SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Assessing and Mitigating the Impacts of Sea Level Rise on Flooding in South Florida

UF Water Institute 2022 Symposium

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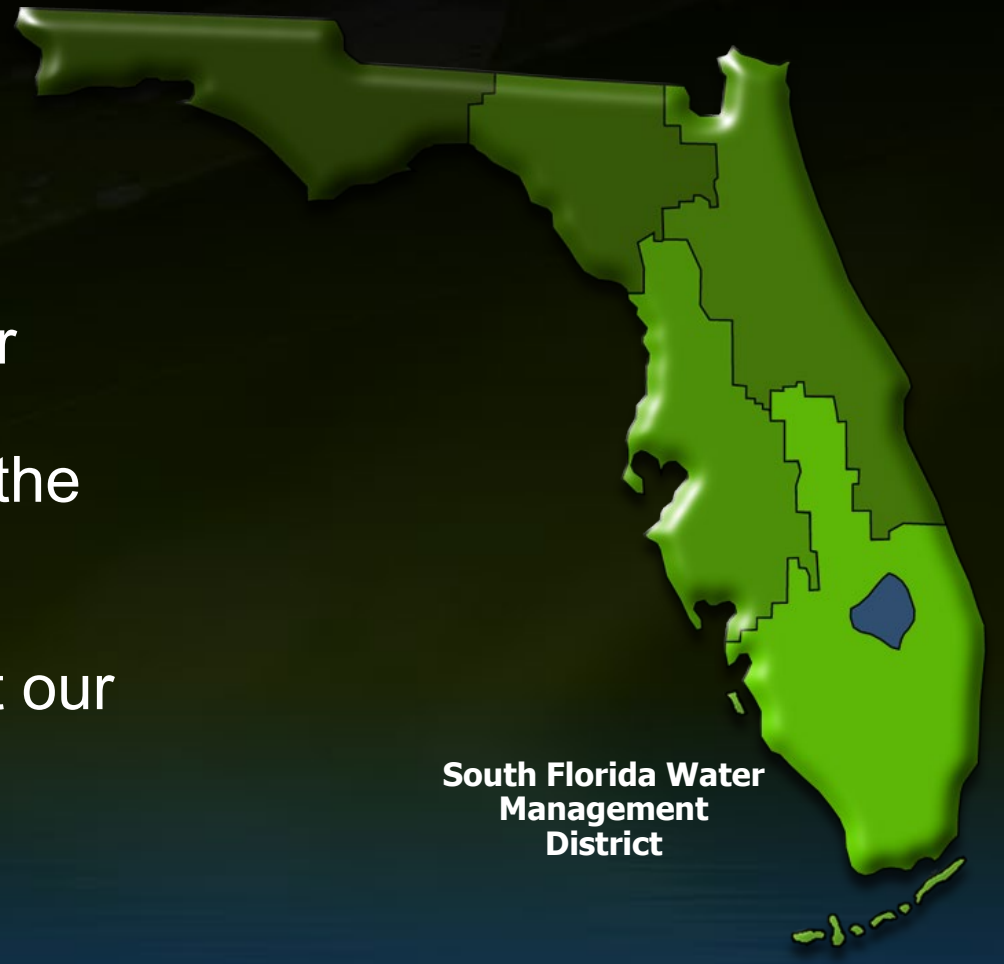
sfwmd.gov

Who we are and what we do

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

- Oldest and largest of the state's five regional water management districts
- Protecting water resources in the southern half of the state since 1949
- Our 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

