Biscayne Bay Coastal Wetlands Phase 1 Project Observed Benefits

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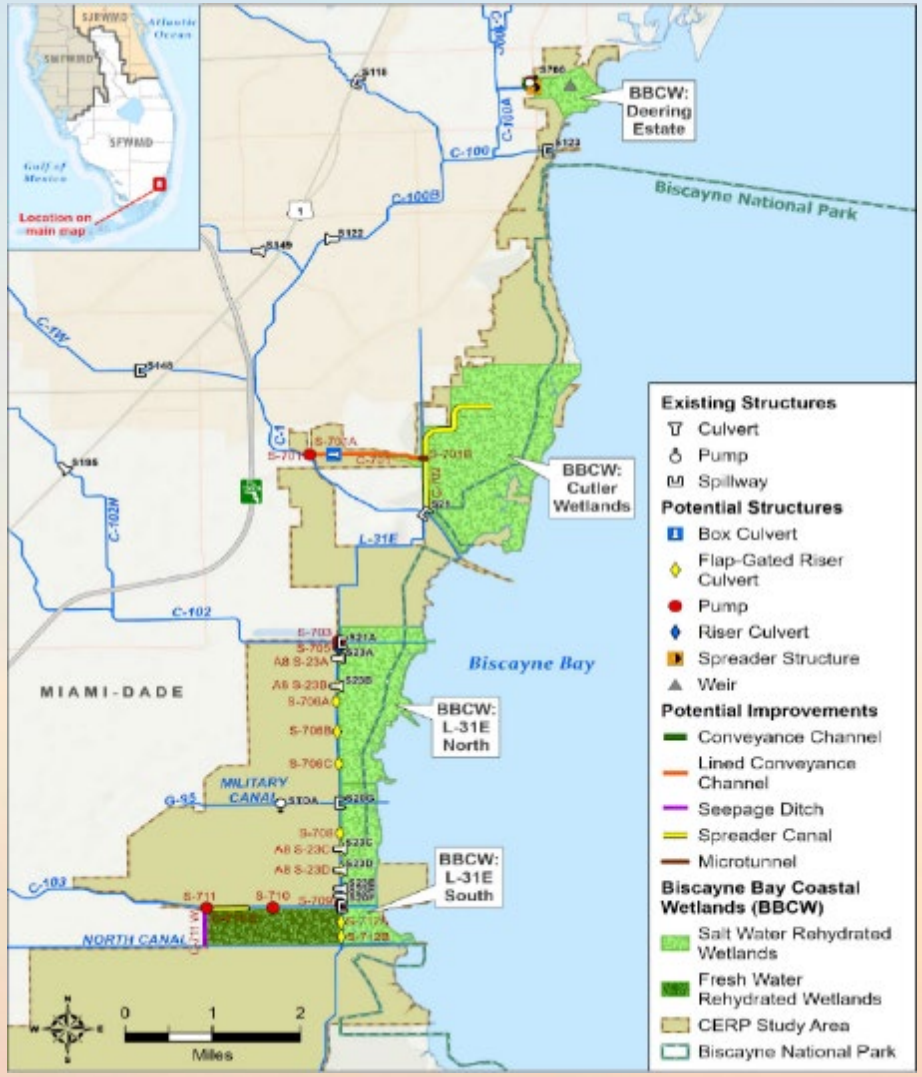
Biscayne Bay Coastal Wetlands Phase 1 Project

- **Objectives:**
  - ❑ Redistribute freshwater flow to minimize point source discharges to improve freshwater and estuarine habitat.
  - ❑ Reestablish productive nursery habitat along the shoreline.
  - ❑ Preserve and restore spatial extent of natural coastal habitat.
  - ❑ Restore nearshore and saltwater wetland salinity regimes.
  - ❑ Restore and improve quality, quantity, timing, and distribution of freshwater to Biscayne Bay, including Biscayne National Park.

- **Monitoring used to track project performance against restoration targets**

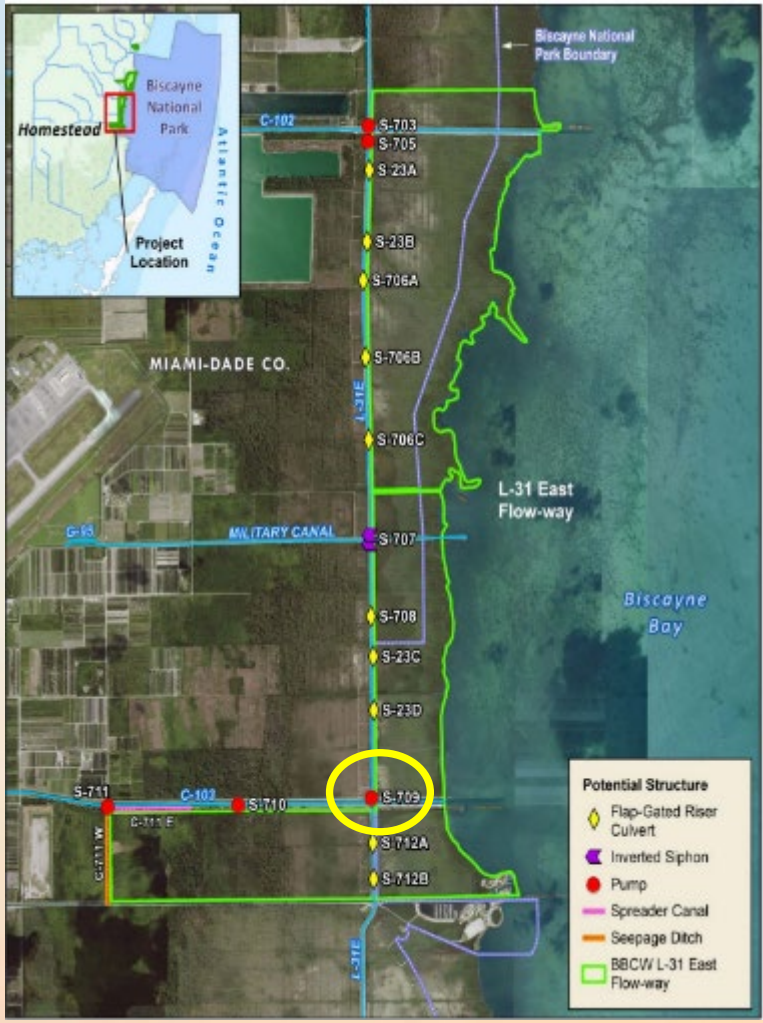


Biscayne Bay Coastal Wetlands Phase 1 Project
L-31E Flow way

- **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

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



L-31E Flow-way component features

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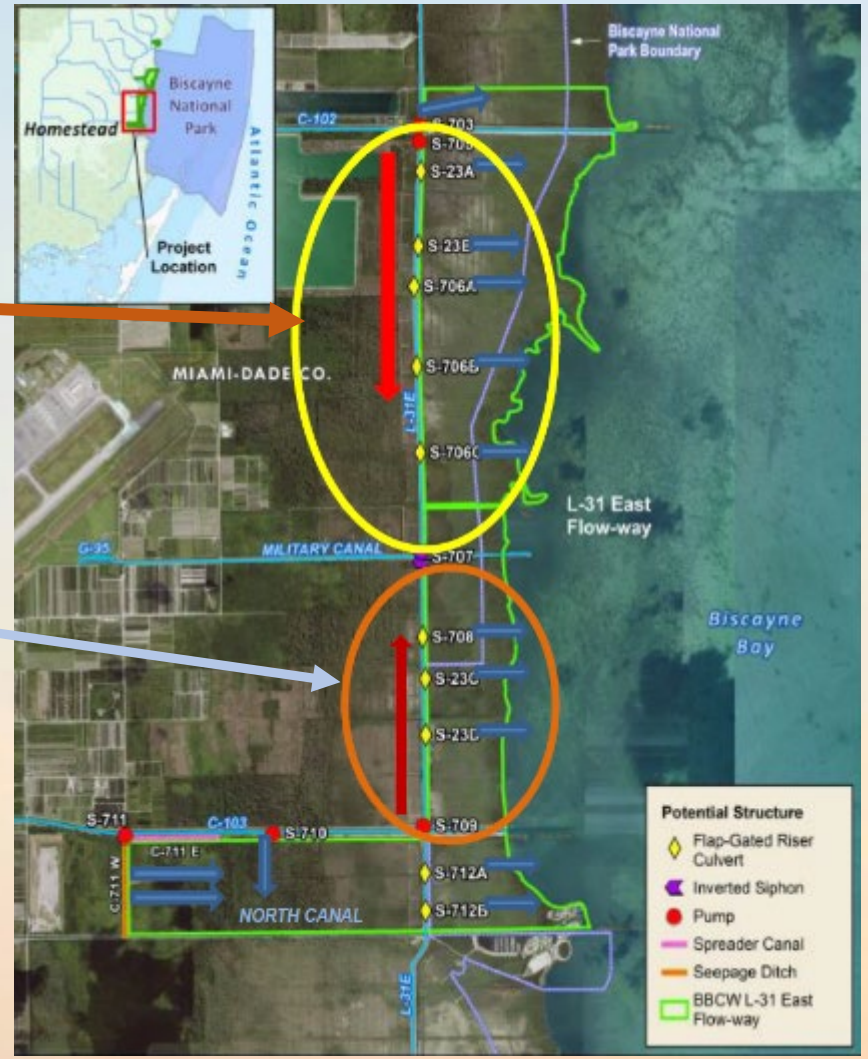
Biscayne Bay Coastal Wetlands Phase 1
Project L-31E Flow way

Pump Station S-705

Pump Station S-709



L-31E Flow way culvert providing redistributed freshwater to the coastal wetlands and Biscayne Bay

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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

