South Florida Water Management District

BIG CYPRESS BASIN BOARD MEETING
AGENDA

October 25, 2024
11:00 AM
Collier County Government Center
Commission Chambers, 3rd Floor
3299 Tamiami Trail East, Naples, FL 34112

Zoom Registration Link: https://sfwmd.link/41gnQfl

FINAL

1. Call to Order - Charlette Roman, Chair, Big Cypress Basin Board
2. Pledge of Allegiance
3. Agenda Revisions - Lisa Koehler
4. Agenda Item Abstentions by Board Members
5. Consider Approval of the Minutes of the August 23, 2024 Meeting
6. Basin Administrator's Report - Lisa Koehler
7. General Public Comment
8. Picayune Strand Restoration Project Update by the U.S. Army Corps of Engineers - Steve Baisden, Project Manager, Ecosystem Project Section, USACE (Staff contact, Amanda McKenzie)
9. Corkscrew Swamp Sanctuary Ecosystem Restoration Project Update - Shawn Clem, Ph.D., Director of Conservation, Audubon's Corkscrew Swamp Sanctuary (Staff contact, Brad Jackson, P.E.)

10. Corkscrew Watershed Initiative Update (Staff contact, Laura Layman)

11. 5-Year Update on the Lower West Coast Saltwater Intrusion Mapping (Staff contact, Pete Kwiatkowski)

12. Board Comment

Technical Reports

13. Field Station Activity Report - Andrew Wolf

14. Water Conditions Report - Brad Jackson, P.E.

Staff Reports

15. Monthly Financial Report - Candida Heater

16. General Public Comment

17. Board Comment

18. Adjourn

Final Presentations:

Agenda Item Background:

08 - Picayune Strand Restoration Project Update
09 - Corkscrew Swamp Sanctuary Ecosystem Restoration Project Update
10 - Corkscrew Watershed Initiative Update
11 - 5-Year Update on Saltwater Intrusion Mapping
13 - Field Station Report October 2024
14 - Water Conditions Report October 2024

PICAYUNE STRAND RESTORATION PROJECT

Briefing to:

South Florida Water Management
Big Cypress Governing Board

Presenter:

Stephen Baisden
Project Manager
Jacksonville District
October 25, 2024

U.S. ARMY

US Army Corps of Engineers



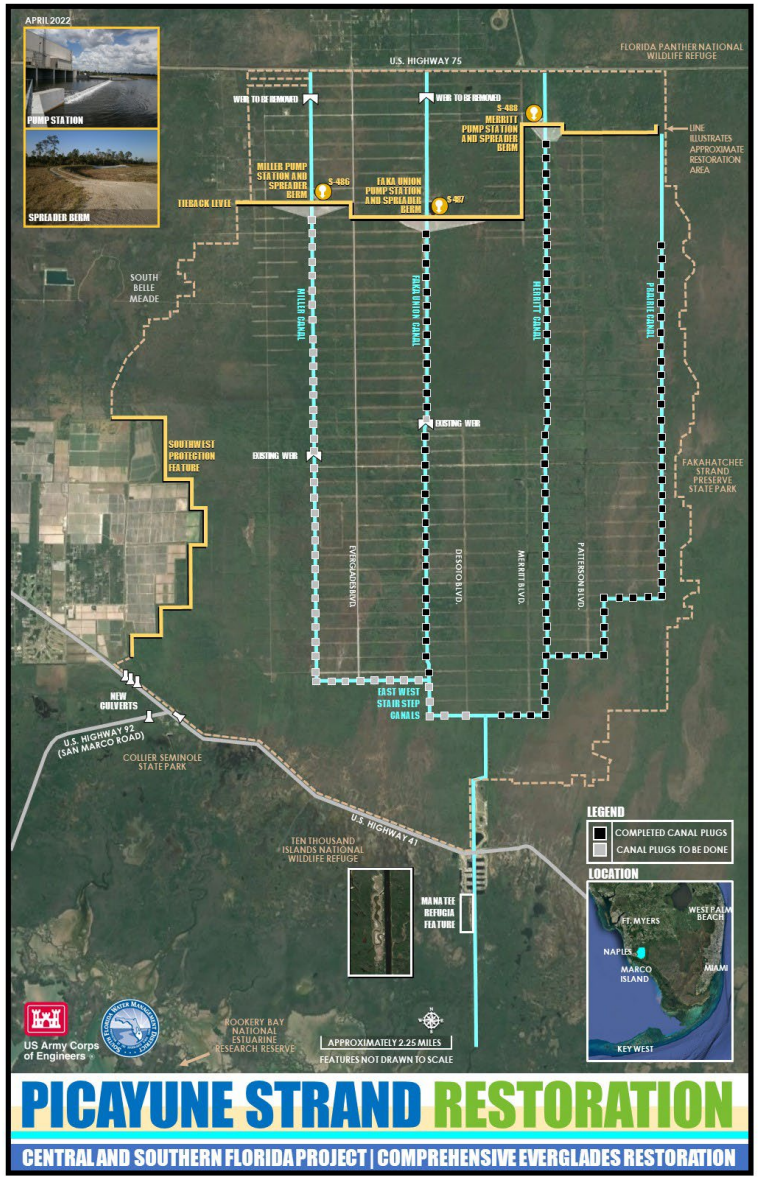


PICAYUNE STRAND
PROJECT GOALS

U.S. ARMY

Project Goals:

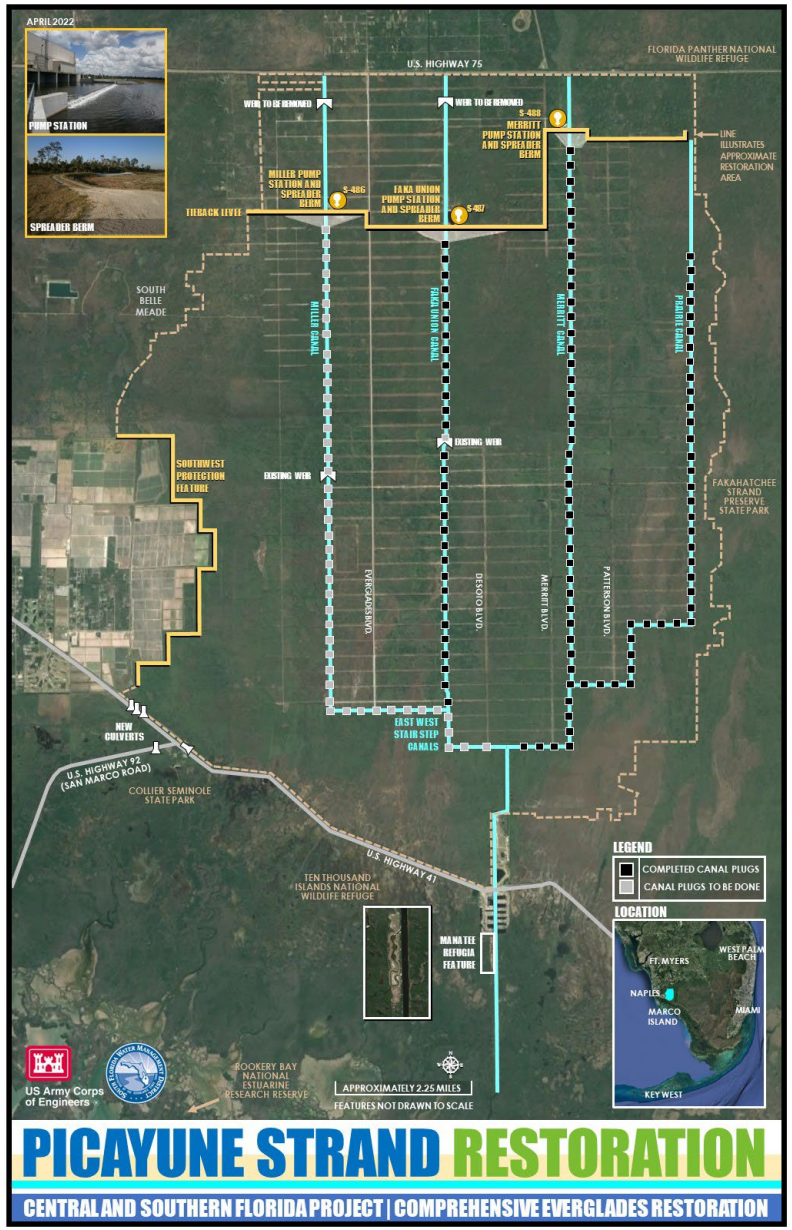
- Improve aquifer recharge to protect water supply and prevent saltwater intrusion
- Maintain existing level of flood protection for Northern Golden Gate Estates.
- Reduce or eliminate over-drainage of adjacent sensitive ecosystems.
- Reduce freshwater releases (point discharges) to improve the health and productivity of downstream estuaries.
- Improved fire regime; Preserve upland habitat; Control invasive exotic plants



PICAYUNE STRAND
COMPLETED CONSTRUCTION

Completed Construction

- Merritt Pump Station (800 cfs) September 2014
- Merritt/Prairie Canal Plugging September 2014
- Faka Union Pump Station (2,625 cfs) July 2017
- Miller Pump Station (1,250 cfs) May 2019
- Manatee Refugia March 2020
- East-West Stair Step Canal clearing/plugging completed June 2021.
- Faka Union and Miller Canal Clearing June 2023
- Miller Tram and Road Removal September 2023
- Faka Union Canal plugged July 2024



PICAYUNE STRAND
SOUTHWEST PROTECTION FEATURE – CONVEYANCE FEATURES

Status:

- Under Construction
- Awarded September 2020
- Completion November 2024
- Contractor - Douglas N. Higgins, Inc.
- Contract Amount $9,149,866



US-41 Culverts

Features:

- Install culverts under:
  - US-41 (3) – 11’x4’
  - CR-92 (1) – 10’x3
  - Indian Village Driveway (1) – 30” HDPE

PICAYUNE STRAND
SOUTHWEST PROTECTION FEATURE - LEVEE

Status:

- Under Construction Awarded September 2020
- Completion April 2025
- Quality Enterprises Inc.
- Contract Amount $30,773,389

- Features:
- The work includes construction of a 7.2-mile levee
- The levee has an adjacent conveyance canal
- There are three separate culvert structures



PICAYUNE STRAND – RESTORATION PROGRESS

U.S. ARMY

Status (16 May 2024)
Picayune Strand Restoration Project

Roads (99%) and Logging Trams (100%) Degraded

Canals 70% Plugged

Prairie Canal – 7 Miles
Merritt Canal – 9 Miles
Stair-Step Canal – 5 Miles
Faka Union Canal – 8.4 Miles

3 Pump Stations Built

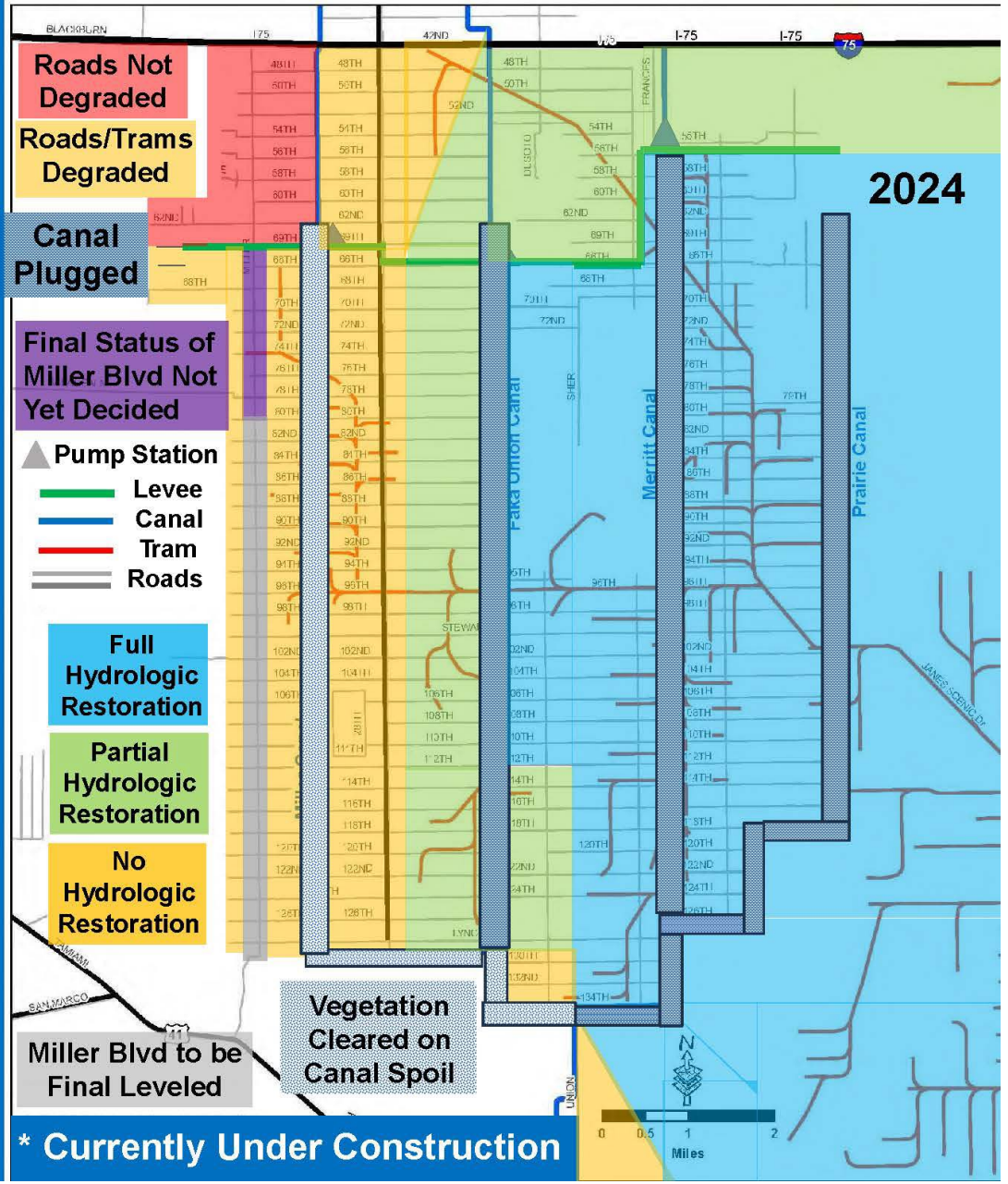
Remaining Work

Construct Southwest Protection Features 2024*

Degrade Miller Blvd 2025*

Plug Canals

Miller Canal – 12 Miles 2025*

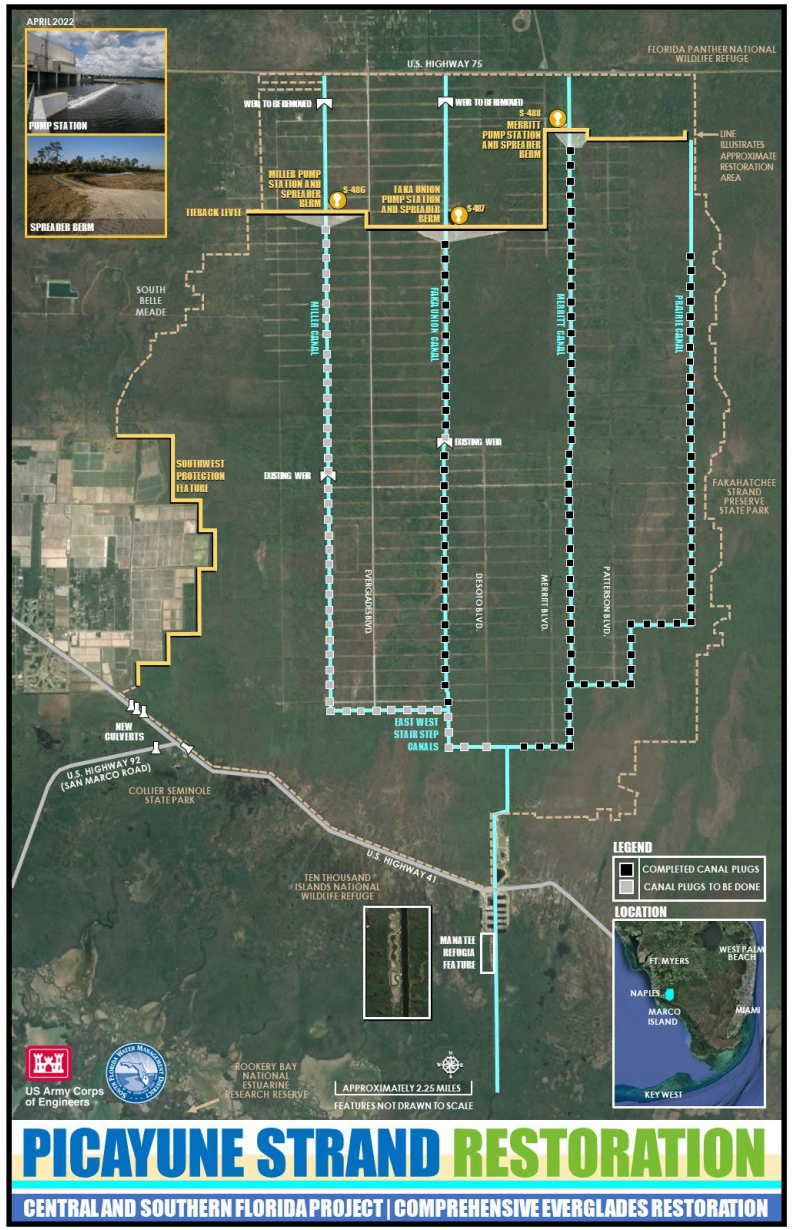


PICAYUNE STRAND
REMAINING WORK

U.S. ARMY

Remaining Features

- Southwest Protection Features (SWPF)
  - Conveyance features (Culverts under US-41 and CR-92) completion November 2024.
  - Levee construction complete April 2025
- Miller Canal plugging construction start January 2025 complete December 2025.
- Remove remaining portion of Miller Blvd from 80TH to 128TH




SOUTHERN END
LOOKING NORTH


LIPMAN FARMS
PICAYUNE STRAND

U.S. ARMY

PICAYUNE STRAND

QUESTIONS?



Corkscrew Swamp Sanctuary Ecosystem Restoration

Big Cypress Basin Board Meeting
October 25, 2024

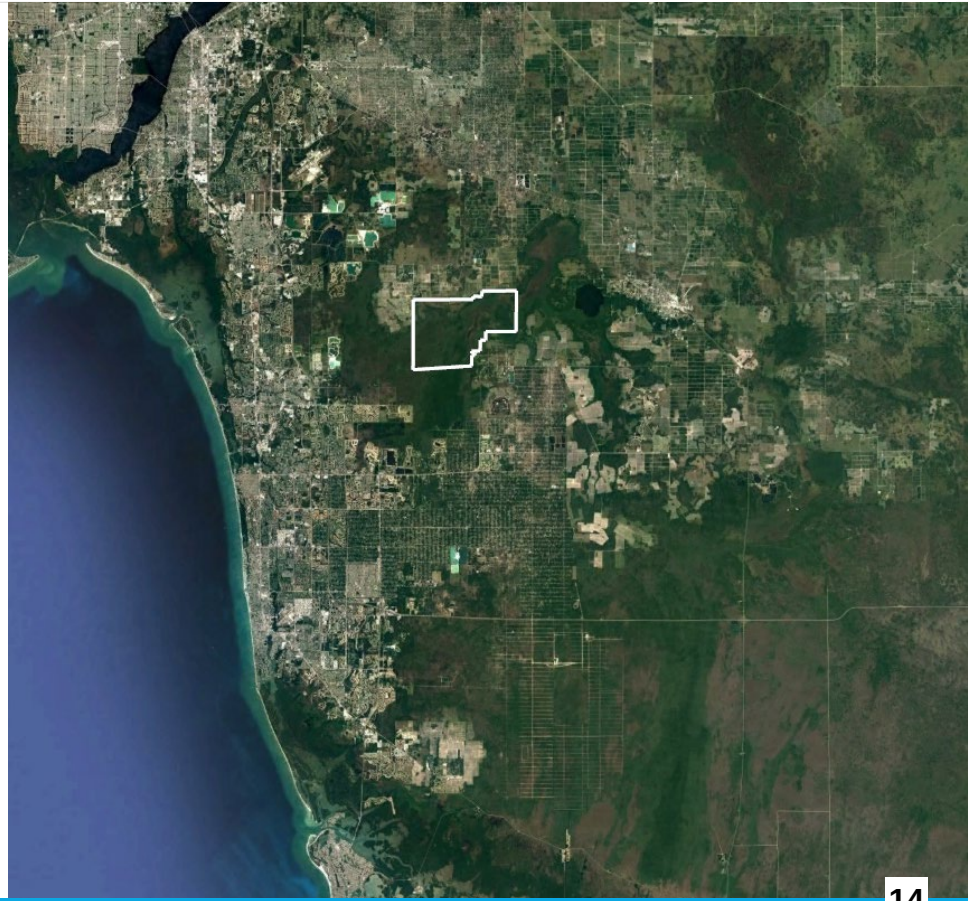


Shawn Clem, Ph.D.
Director of Conservation
Audubon's Corkscrew Swamp Sanctuary

Audubon Corkscrew Swamp Sanctuary
CELEBRATING 70 YEARS

Audubon's Corkscrew Swamp Sanctuary

- Central to Corkscrew Regional Ecosystem Watershed (CREW)
- Wetland of international importance (Ramsar Convention)
- Central to Corkscrew Watershed Initiative





- High evapotranspiration rate (water loss, doesn't support fire)
- Reduced wildlife habitat
- Inaccessible for management

Florida is not alone. Encroachment of woody plants into grasslands has become a global issue, contributing to land degradation.