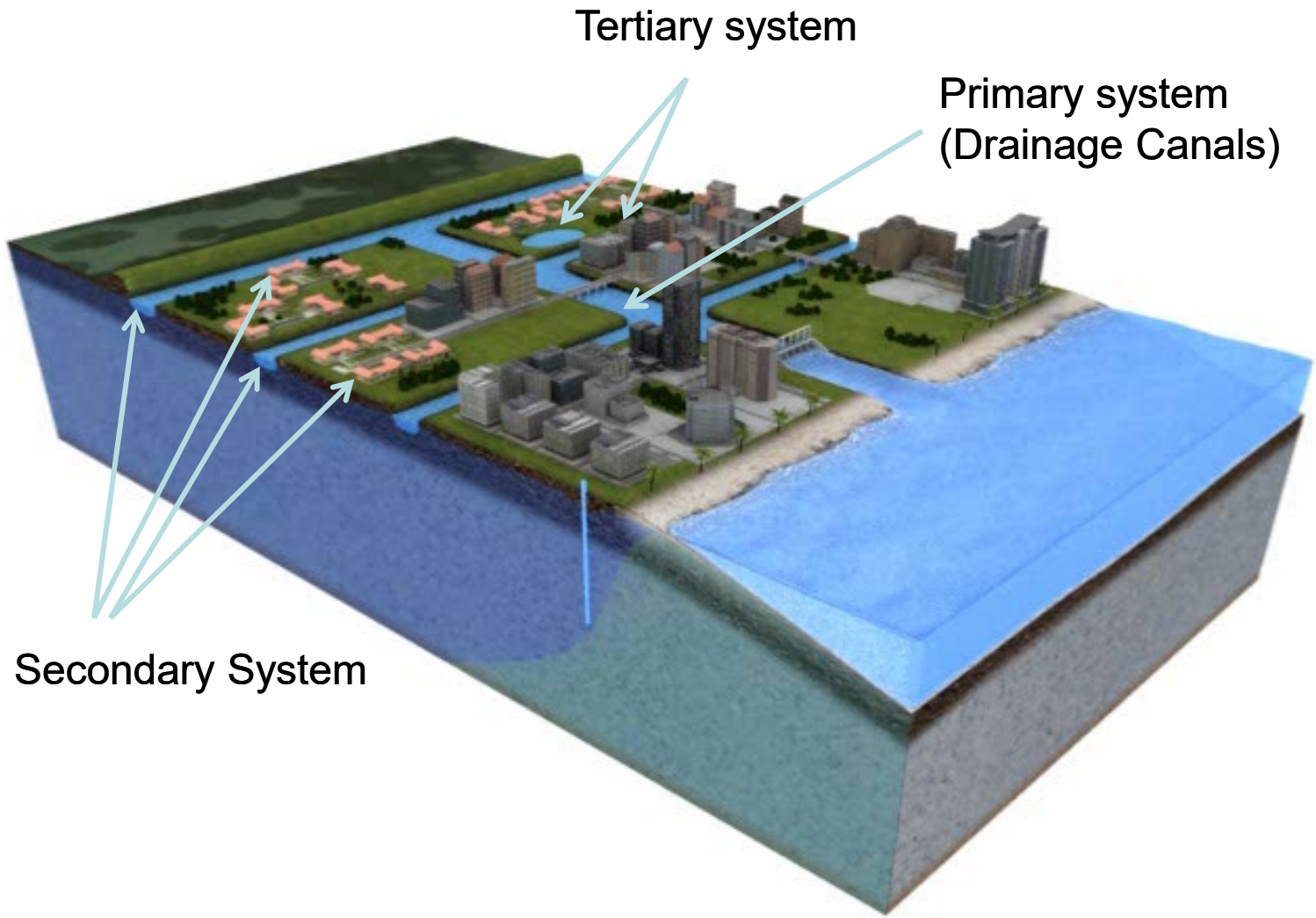


Water Management System

- 2,060 miles of canals
- 2,028 miles of levees
- 160 major drainage basins
- 1,413 water control **structures**
- 71 pumping stations
- 60,000 acres of regional wetland Stormwater Treatment Areas
- Lake Okeechobee
  - 450,000 acres water storage area
- Water Conservation Areas
  - 959,000 acre water storage

Flood Protection Responsibility

- Primary
  - **USACE**
  - **SFWMD**
- Secondary
- Local Governments
  - Special Districts
- Tertiary
  - Homeowners Associations
  - Private Landowners



