

SOUTH FLORIDA WATER MANAGEMENT DISTRICT



# **South Florida Resiliency Coordination Forum**

## **December 1, 2022**

[sfwmd.gov](http://sfwmd.gov)

# 1. Opening Remarks



**Drew Bartlett**

Executive Director

South Florida Water Management District

# Housekeeping

*Moderator: Yvette Bonilla*



## 2. Statewide Office of Resilience



**Wes Brooks, Ph.D.**  
Chief Resilience Officer  
Florida Statewide Office of Resilience





## Overview of District Resiliency Efforts



**Carolina Maran, P.E., Ph.D., District Resiliency Officer**  
**December 1<sup>st</sup>, 2022**

# District Resiliency

Ensuring the Region's Water Resources and Ecosystems Resiliency Now and in the Future

- District's strong commitment to address the impacts of climate change, including rising sea levels and changing rainfall patterns
- Initiated in January 2020, as District Resiliency, and leveraging significant previous efforts by several internal teams

## What do we do?

- Assess how sea level rise and extreme events, including flood and drought events, happen under current and future conditions, and how they affect water resources management, using best available science and technical tools
- Lead implementation of infrastructure adaptation investments that are needed to successfully implement the District's mission, now and in the future



[District Resiliency | South Florida Water Management District \(sfwmd.gov\)](https://sfwmd.gov)



# District Resiliency Projects and Initiatives



[sfwmd.gov](http://sfwmd.gov)

- Water and Climate Resilience Metrics
- Sea Level Rise and Flood Resiliency Plan
  - Resiliency and Flood Protection
  - Resiliency and Water Supply
  - Resiliency and Ecosystem Restoration
- USACE/SFWMD Section 216 C&SF Flood Resiliency Study
- Funding – Grant applications and other coordination efforts
- Infrastructure Projects Implementation
- Stakeholder and Public Engagement





**David Colangelo**  
*Resiliency Grant  
Manager*

- Grants Management
- Grant Applications
- FEMA/LMS Coordination
- Resiliency Plan Updated



**Nicole Cortez**  
*Resiliency  
Coordinator*

- Water and Climate Resiliency Metrics
- Internal and External Stakeholder Engagement
- Coordination with Communications (news and updates)



**Yitzzy Rosenberg**  
*Resiliency Project  
Manager*

- Water Supply Vulnerability Assessment
- WSPs - Resiliency Chapter
- Overall Project Controls



**Francisco Pena**  
*Resiliency Project  
Manager*

- H&H Technical Review and Model Application
- Resiliency Plan Ranking
- Flood Damage Cost Estimate Tool - FIAT
- Future Rainfall



## **Carolina Maran, *District Resiliency Officer***

- Lead the District's resiliency efforts to advance restoration, protect communities from flooding and meet the region's water needs, in collaboration with local, state and federal agencies;
- Coordinate scientific data and research needs to ensure the District's resilience planning and projects are founded on the best available science; and
- Develop and coordinate the implementation of comprehensive District wide resiliency goals to mitigate and adapt to the challenges facing the District's infrastructure and core functions from sea level rise and other climate change impacts.

# Water and Climate Resilience Metrics

- Track and document shifts and trends in District managed water and climate observed data
- Support the assessment of current and future climate condition scenarios, operational decisions, and District resiliency priority projects
- Inform stakeholders, the public, and partner agencies to support local resiliency strategies



[Water and Climate Resilience Metrics | South Florida Water Management District \(sfwmd.gov\)](https://www.sfwmd.gov)



# Resilience Metrics Hub

## Water and Climate Resilience Metrics

Search...

**The South Florida Water Management District is strongly committed to addressing the impacts of sea level rise and a changing climate. The District's resilience efforts support its mission of safeguarding and restoring South Florida's water resources and ecosystems, protecting communities from flooding, and ensuring we are able to meet South Florida's water needs while connecting with the public and stakeholders.**

### Objectives

As part of a series of District Resiliency initiatives to address changing conditions, the District is implementing a set of water and climate resilience metrics districtwide. These science-based metrics are being developed with the goal of tracking and documenting shifts and trends in District-managed water and climate observed data, supporting the assessment of current and future climate condition scenarios and related operational decisions, and informing District resiliency investment priorities. As part of the District's communication and public engagement priorities, this effort informs stakeholders, the general public, and partner agencies about the District's resilience efforts, while supporting local resiliency strategies. This Hub hosts the latest Water and Climate Resilience Metrics information and data analysis results, as well as related information that is relevant to the context of each metric discussion.

This page was designed as a living data hub and will be modified and updated as necessary. Check back frequently for updated data and resilience information.



# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

## Emerging Trends in Regional Resiliency



### Regional Rainfall

Changes in rainfall patterns will impact people and ecosystems by altering the amount of water in our region throughout t...



### Elevations at Coastal Structures and Sea Level Rise

Tailwater and headwater elevations at coastal structures represent how sea level rise affects stormwater discharge capacity in South...



### Saltwater Intrusion in Coastal Aquifers

The inland migration of saltwater poses a threat to water supply and critical freshwater habitats.



### Salinity in the Everglades

The salinization of previously freshwater systems poses threats to several factors.



### Estuarine and Mangrove Inland Migration

Trends in Estuarine Inland Migration provide insights to the impacts of sea level rise in coastal areas and the Everglades.



### Soil Subsidence in South Florida

Maintaining soil elevations within coastal and intertidal habitats, as sea level changes, is an indicator of long-term stability of coastal.

**DBHYDR**  
Data by Hydro

DBHYDR Insights

DBHYDR is the South Florida Water Management District's corporate environmental database that stores hydrologic, meteorologic, hydrogeologic, and water quality data.

[Details](#) [View](#)

**SFWMD Data and Support**

SFWMD SFR 2021

As the South Florida Water Management District works to achieve FIVE New Florida's Environment, we are pleased to present the 2021 South Florida Environmental Report (SFER).

[Details](#) [View](#)

SFWMD GIS Hub

Our Open Data site is where our publicly available spatial datasets can be viewed and downloaded. Additional What-Apps and Story Maps are featured in the website and learn more about the data.

[Details](#) [View](#)

**Local Agencies' Information**

Local Agencies are using their resources to help us understand the potential risks that come with Coastal Resiliency efforts.

Broward County Resiliency Dashboard

Broward County continues to build resilience at a number of scales, internally for government operations, and county-wide through coordination with municipalities and regionally across Southeast Florida.

[Details](#) [Main Page](#)

Miami-Dade County Sea Level Rise Strategy

Miami-Dade County faces an unprecedented challenge in the coming decades to adapt to climate change and sea level rise.

[Details](#) [Main Page](#)

Palm Beach County Office of Resilience

The Office of Resilience (OOR) seeks to ensure that Palm Beach County remains a great place to live, work, and play while addressing physical, social, and economic challenges including climate change.

[Details](#) [Main Page](#)

**Federal and State Agencies' Information**

Federal and State Agencies are using their resources to help us understand the potential risks that come with Coastal Resiliency efforts.

USGS Water Mapbox

This website is designed to conduct automated statistical and graphical analyses on water-level and salinity data collected from sites monitored by the U.S. Geological Survey (USGS) in South Florida.

[Details](#) [View](#)

Florida Resilient Communities Program

The Florida Department of Environmental Protection is committed to marshaling resources to prepare Florida's coastal communities and habitats for the effects of climate change, especially rising sea levels.

[Details](#) [View](#)

NOAA Resilience Hub

This page is a hub for NOAA-related resilience resources. Here you can peruse the agency's related assets, explore ELP-funded resilience projects, and learn more about our grievance community. The ELP Community Theory of Change can also be found on this hub.

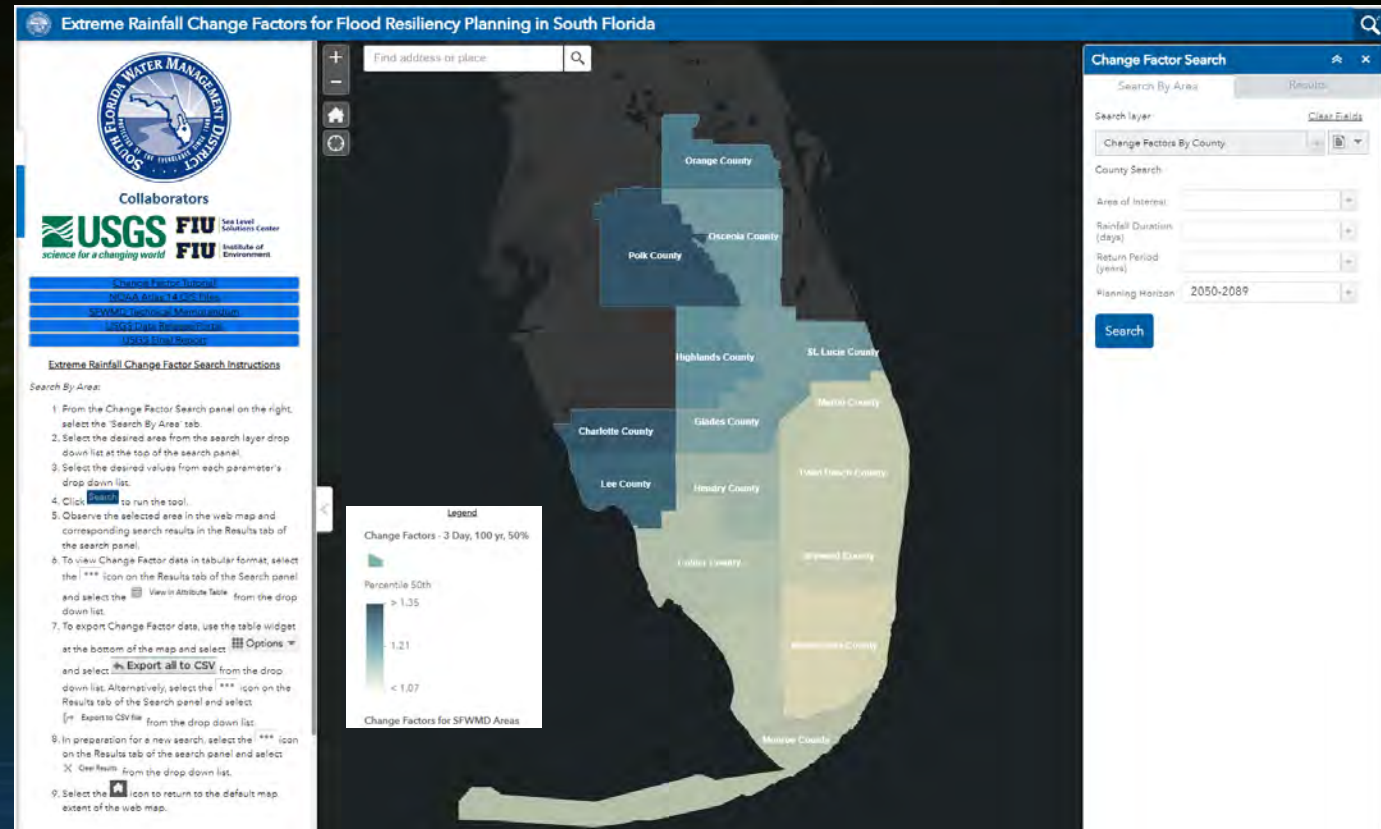
[Details](#) [View](#)

NOAA Global Climate Dashboard

NOAA Climate.gov provides timely and authoritative scientific data and information about climate science, adaptation, and mitigation.

[Details](#) [Explore](#)

# Future Rainfall Projections





- Resiliency and Flood Protection | South Florida Water Management District (sfwmd.gov)

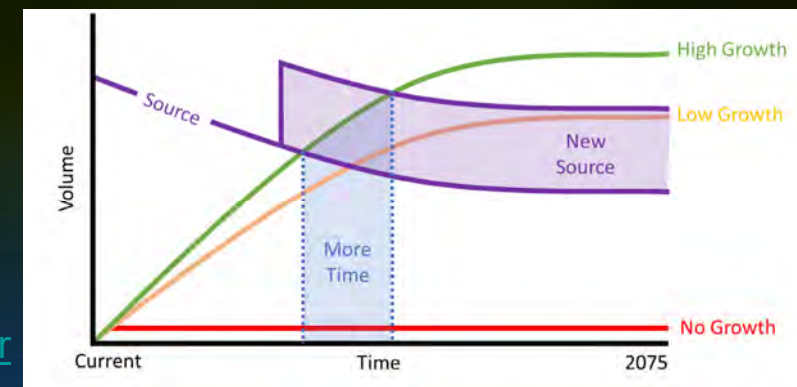
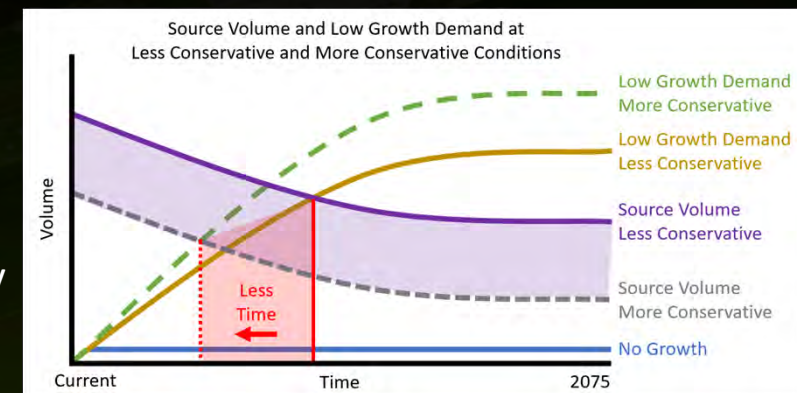




# Resiliency and Water Supply: Water Supply Vulnerability Assessment

- [Saltwater Interface Monitoring and Mapping Program](#) determine the approximate location of the saltwater interface since 2009
- Development of [alternative water supply projects](#) and promotes [water conservation](#) to increase the security and diversity of its water sources
- Sea level rise and climate change adaptations are addressed in the development of [water supply plans](#)
- Upcoming water supply vulnerability assessment, to further understand how future development and climate conditions impacts regional water supply sources

[Resiliency and Water Supply | South Florida Water Management District \(sfwmd.gov\)](#)



# Resiliency and Ecosystem Restoration

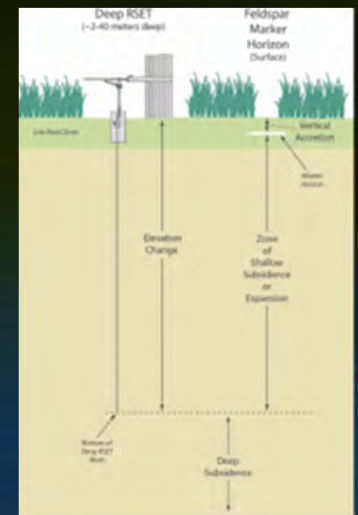
Ecosystem Restoration supports SFWMD's efforts to address the effects of climate change and sea level rise.

