

Halophytes can salinize soil when competing with glycophytes, intensifying effects of sea level rise in coastal communities

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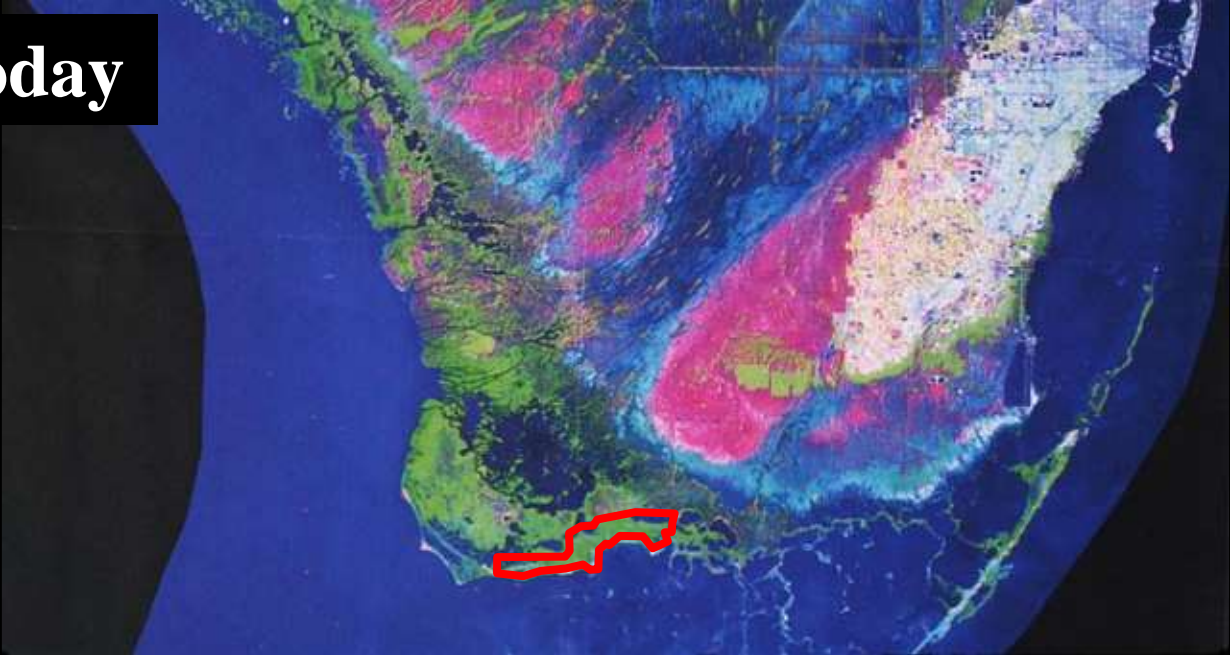
The Everglades Foundation¹
Florida International University²