Blue dots represent places encroachment has been documented, orange and yellow represent different habitats

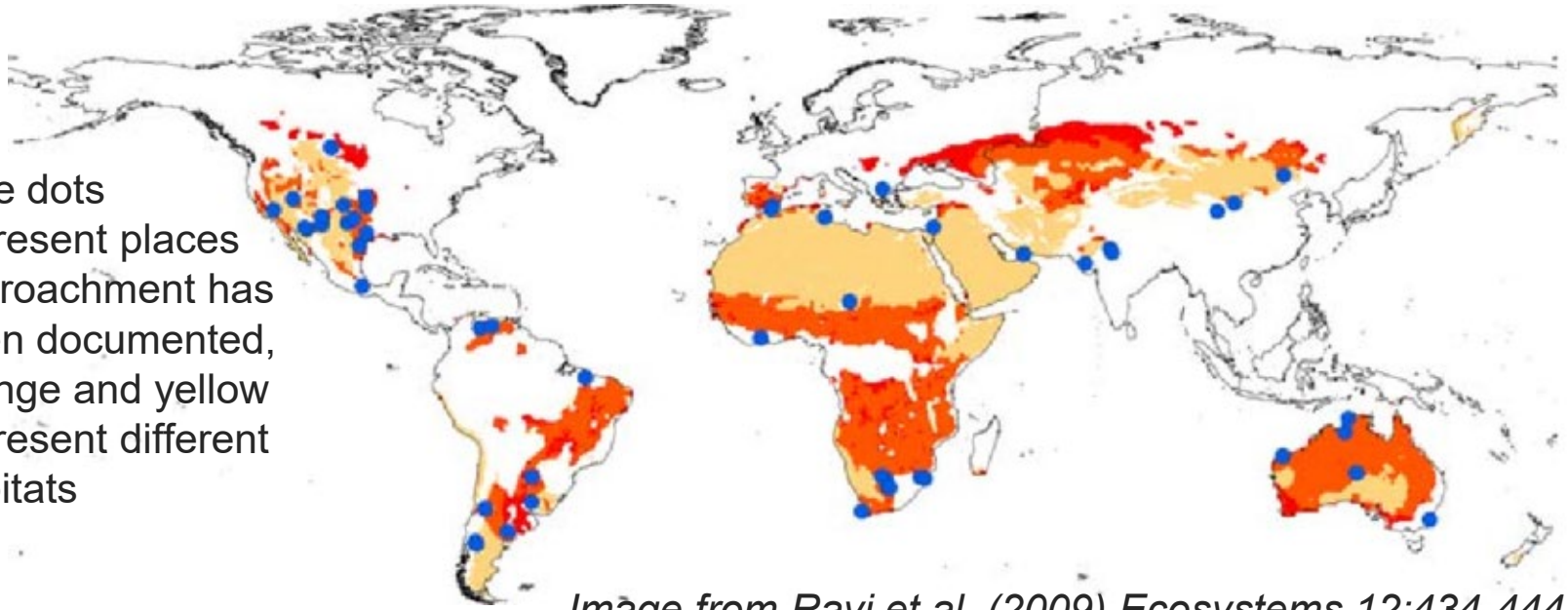


Image from Ravi et al. (2009) Ecosystems 12:434-444.

Native Shrubs & Trees Expanding in SWFL Wetlands



Carolina Willow



Buttonbush



Red Maple

Audubon's 3-Step Mechanical Restoration Method

Mulch Shrubs



Spot Treat (3-5 years)

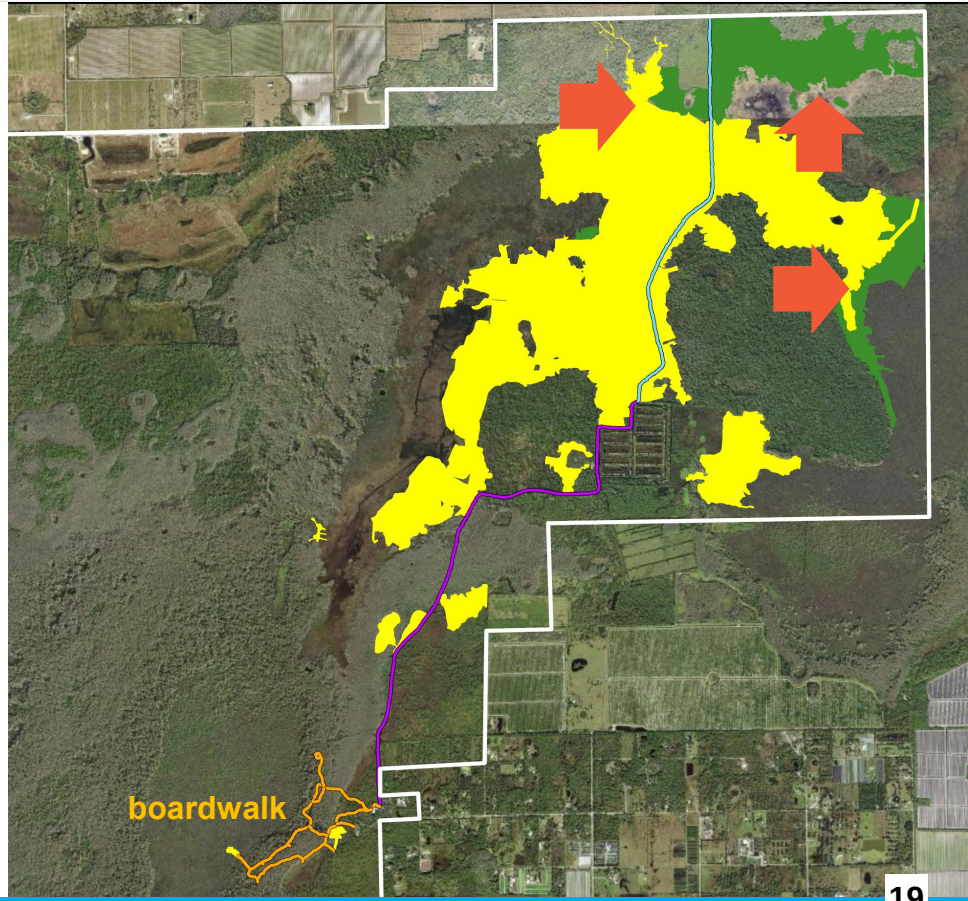


Reintroduce Fire



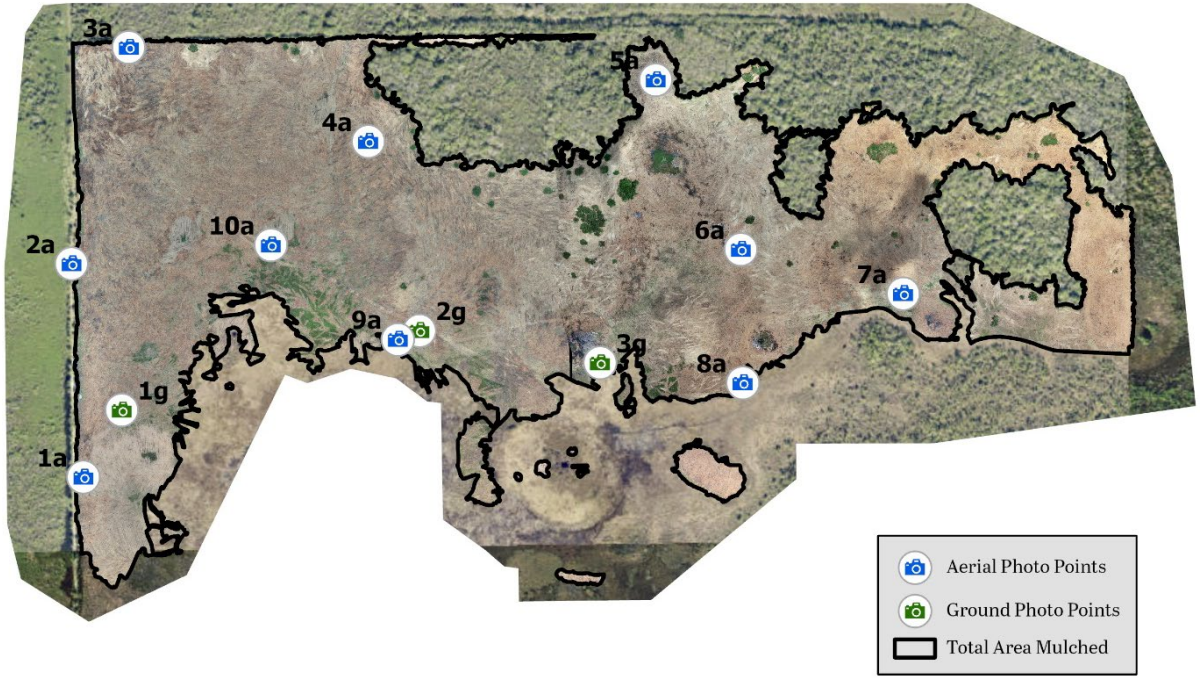
Summary of 2023 Restoration Work

- 275 acres mulched
- 3 primary units
- Largest annual acreage to date due to early start with dry spring conditions



Aerial and ground photo points

Plant, fish and wading bird surveys



Pre-restoration: 4/5/23

Audubon | Corkscrew Swamp Sanctuary
CELEBRATING 70 YEARS



Site 2023I, PP10a

Post-restoration: 5/31/23



Site 2023I, PP10a

3 months post-restoration: 9/7/23



Site 2023I, PP10a

6 months post-restoration: 12/8/23



Site 2023I, PP10a

12 months post-restoration: 5/28/24

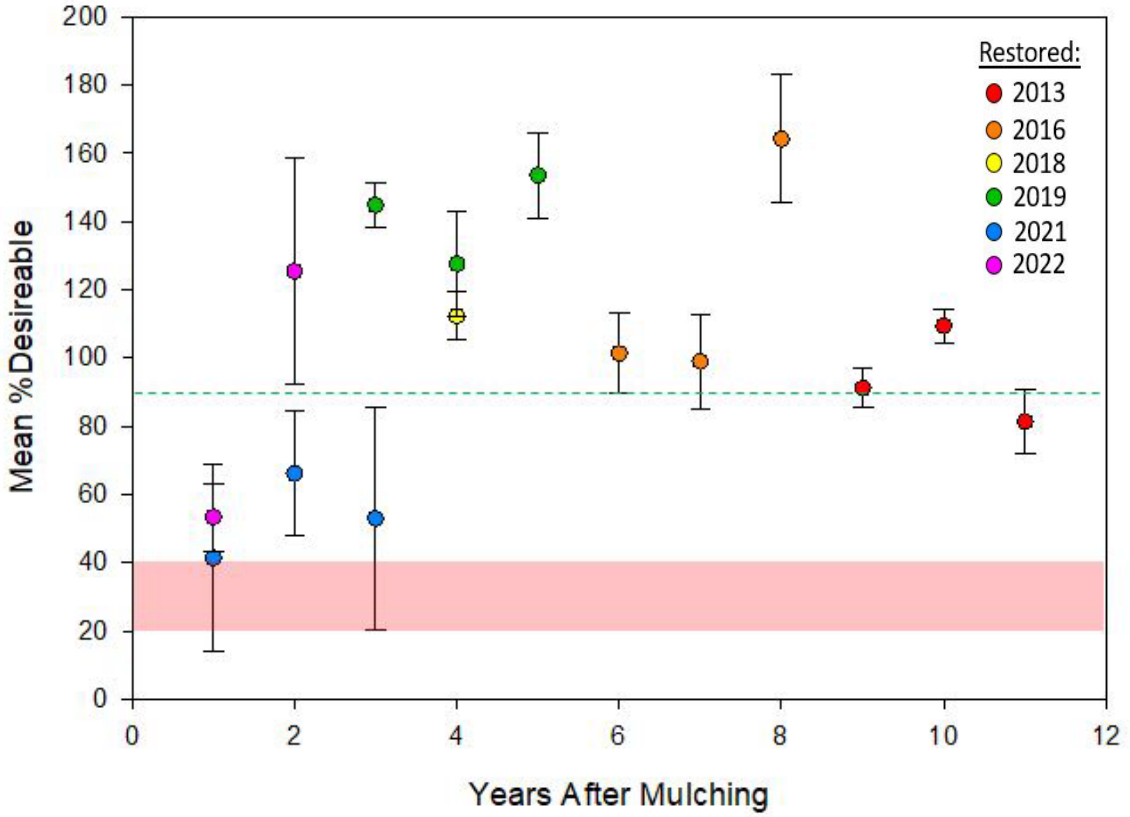
Audubon | Corkscrew Swamp Sanctuary
CELEBRATING 70 YEARS



Site 2023I, PP10a

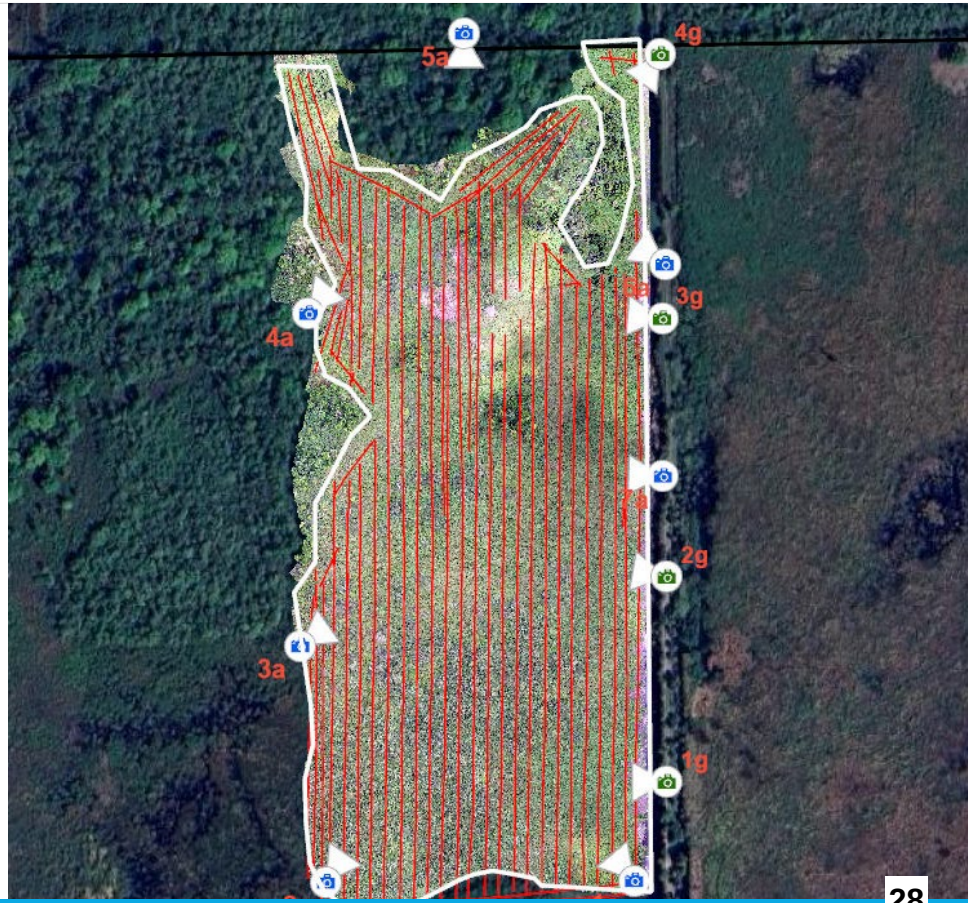
Desirable vegetation is becoming established and persisting





Next Steps

- ≈ 300 acres of willow are left to mulch (2025 & 2026)
- Some areas are not suited to this method
- Launched a pilot project to test another method: aerial herbicide
- Method has been successful in SJRWMD
- Monitoring data will determine our next steps – we look forward to sharing what we learn with our partners & neighbors



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Questions?



Robbyn Spratt/Audubon Photography Awards

Native Buttonbush plant



Corkscrew Watershed Initiative Update

Big Cypress Basin Board Meeting

October 25, 2024



Laura Layman
Project Manager
Ecosystem Restoration Bureau

sfwmd.gov

CWI Objectives

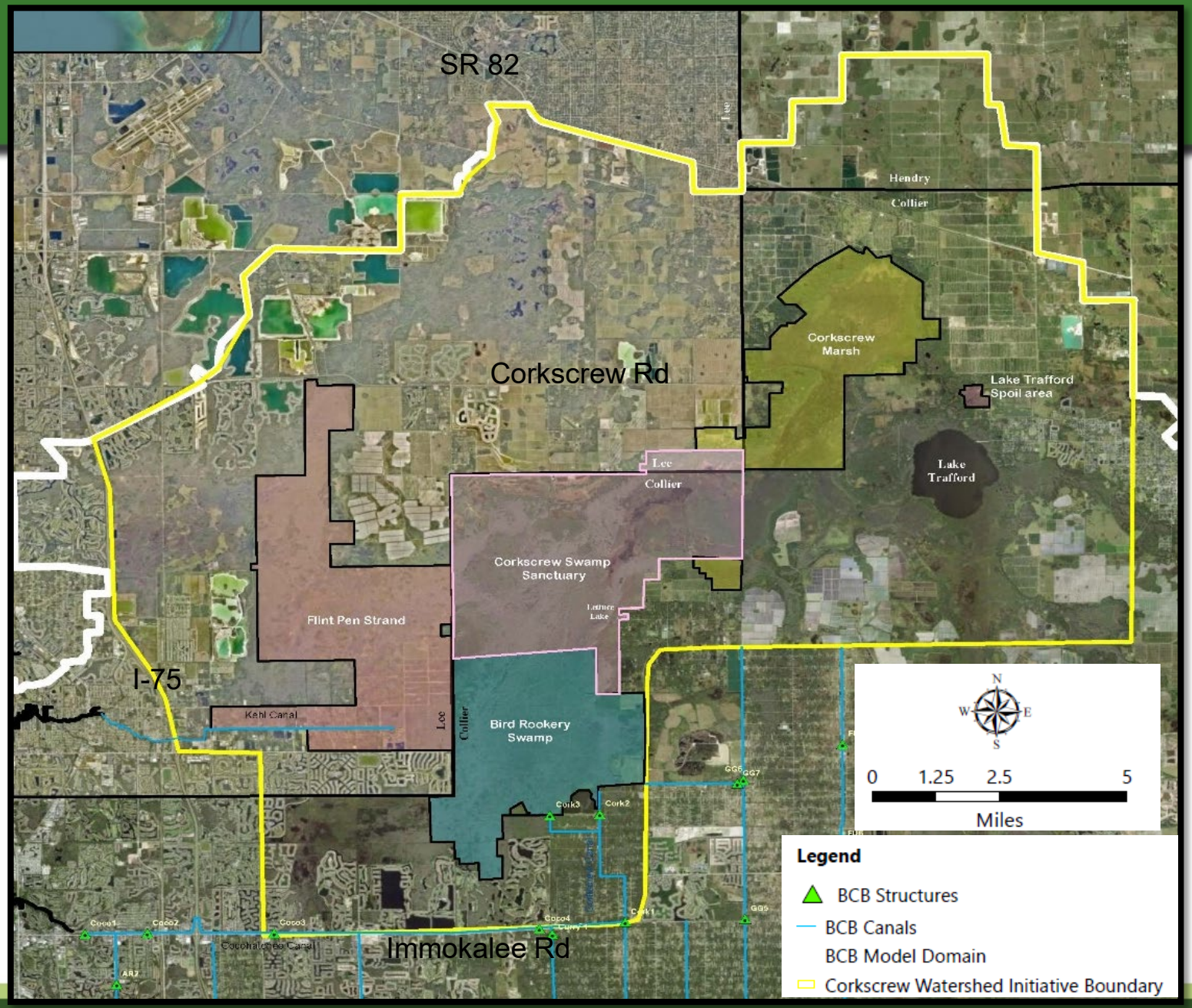


- Comprehensive strategy to achieve ecological restoration of the Corkscrew System; emphasis on hydrology
- Reduce flood risk
- Maintain water supply
- Engage partners, stakeholders and the public in planning
- Identify short- and long-term strategies and features for ecological restoration



Project Area





CWI Overview



- 3-year Public Planning Project (2024-2027)
- Identify projects to be implemented by various agencies
- Builds upon previous BCB efforts in and around Corkscrew Swamp Sanctuary (CSS)
- Identify projects that can be implemented quickly



Wood Storks

Technical Working Group (TWG)



- Includes representatives from local governments and other groups
  - SFWMD, CSS, Corkscrew Regional Ecosystem Watershed (CREW) Land & Water Trust, Collier County, Lee County, City of Bonita Springs, Village of Estero
- Liaison between the project, other staff, constituents and public
- Provides technical input



Public Meetings



2024

- June — Public Mtg #1
- October — Big Cypress Basin Board

2025

- March
- June — Public Mtg #2 Preliminary Projects

2026

- January
- October — Public Mtg #3 Draft Report and Plan

2027

- February — Public Mtg #4 Final Report

Low Hanging Fruit Projects

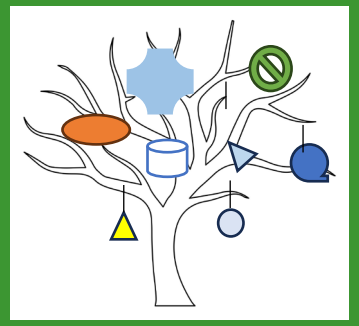


- Expedite and advance separately while CWI planning continues
- Help meet CWI objectives
- Which organization or agency will implement?
- Present concepts to the BCB Board next year



Corkscrew Watershed Initiative Structure

Candidates for Accelerated Schedule (Low-Hanging Fruit)



CWI

Project Team

TWG

Public

Recent Successful Implementation

Other Flood Studies

Other Water Supply Studies

Other Environmental Studies

Potential Projects

CWI Alternatives w/Multiple Projects

Alt - 1

Alt - 2

Alt - 3

Selected Alternative

Presenter: Laura Layman 8

Project Schedule



March 2024
Project Kick Off

September 2024
Data Discovery Technical Memo

January 2025
Refined CWI Model

December 2025
Performance Measures

June 2026
Future Conditions Model

December 2026
Alternatives Model

February 2027
Selected Alternative(s) Conceptual Plans for Future Design & Implementation

Final Project Presentation

CWI Planning Project Report

Next Steps



- Identify and evaluate projects & restoration concepts, including modeling (2025-2026)
- Final Report (Dec. 2026)
- Early restoration project implementation (2026-2028+)
- Implementation of Project Alternatives (2027-2037)
- Corkscrew Headwater Improvements Construction (2027-2029)


American Alligator



Thank You

Questions?