Completed restoration projects will increase the District's ability to better manage water and anticipated extreme weather events.

The restoration of beneficial freshwater flows throughout the system **slows down saltwater intrusion, promote sustainable aquifer recharge rates, healthier estuaries and bays, more stable coastlines and reduced marsh dry outs.**

Support studies about how sea level rise and salinity intrusion affect peat soil, one of the critical building blocks of the Everglades habitat

[Resiliency and Ecosystem Restoration | South Florida Water Management District \(sfwmd.gov\)](https://www.sfwmd.gov)



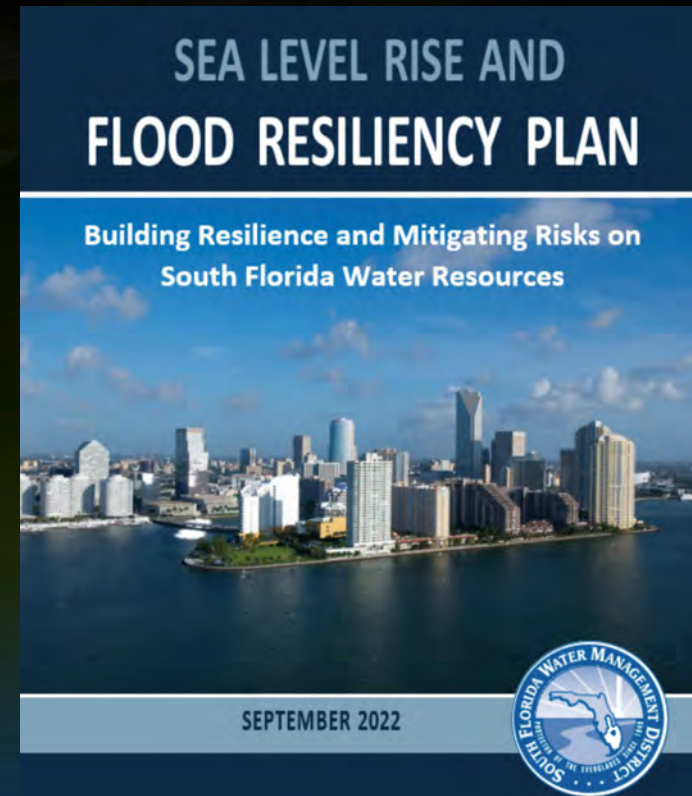


# SLR and Flood Resiliency Plan

Building Resilience and Mitigating Risks on South Florida Water Resources

- List of Priority Resiliency Projects to update and enhance water management infrastructure and implement effective, resilient, integrated basin wide solutions
- Year 2 Update: September 1<sup>st</sup> (annually updated)
- Founded on extensive data observations and robust technical hydrologic and hydraulic model simulations to characterize current and future conditions, and associated risks
- GOAL: to reduce the risks of flooding, sea level rise and other climate impacts on water resources and increasing community and ecosystem resiliency in South Florida

[SLRFRP | South Florida Water Management District \(sfwmd.gov\)](https://sfwmd.gov)

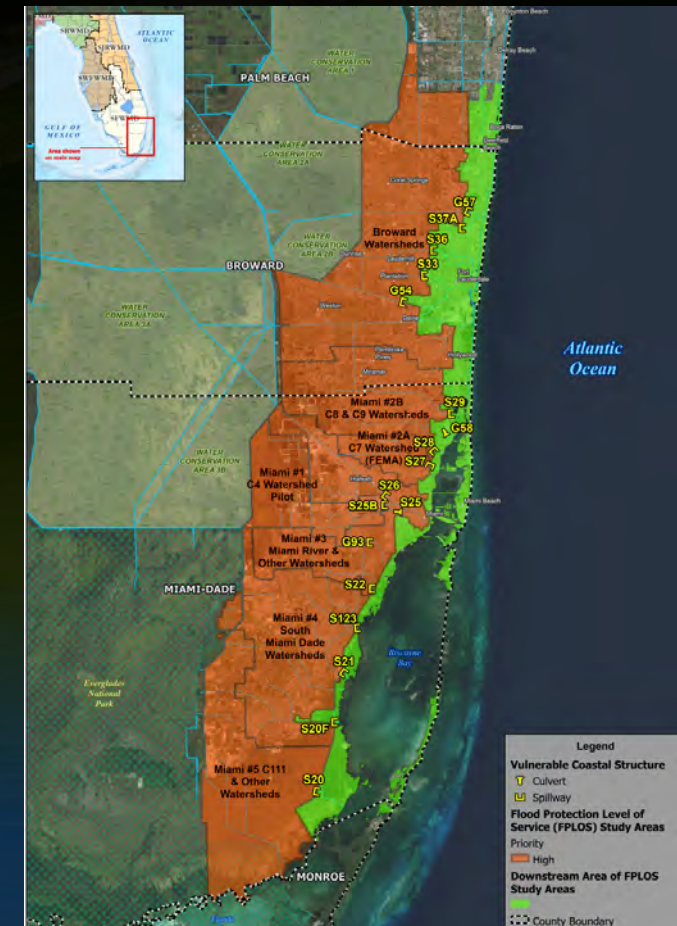


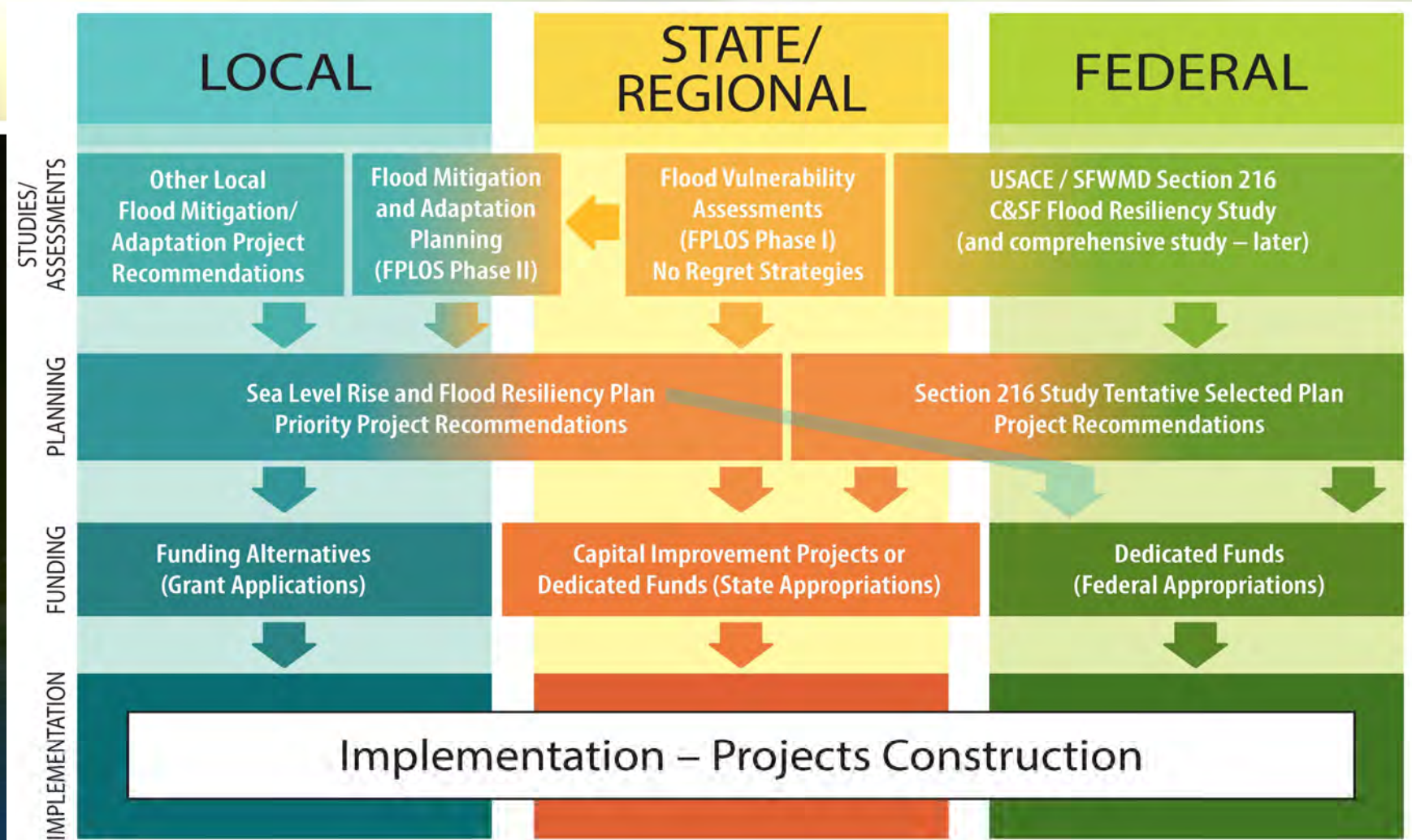


# USACE/SFWMD C&SF Flood Resiliency Study

- Upcoming study to evaluate existing flood risk management infrastructure and **recommend adaptation strategies to build flood resiliency** now and into the future, in the communities served by the C&SF system
- To be conducted under Section 216 of the Flood Control Act of 1970
- Cost Share Agreement between USACE and SFWMD (local sponsor)
- Focus on the **highly vulnerable infrastructure** that can reduce the most immediate flood risks due to changing conditions, and the resilience aspects of such infrastructure

[Central and Southern Florida Flood Resiliency Study](https://www.sfwmd.gov)  
[South Florida Water Management District \(sfwmd.gov\)](https://www.sfwmd.gov)







# State and Federal Funding Opportunities



# Recent Award Recommendation from FDEM / FEMA BRIC



## State of Florida Announces Determination of Eleven Key Mitigation Projects for Building Resilient Infrastructure and Flood Mitigation Assistance Grant Programs

**TALLAHASSEE, Fla.** – The State of Florida is announcing that eleven project sub-applications have been selected by the Federal Emergency Management Agency (FEMA) for the fiscal year 2021 Building Resilient Infrastructure and Communities (BRIC) and Flood Mitigation Assistance (FMA) programs which provide grants to improve resilience and prepare communities for the impacts of storms, flooding and wildfires. While this announcement is not an award, it's a decision on the status of all sub-applications allowing Florida's eleven selected mitigation projects to continue through for final funding decision.

"The State of Florida continues to set a national standard in emergency management thanks to the tireless work of our local and state partners who remain committed to increasing our local communities' resiliency to flooding and other natural hazards," said **FDEM Director Kevin Guthrie**. "With the historic peak of hurricane season right around the corner, I want to thank our Mitigation Bureau who worked diligently to get these projects through to the next step."

"Under the Governor's leadership, Florida is better positioned than ever before to minimize future flood damages and rebound more quickly after significant storm events," said **Chief Resilience Officer Wesley R. Brooks, Ph.D.** "Federal funding for the 11 Florida projects successfully advancing through FEMA's national competition process today would supplement more than \$1 billion in state awards for inland and coastal communities emanating from the new Resilient Florida program."

### Selected Projects include:

- FY 2021 BRIC, South Florida Water Management District Flooding Resiliency C-8 Basin Project
  - Project total: \$71,524,463



# Stakeholder and Public Engagement: South Florida Resiliency Coordination Forum

- **Fact-finding forum** to engage partners on the impacts of changing climate conditions and water management implications, now and in the future
- **Promote collaboration** among the South Florida Water Management District, **local, state, federal and tribal partners** on water management initiatives related to resiliency
- Promote **regional coordination** and **partnership opportunities** by holding **proactive discussions**, leveraging technical knowledge and exchanging information
- Foster a **constructive environment** to discuss tangible asset-level solutions and support decision making on water resource management.

