National Park Service

South Florida Natural Resources Center

Biscayne National Park

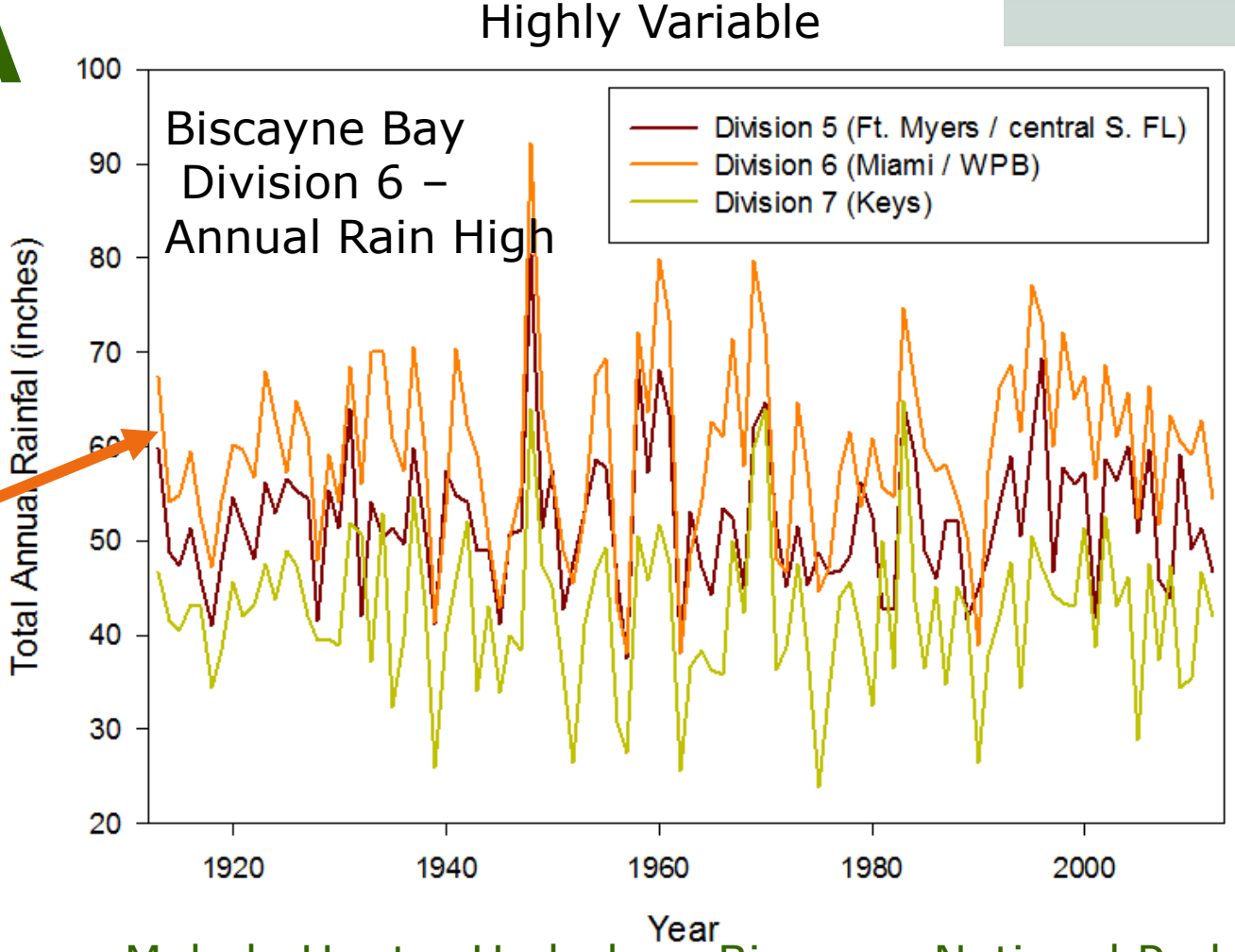
Melody Hunt
National Park Service

November 17, 2020

BBSEER Public Engagement Workshop Sponsored by South Florida Ecosystem Restoration Task Force

ANNUAL RAINFALL SOUTH FLORIDA

NOAA/ NCDC maintains Long-term Climate dataset for U.S.



Melody Hunt – Hydrology Biscayne National Park

Biscayne National Park

EXPERIENCE YOUR AMERICA

FRESHWATER INFLOW

- Altered quantity, quality, timing & distribution
- Canal
- Groundwater
  - Canals
  - Coastal Mangrove/Wetland between canals
  - Card Sound

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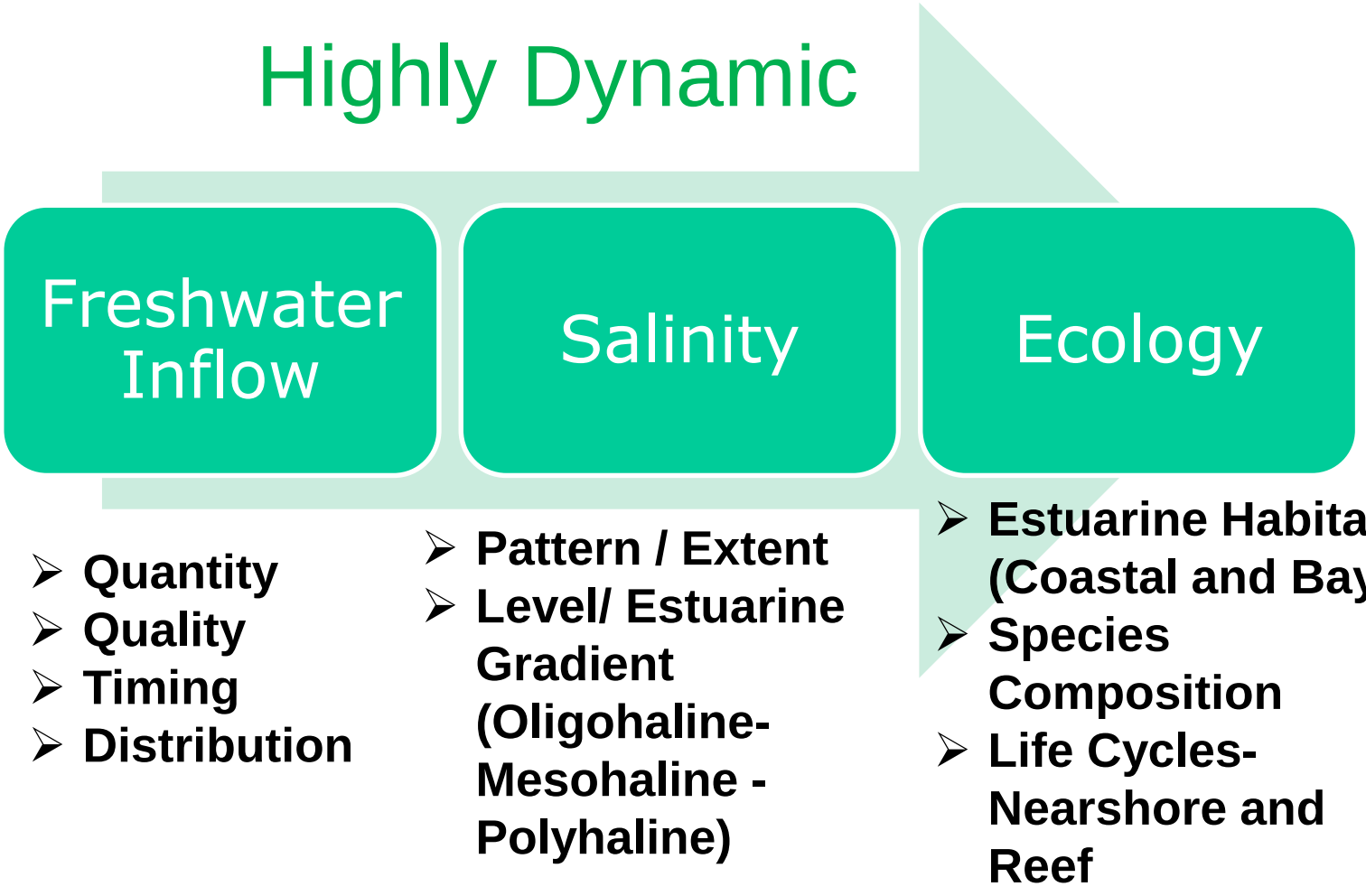
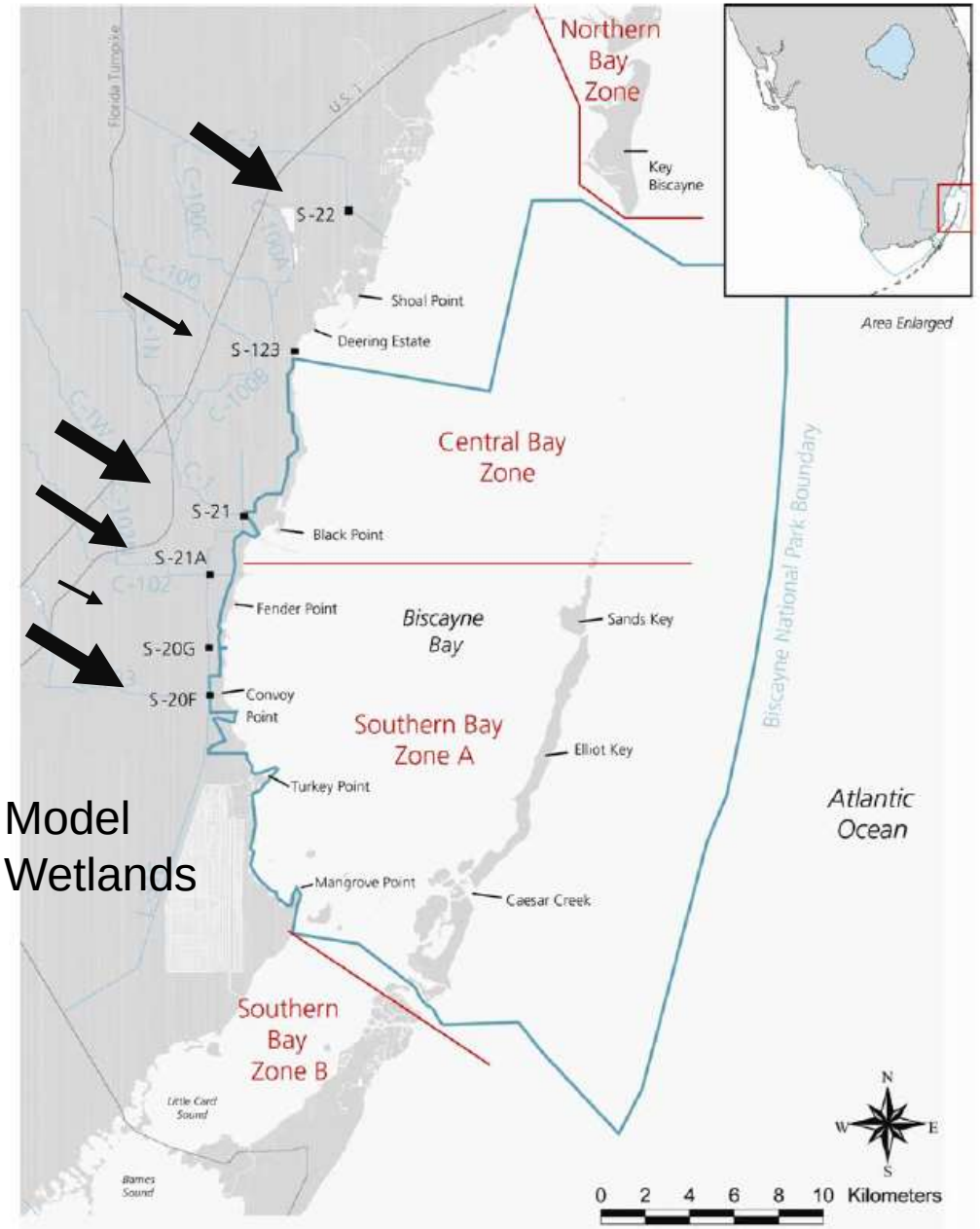
- Canal drainage & control
- Levees and roads
- Land Use - Urban, industrial, agricultural
- Greatly reduced wetlands & available storage
- Compressed natural areas and reduced connectivity between bay and coast near canals – some areas (Upper Card Sound) cutoff from freshwater inflow
- Reduced water table
- Saltwater intrusion
- Variable & high salinity

