

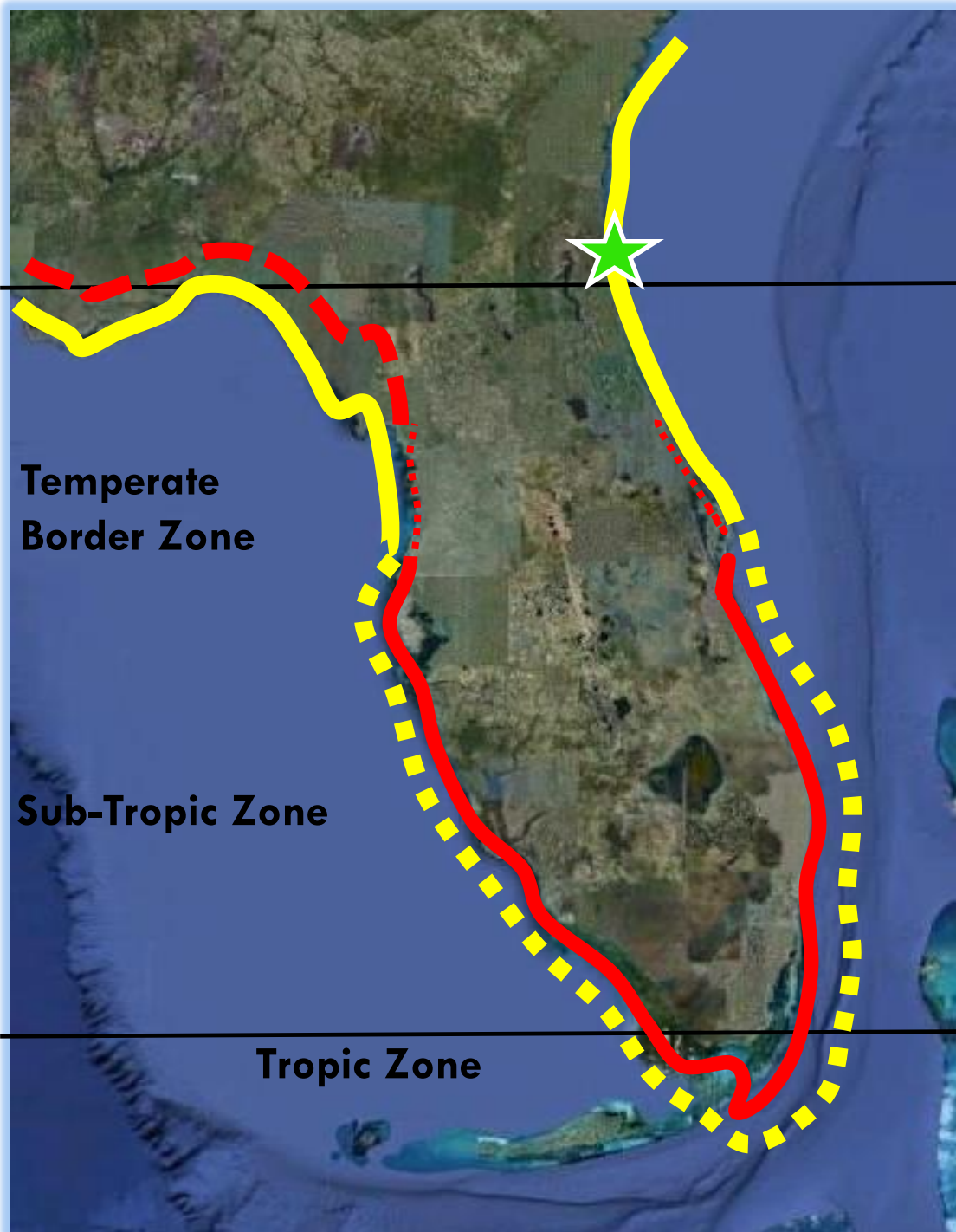


**How will mangroves and
marshes respond to warming
temperatures?: Early findings
from the WETFEET Project**

Samantha Chapman, Matt Hayes, Nikki Dix, Emily
Geoghegan, Chuck Hyde, Gabby Canas, Jim
Morris, Mark Hester, Adam Langley, Candy Feller