GEER 2017

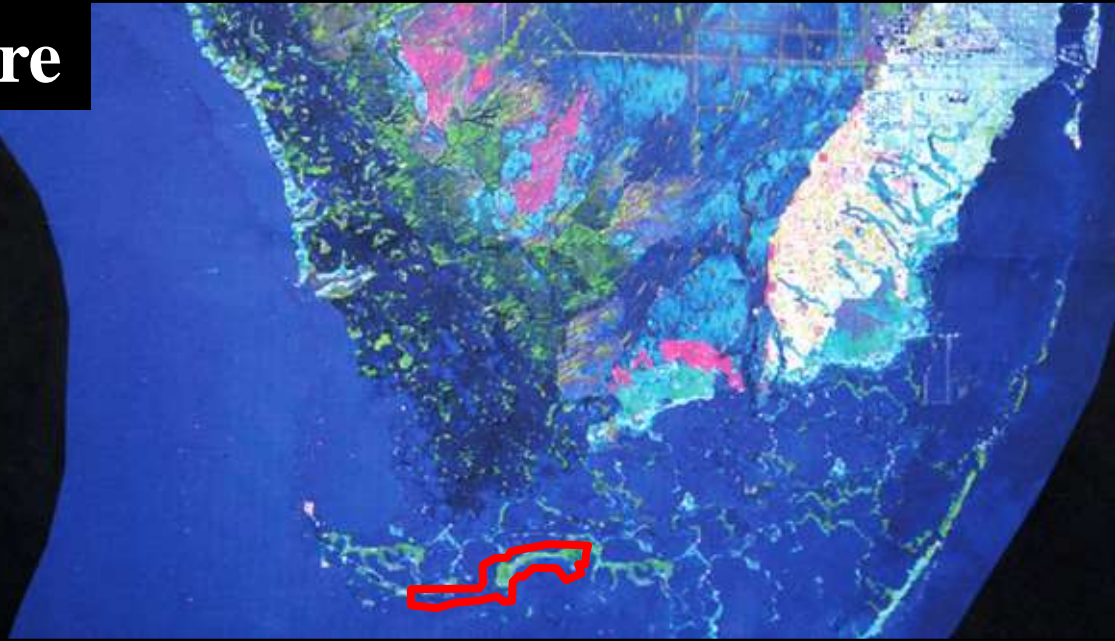


South Florida today



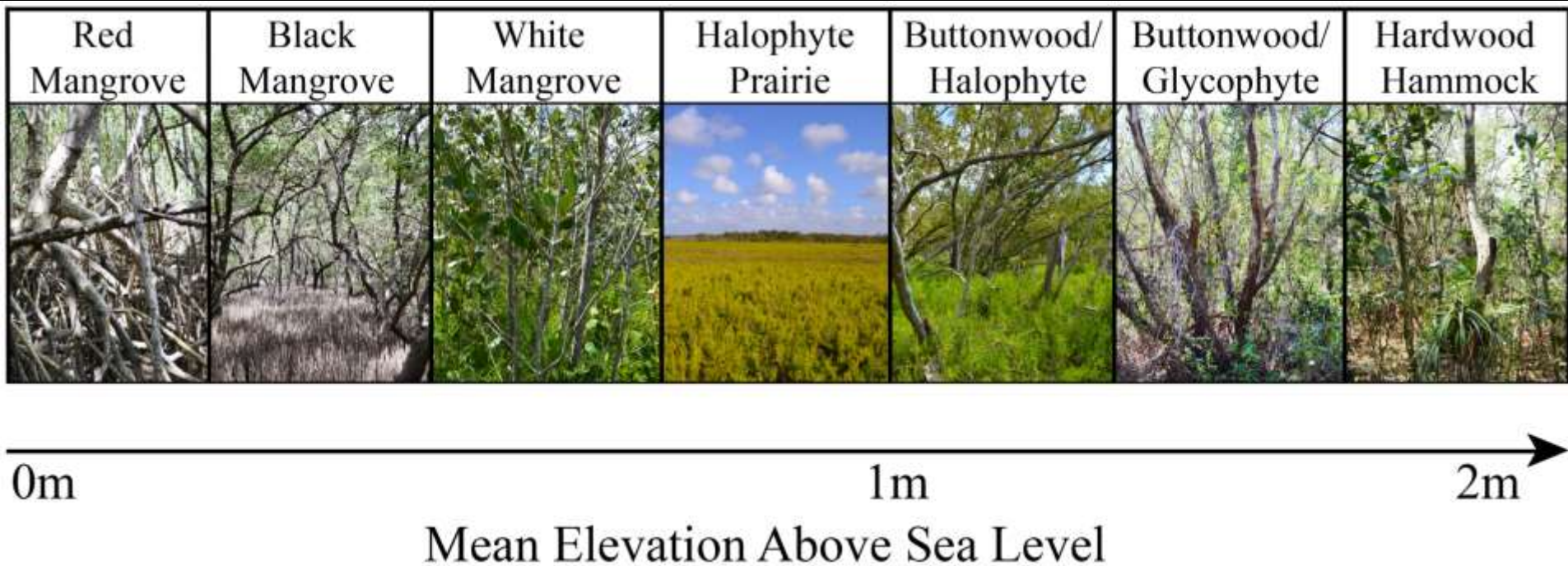
South Florida ~future

+ .6m rise



H. Wanless

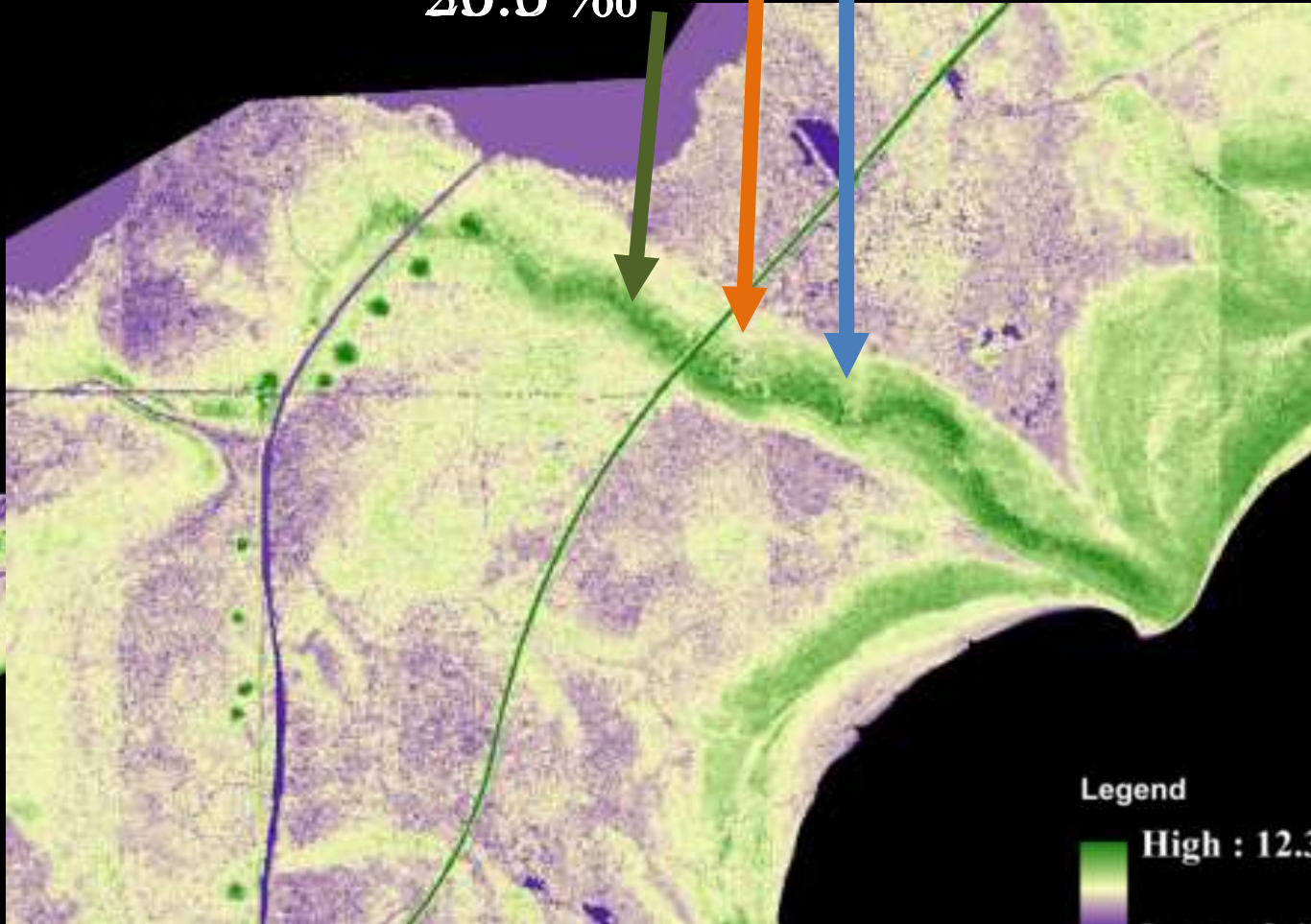
Coastal habitats disperse across the elevation gradient