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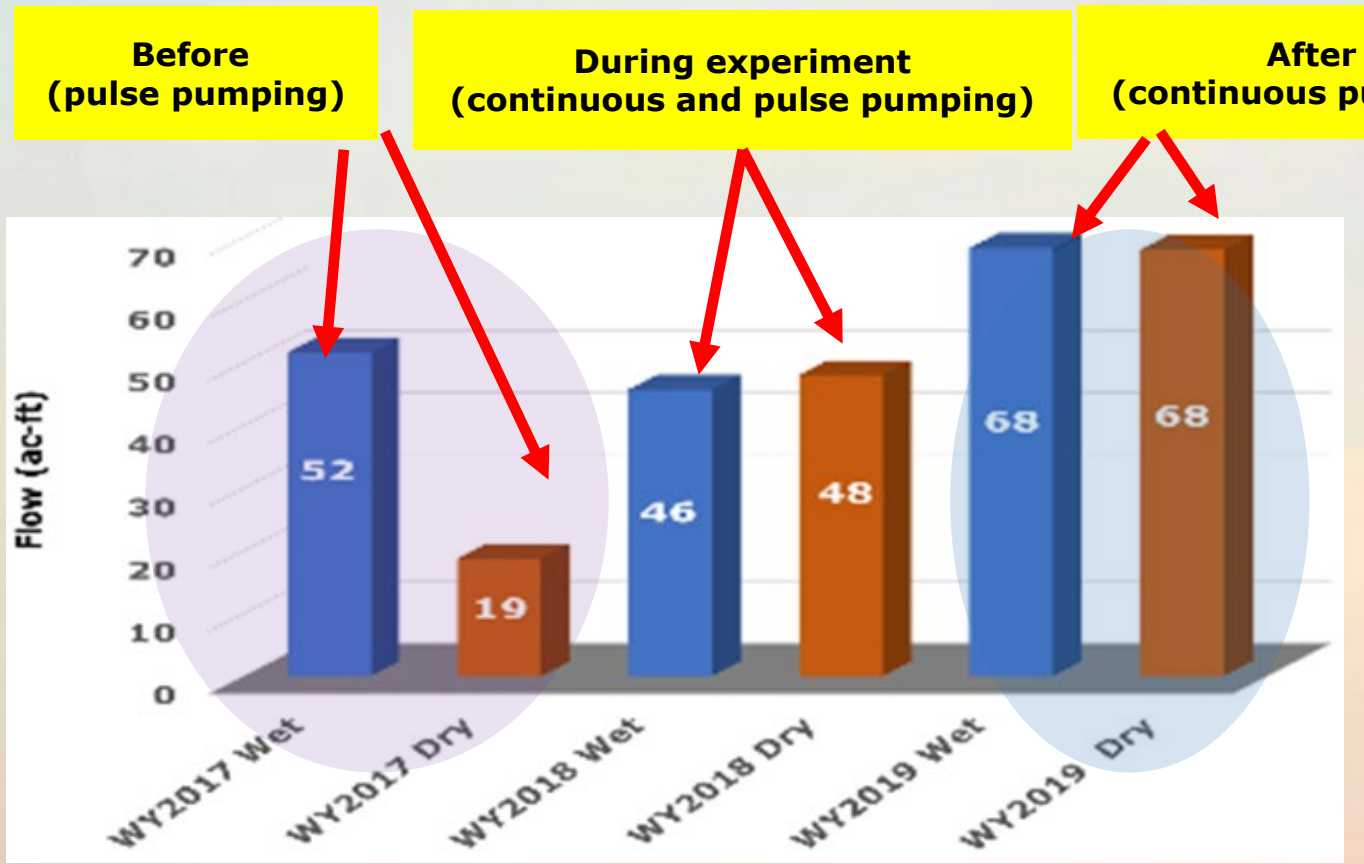
Biscayne Bay Coastal Wetlands Phase 1 Project
Deering Estate – Adaptive Management

- ✓ **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



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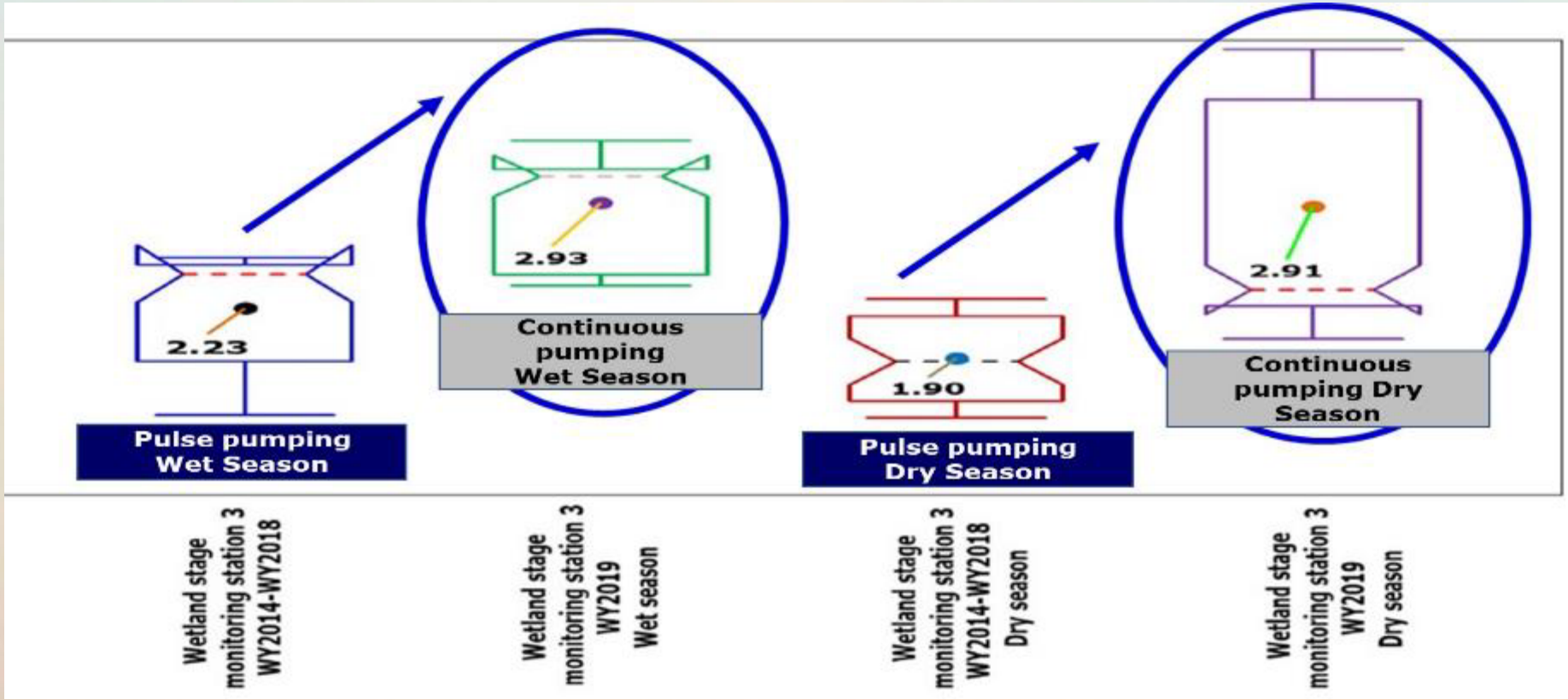
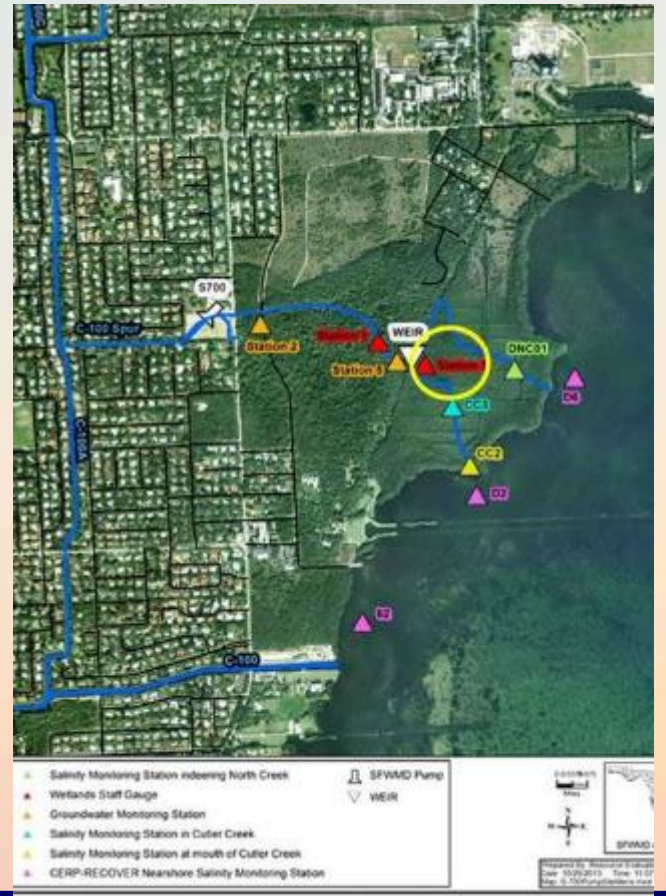
Biscayne Bay Coastal Wetlands Phase 1 Project
Deering Estate - Stage

