



South Florida Water Management District Resiliency Efforts: Leveraging Data and Best Practices for Vulnerability Assessments

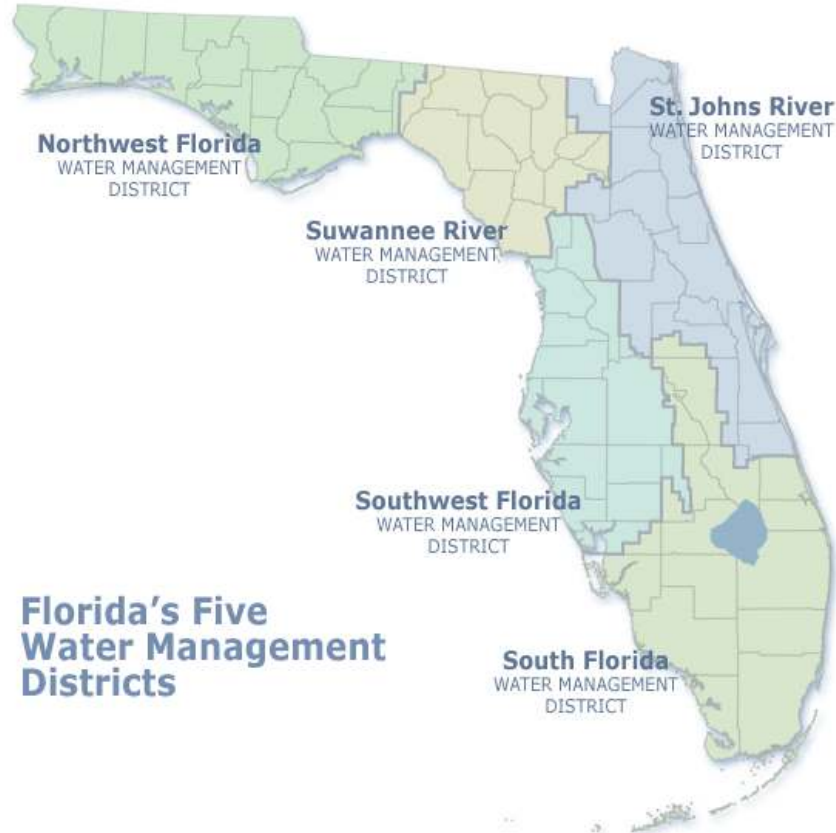
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Who We Are

- Created in 1949, oldest and largest of the state's five water management districts
- 16 counties from Orlando to the Florida Keys
- Serves a population of 9 million residents

MISSION: to safeguard and restore South Florida's water resources and ecosystems, protect our communities from flooding, and meet the region's water needs while connecting with the public and stakeholders.



What We do

- Diverse and skilled workforce
 - Scientists, engineers, planners, accountants, attorneys, land managers, heavy machine operators, artists, writers and meteorologists and more.
- Manage water flow and flood protection including operating the Central and Southern Florida Project
 - 2,200 miles of canals; 2,100 miles of levees/berms, 84 pump stations, 778 water control structures and weirs and 621 project culverts
- Plan for Water Supply and Water Resources of the region
- Safeguard and restoration the ecosystem including Everglades



SFWMD Commitment to Resiliency

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

Central and Southern Florida Flood Resiliency Study

The District is initiating the study to analyze the effects of sea level rise and climate change on the region's water resources and ecosystems. The study is the first of its kind in the United States and will provide critical information for the development of flood resiliency strategies.

- Governance
- SFWMD's Role
- Appraisal
- Letters of Intent

The District is including the study in the Capital Improvement Program (CIP) and the Regional Flood Protection Program (RFPP).

Water and Climate Resilience Metrics

As part of a District-wide study, the District is developing metrics to measure the effectiveness of its flood resiliency strategies. The metrics will be used to track progress and identify areas for improvement.

The first Water and Climate Resilience Metrics Report will be published in 2023.

Resiliency and Ecosystem Restoration

Ecosystem Restoration is a key component of the District's flood resiliency strategy. The District is working to restore and enhance natural ecosystems, such as wetlands and mangroves, to provide natural flood protection.