Presenter: Akintunde Owosina

History How the Program Came About

Aging Infrastructure

- C&SF Project designed and built 60+ years ago
- Approaching end of design life

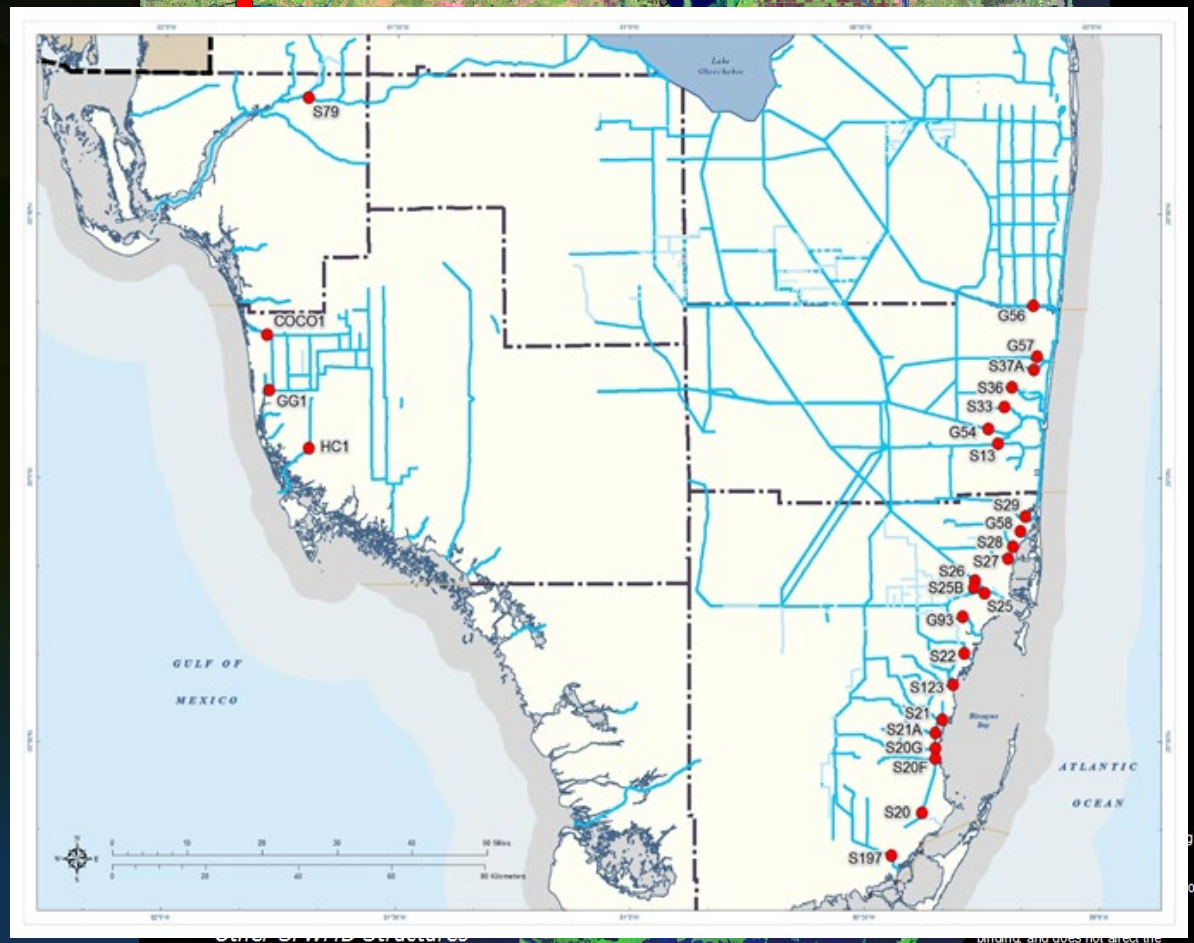
Obsolete Assumptions

- Original design did not account for the sea level rise
- Original design for a population of 2 million people
- Original projections were for less urban development than has occurred over the years

Vulnerable to SLR

- Several low-lying structures determined to be vulnerable to SLR

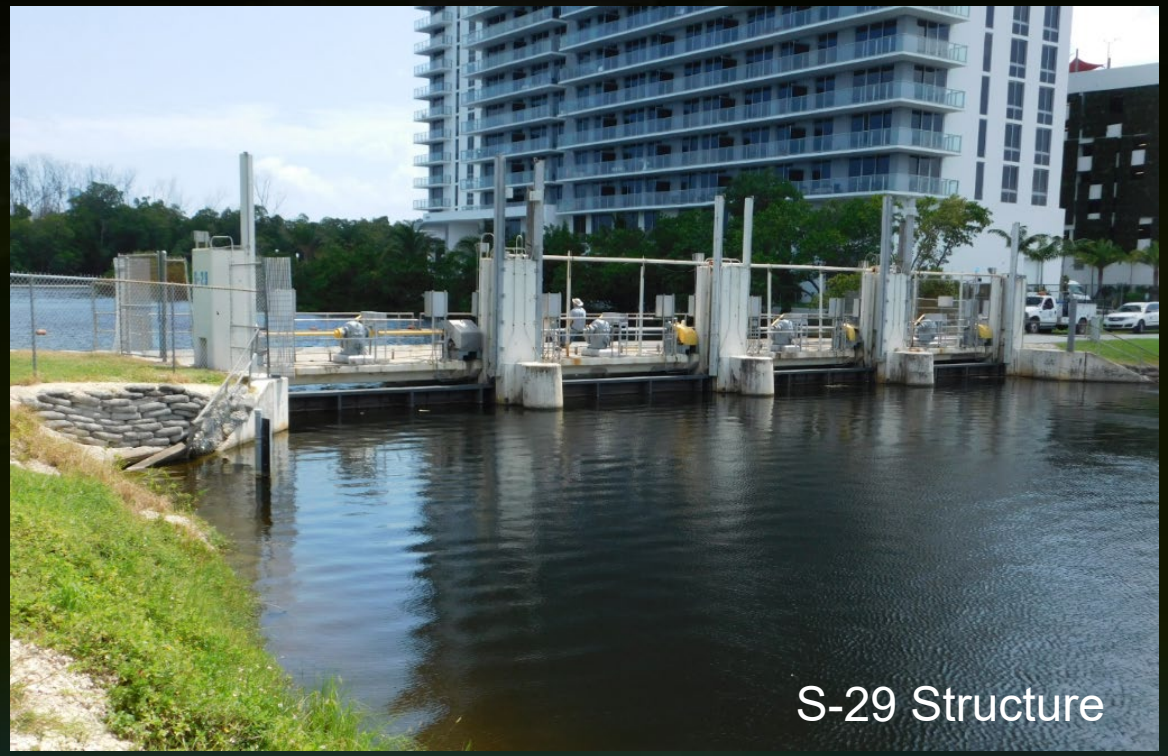
Low-lying Tidal Structure Assessment



The Resource Manager's Question

We have aging infrastructure approaching or past design end of life:

- Do we replace them and if so when do we replace them?
- What do we replace them with?
  - In kind - same as it was? or
  - Different structure to accommodate known changes in the system since original design and projected future changes?
- Where and how?
  - Do we replace them at the same location?
  - Which project goes first, which needs to happens next?

