Florida Department of Environmental Protection

Effect of *Spartina alterniflora* Harvest Intensity on Recovery in Donor Marsh

Cheryl Mannel
February 3, 2017





Role in Ecosystem

The Case for Local Sourcing

- *Spartina alterniflora* is used for marsh and shoreline restoration
  - Purchase increases project cost (permitting requires acquisition from nursery)
  - Transport increases carbon footprint
  - *Spartina* is ***epigenetic***, meaning genetically identical plants can exhibit different phenotypes based on environmental conditions. On-site harvest yields plugs optimized to local conditions.

Eroding shoreline

Planted Shoreline

STAR Program

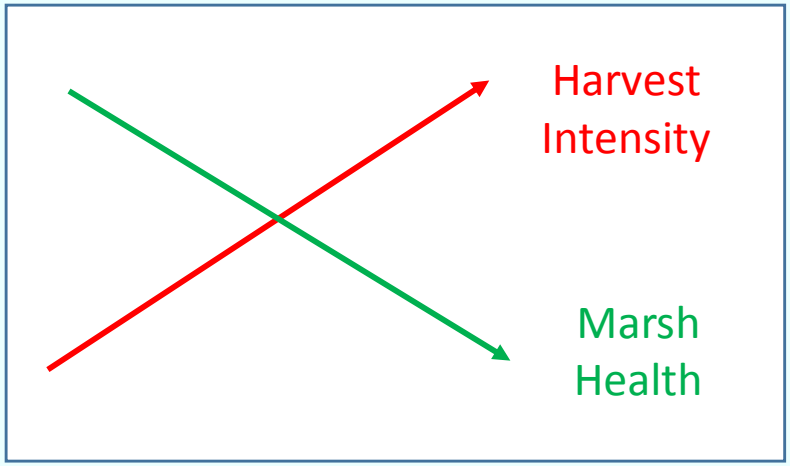
Spartina Transplant and Restoration Program

Created in Spring 2014

- Objective: Transplant Spartina plugs to restore 2 acres of marsh
- Industry standard of 15% harvest
- Standard based on anecdotal, not science- based evidence
- Initiated science-based investigation into best management practices for harvest

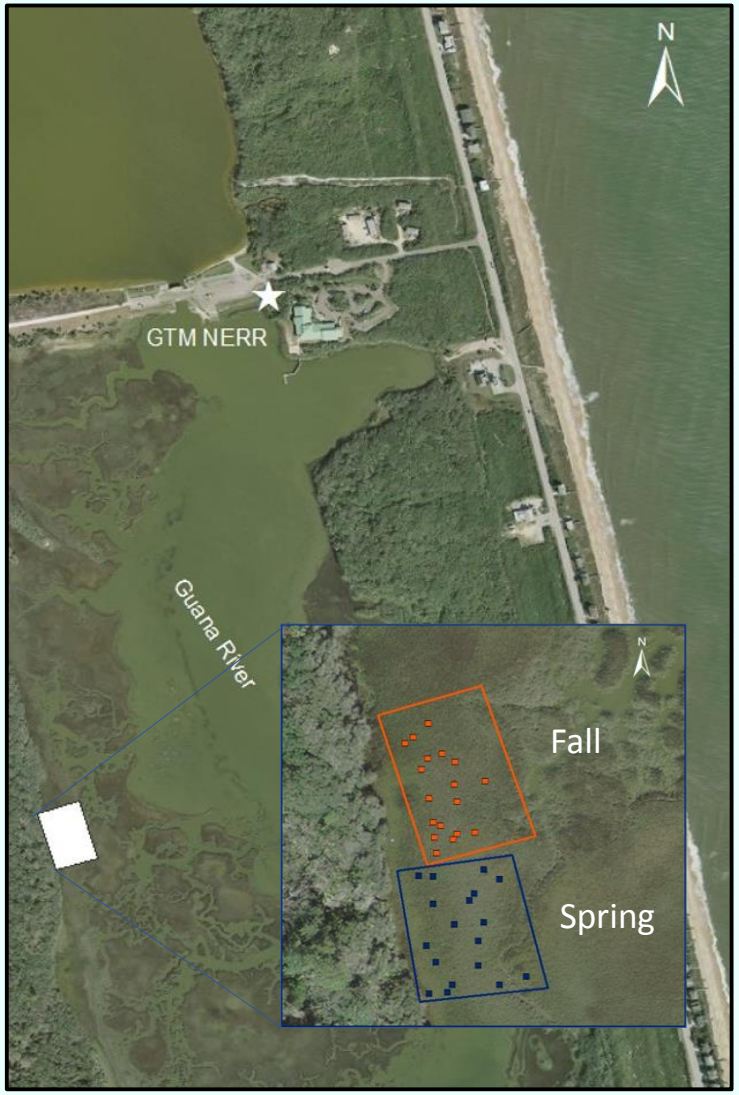
Best Management Questions

- Is full recovery possible post-harvest?
- Does seasonality of harvest influence recovery?
- What intensity of harvest yields the greatest number of plugs with timely full recovery?



