

Biscayne Bay Coastal Wetlands Phase 1 Project Observed Benefits

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**Florida's Coral Reef
Coordination Team (FCRCT)**
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Biscayne Bay Coastal Wetlands Phase 1 Project L-31E Flow-way

- SFWMD completed construction of interim pump (S-709) & operated from August 2014–March 2019

Results

- ✓ Enhanced sheet flow to the coastal wetlands & Biscayne Bay
- ✓ SFWMD and USACE completed construction of new pump station S-709 in March 2023

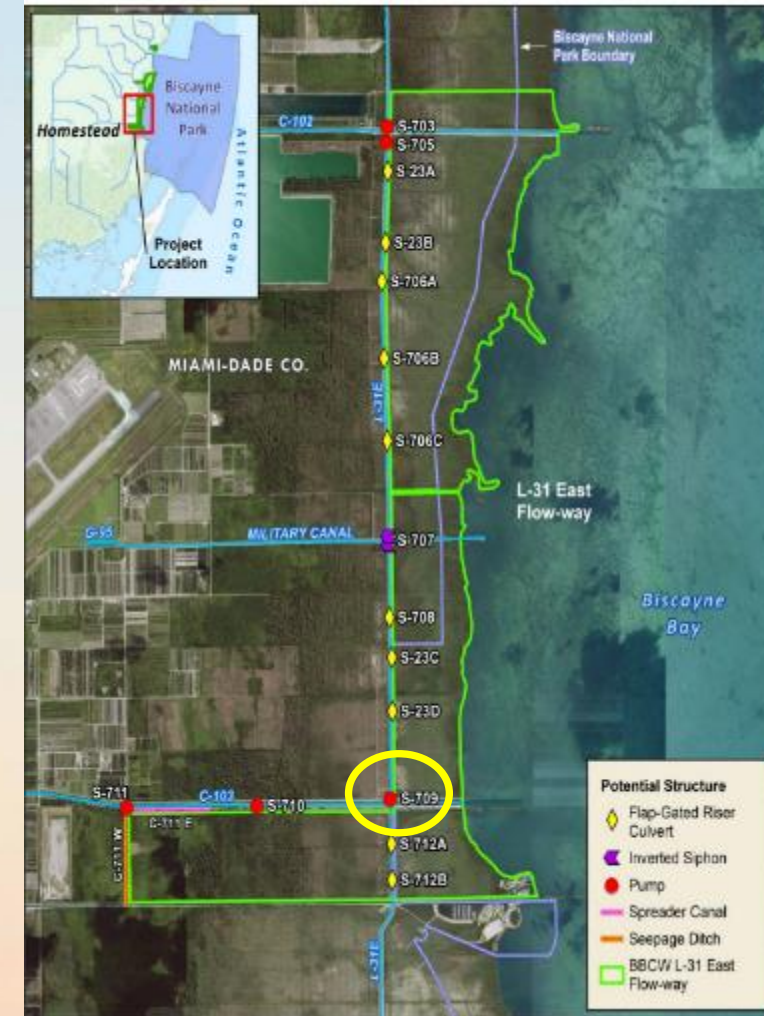


Pilot pump test S-709



Kiewit Biscayne Bay Coastal Wetlands Phase 1 Project, L-31 Flow-Way, Pump Stations S-709, Miami - Dade County
Print #2122206 Date: 10/23/22
Lab.Lin: 25-47024-40-246037 Order No: 71748
Aerial Photography, Inc. 954-968-0424

L-31E Flow way new pump station S-709



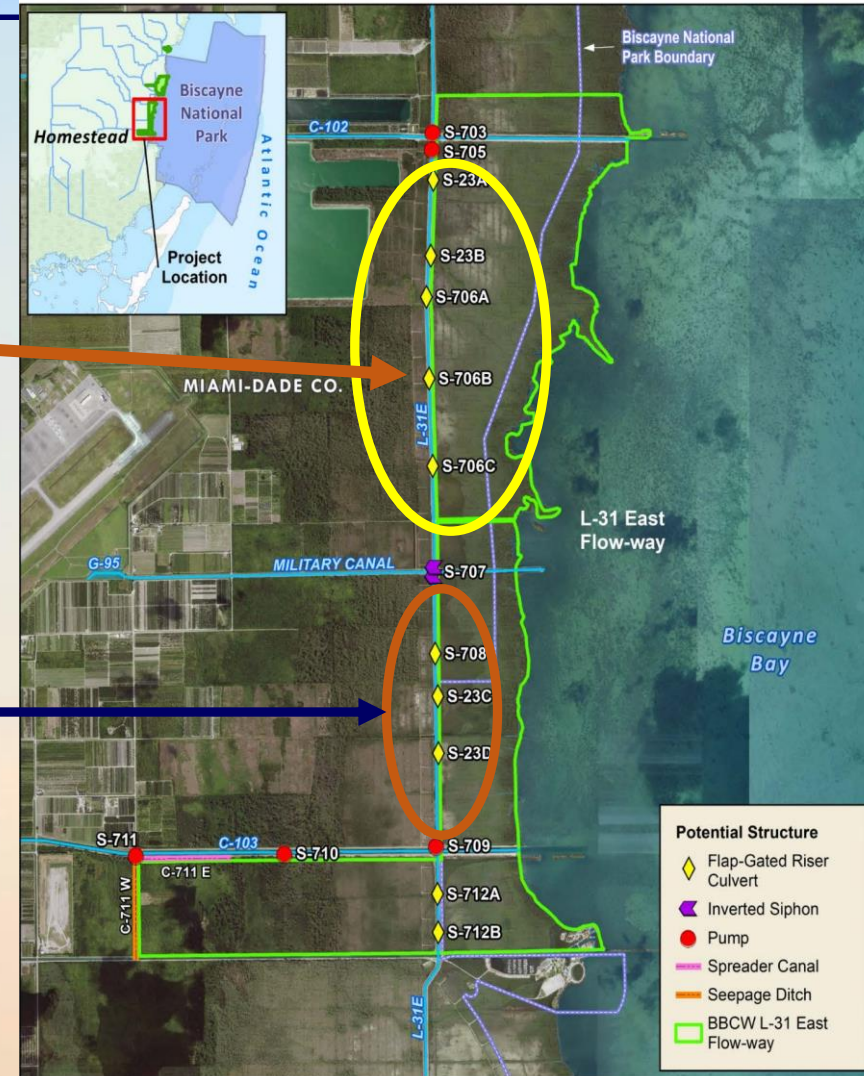
L-31E Flow-way component features

Biscayne Bay Coastal Wetlands Phase 1 Project L-31E Flow-way

Pump Station S-705



Pump Station S-709



Biscayne Bay Coastal Wetlands Phase 1 Project Deering Estate

- The Deering Estate Flow way Construction completed April 2012
- Goals:
 - ❑ Redirect up to 100 cfs freshwater to the coastal wetlands and Biscayne Bay
 - ❑ Re-hydrate the historical sloughs of Deering Estate and restore a more natural freshwater flow regime
 - ❑ Establish an educational wetland



Deering Estate Pump Station (S-700)



Coastal Structure S-123 on C-100 canal

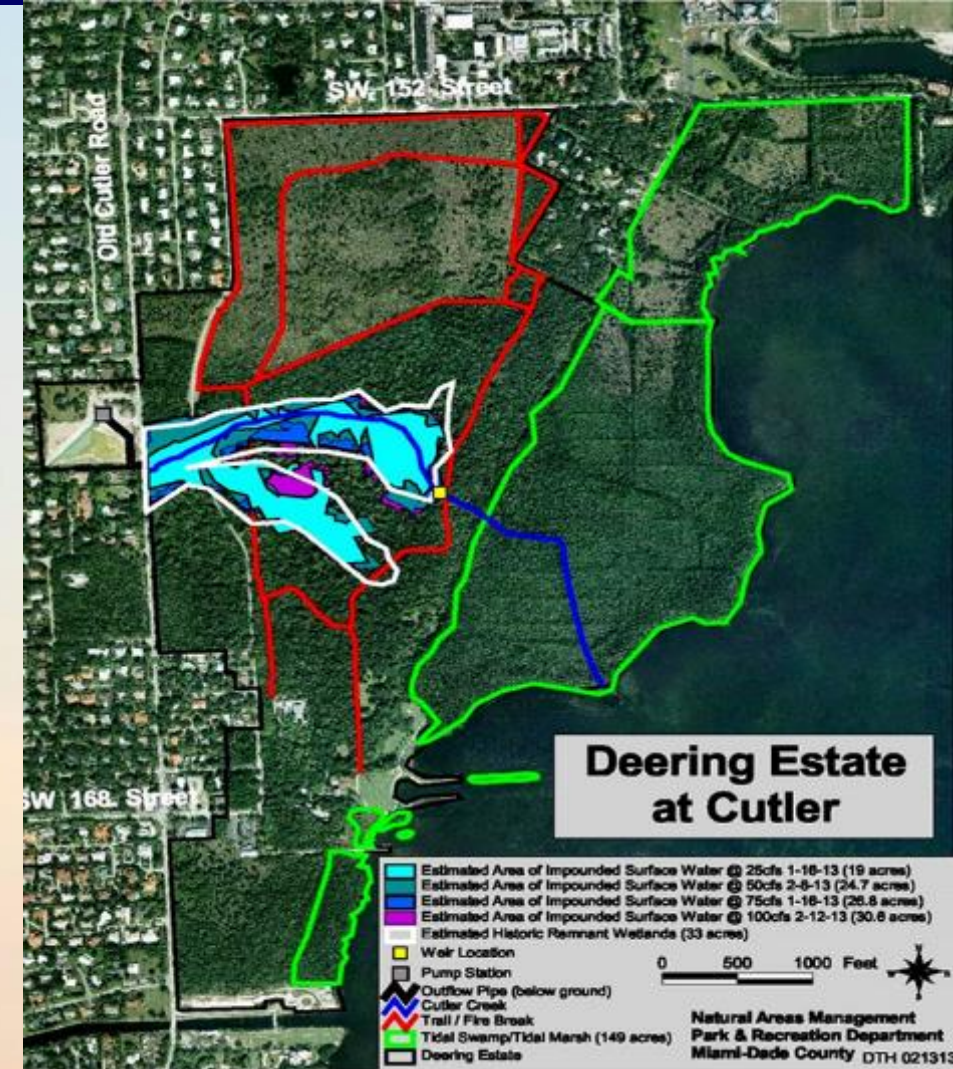


Deering Estate component features

Biscayne Bay Coastal Wetlands Phase 1 Project Deering Estate – Adaptive Management