2024 SFWMD Saltwater Interface Mapping Update

Pete Kwiatkowski, P.G.
Resource Evaluation Section Administrator
Water Supply Bureau, Water Resources Division

SFWMD Staff Acknowledgements

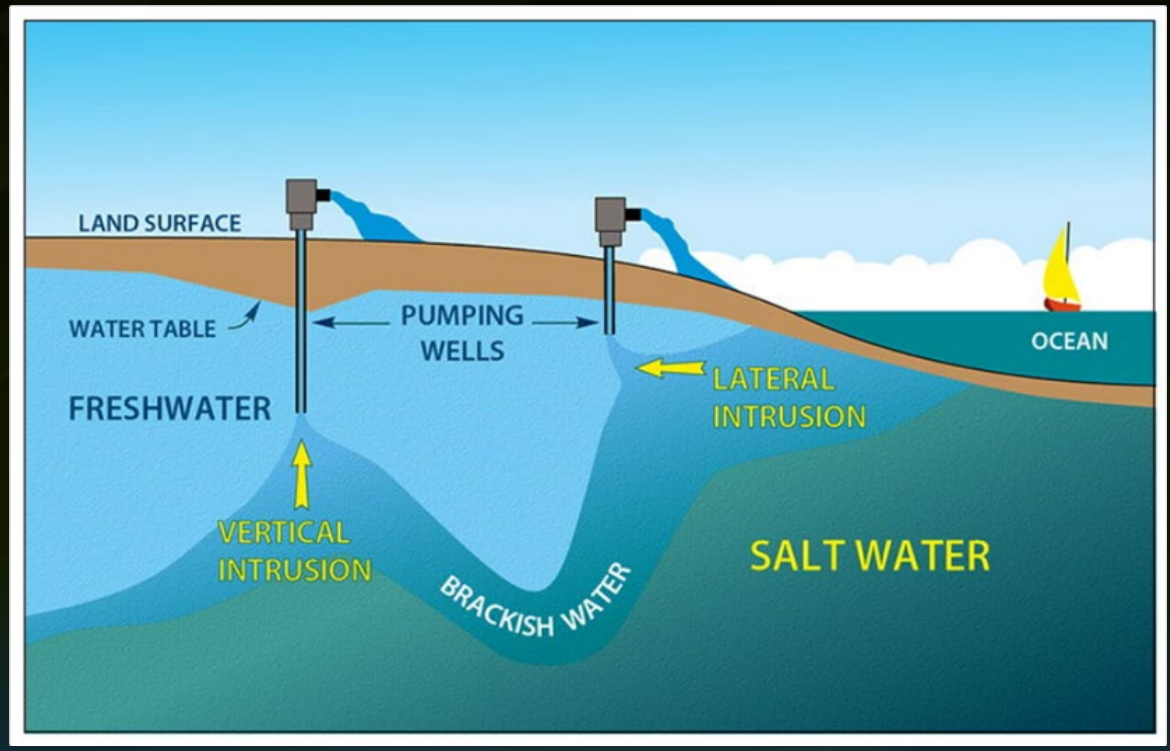
- Justin Zumbro, P.G., Lead Hydrogeologist
- Stacey Coonts, P.G., Senior Hydrogeologist
- Brian Moore, Senior Data Analyst
- Alexandra Hoffart, Geospatial Specialist

Presentation Overview

- Overview of saltwater intrusion and aquifers
- Importance to wellfields and infrastructure
- Project approach
- Results – Water Table, Lower Tamiami, Sandstone, Mid-Hawthorn aquifers (2009, 2014, 2019, and 2024)
- Conclusions
- Next steps

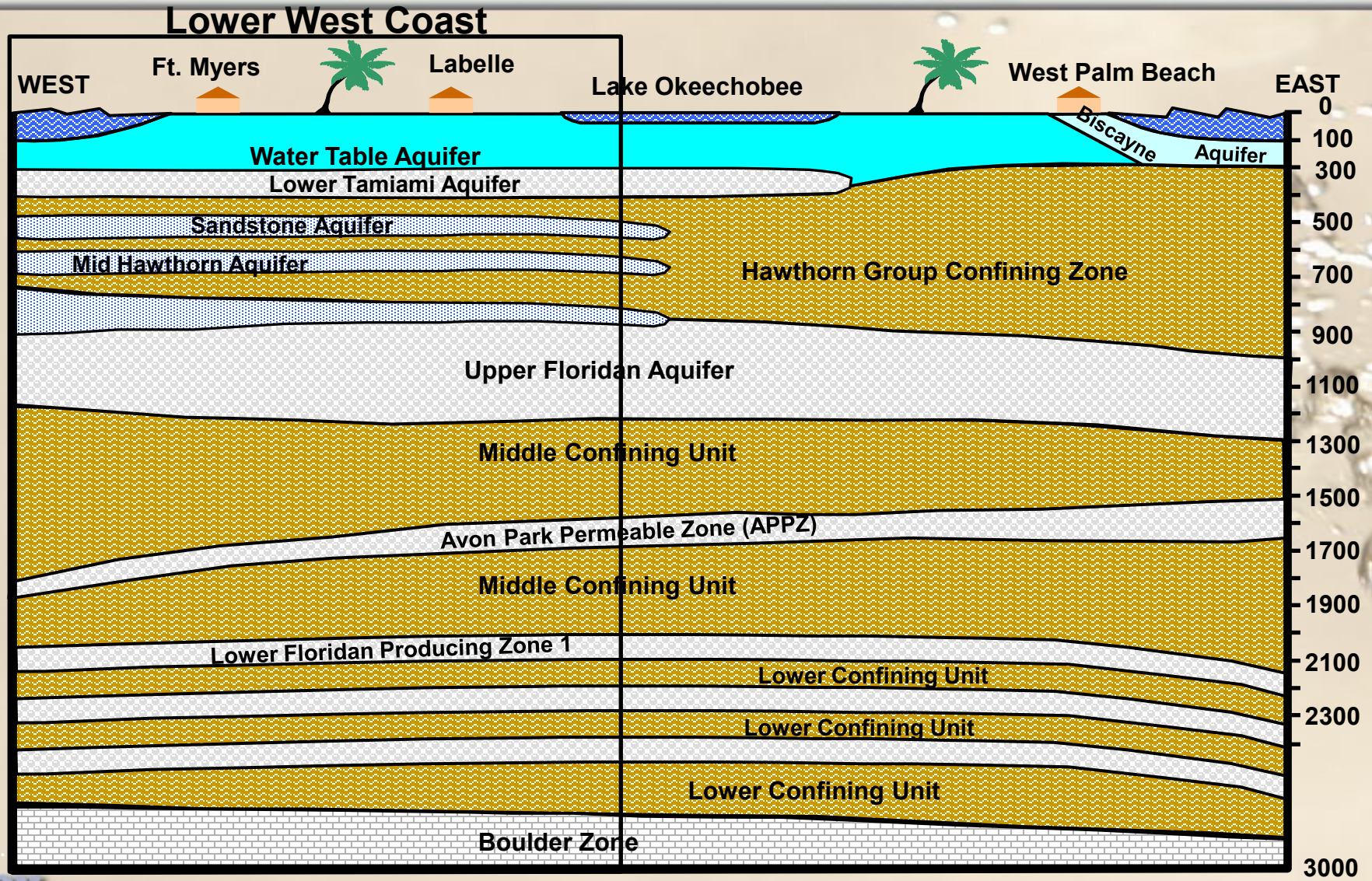
Common Sources of Saltwater Intrusion

- Lateral intrusion from the coast
- Vertical intrusion (upconing) from saltwater below
- Surface Infiltration from estuaries, boat basins, saltwater marshes, saltwater canals, etc.
- Ancient (connate) seawater trapped in low permeability portions of aquifers

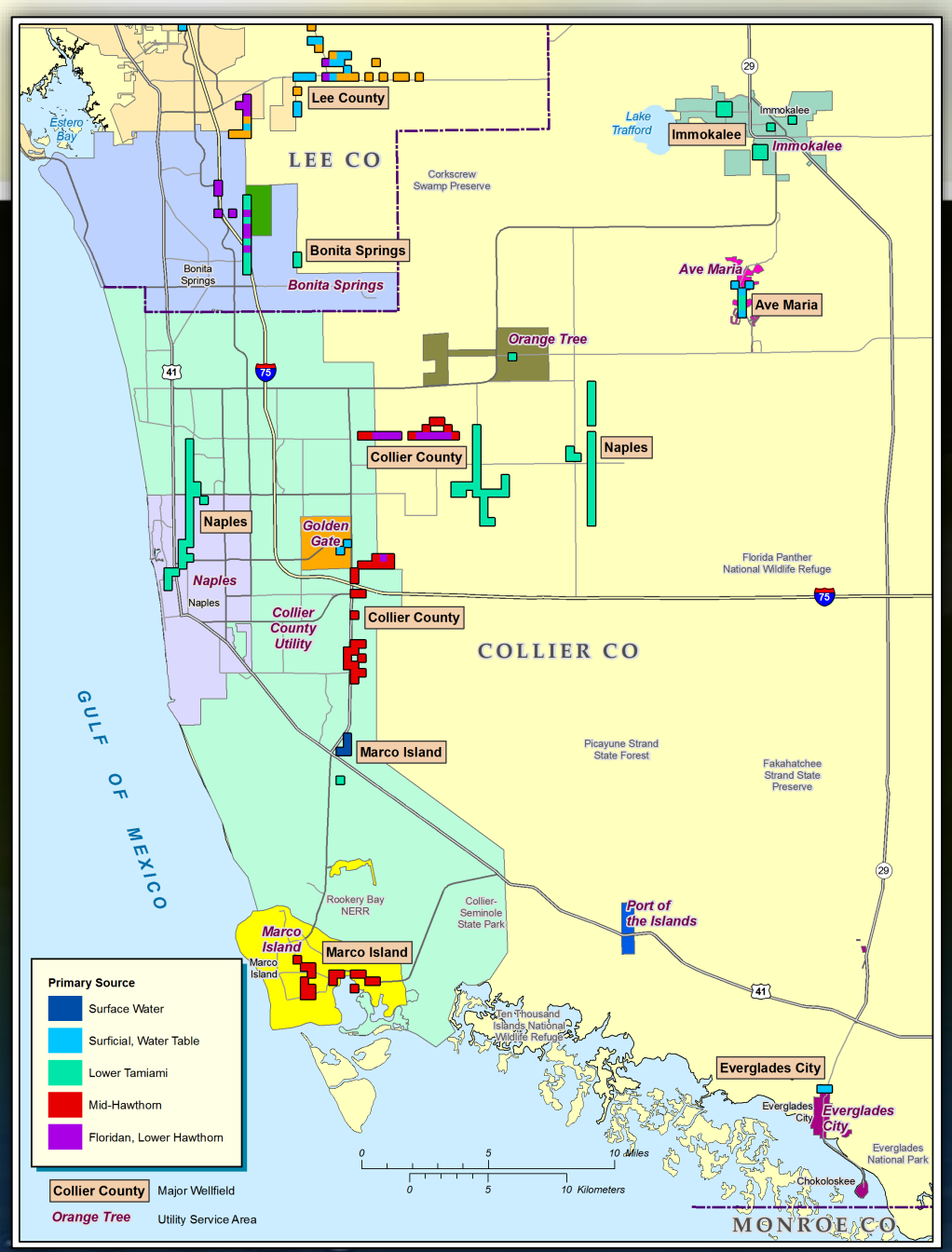


Pete Kwiatkowski, P.G.

Generalized Hydrogeology of South Florida



Pete Kwiatkowski, P.G



Why is this Important?

- Wellfields are a major water supply source – protect investment
- Once saltwater enters wells, it is very difficult - if not impossible - to reverse
- Very expensive to relocate wellfields and associated infrastructure (pipelines, treatment plants and processes, etc.)
- Other sources of water more expensive to treat (e.g., Floridan aquifer – reverse osmosis)

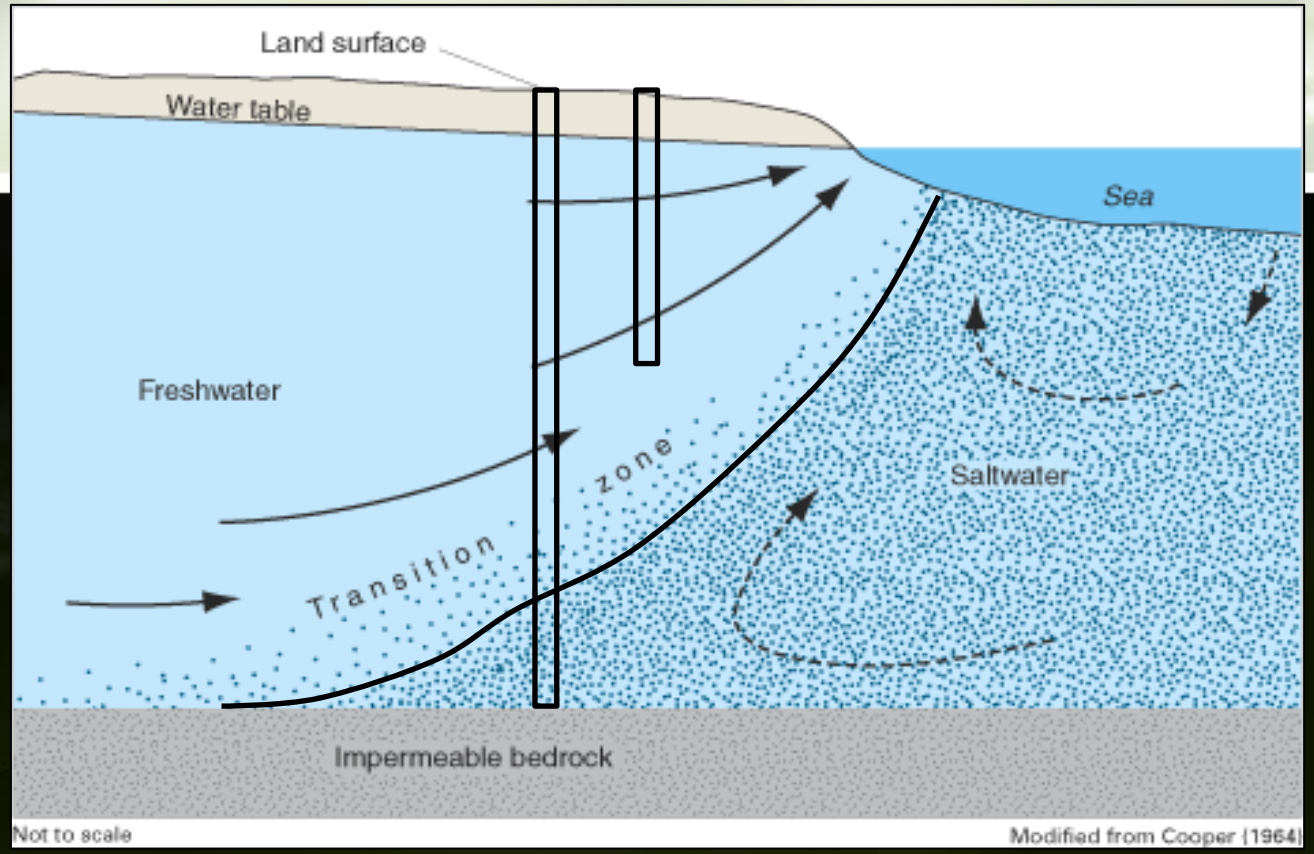
SFWMD Saltwater Interface Mapping Project

- Strategy -- Compare interface positions (i.e., 2009, 2014, 2019, 2024), note areas of concern, adjust monitoring, and adapt as necessary
- Update maps every 5 years
- Use all available data (USGS, SFWMD, Counties, Water Use Permittees)
- Furthest inland extent – dry season
- 250 milligrams per liter (mg/L) chlorides (isochlor)
- Coastal aquifers: Water Table, Lower Tamiami, Sandstone, Mid-Hawthorn

Pete Kwiatkowski, P.G.

Mapping Challenges

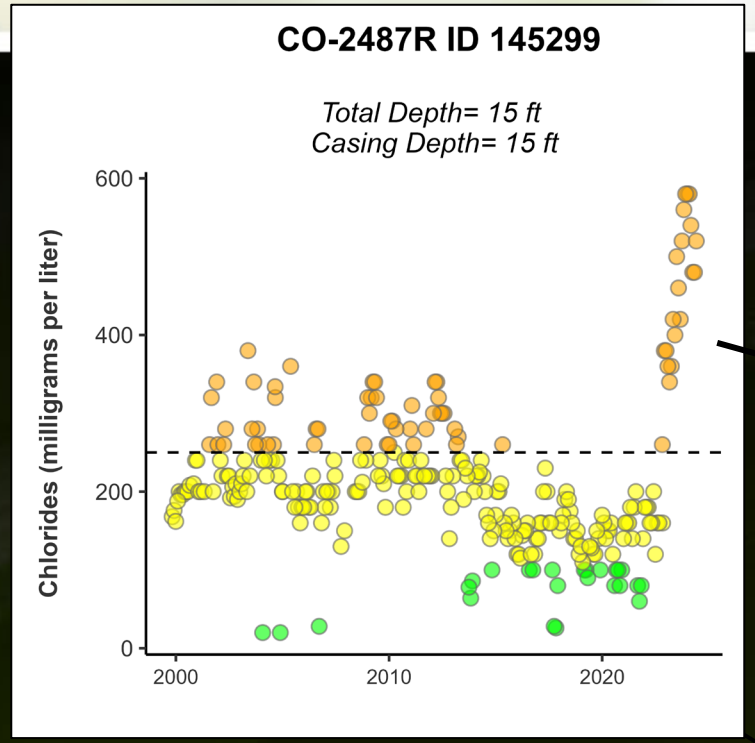
- Representing a three-dimensional feature on a two-dimensional map
- Representing a dynamic interface with fixed-time snapshots
- Representing a diffuse front with a single line

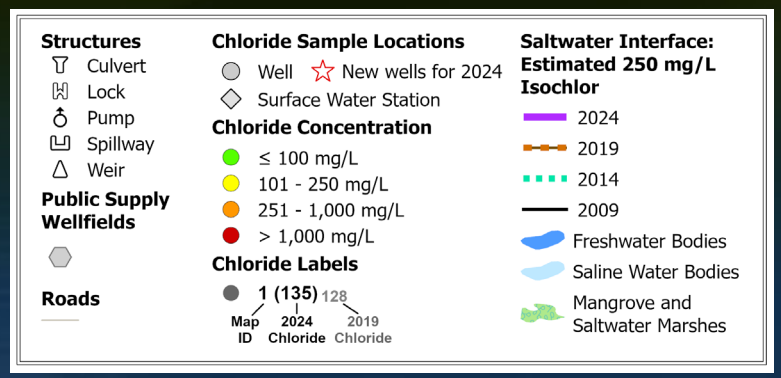


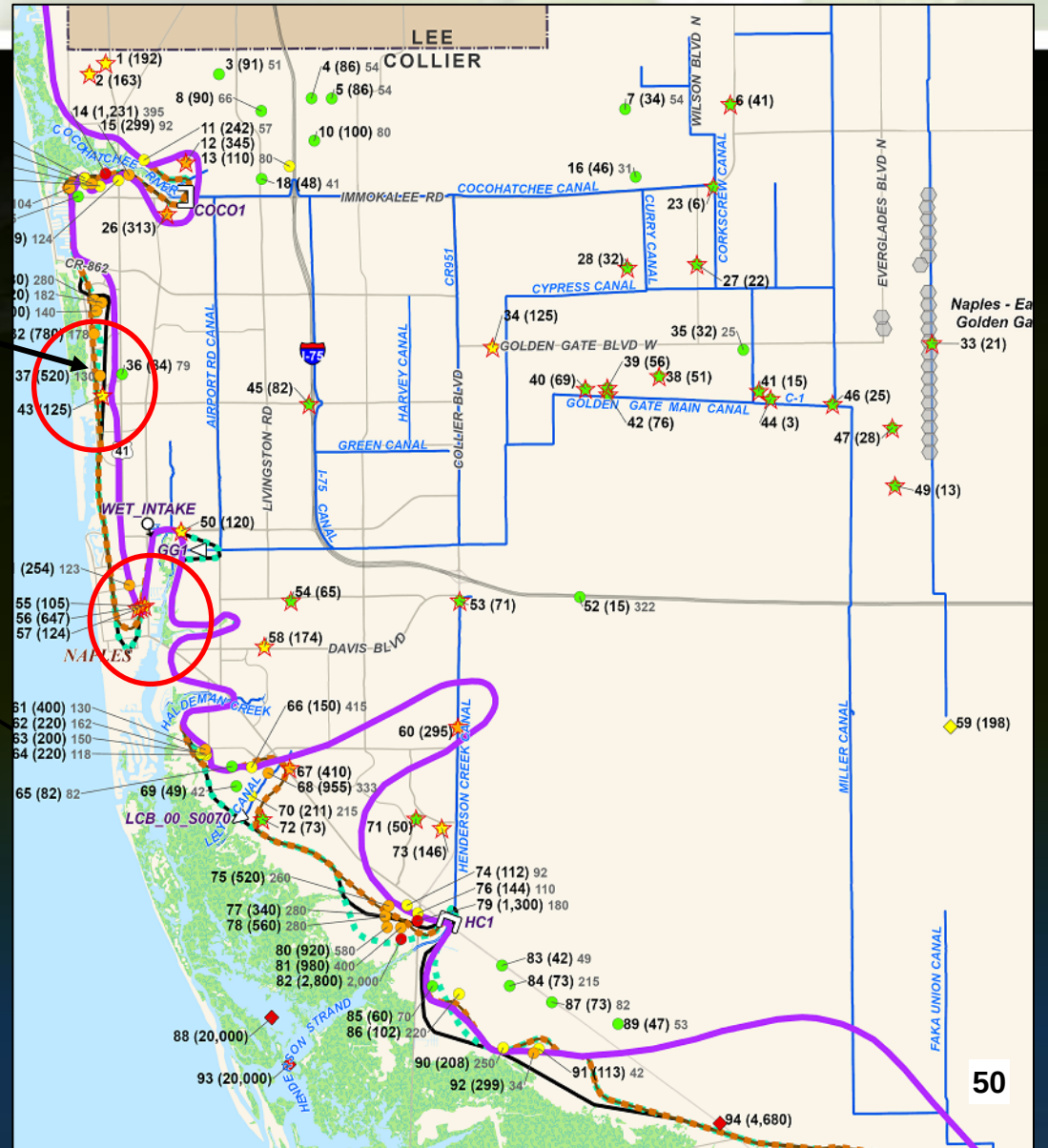
- Mapping from data that may represent one of several saltwater intrusion pathways
- Some wells used in 2009, 2014 and 2019, not available in 2024 (e.g., wells abandoned, destroyed, no longer required to be monitored, etc.)