HYDROLOGY - ECOLOGY





Model Wetlands

CANAL INFLOW

S22, S21, S20F — **More**

S21A, S123*

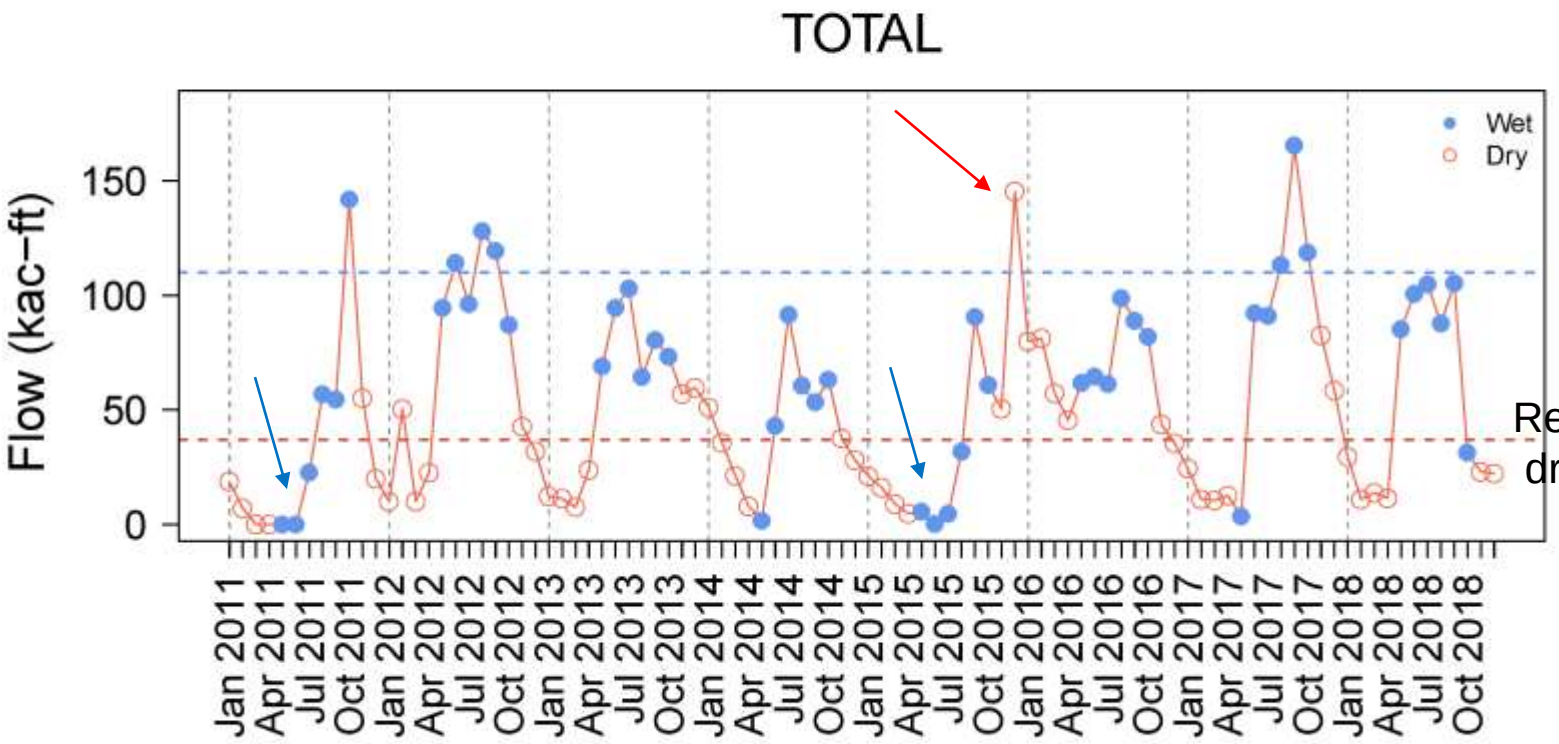
S20G — **Less**

Unequal distribution of canal inflow

Upper Card Sound- freshwater inflow is blocked

Completion BBCW phase 1 will help distribute some flow to wetlands between canals

TOTAL CANAL FLOW



Recommended dry season flow

Timing

- Monthly amounts don't follow wet/ dry seasons
- Several months every year of low/no flow (6 months in some years). See below red dashed horizontal line

HISTORIC CONDITIONS

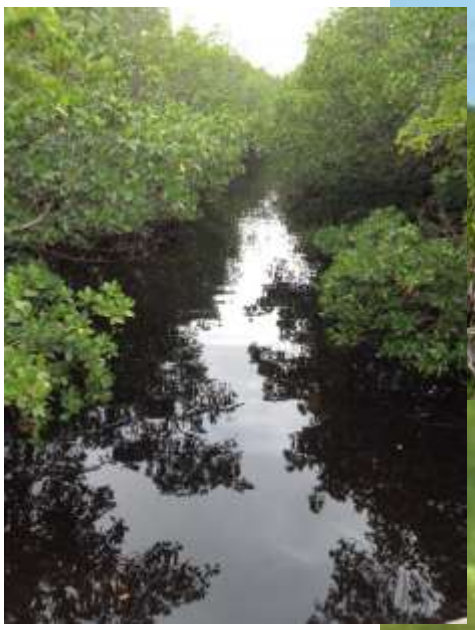
- Largely Estuarine Ecosystem
  - Full range of salinities <30

- Freshwater surface and groundwater throughout most of year supported wide range of flora and fauna

EXPERIENCE YOUR AMERICA

ESTUARINE HABITATS SUPPORTED BY INFLOW

- Coastal Wetlands
- Mangrove Shoreline
- Tidal Creeks
- Nearshore
  - Seagrass Beds
  - Hardbottoms