- ✓ Determined extent of inundation under various pumping rates 25-100 cfs
- ✓ Estimated acreage of impounded surface water within Deering Estate under different pumping/flow rates

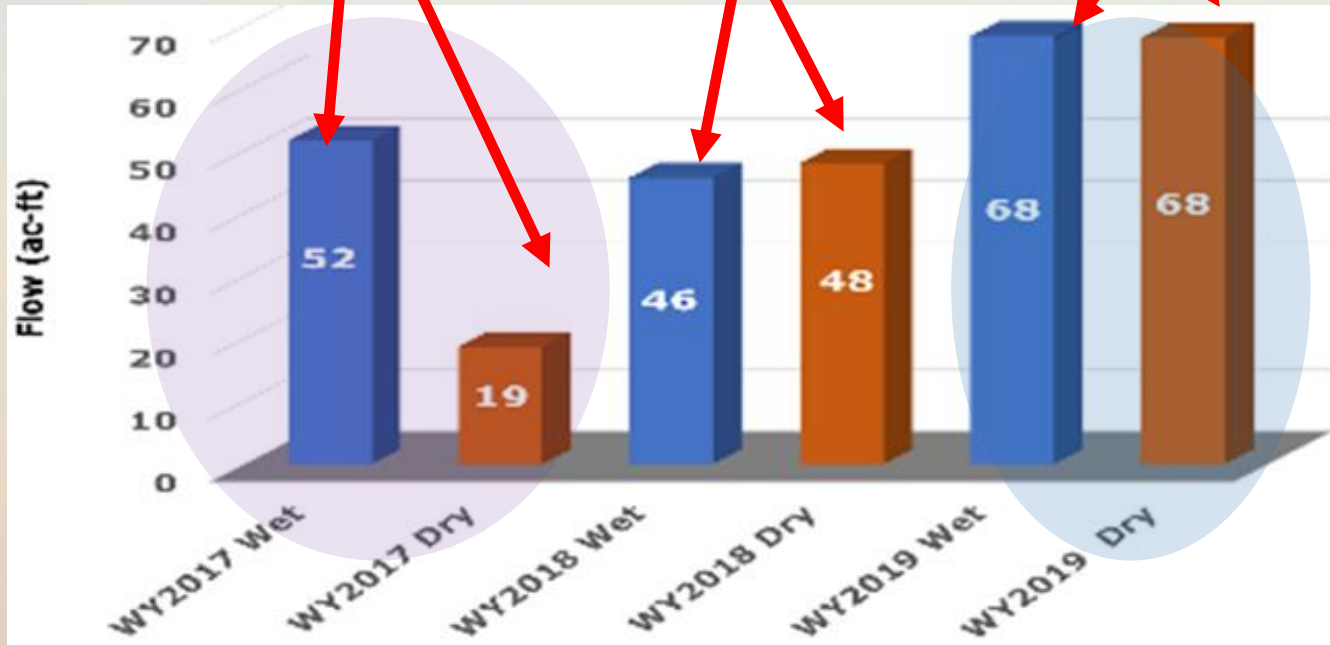
Pumping Rate (cfs)	Duration of Testing (hours)	Estimated Acres of Impounded Surface Water	Percent of Inundated Historic Remnant Wetlands within Cutler Creek
0	5	0	0%
25	5	19	58%
50	5	25	76%
75	5	27	82%
100	5	31	94%



Biscayne Bay Coastal Wetlands Phase 1 Project Deering Estate – Adaptive Management

- ❑ Redistributes freshwater to hydrate coastal wetlands & moderate nearshore salinities
- ❑ WY2017: Pump test compared pulse releases versus continuous pumping at rates of 25-100 cfs

Before (pulse pumping) **During experiment (continuous and pulse pumping)** **After (continuous pumping)**

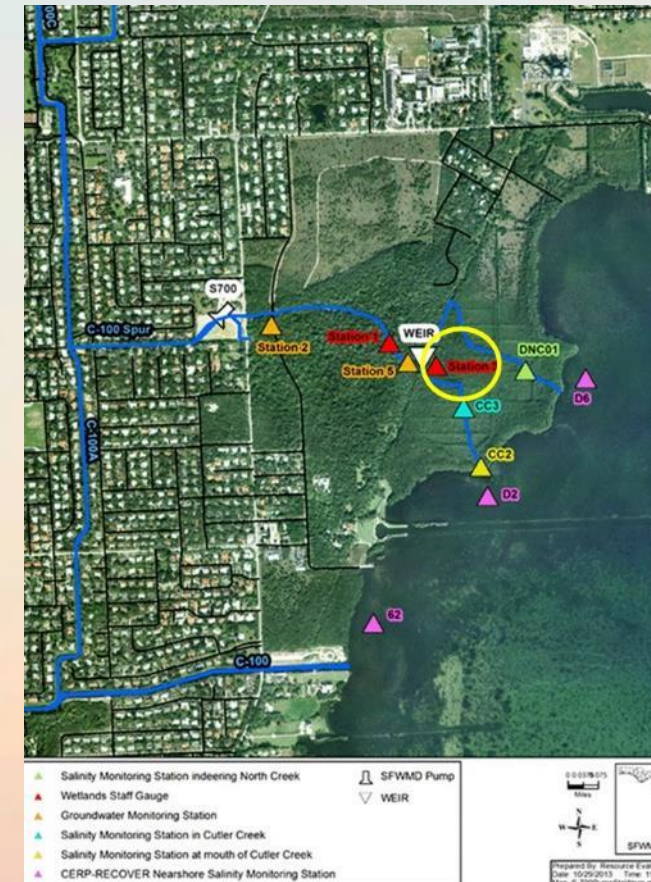
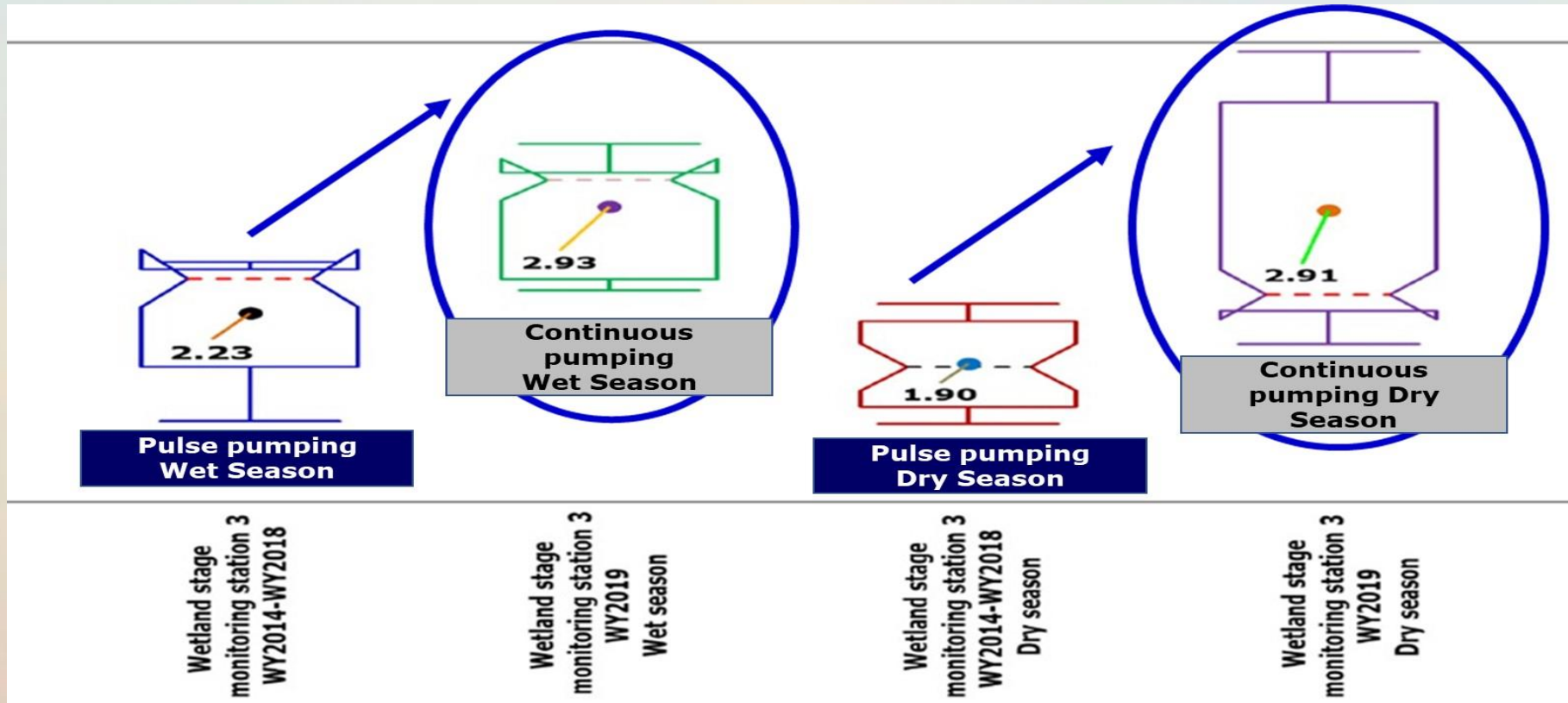