Results: Water Table Aquifer

- Some inland saltwater movement in Naples
- New wells (red circles) better delineate interface (not necessarily interface movement)



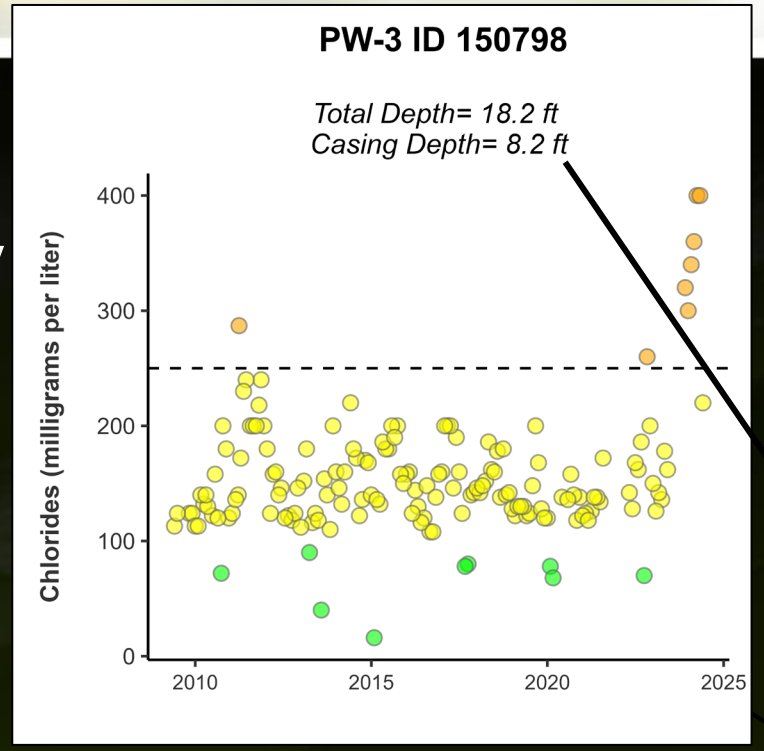


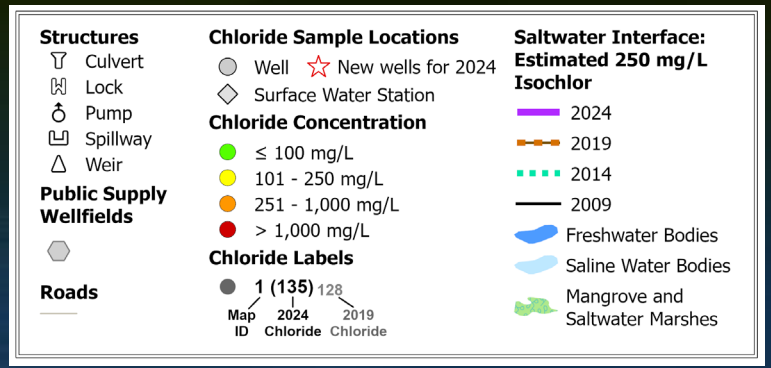


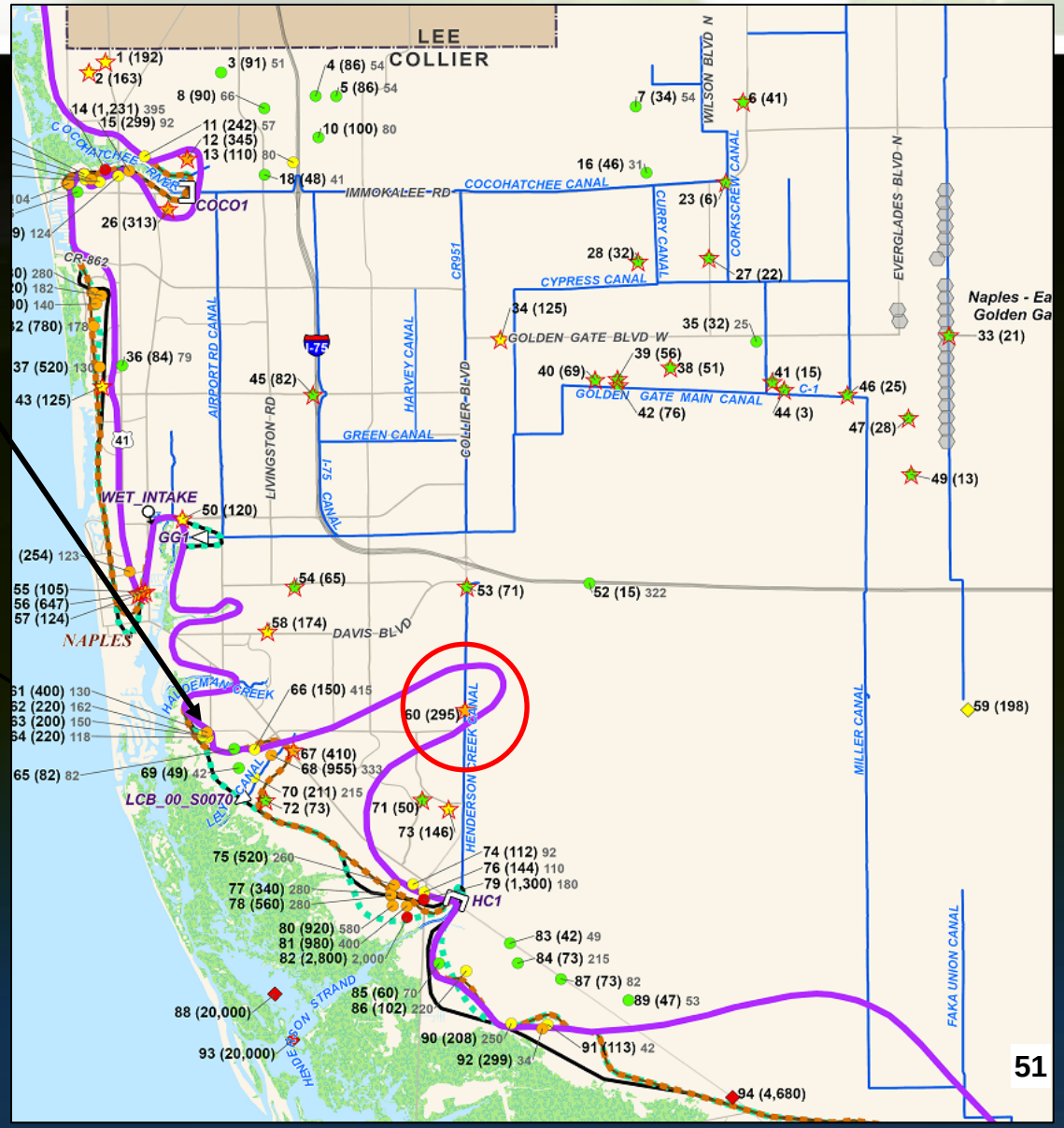
Pete Kwiatkowski, P.G.

Results: Water Table Aquifer

- Some inland saltwater movement in SW Collier County
- New wells (red circles) better delineate interface (not necessarily interface movement)



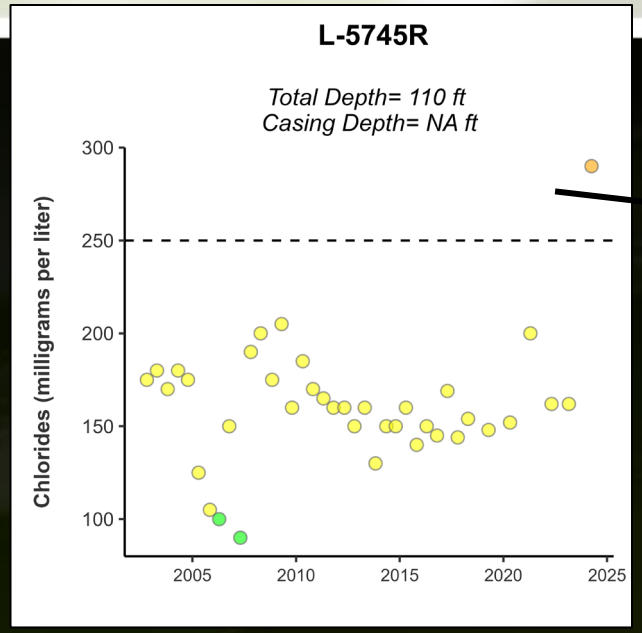


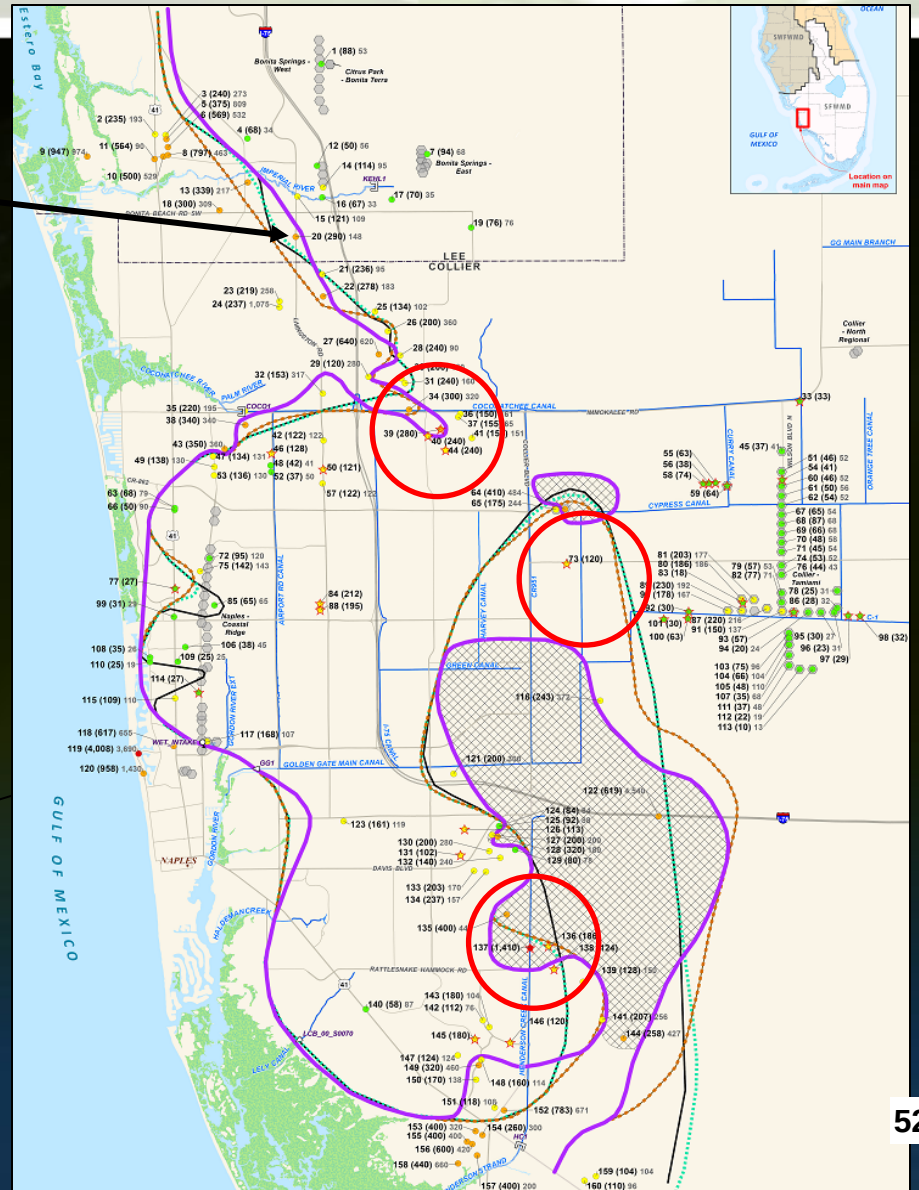


Pete Kwiatkowski, P.G.

Results: Lower Tamiami Aquifer

- Interface appears to have retreated towards coast in Naples area (reduced wellfield pumpage, aquifer recharge from reclaimed water use)
- Some inland movement in Bonita Springs area
- New wells (red circles) better delineate interface (not necessarily interface movement)
- Connate water area less than previously interpreted





Structures
- Culvert
- Lock
- Pump
- Spillway
- Weir

Public Supply Wellfields

Roads

Chloride Sample Locations
- Well
- New wells for 2024
- Surface Water Station

Chloride Concentration
- ≤ 100 mg/L
- 101 - 250 mg/L
- 251 - 1,000 mg/L
- > 1,000 mg/L

Chloride Labels

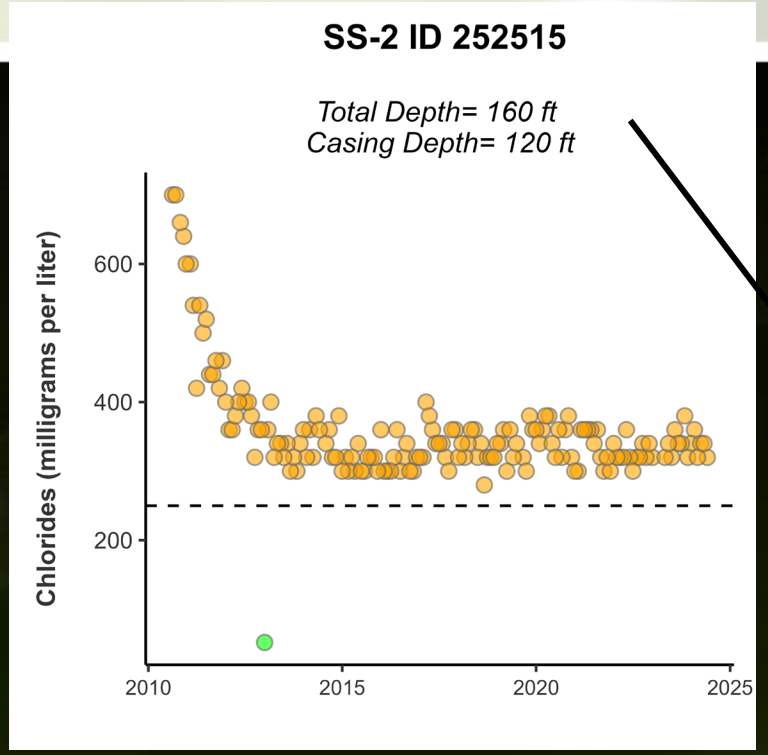
1 (135) 128
Map ID | 2024 Chloride | 2019 Chloride

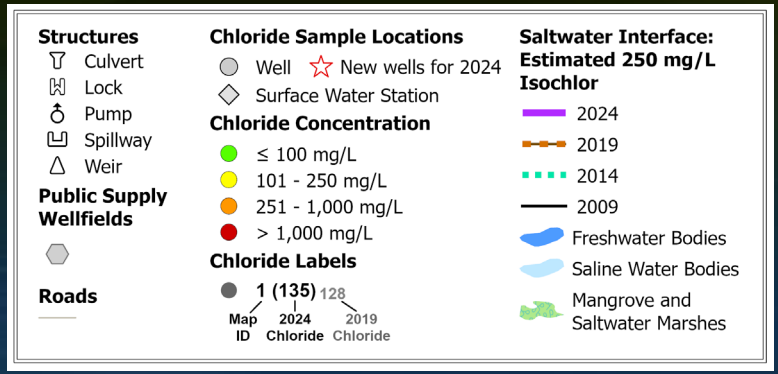
Saltwater Interface: Estimated 250 mg/L Isochlor
- 2024
- 2019
- 2014
- 2009
- Connate Water
- Freshwater Bodies
- Saline Water Bodies
- Mangrove and Saltwater Marshes

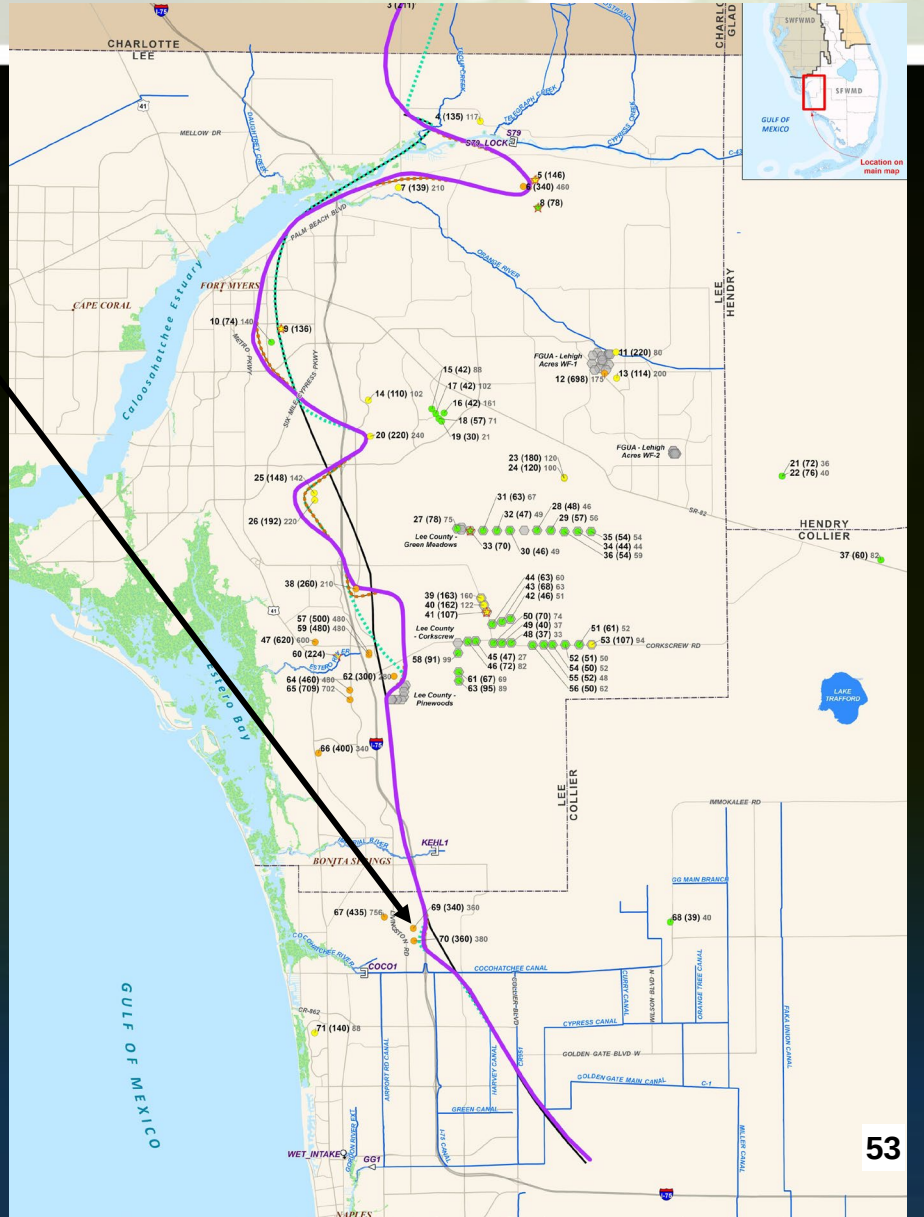
Pete Kwiatkowski, P.G.