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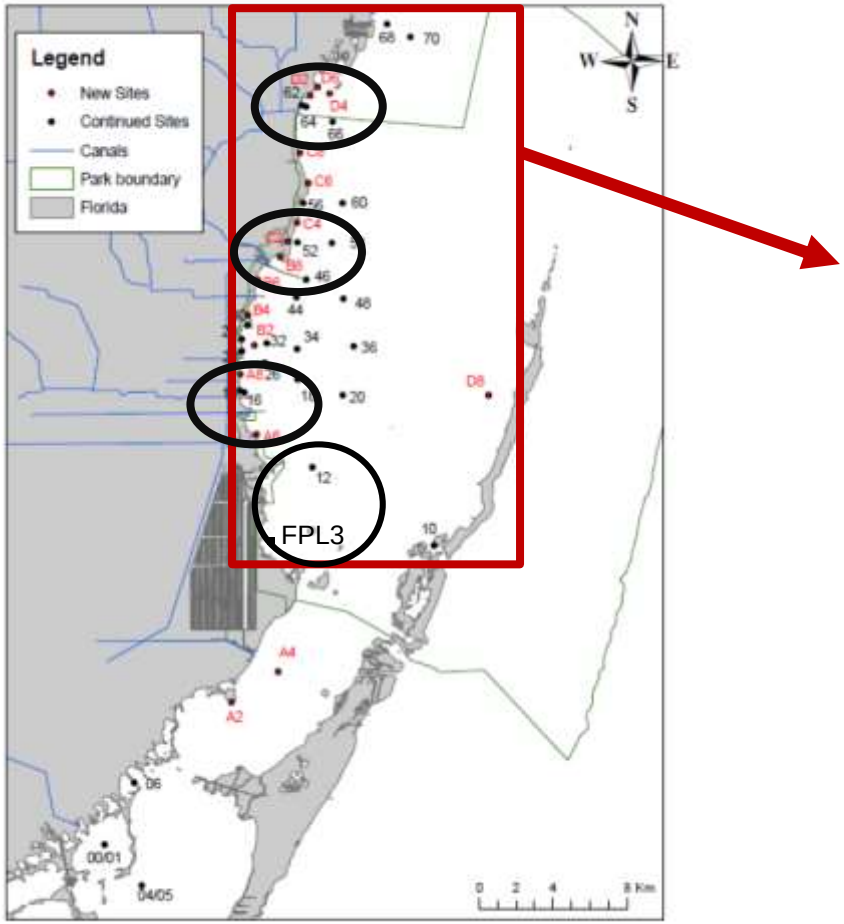
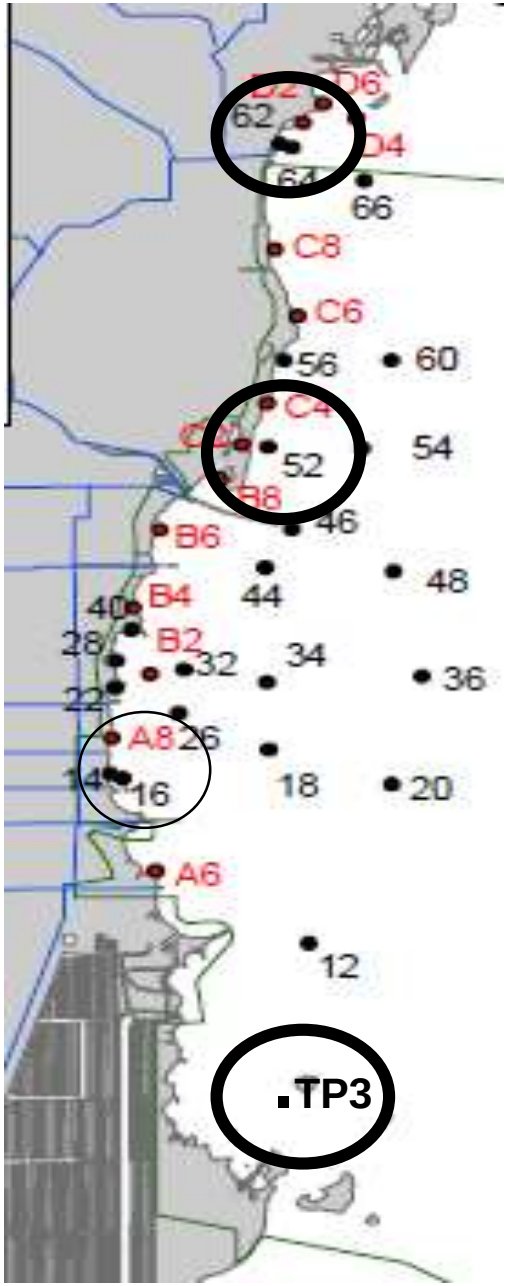
CURRENT CONDITIONS

Largely Marine

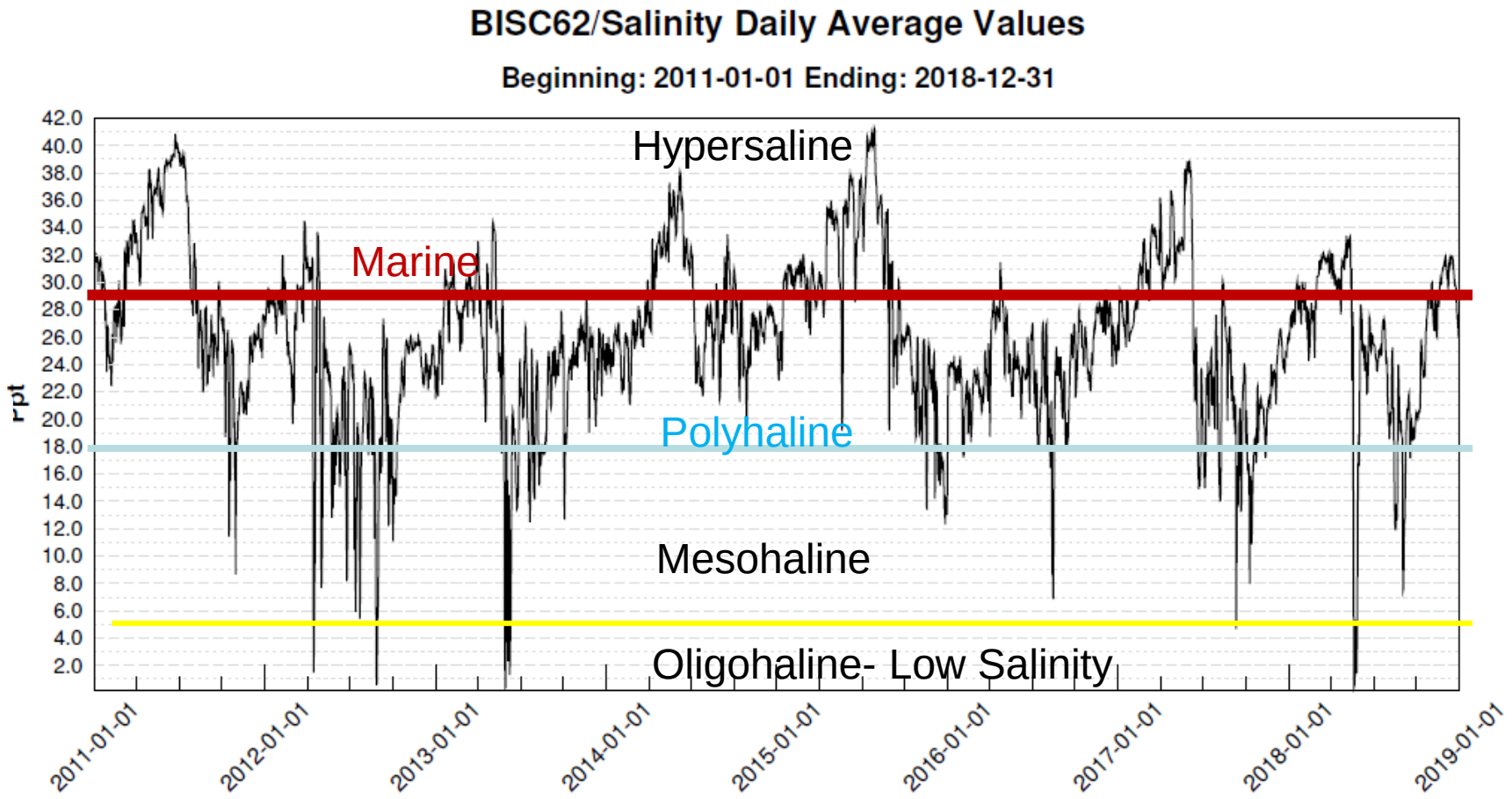
- Volume, timing, and distribution of freshwater flows highly altered
- No practice, standard, or strategy in place to provide dry season flows (such as an MFL)
- Flows not sufficient to maintain an estuarine environment over ecologically significant temporal and spatial scales
  - When estuarine conditions present predominately polyhaline (18-30) nearshore
  - Periods of fully marine conditions
  - Nearshore hypersalinity
- Shoreline of Card Sound predominately marine, loss of estuarine function

