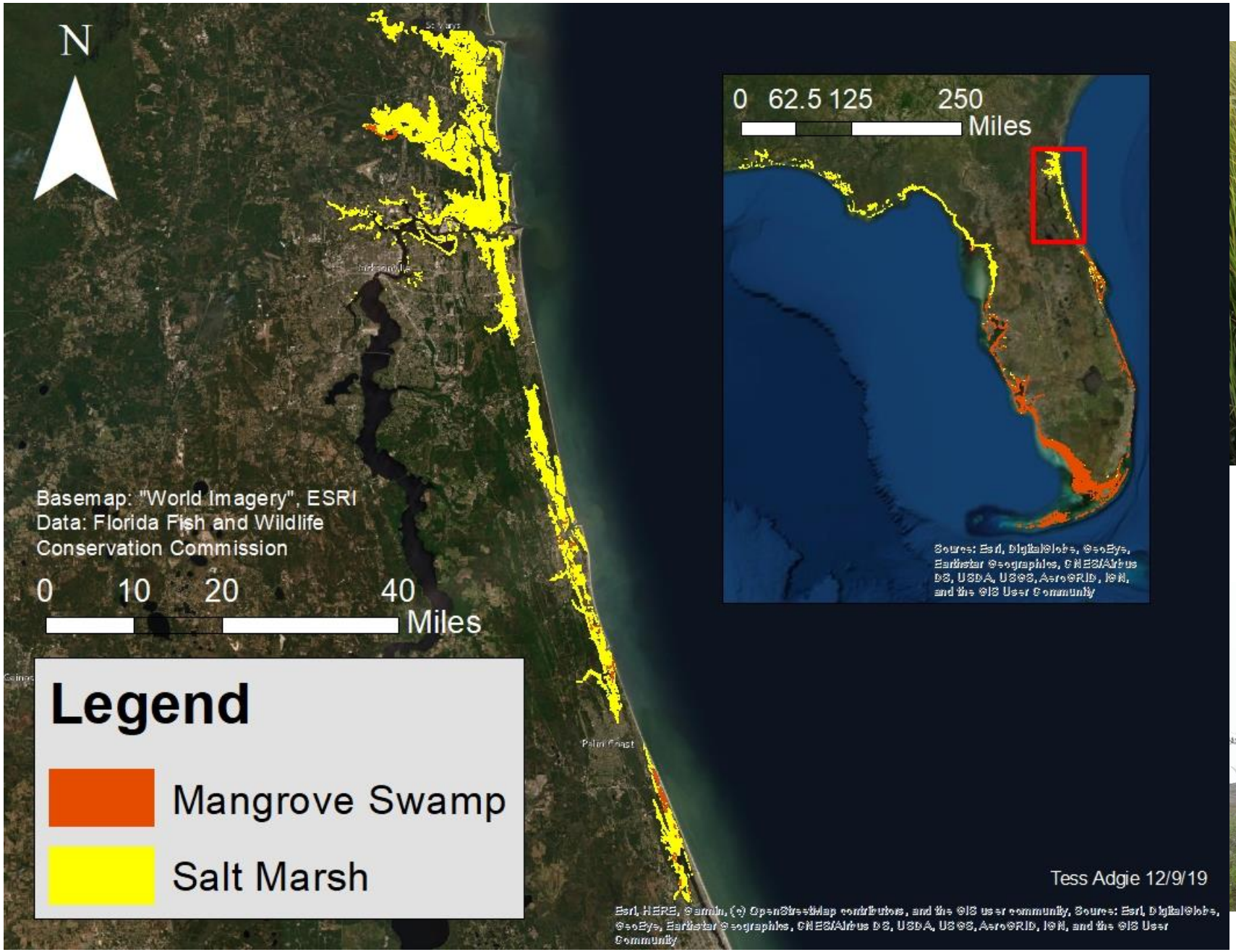
Climate-change driven shifts in mangrove ranges drives changes to above and belowground salt marsh habitat

Tess Adgie, Villanova University

GTM State of the Reserve, 2023


N
0 62.5 125 250
Miles
Basemap: "World Imagery", ESRI
Data: Florida Fish and Wildlife
Conservation Commission
0 10 20 40
Miles
Legend
Mangrove Swamp
Salt Marsh
Tess Adgie 12/9/19
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


Spartina alterniflora


Avicennia germinans

Fewest mangroves
(North Site)

Big Mama

Intermediate
Mangroves
(Middle Site)

Gabbys Creek

Most established mangroves
(South Site)