Some of the WETFEET team





29° 50' Latitude

Species Distribution Overlap

Mangrove Species

-  Dominant
-  Patchy

Salt Marsh Species


-  Dominant
-  Patchy

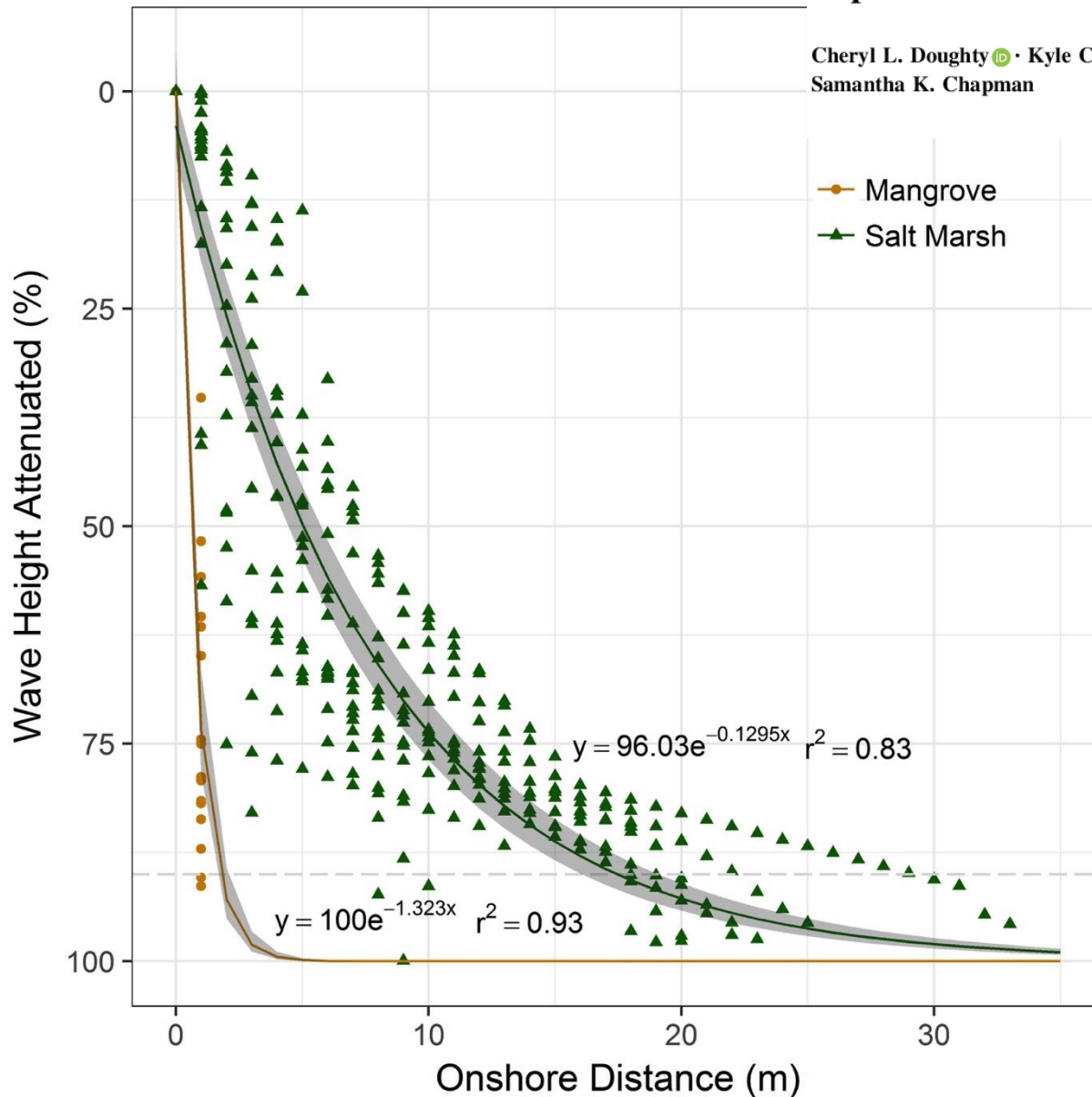
 Our sites at GTMNERR

25° 50' Latitude

Mangroves may provide different ecosystem services than marshes

Impacts of mangrove encroachment and mosquito impoundment management on coastal protection services

Cheryl L. Doughty  · Kyle C. Cavanaugh · Carlton R. Hall · Ilka C. Feller · Samantha K. Chapman



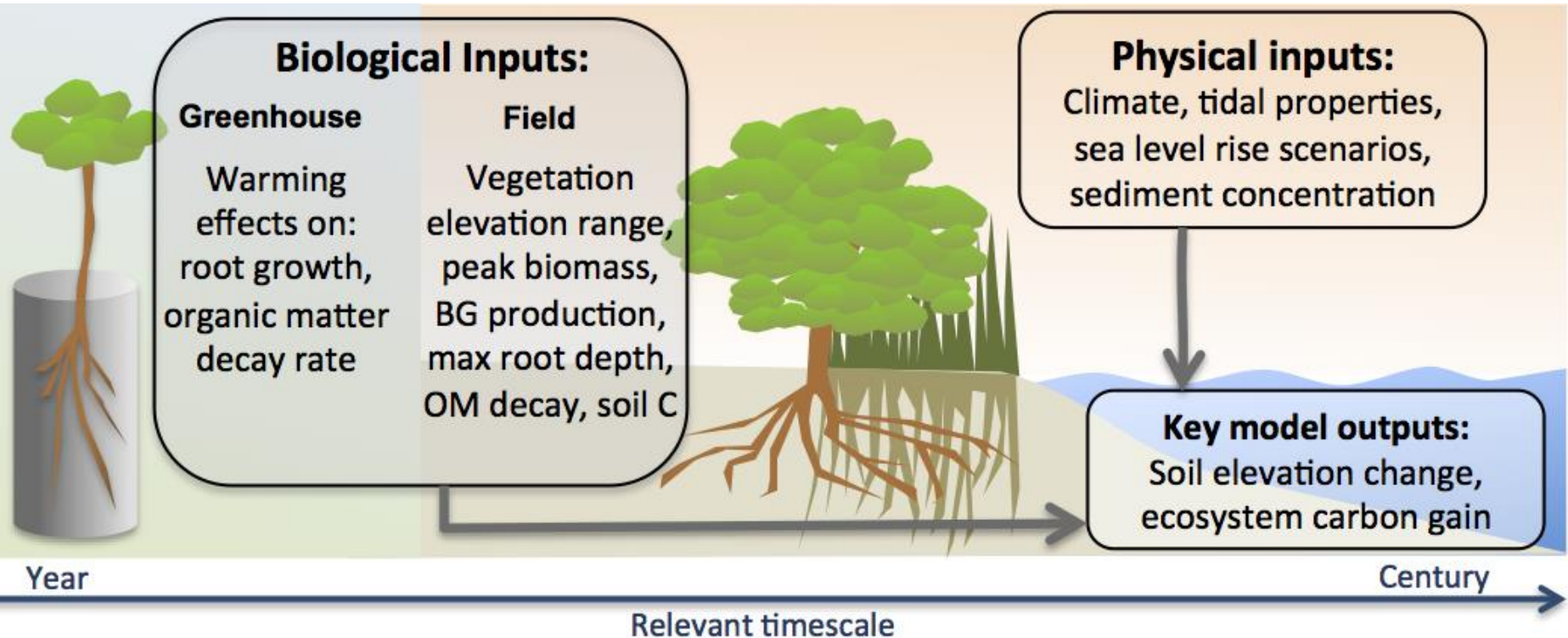
Mangroves attenuate 90% of wave height at 2m.

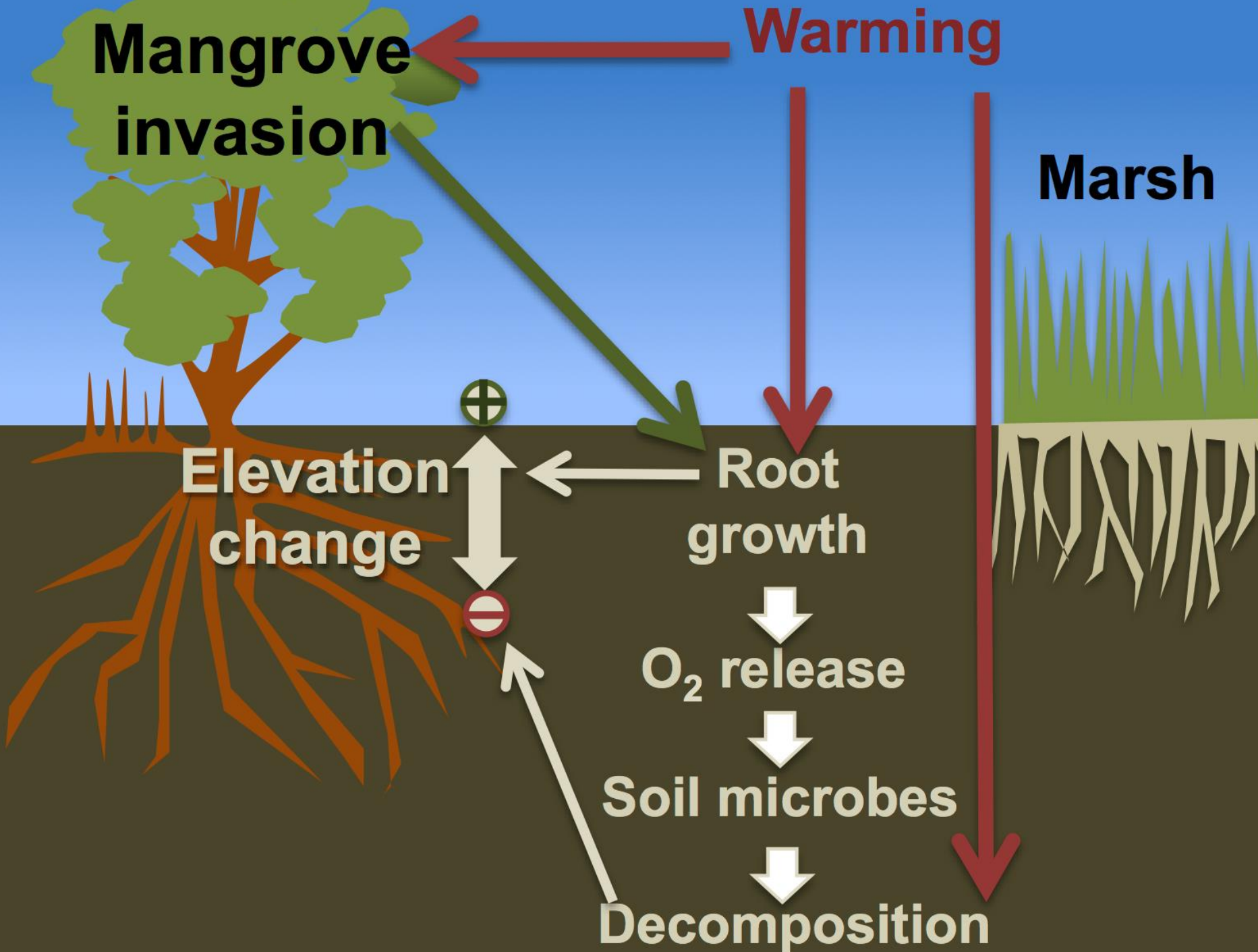
Marshes attenuate 90% of wave height at 20m.