- **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**





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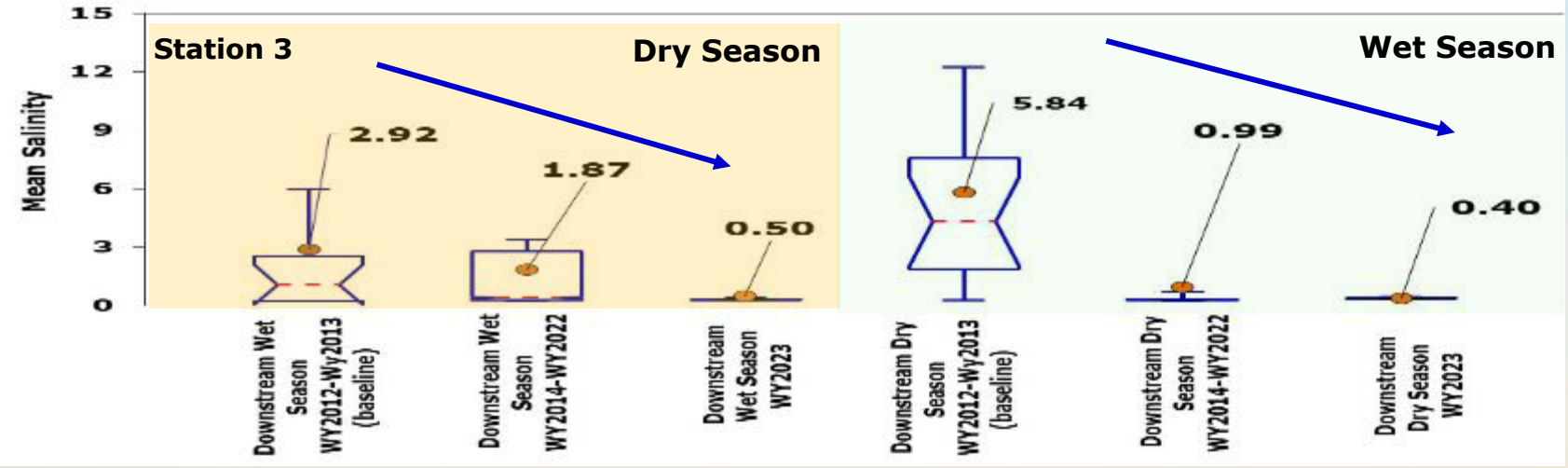
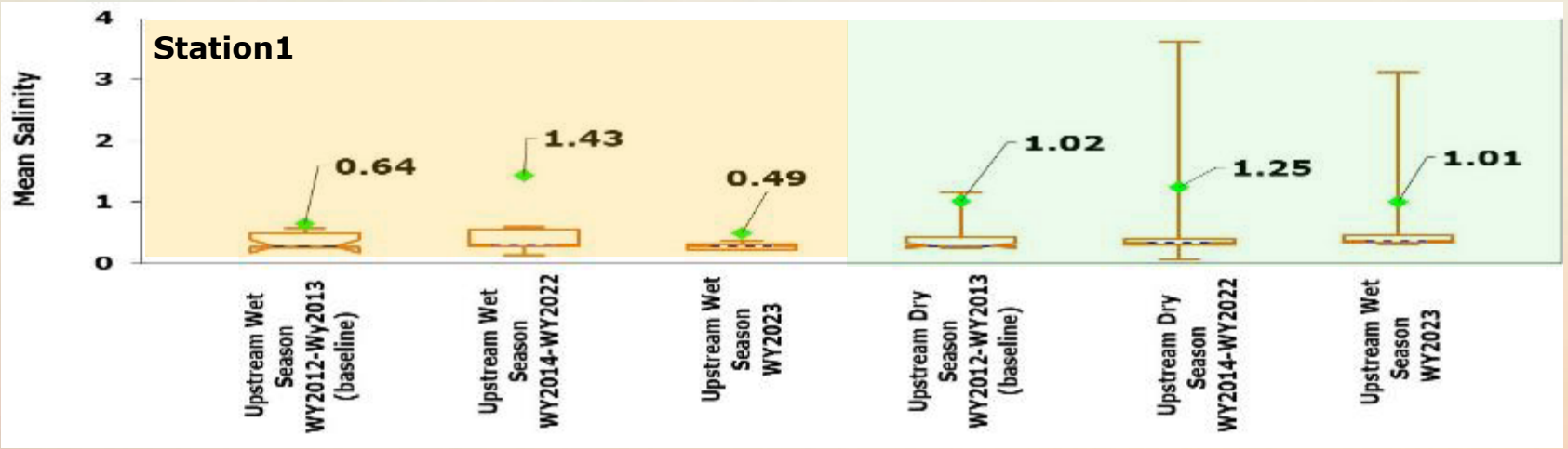
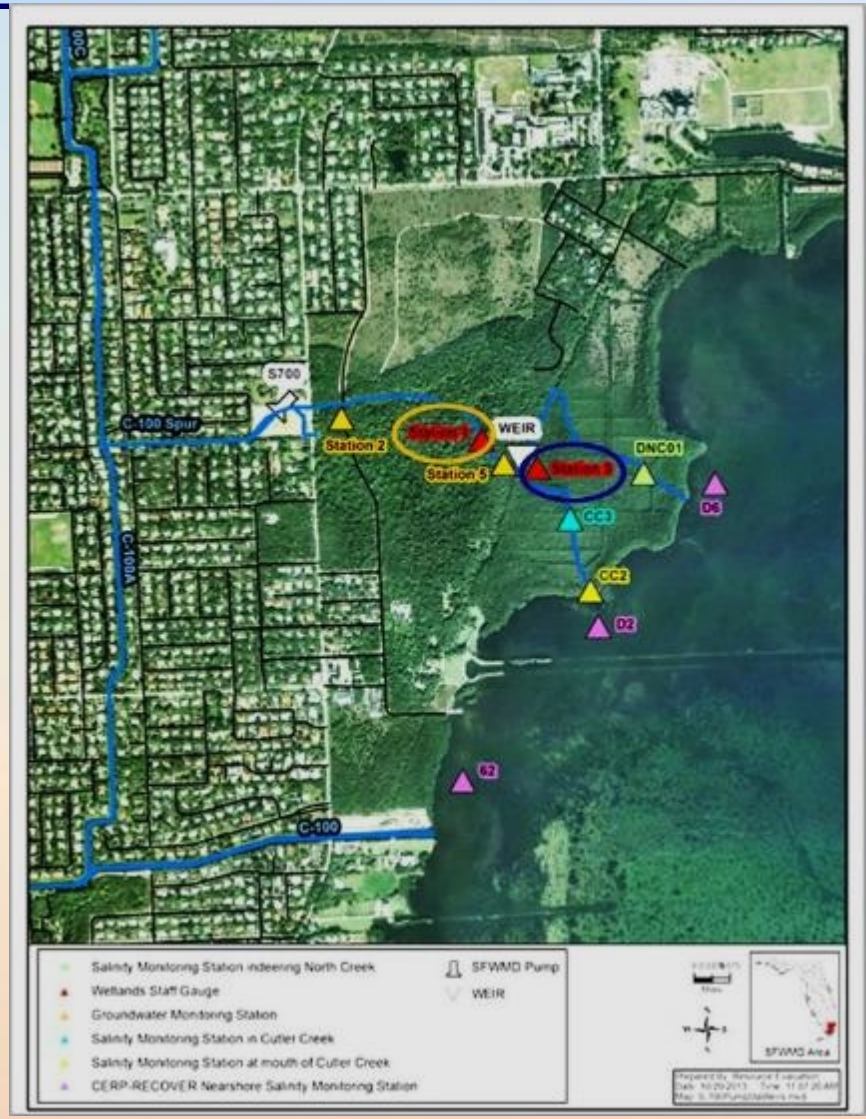
Biscayne Bay Coastal Wetlands Phase 1 Project
Deering Estate – Wetlands Surface Water Salinity