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Resiliency and Water Supply

As part of its adaptation strategies in response to the observed effects of sea level rise, the District is implementing a variety of measures to ensure a reliable water supply. These measures include improving water conservation, increasing water storage capacity, and diversifying water sources.

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Resiliency and Flood Protection

As a key part of its resiliency strategy, the District continues to assess the status of its flood control infrastructure and advancing adaptation strategies necessary to continue providing primary flood protection for South Florida and other mission critical services.

The Flood Protection Level of Service Program ensures the regional flood control system provides the desired level of flood protection upstream of the tidal structures in place today, and will continue to do so, with consideration for sea level rise, as well as more intense rainfall events.

This effort is integrated into the District's Capital Improvement Program to ensure its structures, pumps, canals – all of which are critical in keeping South Florida habitable – are functioning as designed, and will remain.



What We Bring to the Table Today

Stormwater studies, vulnerability assessment & flood resiliency:



Data

➤ Tools & Techniques

➤ Collaboration & Partnerships

DBHYDRO Insights

Data Repository

- Hydrology
 - Surface and groundwater
- Water Quality
- Meteorological
- Water Flows
- System state
 - pump operation or structure opening)
- So much more

The screenshot shows the DBHYDRO Insights Data Repository website. The header includes the SFWMD logo, the DBHYDRO Insights logo, and navigation links for Lens Options, Pages, and Favorites. Below the header, there are five lake-specific data points:

Lake Okeechobee	Lake Istokpoga	Lake Tohopekalgia	East Tohopekalgia	Lake Kissimmee
14.09	38.32	53.45	56.30	51.40
ft-NGVD	ft-NGVD	ft-NGVD	ft-NGVD	ft-NGVD

Below the lake data, there is a search bar labeled "Search Insights (2 characters min)" and a "filterBy" dropdown menu. Underneath, a section titled "Available Lens Options" displays six categories with corresponding images: Sites, Structures, Stormwater Treatment Areas, Watersheds, Data, and System Coming Soon!

<https://apps.sfwmd.gov/dbhydroInsights/>

Introduction/Training: <https://www.youtube.com/watch?v=-Ev3Kv2ctbs>

Water and Climate Resiliency Metrics

Making Informed Decisions



Observed Long Term Trends

Access data analysis to support your vulnerability assessment at:

[Water and Climate Resilience Metrics \(sfwmd.gov\)](https://www.sfwmd.gov)

Tidal Elevations
High Tide Elevations
Saltwater Interface

SEA LEVELS

Estuarine Inland Migration
Soil Subsidence
Salinity
MFLs

ECOSYSTEM

Groundwater Elevations
Evapotranspiration
Rainfall
Flooding Events

HYDROLOGY

Water Temperature
Dissolved Oxygen
pH
Specific conductance

WATER QUALITY

Saltwater Interface Mapping

- SFWMD: St. Lucie, Martin, Palm Beach, Broward, Collier, and Lee Counties
- USGS: Miami-Dade and Monroe counties
- Maps for each aquifer within the surficial and intermediate aquifer systems (SAS and IAS)
- Initiated in 2009, with updated maps every 5 years
- Monitoring SLR Effects: essential part of the SFWMD's resiliency strategies

[Saltwater Interface Maps \(sfwmd.gov\)](http://www.sfwmd.gov/documents-by-tag/saltwaterinterface)

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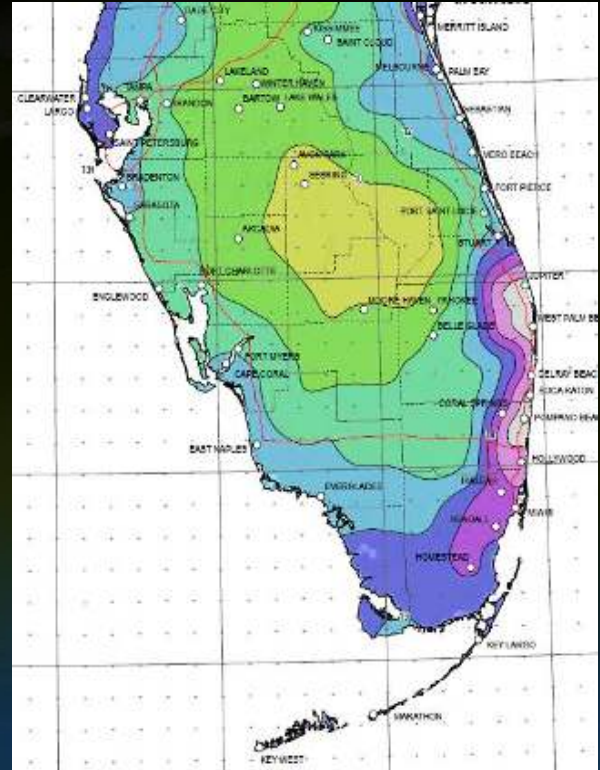