Warming Ecosystem Temperatures in a Florida Ecotone Experiencing Transition



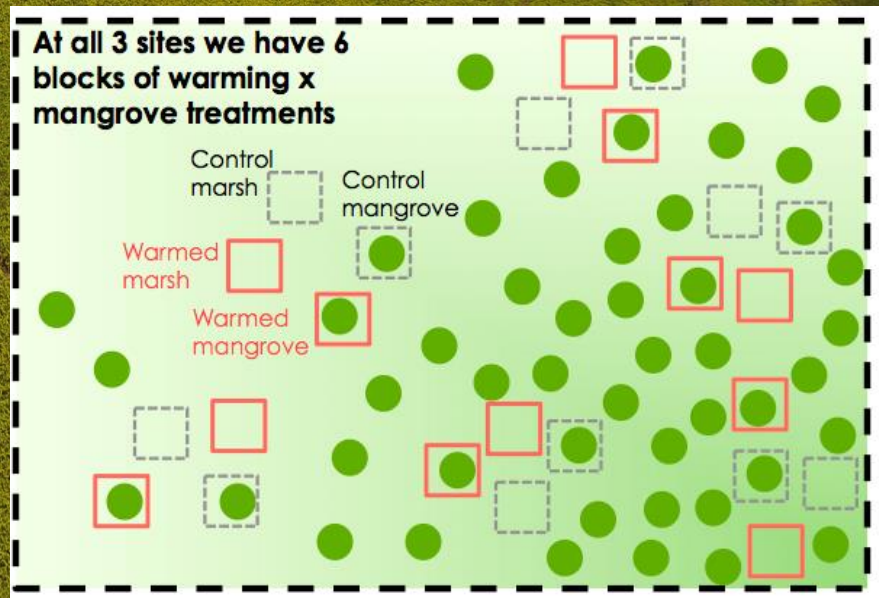
With co-principal investigators:
Candy Feller (SERC), Mark Hester (ULL), Jim Morris (USC), Nikki Dix (GTMNERR), Adam Langley (Villanova), and Matt Hayes (Villanova)





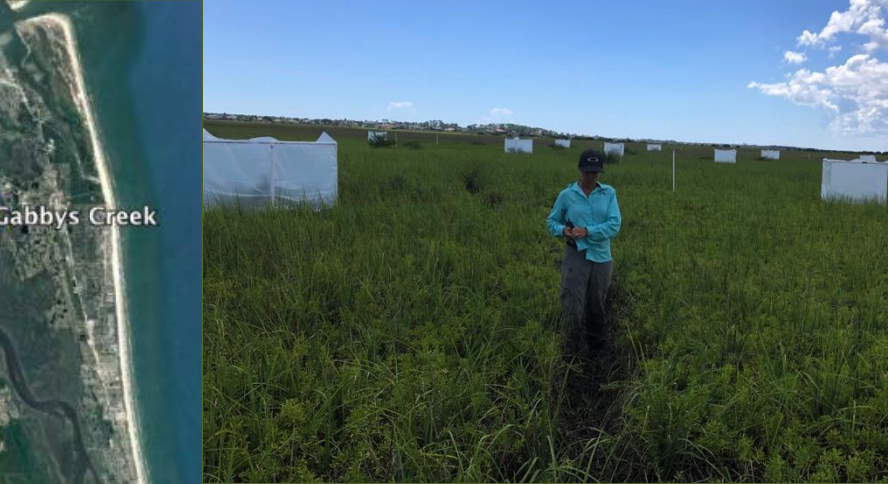


Warming experiments- 3 sites in N. Florida across gradient of mangrove encroachment