Eleocharis Interstincta

Pond Apples

Biscayne Bay Coastal Wetlands Phase 1 Project Deering Estate - Stage

- WY2019: S-700 pump station modified from pulse releases to daily continuous pumping at ≥ 25 cfs
- ✓ Result: Increase of 0.7 ft in Wet season and 1.0 ft in Dry season

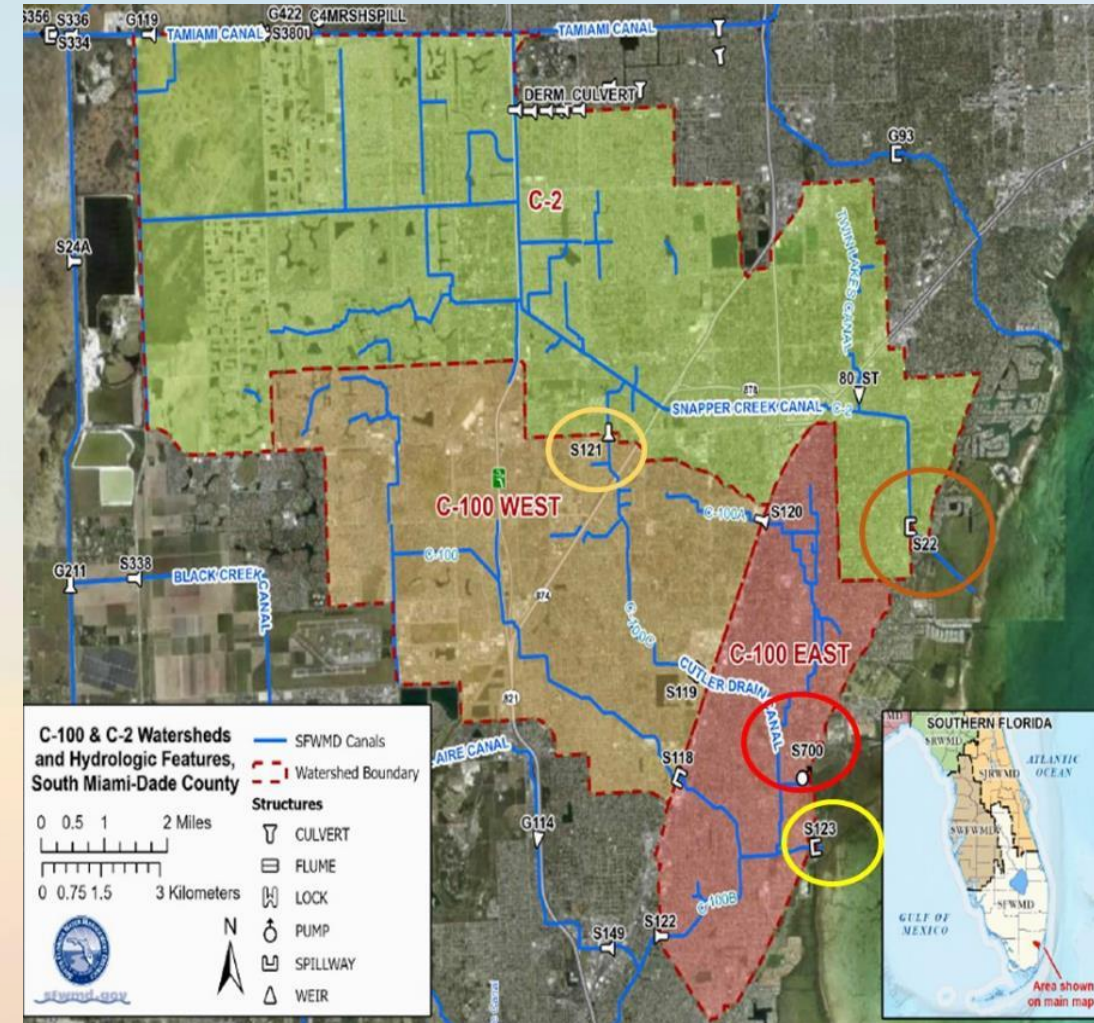


Biscayne Bay Coastal Wetlands-Operation Adaptive Management

Goals:

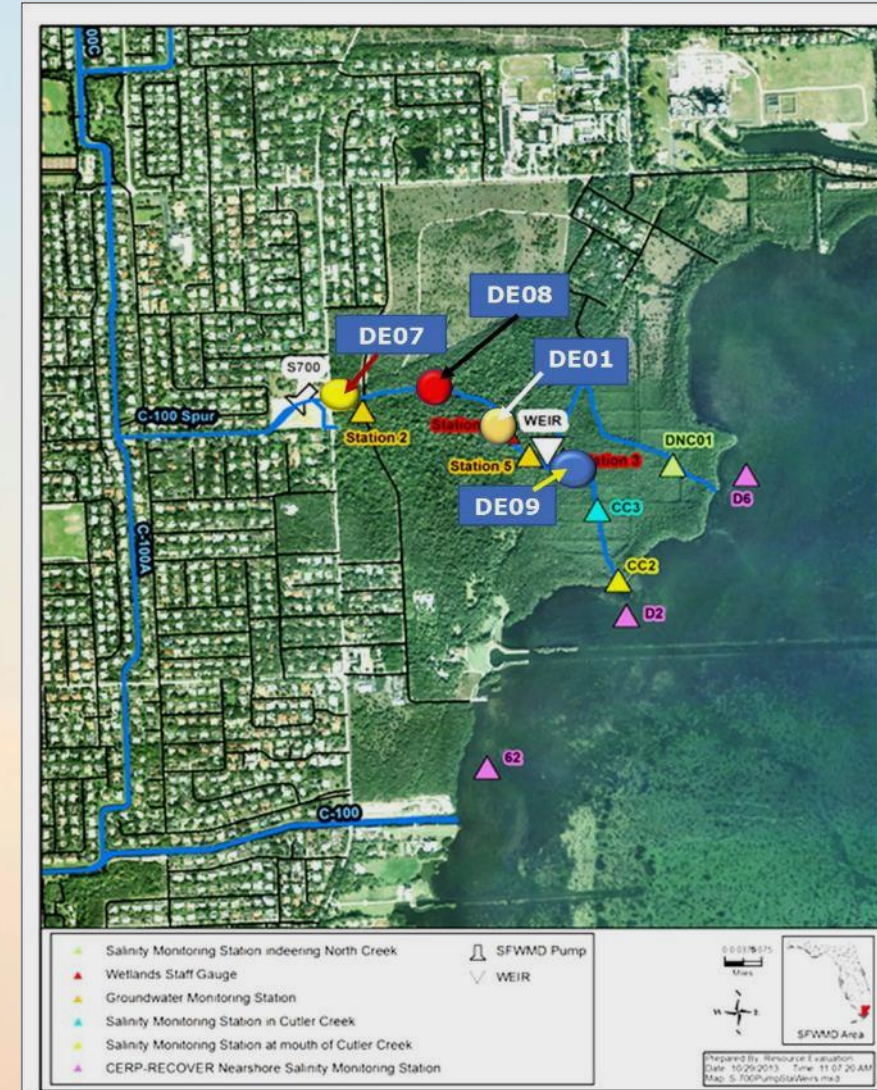
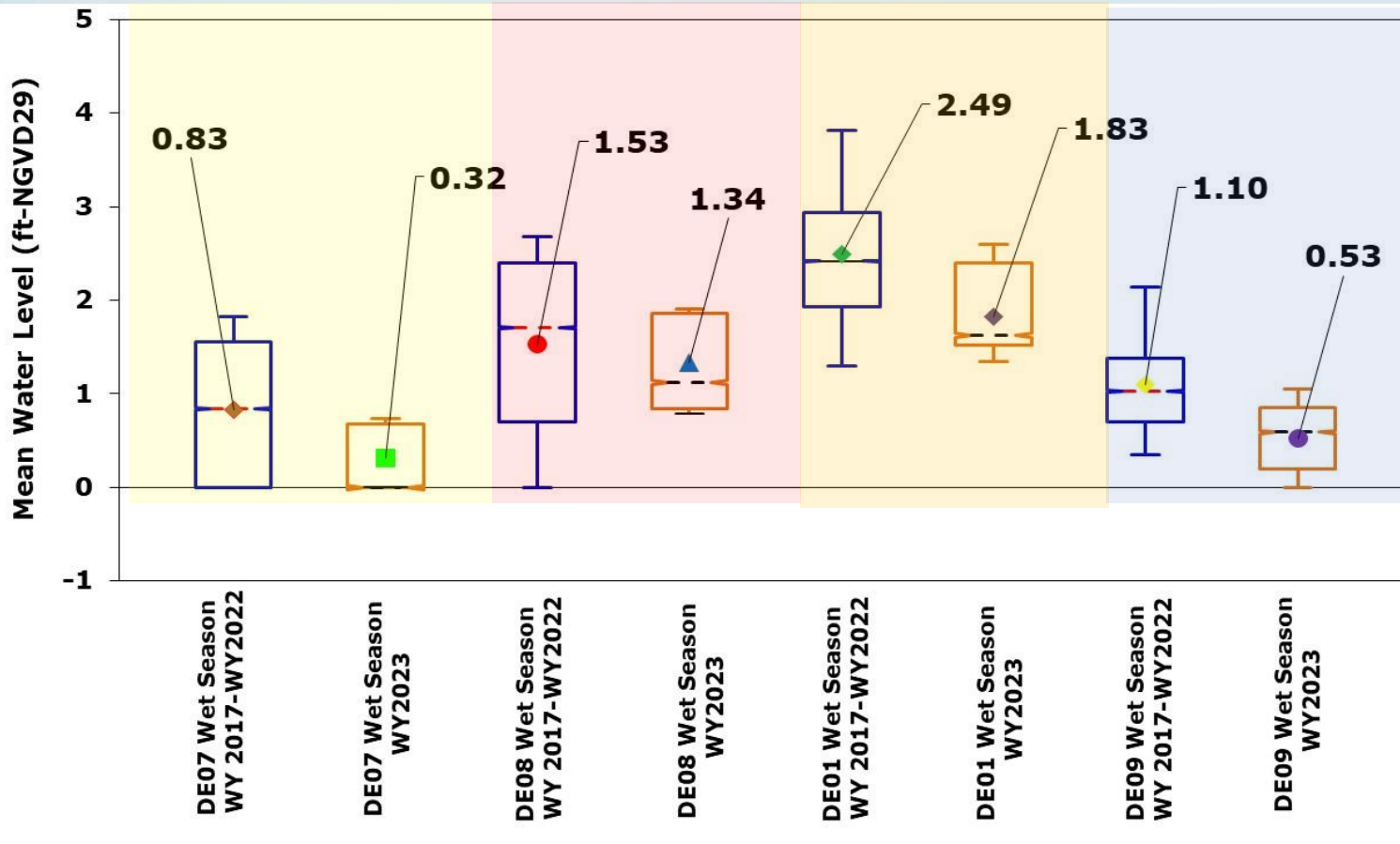
□ Investigate modification to operation of SFWMD structures within C-2 and C-100 basins to divert available freshwater to the coastal wetlands and Biscayne Bay during wet and dry seasons without causing increased flood hazards in adjacent areas by:

- ✓ Modify current operation of coastal structure S-123 (modifying low operational ranges) to reduce direct point source discharges to Bay and to maintain adequate quantity of freshwater in C-100 basin during wet and dry seasons.
- ✓ Install and initiate a pilot 50 cfs electric pump test upstream of manual structure S-121.
- ✓ Modify current operation of Deering Estate pump station (S-700) from daily continuous pumping rate of 25 cfs to 50 cfs or higher during wet and dry season to meet project restoration performance targets and improve conditions in the coastal wetlands and nearshore areas.



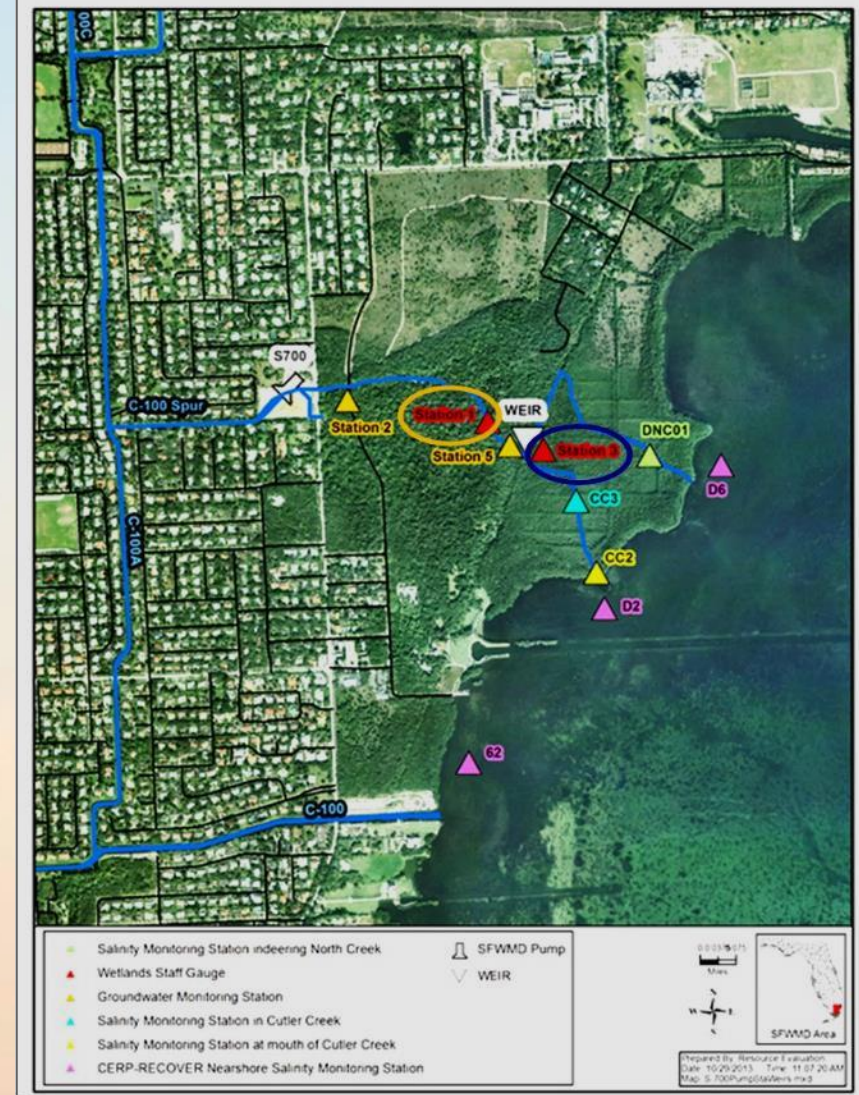
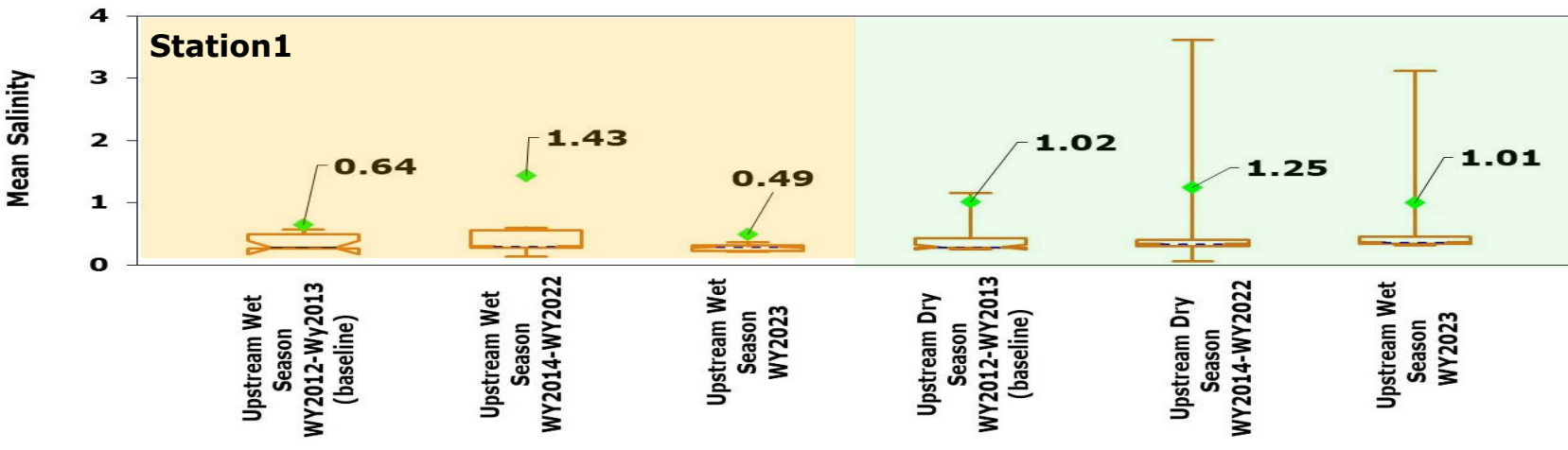
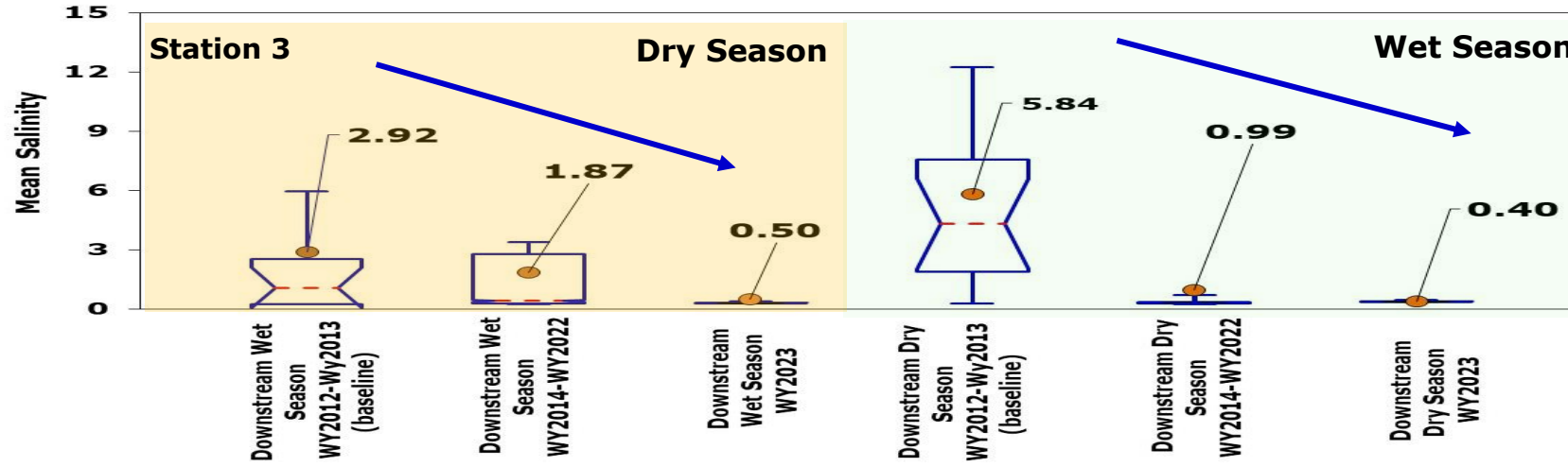
Biscayne Bay Coastal Wetlands Phase 1 Project Deering Estate - Hydrology

