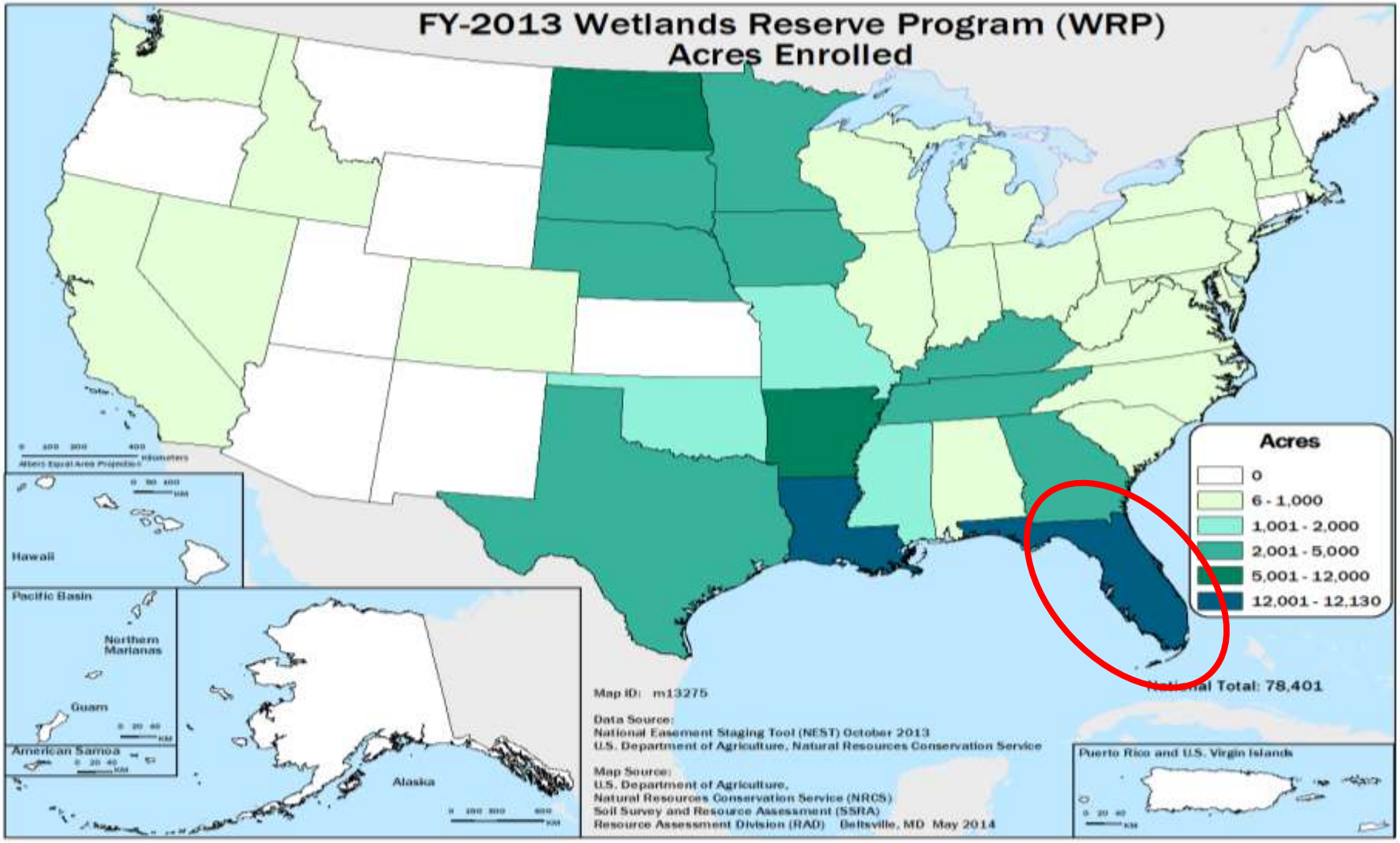
WETLAND RESTORATION AT BUCK ISLAND RANCH A SUCCESS STORY?