Results: Sandstone Aquifer

- Relatively stable interface position



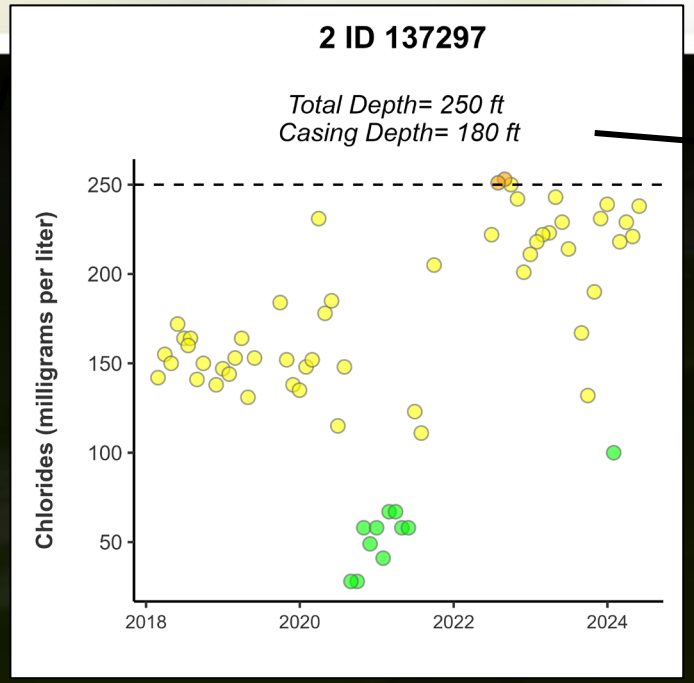


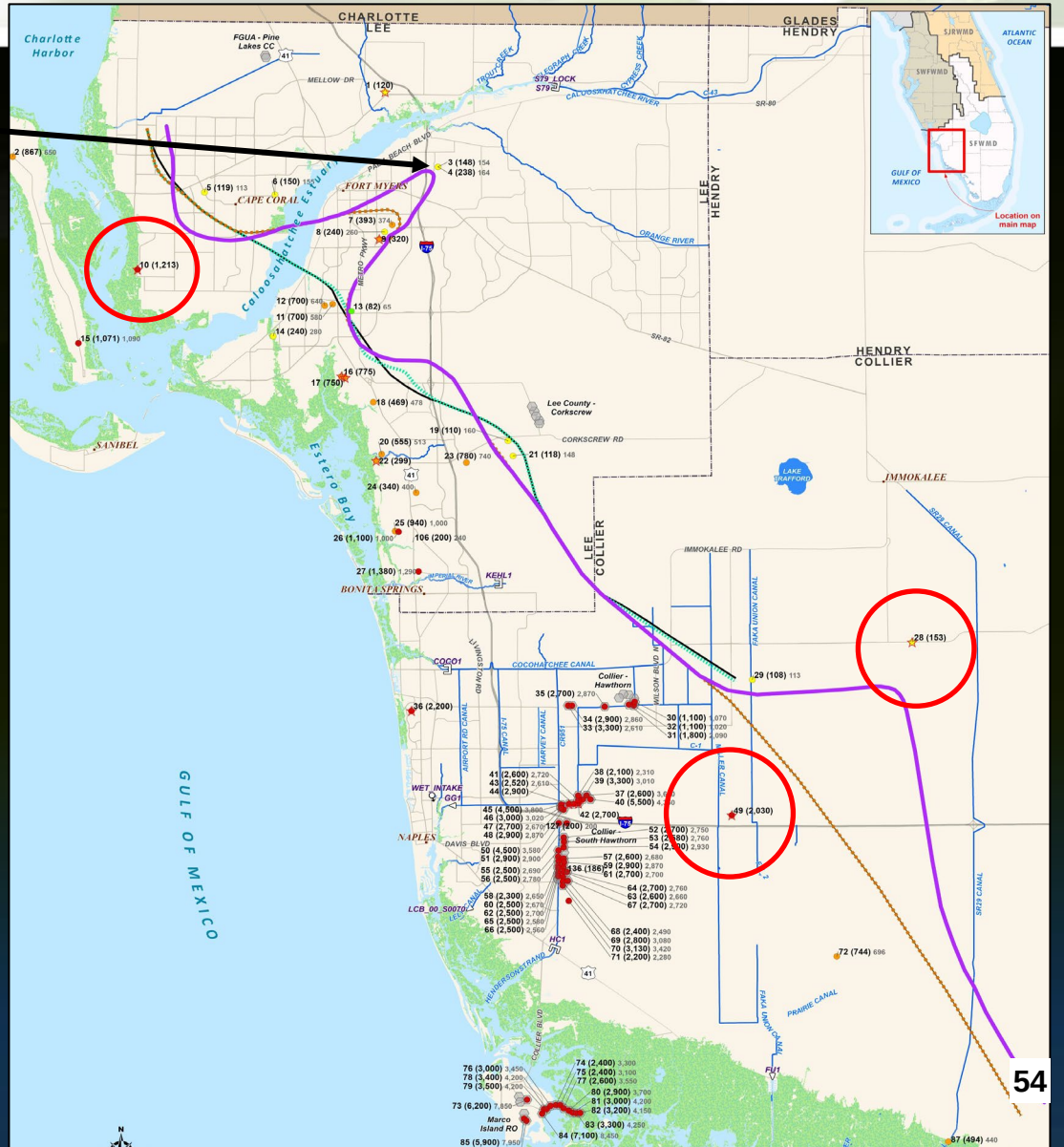


Pete Kwiatkowski, P.G.

Results: Mid Hawthorn Aquifer

- Slight movement of the interface both seaward and landward
- New wells (red circles) better delineate interface (not necessarily interface movement)
- Brackish aquifer in southwest Collier County





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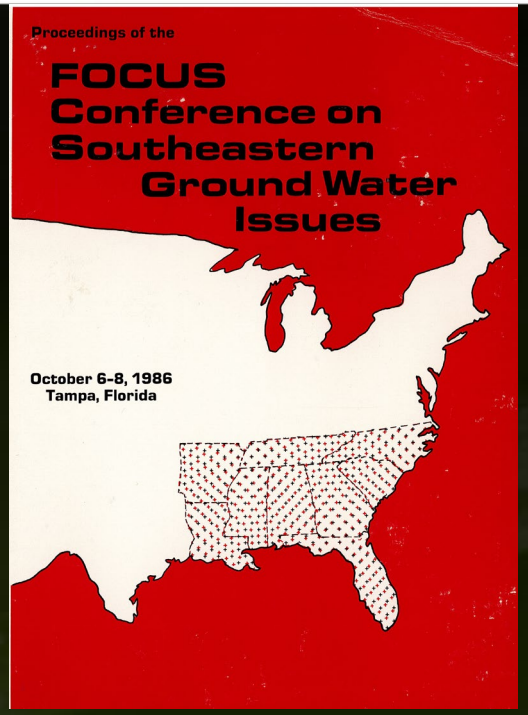
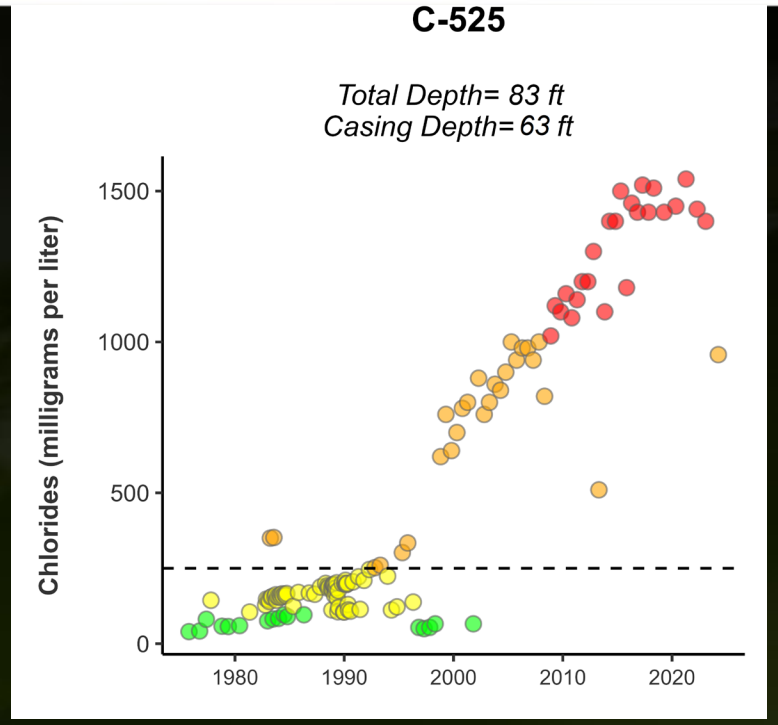
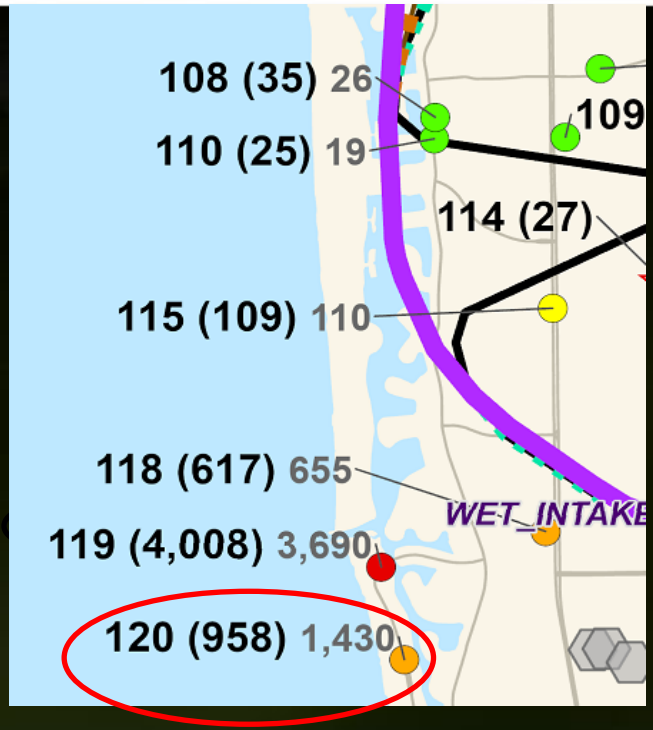
Pete Kwiatkowski, P.G.
sfwmd.gov

Saltwater Intrusion – Then and Now



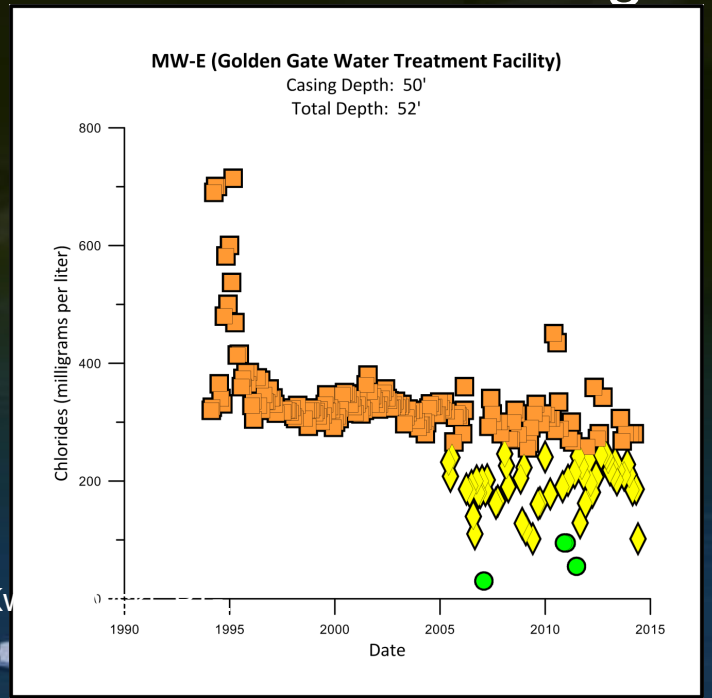


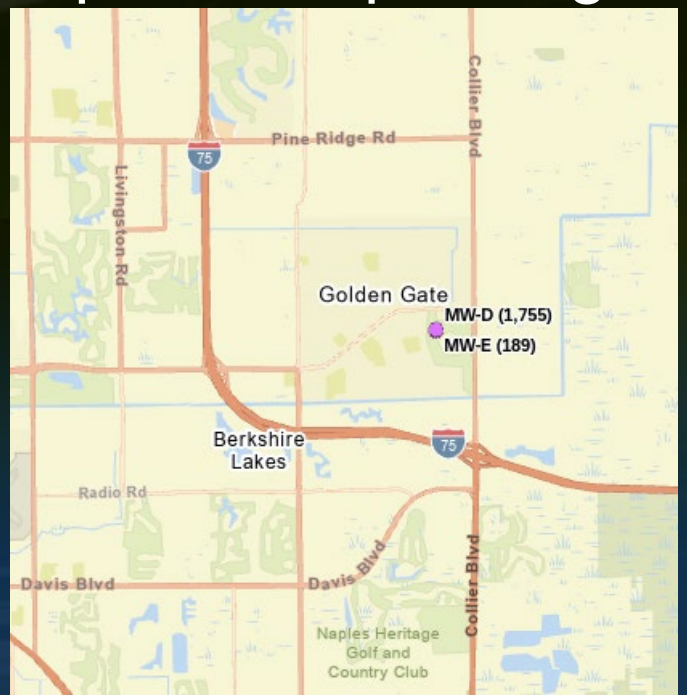


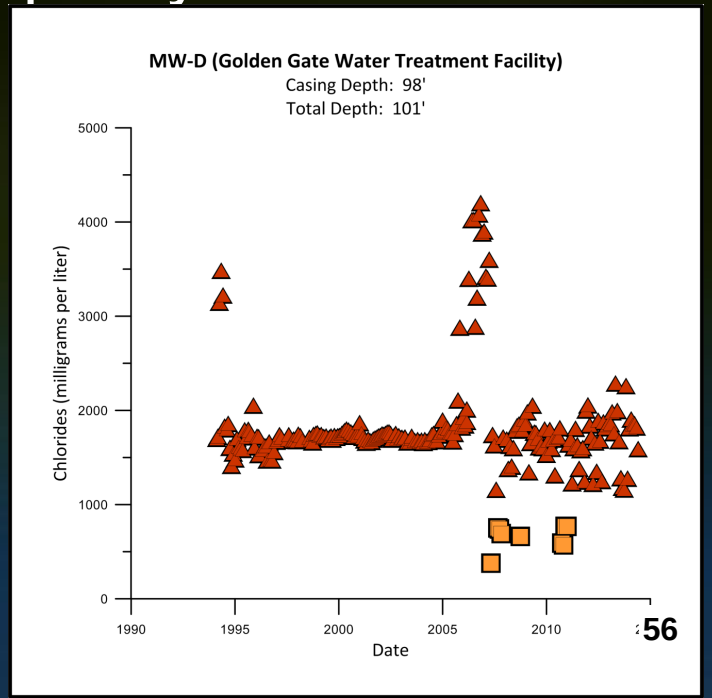
- Gleason, Profilet, and Anderson – The Status of Saltwater Intrusion in South Florida (Oct. 1986)
- C-525 (Map Number 120); Screened Interval 63 to 83 feet bls, Lower Tamiami aquifer
- Chloride Concentrations: 1986 (140 mg/L); 2009 (1,120 mg/L), 2014 (1,400 mg/L), and 2019 (1,430 mg/L) and 2024 (958 mg/L)

Upconing of saltwater from below….

- Golden Gate WTF Monitor Wells E (50 to 52 feet bls; Chloride = 189 mg/L) and D (98 to 101 feet bls; Chloride = 1,755 mg/L) at same location, different depths, in Lower Tamiami aquifer
- Highlights the importance of monitoring both laterally and vertically and wellfield management to prevent upconing of poor-quality water







Conclusions

- Water Table Aquifer – Inland movement noted in a few areas (e.g., Naples, SW Collier County)
- Lower Tamiami Aquifer – Interface retreated in Naples, moved inland in Bonita Springs
- Interface is dynamic – advanced and retreated, depending on rainfall, wellfield pumpage, reclaimed water use, sea-level rise (?), etc.
- Saltwater intrusion is occurring, emphasizing the importance of continued monitoring (laterally and vertically) and wellfield management
- Additional, localized monitoring may be required at select wellfields by permittees to protect water supplies

Next Steps

- Work with local governments, permittees, and others to:
  - Identify other existing wells to increase mapping accuracy for future maps
  - Identify funding to facilitate well replacement as needed
  - Evaluate need and identify funding for new wells (critical data gaps or areas of concern)
- The data will be shared with the Modeling, Resiliency, and Regulation groups within the District for decision-making, modelling, and planning purposes



Questions and Discussion

Link to WebMaps:
https://geoportal.sfwmd.gov/portal/apps/mapviewer/index.html?webmap=1627e8dfaace41ca8c3bd07ef1df7e56

Big Cypress Basin
Field Station Activity Report



Andrew Wolf
Superintendent BCB Field Station
October 25, 2024

Overview

- Field Station/Pump Stations Operations
- Maintenance Activities
- Three Month Outlook