✓ **Result: Surface water level in coastal wetlands has responded to Deering Estate pump station operation**



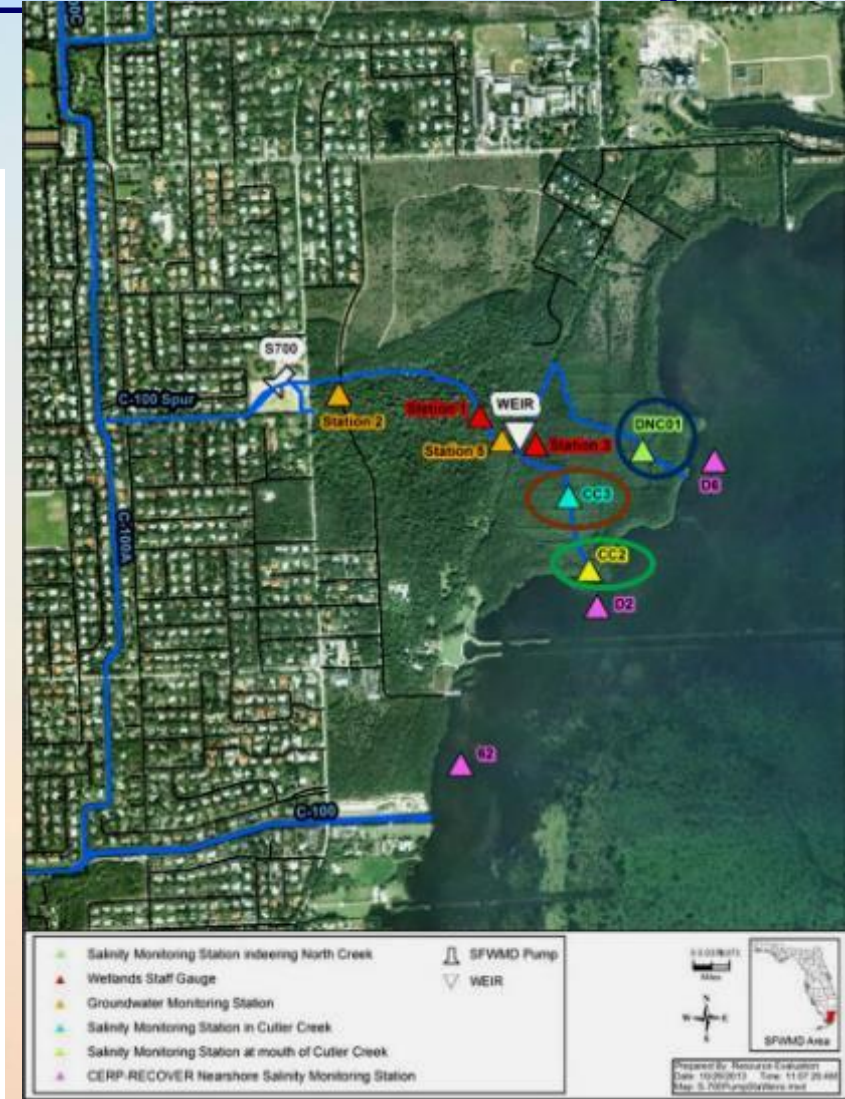
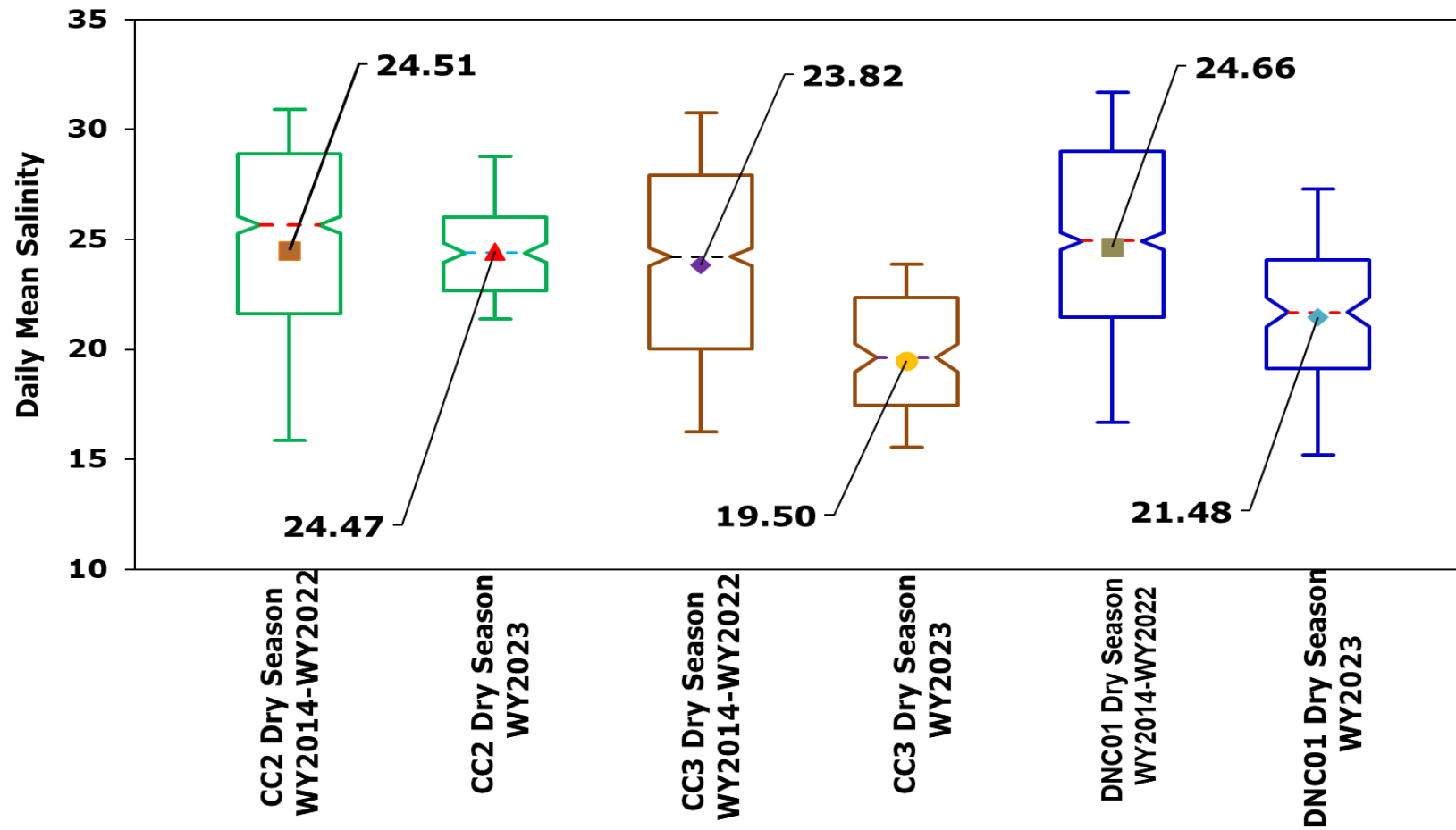
Biscayne Bay Coastal Wetlands Phase 1 Project Deering Estate – Wetlands Surface Water Salinity