G. Sonnier, P. Bohlen, H. Swain, S. Orzell, E. Bridges and B. Boughton

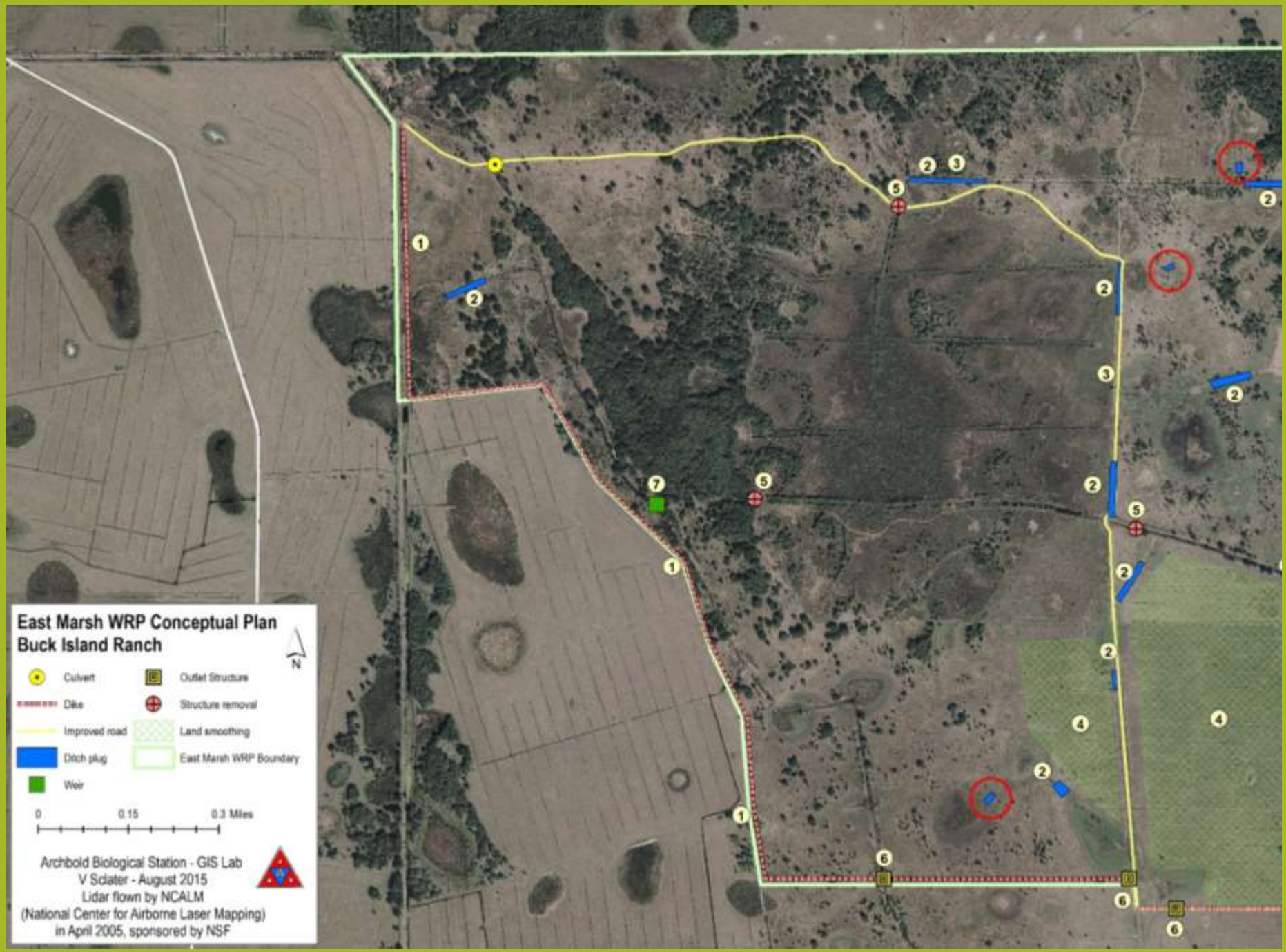
The Wetland Reserve Program



WHERE WE WORK

WRPs at Buck Island Ranch
The South Marsh and East Marsh

South marsh and East Marsh
(748 acres)


East Marsh WRP Conceptual Plan
Buck Island Ranch
N
Culvert
Outlet Structure
Dike
Structure removal
Improved road
Land smoothing
Ditch plug
East Marsh WRP Boundary
Weir
0
0.15
0.3 Miles
Archbold Biological Station - GIS Lab
V Sclater - August 2015
Lidar flown by NCALM
(National Center for Airborne Laser Mapping)
in April 2005, sponsored by NSF

Objectives

1- Was the hydrological restoration successful at restoring hydrology?