SALINITY MONITORING

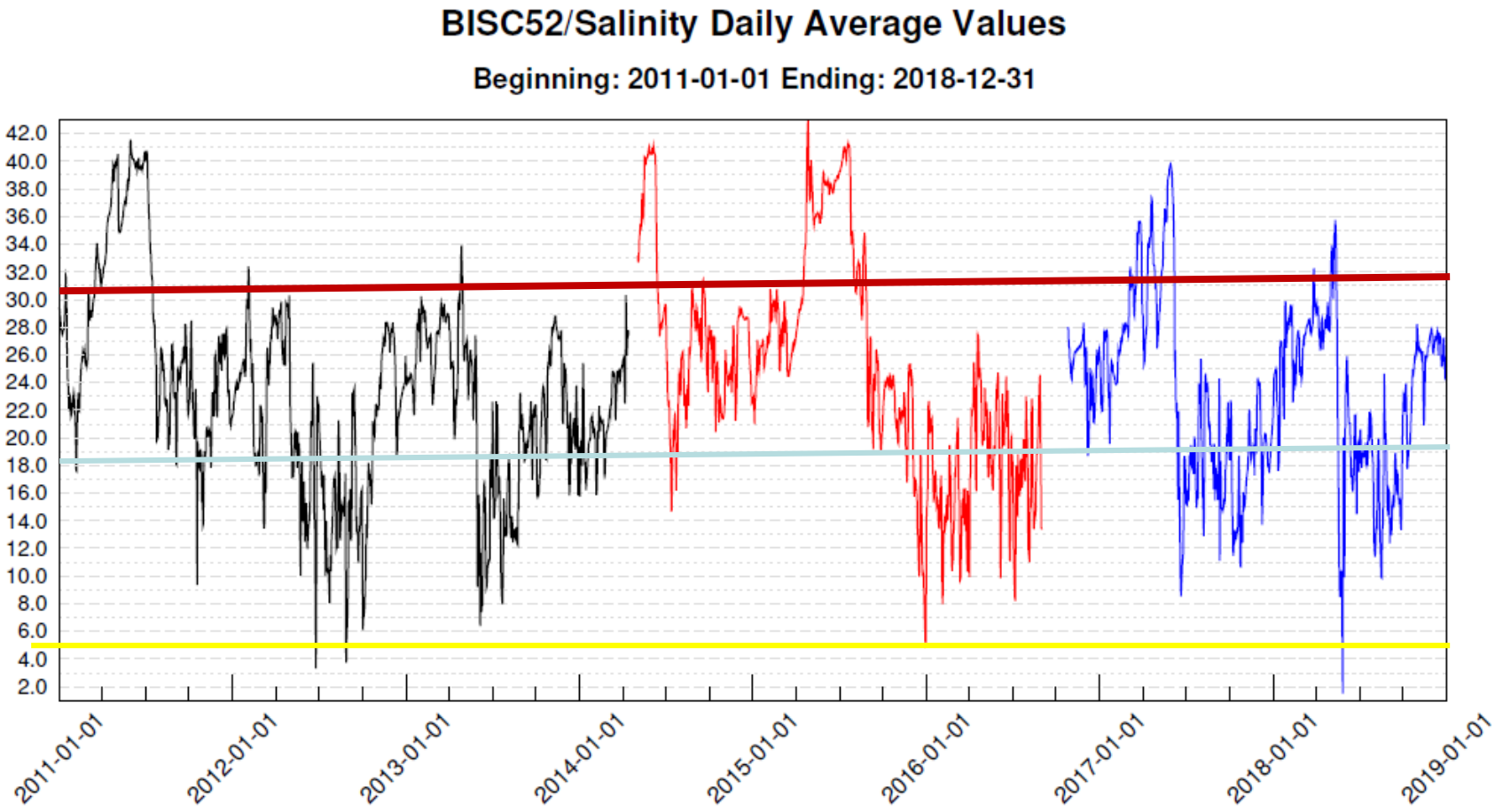




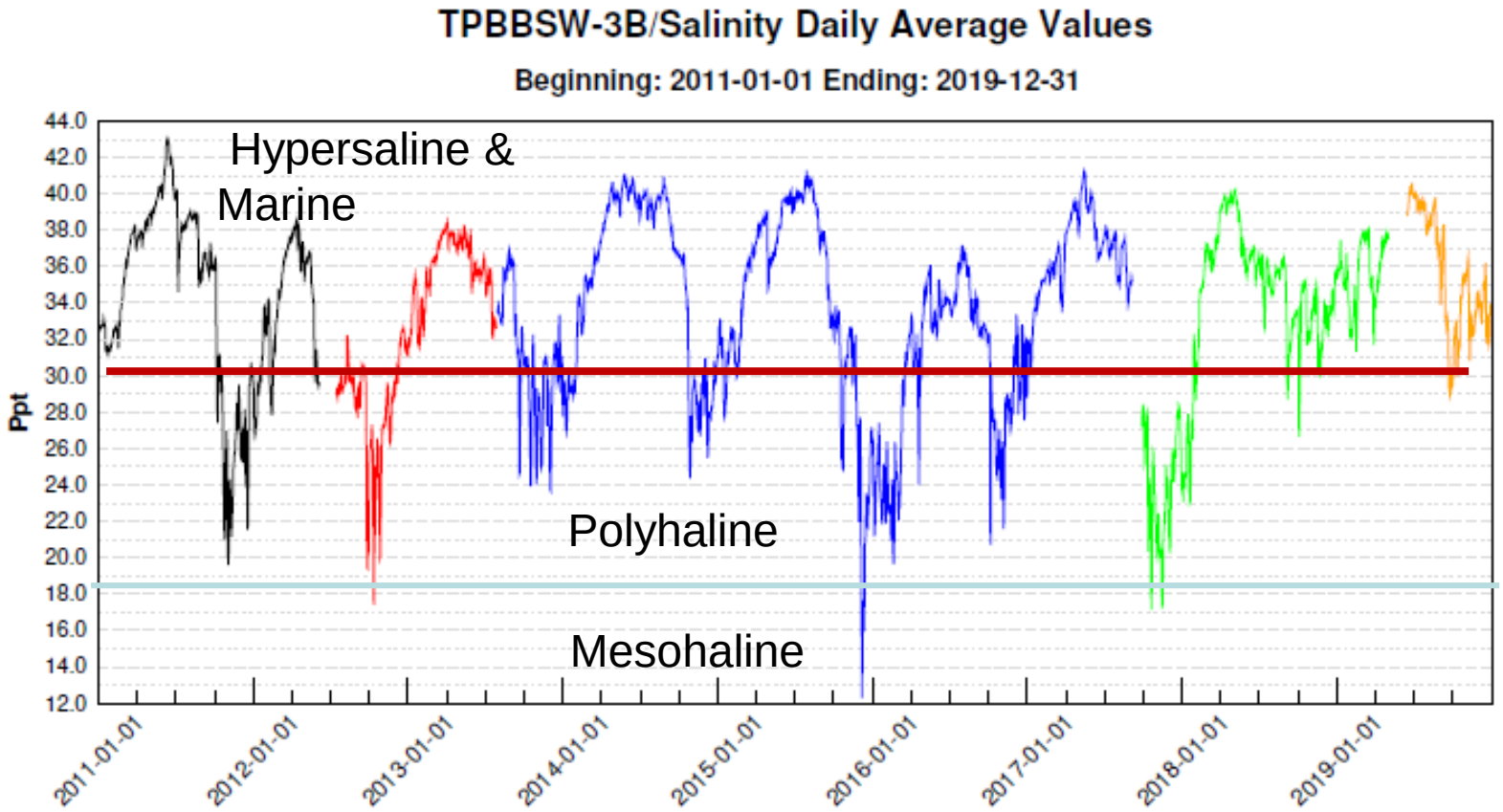
Daily Salinity Measurements Station BISC 62



Daily Salinity Measurements Station BISC 52



Upper Card Sound Nearshore Salinity



SUMMARY

- Canal inputs- unnatural timing and distribution of inflow
- Upper Card Sound - disconnected from freshwater inflow
- Dry season inflows insufficient to maintain estuarine environment & no strategy in place to provide needed dry season inflow
- Estuarine gradient restricted
- Natural areas along coastline- compressed, limited water storage

Thank you!

Melody Hunt
Melody_Hunt@nps.gov

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Eastern Panhandle Everglades National Park