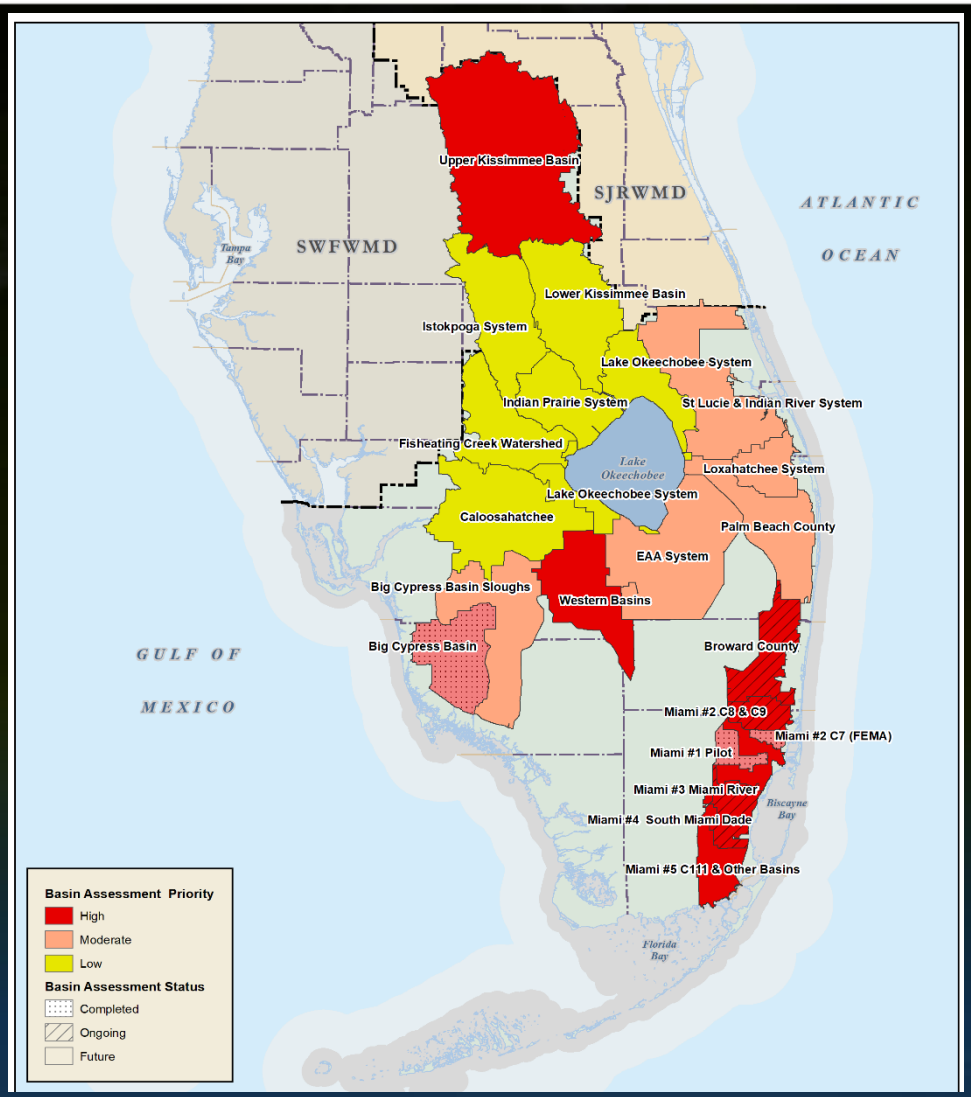


S-29 Structure

Flood Protection Level of Service Program

How we ensure that our flood control assets are up to the task considering development, land use change, SLR and climate change

- Identify and prioritize long-term District infrastructure needs
- Assess level of flood protection throughout the 16-counties of the SFWMD – relative to design
- Identify at-risk structures and needed improvements to operations, canal conveyance or structures
- Provide a formal process to initiate retrofit and adaptation efforts for future infrastructure improvements and/or modification of regulatory criteria
- Incorporate **resilient** design standards and construction
- Coordinated with SFWMD Operations, local government entities, drainage districts and other agencies with flood control or related responsibility



Three Phases of the FPLOS Program

Phase 1
Assessment

- Focus on Flood Control Assets in Primary system
- Identify flood vulnerable assets and regions

Phase 2
Mitigation and Adaptation Planning

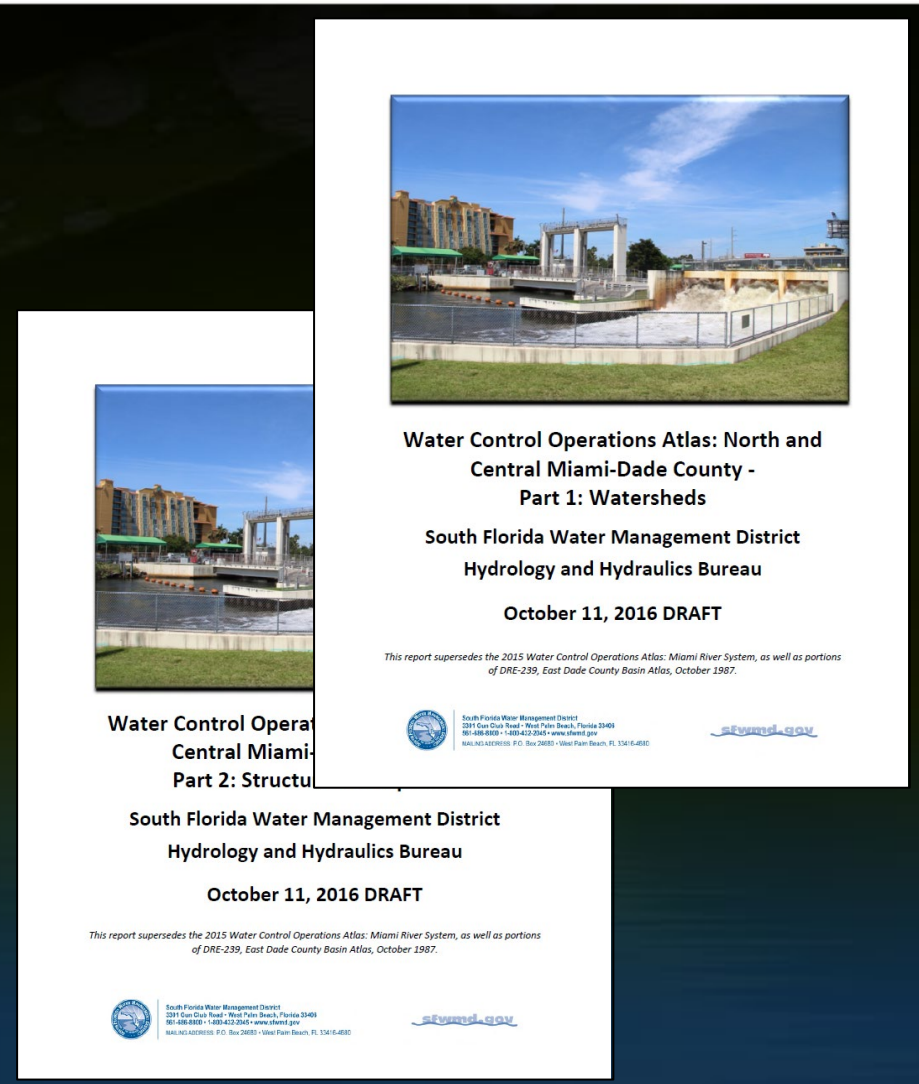
- Focus on Primary, Secondary and Tertiary systems
- Collaboratively identify projects, operations or regulations to meet flood control needs