NMAT

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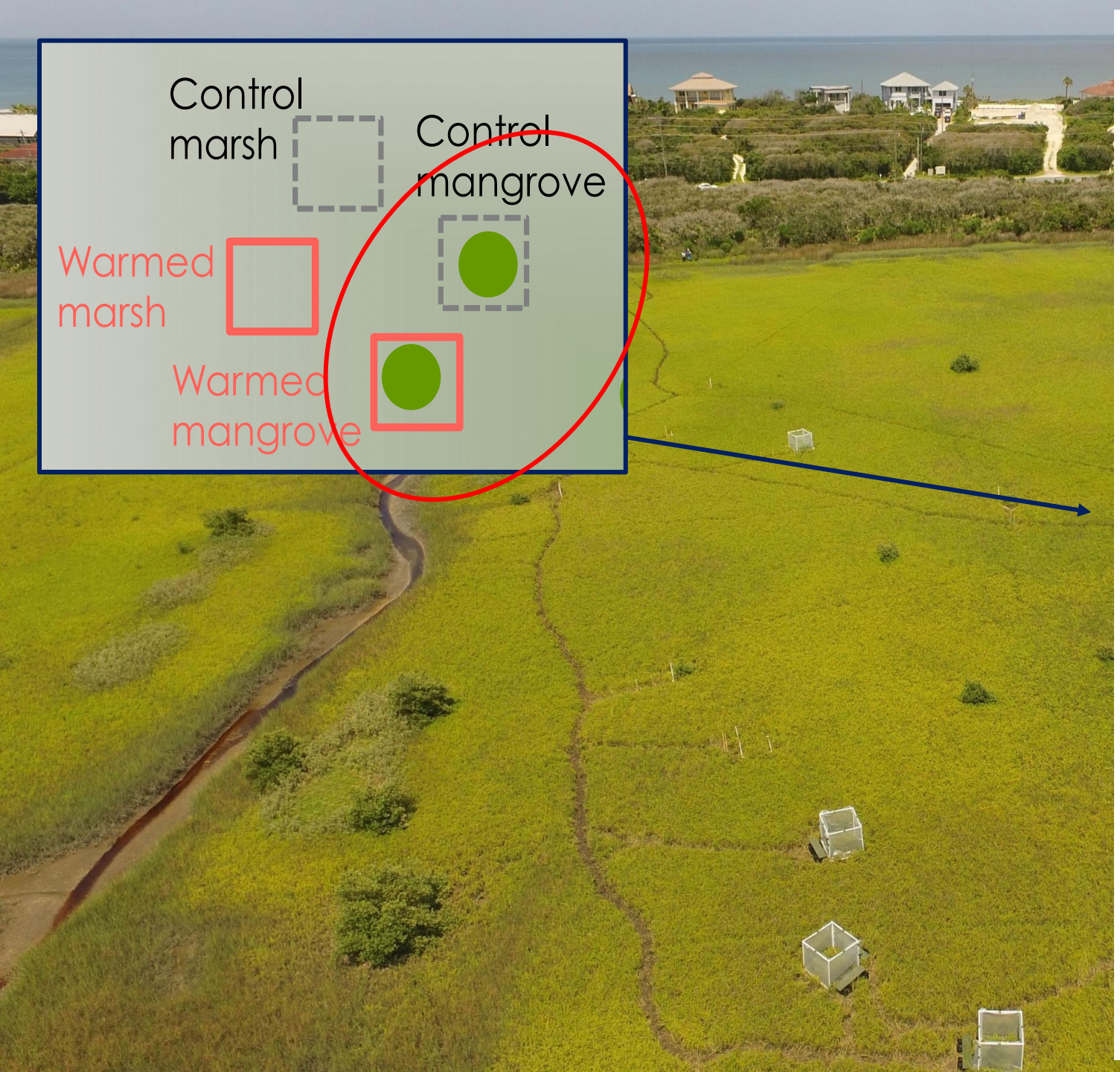