✓ Result: Surface water salinity in coastal wetlands decreased



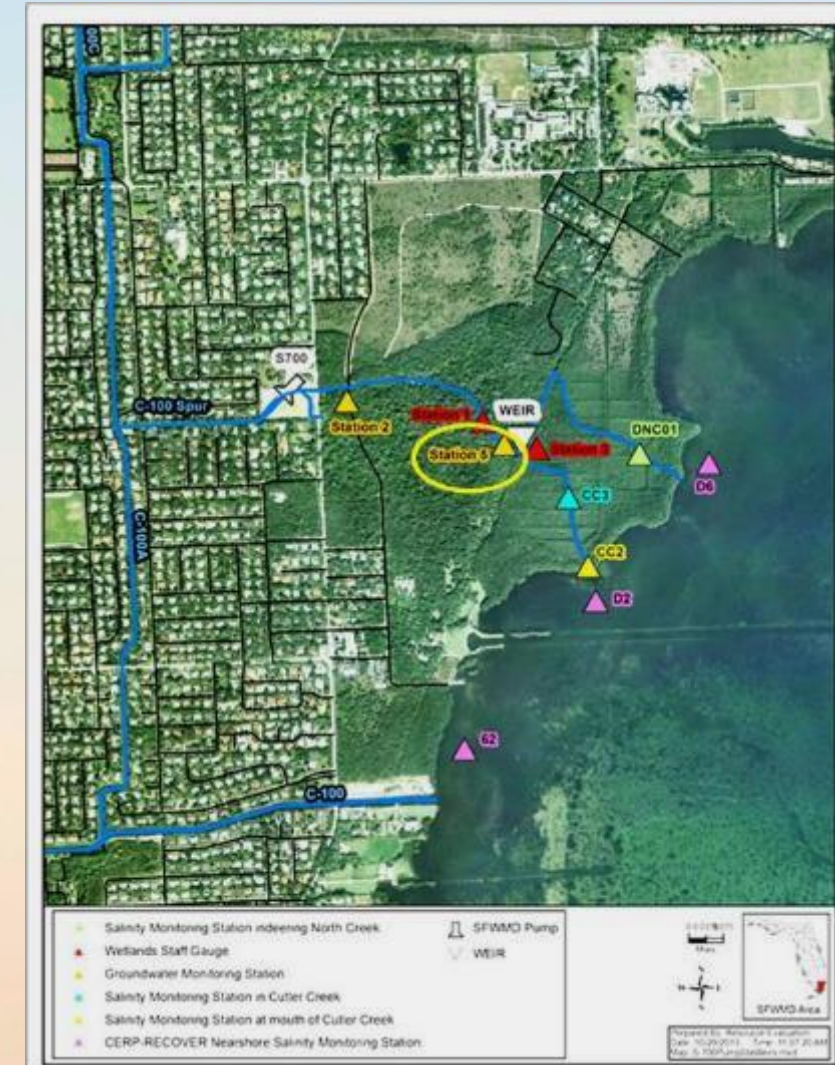
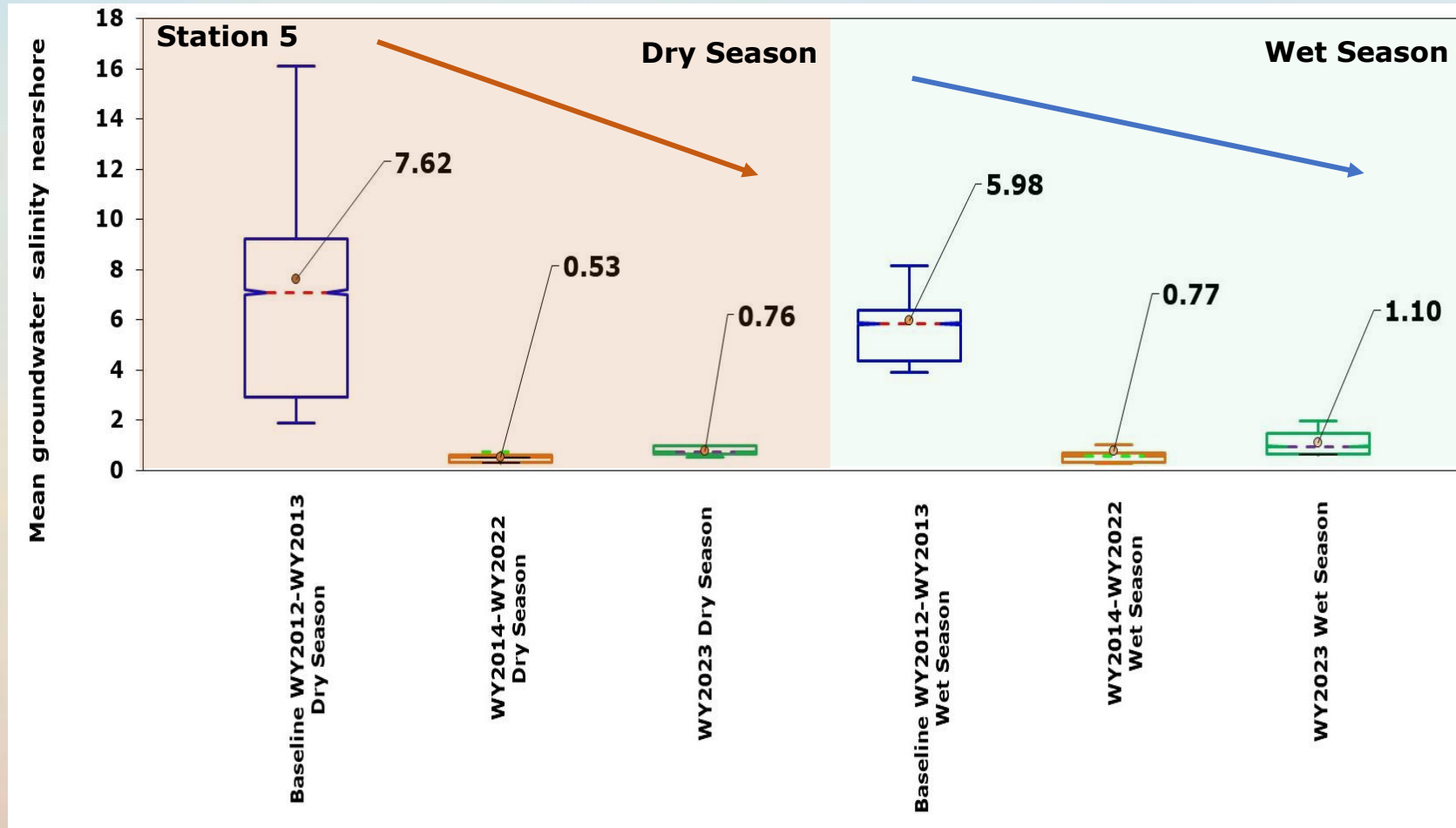
Biscayne Bay Coastal Wetlands Phase 1 Project Deering Estate – Deering Estate Creeks Salinity

✓ **Result: Surface water salinity in Deering Estate Creeks**



Biscayne Bay Coastal Wetlands Phase 1 Project Deering Estate –Groundwater Salinity