[Resiliency Forum | South Florida Water Management District \(sfwmd.gov\)](https://www.sfwmd.gov/resiliency-forum)



## Next Meeting Dates

### Scheduled Meeting Dates:

#### 2022

Wednesday, December 1, 2022

#### 2023

Wednesday, February 22, 2023

Wednesday, May 24, 2023

Wednesday, August 30, 2023

Wednesday, November 29, 2023

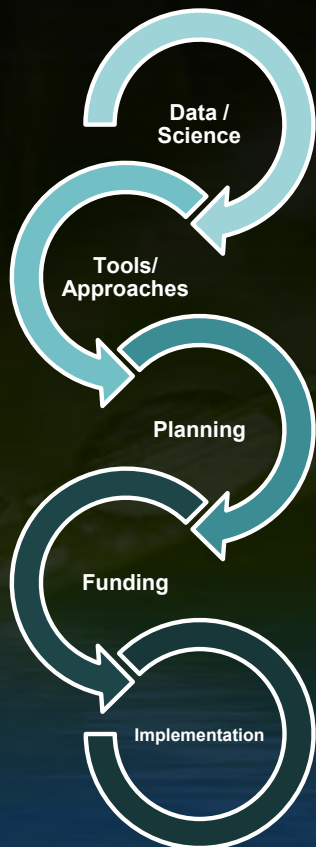
### Invited Partners:

- Resiliency Leads from 16 Counties and Local Governments
- 298 Districts
- Planning Councils
- Tribes
- State Agencies
- Federal Agencies

**Send us your suggestions for upcoming Agenda Items**



# What is Next?



- **South Florida Resiliency Coordination Forum Meetings** and other stakeholder and public engagement efforts
- **Water and Climate Resilience Metrics:** advanced data analysis and automation, Evapotranspiration and Water Quality trends are upcoming
- **FPLOS Program Collaboration:** Flood Vulnerability Assessments and Adaptation Planning – Phase II Study at C7 Basin and ongoing Phase I Studies in Upper Kissimmee Basin and Palm Beach County
- **Sea Level Rise and Flood Resiliency Plan:** 2023 Update
- **USACE/SFWMD Section 216 C&SF Flood Resiliency Study**
- Initiate the Lower East Coast **Water Supply Vulnerability Assessment**, upon completion of the LEC Water Supply Plan
- Advance grant applications and other funding coordination efforts
- Finalize negotiation with FDEM/FEMA for the implementation of flood resiliency measures at C-8 Basin and continue design for S-27 and S-29 Coastal Structures

# How can you be involved?

- Sign-up for our updates by visiting <https://www.sfwmd.gov/news-events> and following these steps:
  - 1 - Click on the “Subscribe for Email” icon
  - 2 - Enter your email address
  - 3 - Select “District Resiliency”  
under Subscription Topics / News
- Contribute on our initiatives and send us an email to [resiliency@sfwmd.gov](mailto:resiliency@sfwmd.gov)
- Visit [www.sfwmd.gov/resiliency](http://www.sfwmd.gov/resiliency) to get updated information
- Visit [www.sfwmd.gov/meetings](http://www.sfwmd.gov/meetings) to attend and participate at District events

The image displays two screenshots from the South Florida Water Management District website. The top screenshot shows the 'News and Meetings' page, with a green box highlighting the 'NEWS & MEETINGS' link in the top navigation bar (labeled '1'). Below, a green box highlights the 'Subscribe for Email' icon (labeled '2'). The bottom screenshot shows the 'Quick Subscribe' form, with a green box highlighting the 'District Resiliency' option under the 'Subscription Topics' section (labeled '3').





# Thanks!

**Carolina Maran, Ph.D., P.E.,**  
[cmaran@sfwmd.gov](mailto:cmaran@sfwmd.gov)  
District Resiliency Officer

South Florida Water Management District  
[www.sfwmd.gov/resiliency](http://www.sfwmd.gov/resiliency)

# **Tools Used to Collect and Assess Observed Flooding**

**Christine Carlson, Lead Geospatial Scientist, IT Geospatial Services,  
South Florida Water Management District**



## Flood Occurrence

- Standing water in areas that are generally dry and not designed and built to retain/detain stormwater





## Why collect?

### ■ During and Immediately Following an Event:

- Provide real time access to conditions within impacted area
- Support rapid and effective response
- Inform deployment of reconnaissance teams to mark / measure high water marks

### ■ Post-Event:

- Estimate inundation depths and extents within impacted areas
- Increase our understanding of frequently flooded areas to inform mitigation/adaptation strategies
- Validate / Ground Truth modeling results



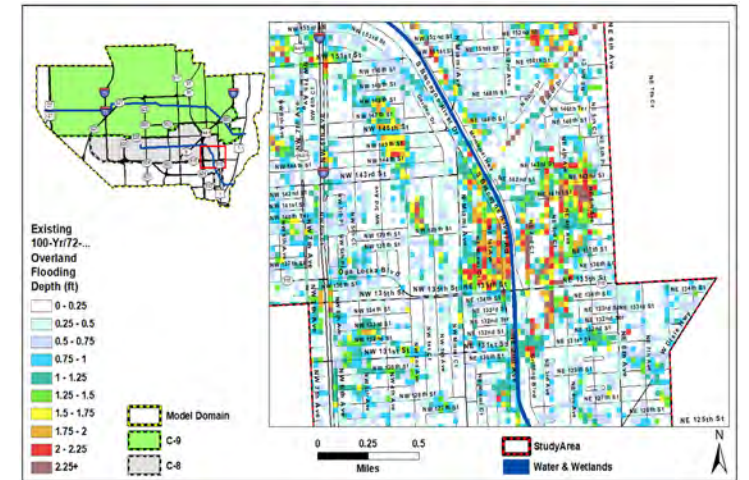
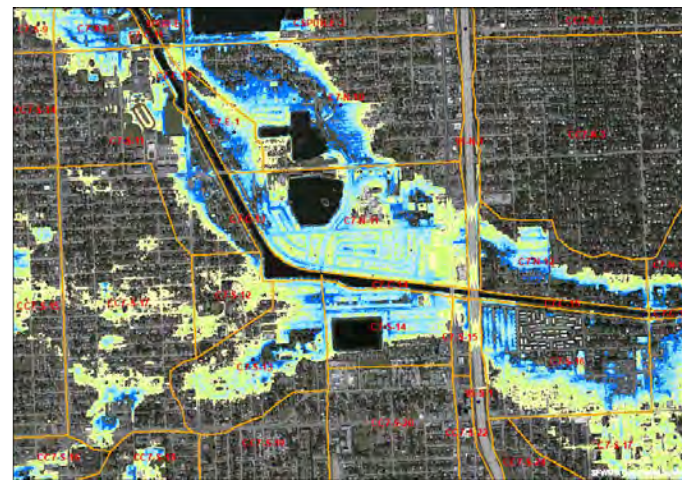
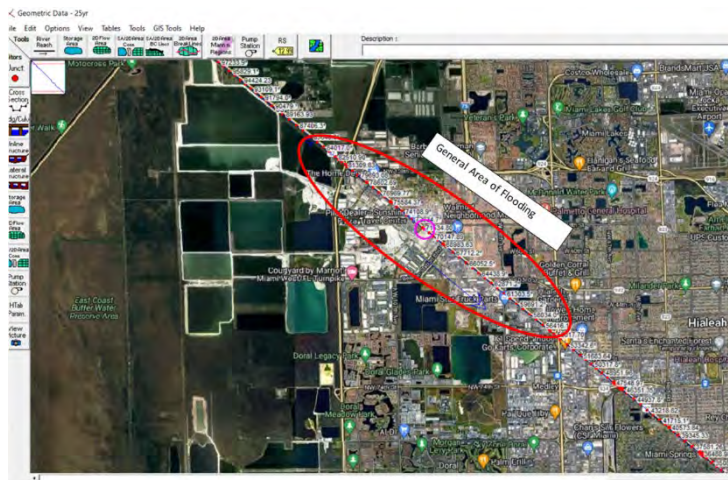


## What Programs do these data support?

- **Resilient Florida Program**: Grant program available to **counties, municipalities, water management districts, flood control districts and regional resilience entities**. Within the program's ranking criteria, points are awarded for documentation verifying flooding more than 3 times within the past 5 years or areas experiencing ongoing erosion as a result of flooding, storm surge and sea level rise.
- **Flood Protection Level of Service Program (FPLOS)**: FPLOS models are being developed throughout the basins, within SFWMD boundaries, and data is needed for model calibration and verification, and to document flood reduction after mitigation measure implementation
- **FDEM / FEMA Hazard Mitigation Programs**: Federally funded program administered by the Florida Division of Emergency Management. Designed to assist **states, local governments, private non-profit organizations and Indian Tribes** in implementing long-term hazard mitigation measures following a major disaster declaration.



## Reported Flooding vs. Predicted Flooding by the FPLOS Models (TS Alex, June 2022)



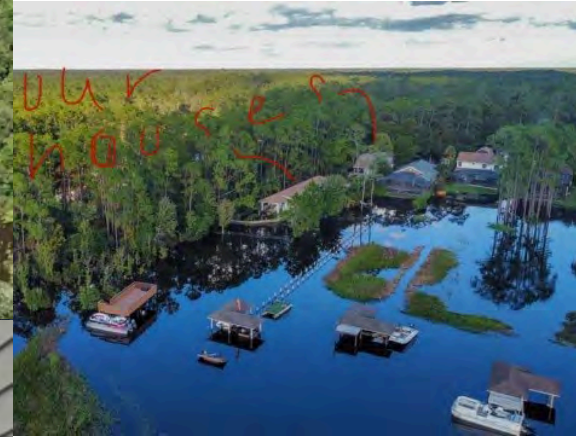
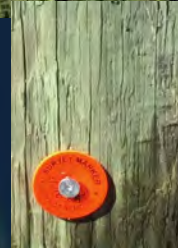
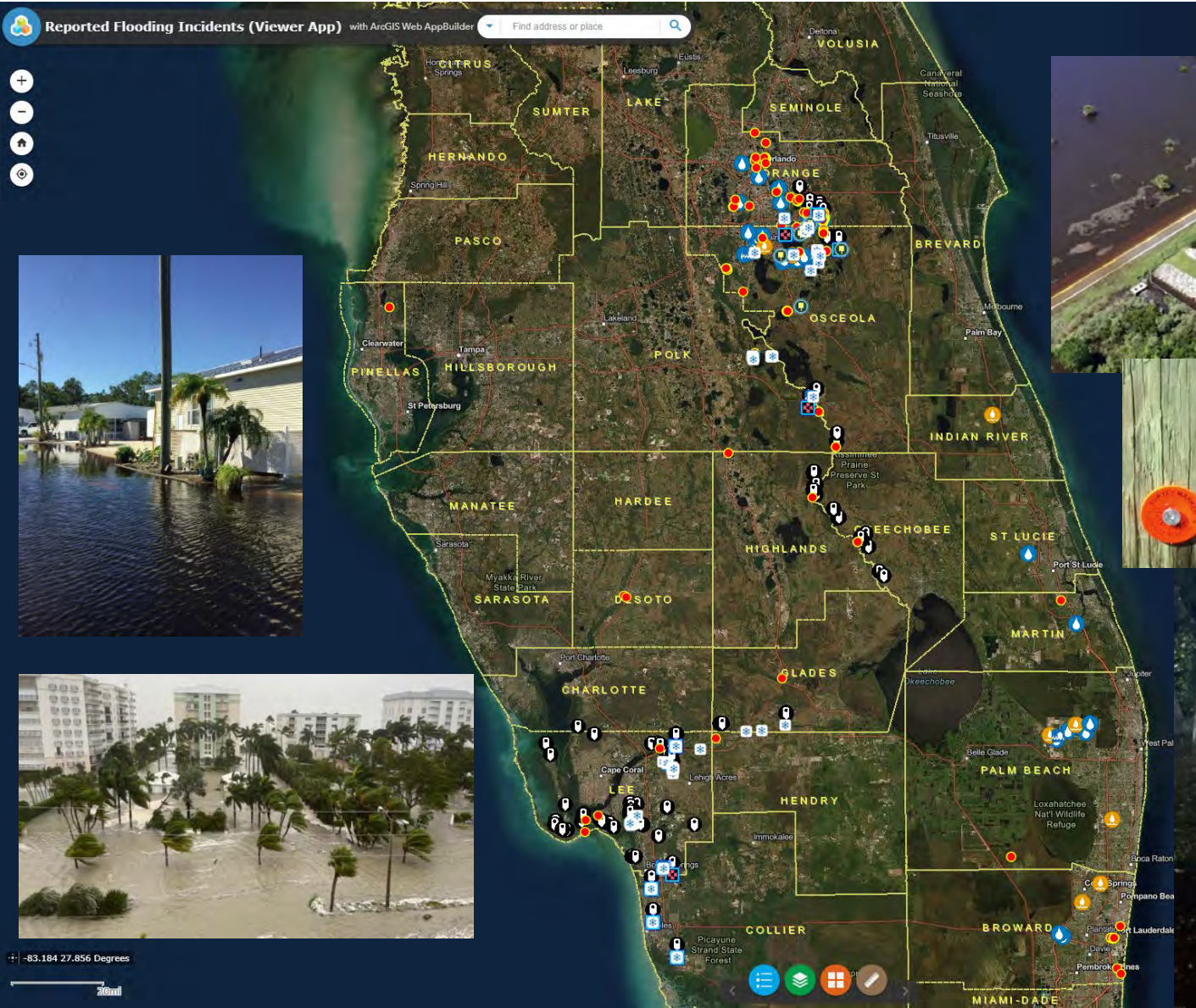
C-6 Basin

C-7 Basin

C-8 Basin



# Flooding Observations: Staff Reports & Environmental Conditions Team High Water Mark and Drone Surveys (Hurricane Ian, September/October 2022)