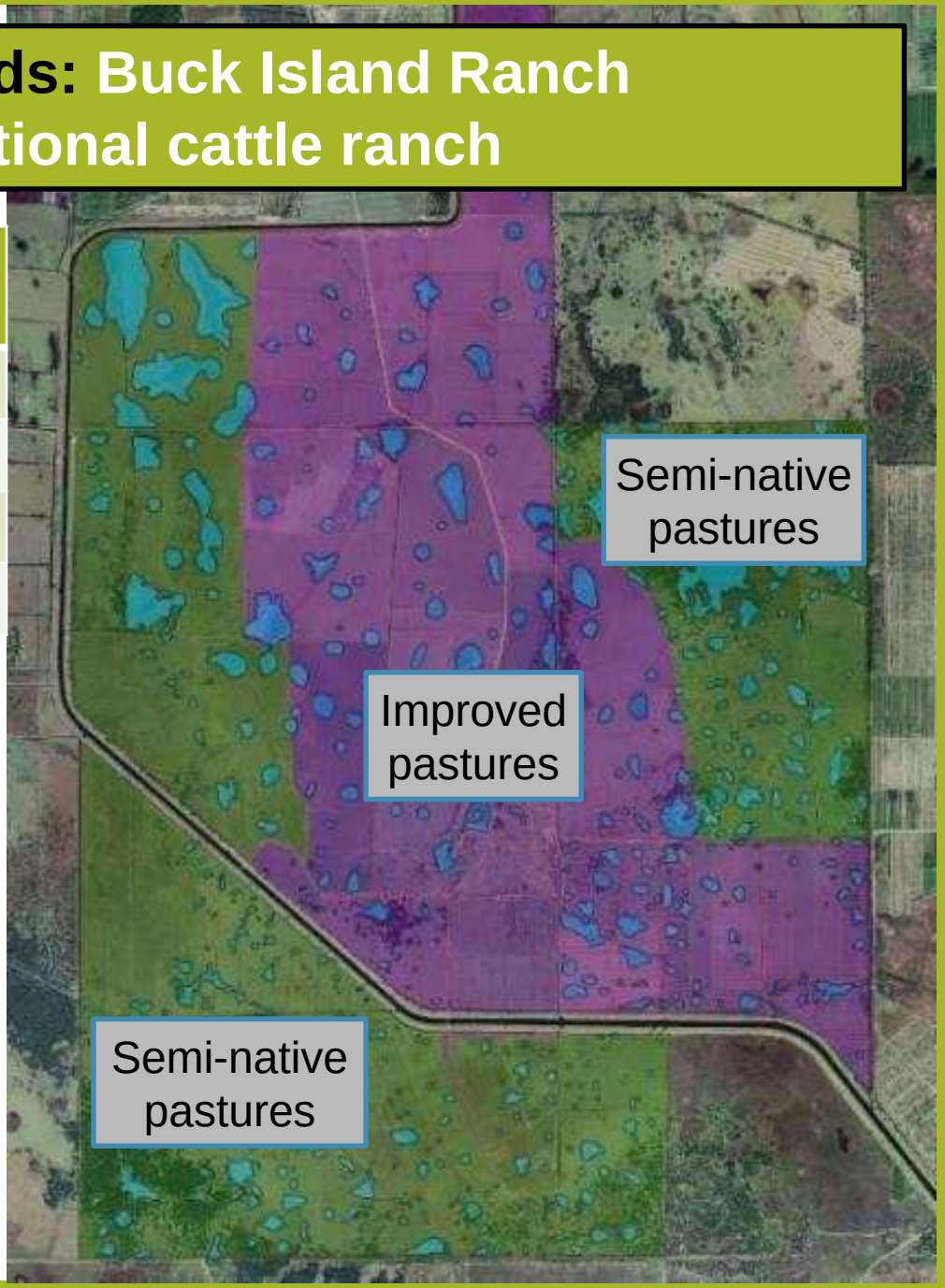
H1= Sites are becoming wetter

2- Was the hydrological restoration successful at restoring plant communities?

H1 = Obligate and facultative wetland species will increase in abundance
H2 = Floristic quality increased following restoration

Material & Methods: Buck Island Ranch a fully operational cattle ranch

	Improved pastures	Semi-native pastures
Cattle load	+++	+
Fertilization	++	0
Seeding	+++	0
Ditching	+++	+



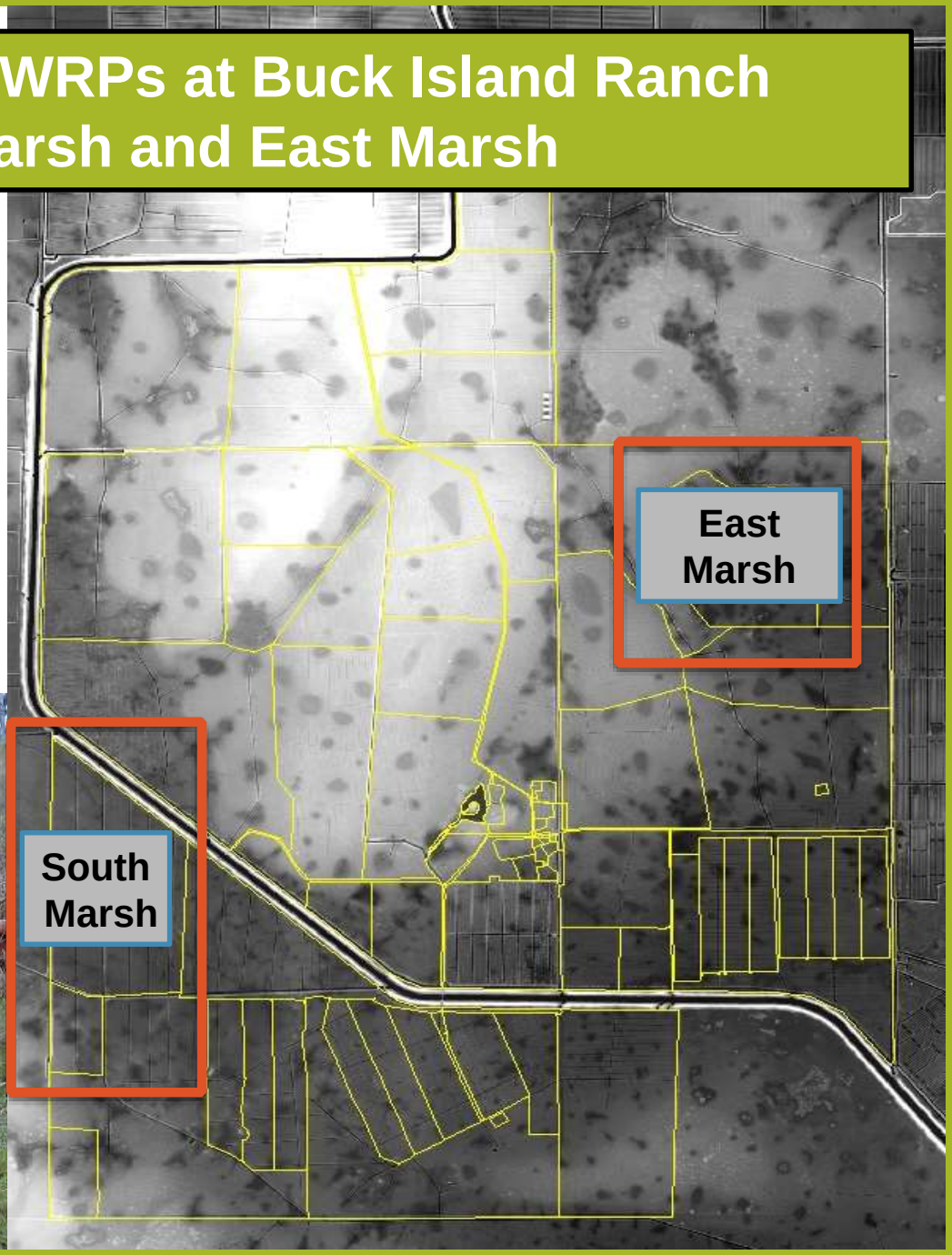
Material & Methods: Buck Island Ranch
a fully operational cattle ranch

Wetland within improved pastures

Wetland within semi-native pastures

Material & Methods: WRPs at Buck Island Ranch
The South Marsh and East Marsh

WRPs are located in **semi-native pastures** and in **lowest elevations** of the ranch