Hardwood forest site 239001 NAD83

-22 cm water table

36.5 ‰



Legend

High : 12.3203 ft

Low : -3.47671 ft

Coot Bay Transect

1980

1998

2009

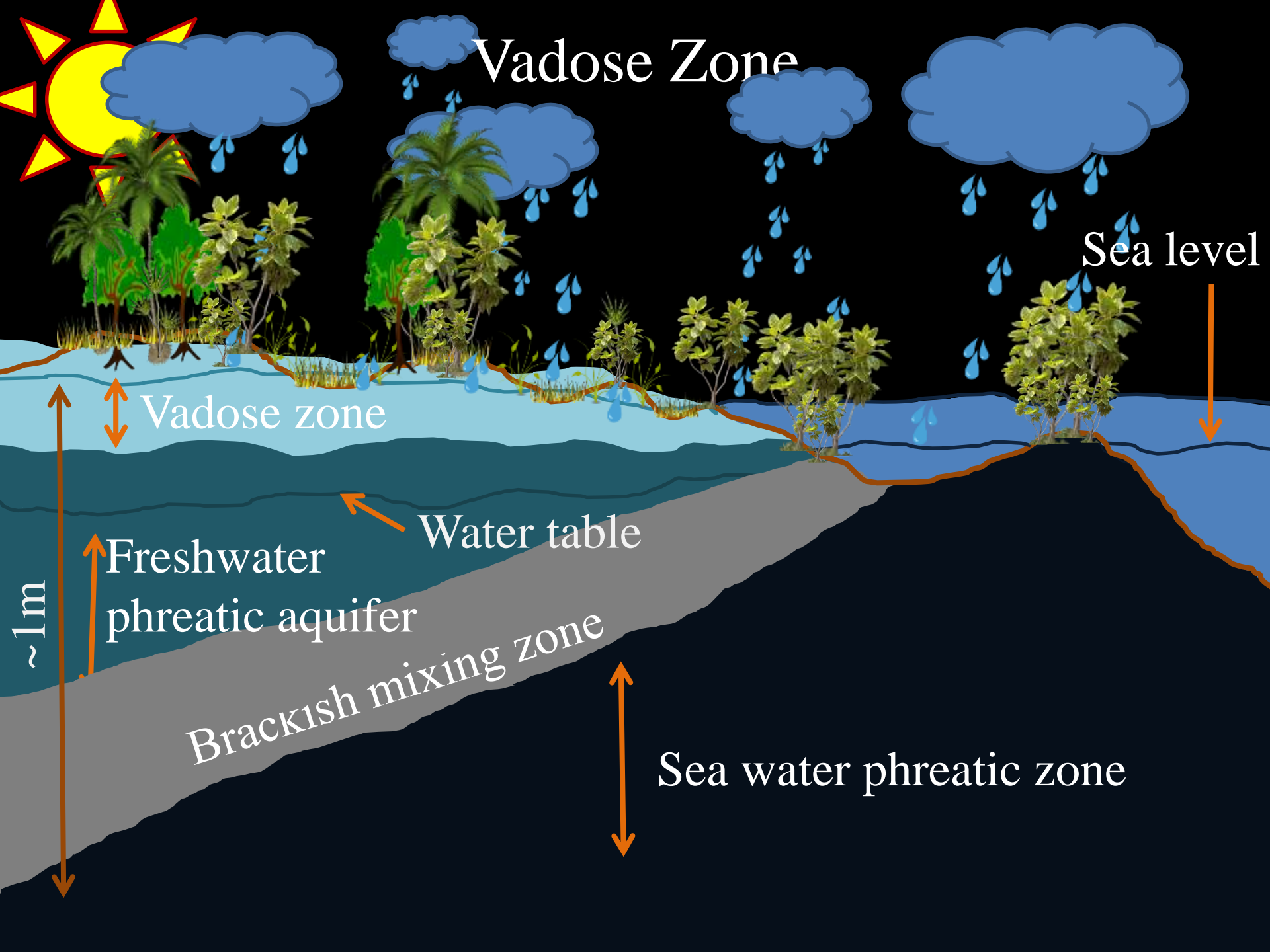


Results

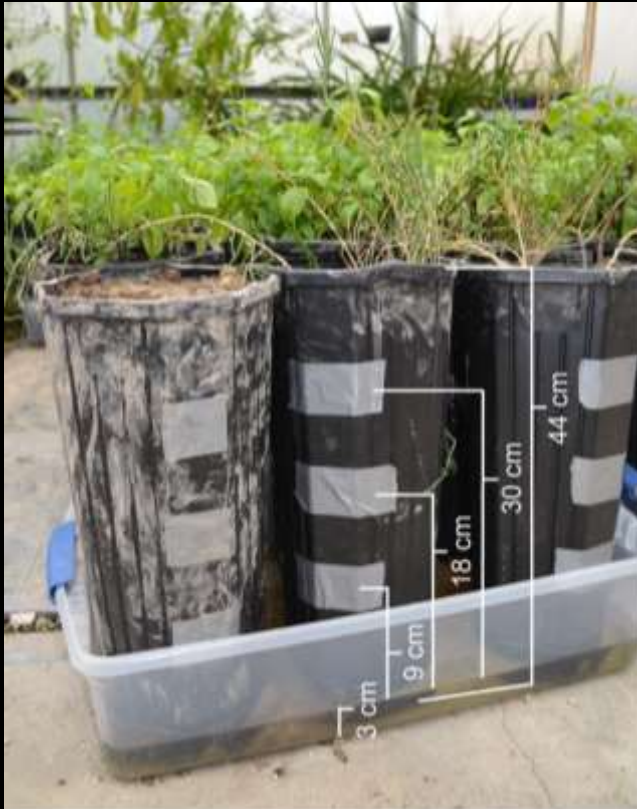
More halophytes
Less glycophytes

Saha et al. 2011



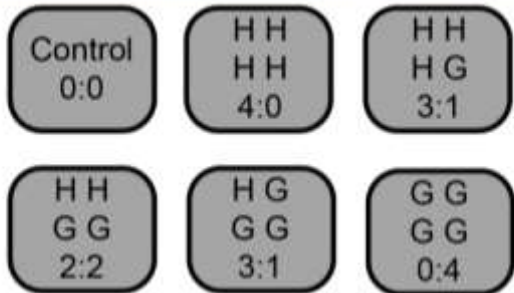


Replacement series competition experiment



5 replicates sets/species combo

Water from the bottom: 26 and 38‰



	Stomata Conductance	Soil Salinity
0‰	1mo.	1mo.
26‰	1mo.	1mo.
38‰	1mo. and 3mo.	3mo.