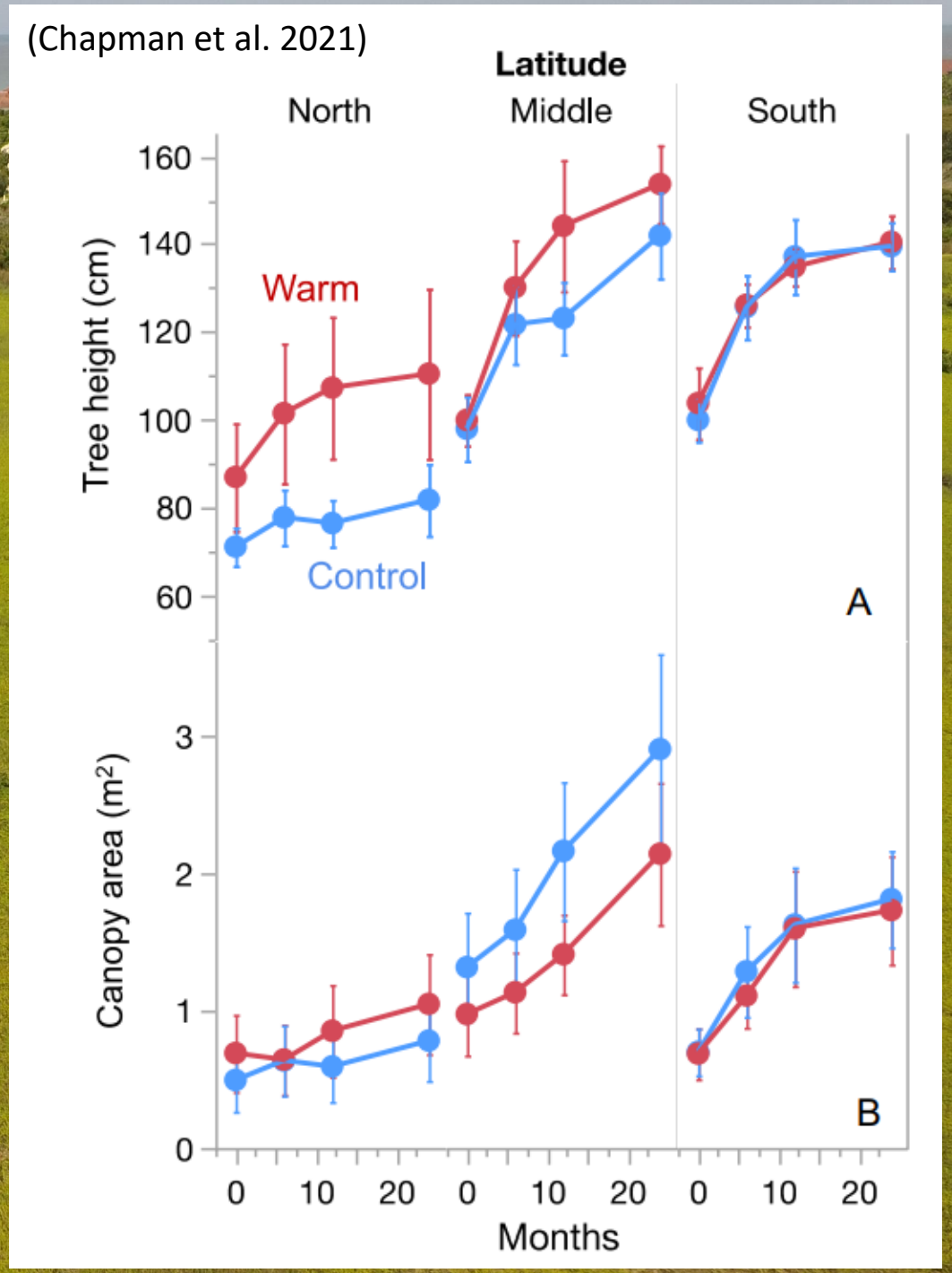
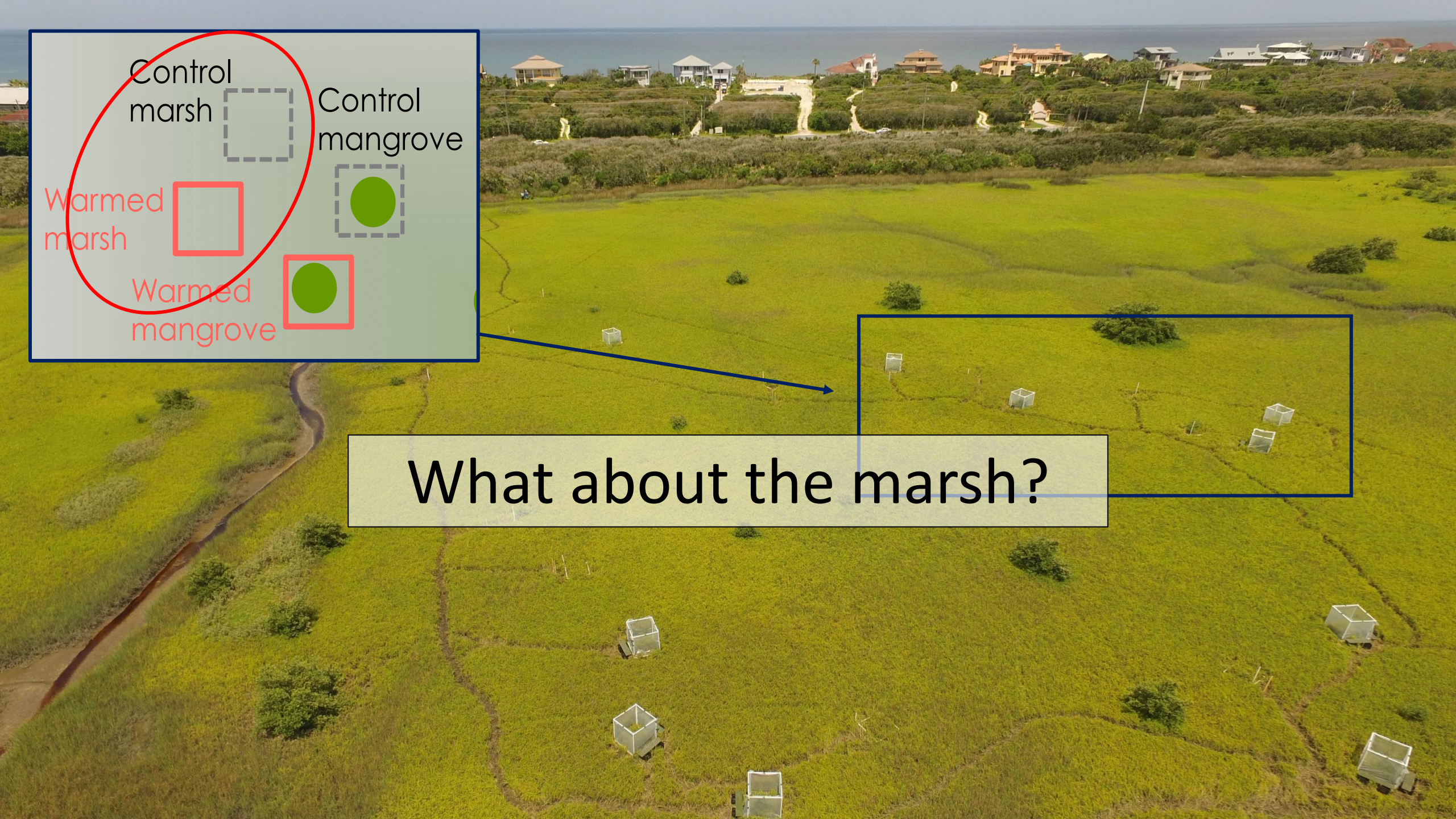