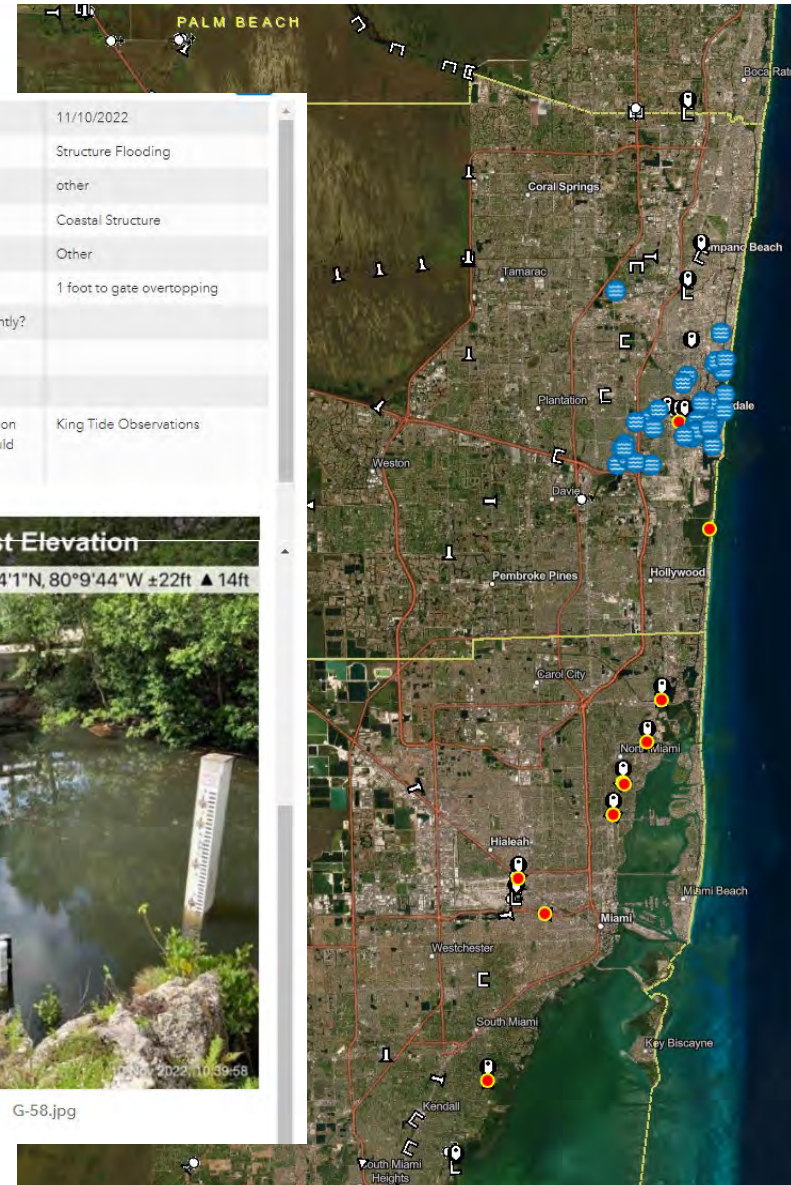


## King Tide Flooding Observations (Hurricane Nicole, November 2022)



G-58.jpg

Report Flooding Date	11/10/2022
What type of flooding?	Structure Flooding
What type of structure?	other
Other	Coastal Structure
How deep is flooding?	Other
Other	1 foot to gate overtopping
Does this area flood frequently?	
How frequently?	
Other	
Please enter other information about this flooding you would like to report.	King Tide Observations



Legend

Flood Observation Survey Viewer

Flood Observation Survey

Flood Concerns Reported to Ft Lauderdale

Broward County Flood Survey Observations

SFWMD Collected Photos

Nicole 2022

Flood Locations - from Public Calls/Emails

Flooding Observed

Flooding

Flooding Concern

All District and Non-District Structures

AHED Structures

Active Structures

Primary Structures

Culvert

Lock

Pump

Spillway

Weir

Flume

Administrative Boundaries

Boundaries

County



## Flood Observations - Tool Inventory

- Local Contact Viewer
- Flood Observation Survey (with support from ArcGIS Quick Capture Mobile Application)
- Flood Reporting Web Map – Flood Incidents Viewer
- Environmental Conditions Team High Water Mark Survey 1-2-3 App
- Drone Reconnaissance
- Florida Department of Emergency Management High Water Mark Survey

# Local Contact Viewer – Find Your Water Manager

The screenshot displays the 'Local Contact Viewer v2.0' web application. The browser address bar shows the URL: `apps.sfwmd.gov/WAB/LocalContactViewer/index.html`. The application header includes 'Local Contact Viewer v2.0' and 'SFWMD Emergency Management'. The main map area shows an aerial view with labels for 'Perimeter Rd', 'Southern Blvd', and 'Lake Lytal Park'. A sidebar on the right, titled 'Near Me', contains a search bar with the address '3301 Gun Club Rd, West P', a search button, and a location pin icon. Below the search bar, it indicates 'Show results within 750 Feet' with a slider set to 0 to 750. The sidebar also lists contact information for 'PALM BEACH COUNTY'.

**Local Contact Viewer v2.0** SFWMD Emergency Management

**Near Me**

Search an address or locate on map

3301 Gun Club Rd, West P X Q

Show results within 750 Feet

0 750

Contact Agency

Approximate Distance: 0 ft

**Local Agency Contacts:**

Agency: PALM BEACH COUNTY

Type: COUNTY

Service Area Status:

Customer Service: 561-684-4010

Emergency: 561-712-6400

Contact Email: [NA](#)

Website: <http://discover.pbccgov.org/pages/contact-us.aspx>

Alternate Agency: NA

Alternate Agency Type: NA

Customer Service: NA

Emergency: NA

## Local Contact Viewer



# Flood Observation Survey (Phase 1 Testing – Internal Tool)

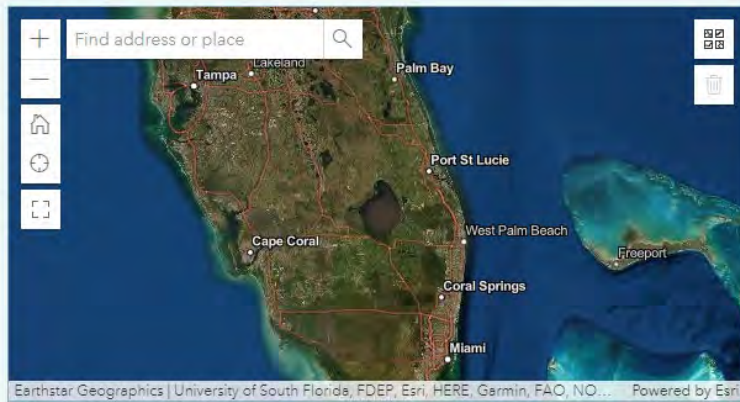
## Report Flooding Date

Please select the date that flooding occurred.

m/d/yyyy

## Report Flooding Location

If you are on a mobile device, please use the location icon on the left side of the map to identify your location. If on a computer, enter your address or navigate to your location using the map.



## Submit Photos

We would like to see pictures of this flooding. Use your computer/mobile device to upload up to 3 photos or take a picture using the camera icon seen in this section of the survey.

1 Select image file (maximum number of files allowed: 3)



## Provide More Information About This Flooding

### What type of flooding?

Structure Flooding

Standing Water

Street Flooding

Structure Flooding

Agricultural Flooding

### What type of structure?

☐ Residential

☒ Commercial

☐ Industrial

☐ Other

### How deep is flooding?

-Please Select-

Ankle deep

Knee deep

Greater than knee deep

Other

### Does this area flood frequently?

☒ Yes

☐ No

### How frequently?

☐ Only during hurricanes and tropical storms

☐ Only during heavy rain events

☐ During King Tides

☐ Every time it rains

☐ Other

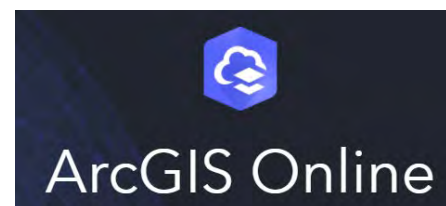
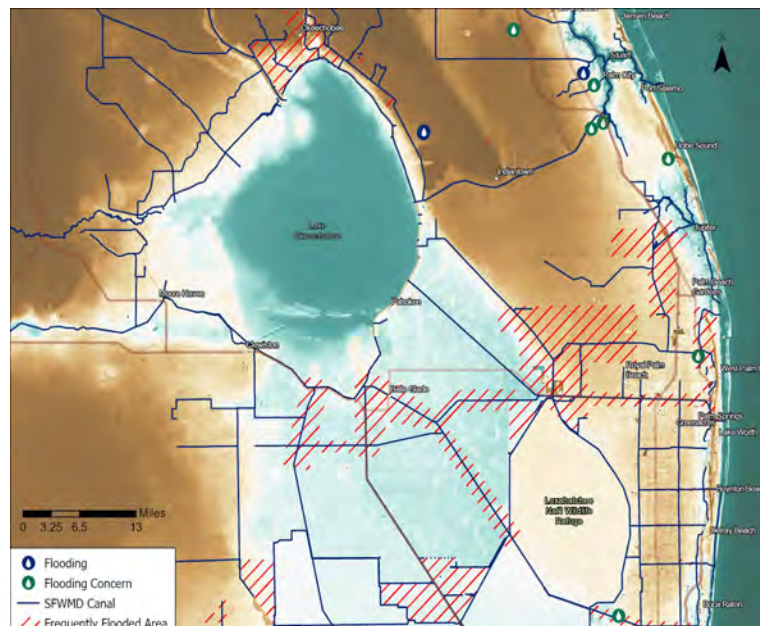
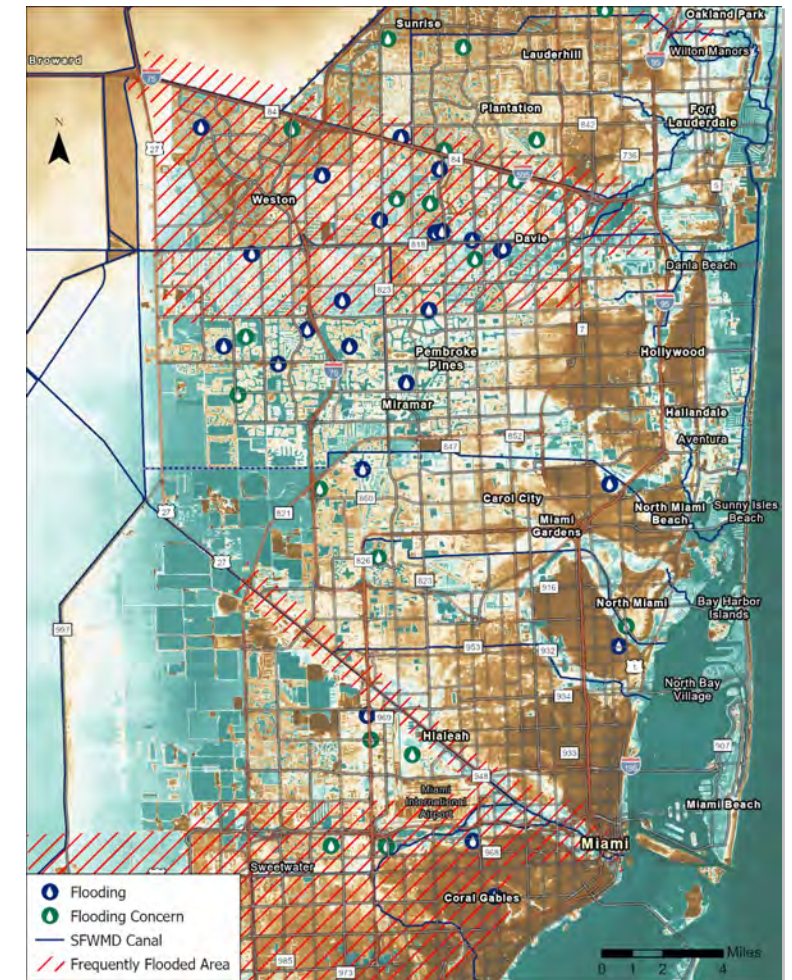
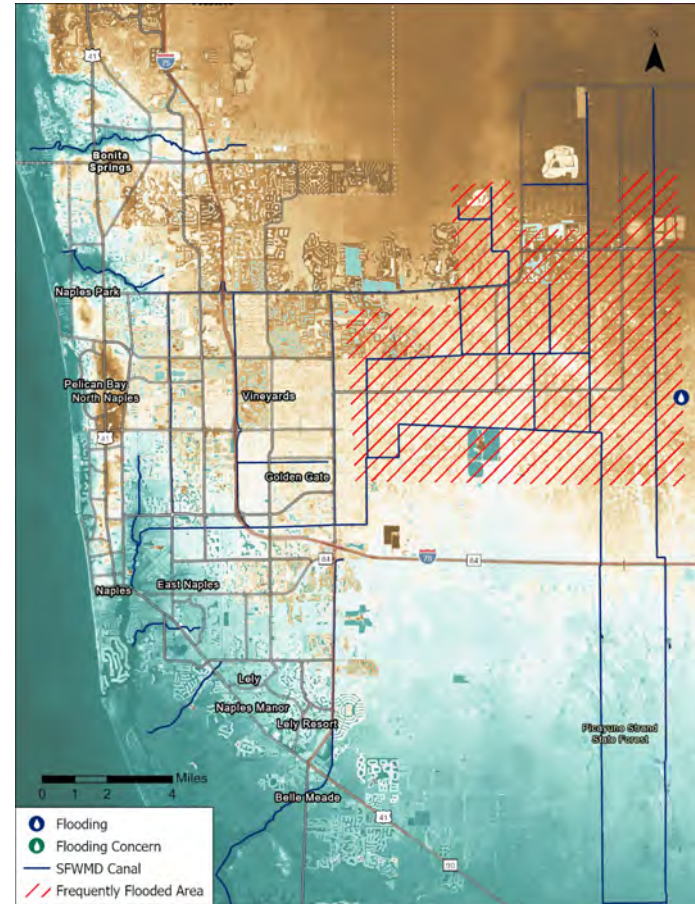
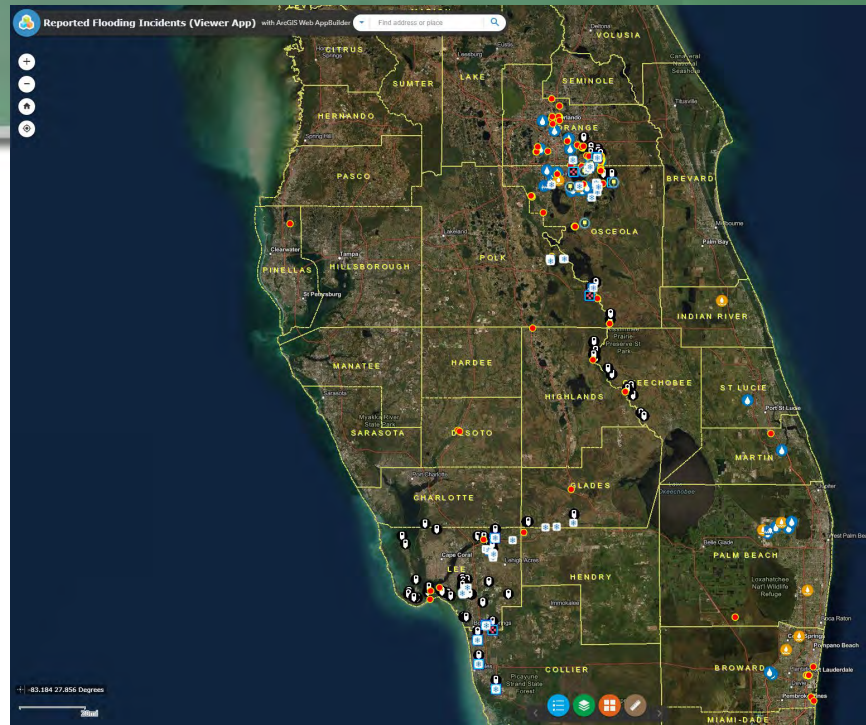
Please enter other information about this flooding you would like to report