✓**Result: Surface water salinity in coastal wetlands decreased**

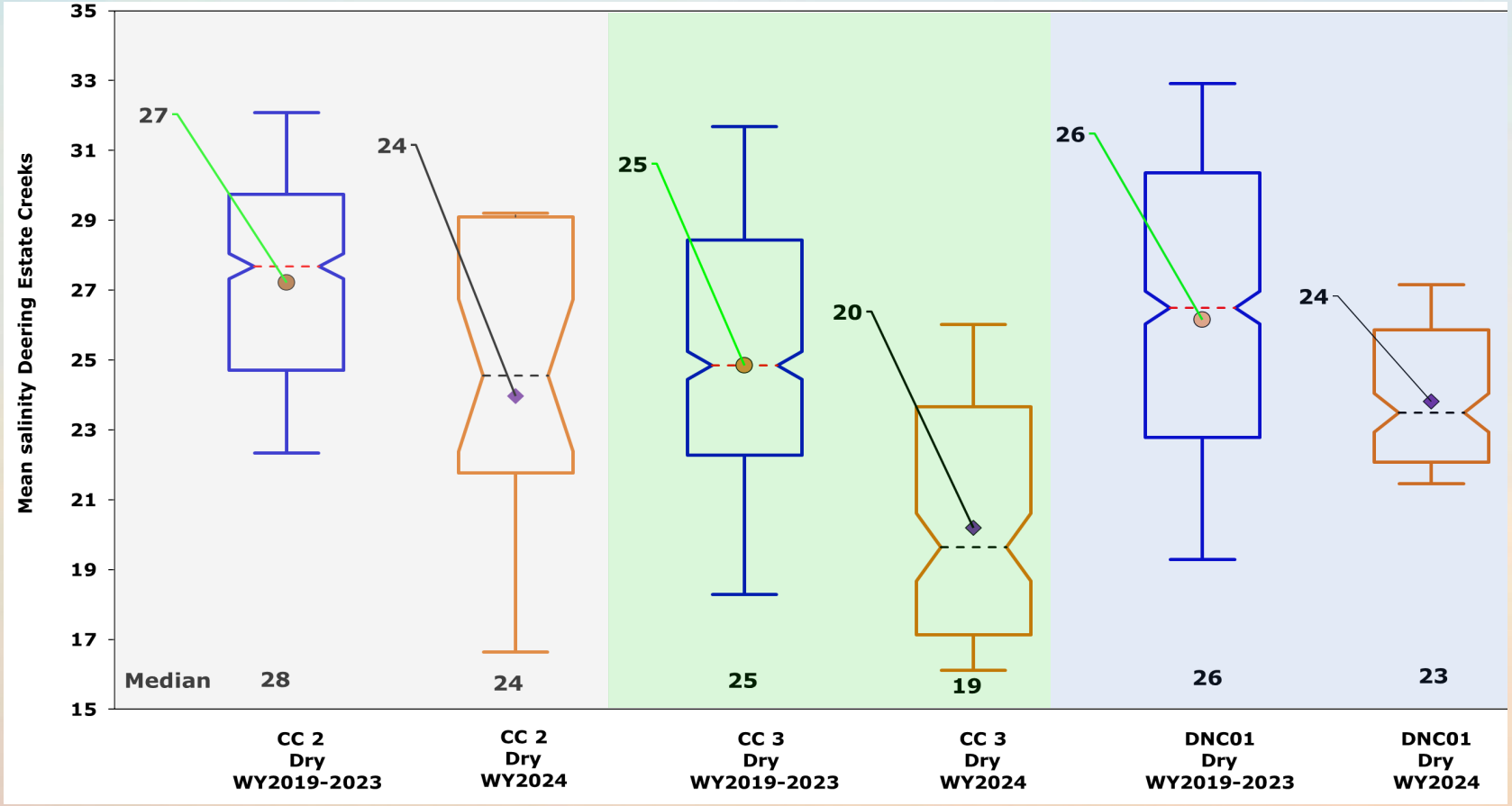


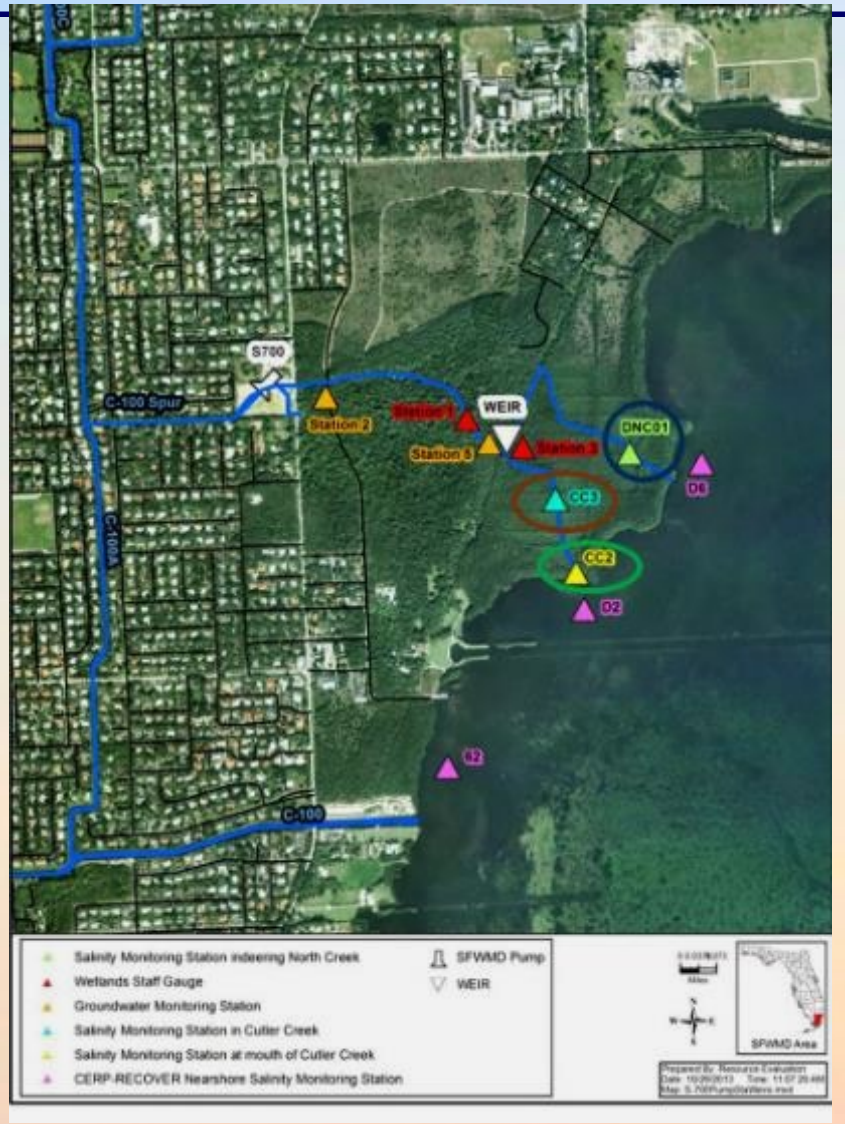




Biscayne Bay Coastal Wetlands Phase 1 Project
Deering Estate – Deering Estate Creeks Salinity

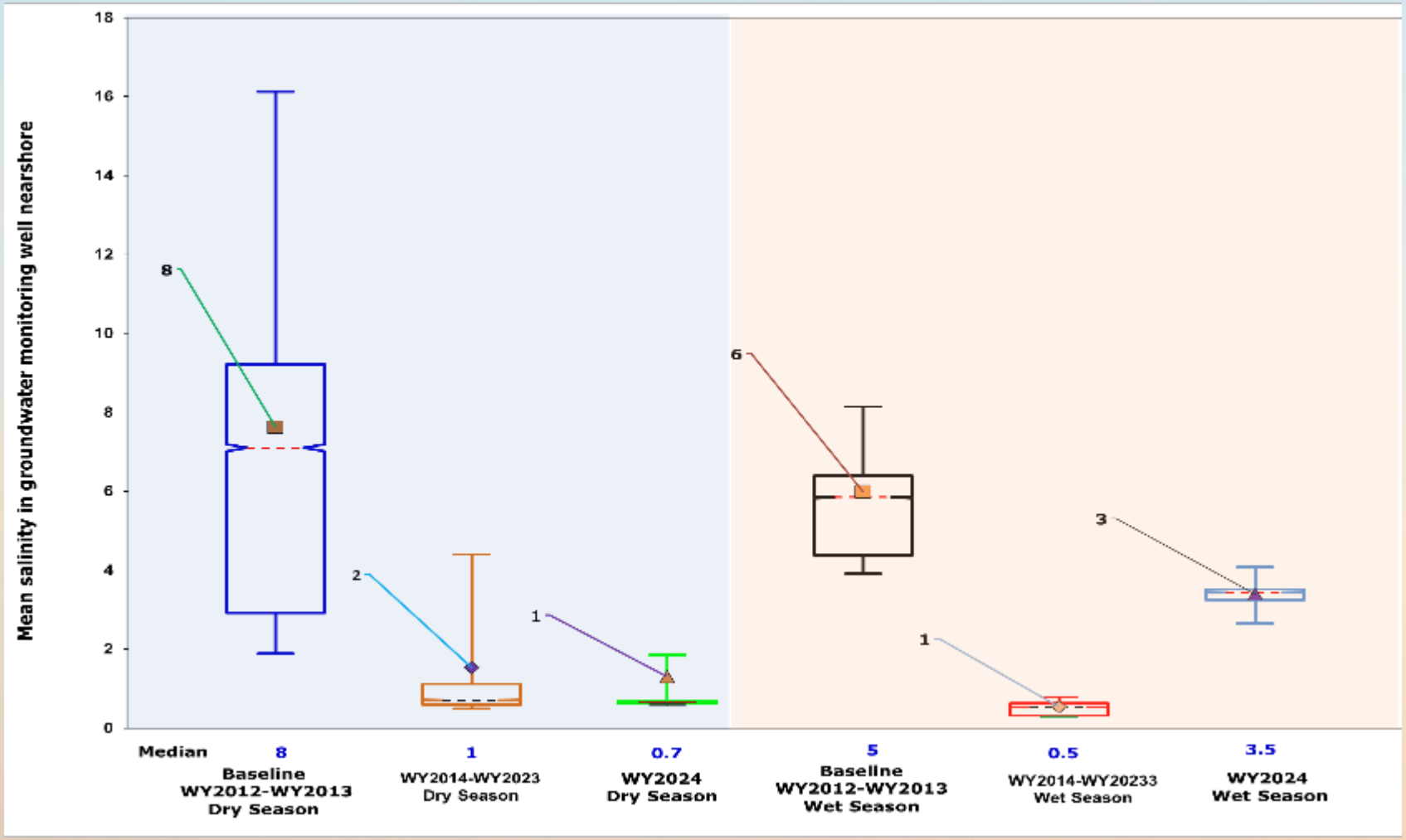
✓ Result: Surface water salinity in Deering Estate Creeks





