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Long term vegetation response to hydrologic recovery in isolated cypress domes of west-central Florida

Megan Bartholomew*, Christopher Anderson
School of Forestry and Wildlife Sciences, Auburn University, Wetland and Riparian Ecology Lab
*mkb0047@auburn.edu

Introduction

- Hydrology determines wetland function and guides restoration planning
- Restoration can fail when hydrology cannot support the re-establishment of the historic vegetation
- We investigated how plant communities respond to hydrologic alterations

Study Site

J.B. Starkey Wilderness Park

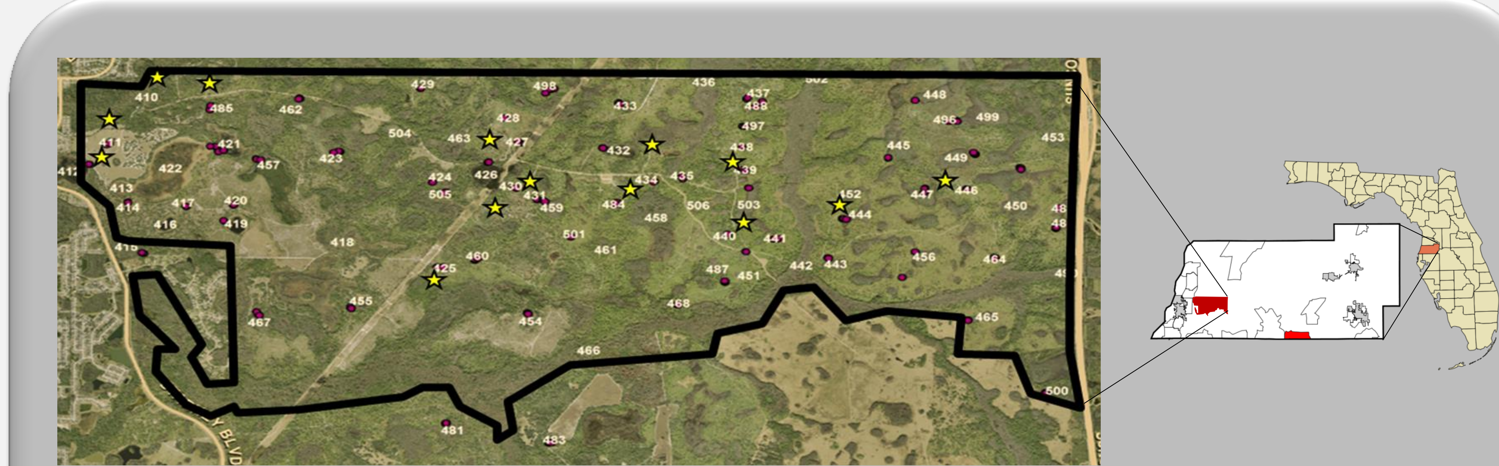


Figure 1. Study site and location in Pasco County Florida. Red circles represent monitored wetlands and stars represent groundwater wells.

- Municipal well field to the Greater Tampa Bay Area near New Port Richie, FL (Fig.1)
- Pine palmetto flatwoods, meadow, wet prairie, cypress slough, and isolated cypress domes (Fig 2.)
- Long term environmental monitoring in wetlands
- Pumping history in the park has created a gradient of hydrologic alterations among wetlands (Fig. 3)

