Carrie Adams Lab
Restoration and Plant Ecology
Recent work in the region

- Plant focused research on ecosystem functions

- Genetic diversity of *Juncus roemerianus*

- Salinity and flooding stress thresholds of salt marsh plants

- Planting guidance for Living Shorelines

- Patterns of stress in *Juncus* marshes

Project motivations

- Observed death of coastal forest trees and reduced regeneration of seedlings
- Substantial marsh loss in the Northeastern US and Louisiana
- Current marsh conditions along Florida's Gulf coast are understudied

Project Objectives

Quantify

Juncus roemerianus morphological and physiological conditions as possible indicators of stress leading to die-off in the Big Bend region
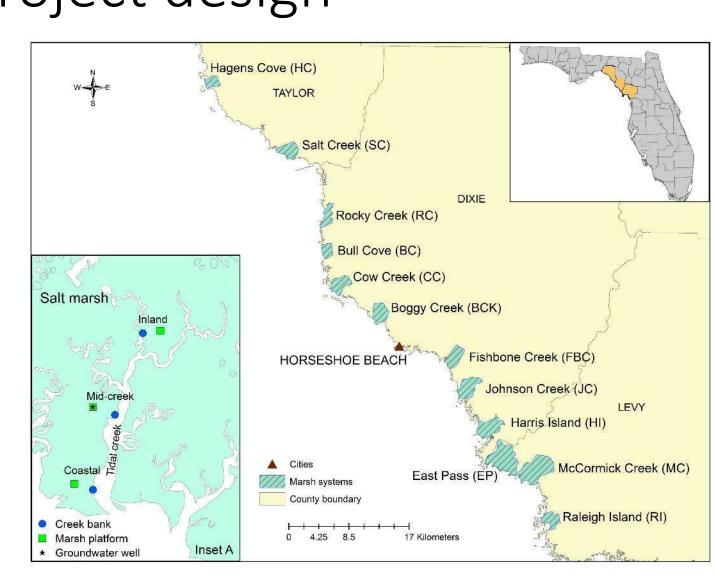

Assess

Juncus conditions across spatial locations within marsh systems
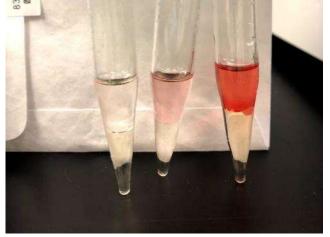

Examine

Patterns in *Juncus* response across environmental factors (soil, water, and herbivory) to determine within- and between- marsh variation

Salt marsh study systems and project design

Salt marsh parameters

Juncus conditions

- Productivity (biomass)
- Stem height and density
- Tissue enzyme (proline) and ion accumulation
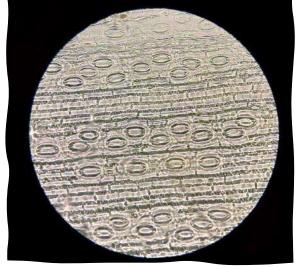- Plant water conductance (stomate density)

Environmental factors

- Soil and groundwater salinity
- Soil nutrient levels (C and N)
- Herbivore presence (snail density)

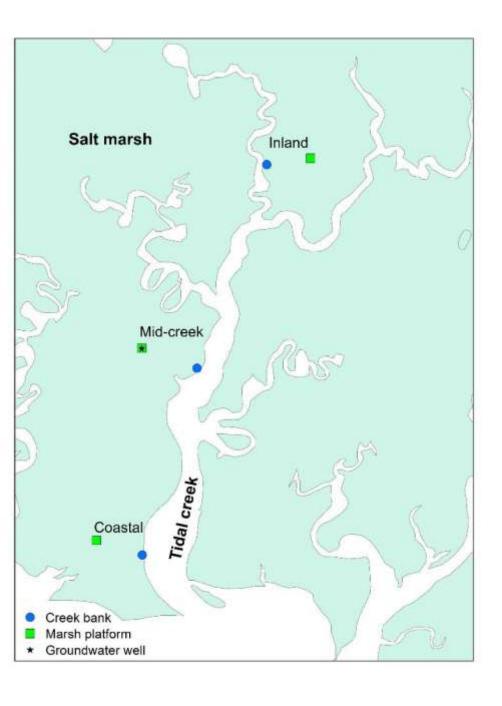# Objective 1: Quantifying *Juncus* conditions

Evidence of stress present in 8 of the 15 measured response variables

- Physiological responses point to *Juncus* experiencing stress
- Productivity did **not** show strong indication of *Juncus* stress
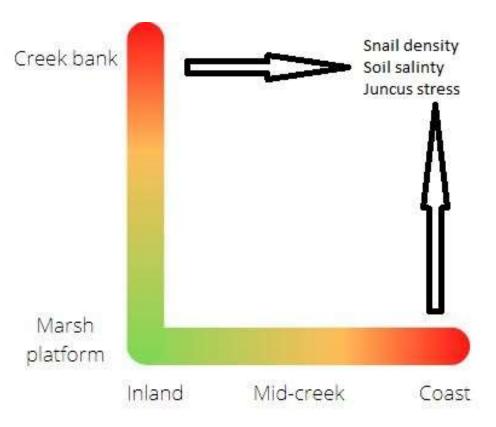
Objective 2: Assess *Juncus* conditions across spatial locations

Objective 3: Examine *Juncus* response to environmental variables to determine within- and between- marsh variation

- Plant stress varied considerably between marsh systems
  - Proximity to Suwannee River showed fewest signs of stress
- Soils varied in texture, organic matter, nutrients, and bulk density
- Groundwater salinity - seasonal trends across creek systems
  - Highest salinities in dry season
  - Lowest salinities in wet season

Project conclusions

- Physiological adaptations buffer *Juncus* from stressful environmental conditions

- Future marsh loss (conversion to open water) to occur at creek margins

- Florida's Big Bend salt marshes are at various stages of threat to marsh die-off

- Fresh water river discharge and rain events likely reduce salinity stress

Thank you!

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