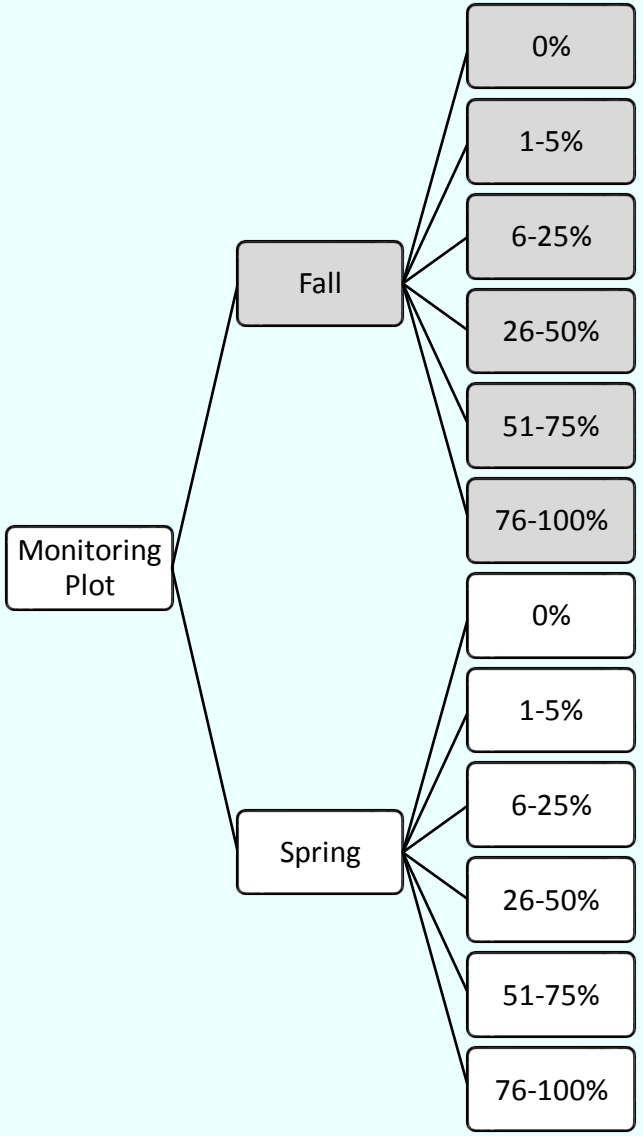
Location

- 169 acres donor marsh on Guana Peninsula
- Monoculture of *Spartina alterniflora* in low salt marsh
- 2 harvest experiment plots: fall and spring
  - Each contained 6 harvest intensities with 3 replicates
  - Total of 36 experimental plots



Design

- Seasons: **Fall and Spring**
- Plots dimensions: **21m x 33m**
  - Subdivided into 3m x 3m grid
  - Treatments randomly assigned to grid squares
- Quadrat dimensions: **0.5 m^2**
- Harvest Treatments:
  - 0, 1-5, 6-25, 26-50, 51-75, 76-100%
  - Braun-Blanquet cover classes designed for consistent easy field assessment
- Replicates per treatment: **3**



Methods

Control

26-50% harvest

75-100% harvest

- Stem density used to determine target # of individuals to harvest
  - i.e.: initial plot stem density is 100, target harvest intensity is 26-50%...