Material & Methods:
Sites & Timeline

Groundwater wells

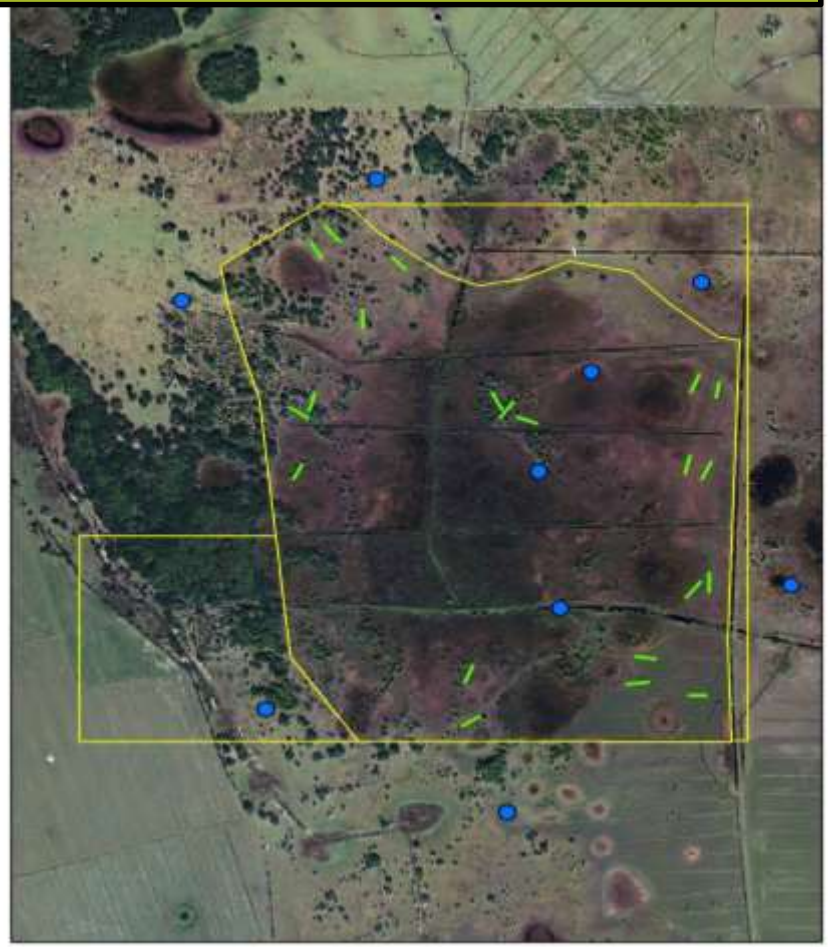
Vegetation sampling

Vegetation sampling

2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 …

Hydrological restoration

Material & Methods:
Following Water Levels



2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 …

Groundwater wells

Hydrological restoration

Material & Methods:
Following Shift in Vegetation

- Transects established in 2005 in different plant community types.
- 10 plots along each transect for a total of 300*1 m^2 quadrats.
- Second sampling in 2012.
- Record presence and cover of each vascular species.

2003 2004 2005 2006 2007 2008 2009 2010 2011 2012

Vegetation sampling

Hydrological restoration

Vegetation sampling

Material & Methods: Following Shift in Vegetation Wetland indicator status

Facultative Upland

Facultative Wetland

Obligate Upland

Facultative

Obligate Wetland

Diversity of Obligate Wetland species

Cumulative Cover of Obligate Wetland species

Material & Methods: Following Shift in Vegetation

Specialist vs. ubiquitous species as indicator of wetland quality (0-10)

Hymenachne amplexicaulis

Diodia viriginiana

Phyla nodiflora

Thalia geniculata

Gratiola hispida

Polygala incarnata

Ludwigia suffruticosa

Ubiquitous → **Specialist**

Juncus effusus

Canna flaccida

Utricularia purpurea

(Weighted) Average of coefficient of conservatism in each plot

Material & Methods:
Statistical Analysis

- **GDW**: Time series

- **Species Survey:**
- Permanent transect/plots → Repeated measurement design
- Plots are nested within transects → Nested design

