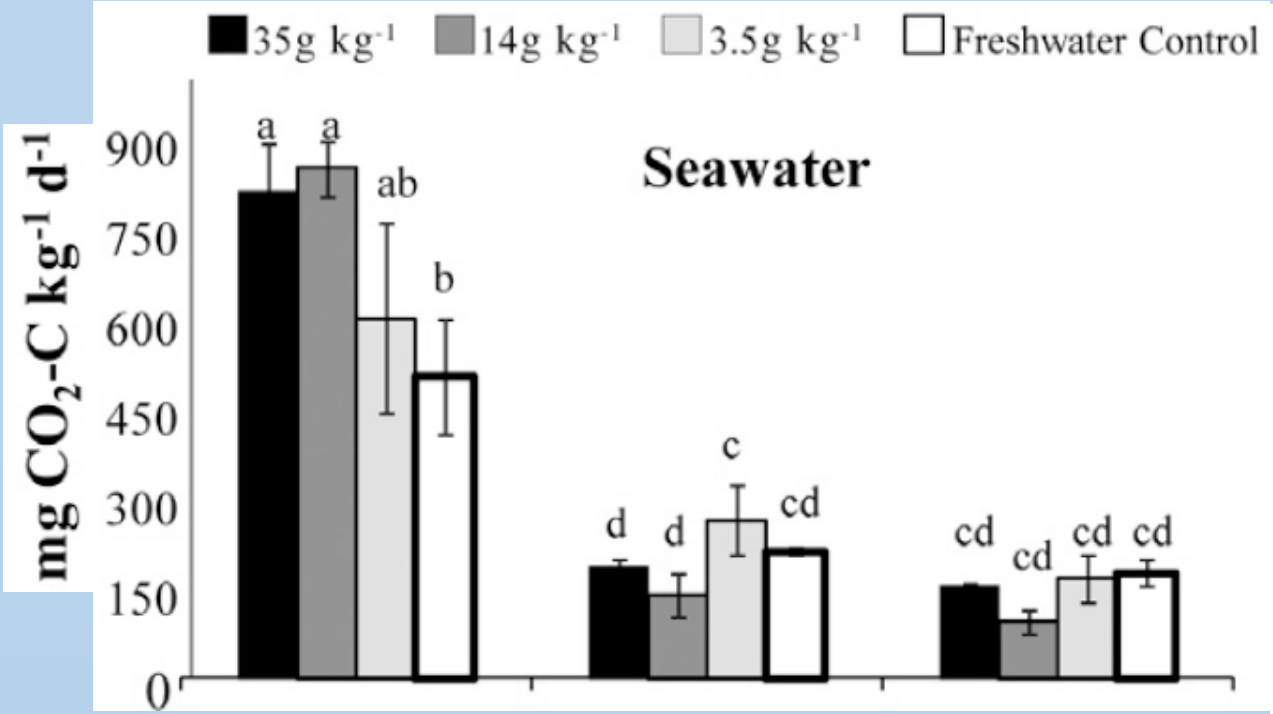
Instantaneous CO_2 flux did not differ between treatments.