Replacement series competition experiment



Batis maritima

experiment

Halophytes



Sarcocornia perennis



Alternanthera flavescens

Glycophytes



Heliotropium angiospermum



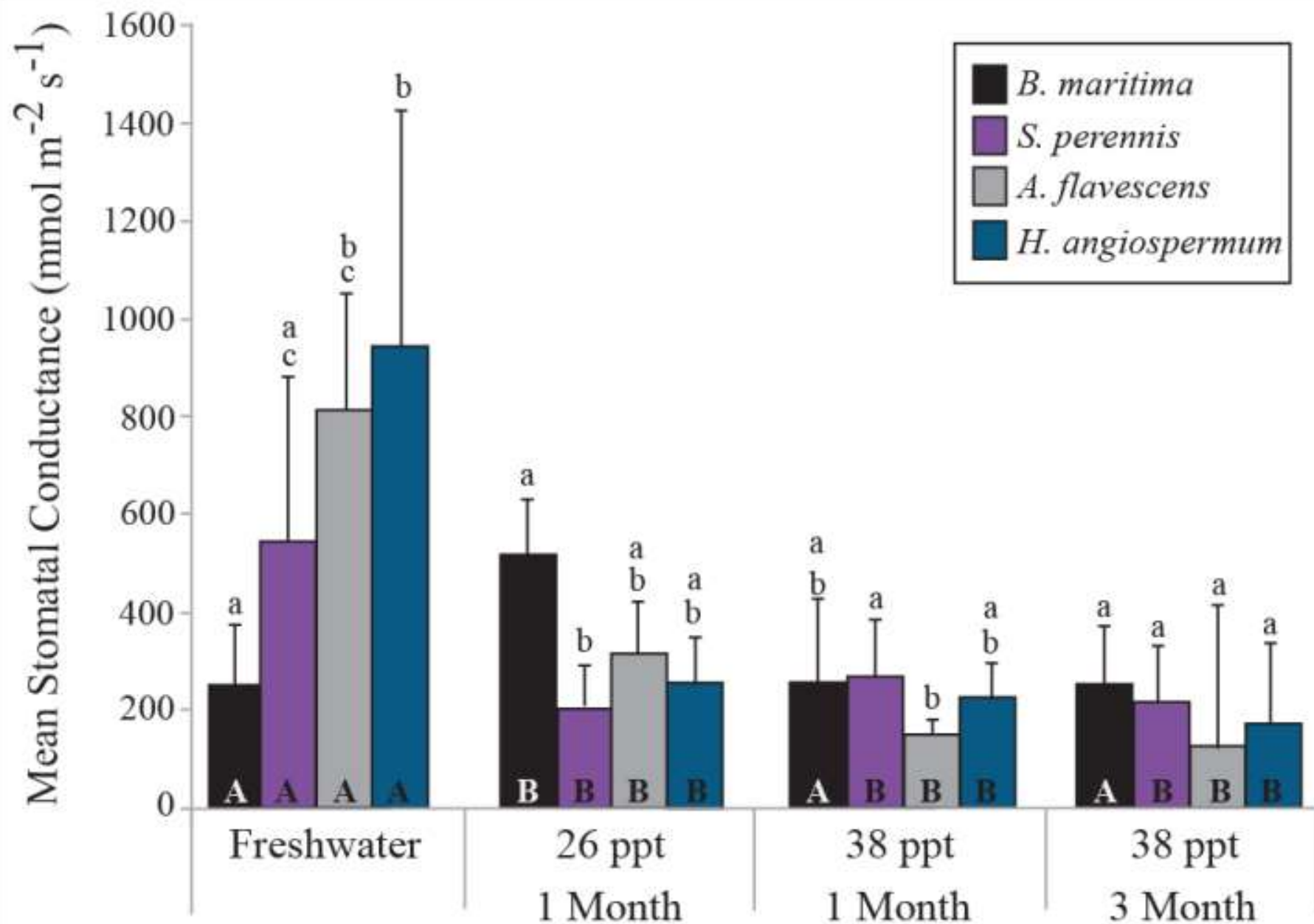
B. maritima

S. perennis

A. flavescens

H. angiospermum

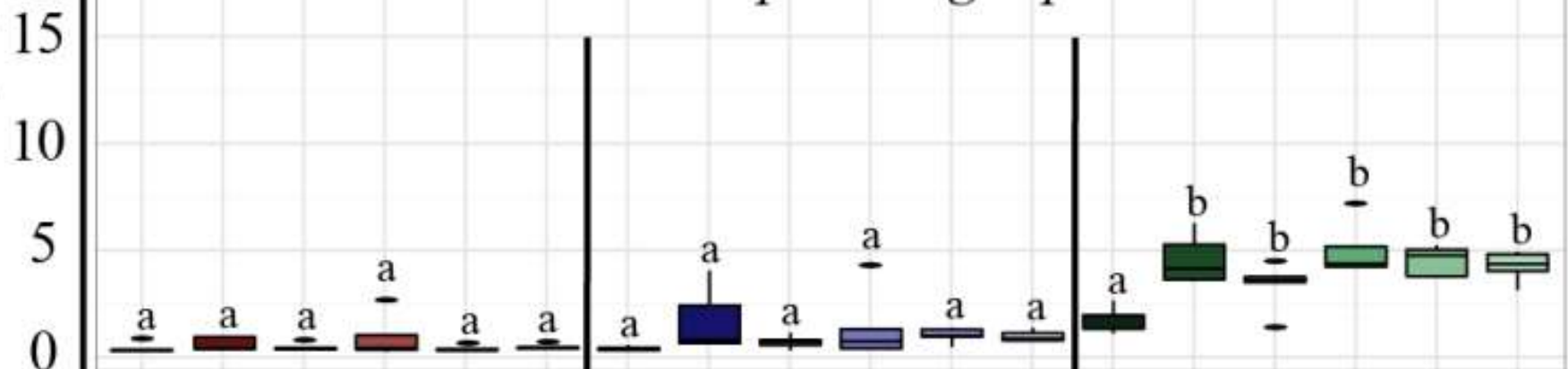




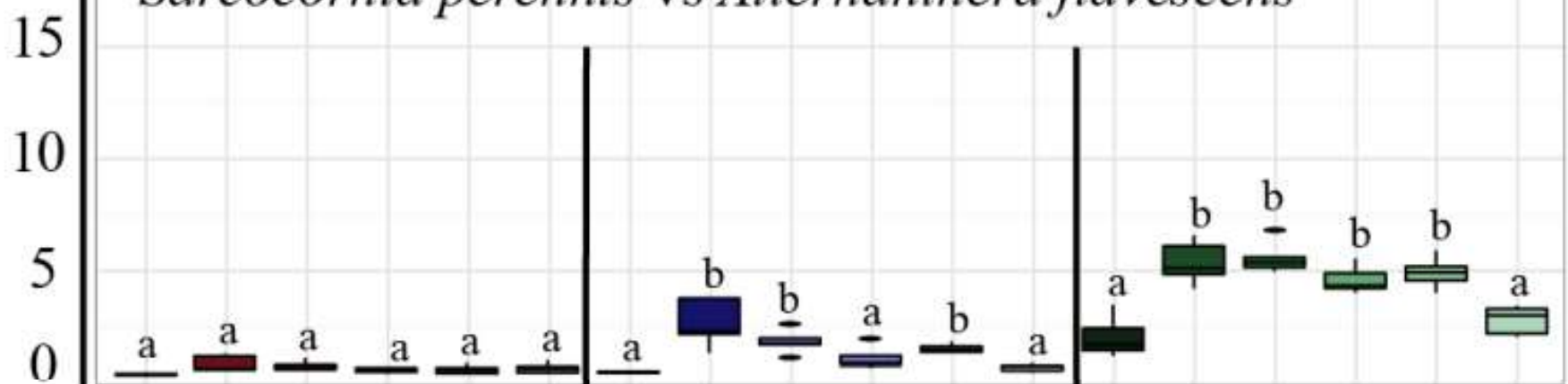
Extracted Relative Salinity (‰)

26 (‰)

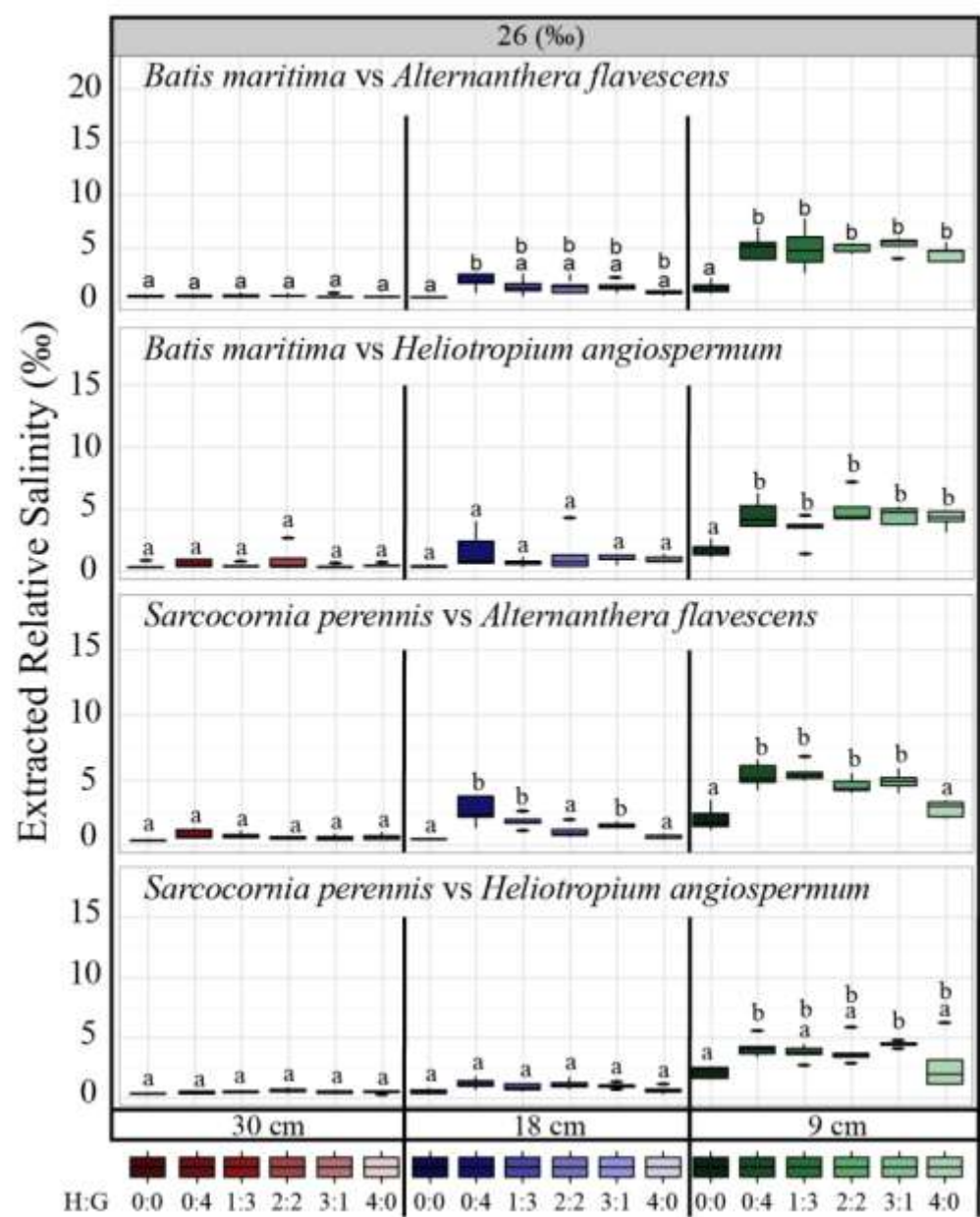
Batis maritima vs *Heliotropium angiospermum*