→ Generalized Linear Mixed Models

Stratified by analysis WRP and vegetation types separately

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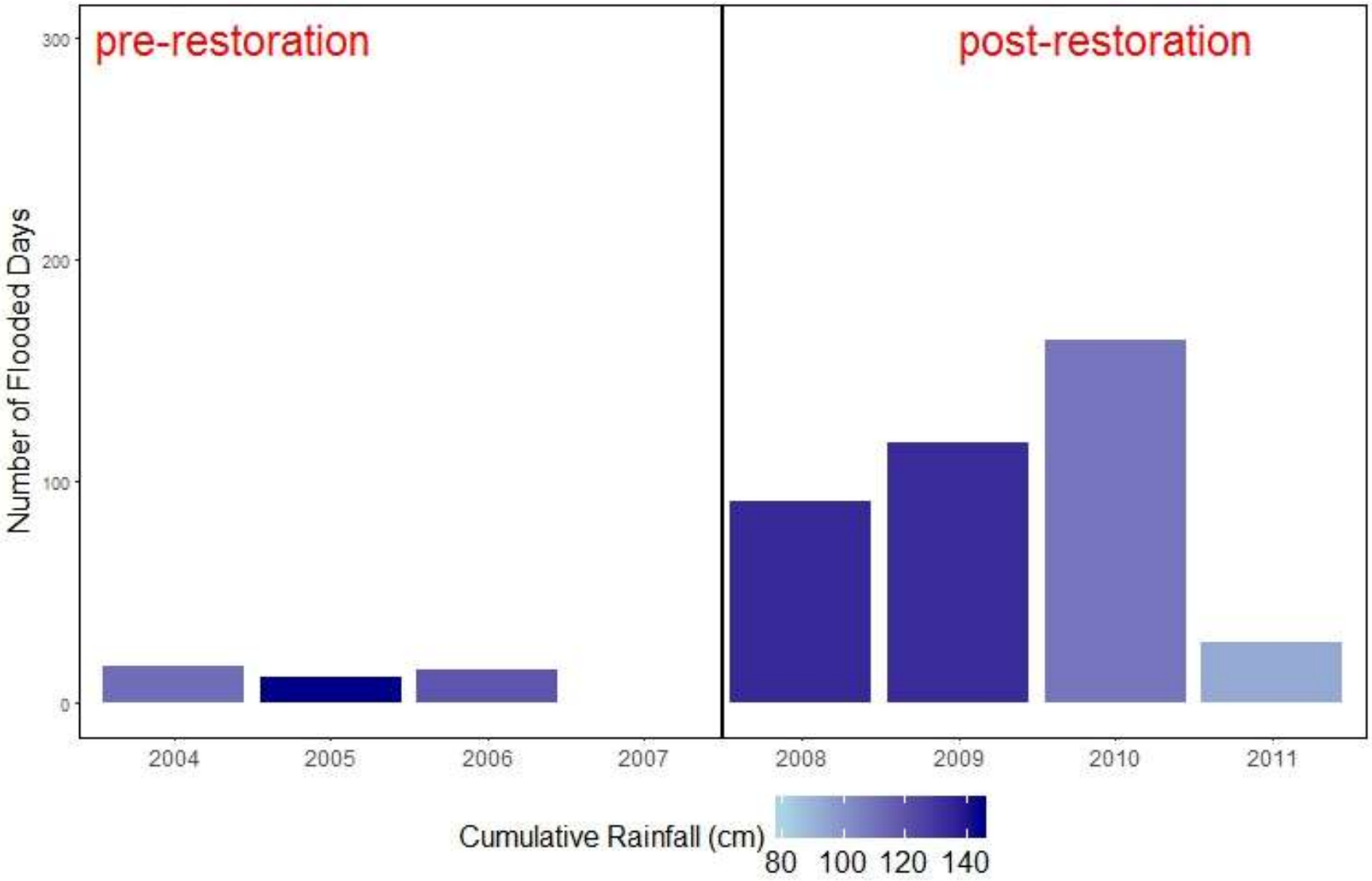
Results: Hydrology of the South Marsh
Numbers of flooded days