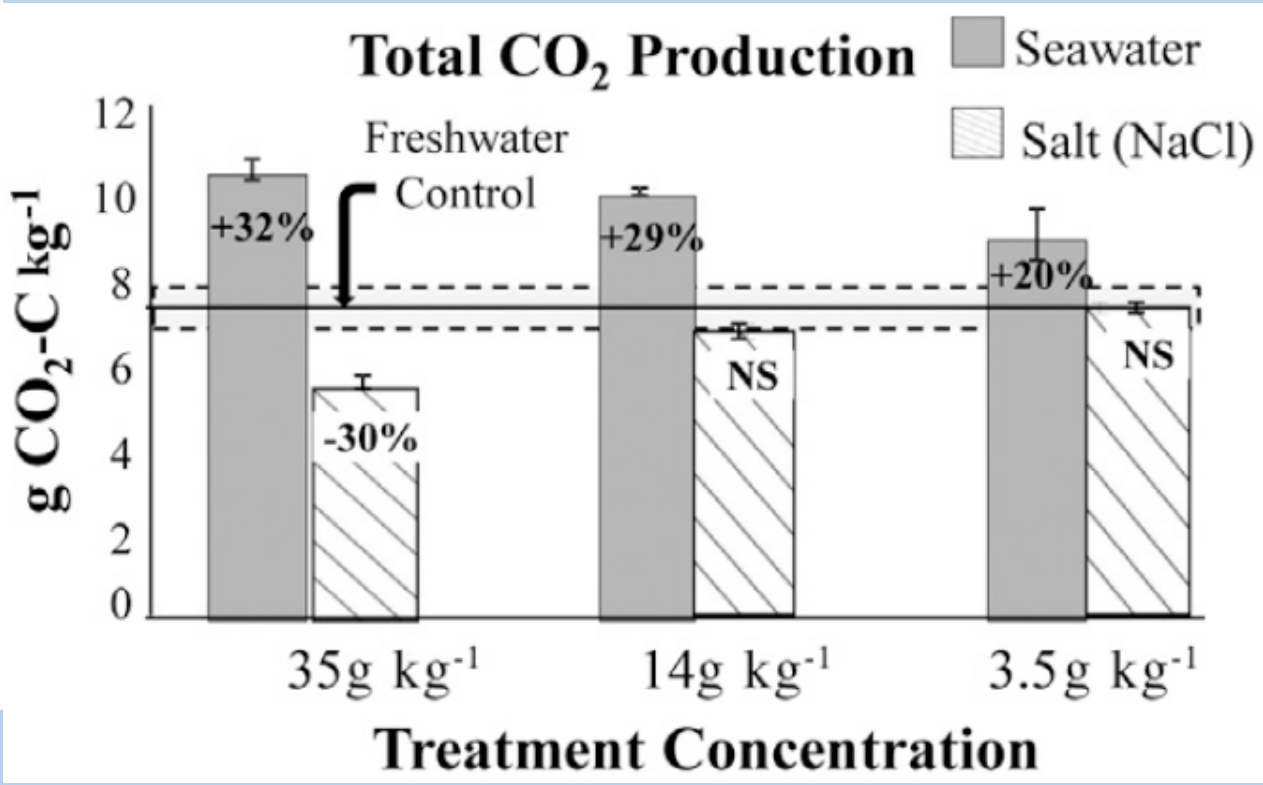
Average CO_2 flux did not differ between treatments.



These results are vastly different from other studies.

