

# 2019 Greater Everglades Ecosystem Restoration Conference

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***RECOVER System Status Report  
Greater Everglades Module  
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# Introduction

The Greater Everglades region includes a unique mosaic of interconnected freshwater wetlands that is differentiated by soil elevation and hydrology, **and** its defining characteristics include a unique combination of sheet flow, water depth patterns, oligotrophy, salinity distributions (in coastal estuaries), landscape patterns, and an abundance of wildlife, particularly large numbers of breeding wading birds,



# Introduction

**But** due to anthropogenic modifications, the geographic extent of the region has been reduced by roughly 50%, the spatial and temporal patterns of hydrology, fire, and nutrient supply have been altered, landscape-scale structure of the ridge-slough mosaic has been lost, and wildlife populations have been negatively impacted,





# Introduction

**Therefore**, CERP was implemented to assist in the restoration of South Florida's natural system, and, in an effort to support adaptive management feedback to improve CERP planning, design, and implementation, we are systematically reporting on the status of the watershed.



# GE Summary Findings

## Periphyton:

- Everglades periphyton continue to expose legacy sources of phosphorus, especially along the boundaries of WCA-3A and LNWR
- The multi-metric approach helps discern effects of increased water loading from exposure to excess phosphorus above background levels
- Related work shows concerning expansion of impacted areas within 100 m of the eastern boundary of Taylor Slough (Gaiser et al. 2015)
- Continued studies are assessing changes along the Shark River Slough and Taylor Slough boundaries associated with modified water deliveries



# GE Summary Findings

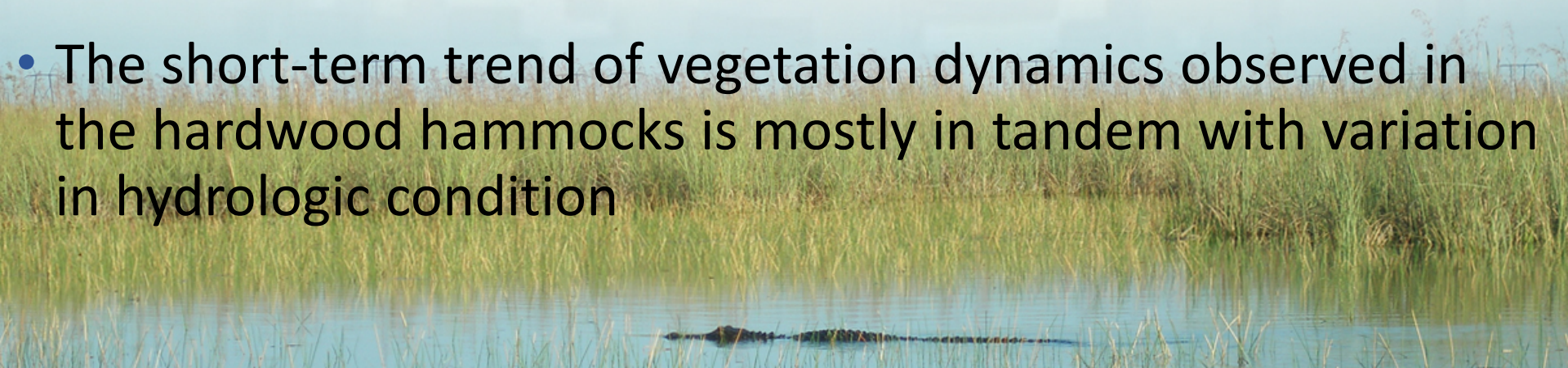
## Ridge and slough landscape:

- While substantial portions of the R&S landscape are severely degraded, patterns of co-variation between topographic variance and vegetation community distinctness indicate that ground elevation changes often precede vegetation change during critical transitions from patterned to degraded landscape states especially in the drained landscapes
- In contrast, vegetation change serves as a leading indicator of landscape degradation in impounded conditions
- Successful Everglades restoration will need to maintain a spatially-averaged long-term mean annual water depth of 35 to 50 cm in the areas where a healthy ridge and slough structure is an important objective