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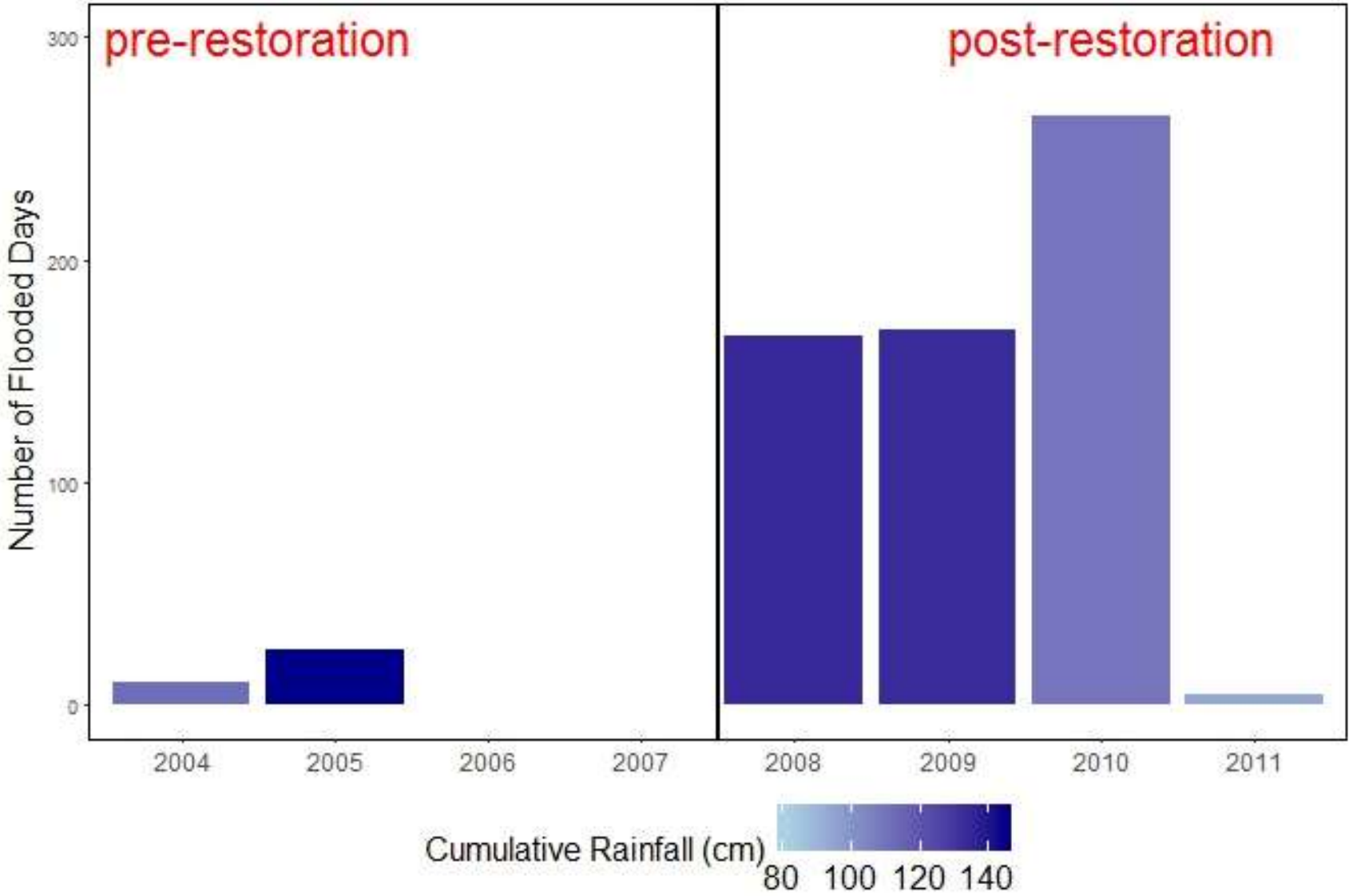
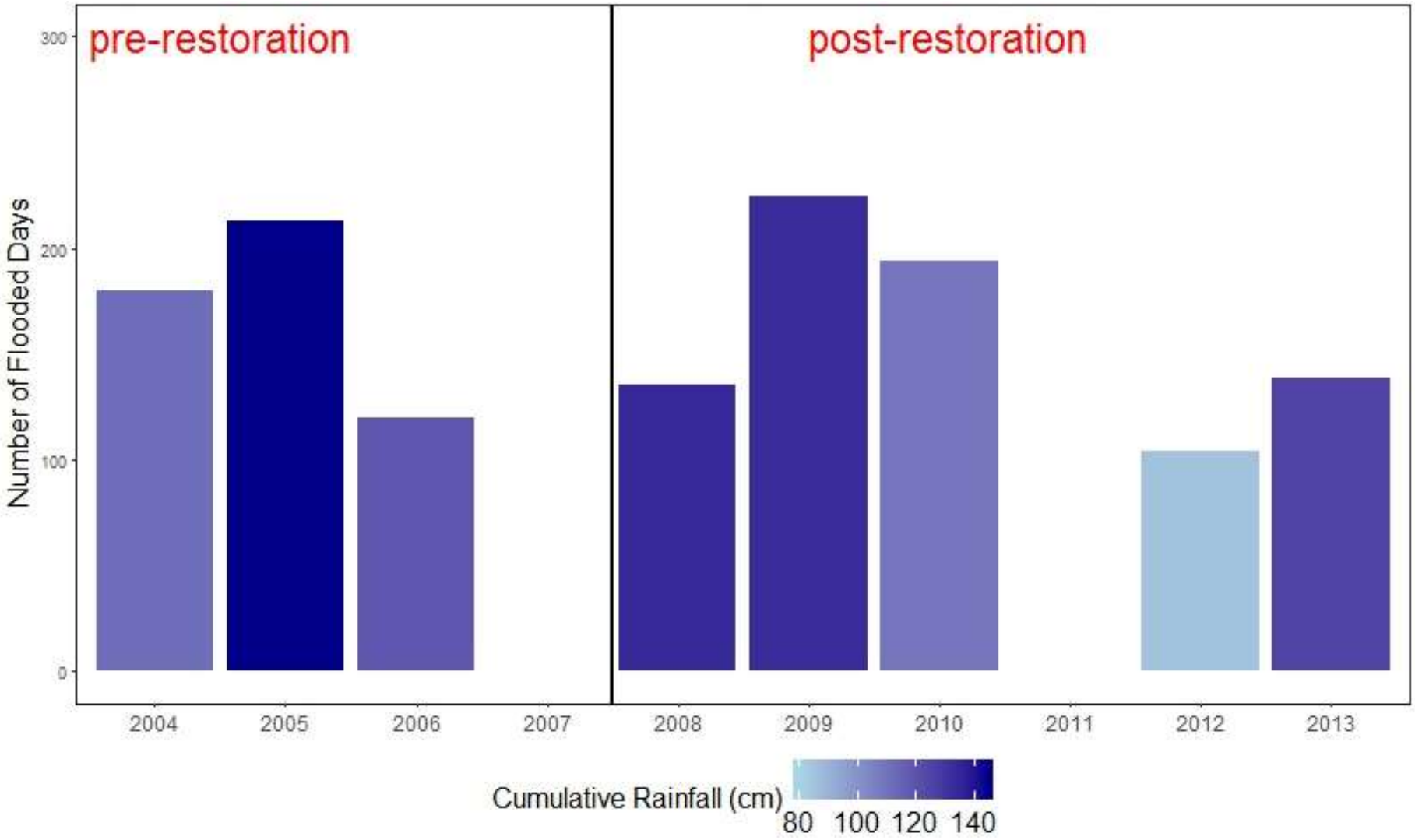
Numbers of flooded days