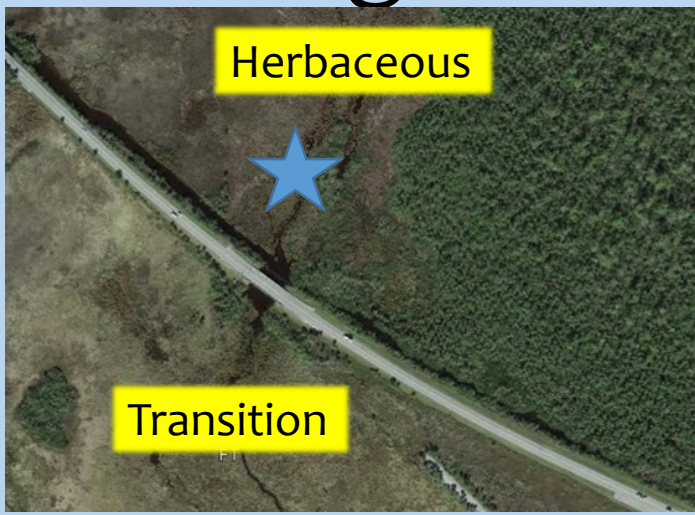


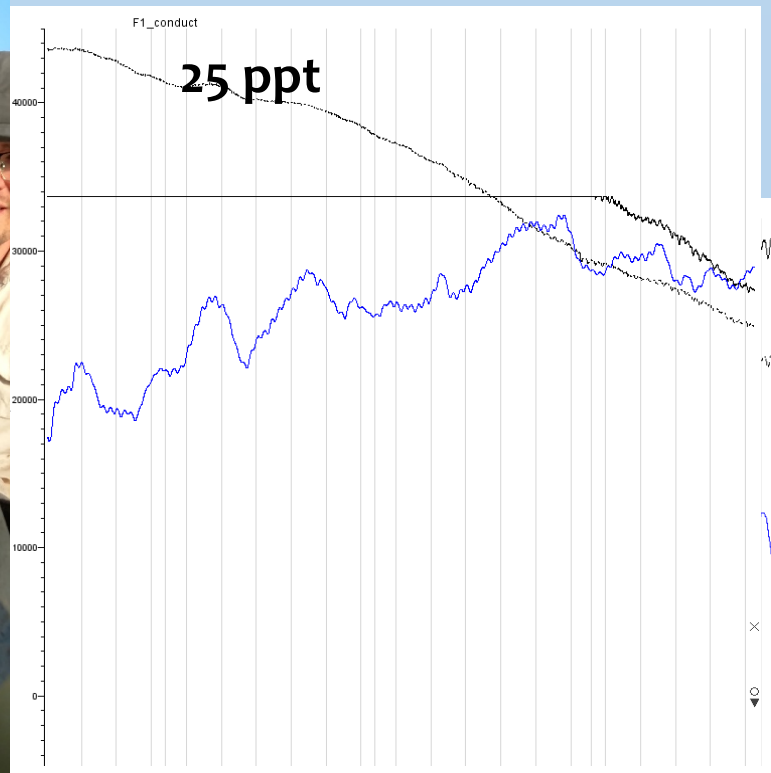
Chambers et al. 2011

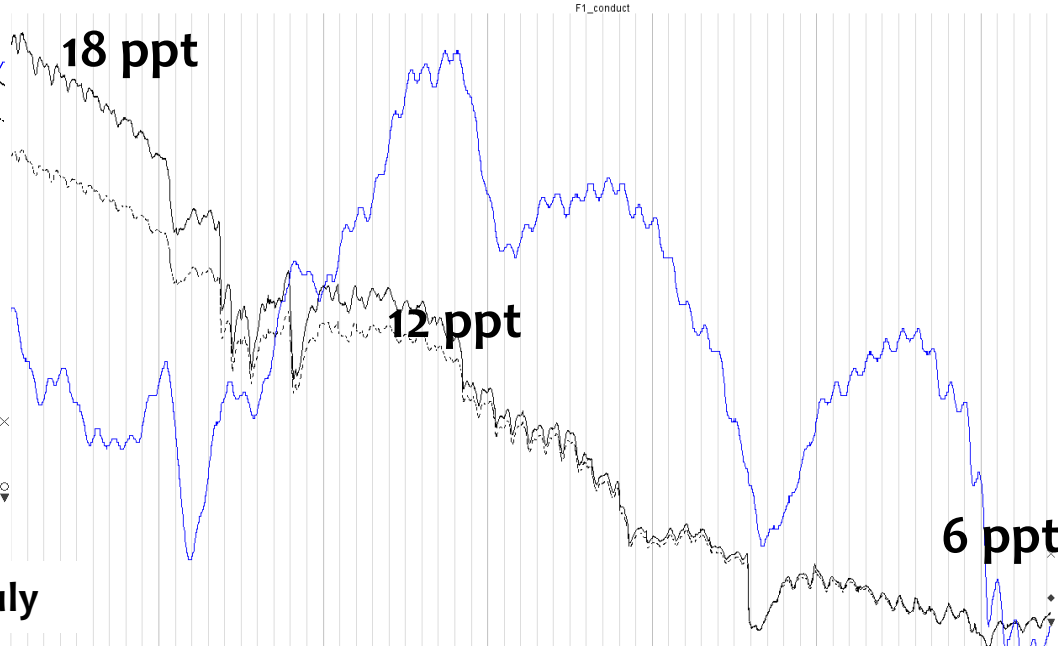