SD * Harvest range = target # stems

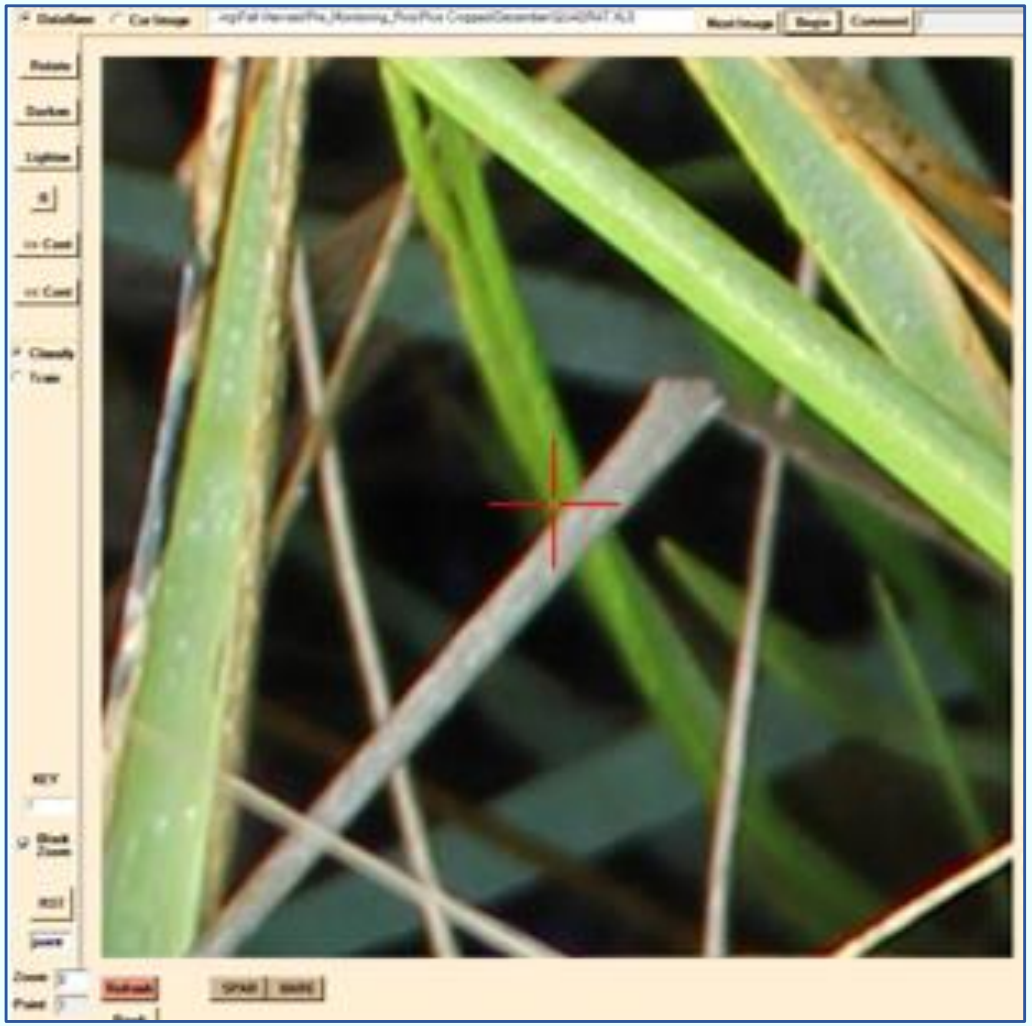
100* 0.26 to 0.5 = 26 to 50 stems harvested

- Target stems identified and removed in clumps until treatment range was achieved
  - Clumps are the practical choice for restoration as clumps have greater survival than individuals
- Plots re-assessed immediately post-harvest and monthly for 12 months

Measured Metrics

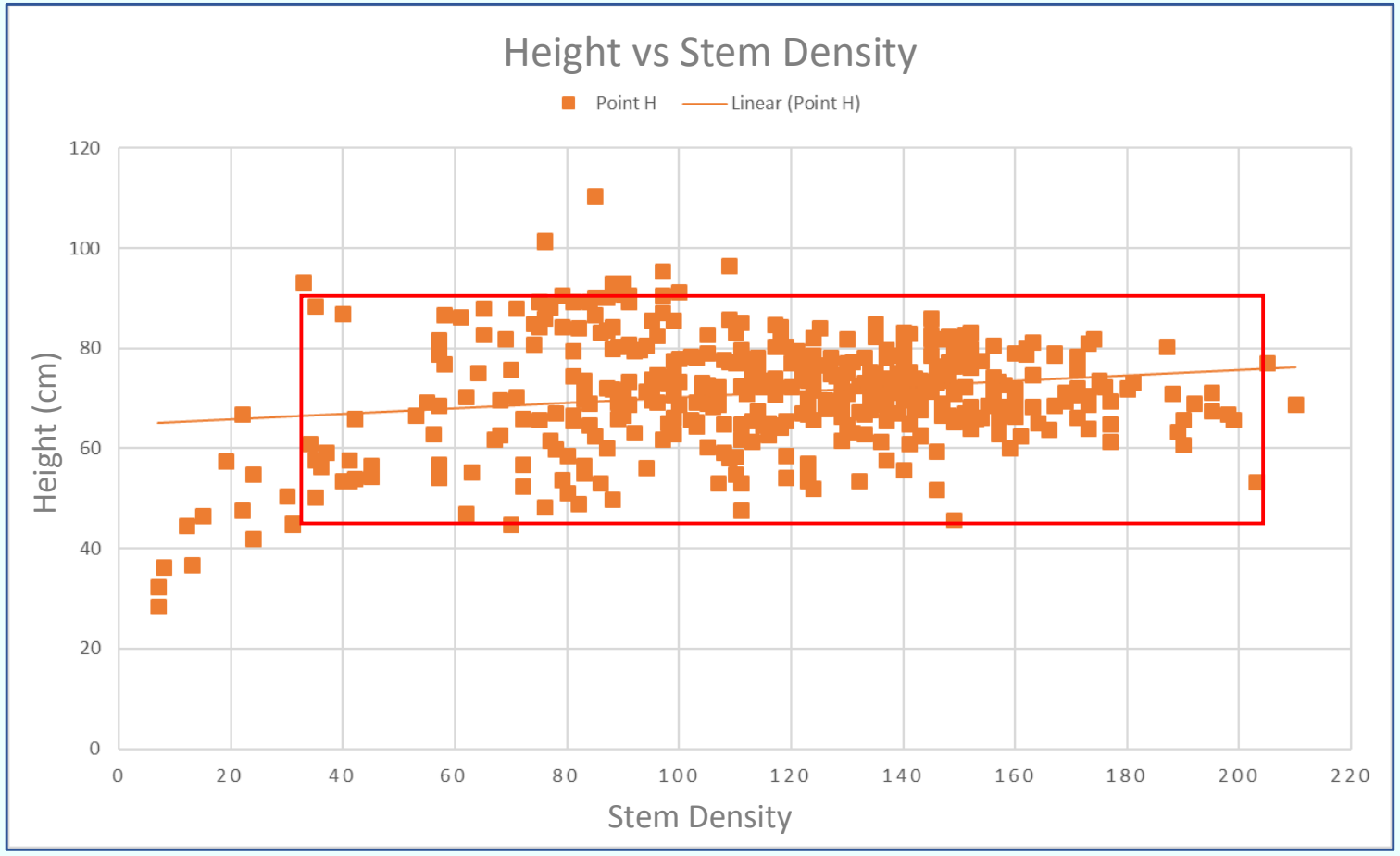
- **Average Culm Height** of 5 tallest individuals
- **Stem Density** (individual count)
- **Percent Cover** (SamplePoint)