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

✓ **Result: Groundwater salinity decreased**



Monitoring stations within Deering Estate and associated nearshore stations

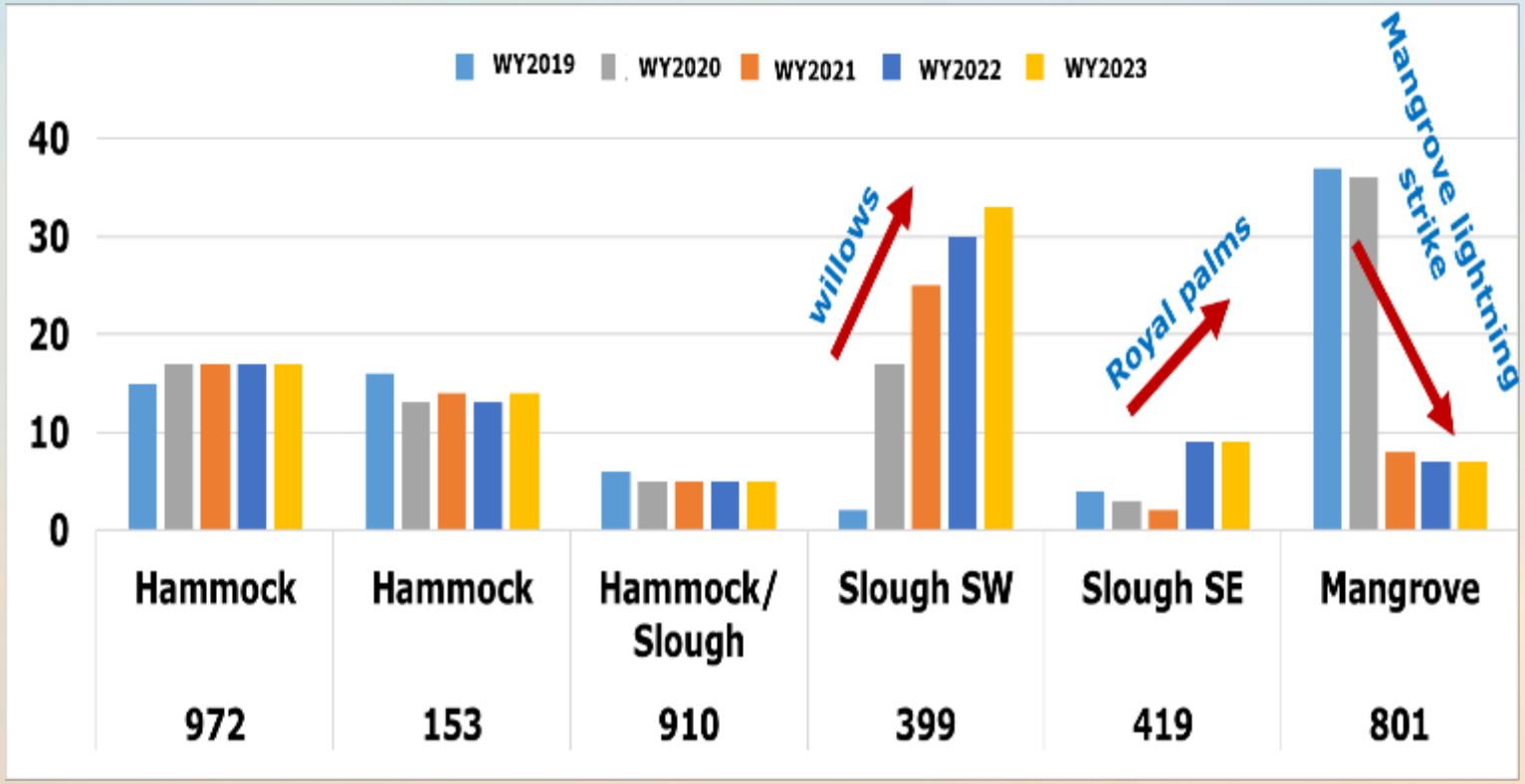
Biscayne Bay Coastal Wetlands Phase 1 Project
Deering Estate – Vegetation Response

✓ 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

- Return of sawgrass in 2017



- Several freshwater plants are recruiting. **In 2022, first occurrence in a research plot (#399)**

Biscayne Bay Coastal Wetlands Phase 1 Project
Deering Estate

- Critically endangered small tooth Sawfish in Deering Estate shoreline

- Additional freshwater from Deering Estate is linked to the observation of an offshore freshwater spring in Biscayne Bay

- Prescribed fire to control invasive plant species and expansion sawgrass, and improving habitat in Deering Estate component - December 2023

Biscayne Bay Coastal Wetlands-Operation Adaptive Management

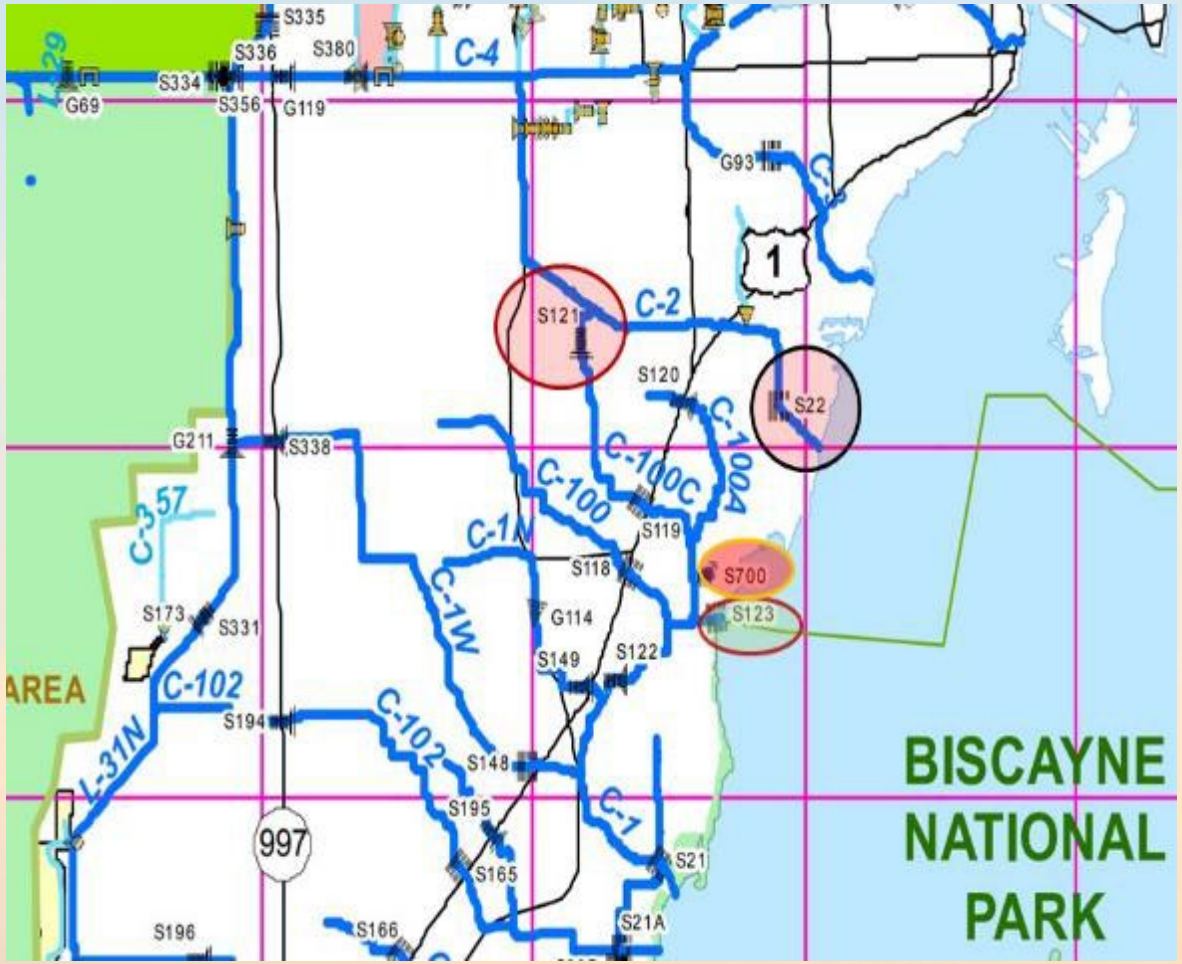
Goals:

- **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.

  - ✓ Modify existing S-121 from manually operated to remotely operated with forward pumps.

  - ✓ 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.