# GE Summary Findings

## Tree islands:

- Hydrology is the major driver of differences in species composition among various plant communities arranged along topographic gradient within a tree island
- In the rarely flooded hardwood hammocks where mean annual water table is often below 40 cm, tree species composition is probably the legacy of long-term interaction between hydrology and other physical processes, including disturbances
- The short-term trend of vegetation dynamics observed in the hardwood hammocks is mostly in tandem with variation in hydrologic condition





# GE Summary Findings

## Marl prairie:

- The trend of vegetation change in marl prairie landscape is influenced by year-to-year variation in water conditions, caused by both rainfall and water management activities
- Marl prairie habitat in the northeastern and eastern portions of sub-population A is showing improvement
- In contrast, the southern portions in sub-population B and western areas in both B and E are expected to get wetter, mostly due to sea level rise (SLR) and increased water flow
- The intensity of the effects of natural events and management activities on marl prairies depends on the rate of SLR and the volume and timing of water deliveries to the Park and water flow in both SRS and Taylor Slough



# GE Summary Findings

## Prey abundance:

- Shark River Slough and Taylor Slough continue have poor match to targets because they receive less water at critical times in the dry season than desired
- Recent rapid increases in nonnative fishes, notably African Jewelfish, are causing native fish abundance to be below targets, resulting in low scores
- The fish and crustacean metric is an index of food-web functions that support iconic apex predators
- Nonnative fish invasions are a new threat to this function, in addition to the challenges of hydrological management

# GE Summary Findings

## Prey availability:

- The amount and quality of dry-season prey concentrations, and the spatial and temporal pattern of prey availability across the landscape all can influence wading bird nesting, with the relative contribution of each varying yearly based on hydrologic conditions
- The highest prey availability occurs when high wet season water levels that promote production are followed by a prolonged recession that generates high concentrations
- Managing for high water levels at the start of the dry season maximizes the amount of the landscape that is inundated, increasing the spatial extent of foraging habitat that becomes available for breeding wading birds as water levels recede



# GE Summary Findings

## Nonnative fish and wood stork diets:

- A recent three-year study of wood stork diets in the Everglades indicated that storks, but not small herons, have switched from consuming primarily native fish in the 1970s to consuming mostly native sunfish and nonnative African Jewelfish
- Finding an increasing frequency of nonnative fish in the diet of wood storks was unexpected because nonnative fish are <1% of the fish community in the drying pools in which wading birds forage
- There is some evidence that cichlids and sunfish may move away from drying pools into deeper refuges before the water is shallow enough to trap them
- If storks were preferentially foraging in or near deeper water microhabitats within the Everglades marsh, it could also lead to an increase in the prevalence of nonnative fish in their diets

# GE Summary Findings

## Wading birds:

- Four indicators of wading bird success have been used in CERP (colony location; ratio of visual to tactile foragers; timing of nesting and; exceptionally large ibis breeding)
- The measure for ibis has been met regularly
- There is hopeful movement for nesting into the coastal zone
- Little evidence timing of wood stork nesting is improving
- Ratio of visual to tactile foragers remains an order of magnitude below restoration targets



# GE Summary Findings

## Alligators:

- Relative abundance (past 5 yrs) and body condition (past 3 yrs) for alligators were stable
- However, with the exception of the LNWR, these measures are far below target
- It is suggested that a greater range in annual water depth is important for improvement of alligator body condition
- It is hypothesized that alligators will respond to restored hydrological patterns by increasing in size (body condition) and number (relative abundance), or both, and while that response may begin quickly it may take 3-5 yrs to become evident

# GE Summary Findings

## Invasive reptiles:

- Burmese pythons, northern African pythons, Argentine black and white tegus, Nile monitors and spectacled caiman have been chosen as performance indicators for the Greater Everglades
- The desired condition for each indicator is decreasing abundance and spread leading to absence, and minimal to no impacts
- Performance indicators for invasive reptiles have not met desired conditions for any year going back to WY12
- New invasive species also pose a threat and provide an opportunity for eradication if detected and responded to early



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