<u>Recovery defined as return to pre-harvest values</u>



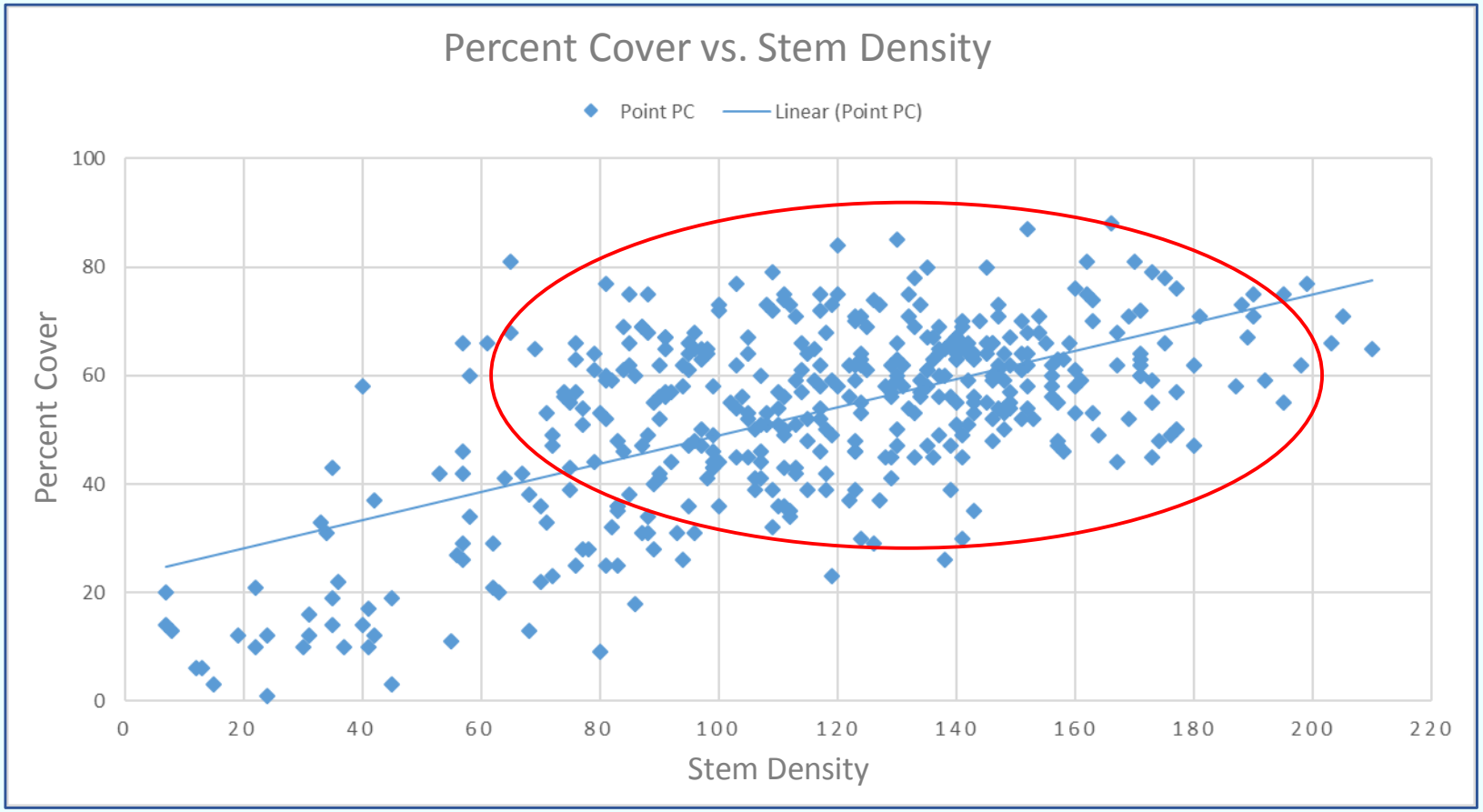
Sample Point screen shot

Height as an Indicator