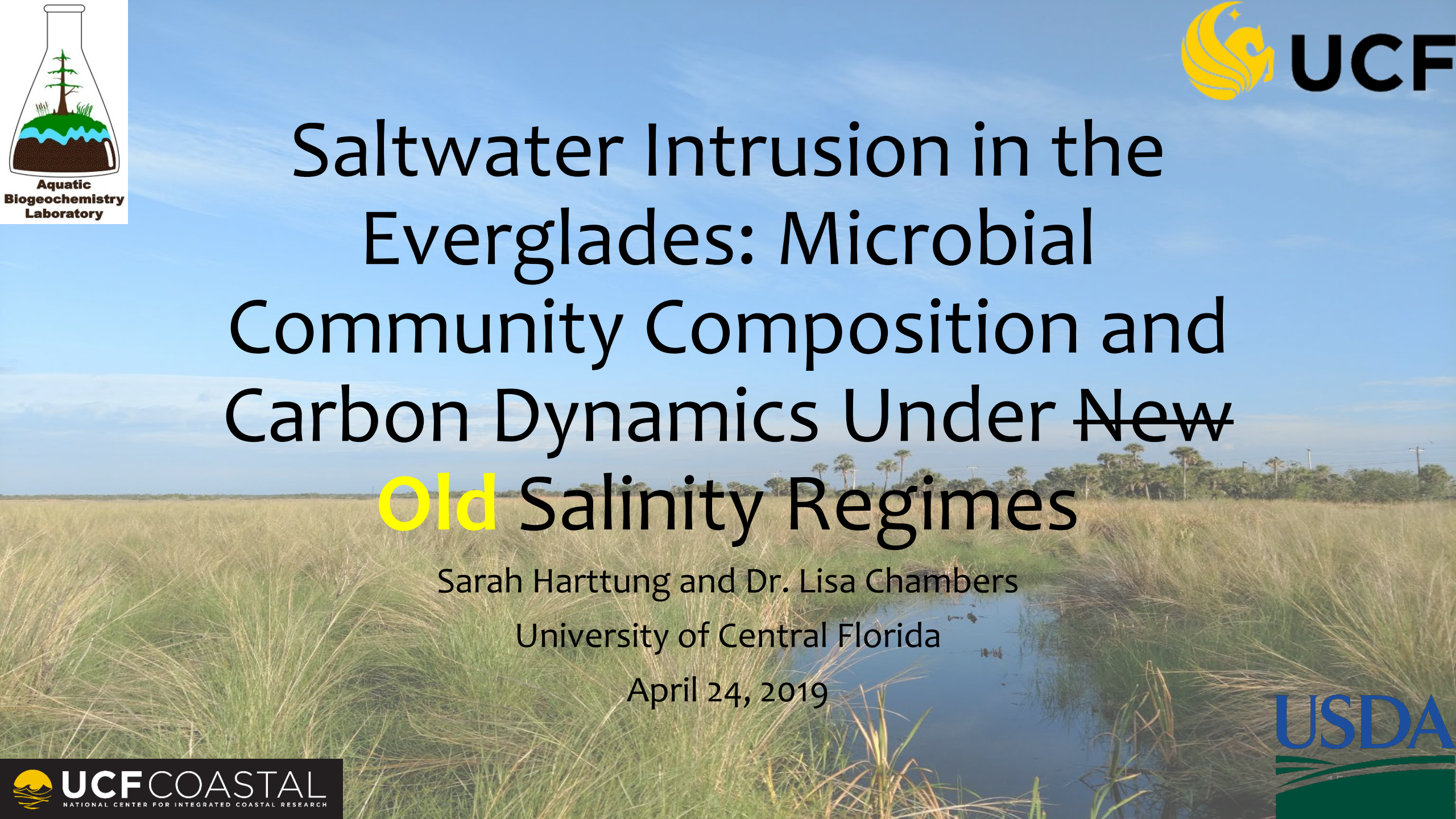
Short-Term Response of Carbon Cycling to Salinity Pulses in a Freshwater Wetland

The site is accustomed to exposure to high salinity.