**Fewest
mangroves**

Big Mama



**Intermediate
mangroves**

Gabbys Creek



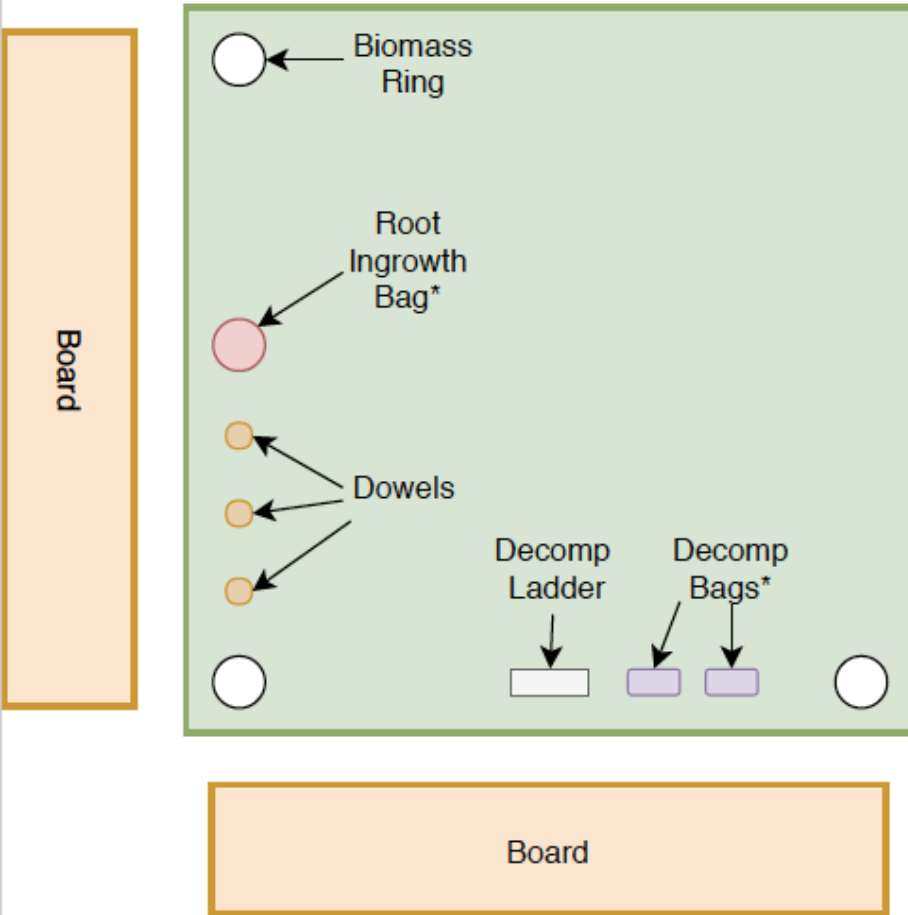
**Most
established
mangroves**

NMAT



Warming chamber design

Chamber Installation Setup



By Emily Geoghegan

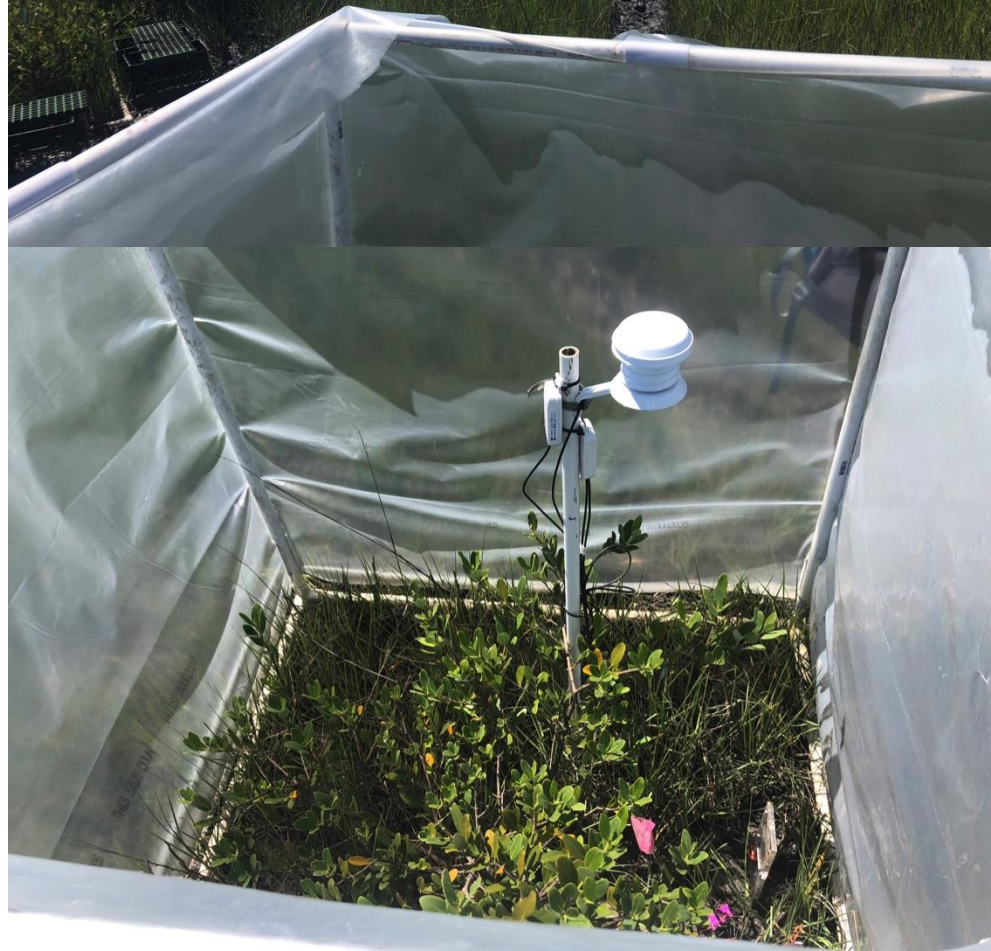
*Placement varies slightly
in each chamber



Gabby Canas



Matt Hayes



Drone Imagery of site nearest to GTM

All sites have been color coded so that Block and Treatment can be identified from drone and plots monitored without additional walking in the marsh.