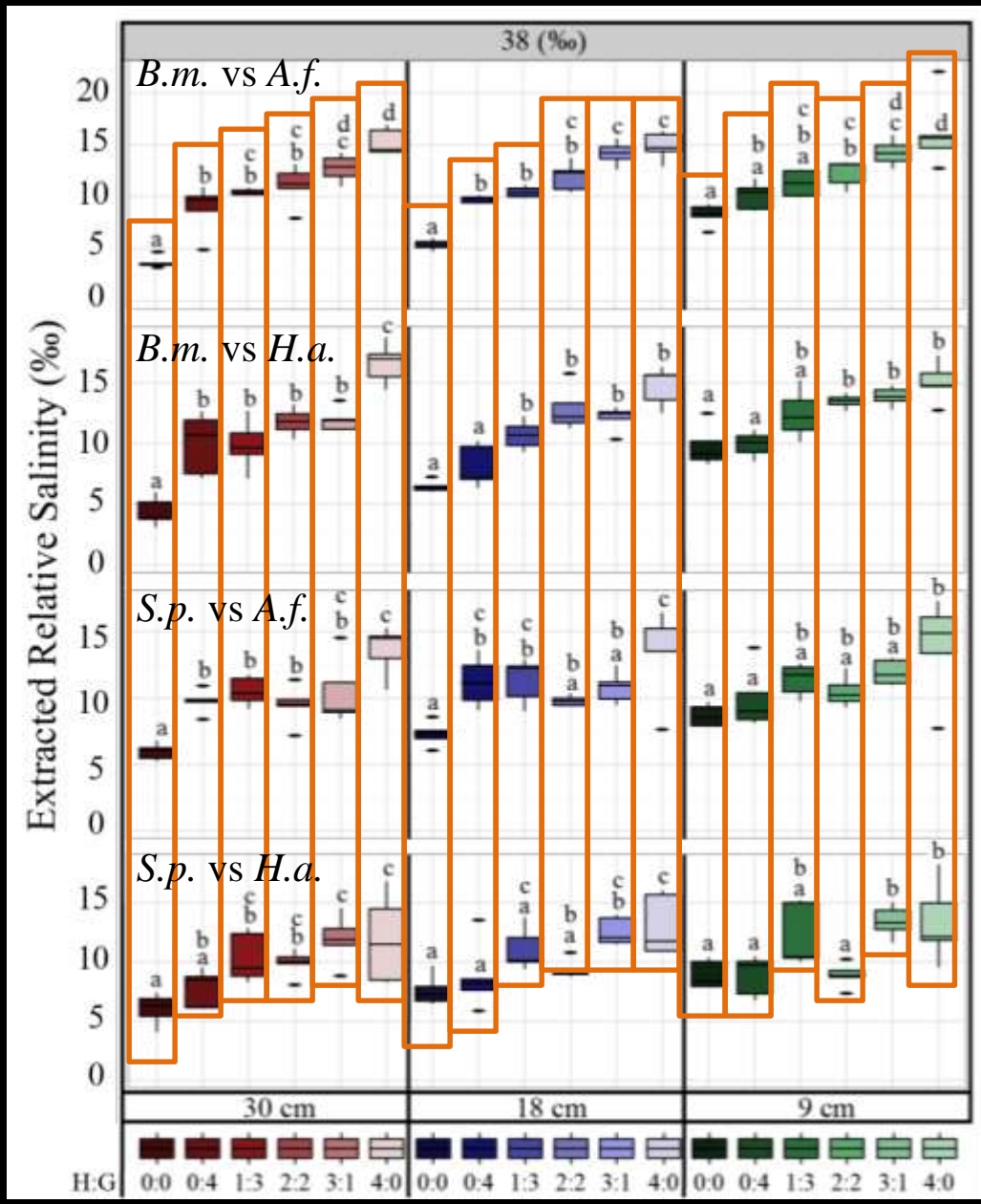


Sarcocornia perennis vs *Alternanthera flavescens*

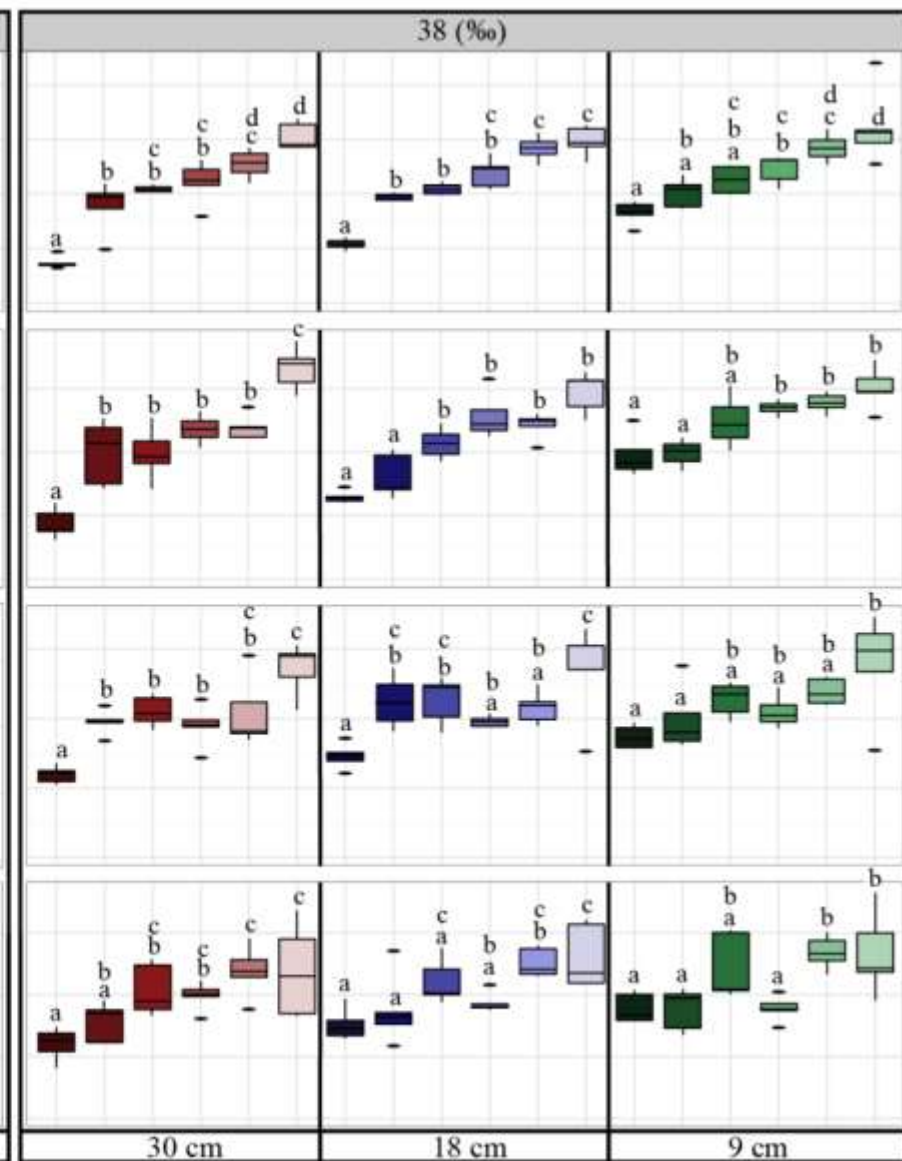
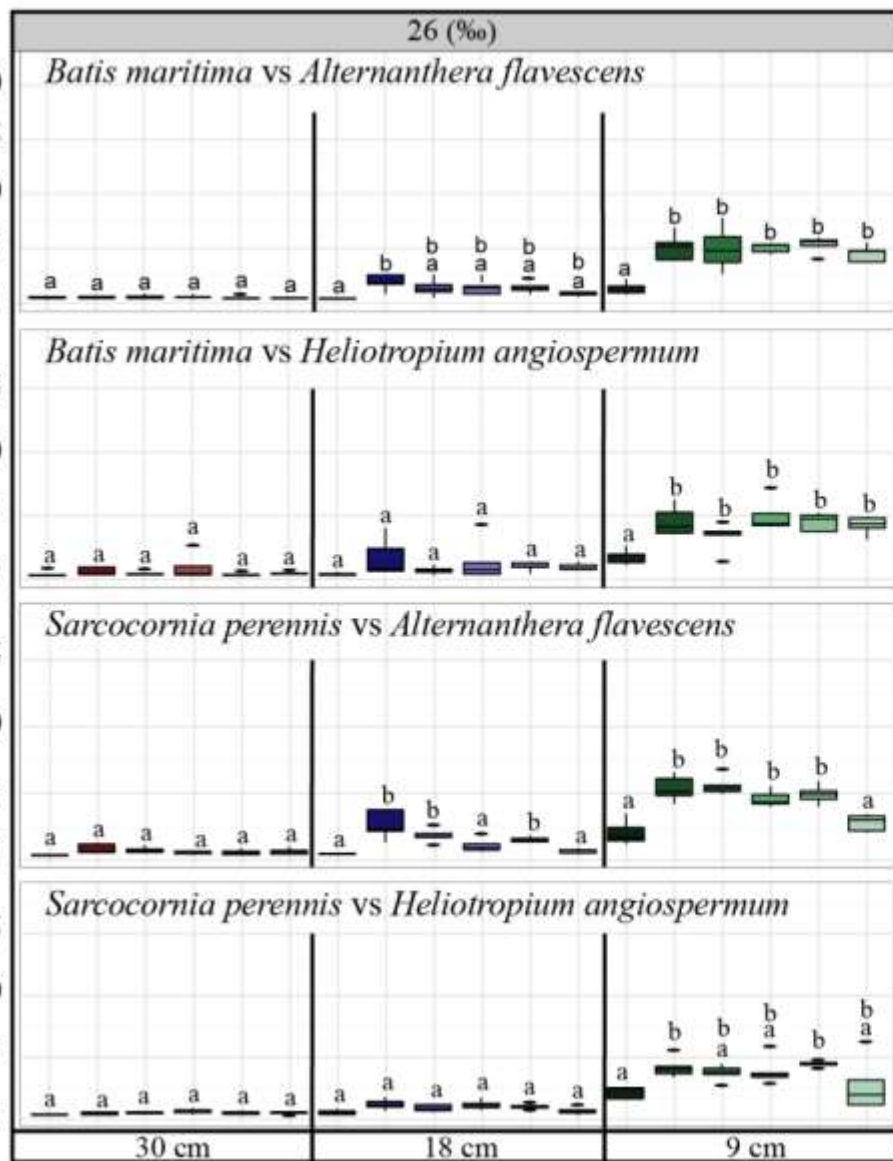