(Chapman et al. 2021)




Control marsh
Control mangrove
Warmed marsh
Warmed mangrove
What about the marsh?

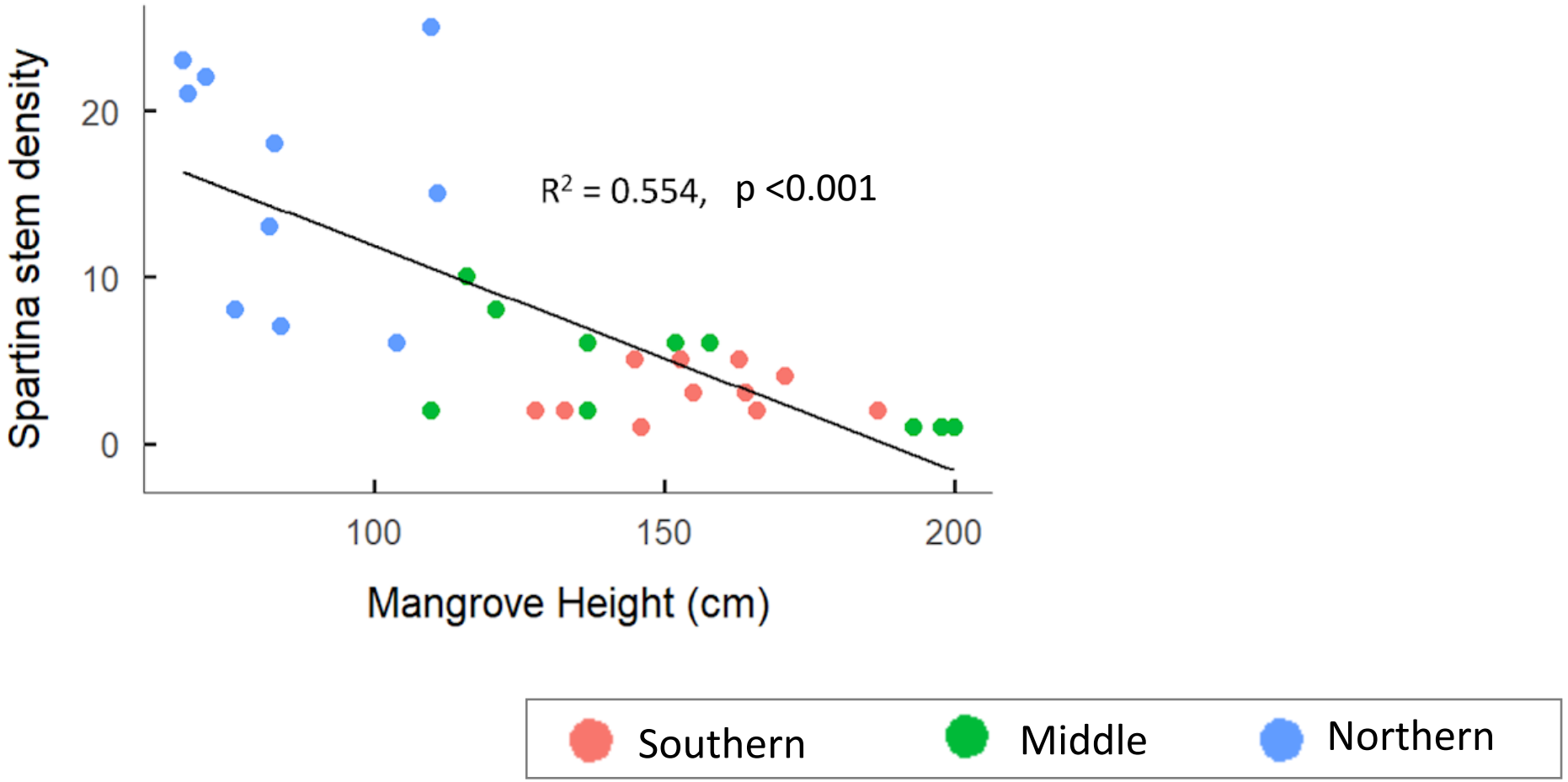
Aboveground

- 30 x 30 cm quadrat
  - *Spartina* height
  - *Spartina* density
  - *Batis* density