ArcGIS Survey123



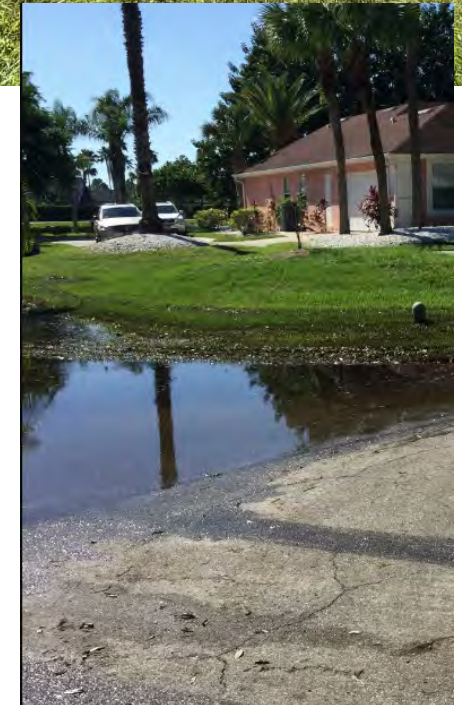
## Flood Reporting Tool – Map Viewer





## Environmental Conditions Team

- Deployed to investigate reported ground conditions
- Mark high water marks
- Take pictures to document conditions
- May work in concert with drones to determine best locations for marking high water marks
- Subsequent elevation surveys
- Generate report archive of observations





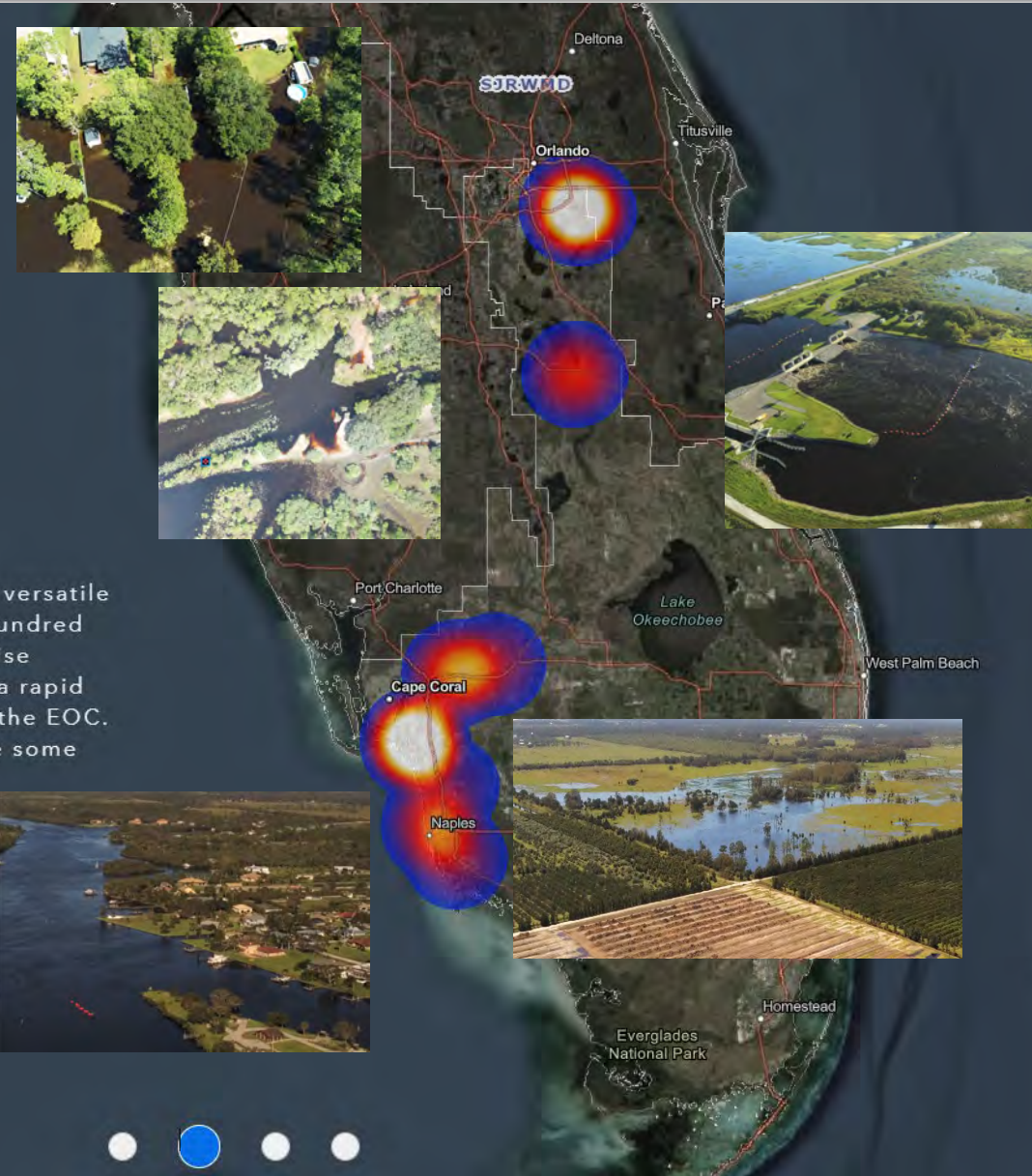
# Implementing New Drone Technology as an Effective Emergency Management Tool (Hurricane Ian, September/October 2022)

- 9 Drone Deployments;  
17 sites visited
- 11 ECT HWM  
Deployments; 57 High  
Water Marks Collected
- 14 Survey Deployments

## Aerial Imagery

### Over 600 Images Collected

UAS/Drone Imagery is one of the most widely used and versatile products from drones. The EOC Drone team captured hundreds of images from standard point and shoot shots, to precise mappings imagery. Utilizing the Drone Images provide a rapid turn around time to get live ground conditions back to the EOC. Click near the center of the hotspots on this map to see some images collected.





# State Coordination: FDEM Silver Jacket High Water Mark Survey

## High Water Marks Survey



### Collection Date:\*

10/19/2021

### Event Type:\*

Please select one

☐ Hurricane

☐ Flooding

☐ Tidal

☐ Other

### Event Name:\*

Name of Hurricane or Flooding event, i.e. Michael or 2019 Spring Flooding

### County:\*

Select County from dropdown

-Please Select-

### Recorder Name:\*

Provide your Name

### Recorder Email:\*

Provide your Email

### Location Description:\*

Provide exact address or general location of high water mark, i.e. right-of-way of State Road 60

### High Water Mark Description:\*

Provide description of High Water Mark, i.e. water line identified on exterior of structure on garage door

### Elevation (ft):\*

Provide High Water Mark elevation in feet

### Elevation Comments:

Provide comment on elevation, i.e. elevation provided is above ground or above datum (NAVD29 or NAVD88)

### Additional Notes:

Provide any additional notes about High Water Mark

### Location\*

Provide location of High Water Mark



### Attachment (Required)\*

Select image file



### Attachment (Optional)

Select image file



### Attachment (Optional)

Select image file



### Attachment (Optional)

Select image file



### Attachment (Optional)

Select image file



Submit



ArcGIS Survey123

# Lessons Learned and Added Value

## ➤ Lessons Learned:

- Need to encourage adoption of new tools and ways of capturing and conveying ground condition information to Mission, Logistics, Operations, and Planning officers
- Need to expand use of observation tools to improve access to real-time ground conditions
- Georeferenced ground observations support evaluation of operational alternatives and adaptive response to water management operations
- Timely access to damage assessment observations facilitates deployment of teams to areas of interest / concern
- Combined deployment of ECT and Drone teams provides reconnaissance efficiencies in areas with extensive flooding

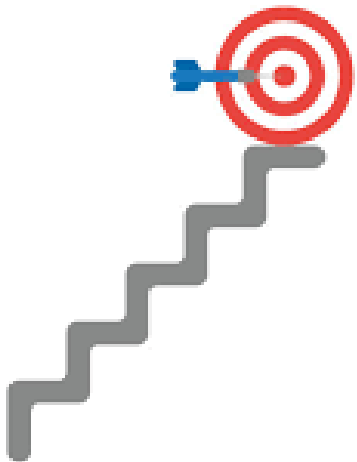
## ➤ Added Value:

- Better documentation of the extent, location, and frequency of flooding will be used to
  - Facilitate documentation of flood occurrence and related triggers for that flooding
  - Validate H&H modeling results and flood vulnerability assessments
- Increased situational awareness for water managers and incident commanders and officers
- Improved equity in reporting. Accomplishing this is totally dependent on access to and adoption of these tools as means of communicating ground conditions and concerns to local contacts and water managers.





## Next Steps



- Consolidation of tools to reduce and streamline post-processing level of effort and facilitate timely access to observations
- Consolidation of collected information into a more useable format
- Development of automated reporting strategies for real-time event reports and after-action data access and evaluations
- Assessment of radar / satellite data to support additional documentation of flood extension, duration and depths
- Phase 2 Tools Testing: Outreach to our local partners to use reporting / observation tools
- Design and implementation of a strategy for long-term storage and access to collected data, and flooding events trend analysis

# 4a. Collier County Overview

Christopher Mason, CFM, FEMA Flood Plain  
Coordinator, Collier County







4b.

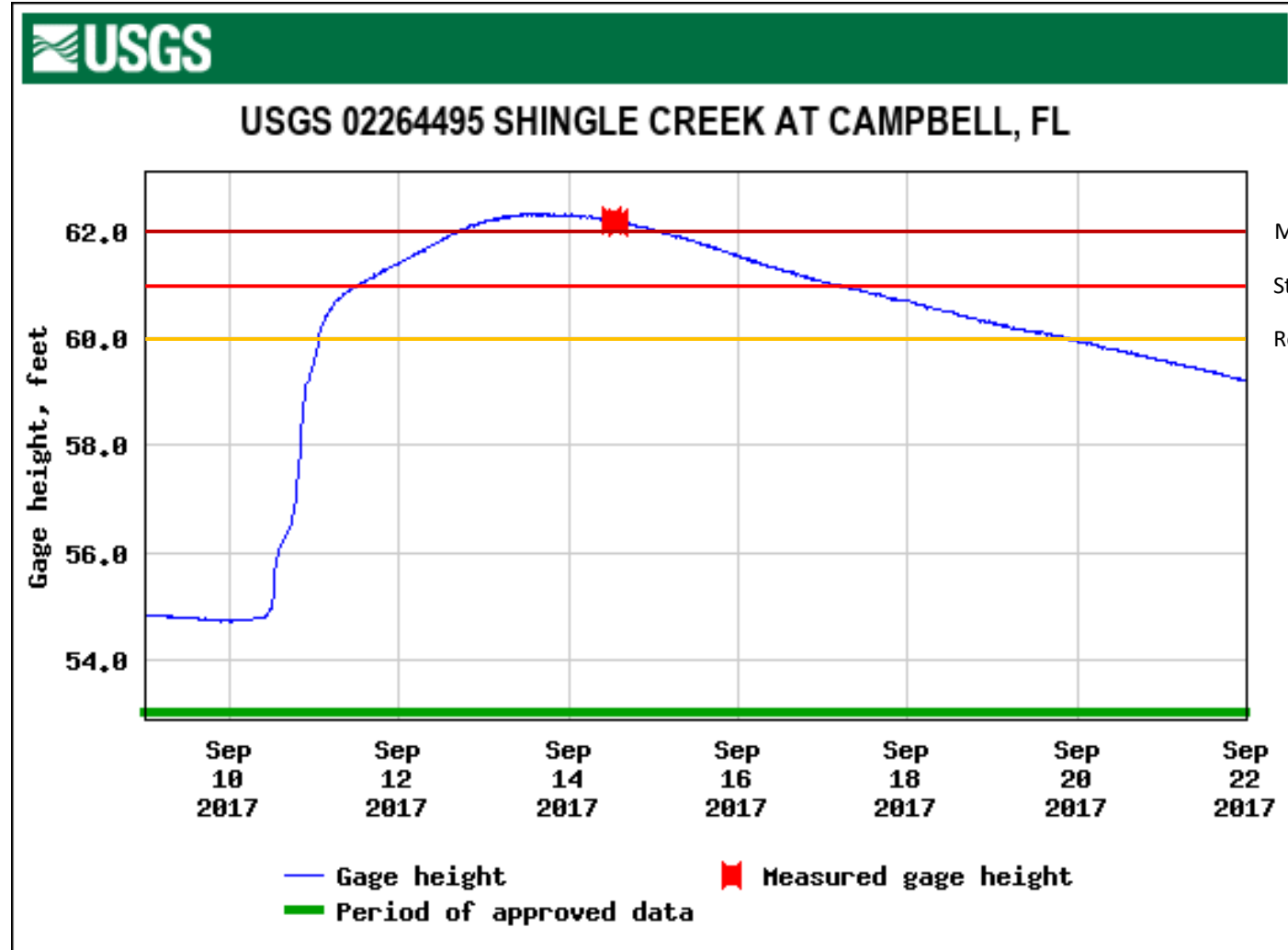
# Osceola County

Steps to Resiliency



# Why is Resiliency needed?

## Understanding the Issues



Major Flooding at Gage Height 62.0  
Structure Flooding at Gage Height 61.0  
Roadway Flooding at Gage Height 60.0