Results: Hydrology of the East Marsh
Numbers of flooded days



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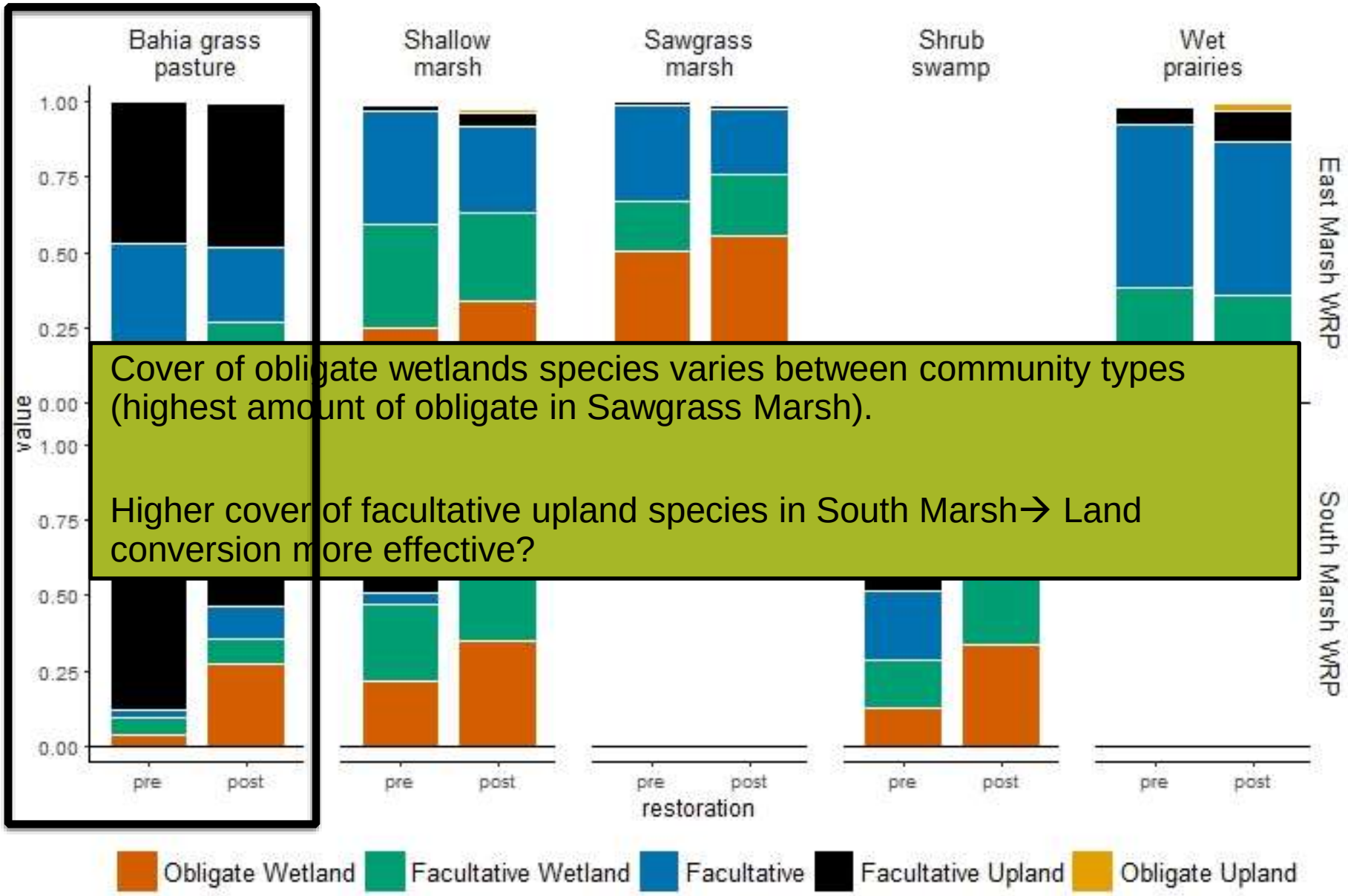
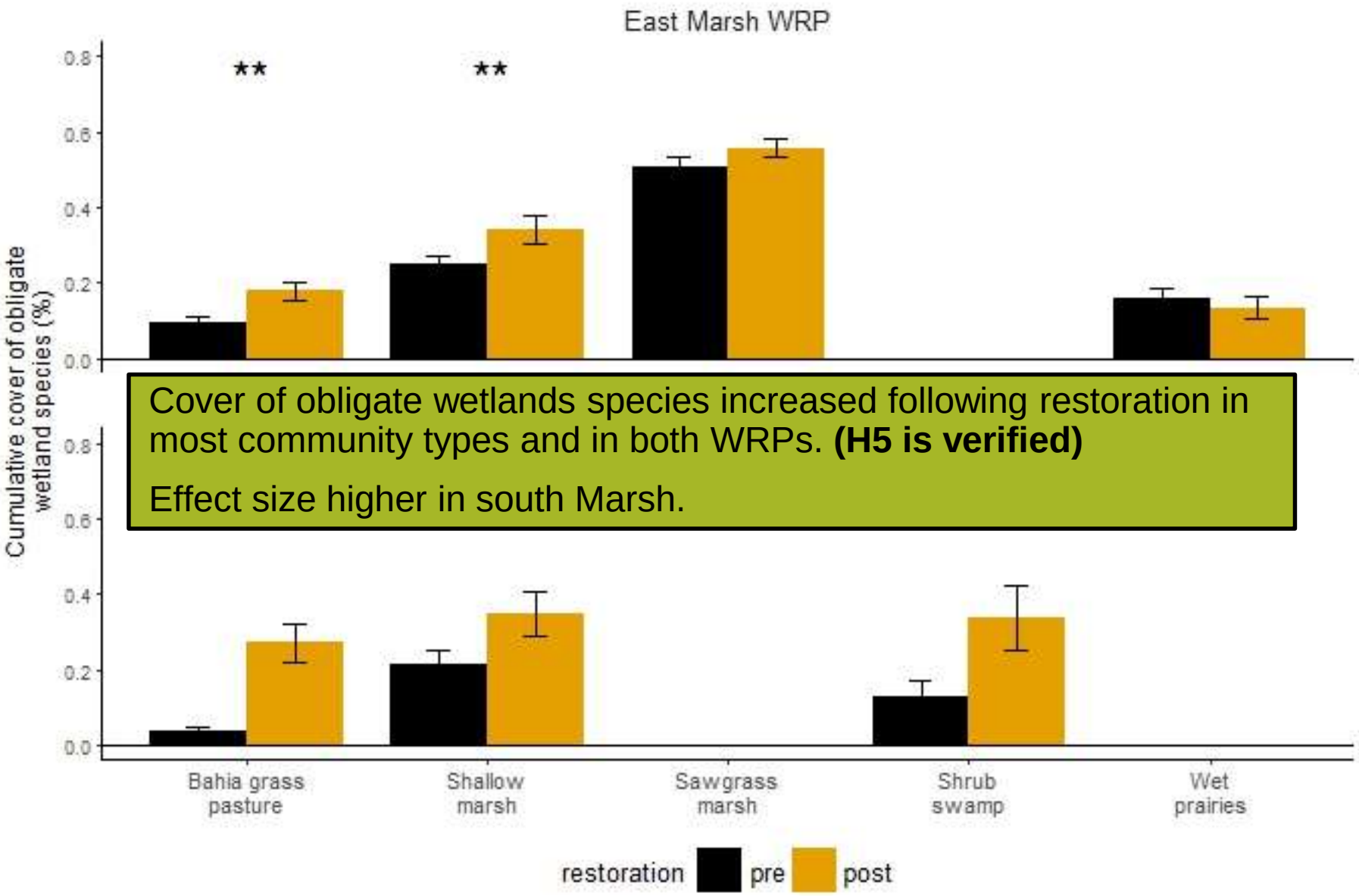
Results: Shift in Wetland Indicator Status



Cover of obligate wetlands species varies between community types (highest amount of obligate in Sawgrass Marsh).