Estimating Future Rainfall

From Observations to Projections

- SFWMD partnership with USGS & FIU
- Global climate model downscaling datasets
- Review of the latest science and refined evaluation of predicted rainfall
- Estimate **change factors in extreme rainfall** by 2070, districtwide, compared to NOAA Atlas 14 observations
- Develop **future intensity-duration-frequency curves** for the 16-counties area
- Strengthen District's planning capacity and allow for FPLOS Future Rainfall Scenarios

Available in Fall 2021



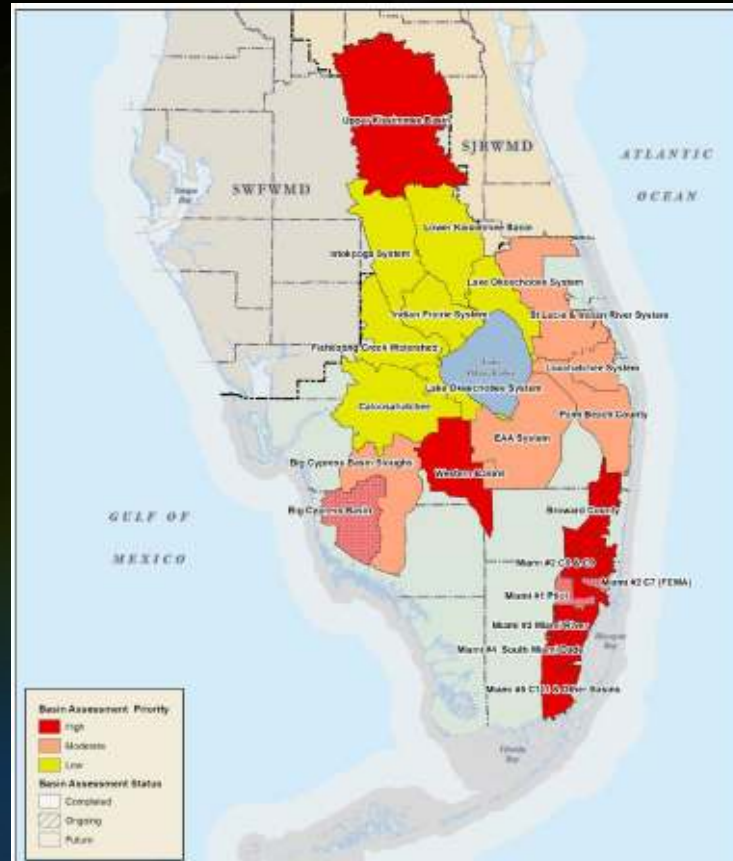
Flood Protection Level of Service Program