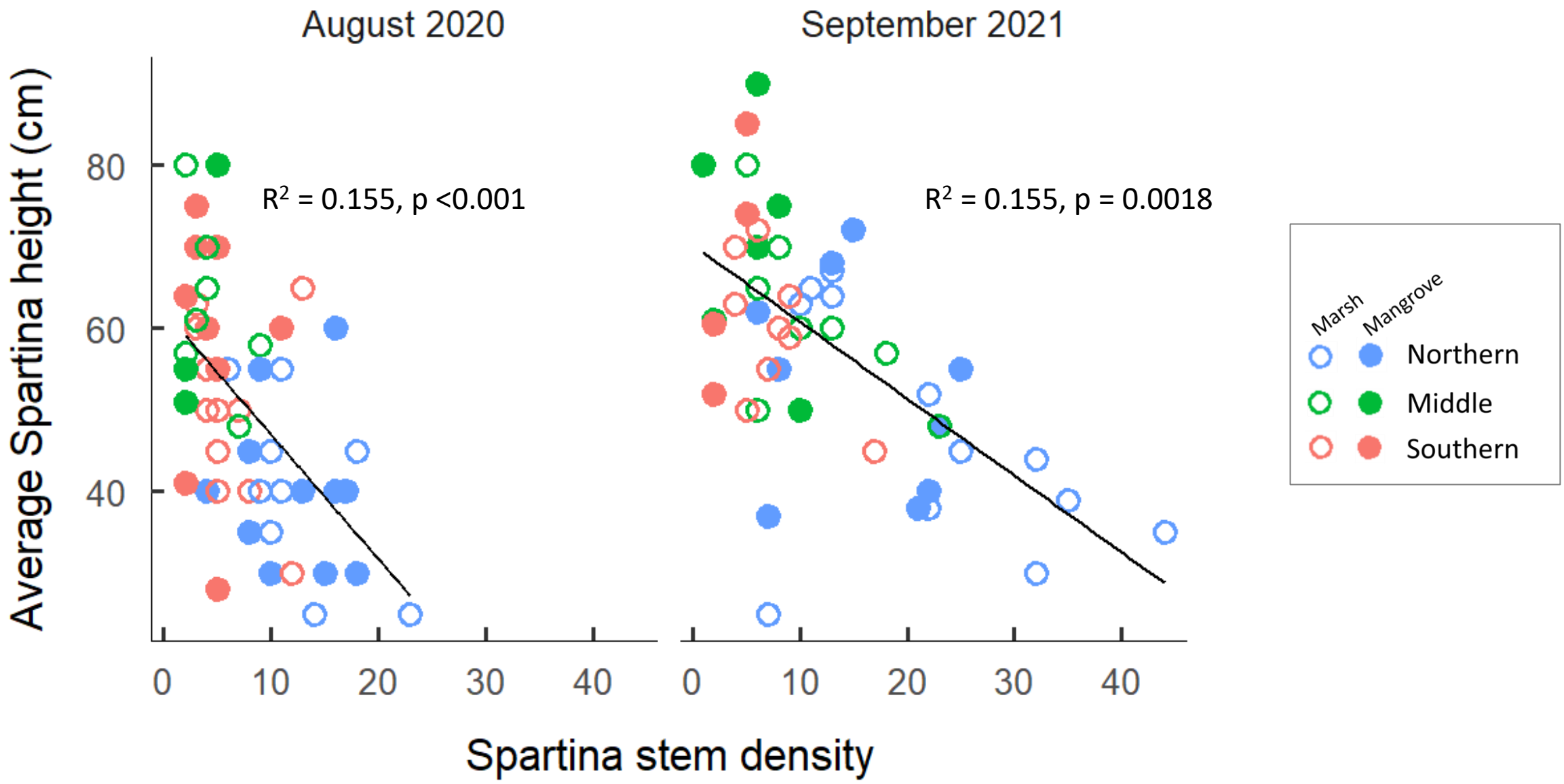
Belowground

- Soil cores
  - Root biomass
  - C and N at 5, 15, and 30 cm

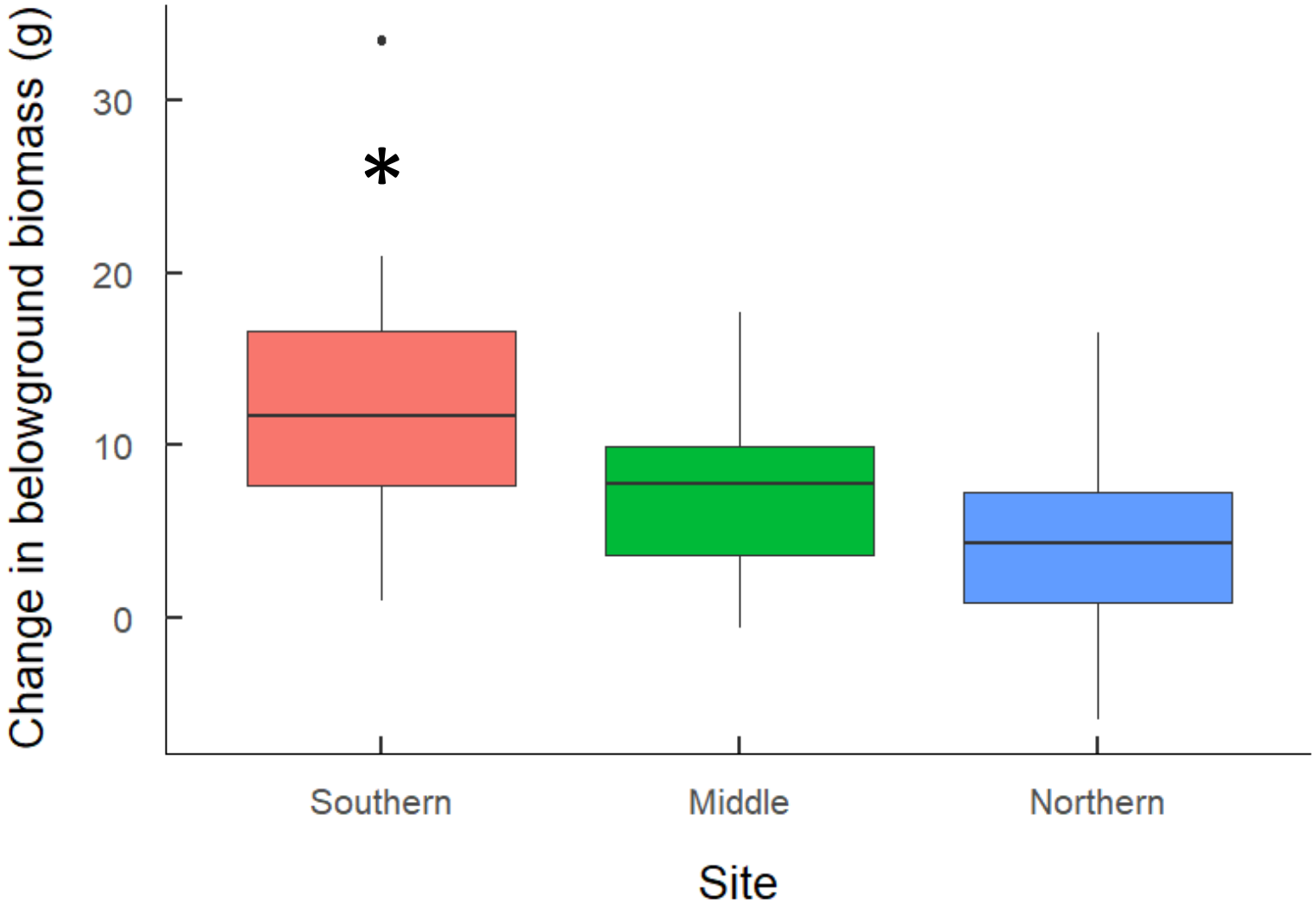
Aboveground



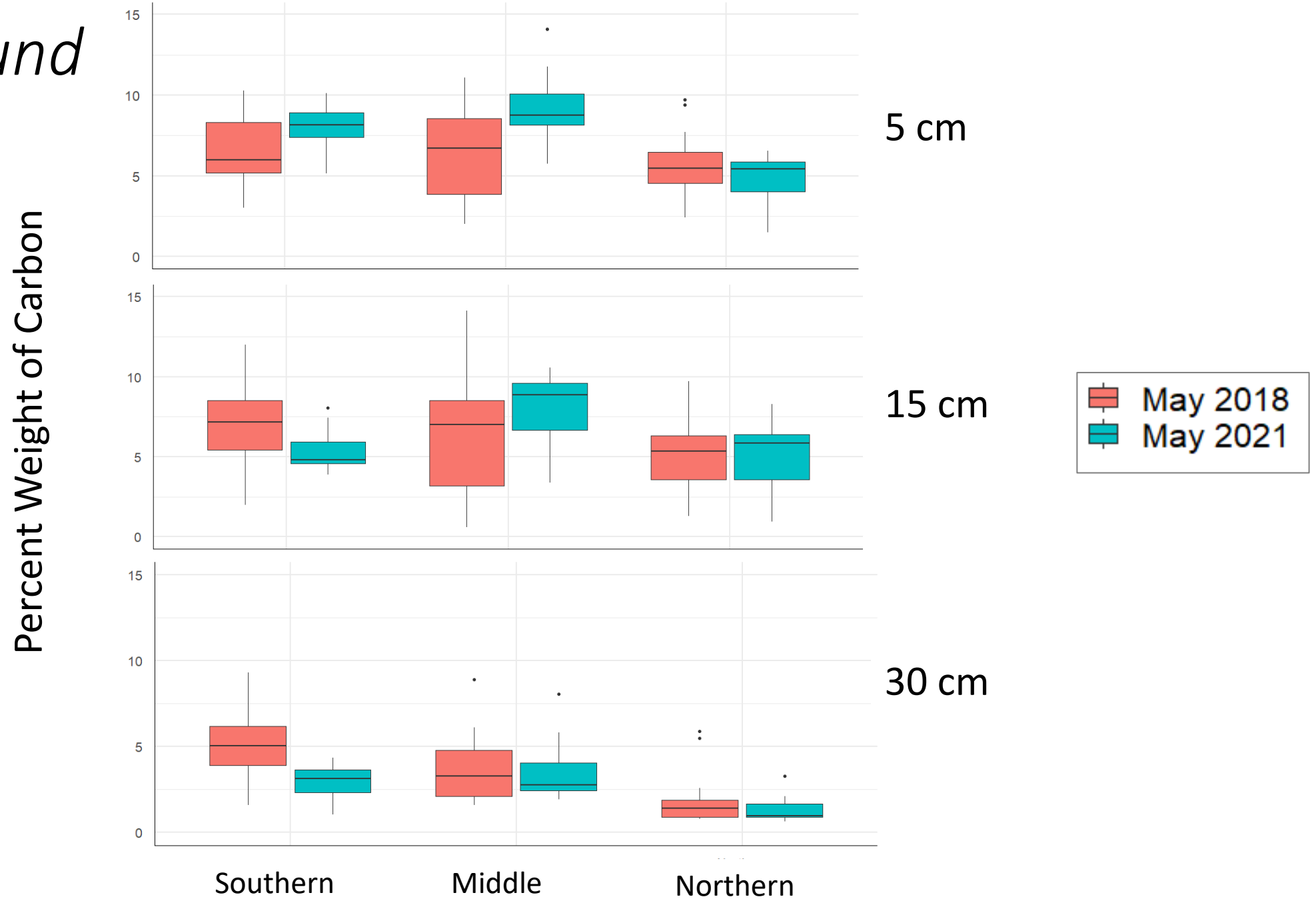
Aboveground

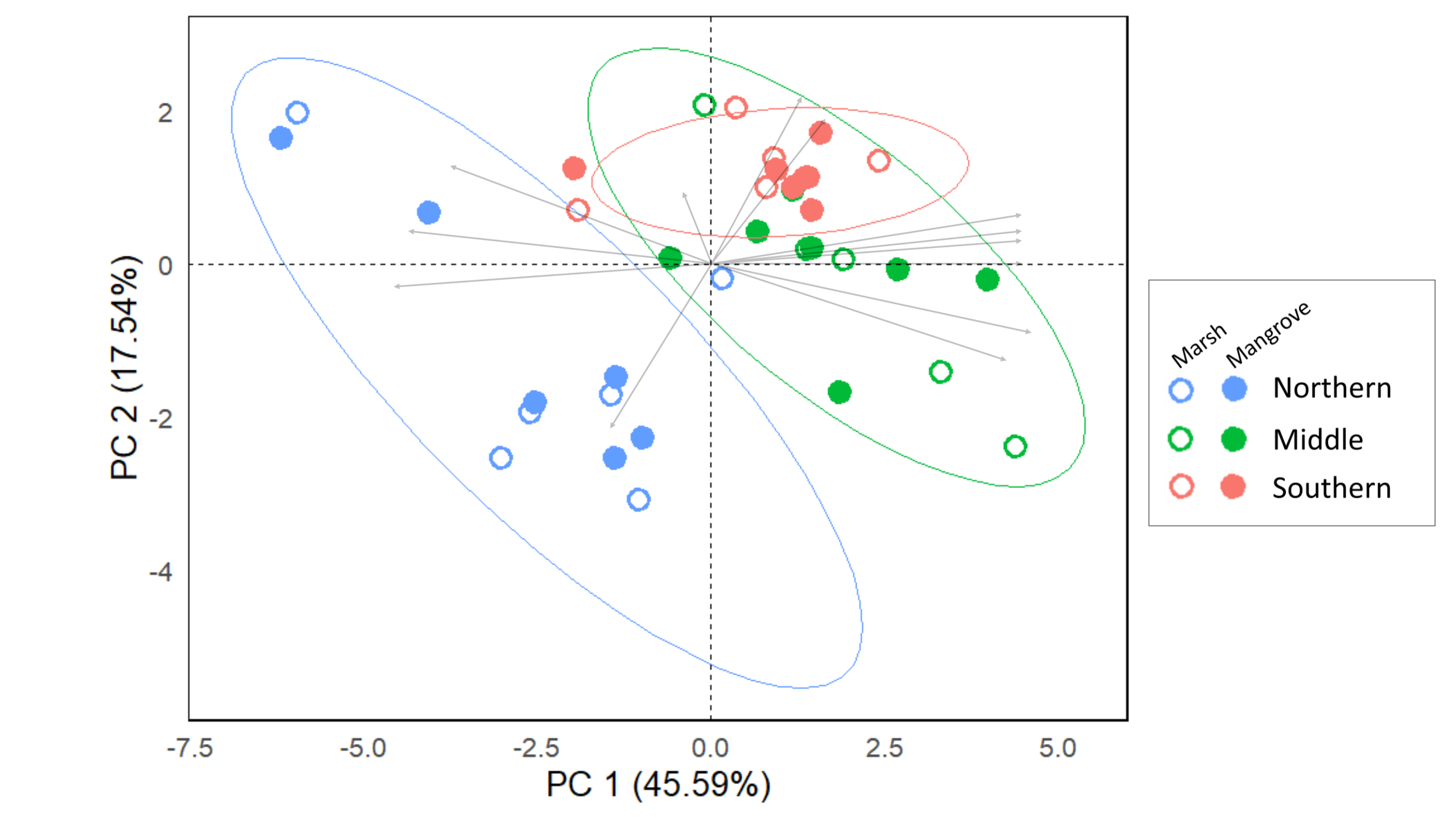