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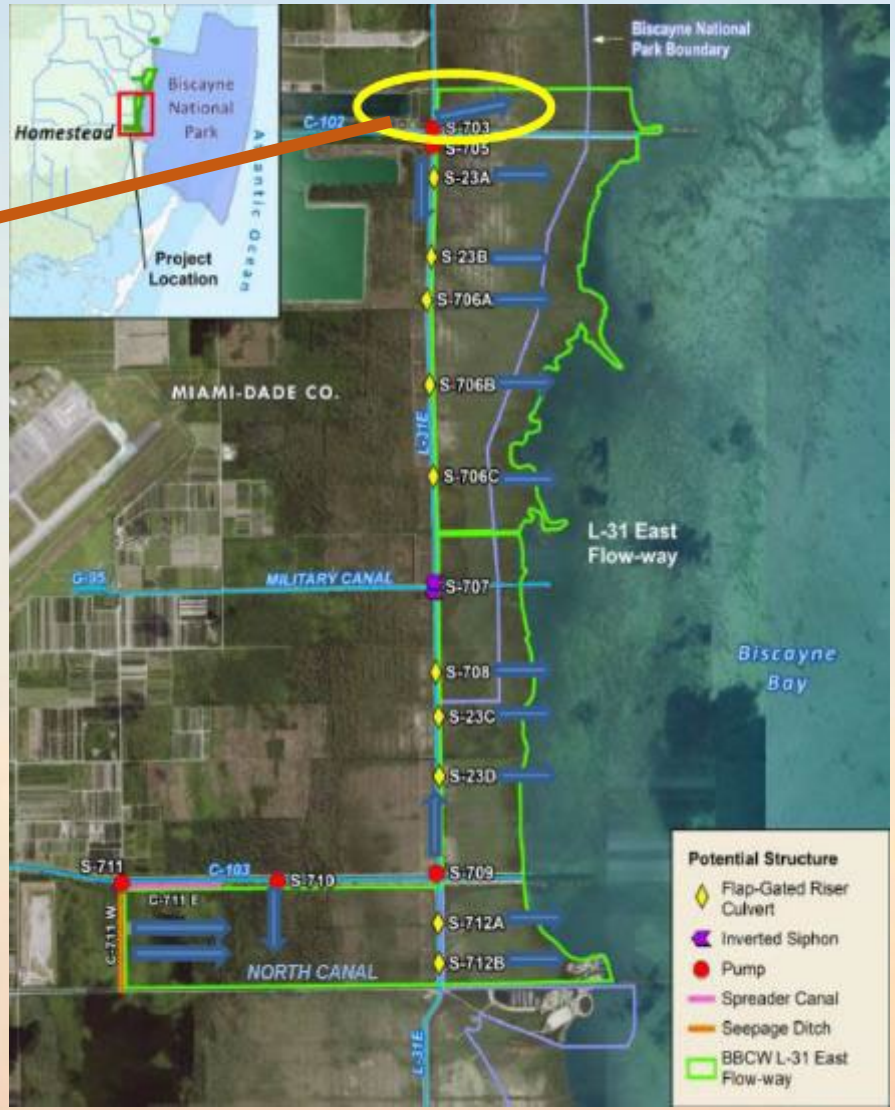
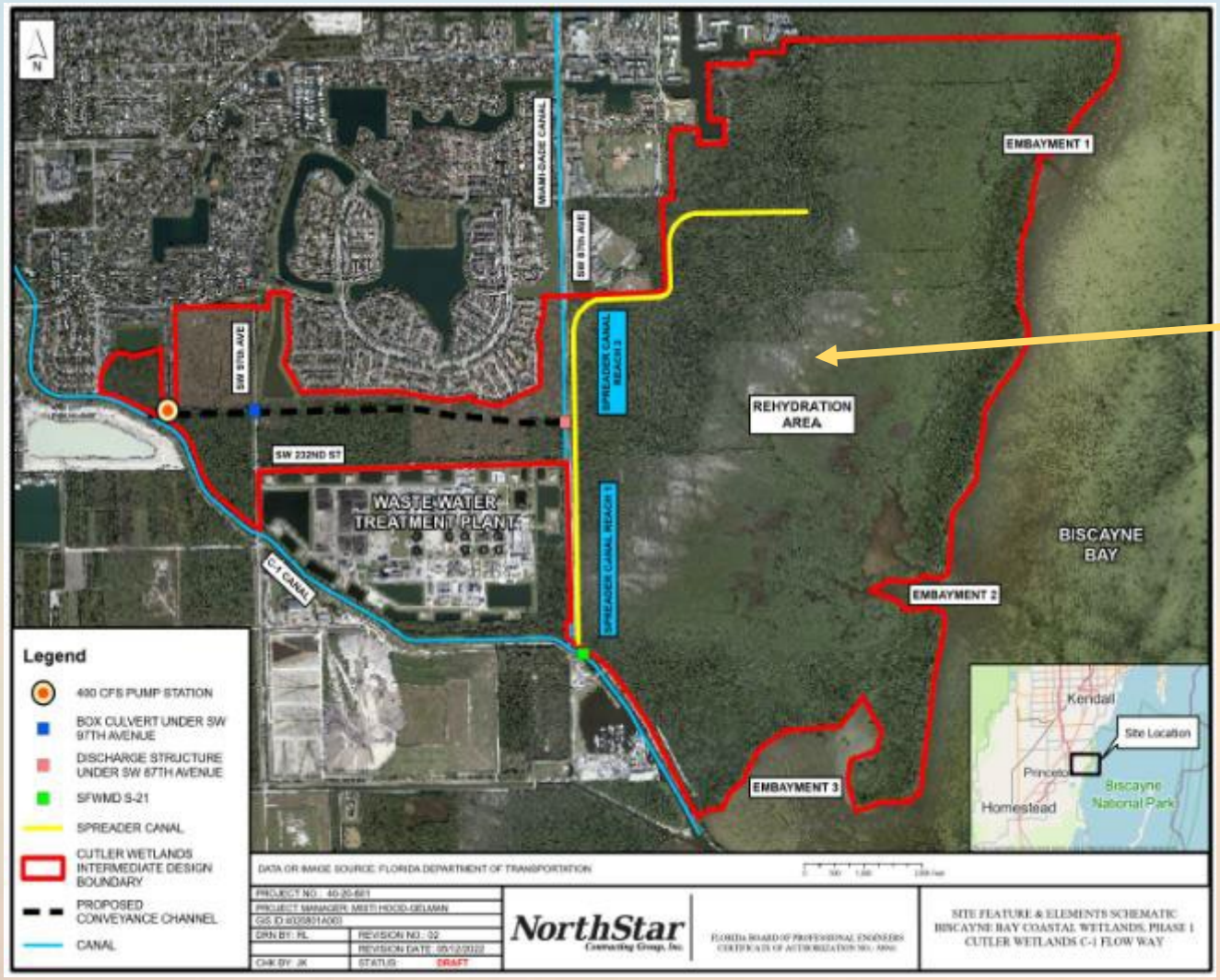
Biscayne Bay Coastal Wetlands
L-31E Flow way

Improve flows
shallow spreader pump station S-703



BBCW Cutler Coastal Wetlands Flow way Site Investigation Improve Flows



- Evaluate proposed ditch plug locations (15)
- Site Reconnaissance
- Elevation Cross-sections

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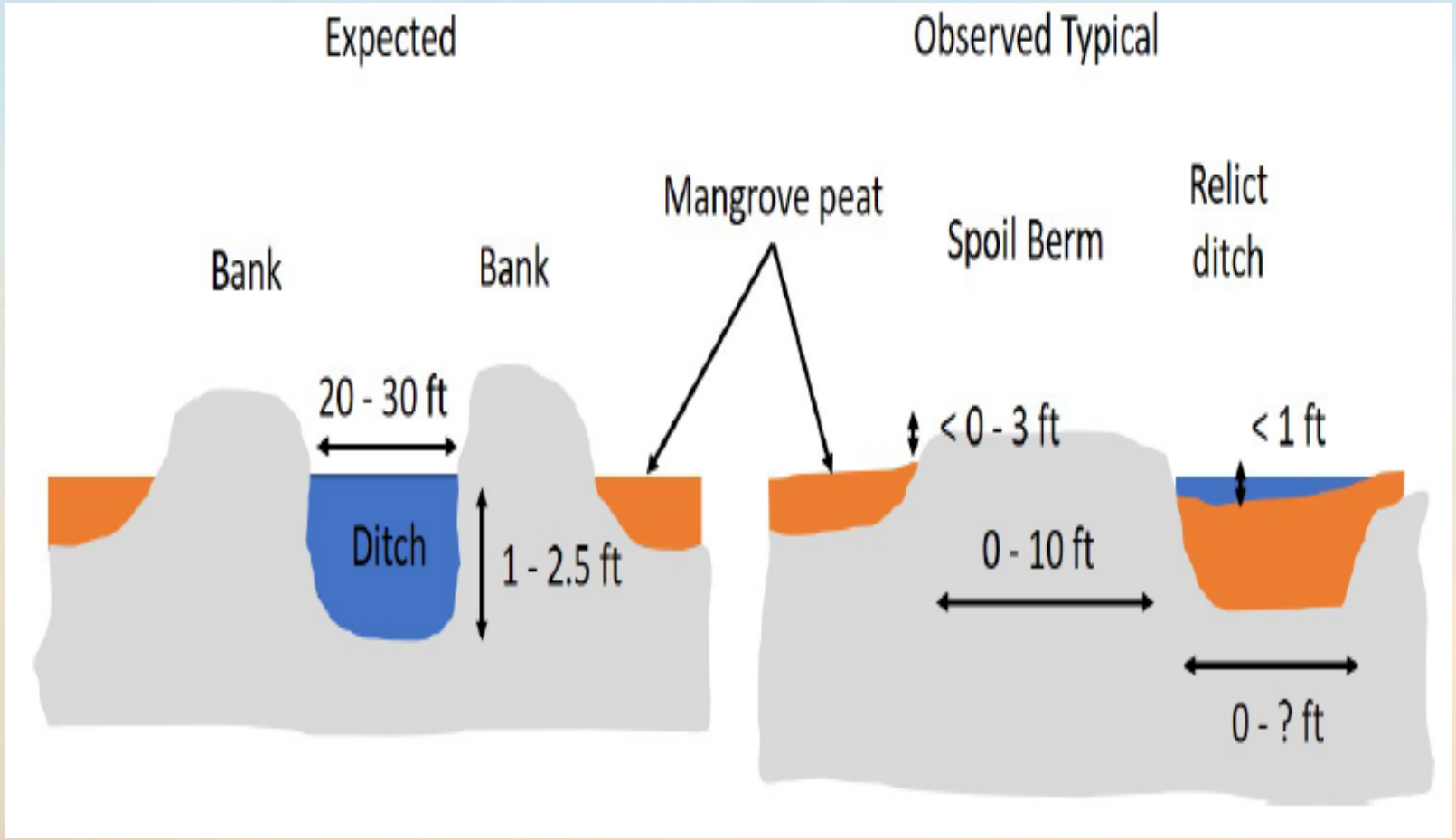
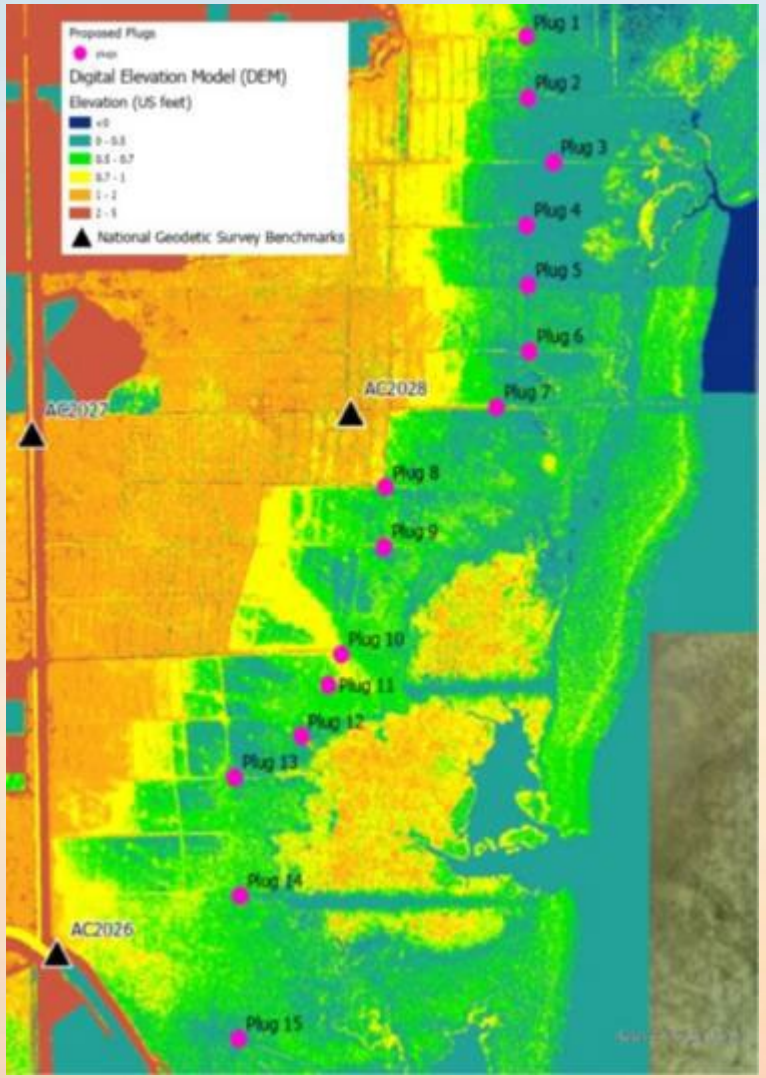
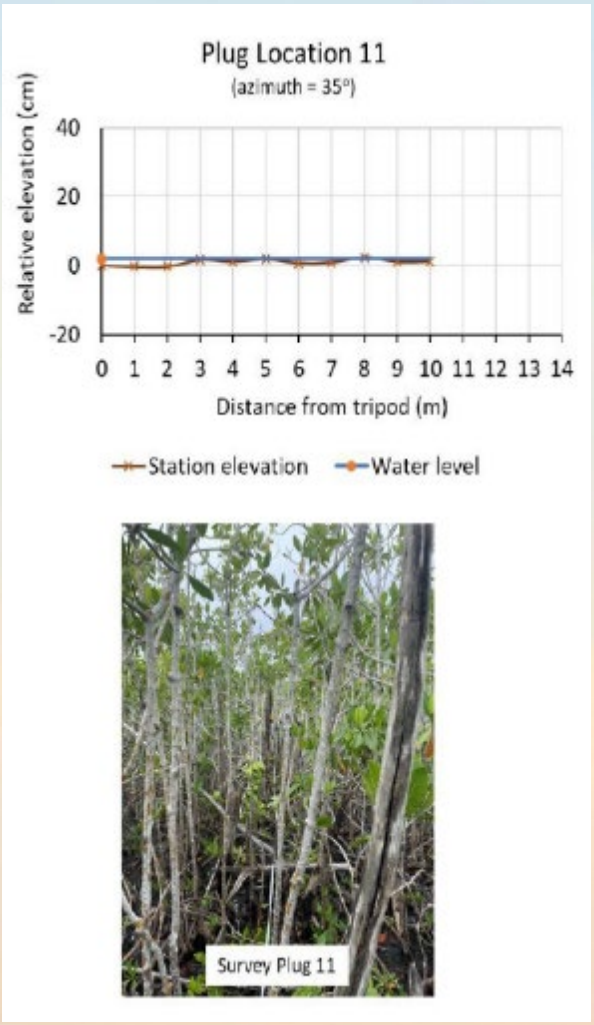
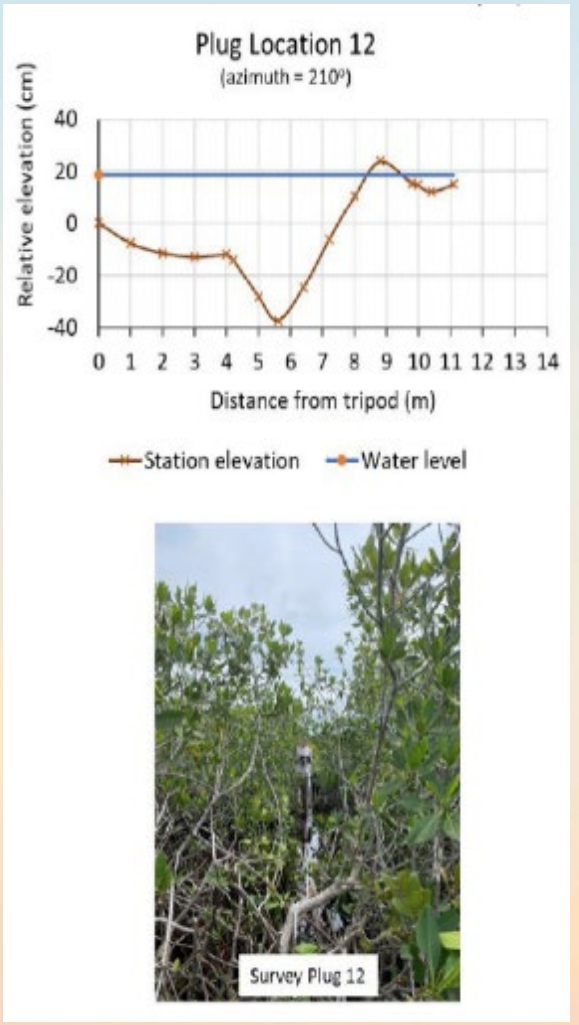
BBCW Cutler Coastal Wetlands Flow way
Expected vs. Observed Relief