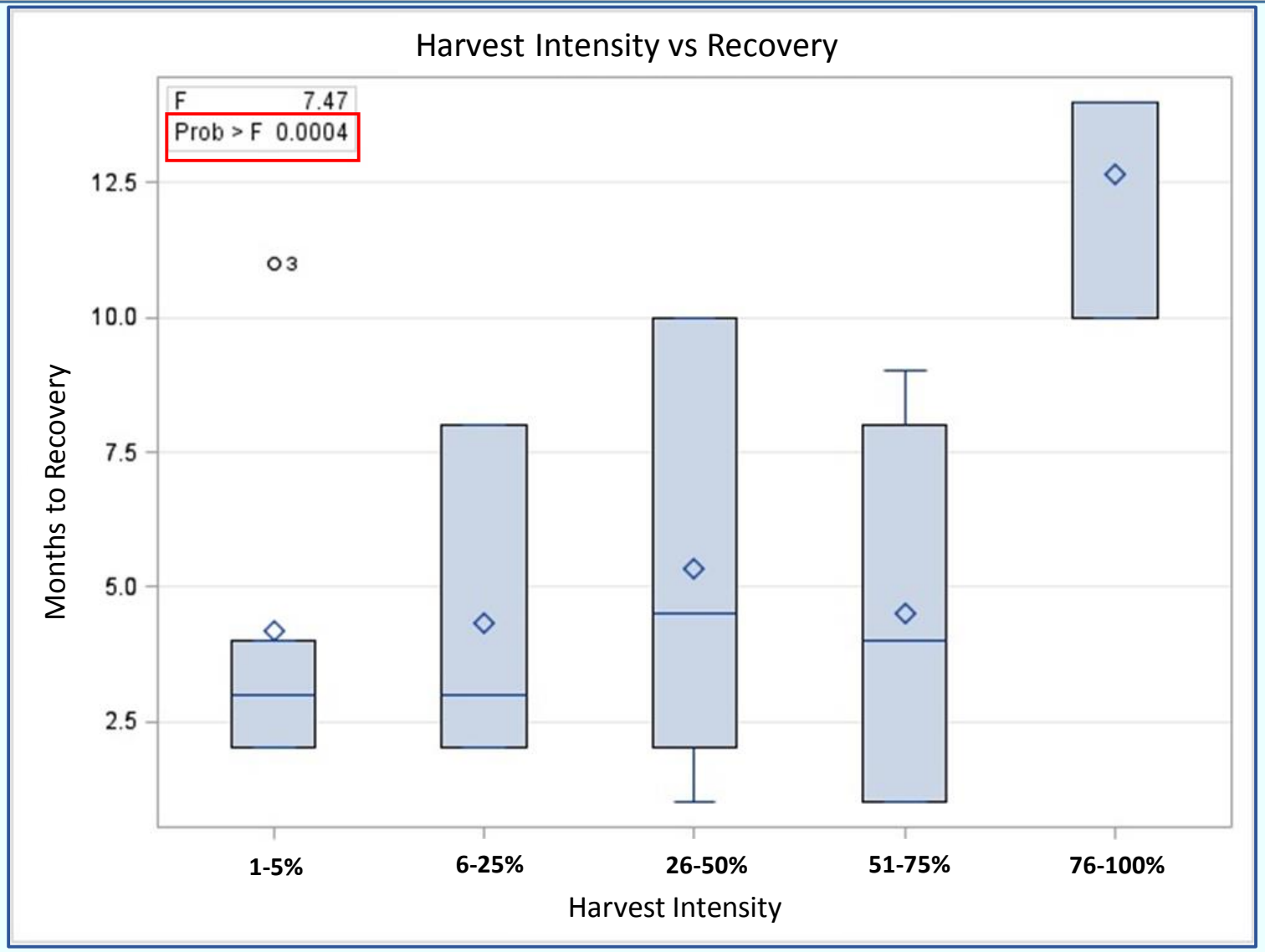
Height fairly uniform across most stem density values, thus not effective in detecting differences between plots