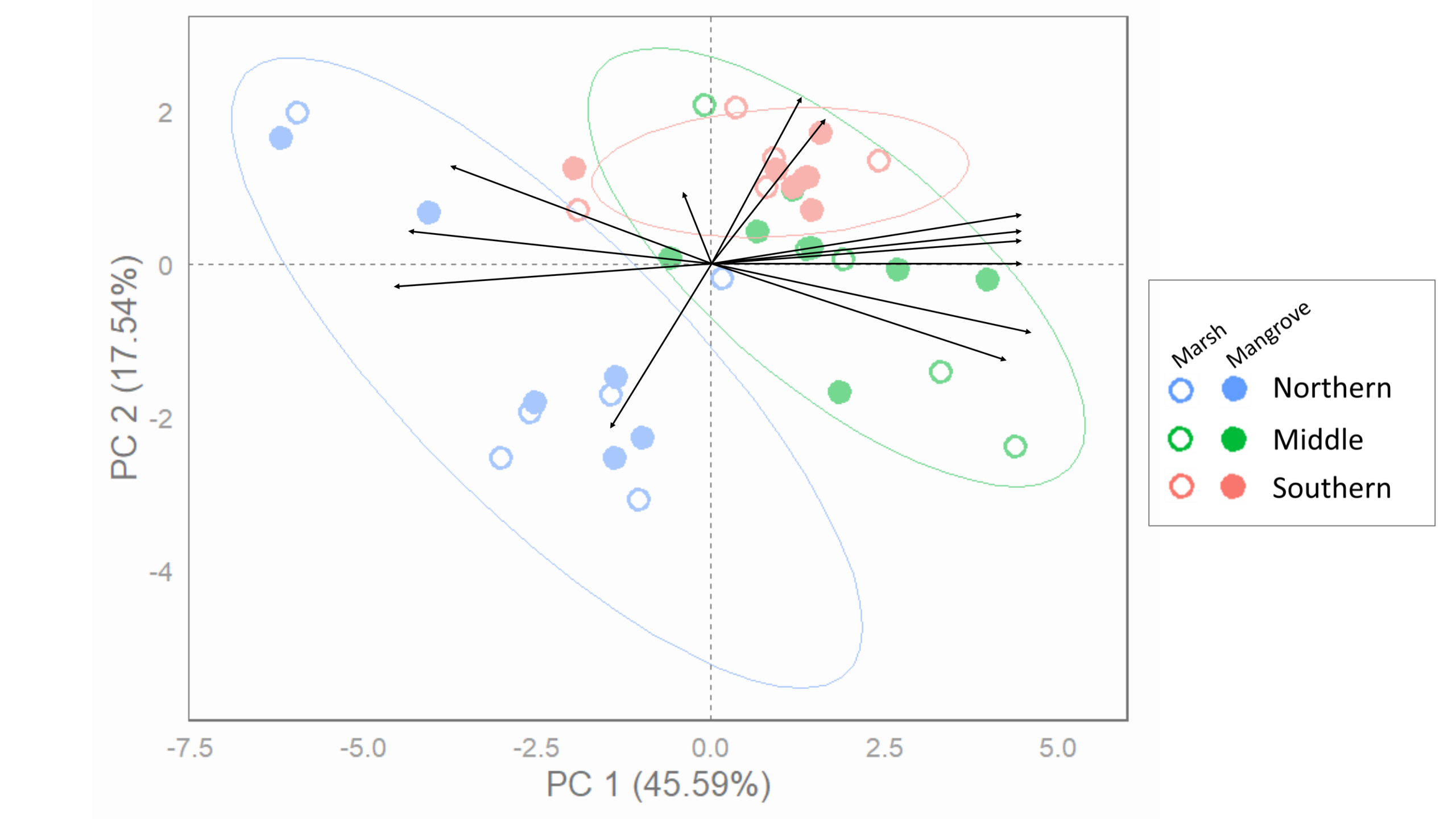
Belowground



Belowground




2
0
-2
-4
PC 2 (17.54%)
-7.5
-5.0
-2.5
0.0
2.5
5.0
PC 1 (45.59%)
Marsh
Mangrove
Northern
Middle
Southern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Marsh
Mangrove
Northern
Middle
Southern

So what's going on??

Spartina height and density is linked with mangrove growth	→	Mangroves move in, increase competition
Carbon is lowest at North site	→	Smallest size and number of mangroves, channel widening
Belowground productivity increased most at Southern site	→	Rapid growth of juvenile mangroves
Overall, site has greatest impact on salt marsh	→	Ecotonal patterns associated with mangrove range shifts are more visible at site scale


Thank you!
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