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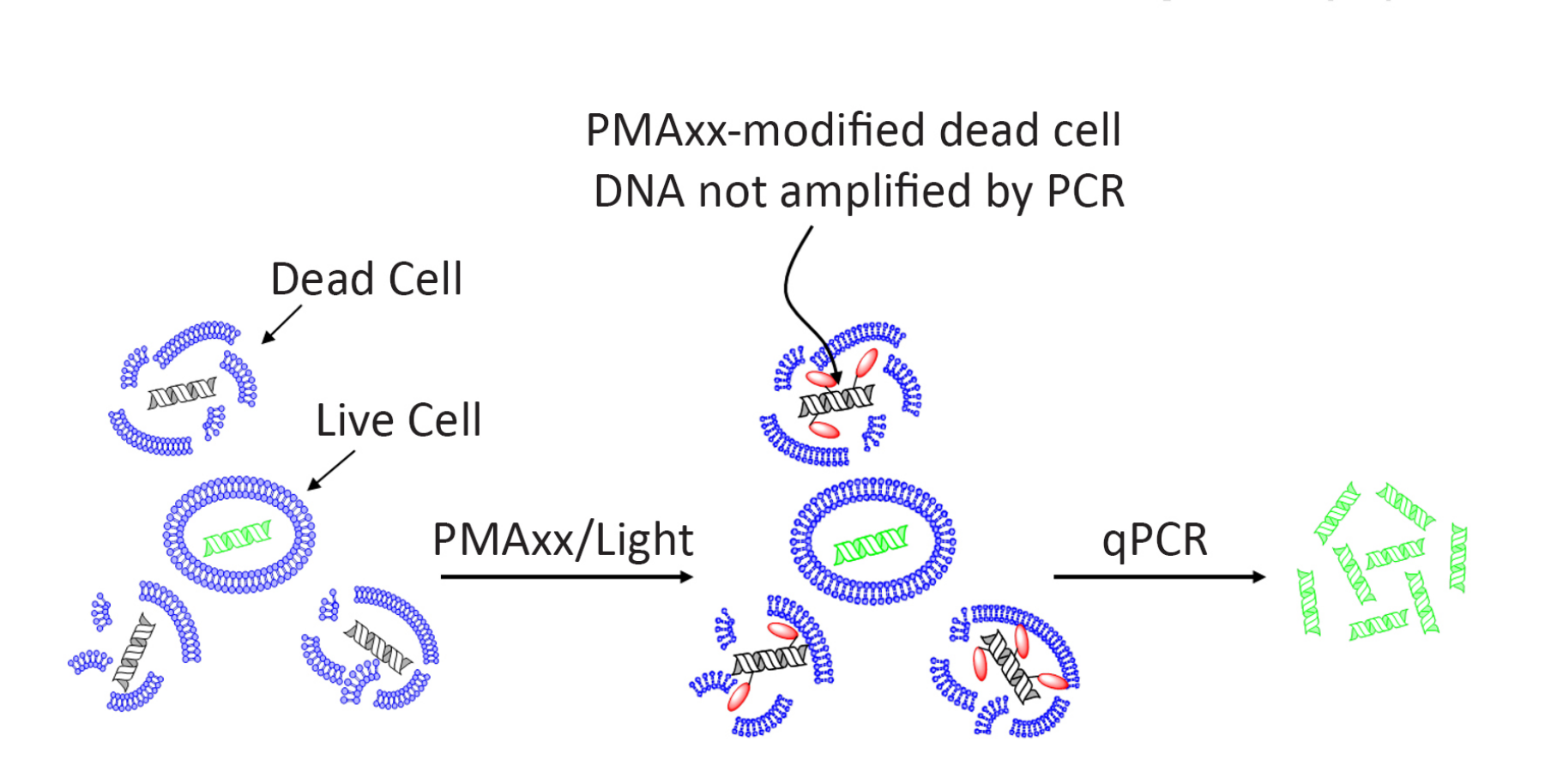
Future work includes a qPCR method that tests for viability.