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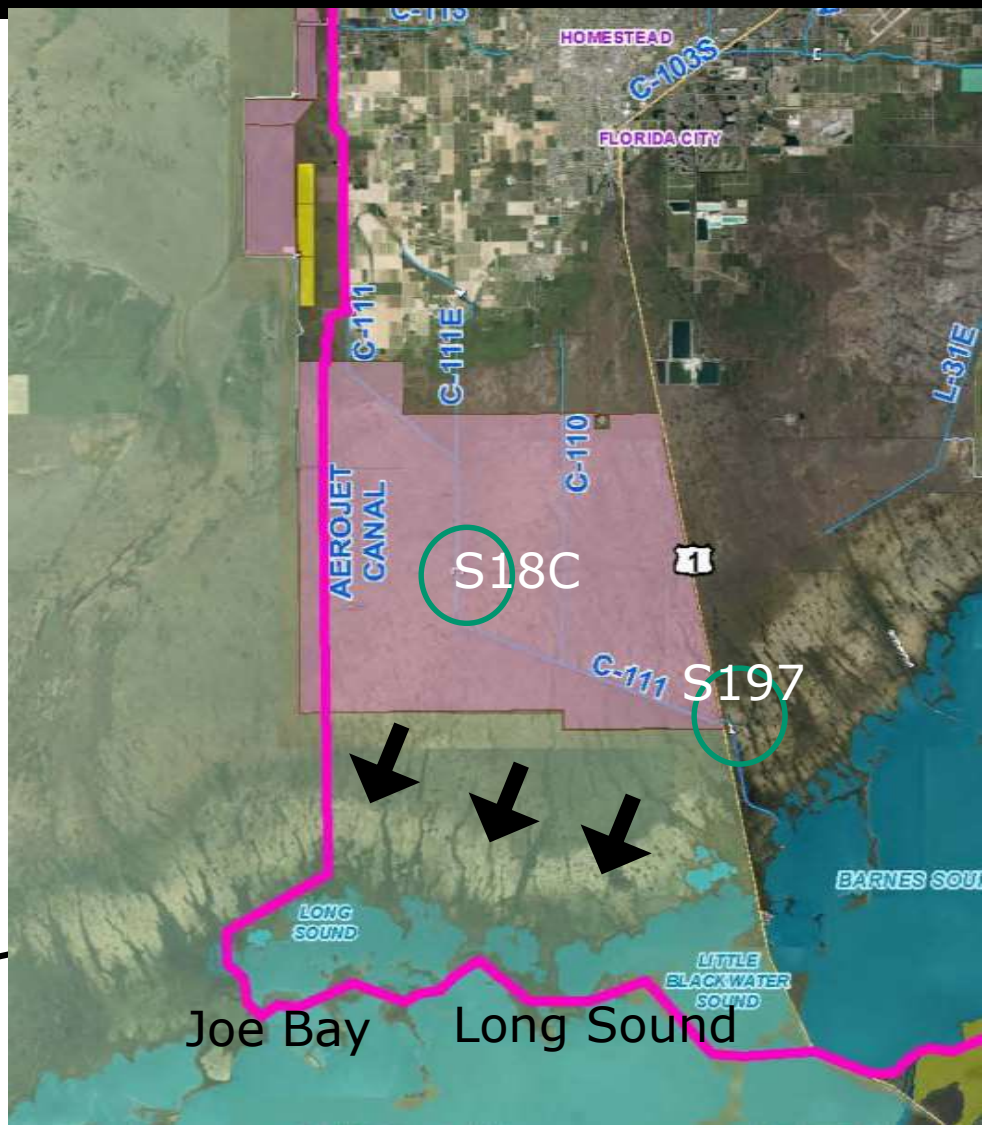
INFLOW

- **Freshwater inflow- direct rainfall and managed overland flow**
- **Overland inflow from C-111 (S18C and S197)**

Eastern Panhandle: South western area of BBSEER Project



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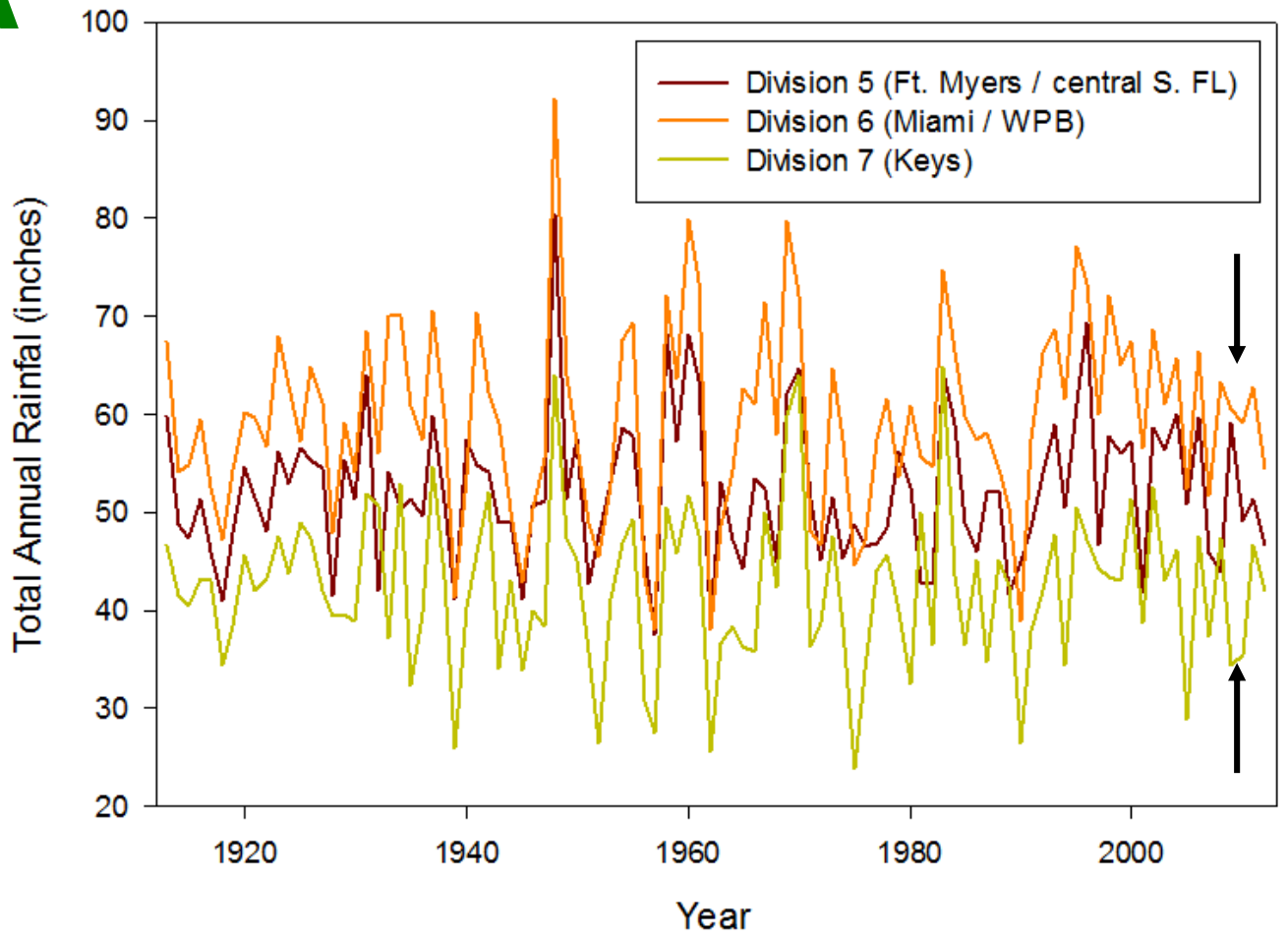

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HABITATS & FEATURES INFLOW DEPENDENT

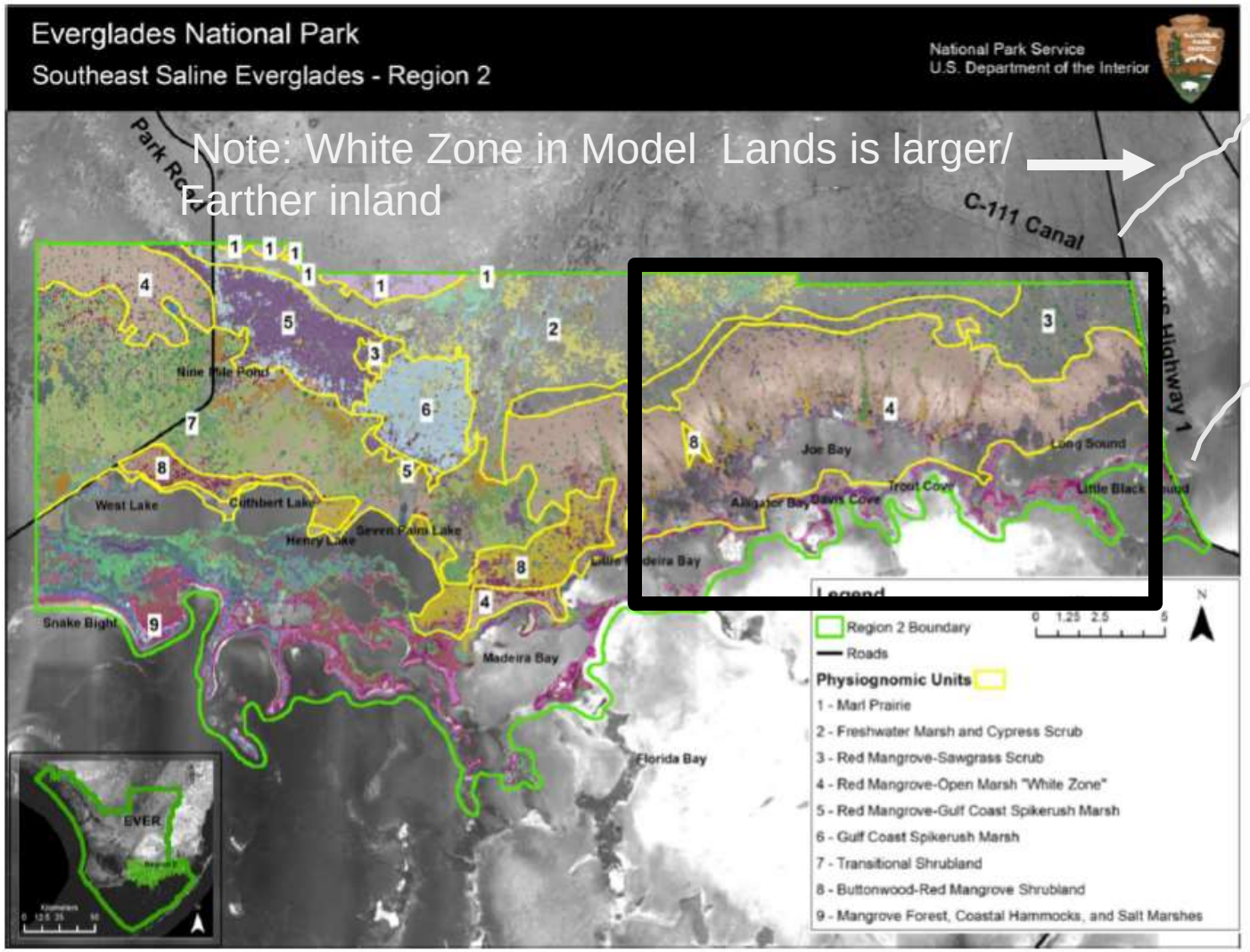
- Transition Zone
- Marsh & Mangroves with White Zone
- Tidal Creeks
- Coastal Bays