H:G 0:0 0:4 1:3 2:2 3:1 4:0 0:0 0:4 1:3 2:2 3:1 4:0 0:0 0:4 1:3 2:2 3:1 4:0





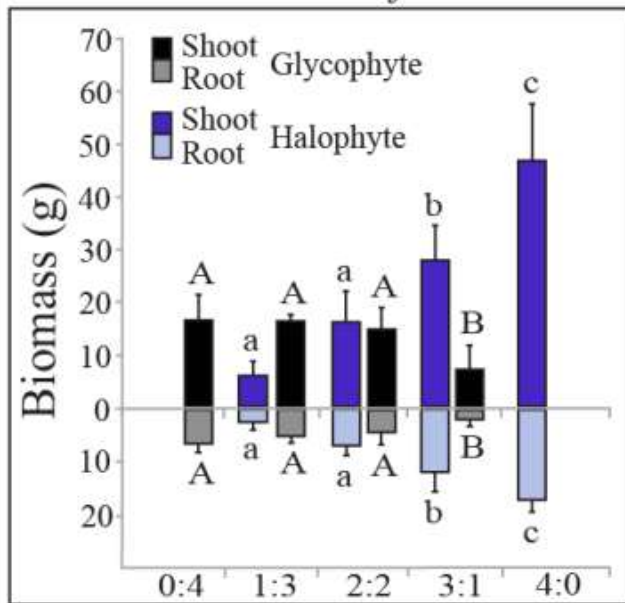
Extracted Relative Salinity (‰)