Phase 3
Implementation

- Design, permit and build identified projects to achieve resilient flood protection goals, **integrated into the Sea Level and Flood Resiliency Plan**

Activities Completed in a Typical FPLOS Assessment (Phase I)

- Compilation and publishing of a multi-volume water control operations atlas of the basin
- Hydraulic and hydrologic model of basin including structures, pumps stations and canals
- Assessment of current conditions using different severity of storm events (rainfall) plus storm surge
- Simulation of future conditions with three different Sea Level Rise projections also with rainfall and storm surge
- Identification of underperforming or at-risk segments or components
- Coordination with counterparts in the County
- Assessments every 8 to 10 years

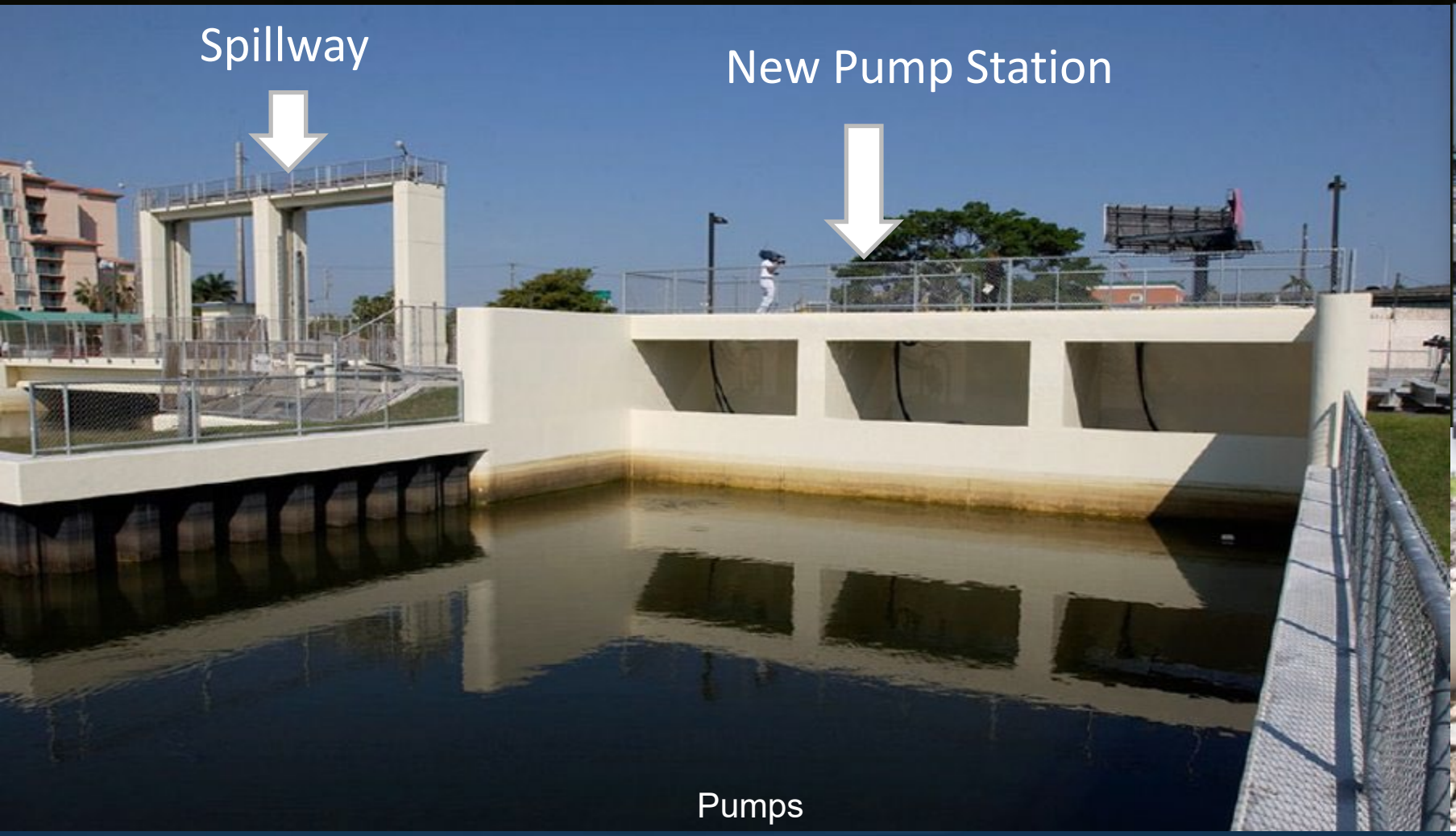


Activities Completed in a Typical FPLOS Adaptation and Mitigation Planning and Design