Melody Hunt - Hydrology Eastern Panhandle of ENP

VEGETATION TYPES SOUTHEASTERN SALINE EVERGLADES

- Zonal pattern of vegetation

- **Red Mangrove scrub (3)** already north of C111 canal
- **Transitional shrubland (7)** west of Taylor slough and **Red Mangrove-Open Marsh "White Zone" (4)** east of Taylor slough



VEGETATION ZONES

The Everglades National Park and Big Cypress National Preserve Vegetation Mapping Project

Interim Report–Southeast Saline Everglades (Region 2), Everglades National Park

Natural Resource Report NPS/SFCN/NRR—2017/1494

Freshwater Marsh

Photo 3. Freshwater marsh dominated by Gulf Coast spikerush and string lily within the Freshwater Marsh and Cypress Scrub unit within the Southeast Saline Everglades, Region 2, Everglades National Park.

Red Mangrove Scrub

Photo 5. Red Mangrove-Sawgrass Marsh unit within the Southeast Saline Everglades, Region 2, Everglades National Park.

Red Mangrove/Open Marsh White Zone

Photo 6. Red Mangrove-Open Marsh unit, the "White Zone", within the Southeast Saline Everglades, Region 2, Everglades National Park. Note the absence of any graminoids in the understory.

Mangrove/ Coastal Habitat

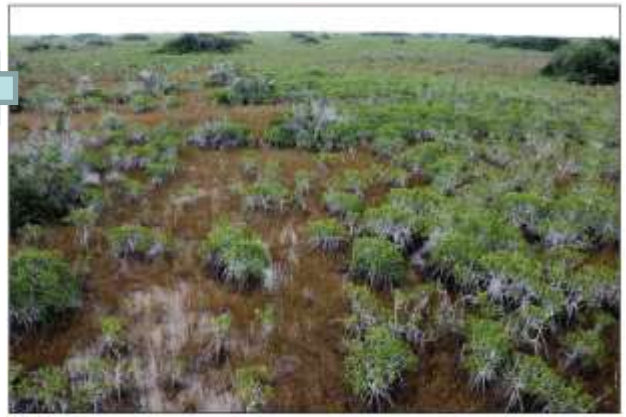
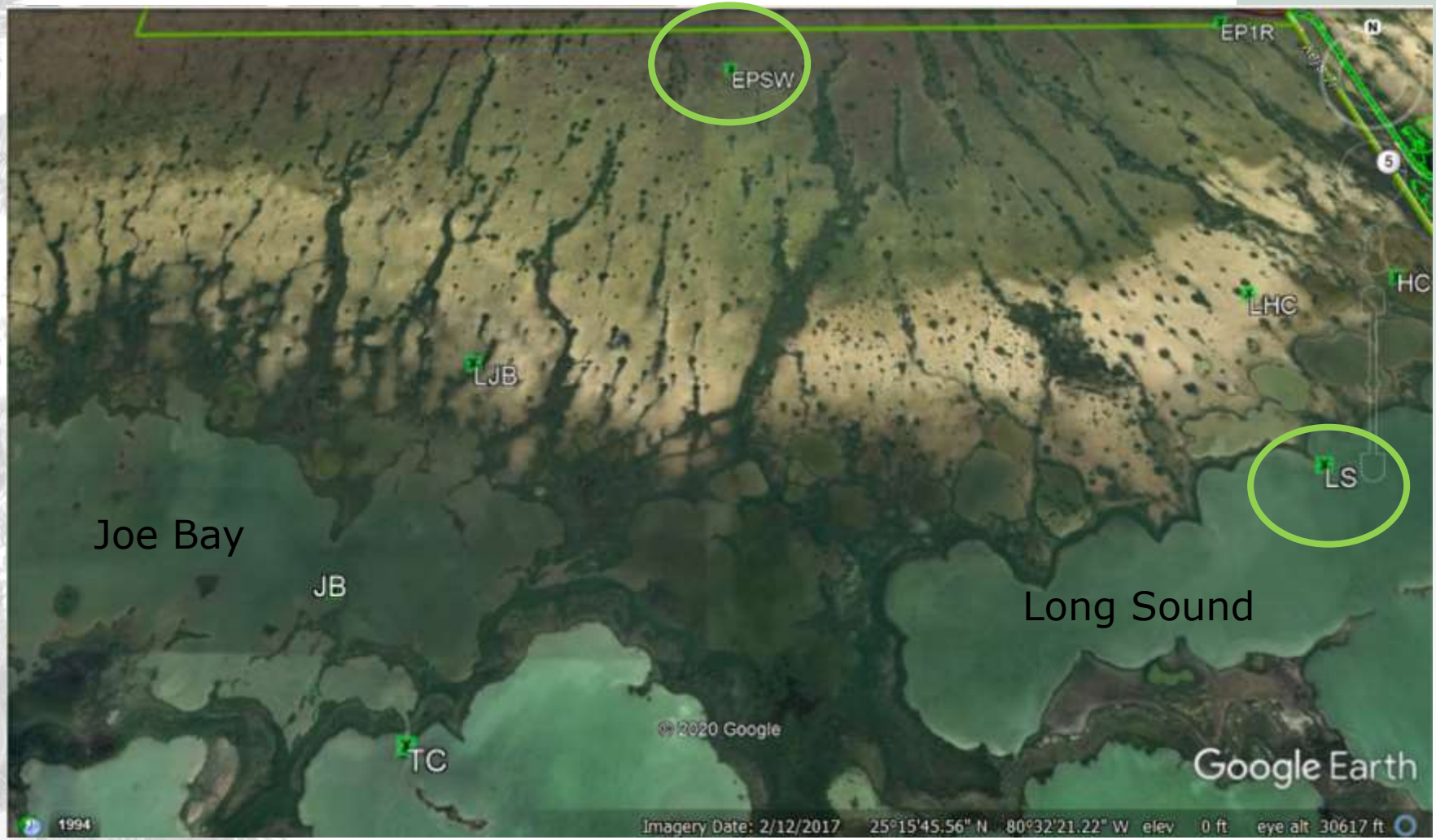


Photo 7. Red Mangrove-Gulf Coast Spikerush Marsh unit within the Southeast Saline Everglades, Region 2, Everglades National Park.

Photo 16. Mixed-species assemblage of halophilic succulents and graminoids within the Mangrove Forest, Coastal Hammock, and Salt Marsh unit in Region 2, Everglades National Park.