Drone imagery by Mike Dixon

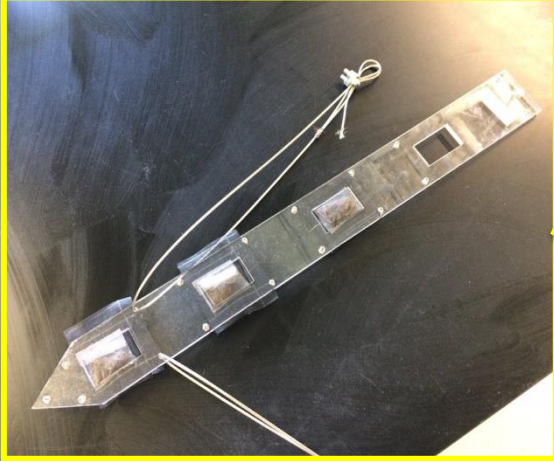


Site ID system designed by Gabby Canas

Violet and
White: 5MW

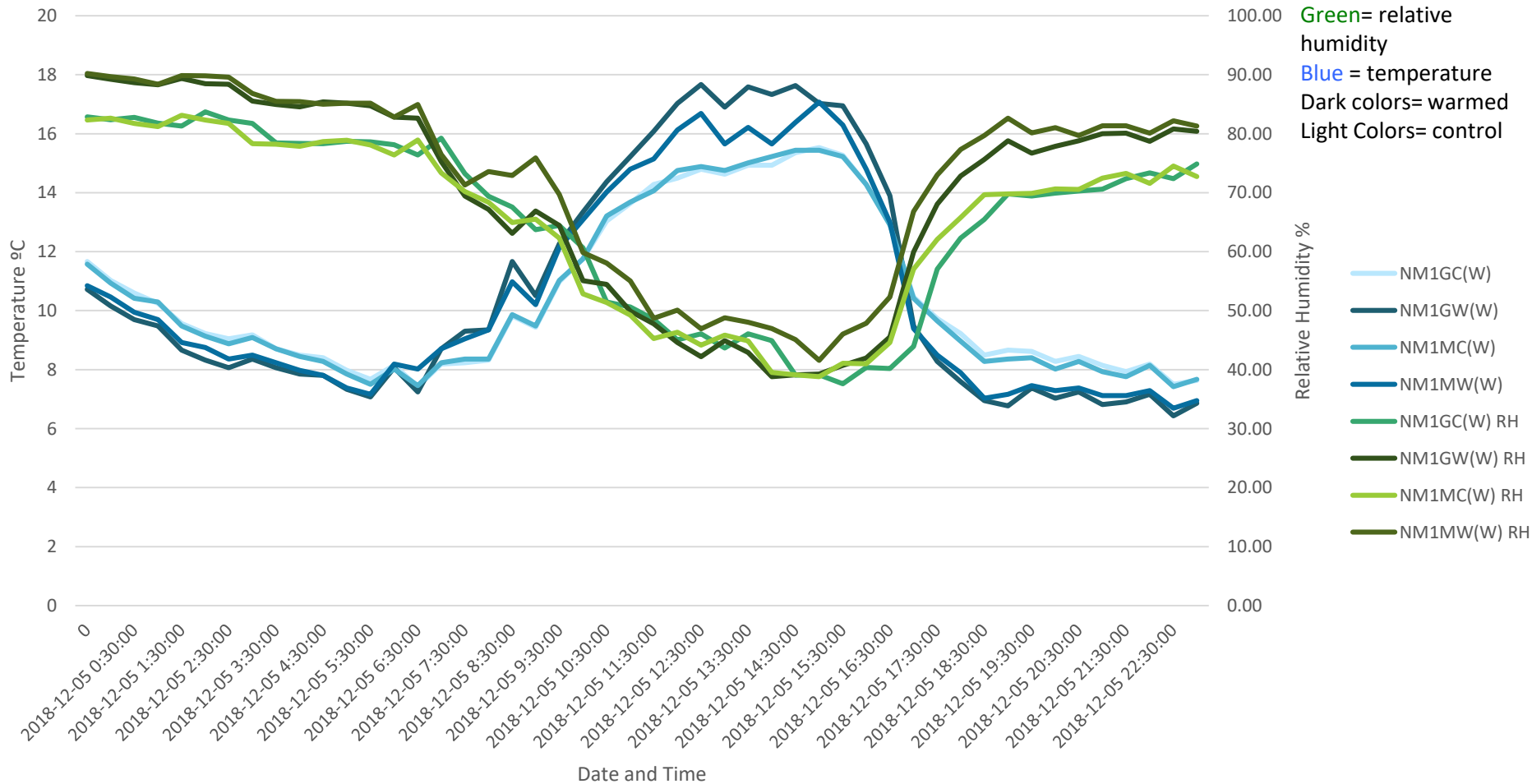


Violet and Black: 5GC



Temperature Data at NMAT Site i.e. Warming is working! 😊

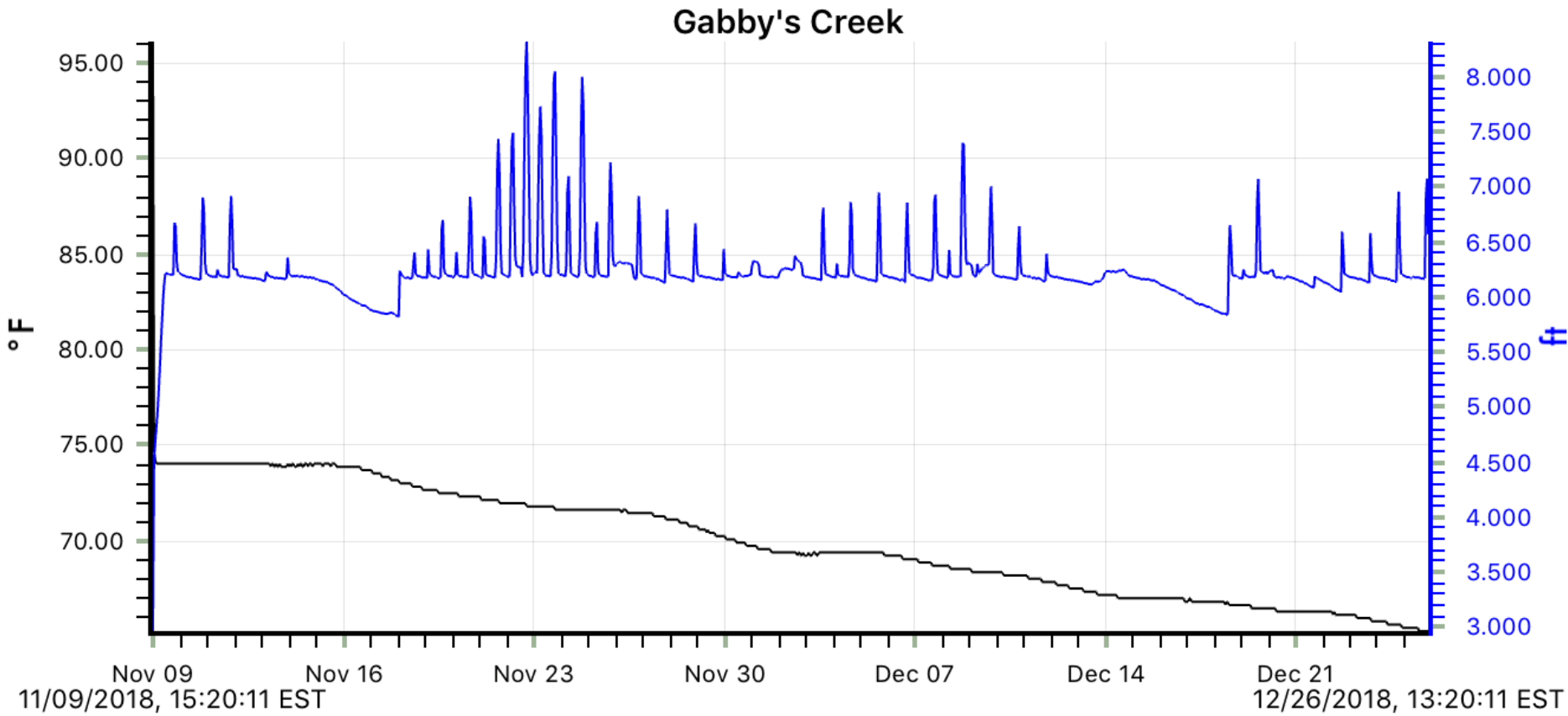
North Matanzas 24hr Temp Comparisons (12/5/18)