Percent Cover as an Indicator



Cover values similar for wide range of stem densities, suggesting it is less sensitive measure

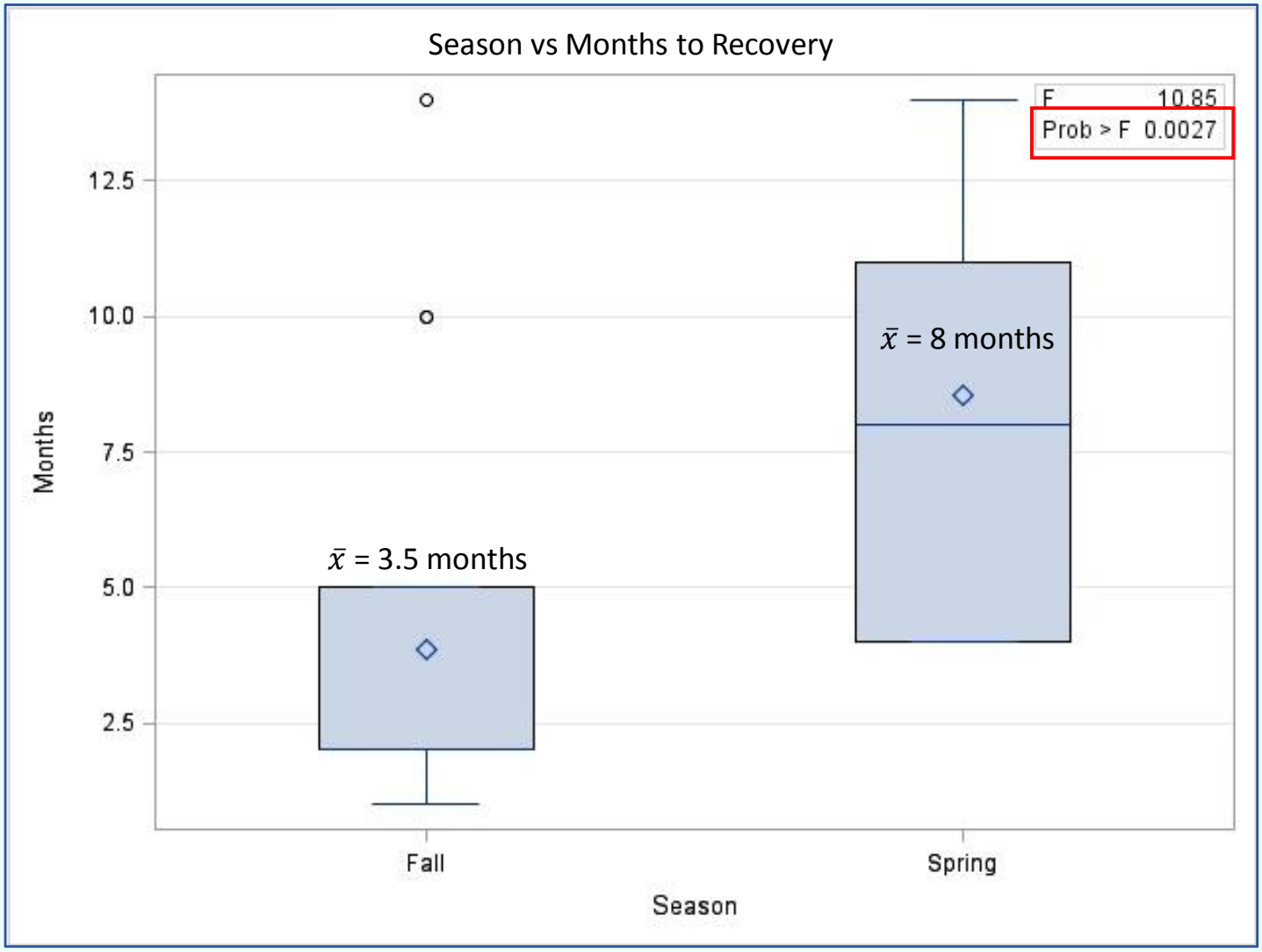
Treatment Effect