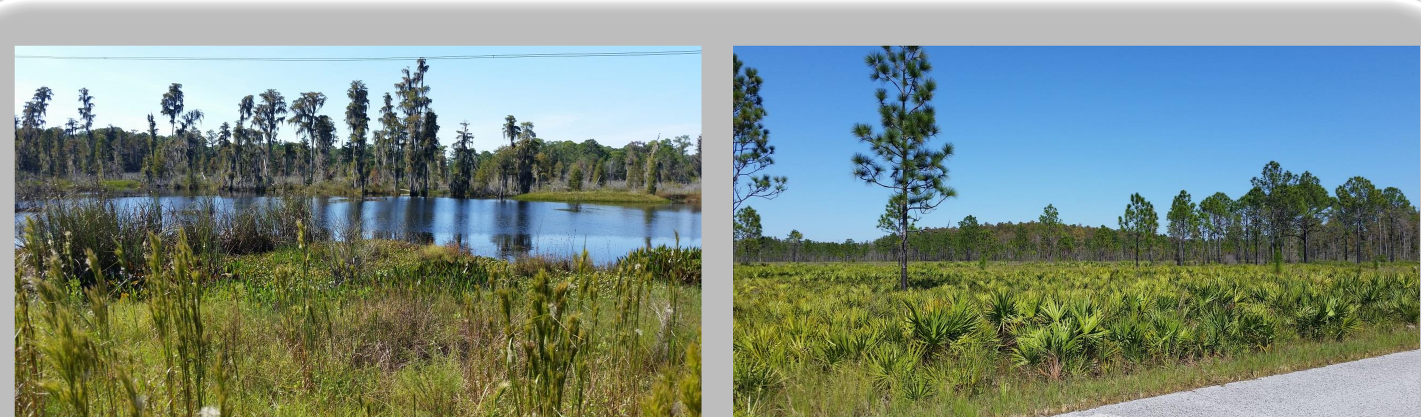


Figure 2. Various ecosystems within J.B. Starkey Wilderness Park.

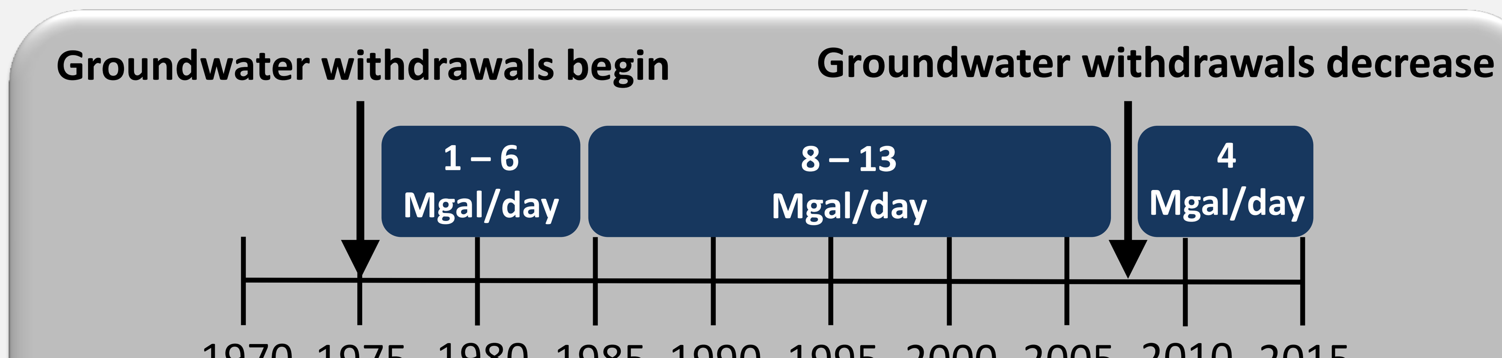
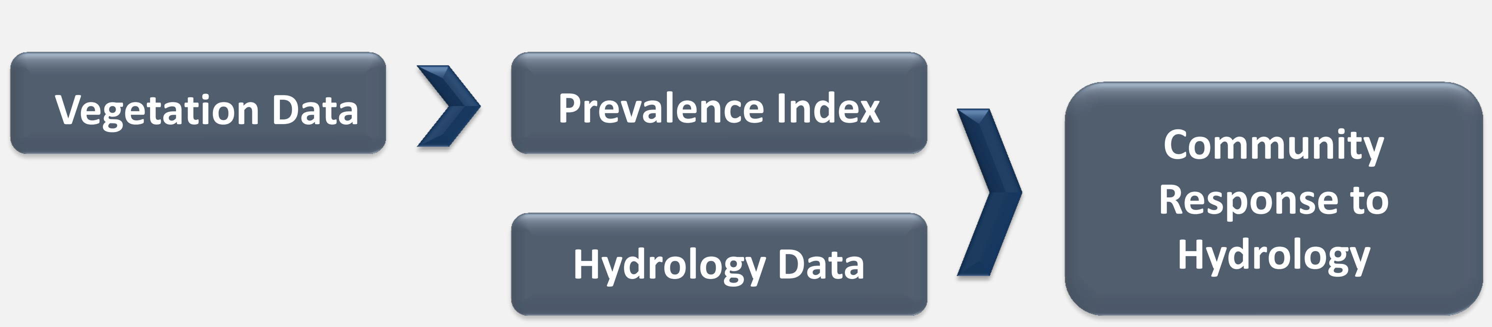


Figure 3. Historical pumping rates within J.B. Starkey Wilderness Park.