✓ Result: Groundwater salinity decreased



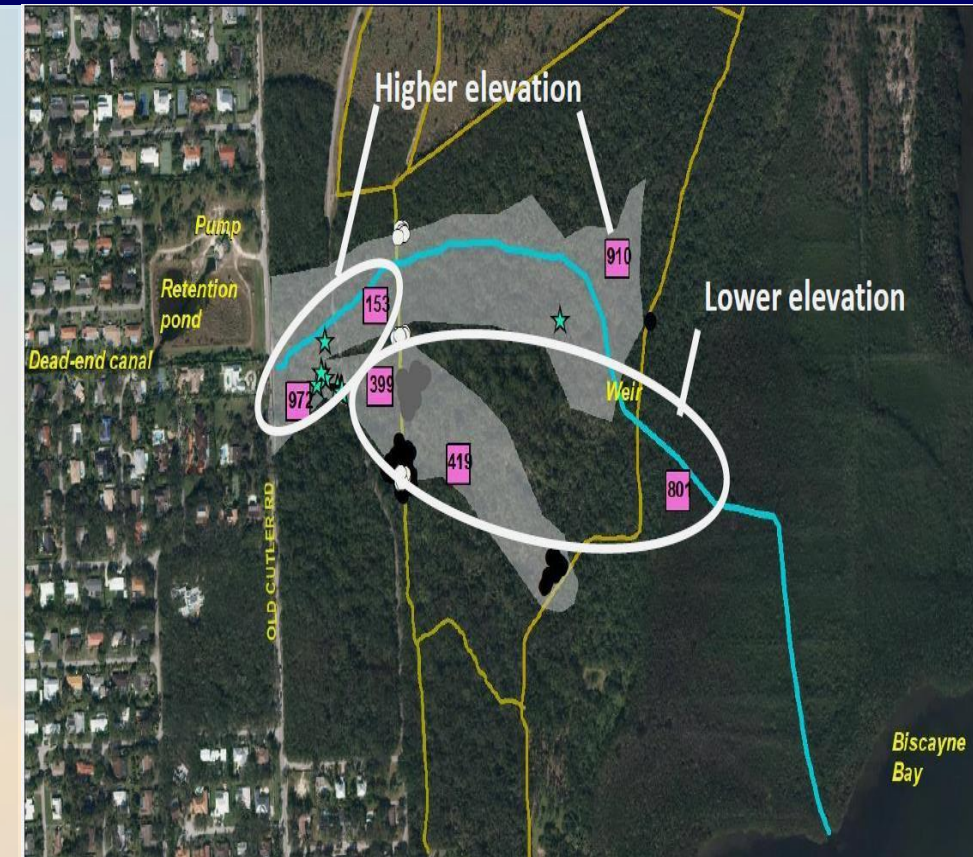
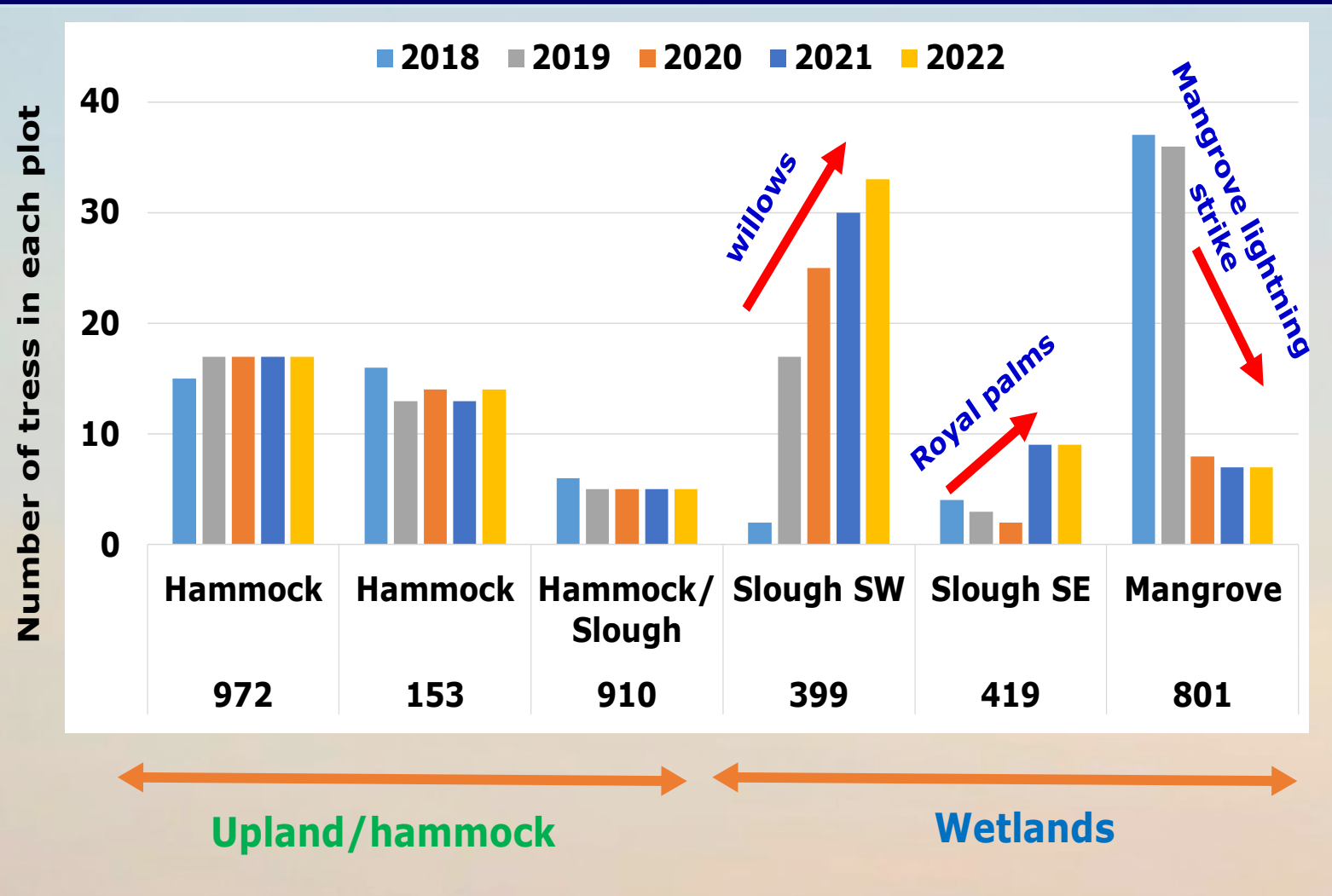
Biscayne Bay Coastal Wetlands Phase 1 Project Deering Estate – Vegetation Response

✓ Results:


- Sawgrass began to establish naturally in the slough
- Herb & shrub cover decreased, while canopy cover increased in all slough plots
- State-endangered ferns increased in abundance in both hammock plots
- Native species richness largely increased in upland hammock sites



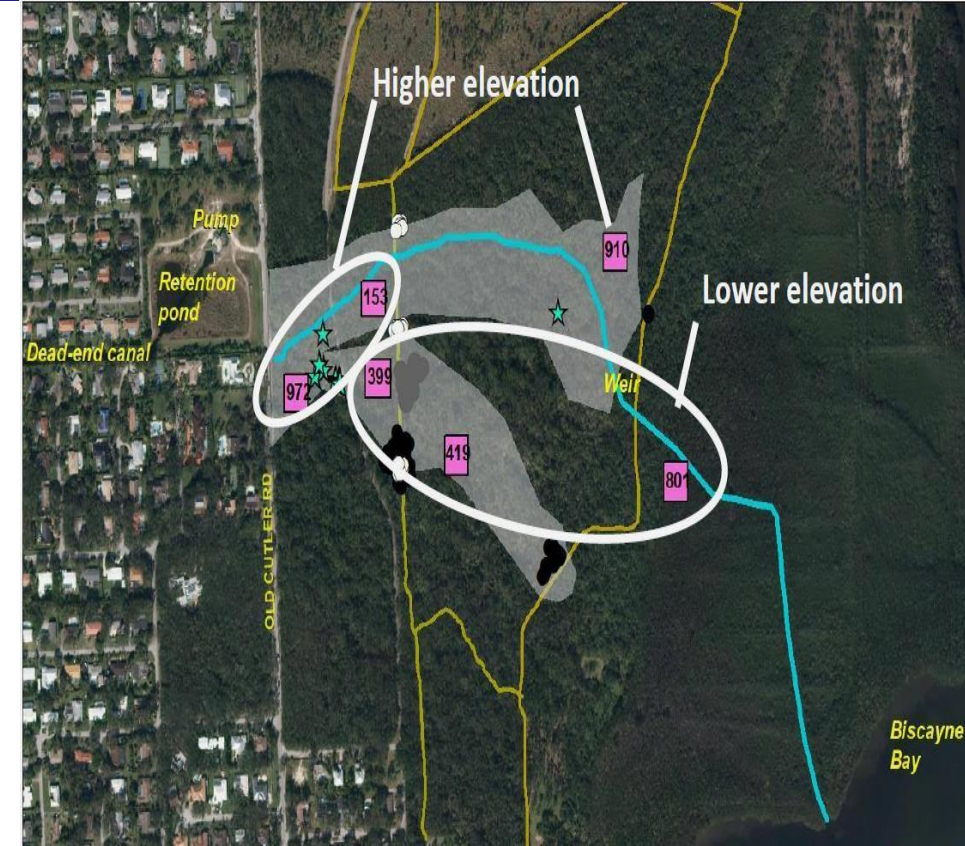
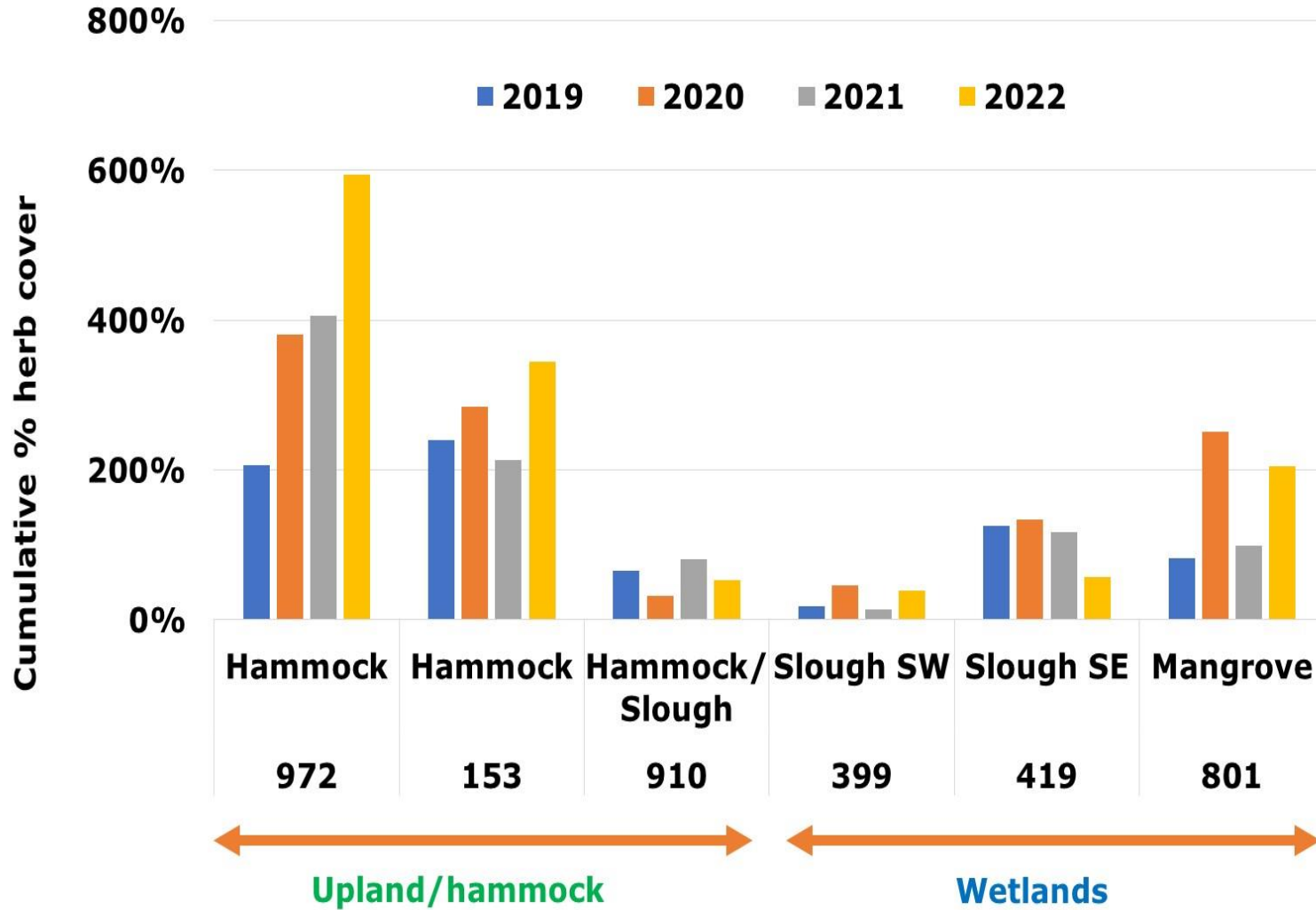
Biscayne Bay Coastal Wetlands Phase 1 Project Deering Estate– Vegetation Response