From Data Analysis to Robust H&H Modeling Assessments

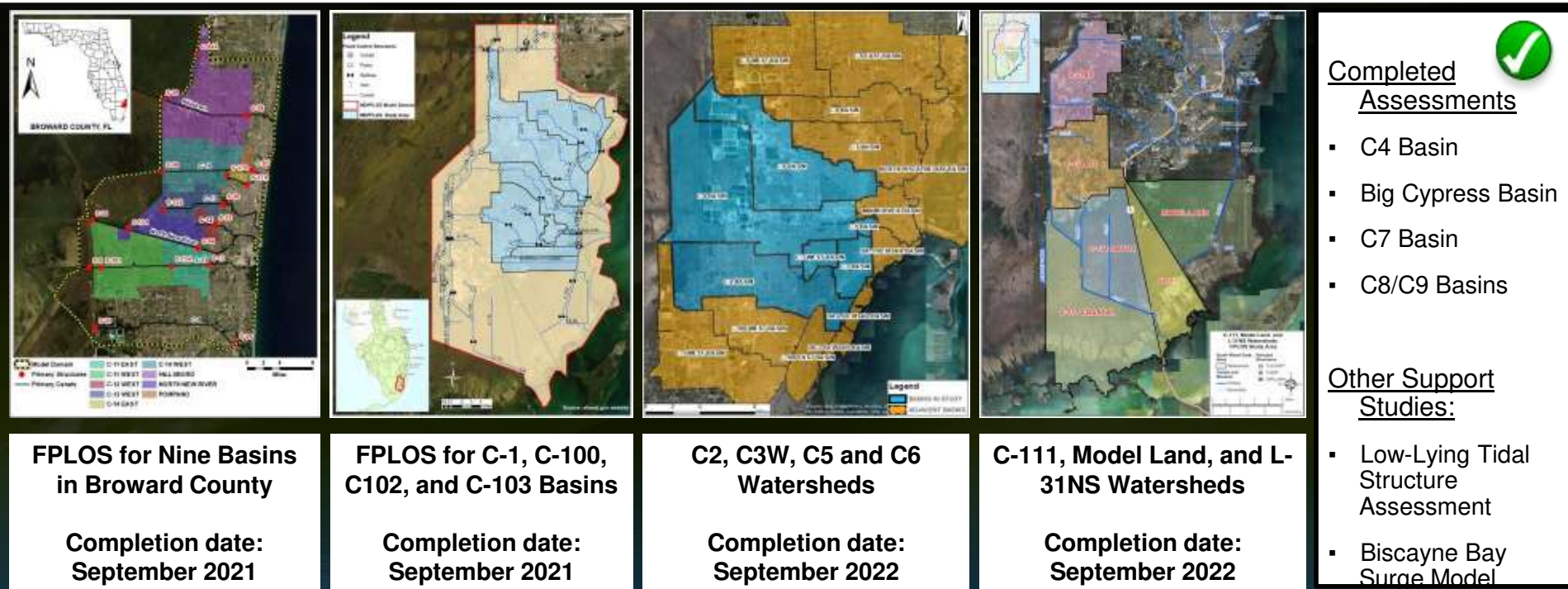
Critical District's strategy for assessing and addressing the impacts of development and climate change on flood control

- Evaluate current and future flood risk in the canal system and communities basinwide
 - Considers rainfall, tide, storm surge and sea level rise
- Support decision making on prioritizing investment for improvements and adaptation

www.sfwmd.gov/our-work/flood-protection-level-service



Phase I: Ongoing FPLOS Assessments



Future basins: Upper Kissimmee, South Lee, Western Basins (C-139), Palm Beach County, Lower Kissimmee

Phase II: Flood Adaptation / Mitigation Strategies

Basin-wide Coordinated Approach: understanding local and regional priority needs

C-7 Basin:

- Pilot Study Completed in 2017

C-8/C-9 Basins:

- Kickoff on Aug 3
- Project Website:

[C-8 C-9 Basins FPLOS \(buildcommunityresilience.com\)](https://buildcommunityresilience.com)

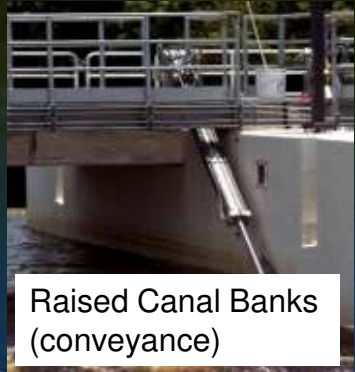


Stakeholder
Engagement

Local & Regional
Partnerships

Reduced Flood
Risks

Examples of Flood Mitigation Solutions



Examples of Flood Mitigation Solutions

Importance of Basinwide Strategies



Source: BCB Strategic Plan

Source: Miami Dade Office of Resilience

Green Infrastructure
(enhance infiltration,
increase storage,
distribute and slow the
flow, associate water
quality benefits)