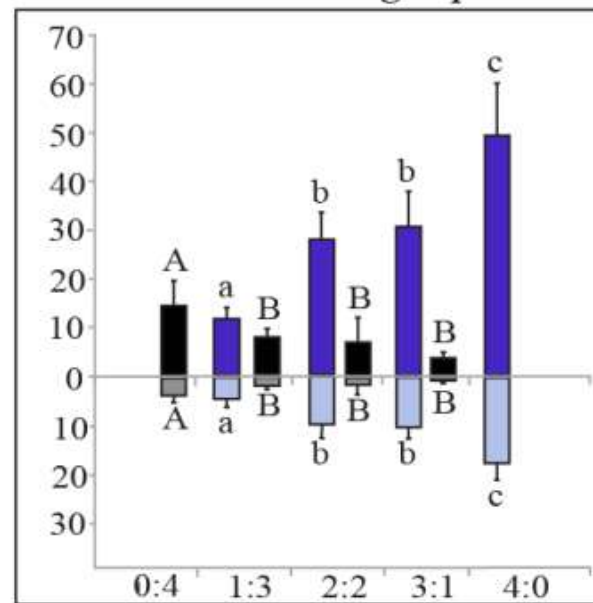
H:G 0:0 0:4 1:3 2:2 3:1 4:0

0:0 0:4 1:3 2:2 3:1 4:0 0:0 0:4 1:3 2:2 3:1 4:0 0:0 0:4 1:3 2:2 3:1 4:0

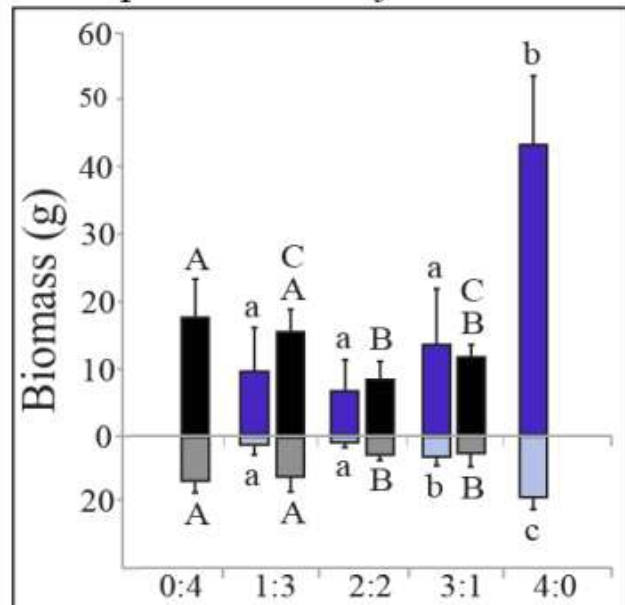
B. maritima vs *A. flavescens*



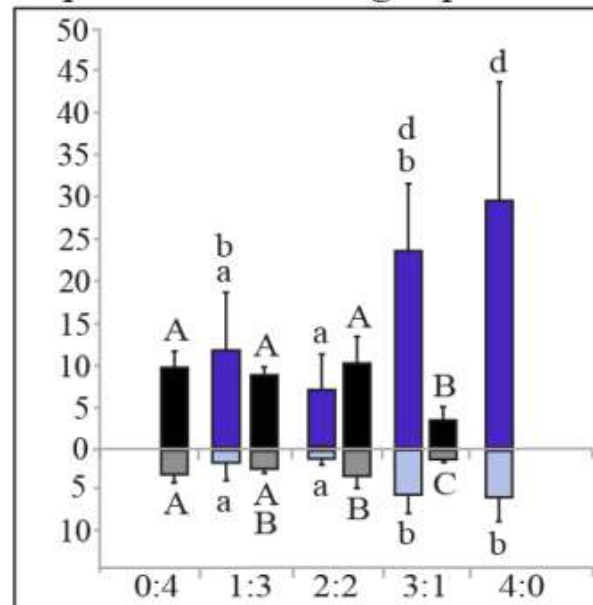
B. maritima vs *H. angiospermum*



S. perennis vs *A. flavescens*



S. perennis vs *H. angiospermum*



Conclusions



The more halophytes...the saltier the soil.

Osmotic or ionic stress decreases biomass and, overall, photosynthesis.

May increase the rate of plant community change.

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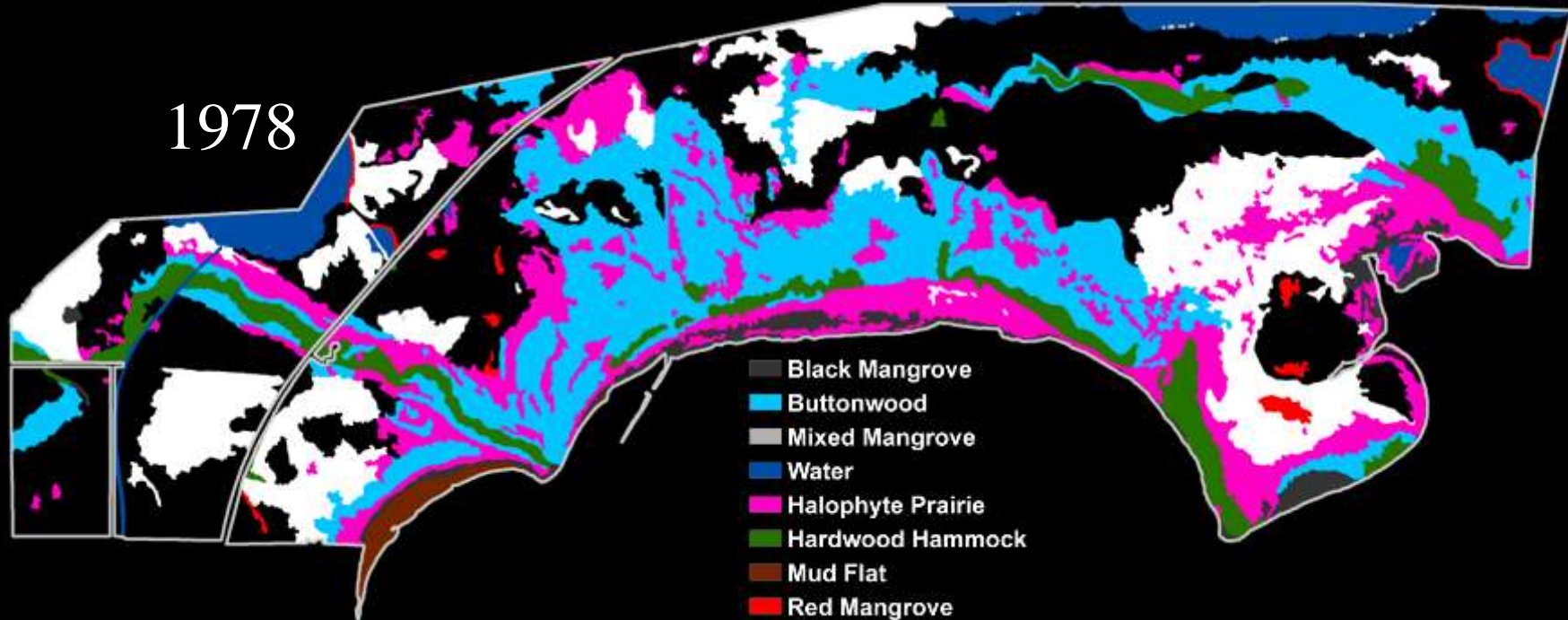
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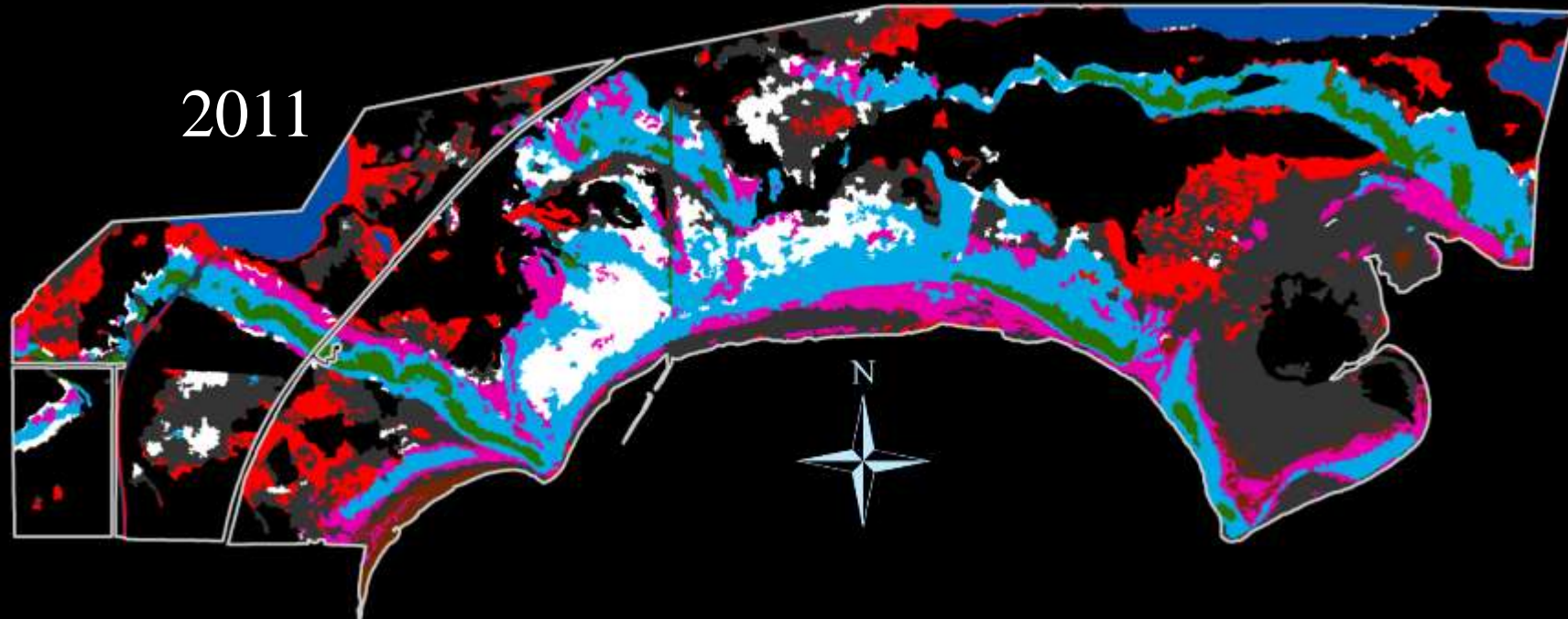
Questions?