# Steps to Resiliency

- Shingle Creek Basin Study
- Osceola County Master Surface Water Management Plan
- Osceola County Vulnerability Assessment





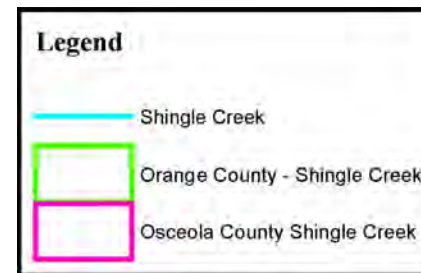
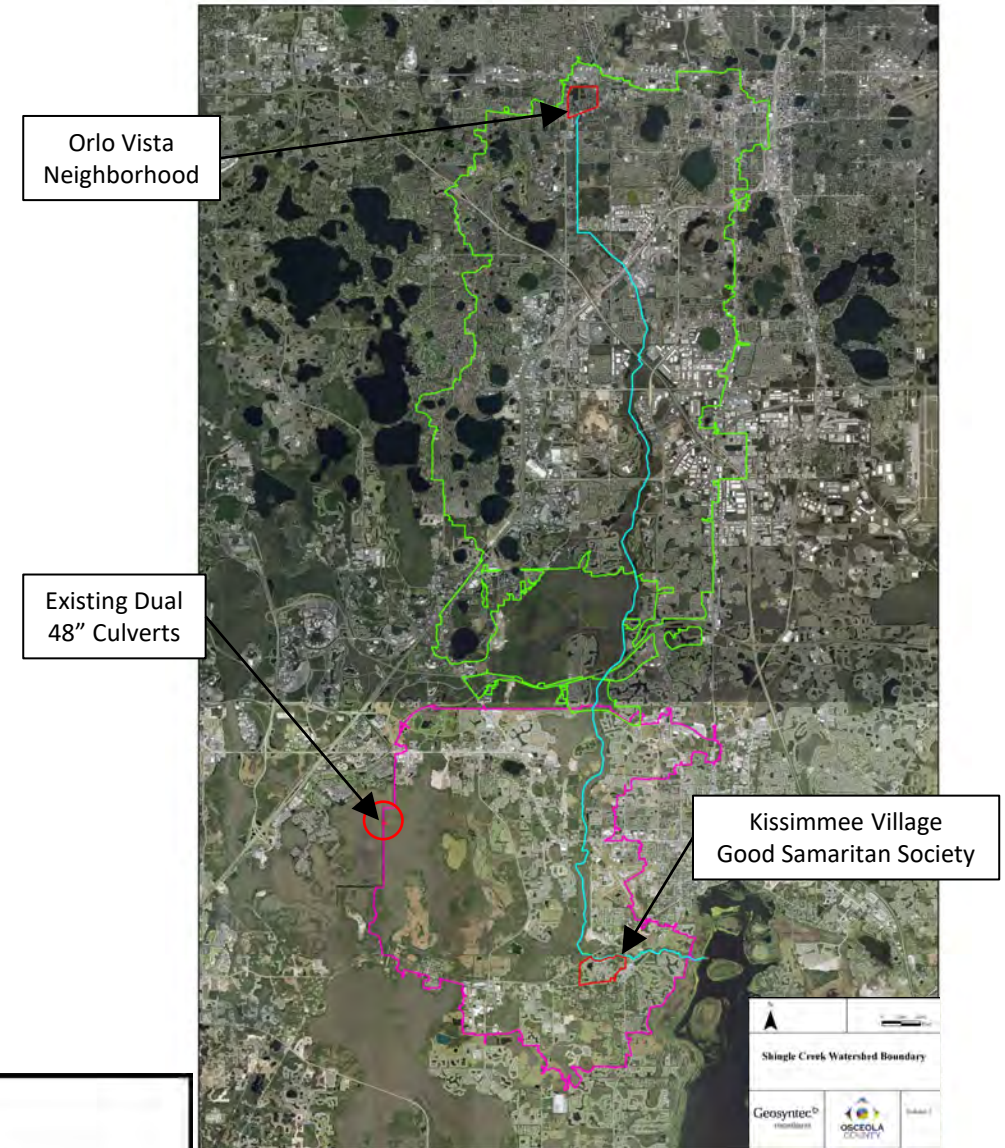
# Shingle Creek Basin Study

## Goals

- 90,000-acre drainage basin.
- Covers parts of Orlando and Orange and Osceola Counties.
- Several areas known for flooding.
- 1 foot break in FEMA elevations between Orange and Osceola County.
- Orange County and City of Orlando are completing their basin studies for their respective sections of Shingle Creek.
- Orange County and City of Orlando are cooperating with Osceola County data compilation.

## Goals

- Resolve elevational break.
- Create a unified model of Shingle Creek and associated tributaries.
- Develop conceptual solutions to reduce flood stage and duration for properties in the Shingle Creek basin.





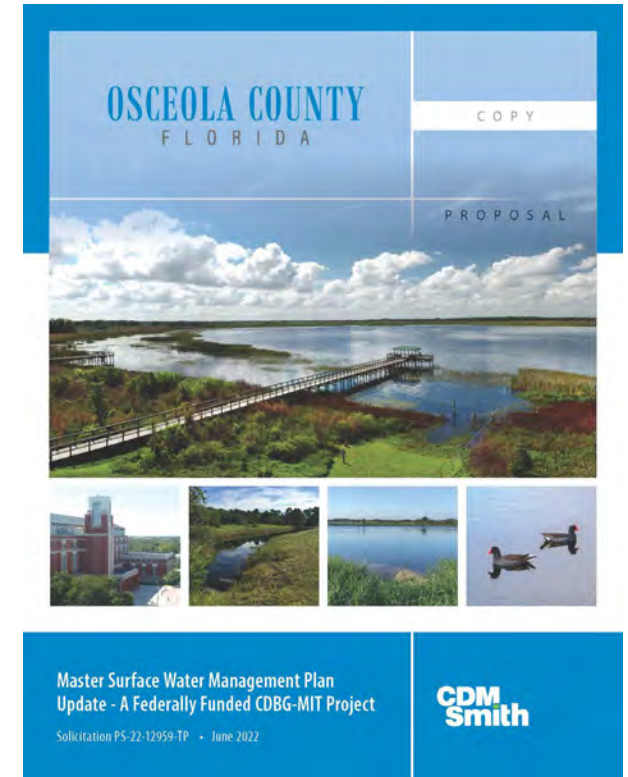


# Master Surface Water Management Plan Update

- Master Surface Water Management Plan is to cover all of Osceola County.
- Last update occurred in 2014.
- Focus of the 2014 study was water quality in the Urban Growth Boundary.

## Goals

- Create a high-level model of current drainage conditions within Osceola County.
- Produce policy recommendations for the County's Comprehensive Plan and Land Development Code.
- Propose expansions to the current water quality and quantity monitoring network.
- Utilize modeling and water quality data to create conceptual dispersed water project(s) to reduce the nutrient impact from high flow events such as Hurricane Irma to the downstream Lake Okeechobee watershed
- Model conceptual improvements to the secondary system to reduce flood risk





# Osceola County Vulnerability Study

- Submitted an application to the Florida Department of Environmental Protection for grant funding under the Resiliency Planning Grant program.

## Goals

- Create a high-level model of future drainage conditions within Osceola County merging the model from the SFWMD FPLOS for the Upper Kissimmee Basin and the model from the SJRWMD Flood Forecasting Model of the Upper St. Johns River Basin.
- Determine flood risk to critical infrastructure from increased storm intensity and duration in the 50-year timeline.
- Produce policy recommendations for the County's Comprehensive Plan and Land Development Code.
- Suggest improvements to critical infrastructure.
- Preliminary discussions have begun with FDEP on the proposed scope of the Vulnerability Assessment.







# Hurricane Ian Update

 **Good Samaritan Society**  
KISSIMMEE VILLAGE  
[www.good-sam.com](http://www.good-sam.com)  
(407) 933-3213





Thank You!



# USACE/SFWMD C&SF Flood Resiliency (Section 216) Study: Integrating Resilience Efforts and Solutions in South Florida

SFWMD Resiliency Coordination Forum

1 December 2022

Eva B. Vélez, P.E.  
Chief, Ecosystem Branch

E. Timothy Gysan, PE. PMP  
Resiliency Senior Project Manager  
Jacksonville District  
U.S. Army Corps of Engineers

*Working Today to Build a Better Tomorrow*



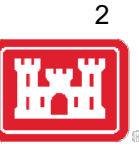
US Army Corps  
of Engineers®





# BUILDING COMMUNITY RESILIENCE

## A COMPREHENSIVE AND COLLABORATIVE APPROACH



### SHARED RESPONSIBILITY

**An Effective Resilience-focused Strategy Requires a Coordinated and Integrated Approach Across All Levels of the Public and Private Sectors**

- The problems related to climate change are uncertain, broad, and complex
- It is essential to survey and assess relationships among all public and private sector deliverables and capabilities – at local, regional, state and federal levels – to determine the most appropriate and effective packaging of programs, projects, and services to accomplish resilience and sustainability objectives







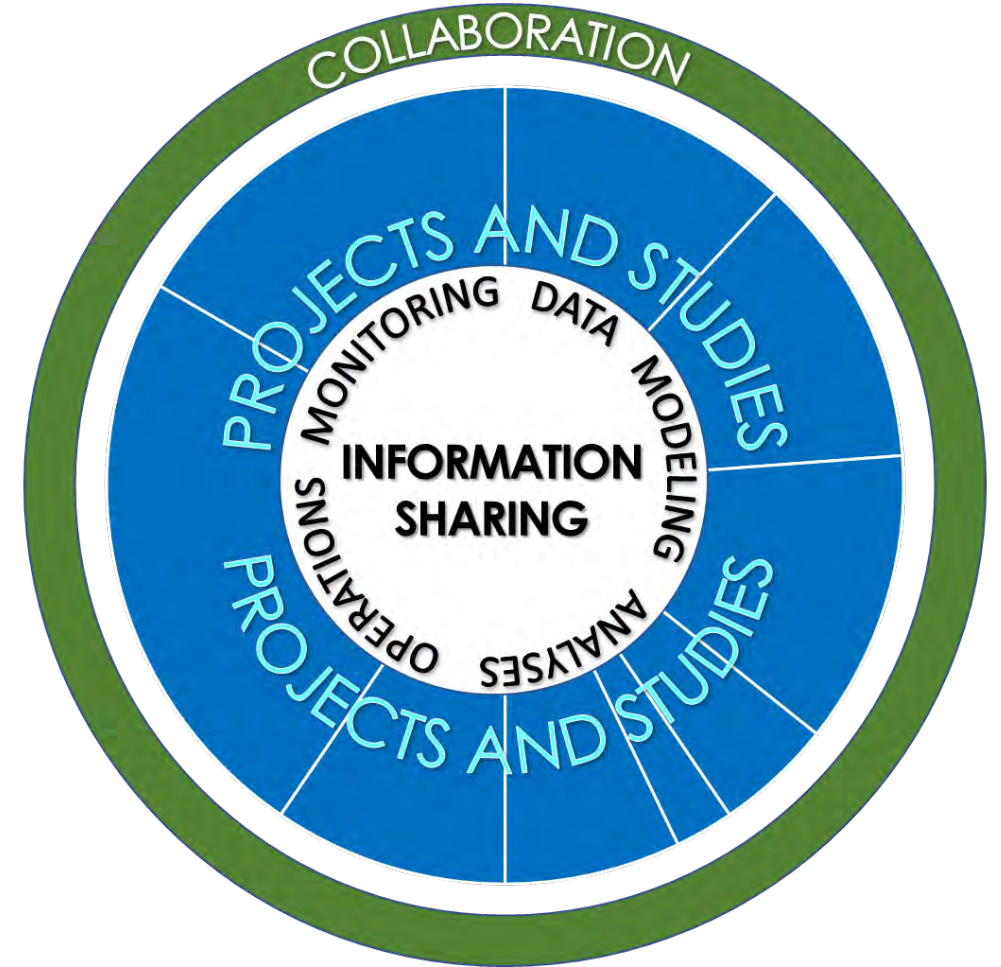
# BUILDING COMMUNITY RESILIENCE

## A COMPREHENSIVE AND COLLABORATIVE APPROACH



### HOW DOES IT ALL FIT TOGETHER?

Collaboration is key to identify and assess impacts, connections, dependencies, relationships, causes, economies of scale, etc. – that are needed to more fully and adaptively plan, implement, integrate, and operate programs and projects for more resilient and sustainable communities in the long term, and in the face of climate change.