No significant difference in recovery time for harvest intensities <75%

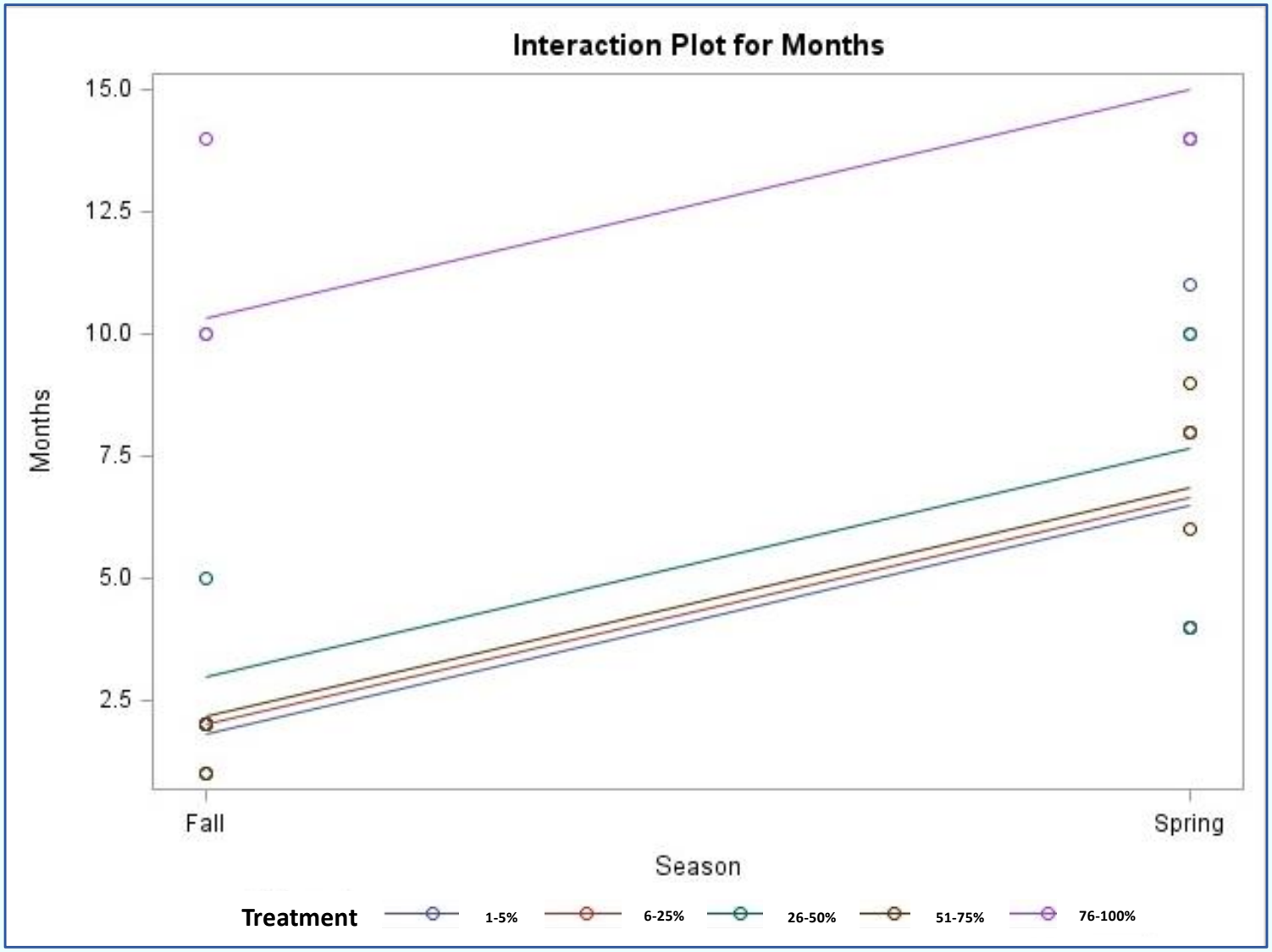
Seasonal Effect

Fall harvest resulted in ***significantly faster recovery*** time than Spring harvest