Six long term vegetation monitoring plots

 **Cladium jamaicense**

Biscayne Bay Coastal Wetlands Phase 1 Project Deering Estate– Vegetation Response



Six long term vegetation monitoring plots

 **Cladium jamaicense**

Biscayne Bay Coastal Wetlands Phase 1 Project L-31E Flow-way – Vegetation Response

- ✓ **Result: Sawgrass acreage increased > 9 acres since 2013**
- ✓ **Result: Reduced percent cover of exotic plants**



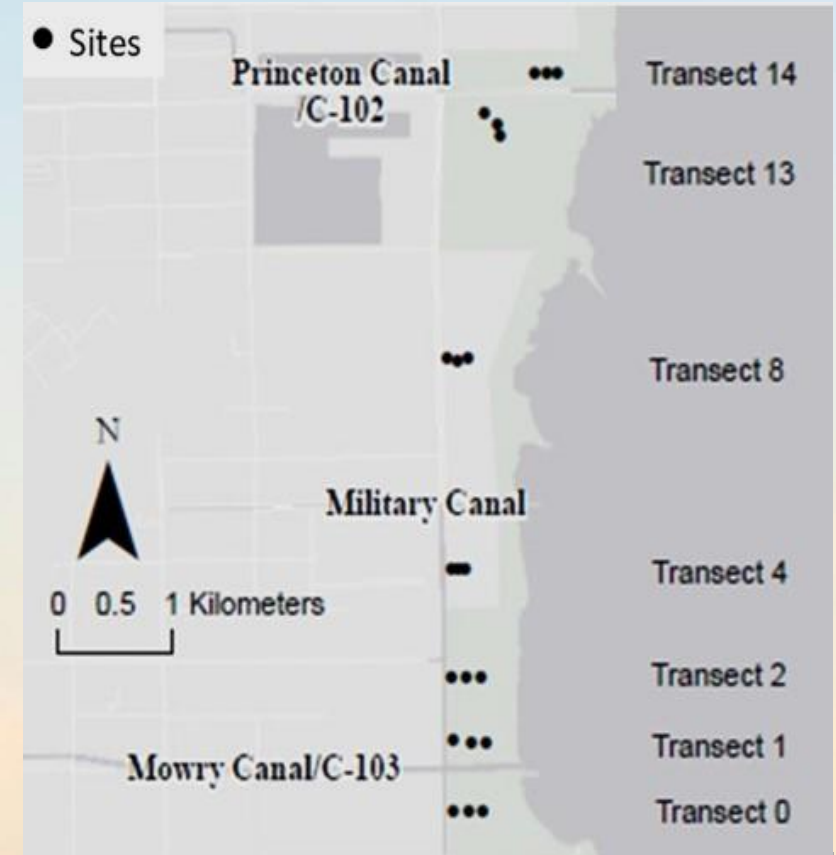
WY2023 sawgrass recruitment east of the L-31E levee.



Biscayne Bay Coastal Wetlands Phase 1 Project L-31E Flow-way – Vegetation Response

□ Annual L-31E Flow-way Vegetation Monitoring

- Transects were established by WY2020, with 3 sampling locations along each transect
- Most sites are dominated by red mangrove (*Rhizophora mangle*) and other saltwater species.
- Only minor differences in vegetation composition existed between west, interior, and east plots
- These patterns are expected to change as delivery increases in the future

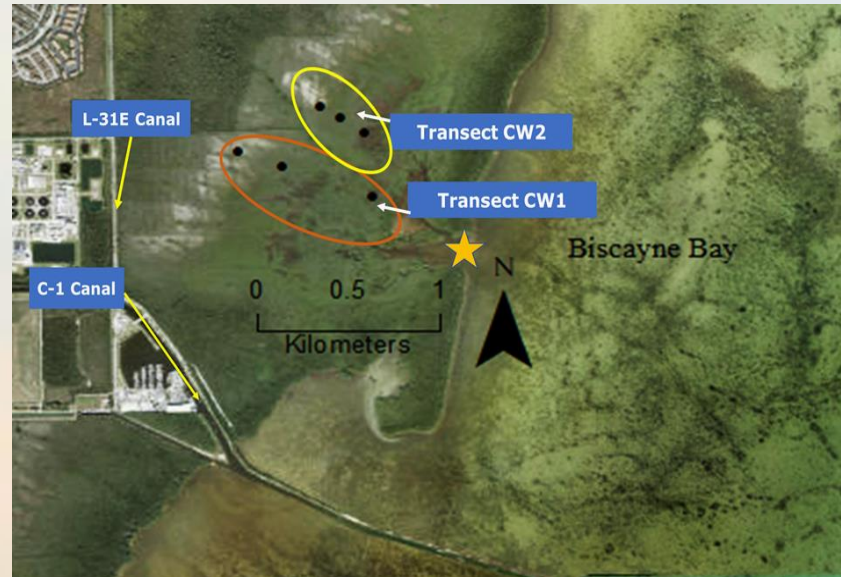


Location map of L-31E Flow way (circle symbol) sampled along Transects 0, 1, 2, 4, 8, 13, 14 in WY2021 and WY2022. For L-31E Flow way, points from left to right are the West (W), Interior (I), and East (E) sites, respectively.

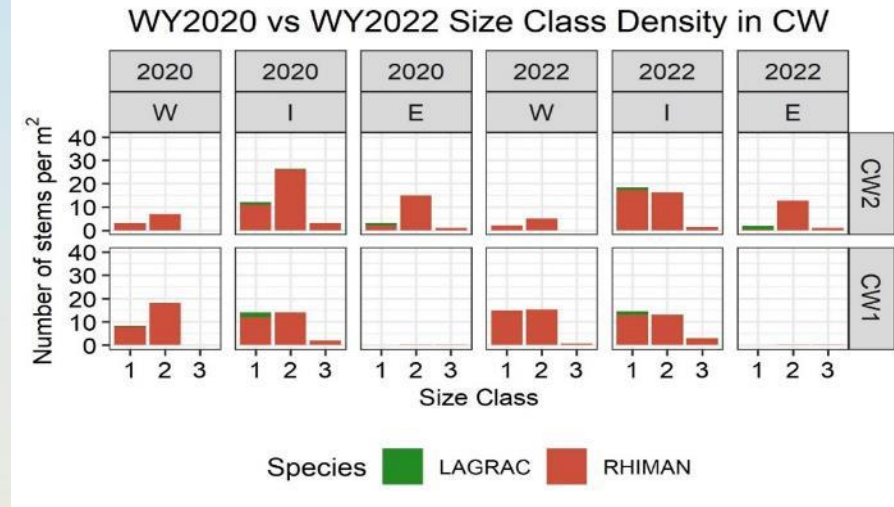
Biscayne Bay Coastal Wetlands Phase 1 Project Cutler Flow way and Cutler Wetlands– Vegetation Response

Annual Cutler Flow-way Vegetation Monitoring

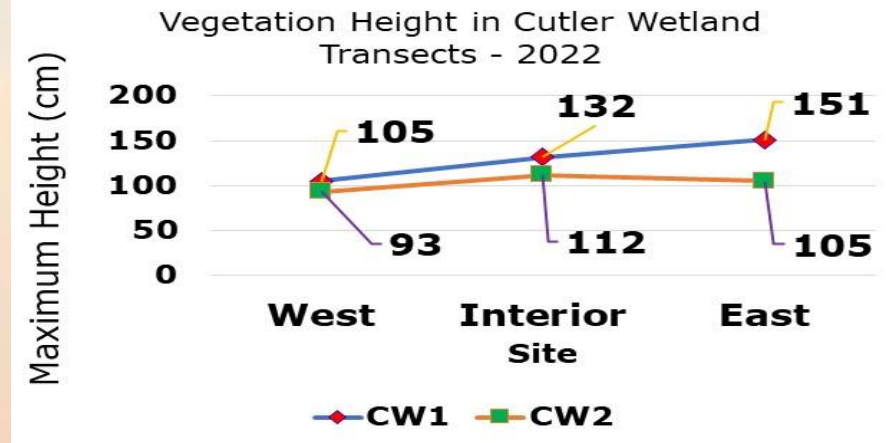
- ✓ In CW1, mangrove canopy height increases continuously from the interior to the fringe of the embayment.
- ✓ In CW2, mangrove canopy height increases to the interior but then declines slightly approaching the bay where the relatively tall mangroves on the east are also low in density, suggesting some inundation effects from rising sea level.



LAGRAC – white mangrove (*Laguncularia racemosa*);
RHIMAN – red mangrove (*Rhizophora mangle*)



Red mangrove (*Rhizophora mangle*) is the dominant species.





Thanks



Mangrove Terrapin in Deering Estate Coastal Wetlands