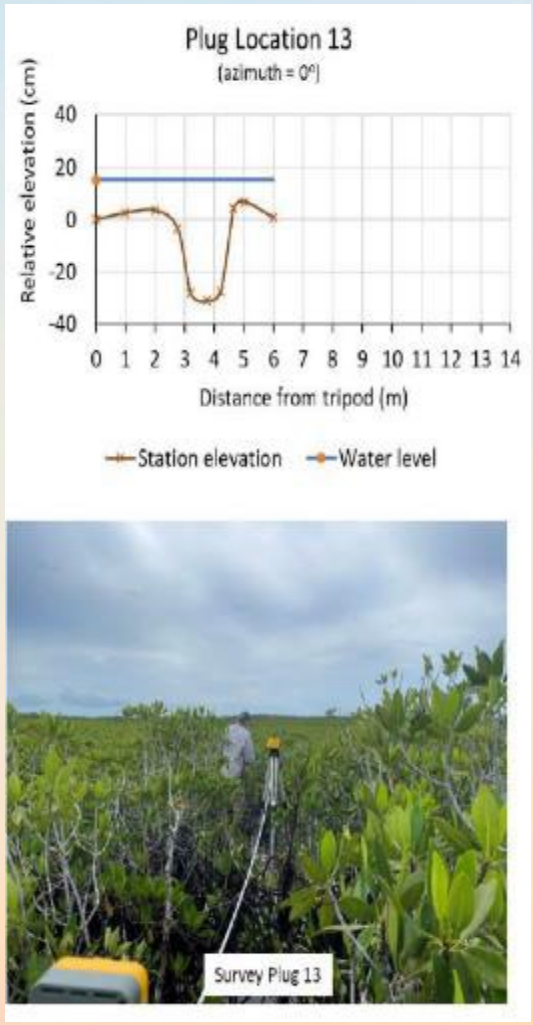




BBCW Cutler Coastal Wetlands Flow way Elevation Profiles







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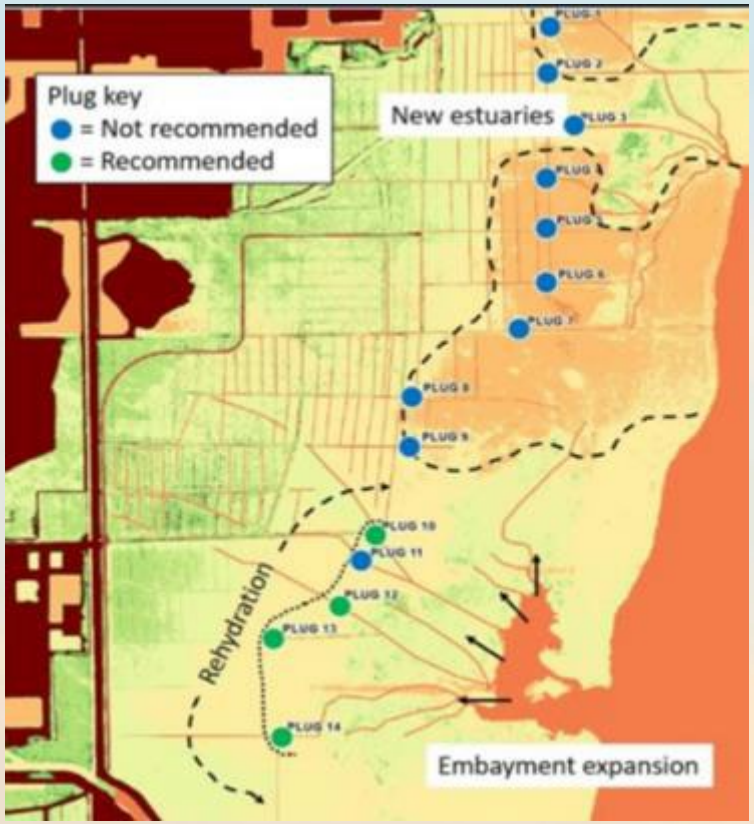
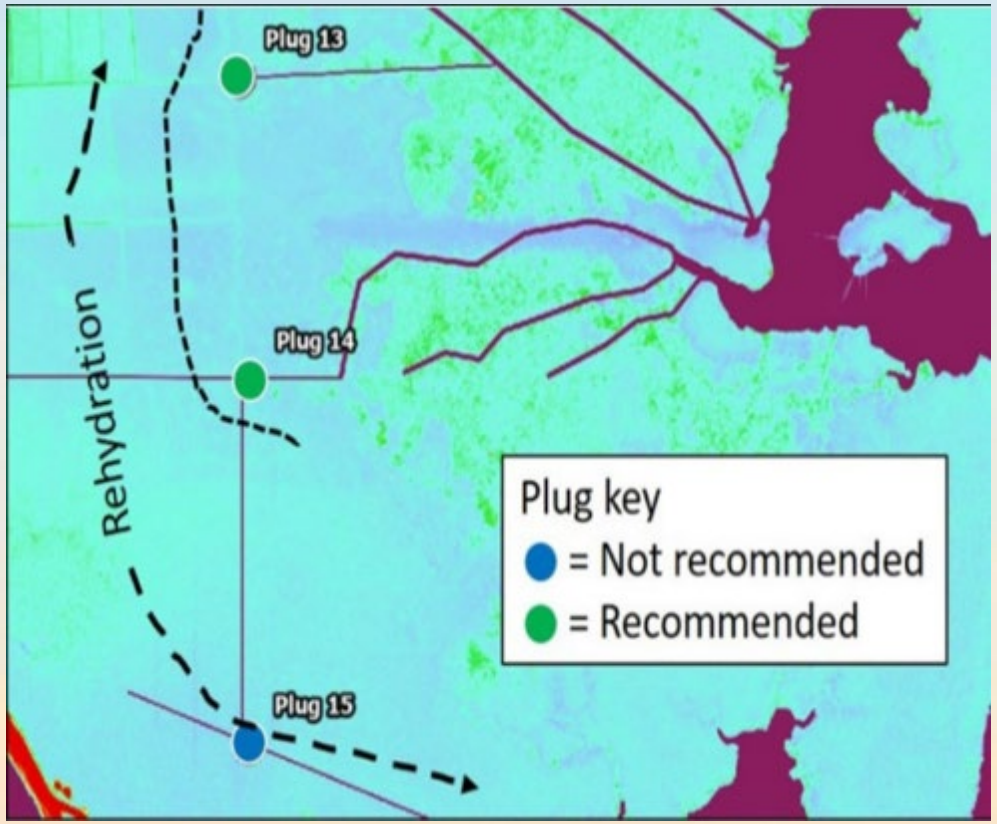
BBCW Cutler Coastal Wetlands Flow way Recommendations