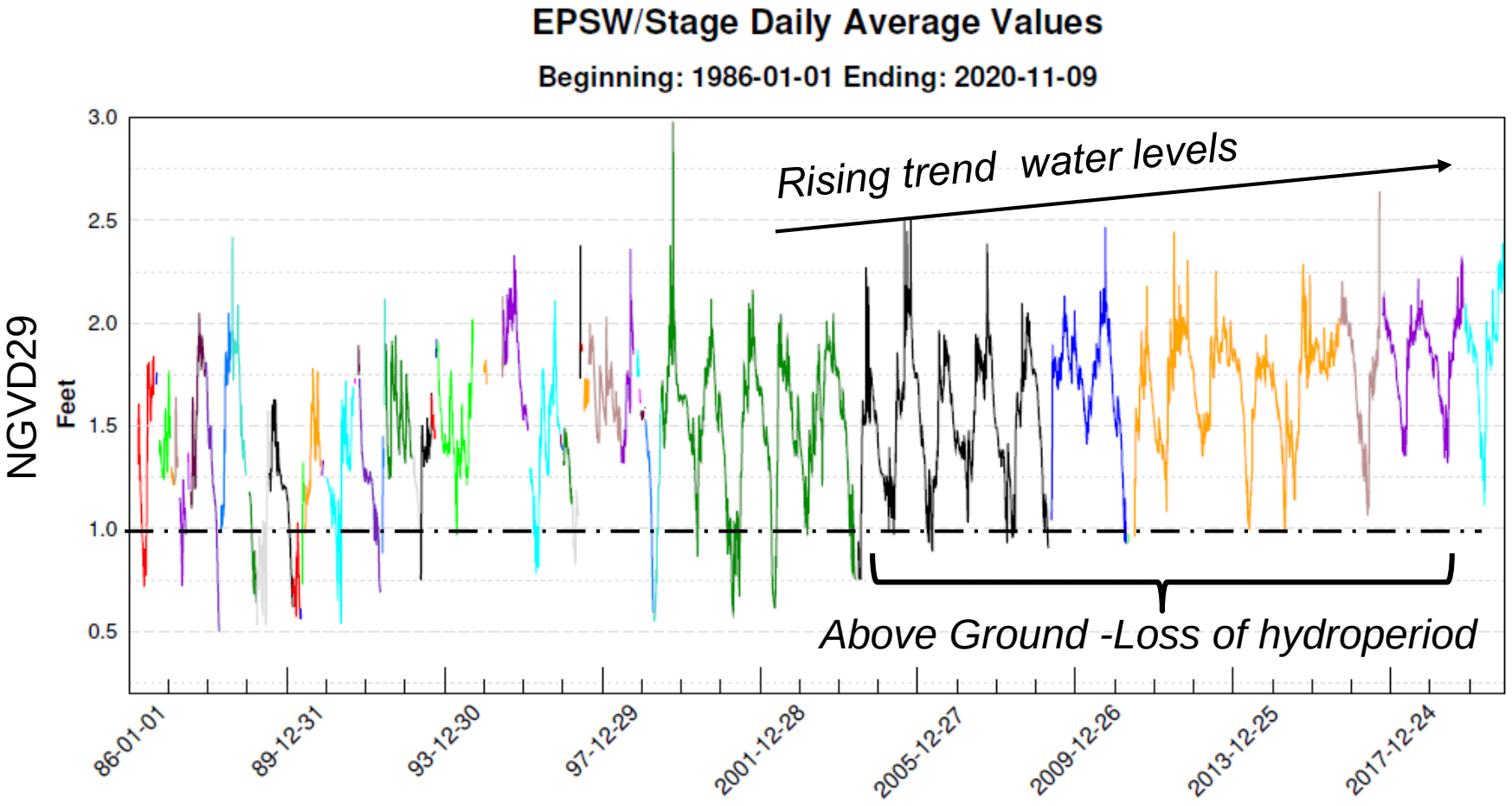
MONITORING SITES

EXPERIENCE YOUR



Melody Hunt - Hydrology Eastern Panhandle of ENP

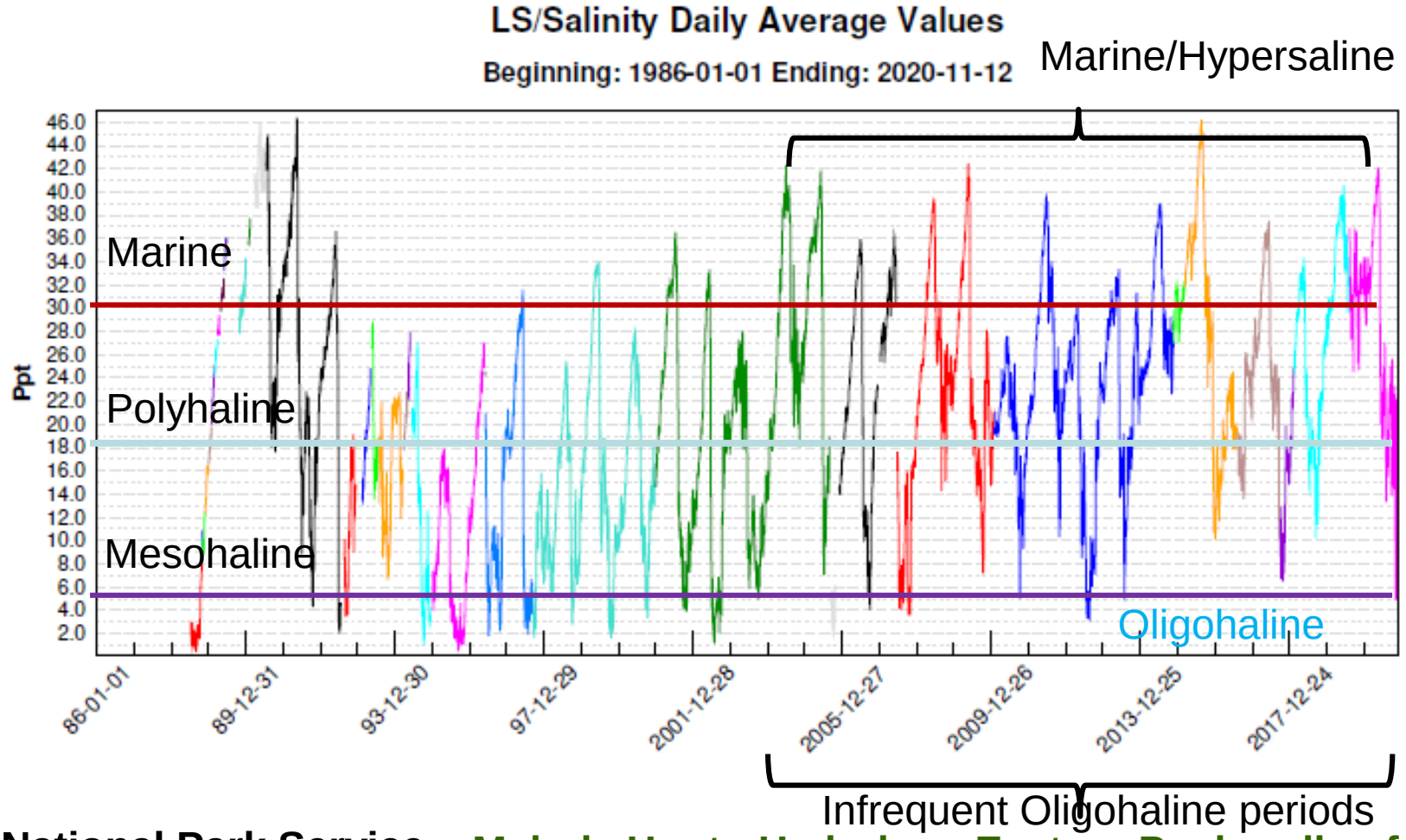
Freshwater Marsh Stage EPSW



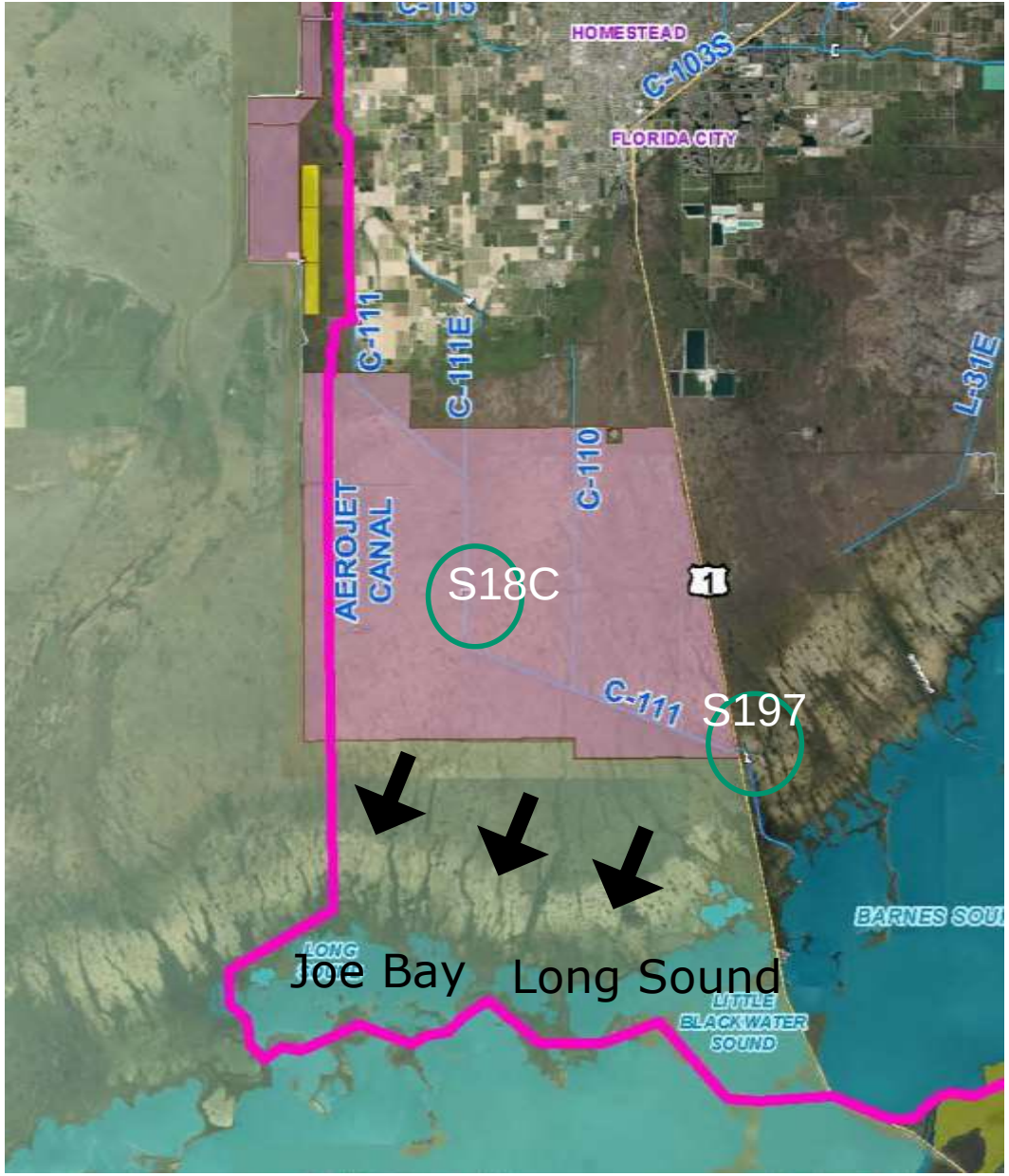
Highest recorded value TS ETA 11/9-11/11 @2.98