- Focus on full system, primary, secondary and tertiary
- Public planning process to integrate input strategies
- Flood Mitigation and adaptation strategies in all tiers
- Hydraulic and hydrologic model of the strategies
- Damage assessment without adaptation and with each identified strategy or combination of strategies
- Sequencing and combination of courses of action
- Selection of optimal course of action
- Basis of design level evaluation of selected plan

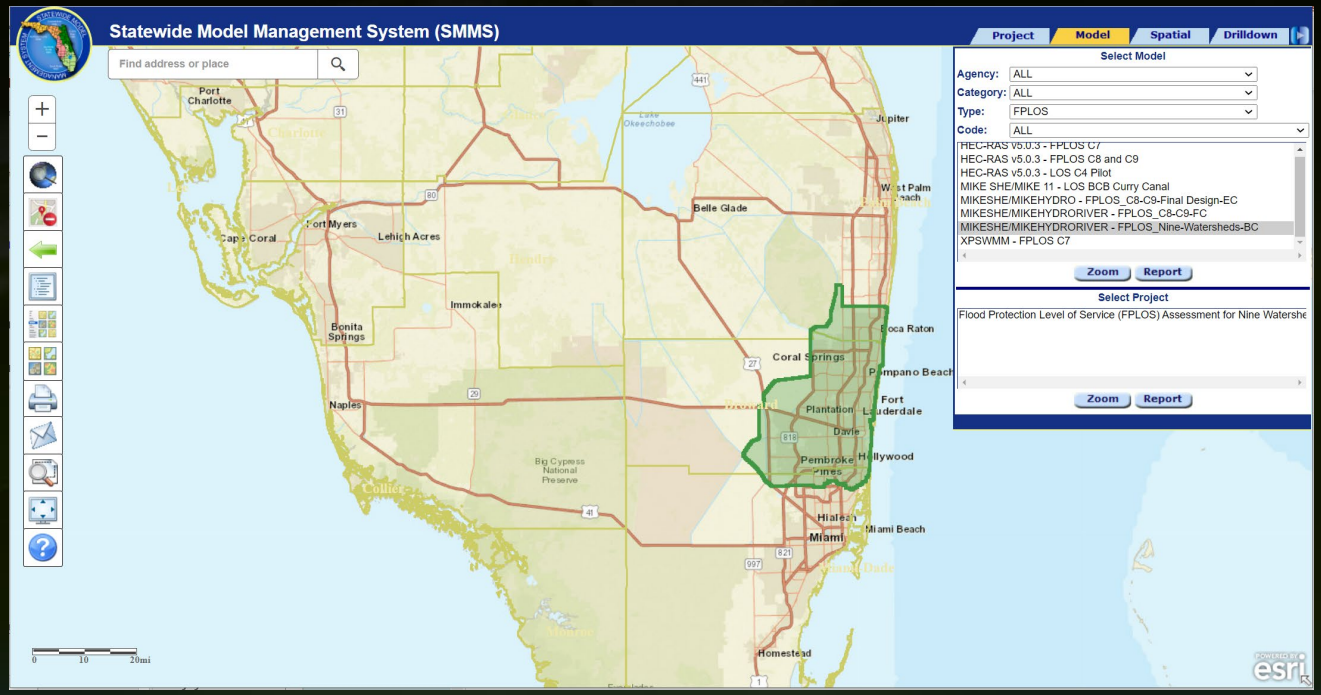
Detention Basins

Activities Completed in a Typical FPLOS Adaptation and Mitigation Planning and Design



Following Adaptation & Mitigation Planning

- Identified projects ready for design and implementation
- Extensive coordination with partners responsible for different components of the selected course of action
- Tools made available to the communities and their consultants through Statewide Modeling Management System (Archive)
- Re-evaluating basin to ensure that flood protection needs continue to be served into the future