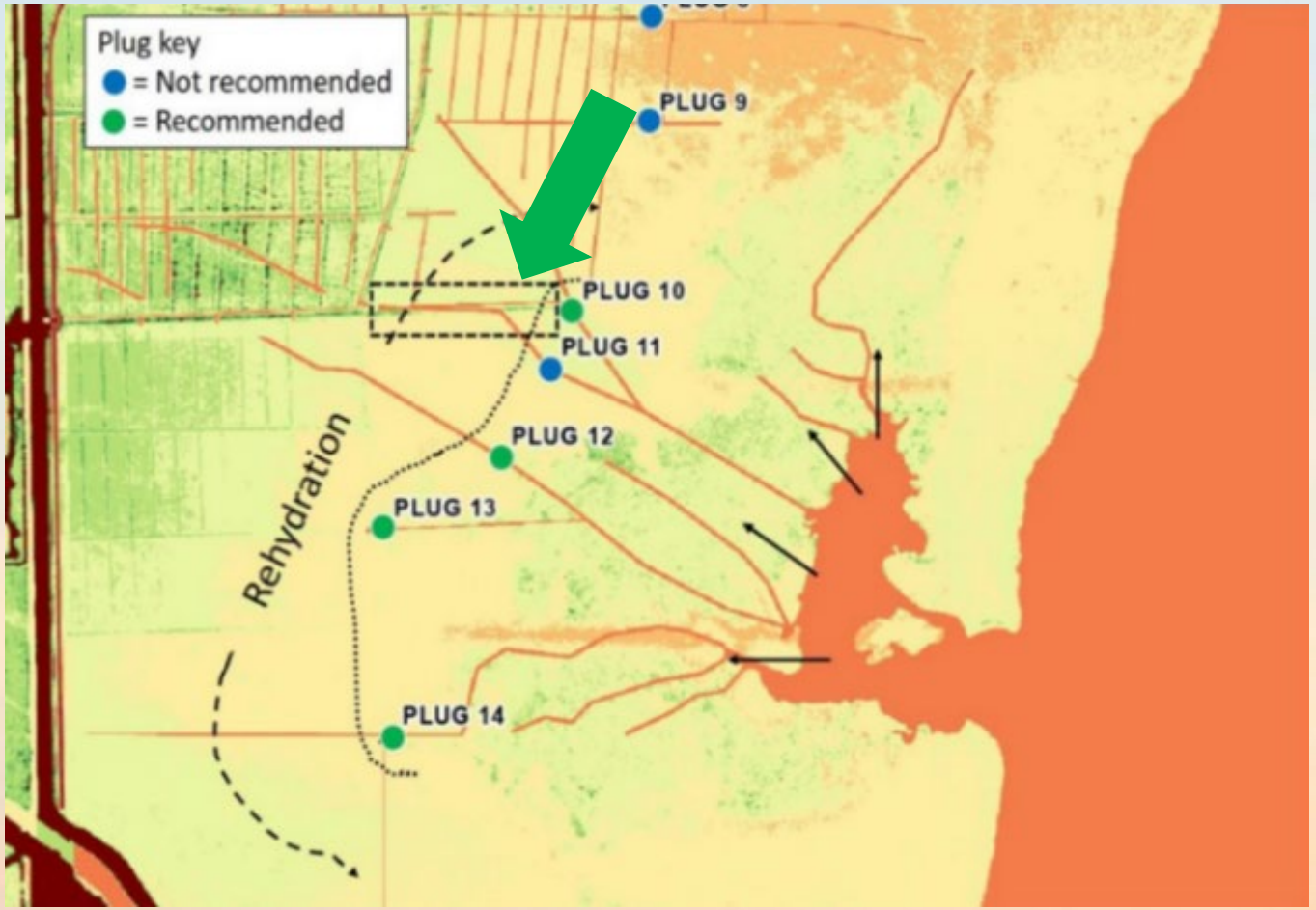




- Plugs 1-11, 14 & 15 not recommended. No channel or minimal relief (<10 cm) observed so no plug warranted. These sites are likely to be permanently submerged within the next 15 years.
- Installation of Plugs 12 & 13 may contribute to rehydration of westward wetland areas by blocking channelized flow to adjacent embayment.

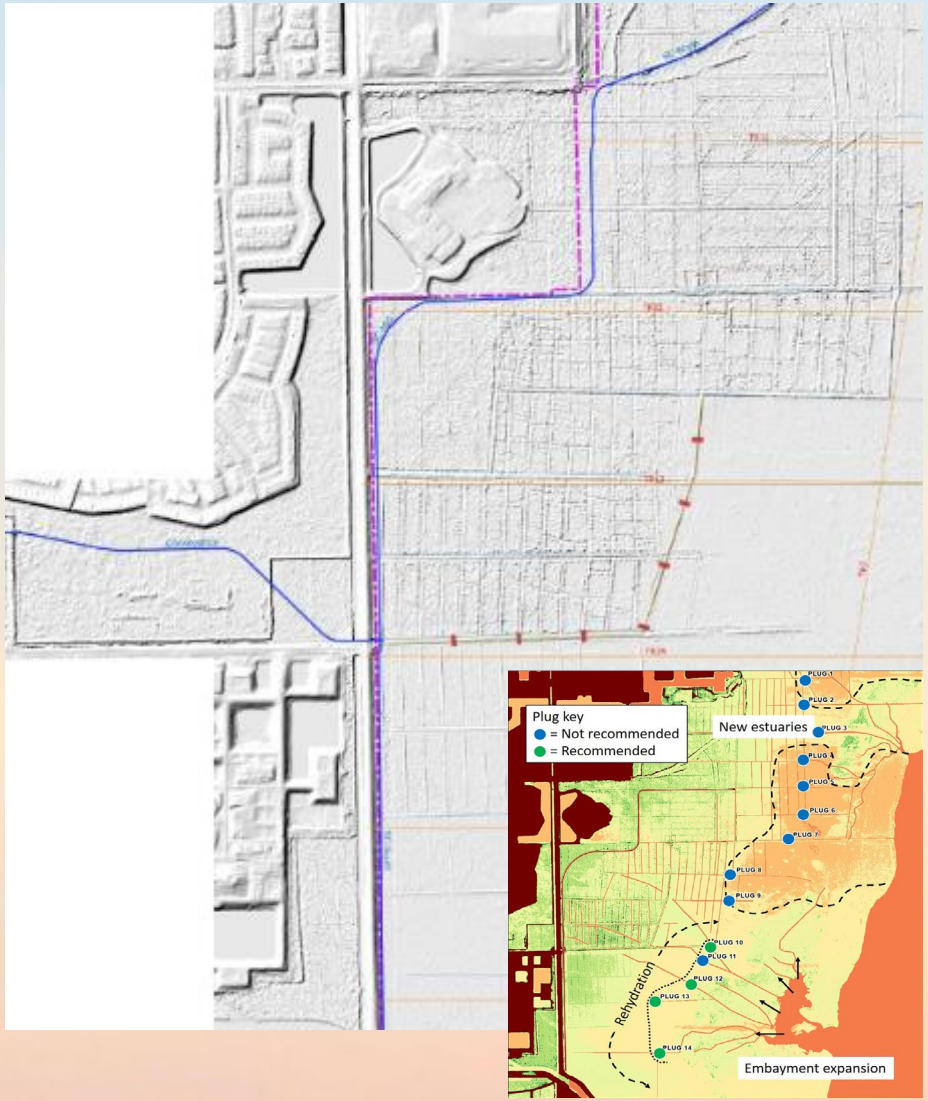
BBCW Cutler Coastal Wetlands Flow way Recommendations

- To facilitate rehydration, a segment of the road/berm leading to Plug 10 should be removed.



BBCW Cutler Coastal Wetlands Flow way Plug Installation

- **Plug Recommendations:**
  - Install Plugs 12 & 13
  - Remove segment of road/berm leading to Plug 10
- **SFWMD & USACE Decision:**
  - Evaluate need for Plugs 12 & 13 post-construction as adaptive management measure.
  - Install berm gaps during construction.



Mangrove Terrapin in Deering Estate Coastal Wetlands