By Gabby Canas

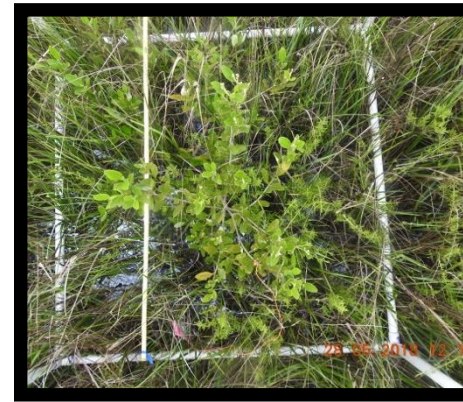
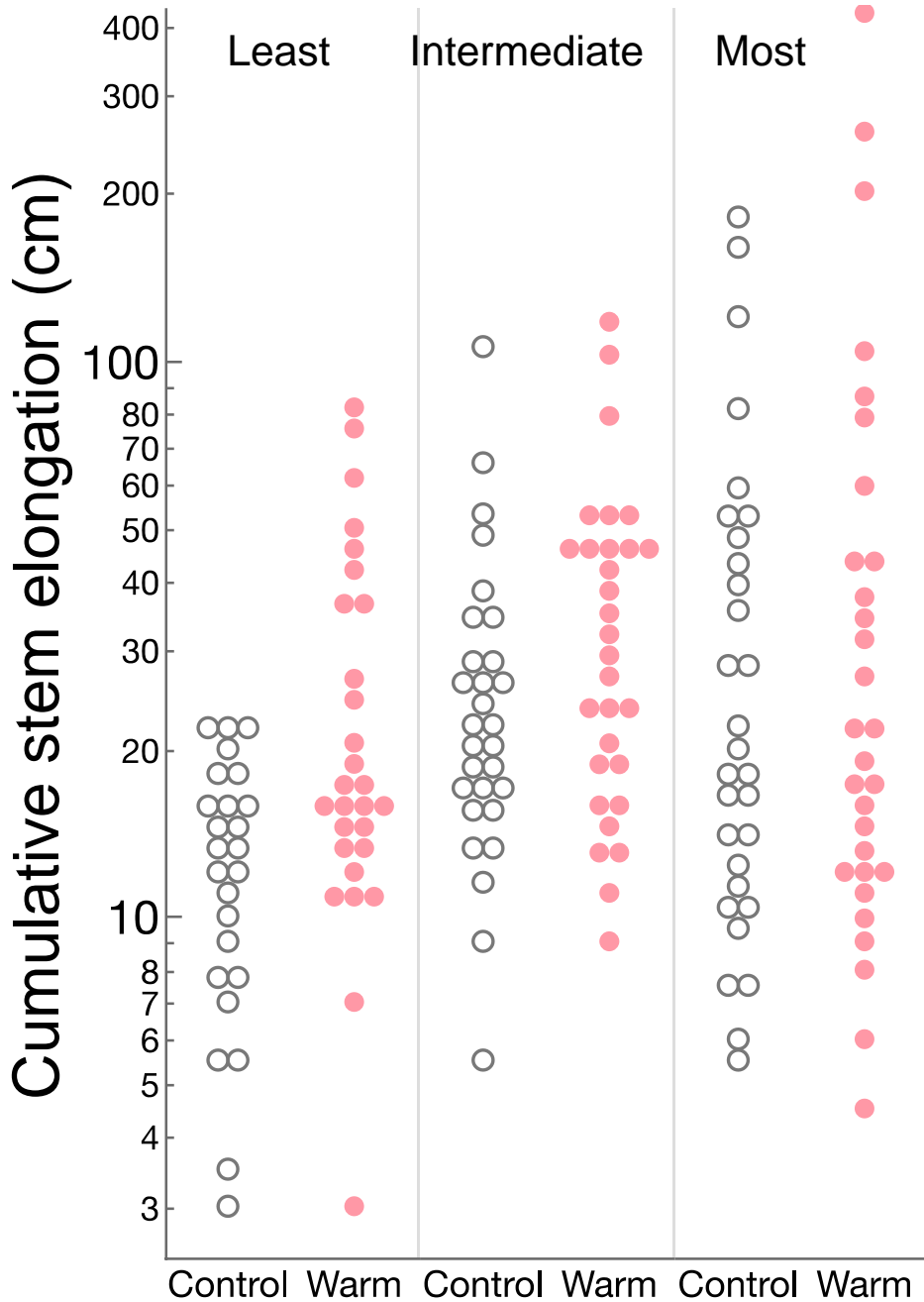
Water Level Logger Data at Gabby's Creek

Blue = water level



By Gabby Canas

Degree of mangrove encroachment



Control



Warm

Warming increased mangrove stem elongation after only 6 months

The most northern site (GTM), which has the least mangroves, exhibited the largest warming effect.

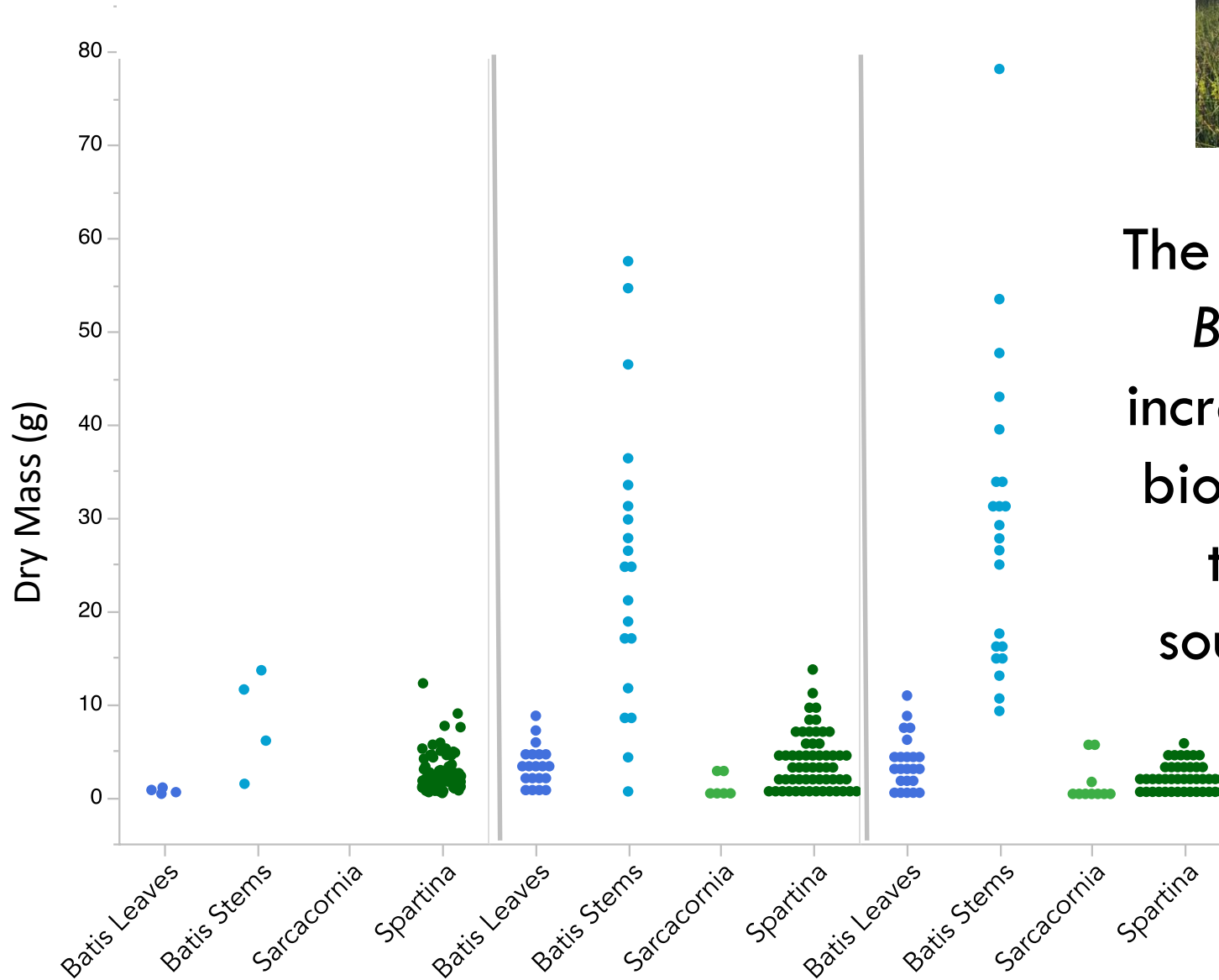
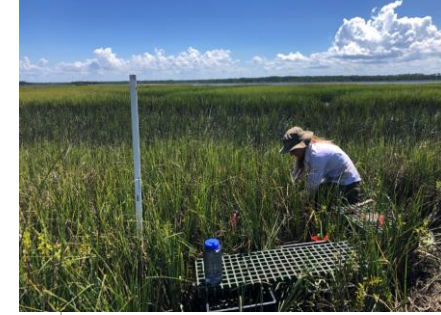
By Candy Feller and Matt Hayes