Higher cover of facultative upland species in South Marsh→ Land conversion more effective?

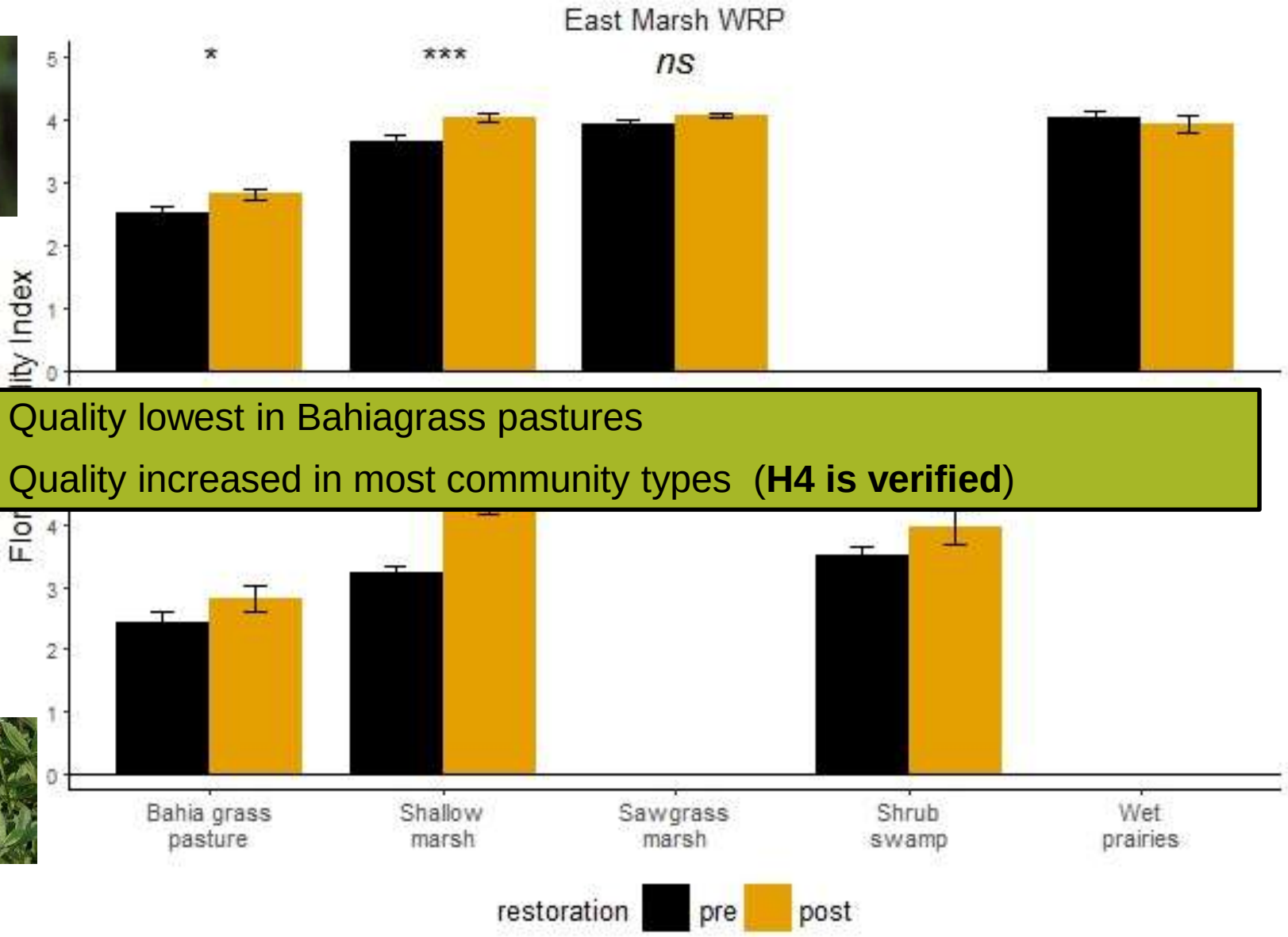
Results: Shift in Wetland Indicator Status



Cover of obligate wetlands species increased following restoration in most community types and in both WRPs. **(H5 is verified)**

Effect size higher in south Marsh.

Results: Shift in Floristic Quality



Floristic Quality lowest in Bahiagrass pastures

Floristic Quality increased in most community types (**H4 is verified**)

Take Home Message

- Hydrological restoration **increased hydroperiod** in the South Marsh, but we could not confirm it did so in the East Marsh.

- Hydrological restoration **increased cover of Obligate Wetland Species**. Cover of facultative wetland species do not necessarily increased.

- Hydrological restoration **improved floristic Quality** in both WRPs.

Take Home Message

- Beta diversity increased suggesting that sites are becoming **more heterogeneous** following restoration.

- Most plots were grazed suggesting grazing is not detrimental to restoration success

Acknowledgments

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Betsey Boughton

Thank you. Any Questions?