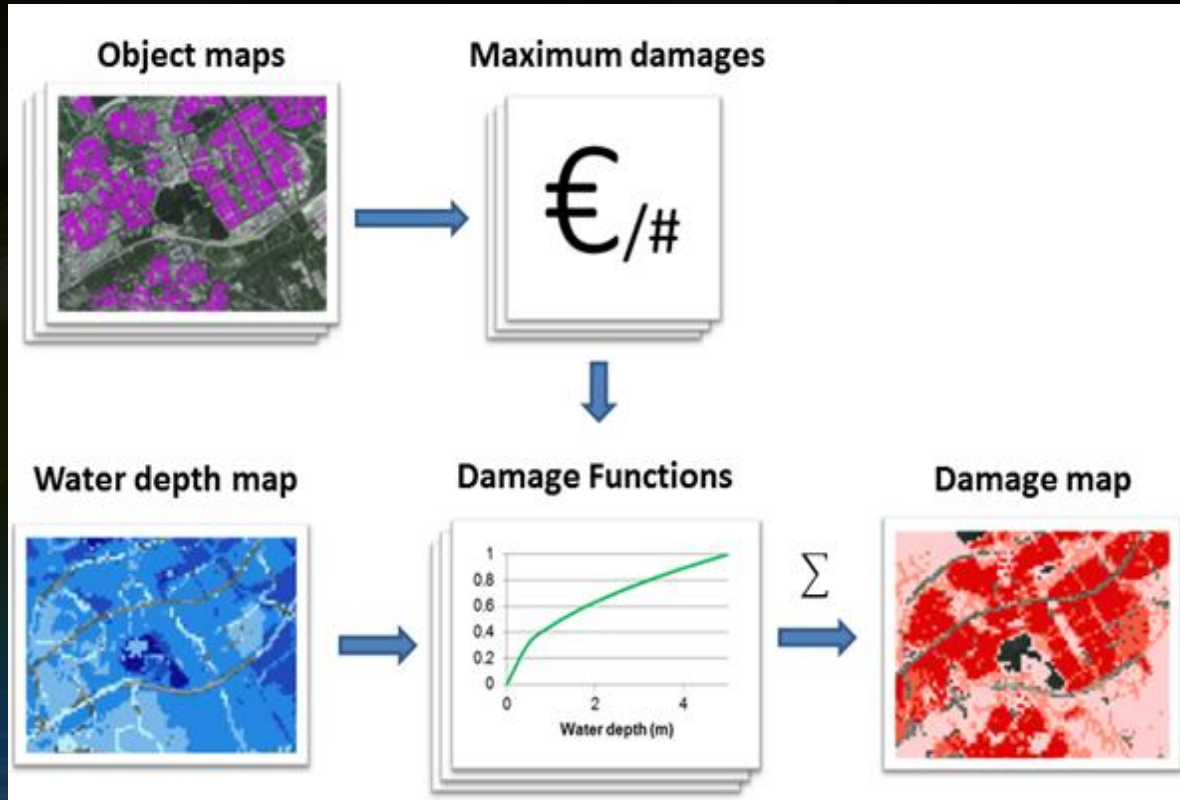


Flood Damage Cost Estimate Tool

In partnership with Deltares:

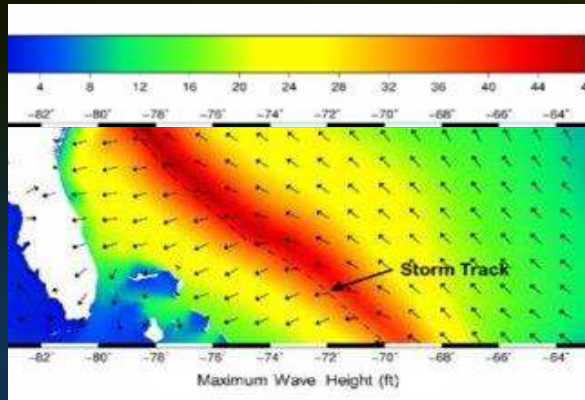
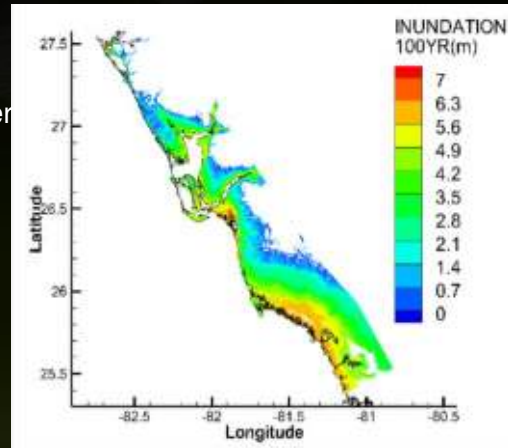
- Desktop Tool Development
- Flexibility of Scenario Assessment
- Incorporation of the latest flood damage functions (FEMA Hazus)
- Allowing for more accurate flood damage assessments
- Strengthening region's planning capacity