Salt Marsh Biomass

Fewest Mangroves

Intermediate Mangroves

Most Established



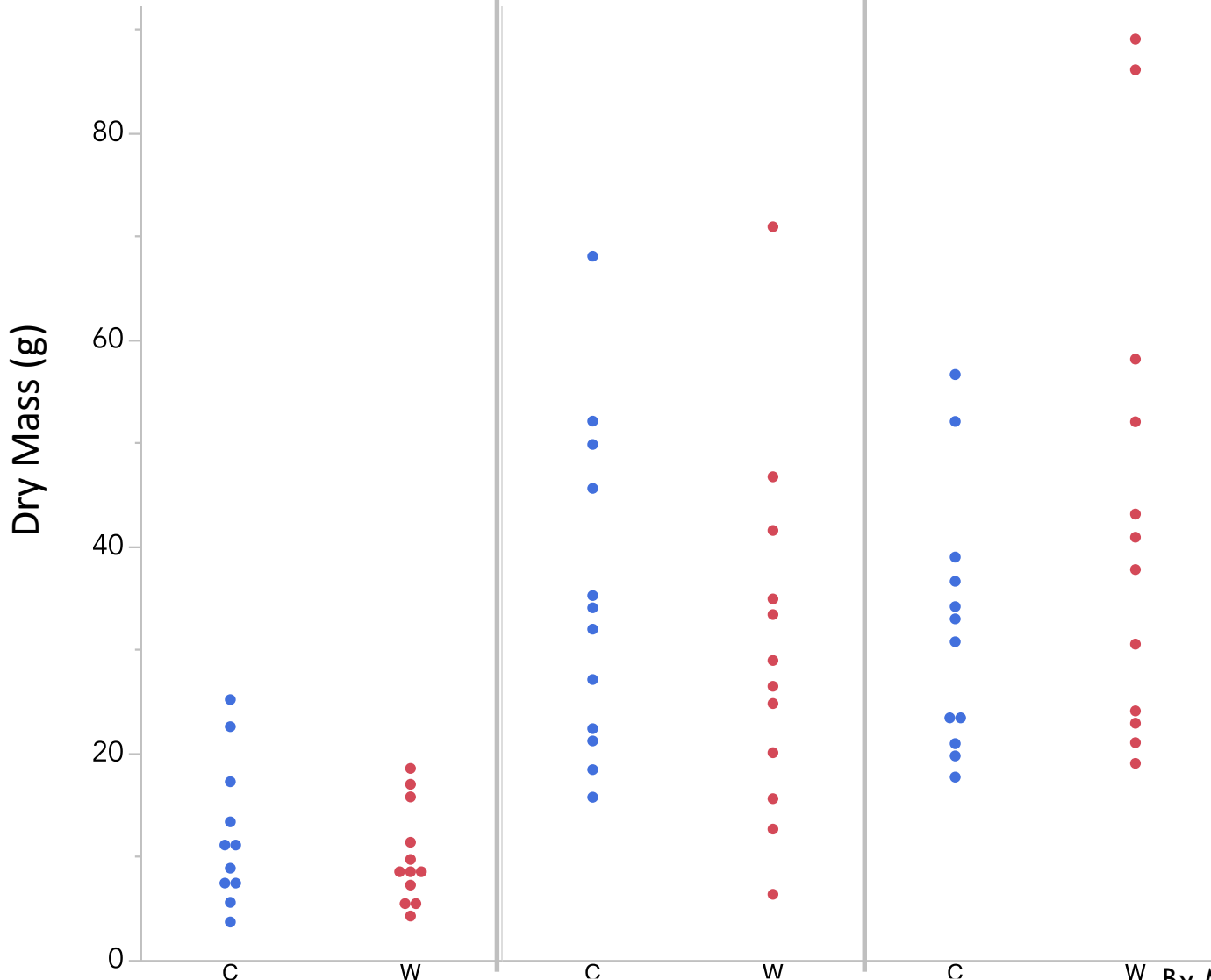
The presence of *Batis* stems increases marsh biomass at the two more southern sites

Plant Species

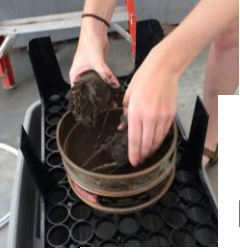
By Matt Hayes, Nicole Spanier & Emmett McAndrew