Replacing Motor Curry-1



Presenter: Andrew Wolf

Miami Towboat in Golden Gate Canal





Miami Towboat with Tuffboom





Filling Washouts on Corkscrew Canal



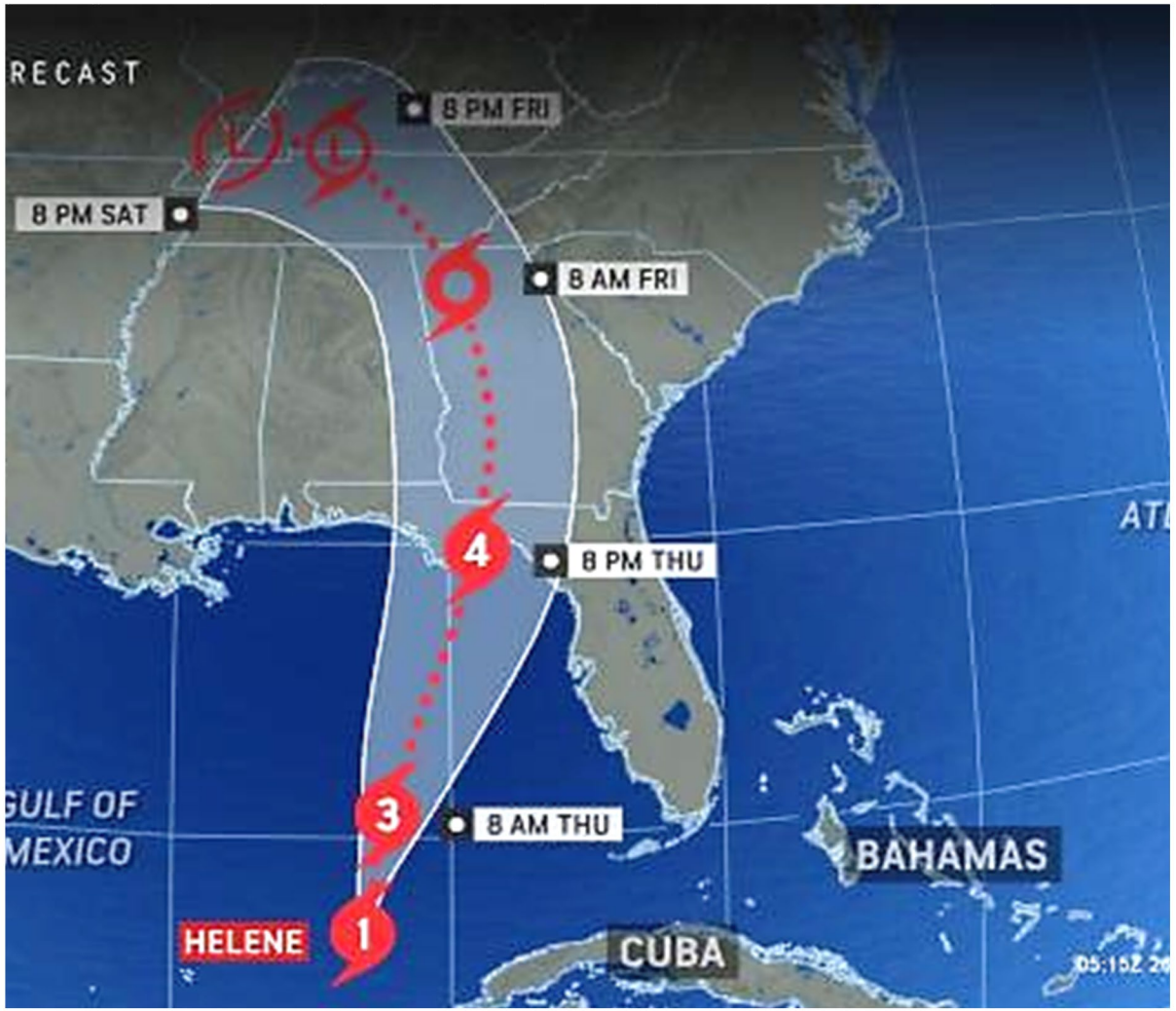


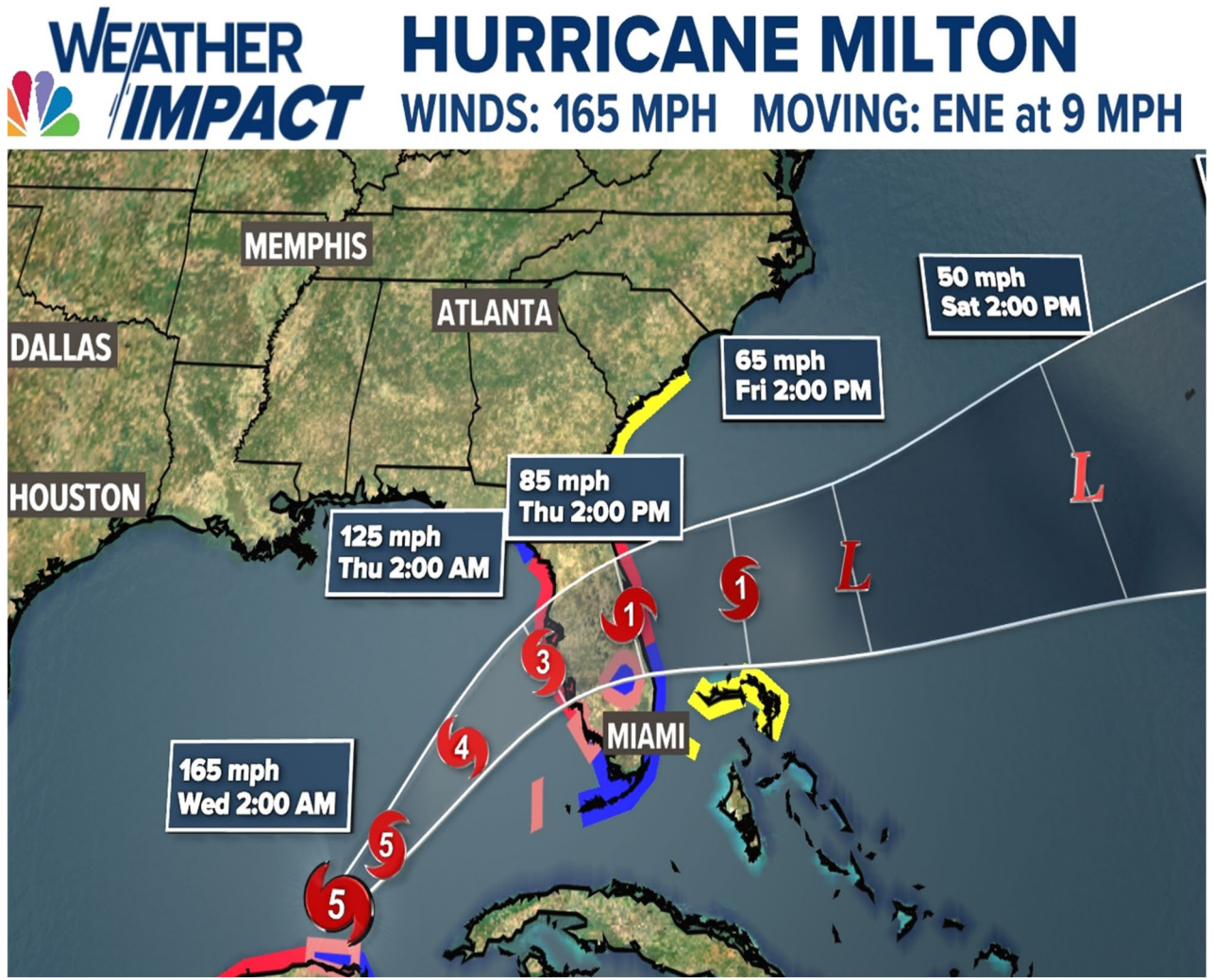
Conver Assisting Clewiston Field Station





Preparing for Helene & Milton





Preparing for Helene & Milton

- Preventative maintenance to structures and canals
- Gate changes to start drawing water down





Preparing for Helene & Milton

- Inspect all structures and canals, documenting with pictures
- Clear any debris at tuff booms
- More gate changes as storm approaches
- Secure field station and equipment



Cleaning Tuffbooms During Draw Down





Cleared Bridge on Henderson Creek







Equipment Secured in Field Station





After The Storm Has Passed

- Four teams inspect all structures and canals, documenting with pictures
- Clear any debris at tuff booms
- Gate changes as storm departs



Three Month Outlook

- Start FY 2025 SIP (Structure Inspection Program) repairs.
- Continue Vegetation removal in all canals.
- Complete the automation of 951 north structure.
- Respond to wet/dry season gate changes.





MERRITT Pump Station
PS-488



FAKA Union Pump Station
PS-487



MILLER Pump Station
PS-486

Comprehensive Everglades Restoration Projects (CERP)
Activity Report

Presenter: Andrew Wolf

Structure Inspection Program Repairs 98%



Presenter: Andrew Wolf

Overhauled Lube Water Pump





New Distribution Pump Installed



Presenter: Andrew Wolf

Mowing Manatee Mitigation Feature





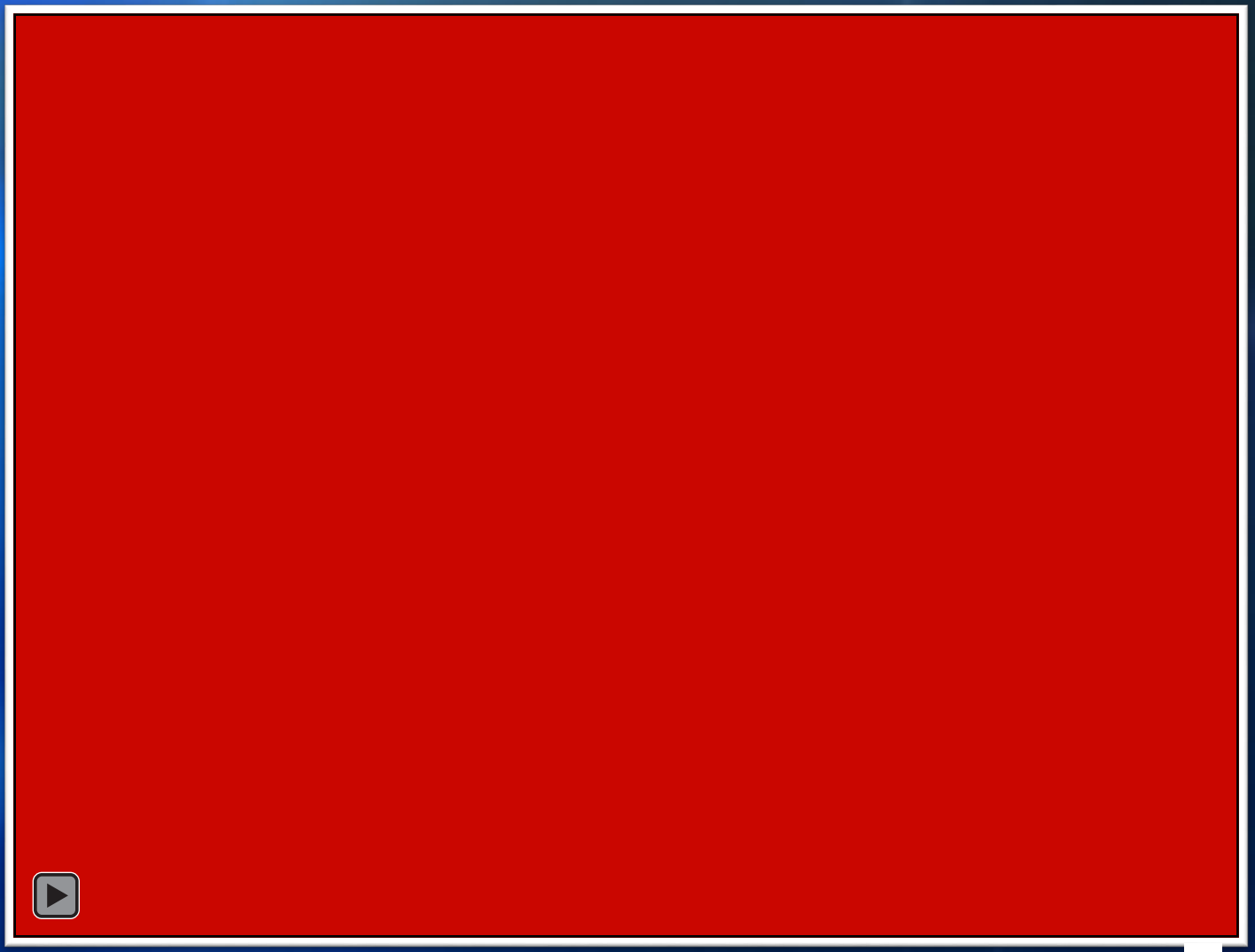
Hurricane Helene & Milton

Merritt and Faka Union Pump Station were staffed for the storms. The teams worked a 22-hour shift for Helene and 30-hour shift for Milton



Three Month Outlook

- Respond to wet/dry season pump orders and issues.
- Install repaired low flow pump at Merritt in November
- Start FY-25 SIP (Structure Inspection Program) repairs







Questions





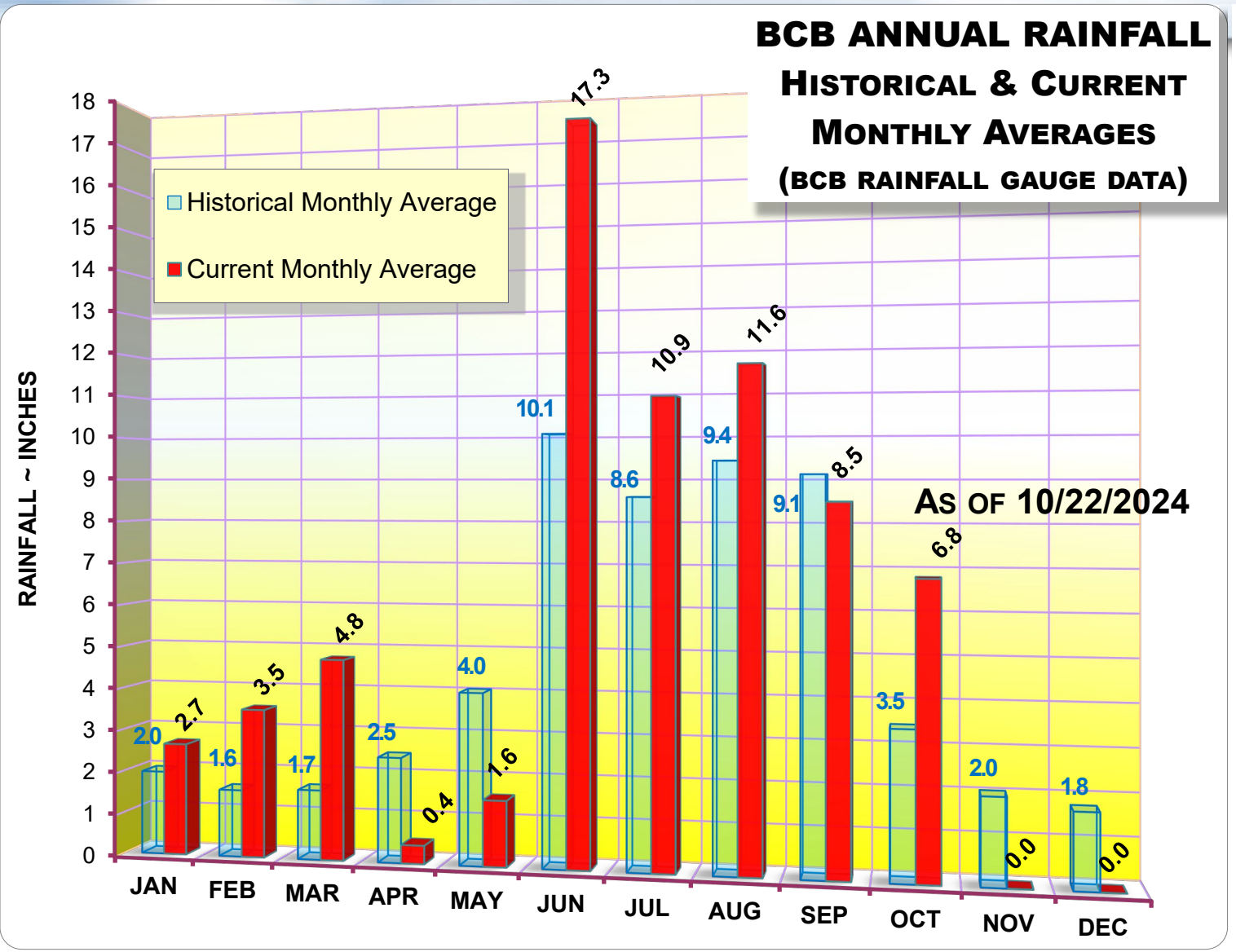
Big Cypress Basin Water Conditions Report

Big Cypress Basin Board Meeting
October 25, 2024



Brad J Jackson, P.E., CFM
Big Cypress Basin – Principal Engineer

2024 Rainfall Summary



- 2024 YTD TOTAL = 68.0”
- HISTORICAL AVERAGE TOTAL = 51.4”
- 132% OF NORMAL RAINFALL
- 17-INCH SURPLUS YTD
- JUNE - INVEST 90L
- AUGUST – TROPICAL STORM DEBBY
- SEPTEMBER – HURRICANE HELENE
- OCTOBER – HURRICANE MILTON



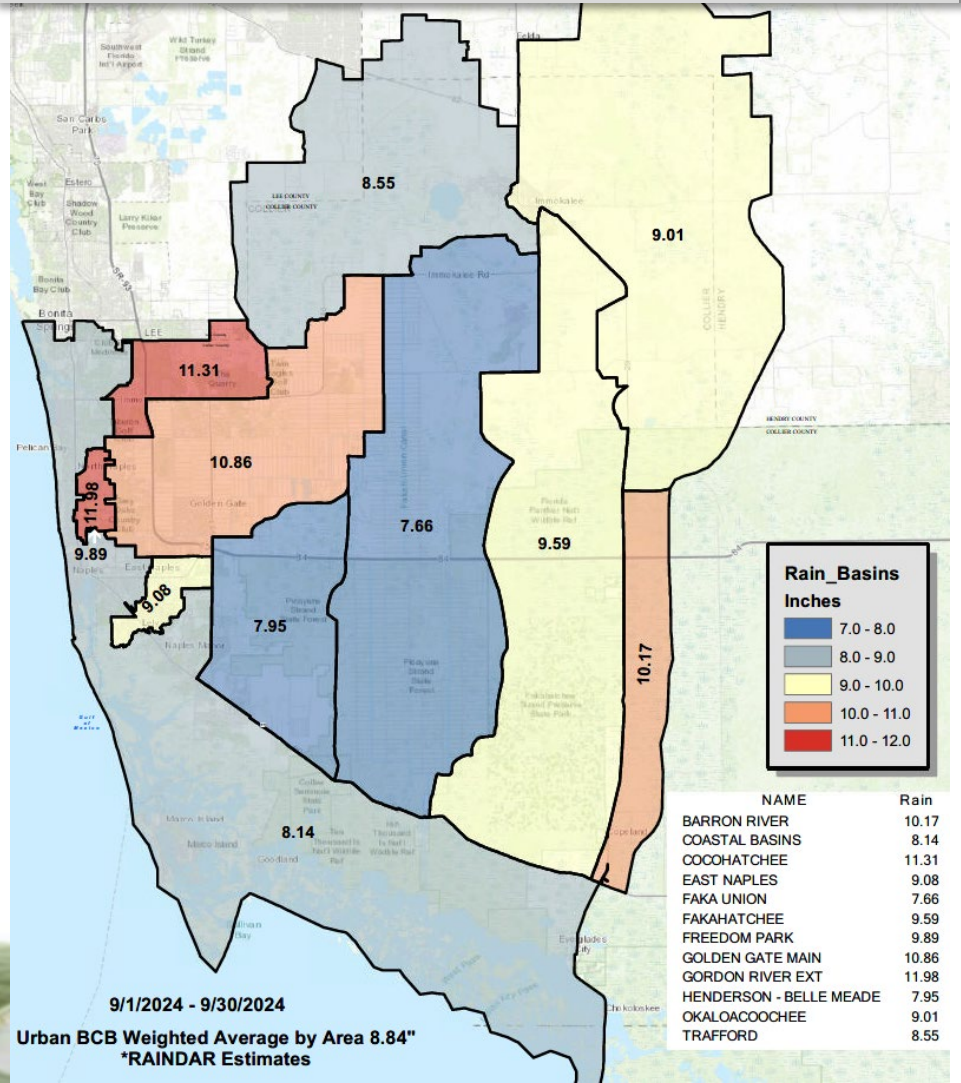
Presenter: Brad Jackson

September 2024 - Rainfall

September

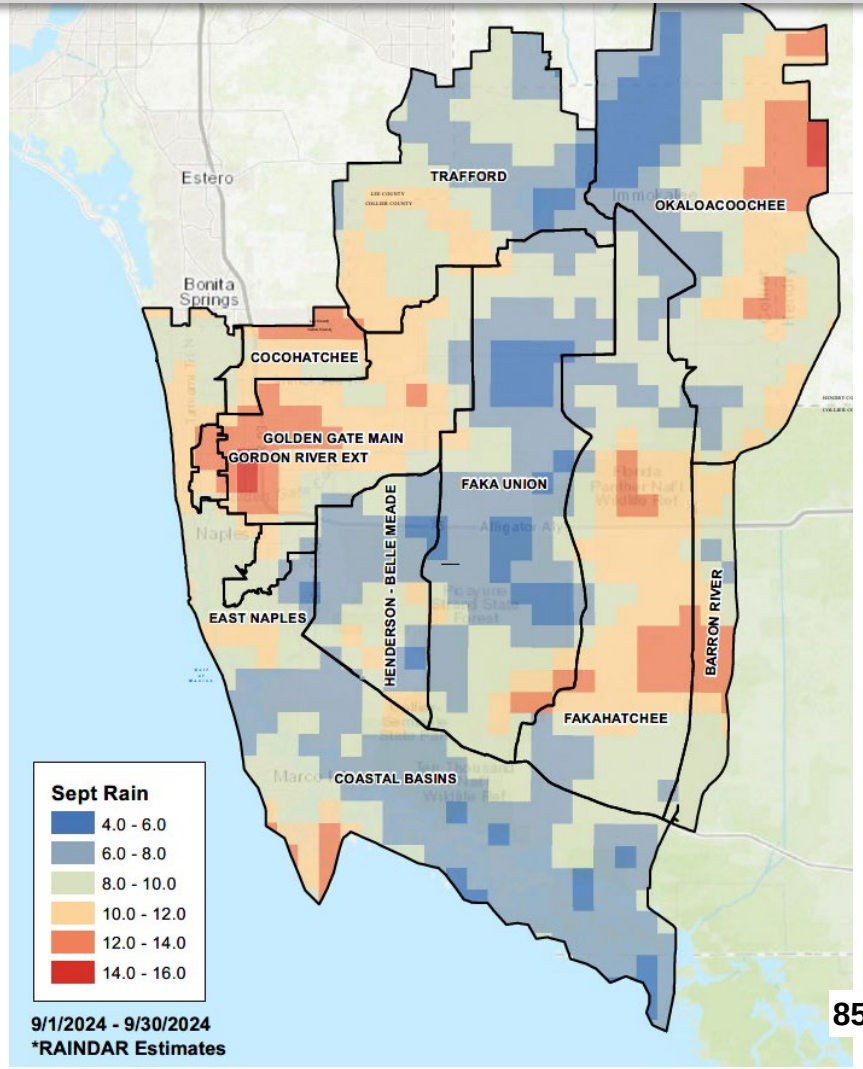
- 2024: 8.5” (96% of Normal)
- Historical Avg: 9.1”
- High: 17.5” (2017)
- Low: 2.4” (2019)
- Highest Rainfall Cocohatchee, Golden Gate, Gordon River

Sept. 2024 by Basin



NAME	Rain
BARRON RIVER	10.17
COASTAL BASINS	8.14
COCOHATCHEE	11.31
EAST NAPLES	9.08
FAKA UNION	7.66
FAKAHATCHEE	9.59
FREEDOM PARK	9.89
GOLDEN GATE MAIN	10.86
GORDON RIVER EXT	11.98
HENDERSON - BELLE MEADE	7.95
OKALOACOOCHEE	9.01
TRAFFORD	8.55