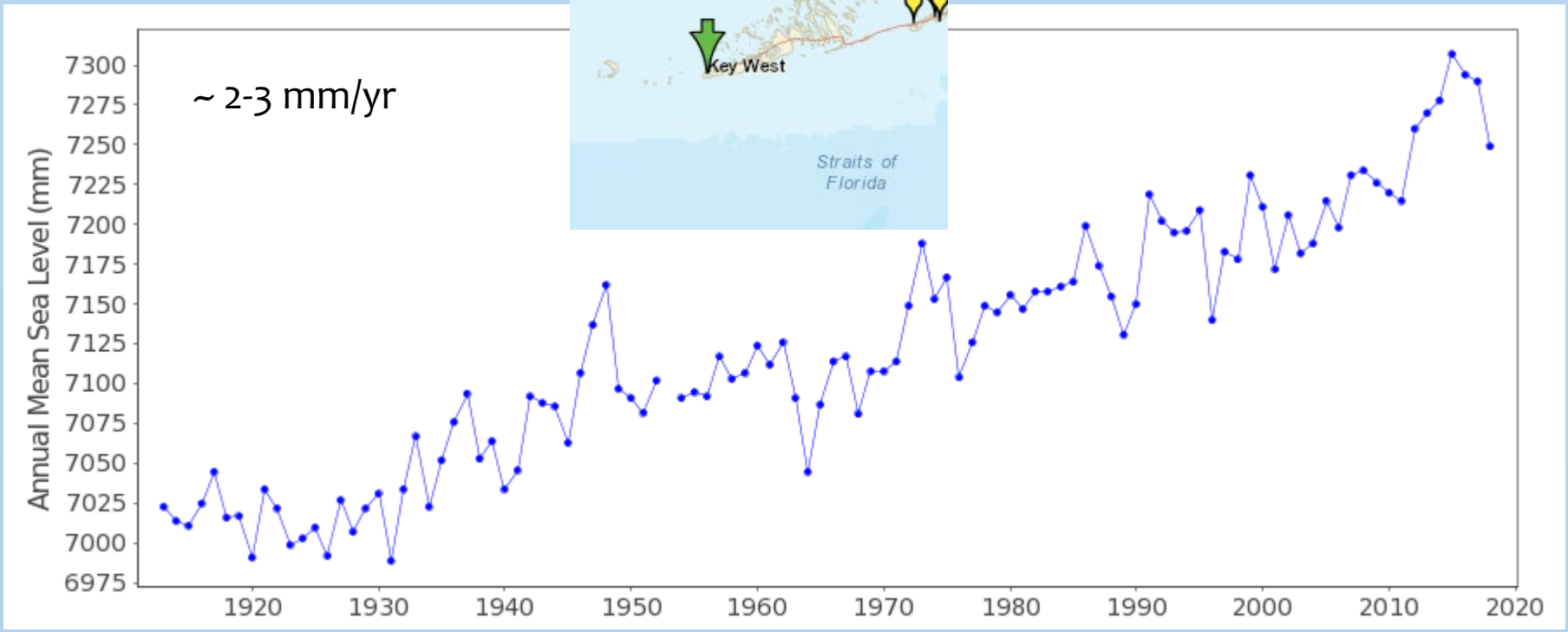
Based on these results, do I predict change in microbial community composition?

Unlikely

Thank you!