Salt Marsh Biomass

100 Fewest Mangroves Intermediate Mangroves Most Established

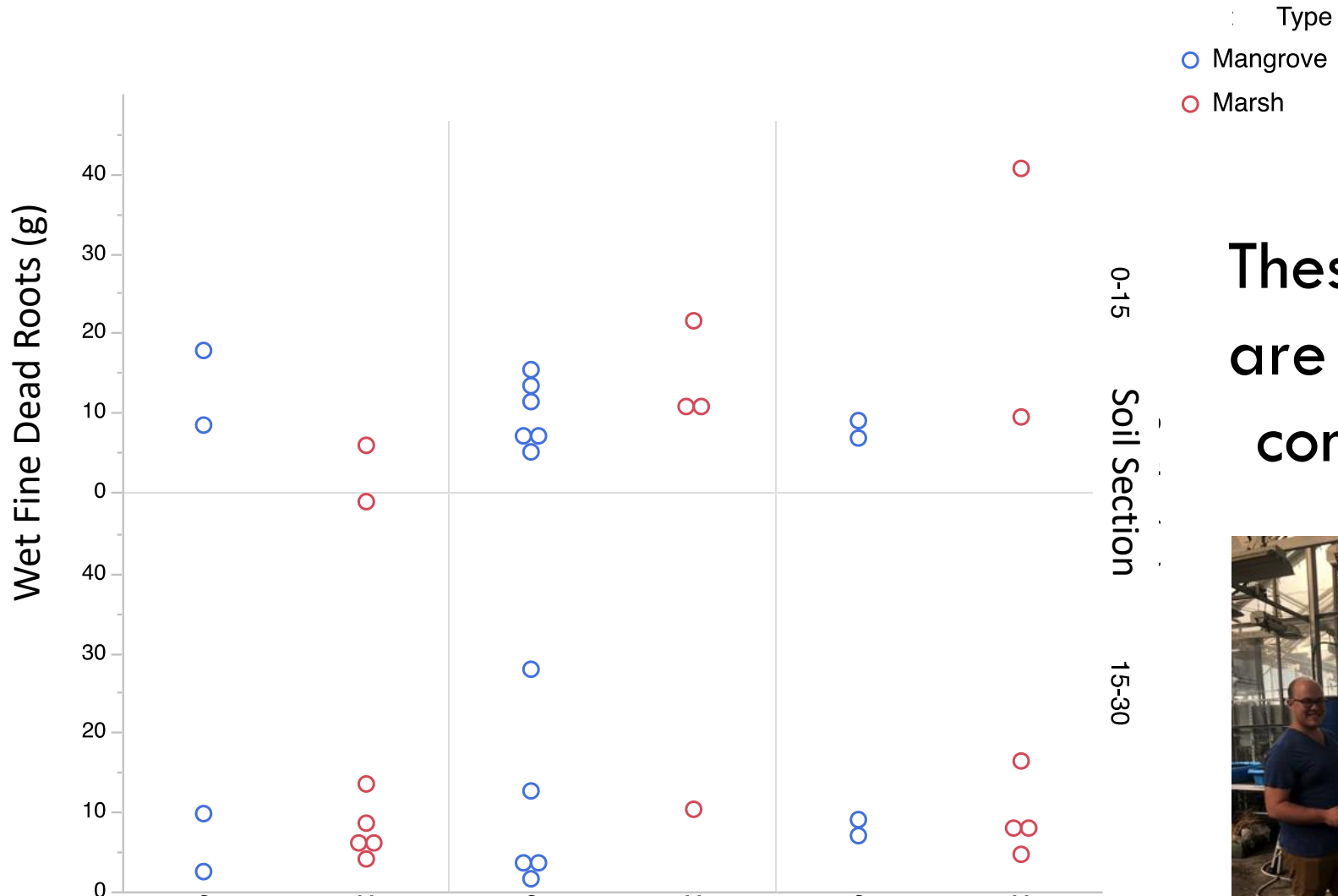


Warming isn't having a large impact on salt marsh biomass yet



Root Mass

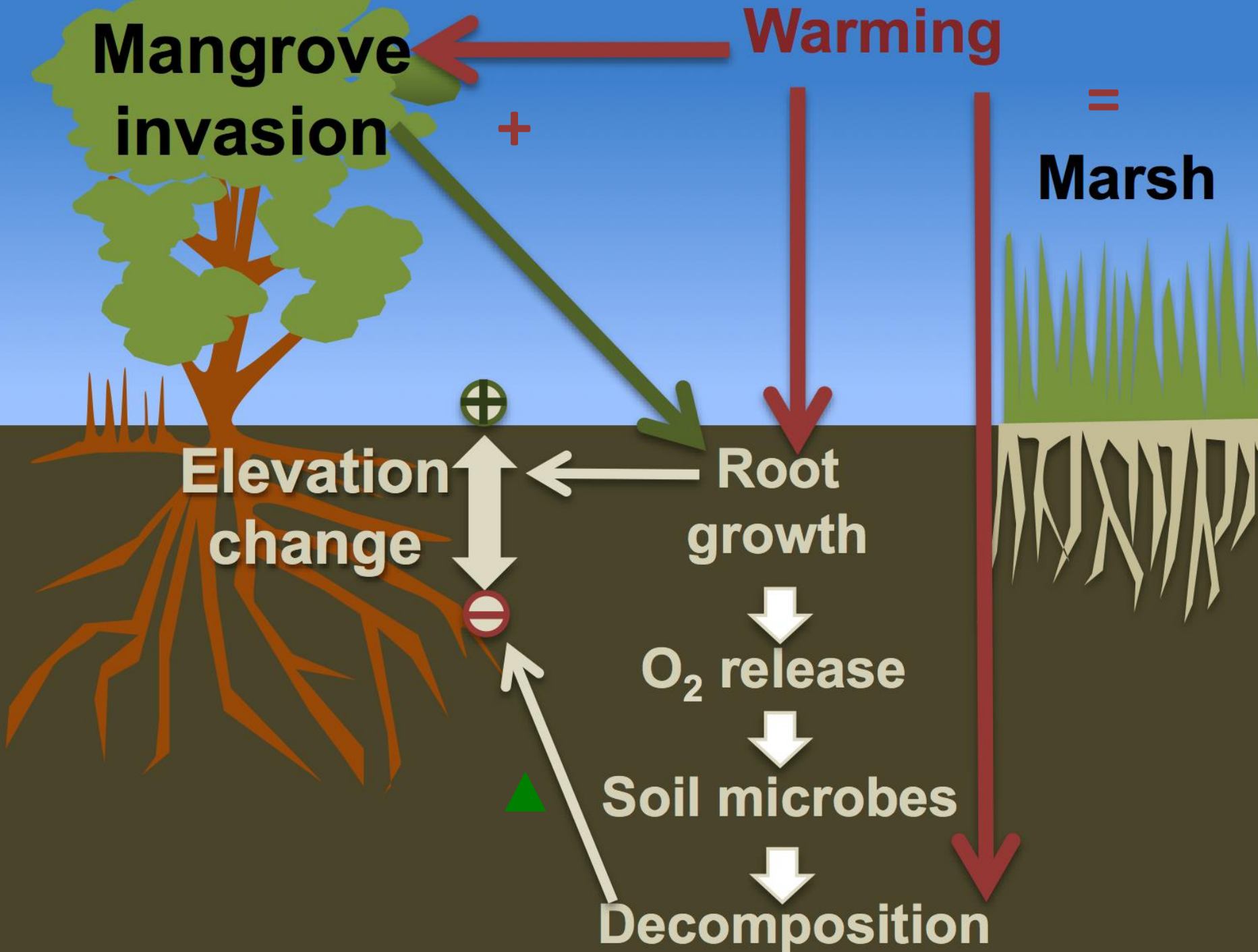
Fewest Mangroves Intermediate Mangroves Most Established



These data are not yet complete



By Emily Geoghegan, Tess Adgie, Nicole Spanier etc.



*See Mark Hester's Poster on the WETFEET project work at the University of Louisiana

University of Louisiana at Lafayette
NSF Mesocosm Setup (July 10, 2018)
Harris Stevens, William Vervaeke, and Mark Hester





Biological Inputs:

Greenhouse

Warming effects on:
root growth,
organic matter
decay rate

Field

Vegetation
elevation range,
peak biomass,
BG production,
max root depth,
OM decay, soil C



Physical inputs:

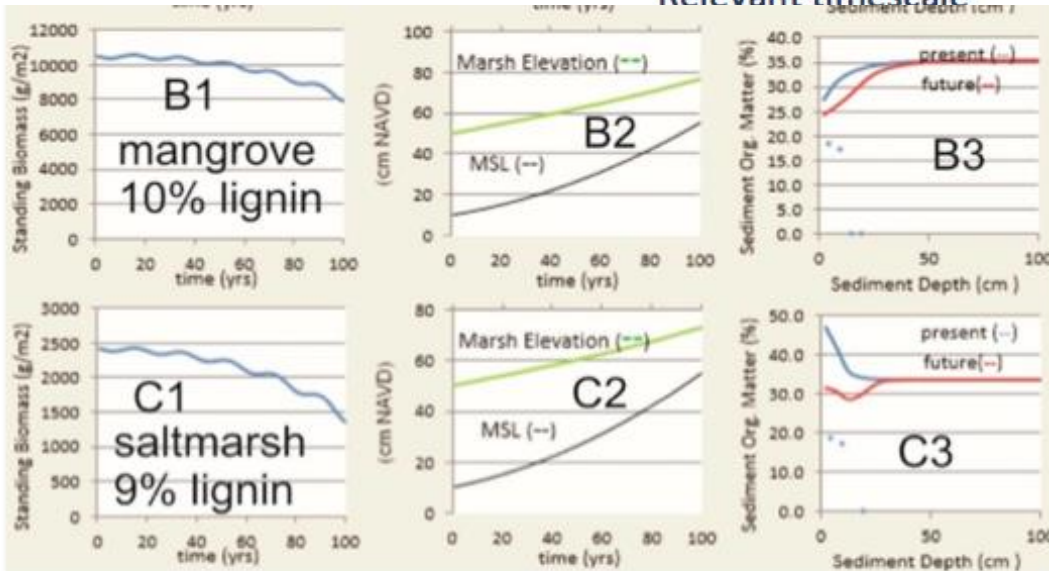
Climate, tidal properties,
sea level rise scenarios,
sediment concentration

Key model outputs:
Soil elevation change,
ecosystem carbon gain

Year

Century

Relevant timescale



MEM model
development for
mangroves with
Jim Morris

Questions?