1978



2011



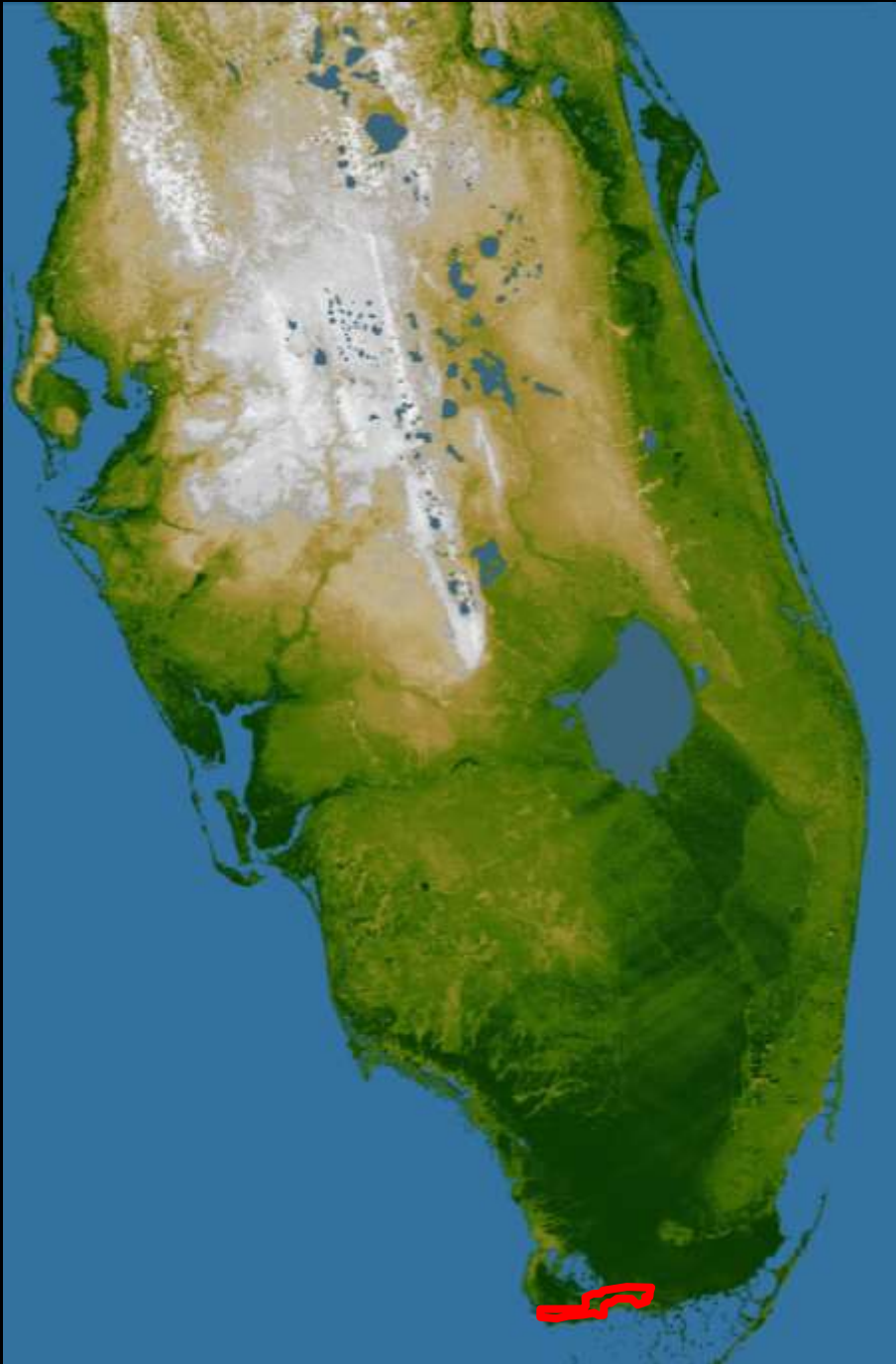


Image Courtesy SRTM Team NASA/JPL/NIMA

■ Ocean Surface ■ Elevation <5m ■ Elevation <10m