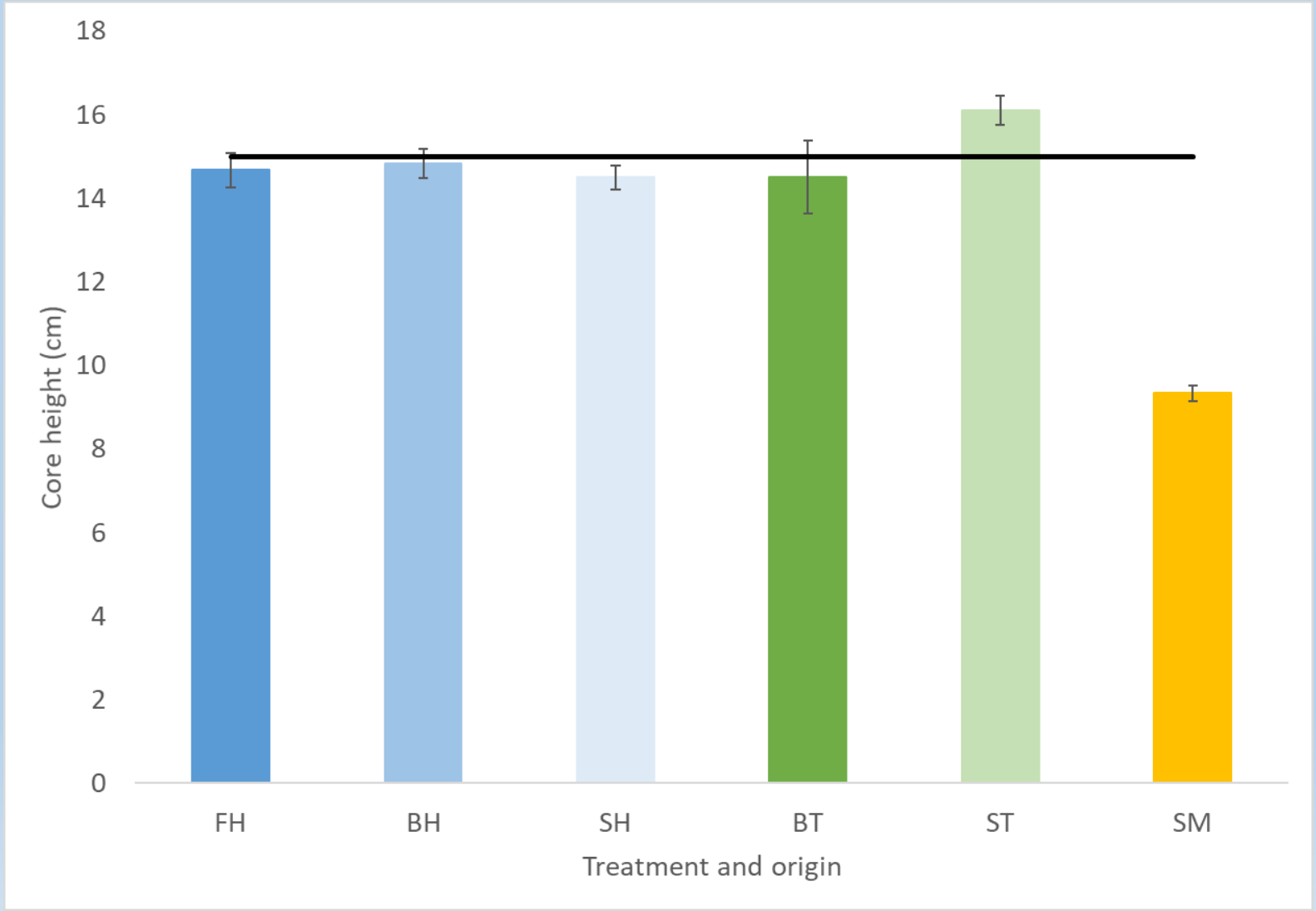
Extra slides

Florida's coasts are particularly vulnerable to sea level rise.



Permanent Service for Mean Sea Level

Most treatments lost height, likely from transport out of the core through the sides.



Sea level rise is not the only culprit.