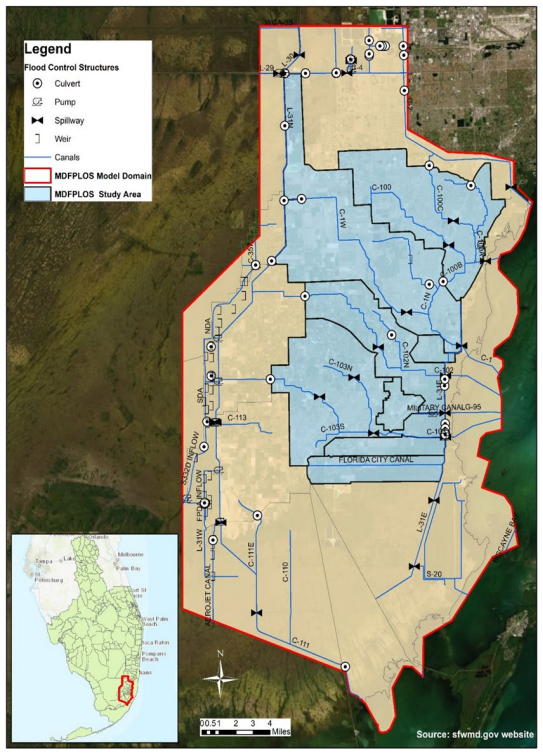


Statewide Model Management System

H&H Models/Tools Repository

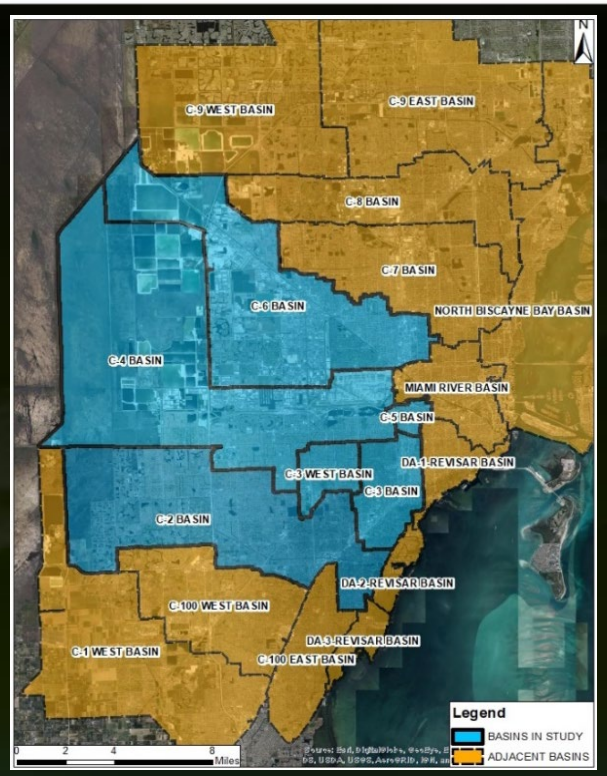
https://apps.sfwmd.gov/smmsviewer/

Ongoing FPLOS Assessment Projects



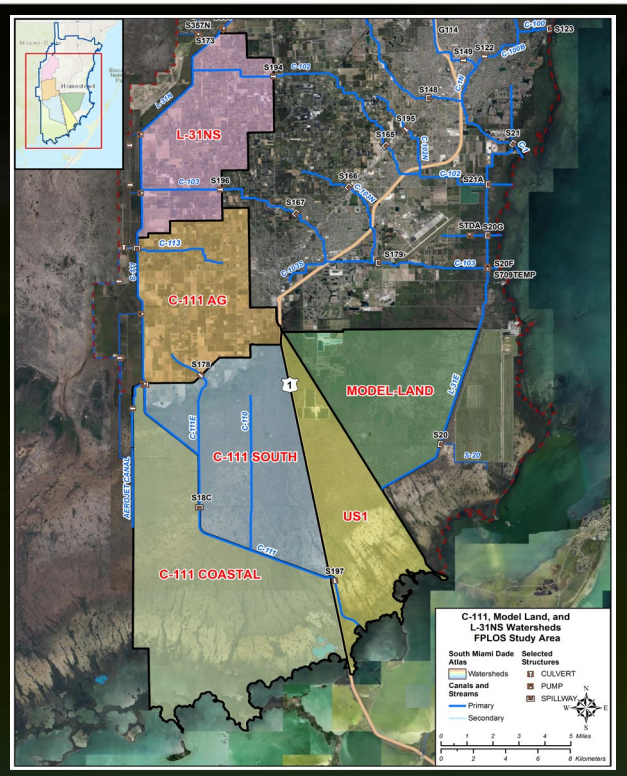
FPLOS for C-1, C-100, C102, and C-103 Watersheds