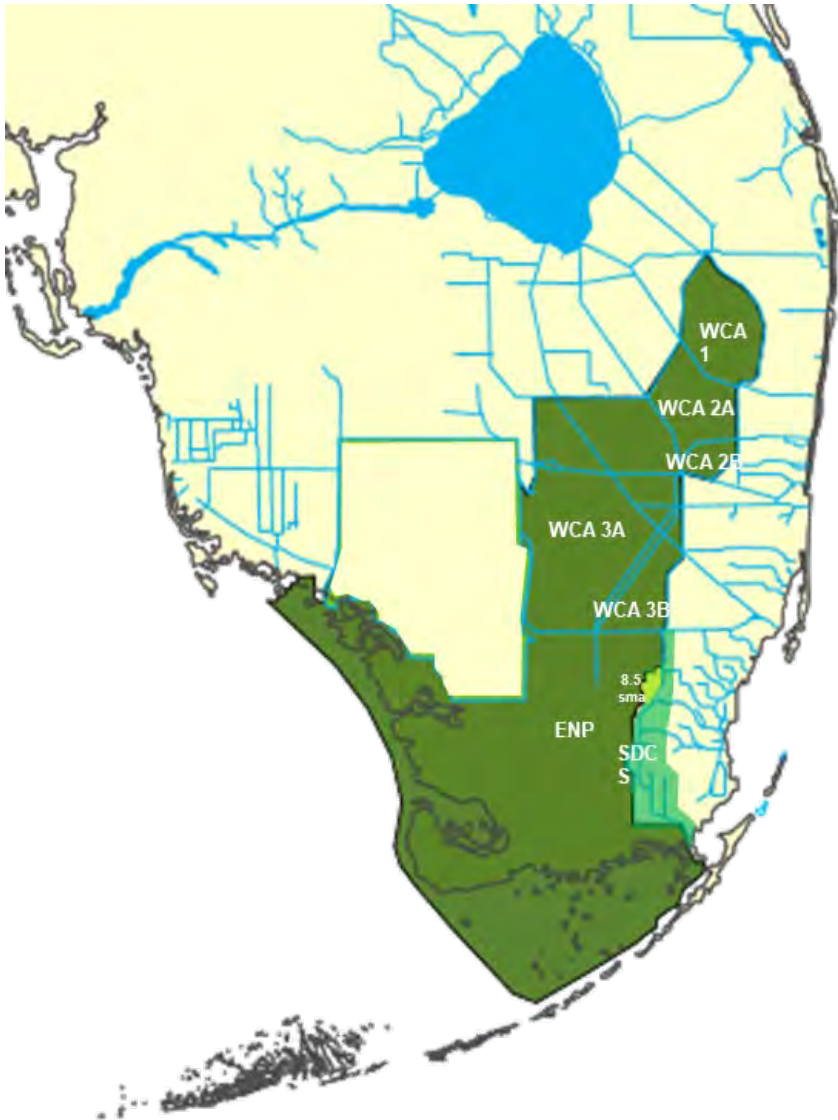


**C&SF System is the connector**

*Working Today to Build a Better Tomorrow*



# CENTRAL & SOUTHERN FLORIDA (C&SF) PROJECT



Balance multiple congressionally-authorized project purposes:

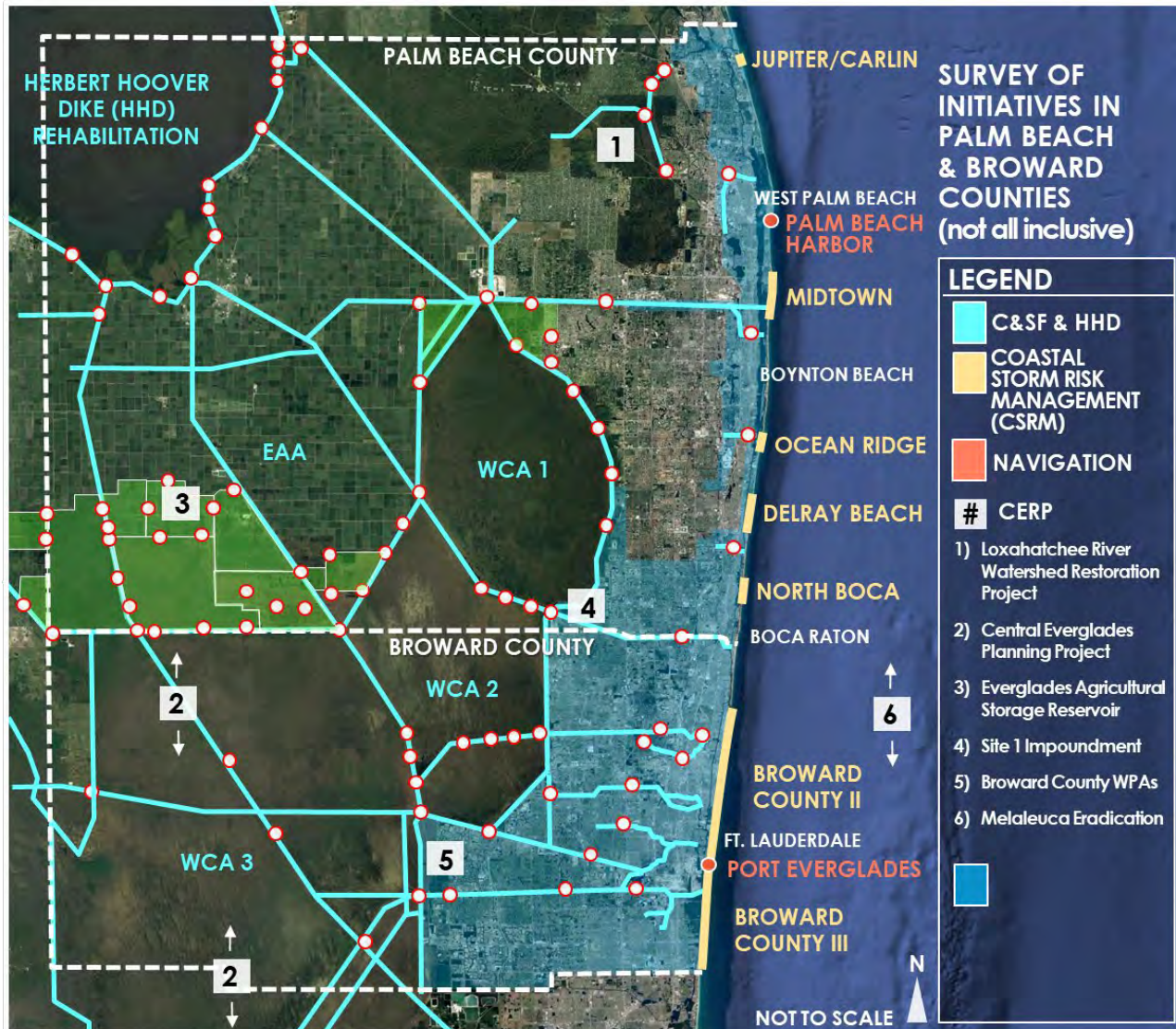
- Flood control
- Navigation
- Water supply for :
  - Agriculture
  - Municipalities
  - Industry
  - Everglades National Park
  - Regional groundwater control
  - Salinity control
- Enhancement of fish and wildlife
- Recreation





# USACE PROJECTS & THE C&SF IN SOUTHEAST FLORIDA

## PALM BEACH AND BROWARD COUNTIES



### UNDERSTANDING THE C&SF SYSTEM IS THE KEY

- When you look at this image, what you see depends on your perspective
- Operations of the C&SF are the basis of adaptation – form the context for all other actions

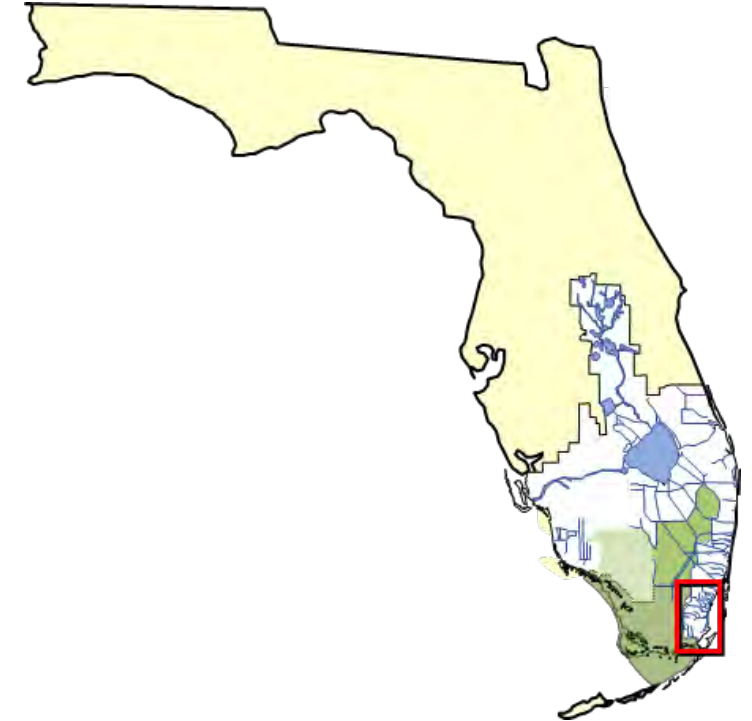
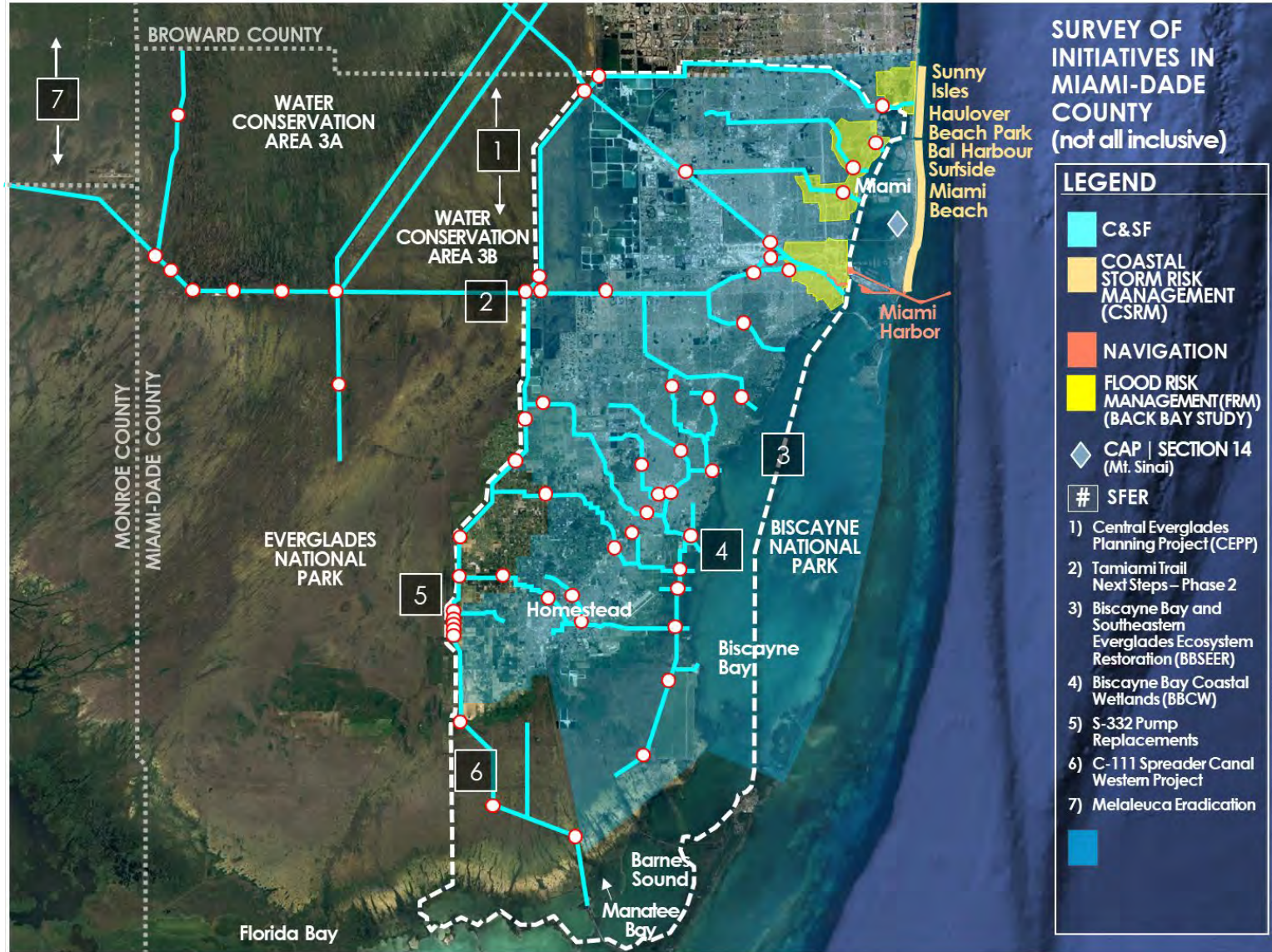