Sept. 2024 RAINDAR

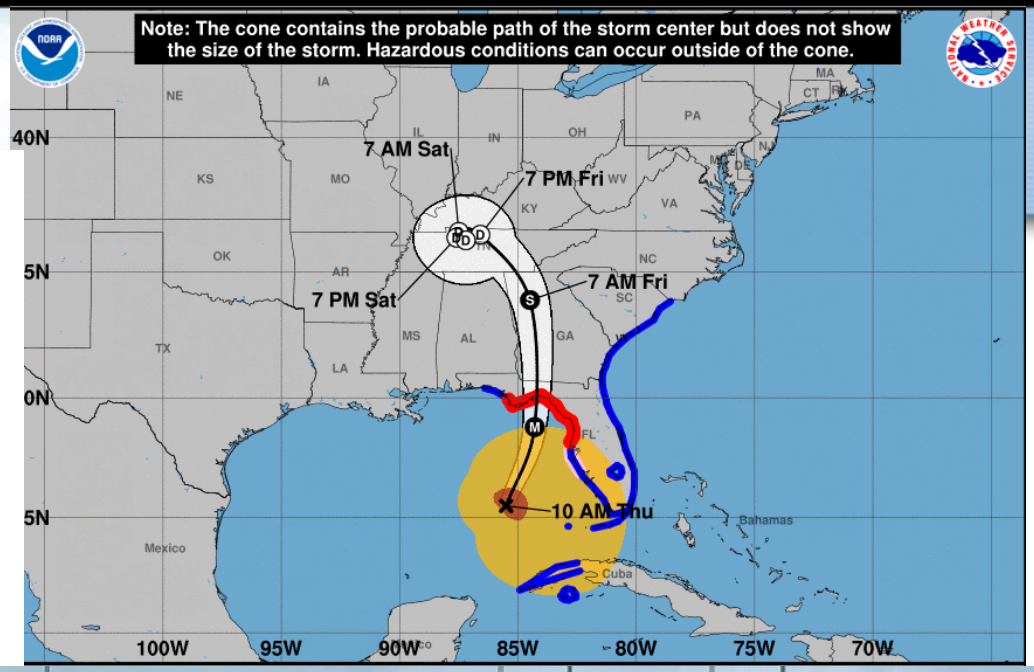


Presenter: Brad Jackson

Hurricane Helene

September 25th – September 27th

- Outer rain bands started September 25th
- Approx 240 miles west of Naples on 9/26/24 10 am
- Landfall 9/26/24 Florida Big Bend as CAT-4 Hurricane
- Rain bands ended early 9/27/24
- Pre-storm drawdown - Started 5 days before arrival (September 22nd)



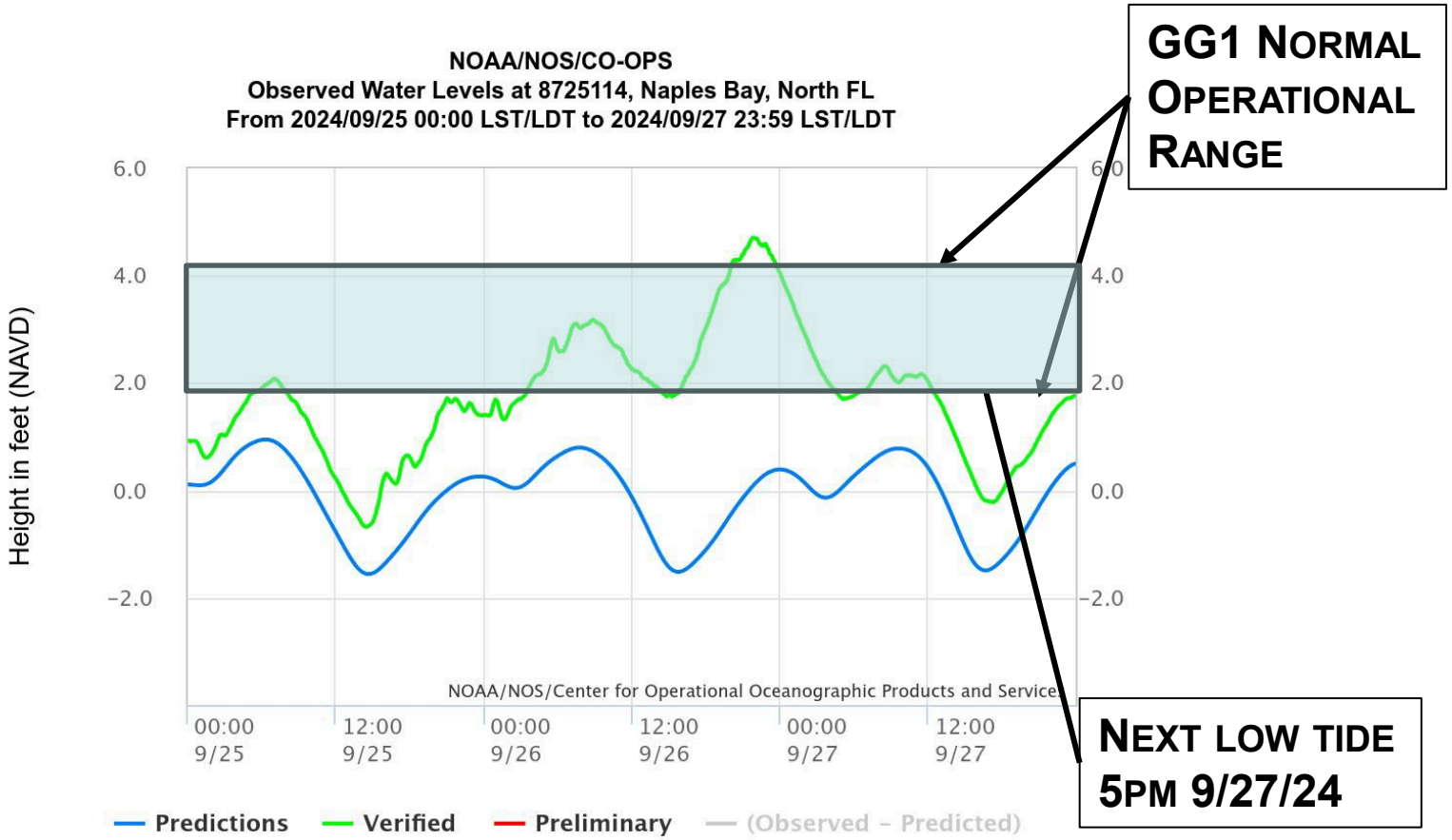


Pre-Storm – I75#2 Upstream



Pre-Storm – COCO1

Hurricane Helene



Rainfall 9/25/24 to 9/27/24

- BCB 3-Day Rain Average: ~2.5”
  - Lowest – 0.5” Ave Maria Rain Gauge
  - Highest – 4.0” Radar Estimates

Storm surge effects

- GG1 peak stage: 4.7 NAVD – 0.7 ft above normal operational range
- COCO1 peak stage: 5.6 NAVD – 0.3 ft above normal operational range
- Gates & weirs closed in response to rising storm surge
- Zero discharge during peak surge

Canal Response & Recovery

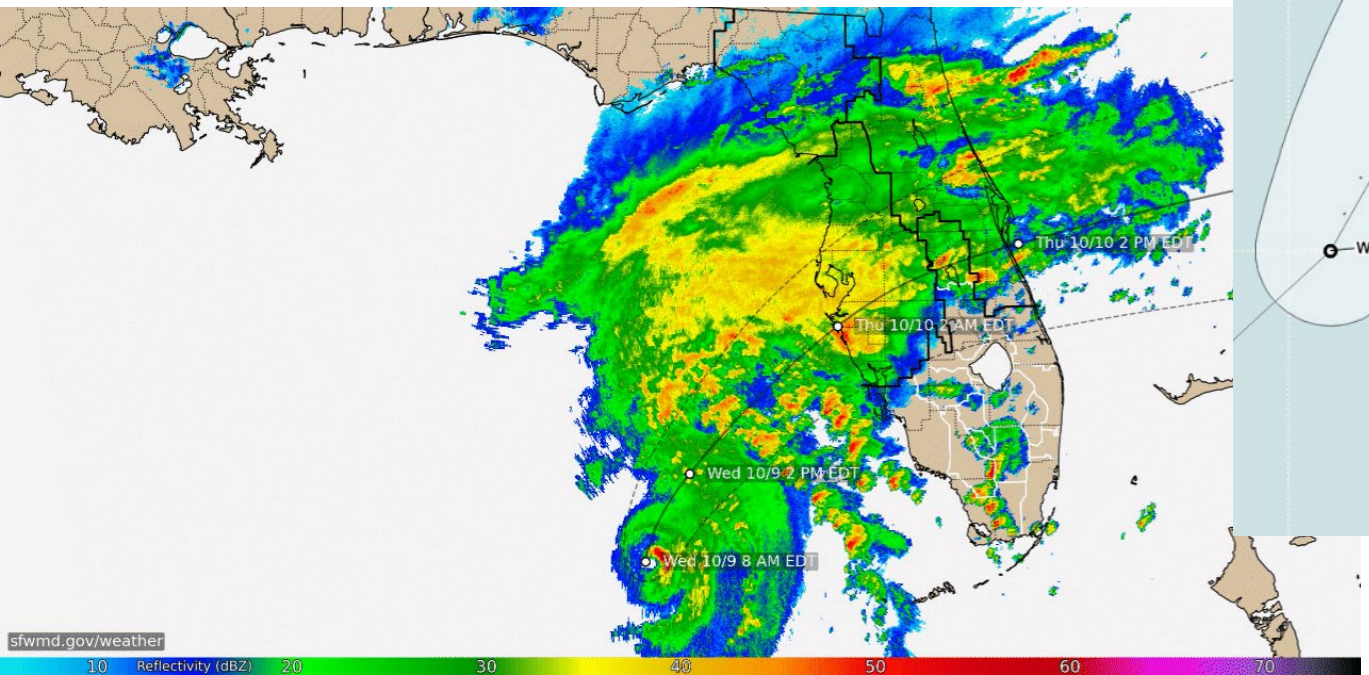
- All but COCO1 & GG2 remained in normal range
- No operational or communication issues
- Return to normal condition 9/27 AM

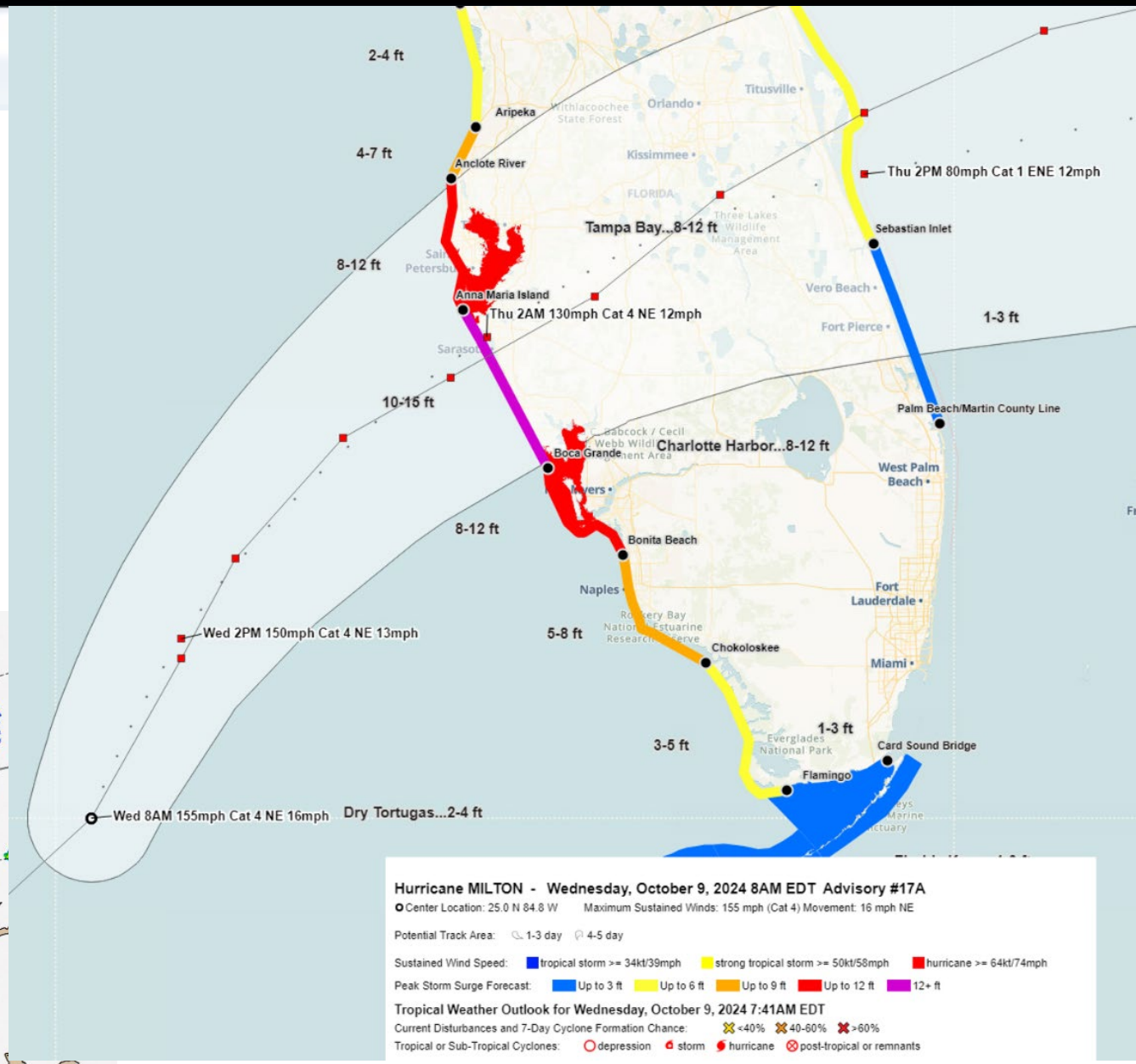
Presenter: Brad Jackson

Hurricane Milton

October 6th – October 10th

- 5-day rainfall & storm event – Rare preceding non-tropical storm ahead of Milton
  - Forecast totals 6-8” rainfall
  - Significant storm surge threat 5-8 ft
- Landfall 10/10/24 Siesta Key as CAT-3 Hurricane
- Pre-storm drawdown – Started October 3rd days before arrival





Presenter: Brad Jackson

Hurricane Milton

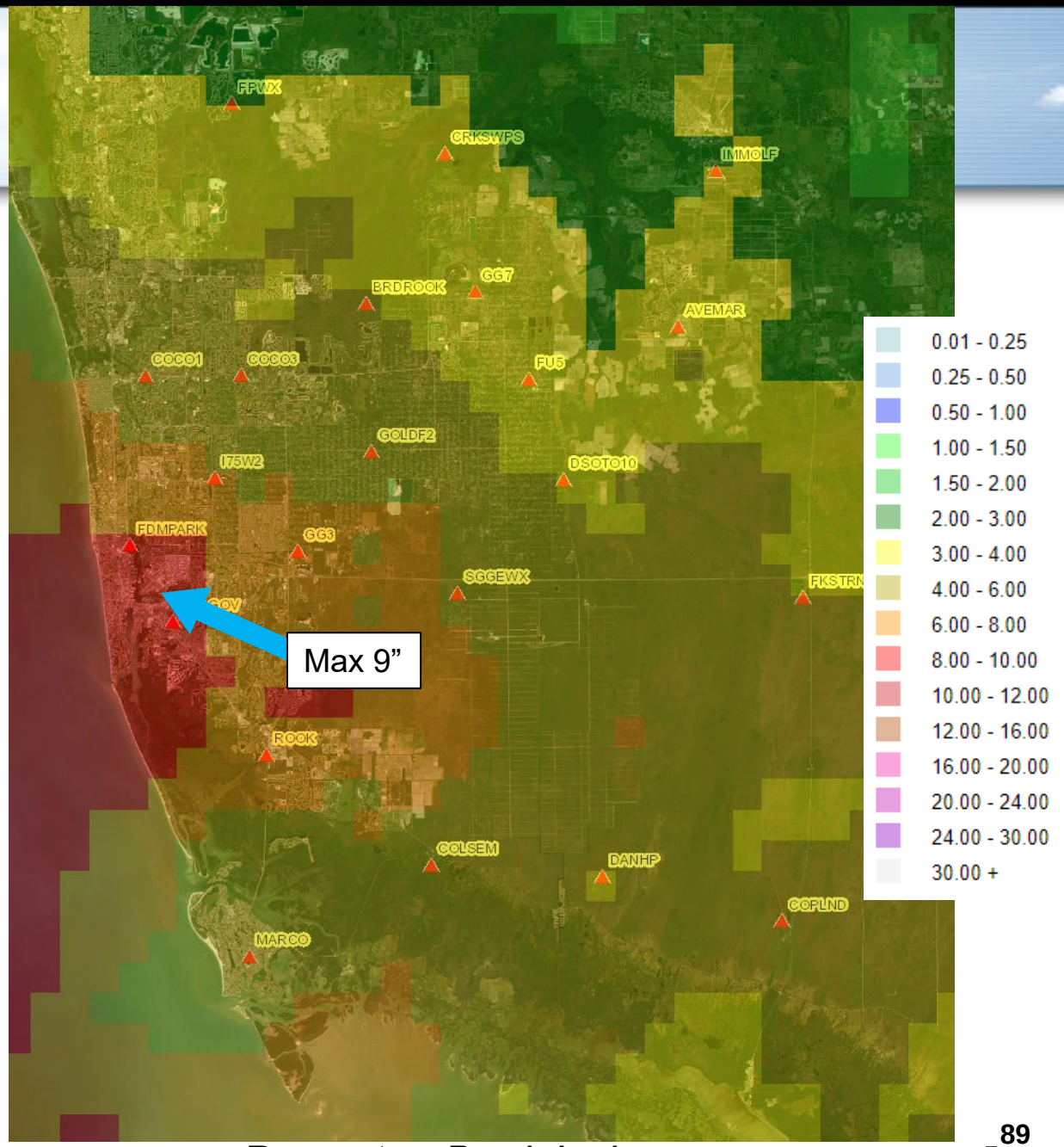
Rainfall 10/6/24 to 10/10/24

- BCB Rain Gauge Average: ~5.5”
  - Lowest – 2.5” Lake Trafford
  - Highest – 9.0” Freedom Park & Collier Courthouse
- 150% to 250% of October Rainfall in a few days on already saturated conditions