Coastal Bay Salinity Long Sound

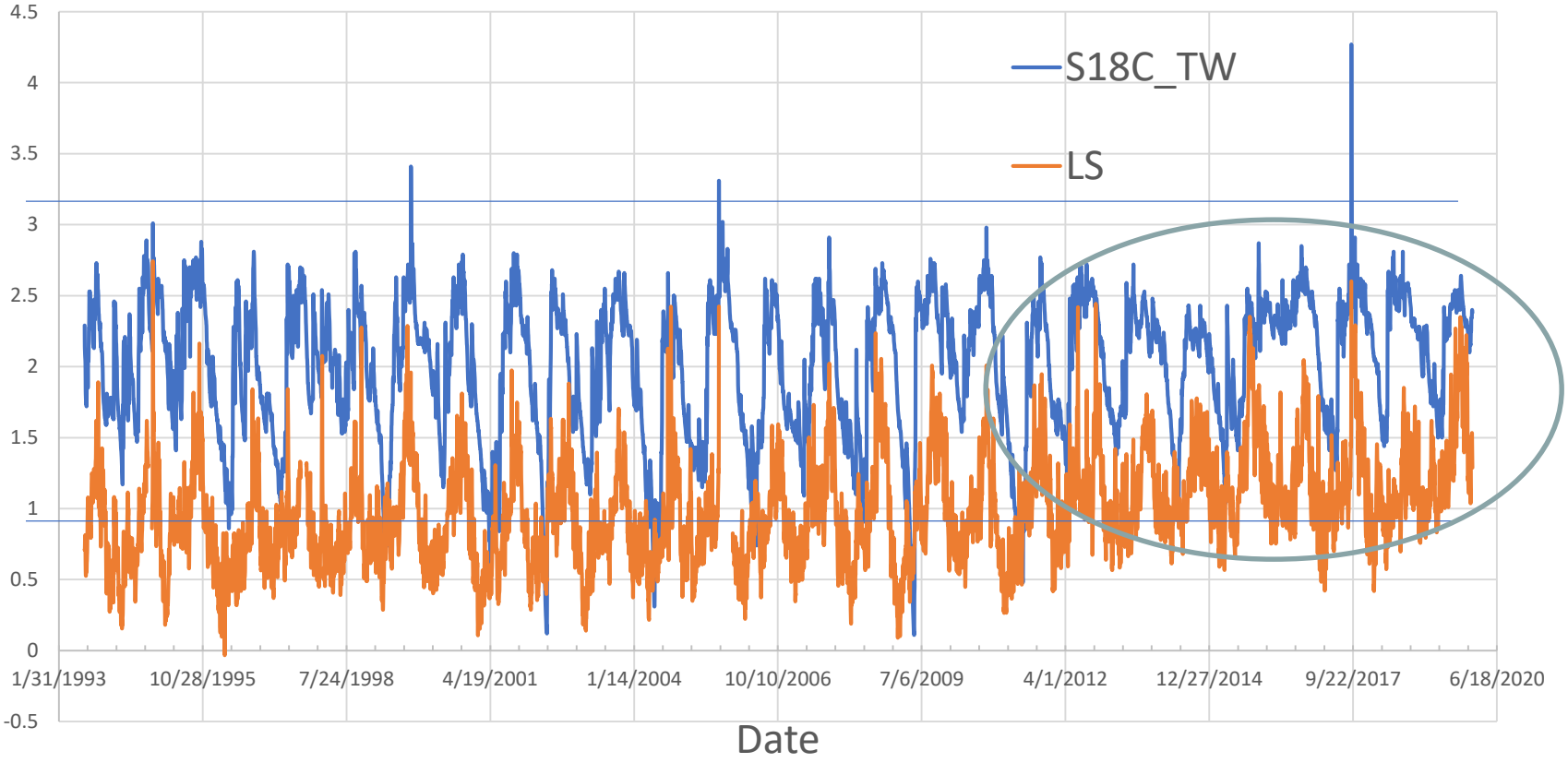
Eastern Panhandle is important area to South Florida ecosystem restoration - constitutes major pathway for freshwater to reach coastal bays



Location of Coastal Structures



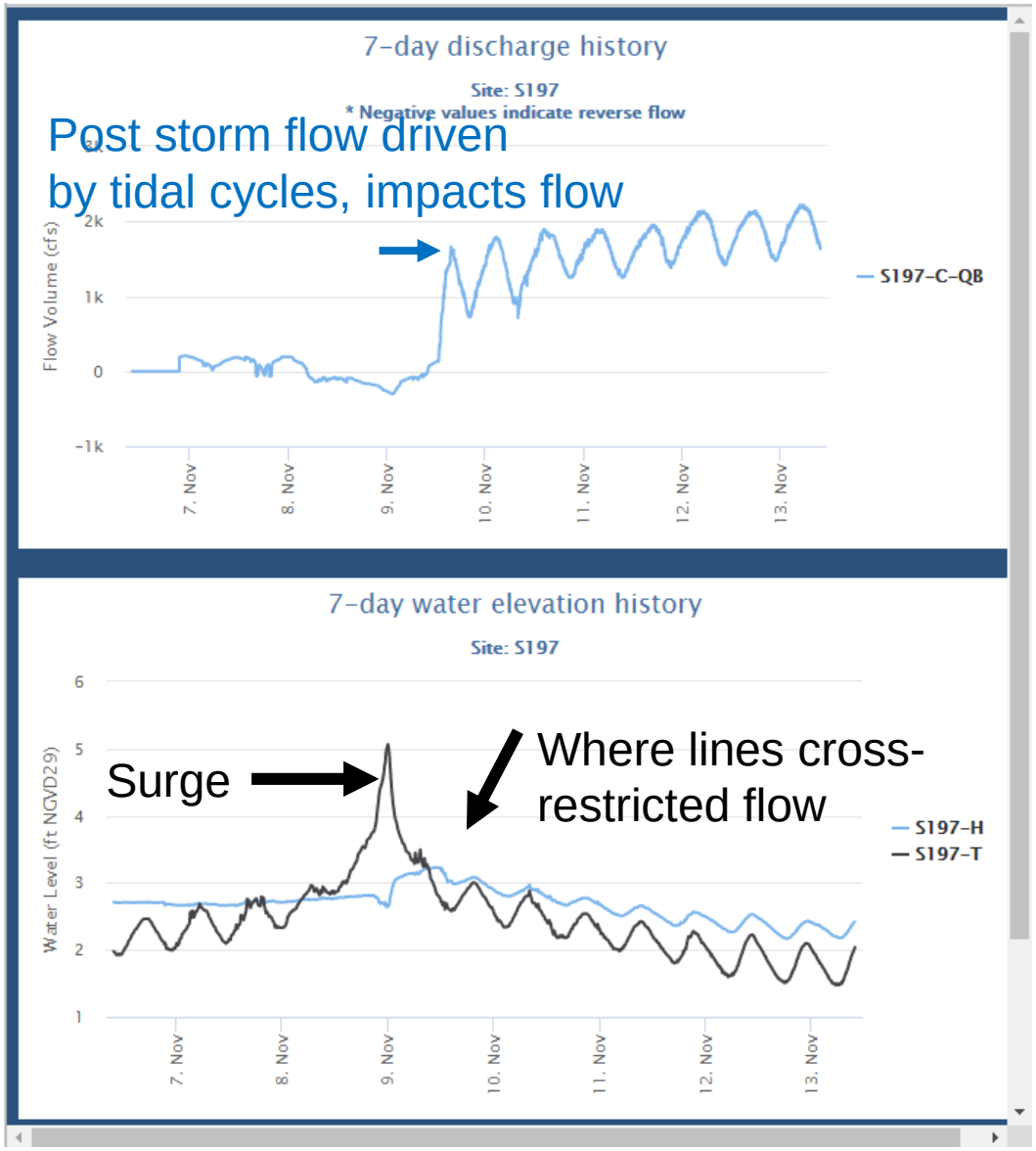
Stage S18C Tailwater and Long Sound



Water level in Long Sound converging on S18C levels, less gradient

Coastal Structure Storm Recovery & Tidal Influence

- TS Eta 11/9/2020
- Coastal structures impacted by tides
- Surge
- King Tides Nov 13-18



SUMMARY

Marsh

- Vegetation transition occurring (slow)
- Increasing water levels in marsh- less seasonal dry down

Coastal Bays

- Salinity variable/flashy, increasing periods of marine & hypersalinit and less oligohaline periods

- Saltwater front advancement
  Slow decadal Sea Level Rise
  Episodic-Tidal Oscillations (King Tides) and Storm - Surge

New projects & operating plan do not use current or future sea level rise.
Key- keep transition slow, ensure landscape does not go hypersaline
Note white zone has not expanded in panhandle as much as Model Lands

Thank you!

Melody Hunt
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