Objectives

- Determine how vegetative communities differ among wetlands affected by groundwater withdrawal
- Determine vegetation response and recovery to changes in hydrology



Methods

Hydrologic Data

- Hydrology has been monitored regularly in selected wetlands since 1990 (n=12)
- Wetlands were categorized based on differences in inundation in specific zones (Fig. 4, 5, and Table 1)

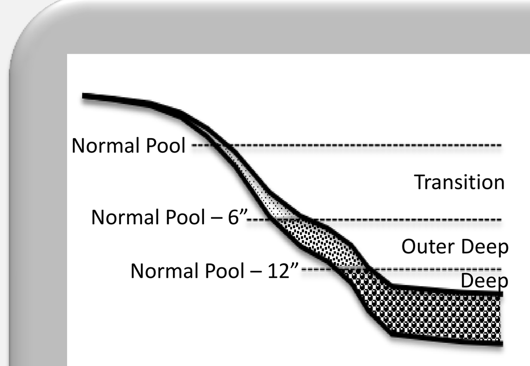


Figure 4. Illustration of wetland zonation.

Table 1: Hydrologic classification based on inundation.

	% Inundated Observations in Zone	
Classification	Outer Deep	Transition
Unaltered	50 – 70	30 – 45
Marginal	30 – 50	15 – 30
Altered	10 – 30	0 – 15

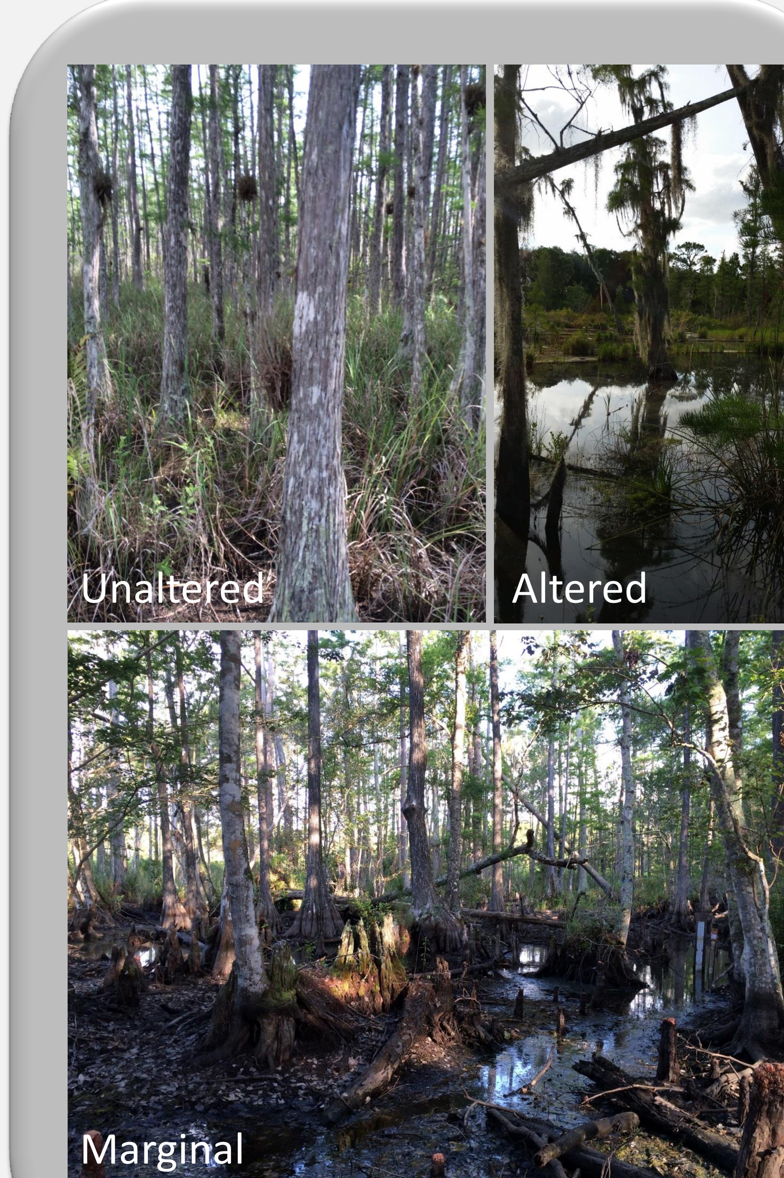


Figure 5. Example of hydrologic groups.