Available in Spring 2022



Auxiliary Tools

- Adaptation of Coastal Urban and Natural Ecosystems (ACUNE) <https://aces.coastal.ufl.edu/ACUNE3.0/> (username: demo / password: Collier)
 - Web-Based Interactive Decision-Support Tool for Adaptation of Coastal Urban and Natural Ecosystems in Southwest Florida
 - Integrated programs, projects and tools (Including Mangrove model)
 - Wave, storm surge, coastal urban and inland flooding
- Hydrodynamic Model for Biscayne Bay
 - Bathymetry; structure geometry and operation
- ADCIRC Storm Surge Scenarios
 - Storm Direction and Intensity Data
- Future: Compound flooding analysis

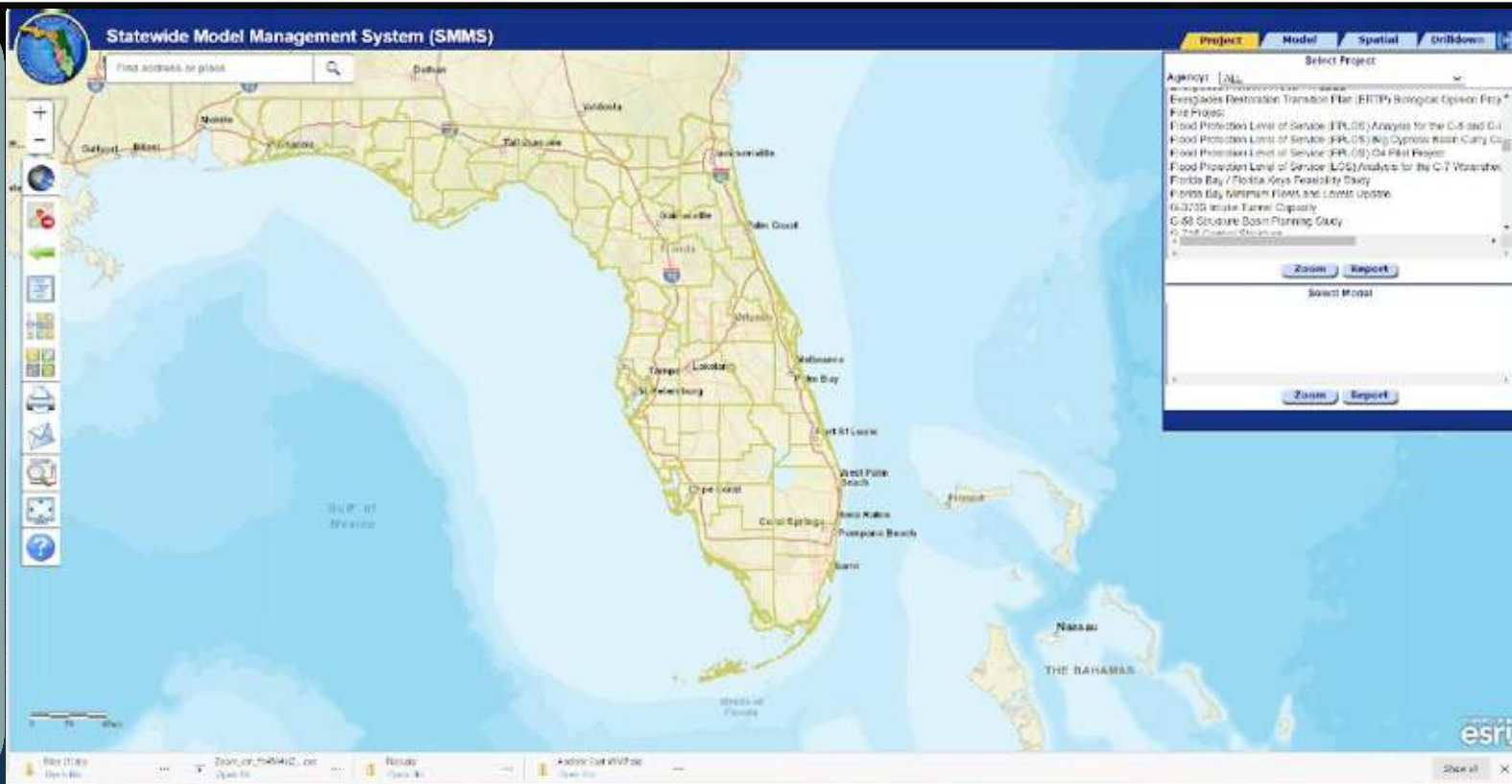


Statewide Model Management System

H&H Models/Tools Repository

Statewide Model Management System (SMMS)

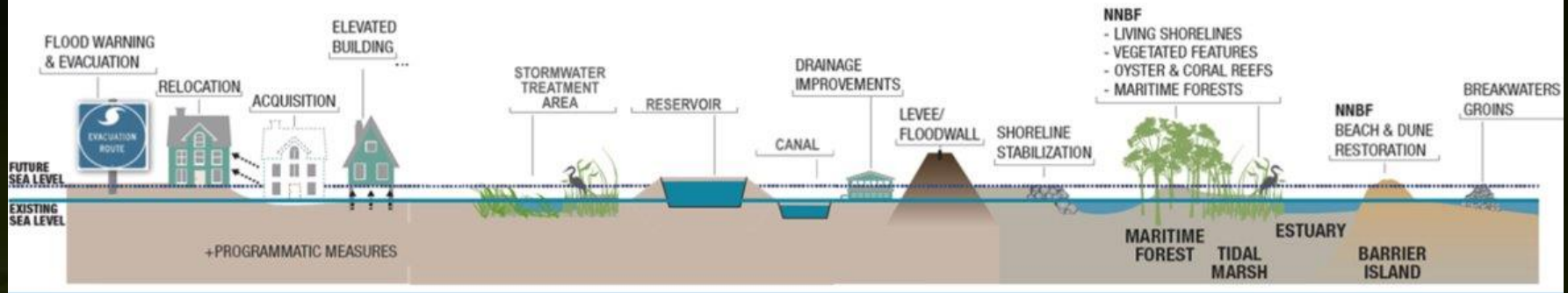
A GIS based archive and repository of models, model data and reports available online at SFWMD.



Collaboration and Partnerships

POTENTIAL MEASURES TO IMPROVE RESILIENCE AND SUSTAINABILITY

Graphic modified from https://ewn.el.erdc.dren.mil/nnbf/other/5_ERDC-NNBF_Brochure.pdf



Source: FEMA BRIC

Source: USACE



Stakeholder
Engagement

Local & Regional
Partnerships

Reduced
Vulnerability

Welcome to RCAP 2.0

[BUILD YOUR OWN PLAN](#)

[GET STARTED](#)



WATER

GOAL: Advance the water management strategies and infrastructure improvements needed, in parallel with existing water conservation efforts, to mitigate the potential adverse impacts of climate change and sea level rise on water supplies, water and wastewater infrastructure, and water management systems, inclusive of regional canal networks, pumps, control structures, and operations.

Regional Climate Action Plan

The Regional Climate Action Plan (RCAP) is the Compact's guiding tool for coordinated climate action in Southeast Florida to reduce greenhouse gas emissions and build climate resilience. The RCAP provides a set of recommendations, guidelines for implementation, and shared best practices for local entities to act in-line with the regional agenda.

[LEARN MORE](#)

Thanks!

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www.sfwmd.gov/resiliency

Questions?