Extremely successful pre-storm draw down throughout system

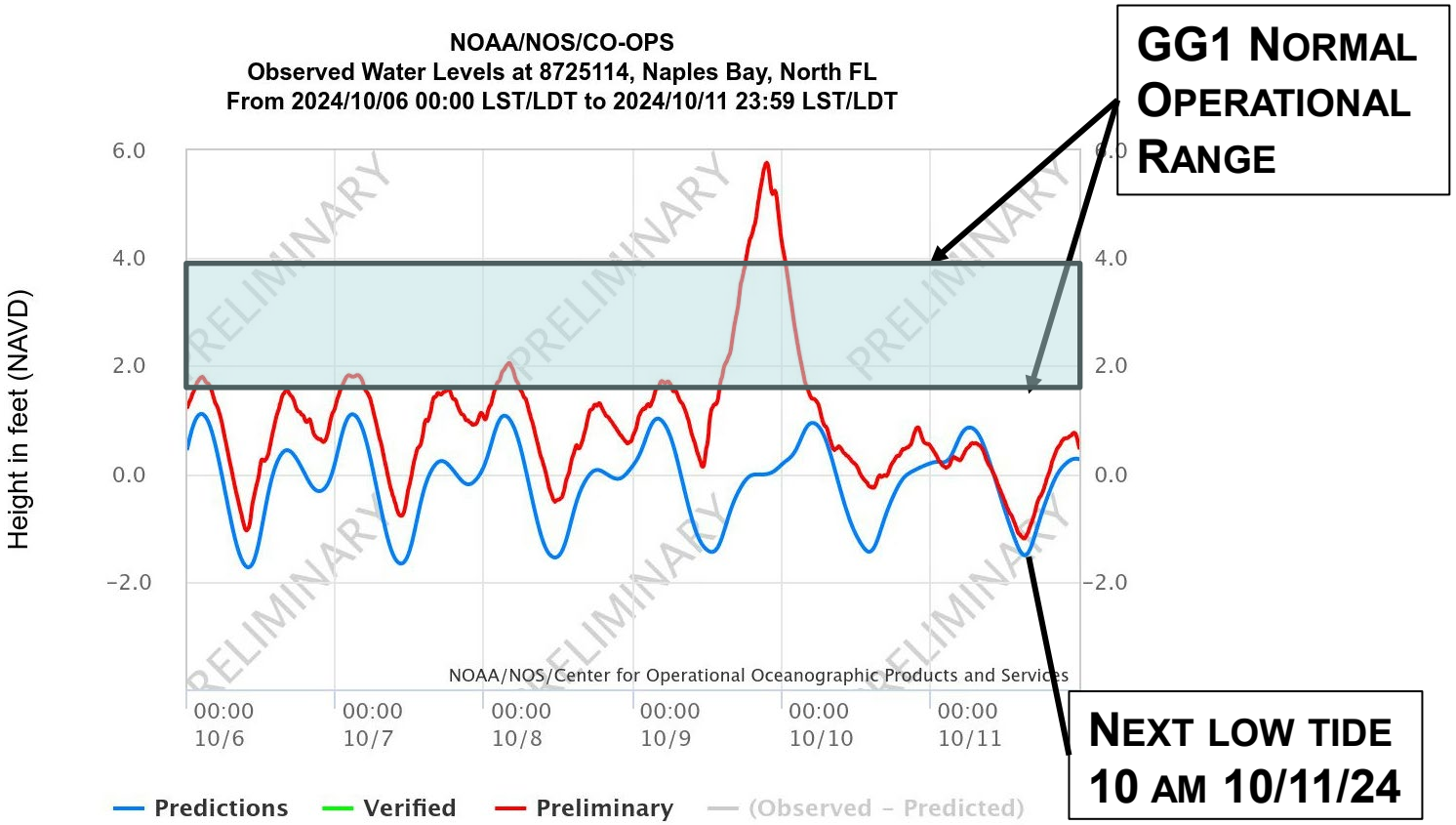


Pre-Storm – GG1



Presenter: Brad Jackson

Hurricane Milton Storm Surge

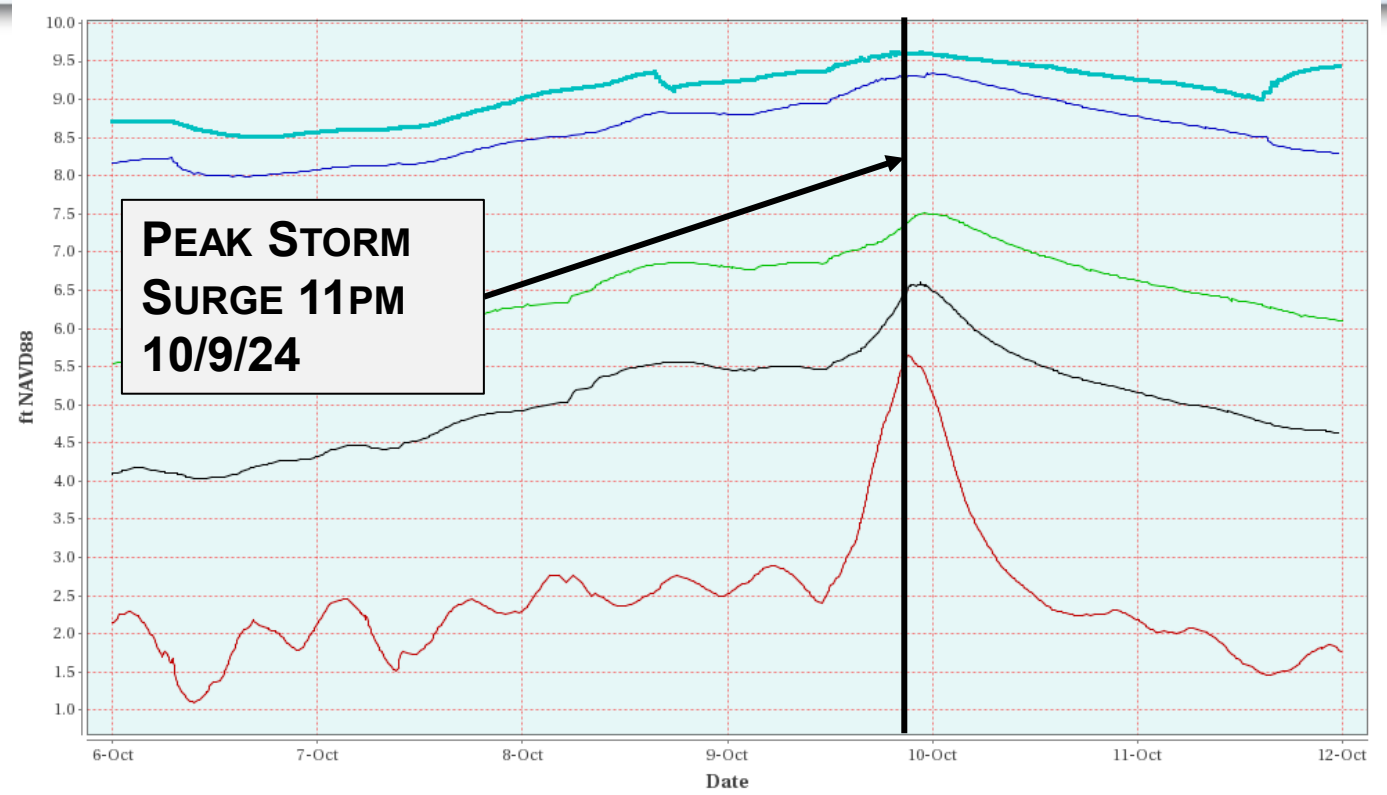


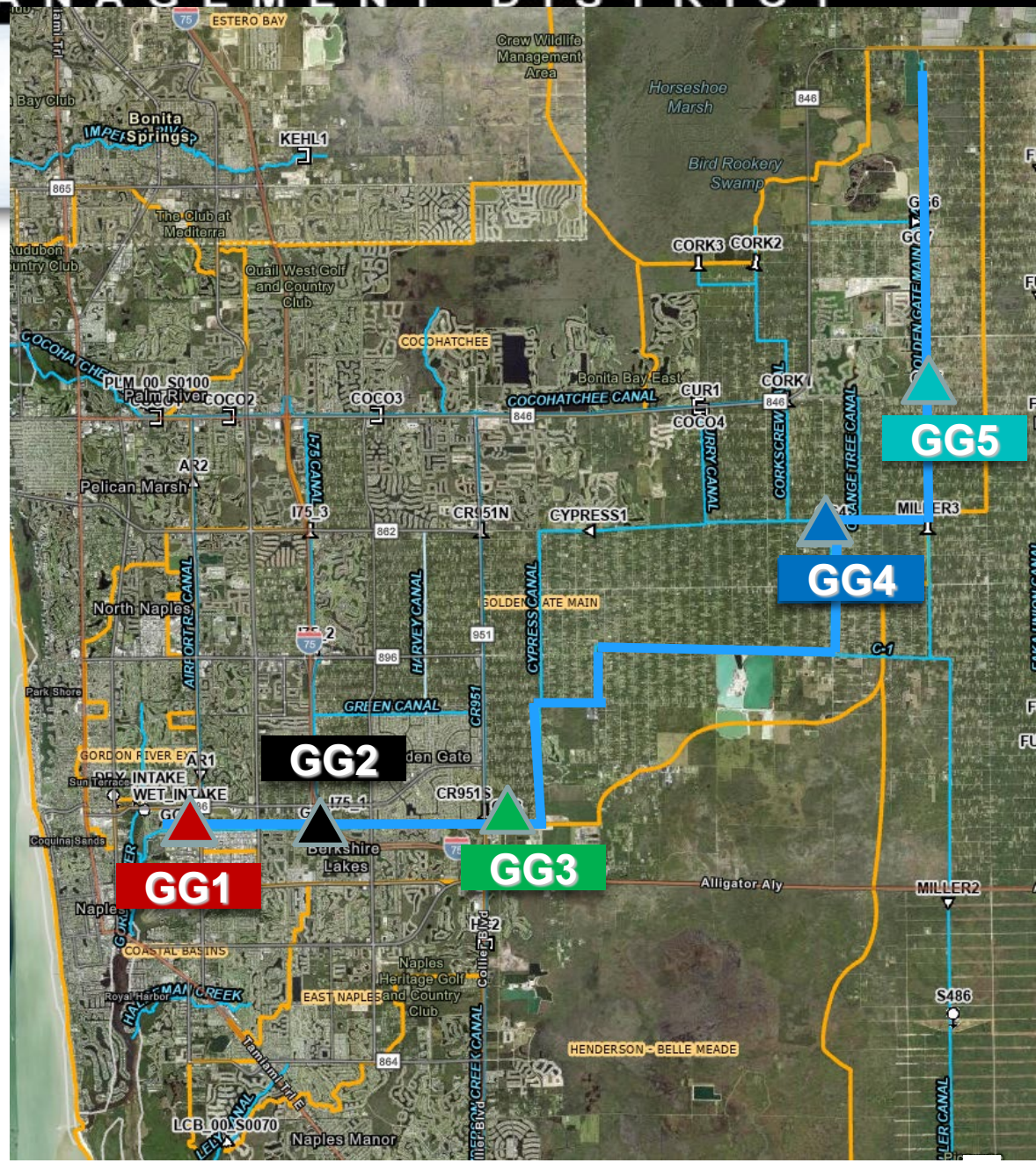
Storm surge effects

- GG1 peak stage: 5.6 NAVD
  - 1.7 ft above normal operation
- COCO1 peak stage: 6.9 NAVD
  - 1.5 ft above normal operation
- HC1 peak stage: 5.0 NAVD
  - 0.8 ft above normal operation
- FU1 peak stage: 4.0 NAVD
  - 1.5 ft above normal levels

Can prevent flood control releases to tide

Hurricane Milton





- Storm surge increased canal stages for 25 miles upstream of GG1
- Fortunate heavy rains preceded surge event
- Canal levels stabilized prior to surge

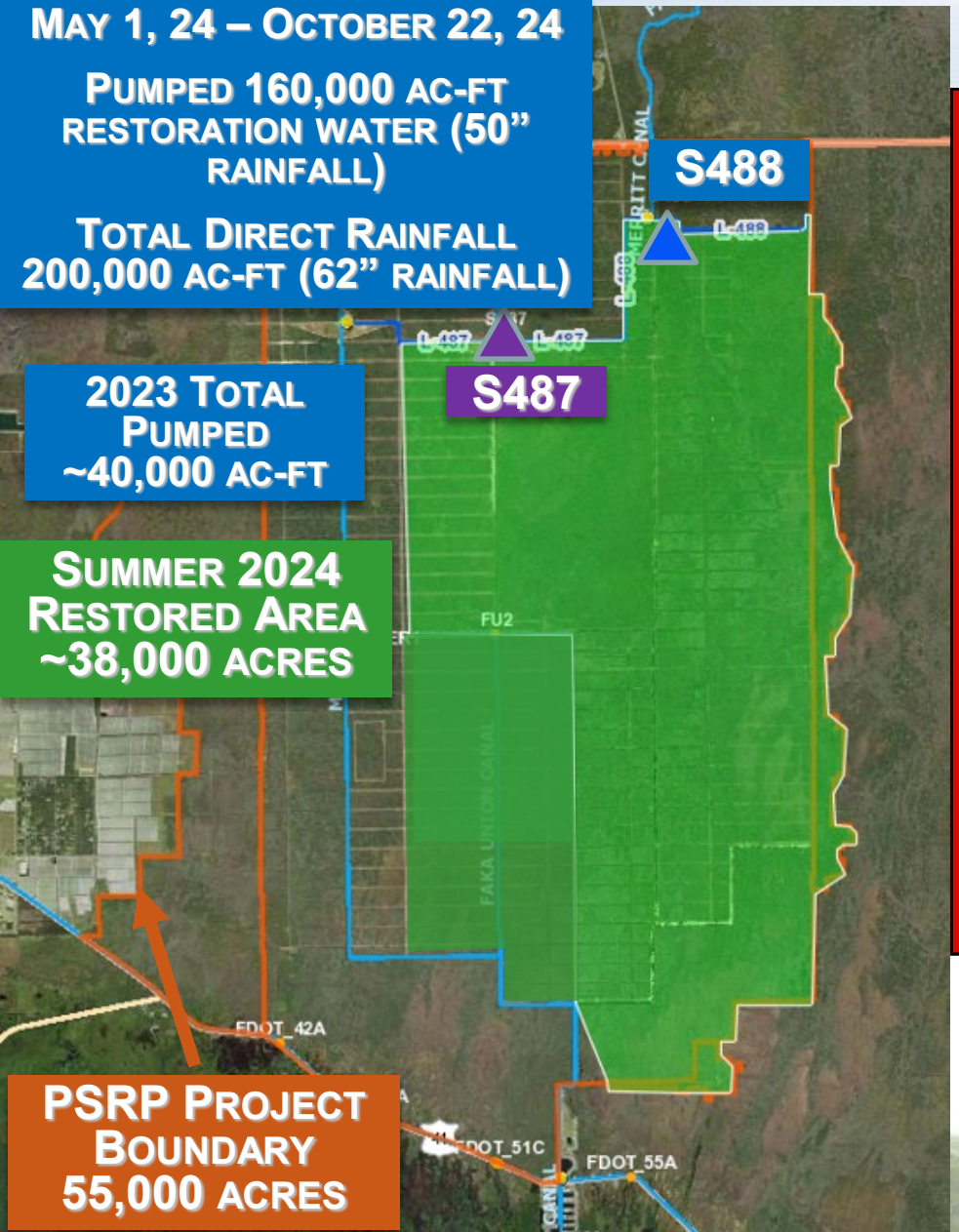
Presenter: Brad Jackson

Picayune Strand Restoration Project Operations

MAY 1, 24 – OCTOBER 22, 24

PUMPED 160,000 AC-FT RESTORATION WATER (50" RAINFALL)

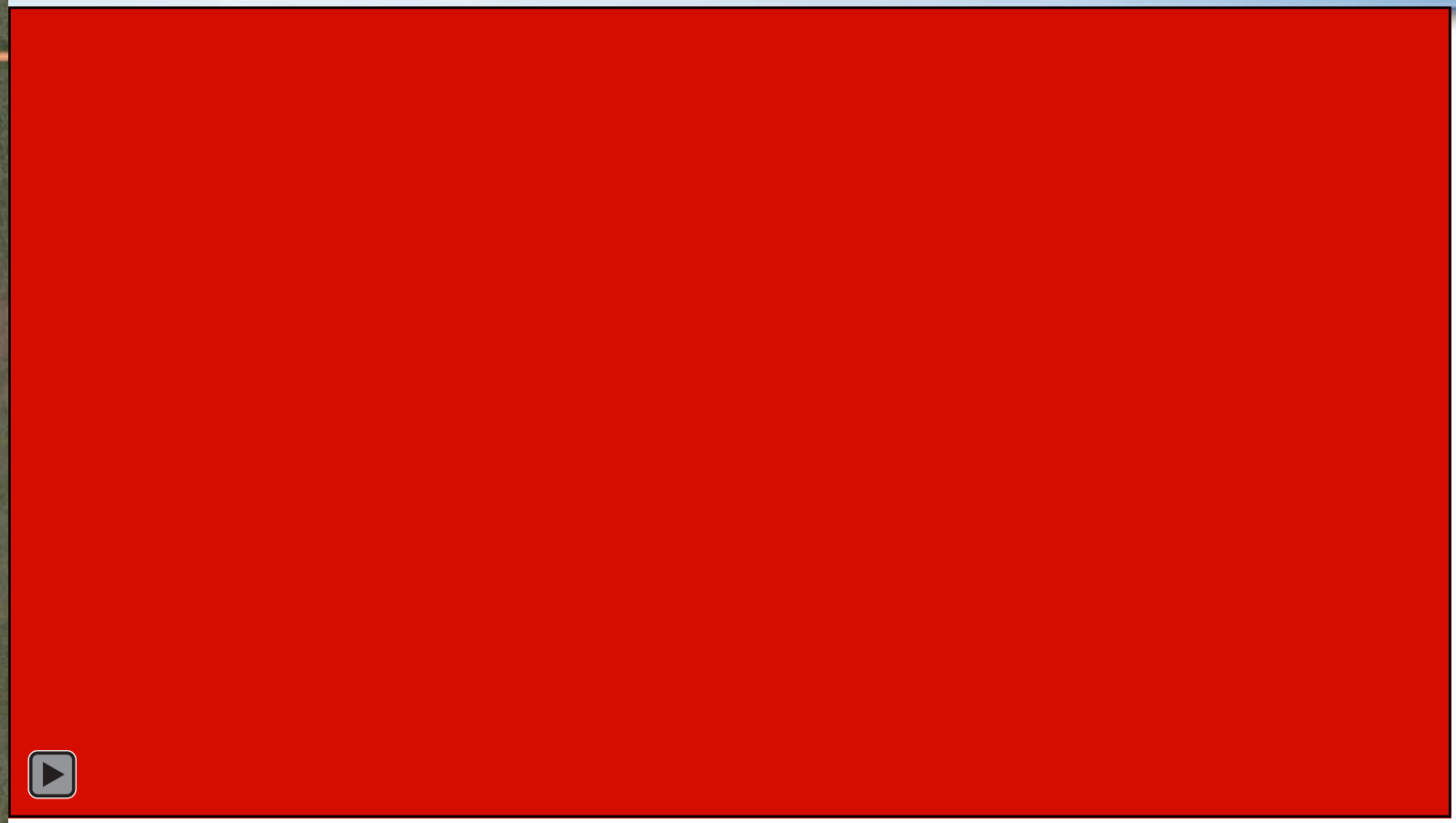
TOTAL DIRECT RAINFALL 200,000 AC-FT (62" RAINFALL)



2023 TOTAL PUMPED ~40,000 AC-FT

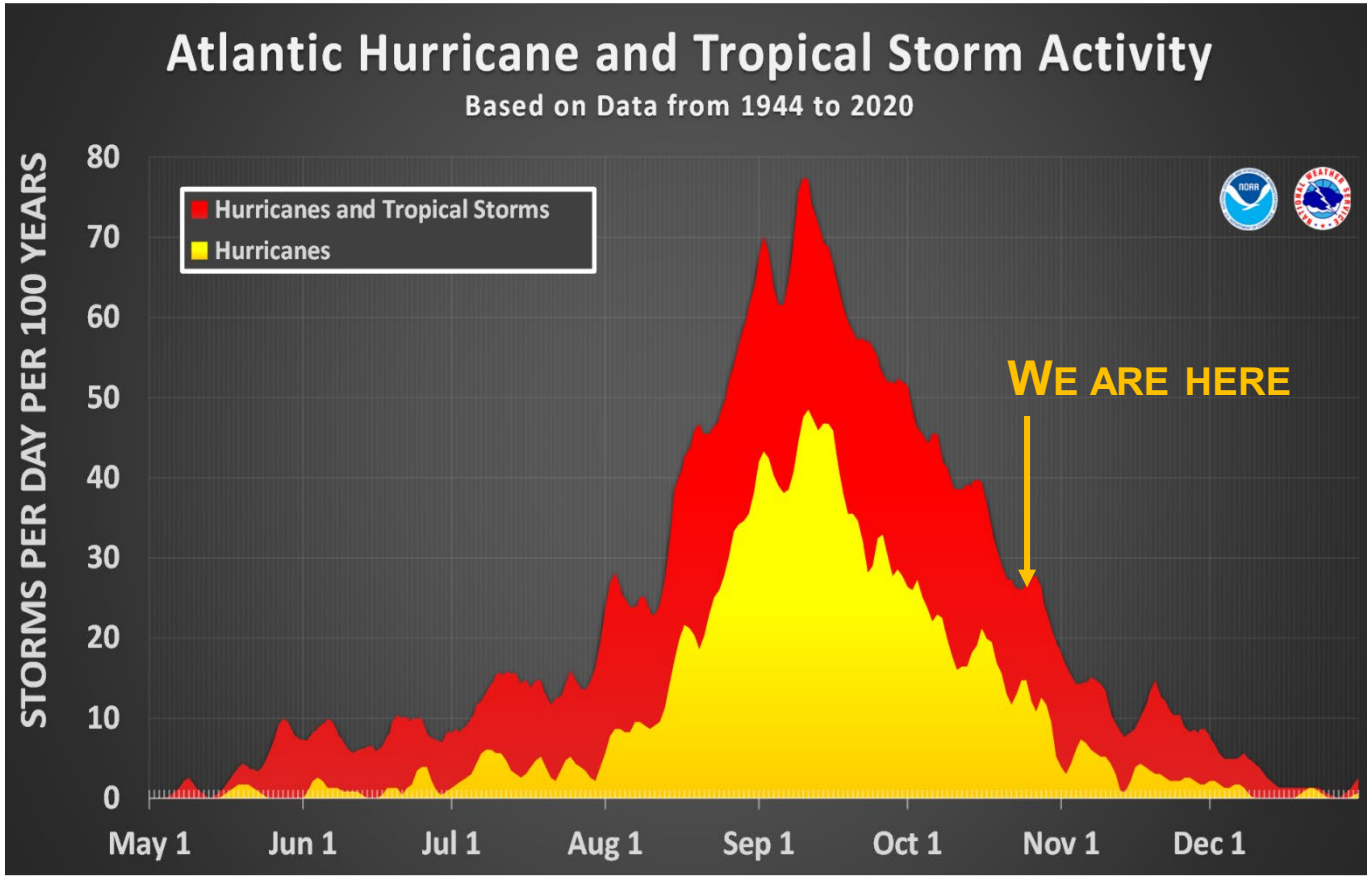
SUMMER 2024 RESTORED AREA ~38,000 ACRES

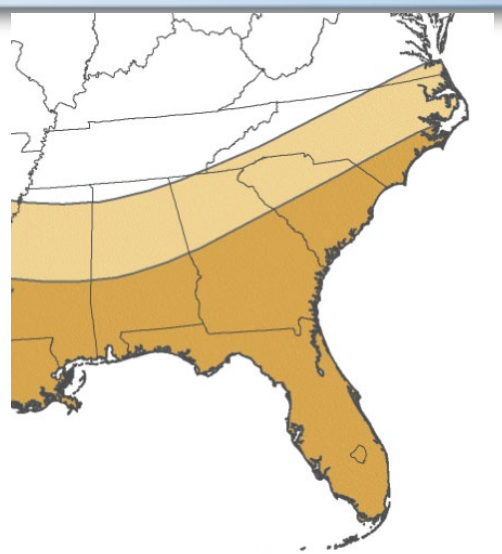
PSRP PROJECT BOUNDARY 55,000 ACRES



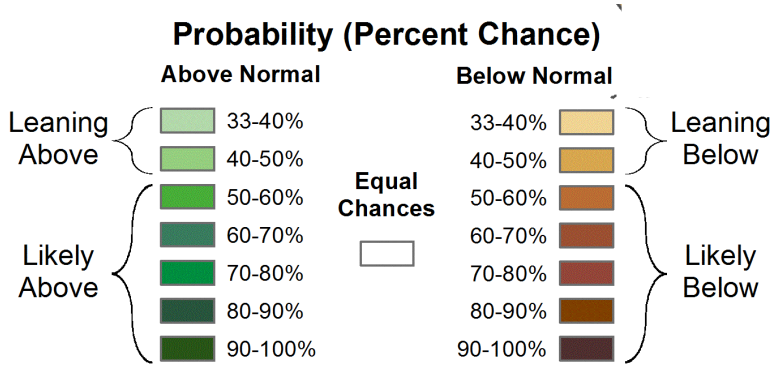
SOUTHERN FAKA UNION RESTORATION

Seasonal Precipitation Outlook





Long Range Outlook
Nov 2024 – Jan 2025



Presenter: Brad Jackson

BCB Water Conditions Report



Presenter: Brad Jackson