Vegetation Data

- Vegetation surveys have been conducted annually, via Wetland Assessment Procedure (WAP) since 2005
- Data includes annual species lists, percent covers, and distributions for each zone in each wetland

Prevalence Index Scores

- Weighted average indicating the prevalence of hydrophytic vegetation
- Lower scores indicate more hydrophytic communities than higher scores
- Calculated using annual WAP vegetation data per zone and cover type

Preliminary Results

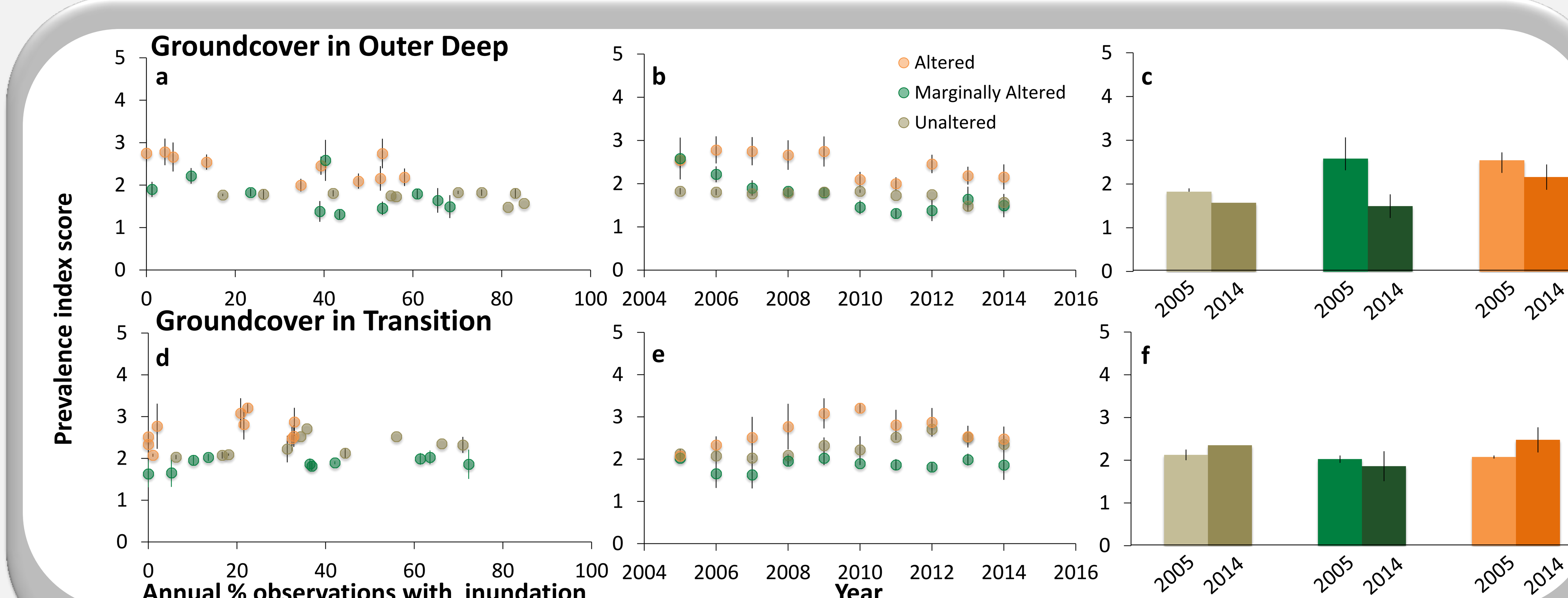


Figure 6. Scores over inundation (a, d), over years (b, e), and after a decade of hydrologic recovery (c, f).

Summary

- Outer deep communities became more hydropytic over time and as inundation increased (Fig. 6a, 6b)
- Transition communities in the marginally altered sites remained largely unchanged while communities in the altered and unaltered wetlands fluctuated over time (Fig. 6d , 6e)
- Marginally altered wetlands have wetter communities today than in the past
- Altered wetlands have more hydrophytic communities in the outer deep and less hydrophytic communities in the transition zone (Figure 6c, 6f)

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