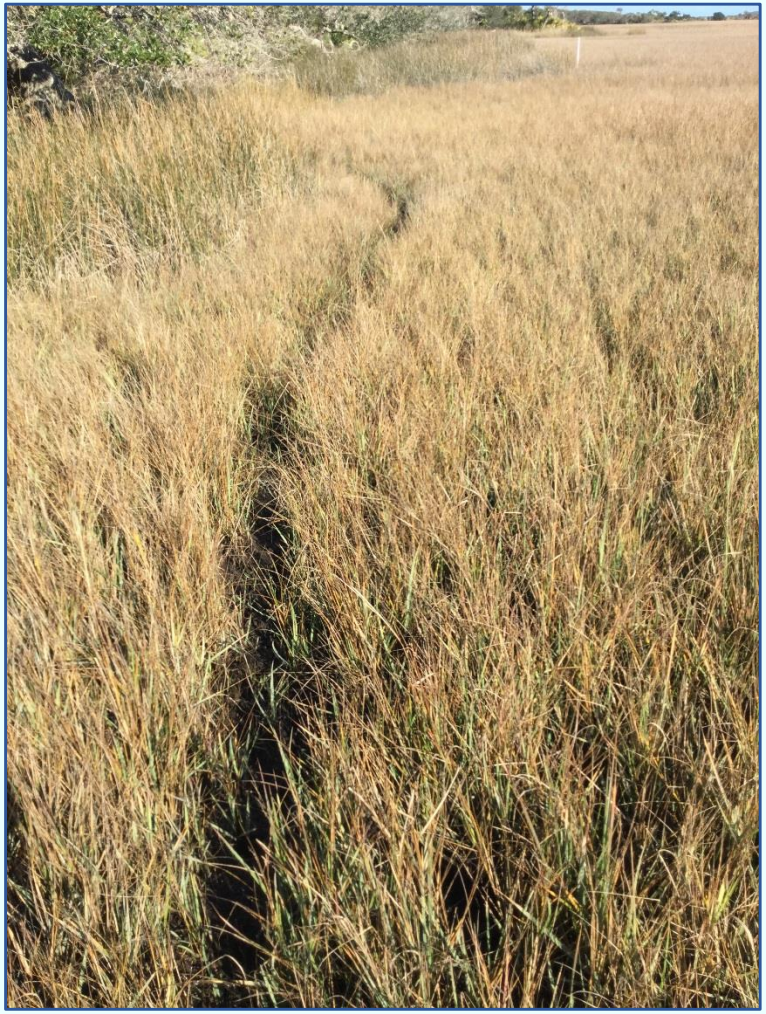


Combined Effects

All Fall plots harvested at <75% recovered faster than Spring plots harvested at all intensities



Considerations



Vegetation trampling

Soil compaction

Boardwalks help to minimize impact from foot traffic

Next Steps

Landscape Scale Testing

- Use this data to focus efforts
  - Fall Harvest
  - Mid-Intensity

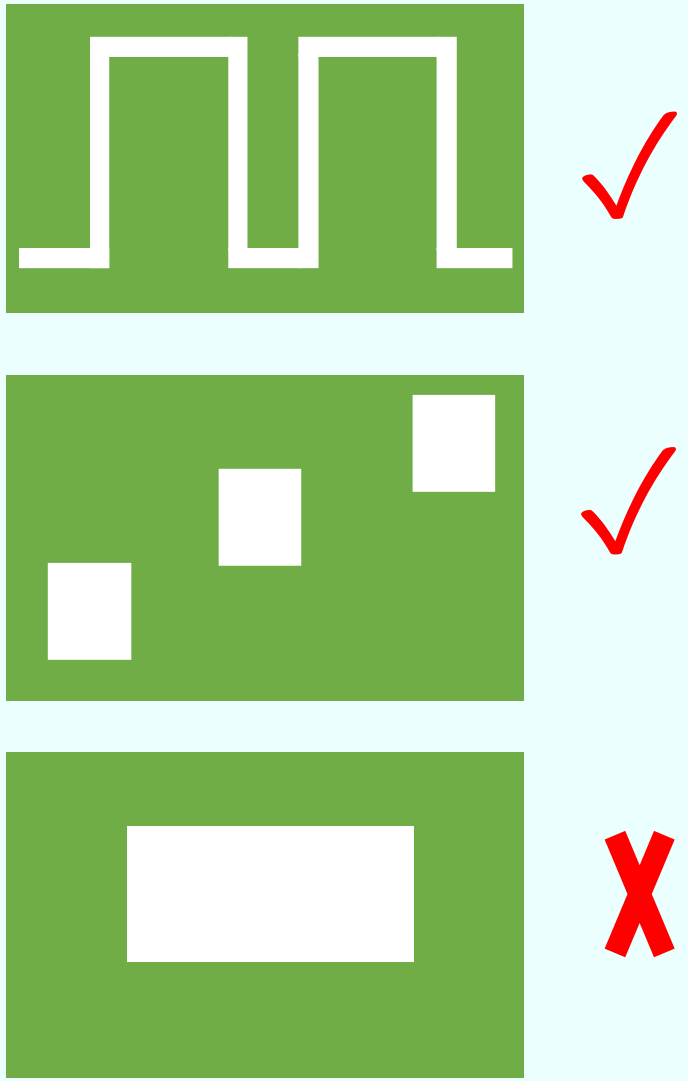
Streamline Measurements

- Stem Density measurements are time consuming on large scale
- Consider alternative percent cover analysis such as larger grid in Sample Point
- Consider use of drones for monitoring

Harvest Mosaics

- Rhizomatous regrowth should be considered
- Balance between yield and trampling impact

Potential harvest patterns



Closing Thoughts

- Current industry standard (15% harvest) is within reasonable range
- May possibly harvest more with little increase in impact to donor marsh but more research is needed
- Most profound influence on recovery is season

Acknowledgements

Many thanks to Brian Alexander for his tireless contributions and continuous dedication.

The U.S. Fish and Wildlife Service for generously funding this project

Questions

Cheryl Mannel

Environmental Specialist II
GTM Research Reserve

Cheryl.Mannel@dep.state.fl.us
904-823-4500

www.gtmnerr.org