# USACE PROJECTS & THE C&SF IN SOUTHEAST FLORIDA

## MIAM-DADE COUNTY

6



*Working Today to Build a Better Tomorrow*

6





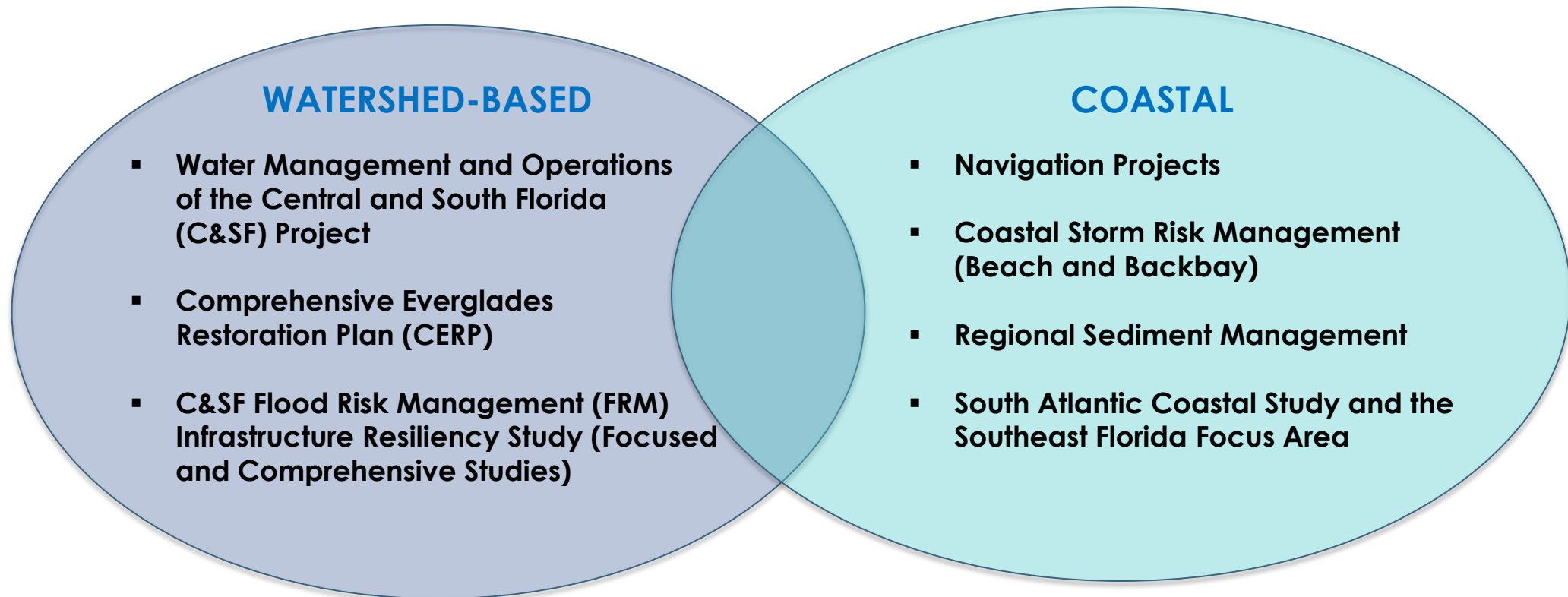
# C&SF FLOOD RESILIENCY (SECTION 216) STUDY

## Strategic Topics



### HOW DOES IT ALL COME TOGETHER TO BUILD COMMUNITY RESILIENCE?

The conditions and operations of the C&SF system, the benefits of CERP, and climate change science will form the context of the C&SF Flood Resiliency (Section 216) Study



# C&SF FLOOD RESILIENCY (SECTION 216) STUDY

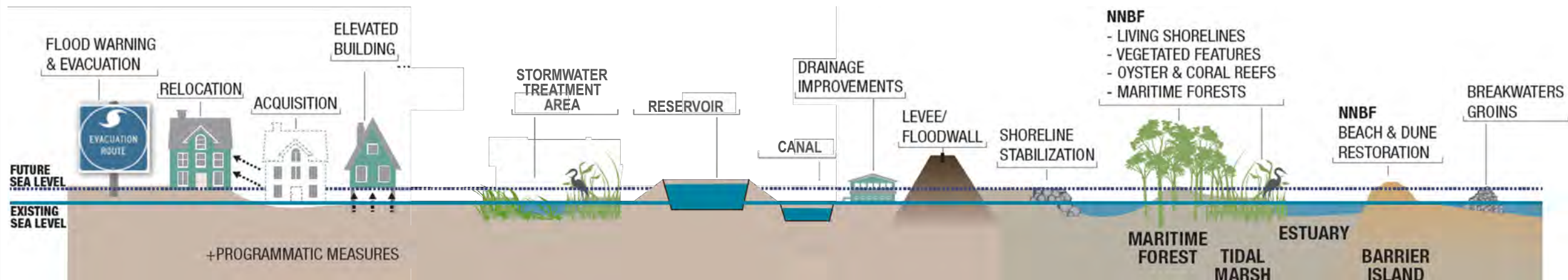
## Strategic Topics

### BUILDING COMMUNITY RESILIENCE: MEASURES IN ACTION

❑ NATURAL    ❑ STRUCTURAL    ❑ NATURE-BASED    ❑ NON-STRUCTURAL

### CLIMATE CHANGE ADAPTATION OPPORTUNITIES

Each mission area contributes a collection of measures to combine into projects to help adapt to climate change and render a community more resilient

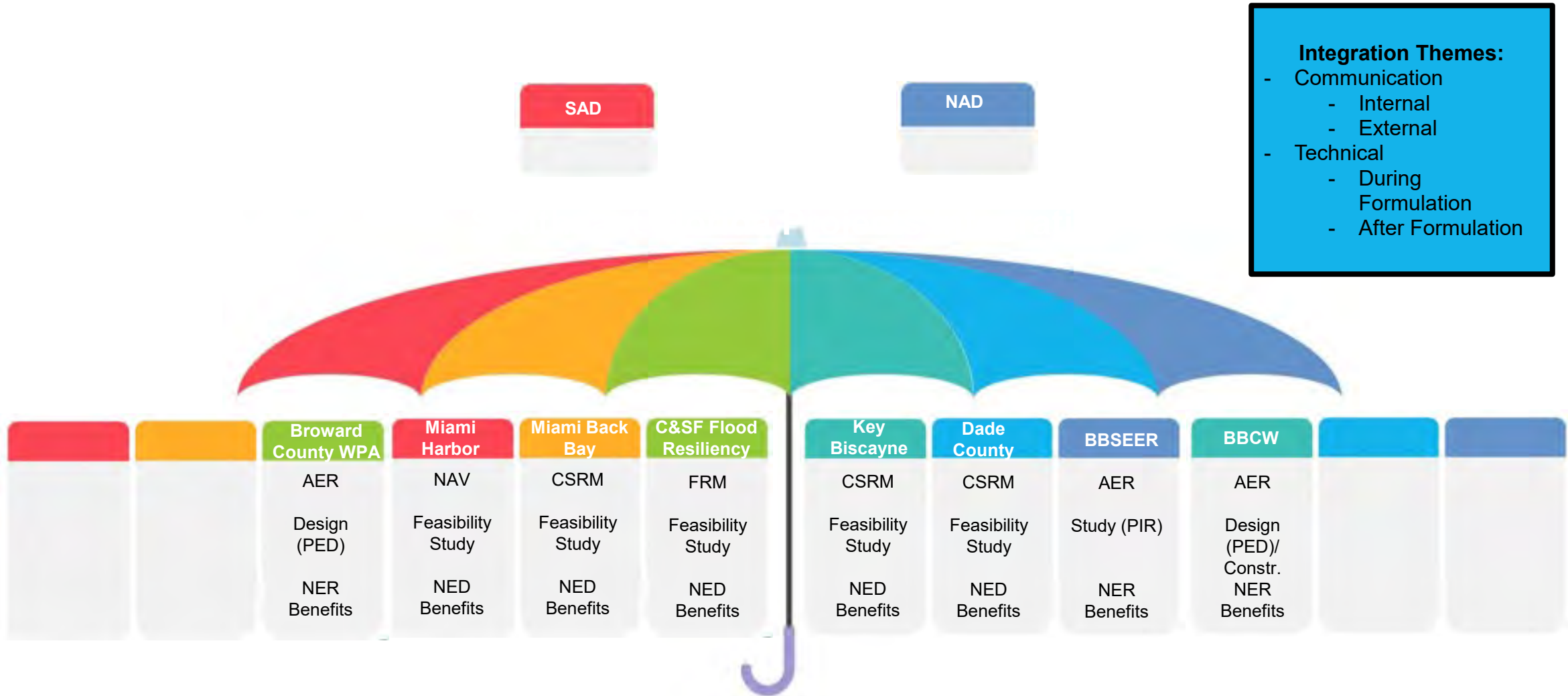






# SOUTHEAST FLORIDA PROJECT INTEGRATION

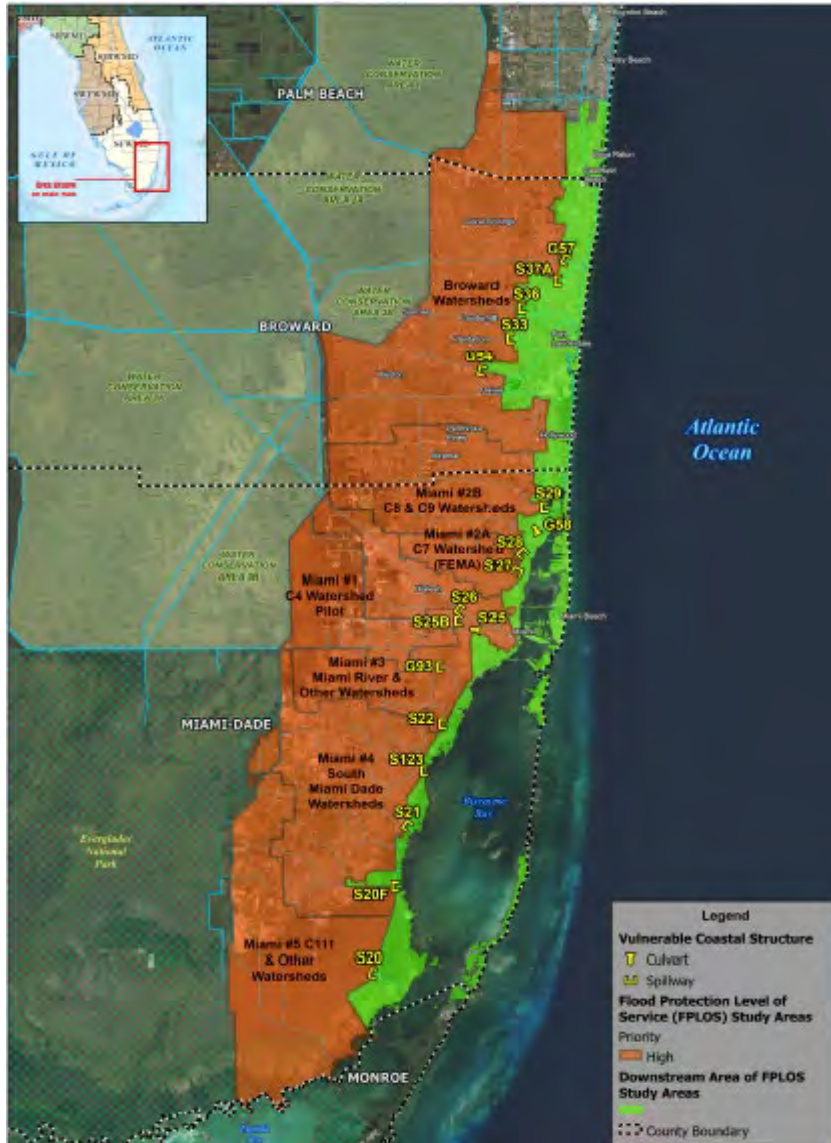
## Strategic Topics





# C&SF FLOOD RESILIENCY (SECTION 216) STUDY

## Overview



### Authority –

- Section 216 of the Flood Control Act of 1970 (33 U.S.C. 549a).
- Review existing projects that have significantly changed physical, economic, or environmental conditions

### Scope –

- C&SF system resiliency in the highest risk areas in Lower East Coast – Palm Beach, Broward and Miami-Dade counties.
- Most immediate needs due to effects from climate change, sea level rise, land development, and population growth
- Flood Risk Management (FRM) benefits; will evaluate benefits to the other C&SF project purposes

### Schedule/Upcoming Efforts –

- FCSA executed 21 September 2022
- SFWMD Workshops held 26/27 October 2022
- NEPA Scoping meetings 28 November 2022
- NEPA Scoping Period Comments due 7 December 2022
  - Email: CSFFRSCComments@usace.army.mil
- Will follow SMART process resulting in a Chiefs Report; potential for WRDA 2026 inclusion
- AMM – March 2023; SAD/HQ coordination per VTAM guidance ongoing

### Website:

[www.saj.usace.army.mil/CSFFRS](http://www.saj.usace.army.mil/CSFFRS)