Completion date: March 31, 2022



C2, C3W, C5 and C6 Watersheds

Completion date: September 2022



C-111, Model Land, and L-31NS Watersheds

Completion date: September 2022

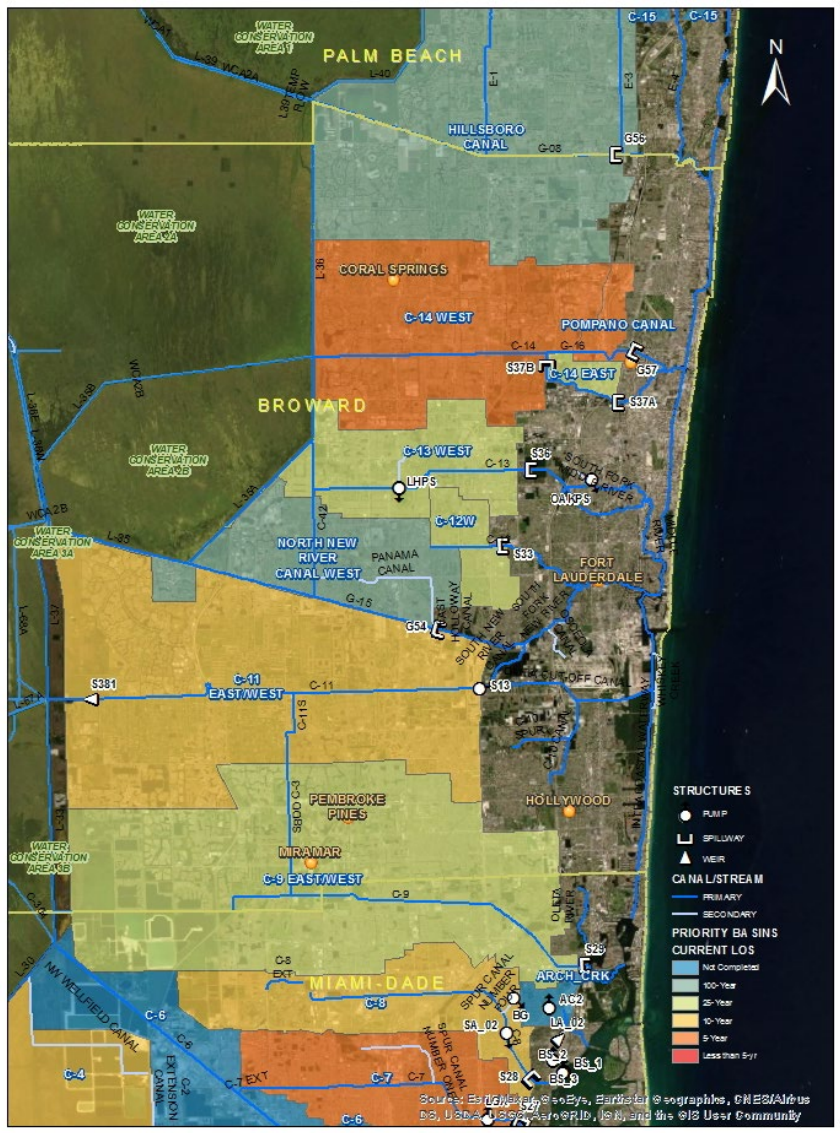
Completed Assessments

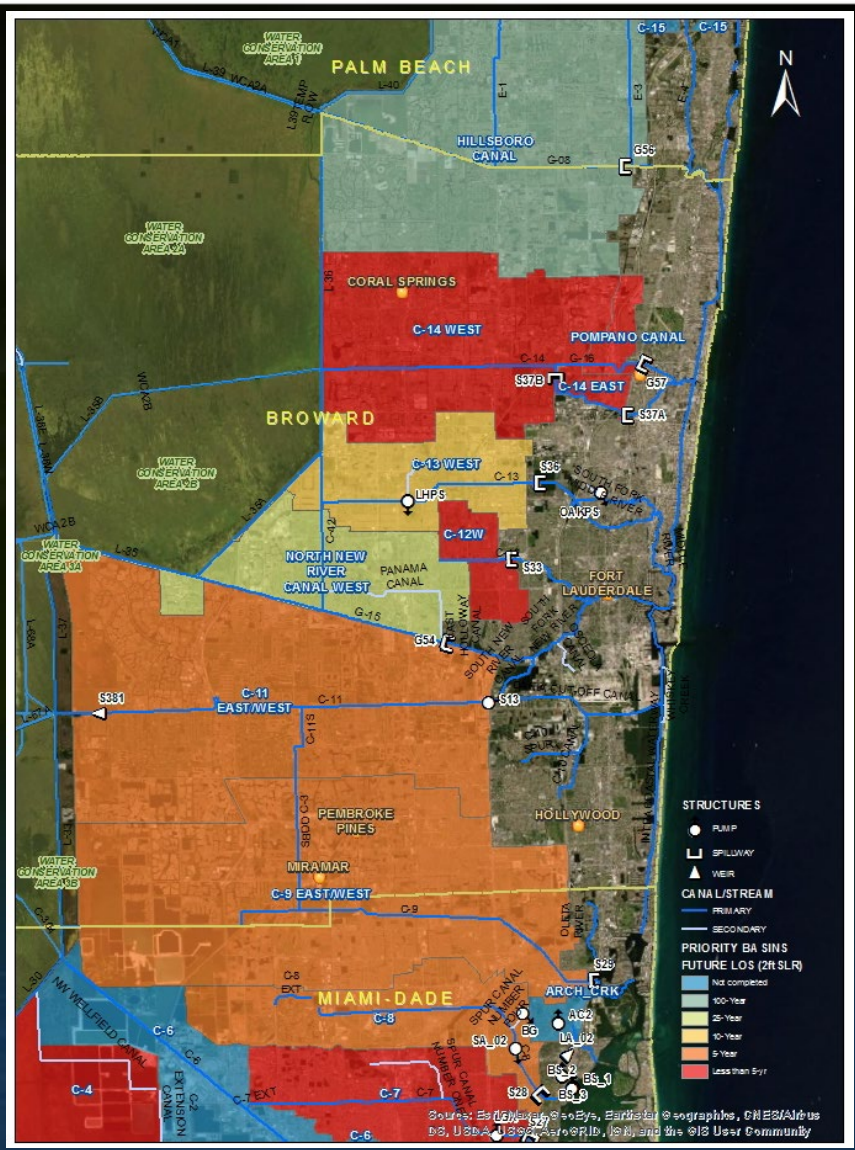
- C4 Basin
- Big Cypress Basin
- C7 Basin
- C8/C9 Basins
- Broward County

New Starts:

- Upper Kissimmee Basin
- Palm Beach County

Assessments of Upstream Basins of Coastal Structures in the Lower East Coast





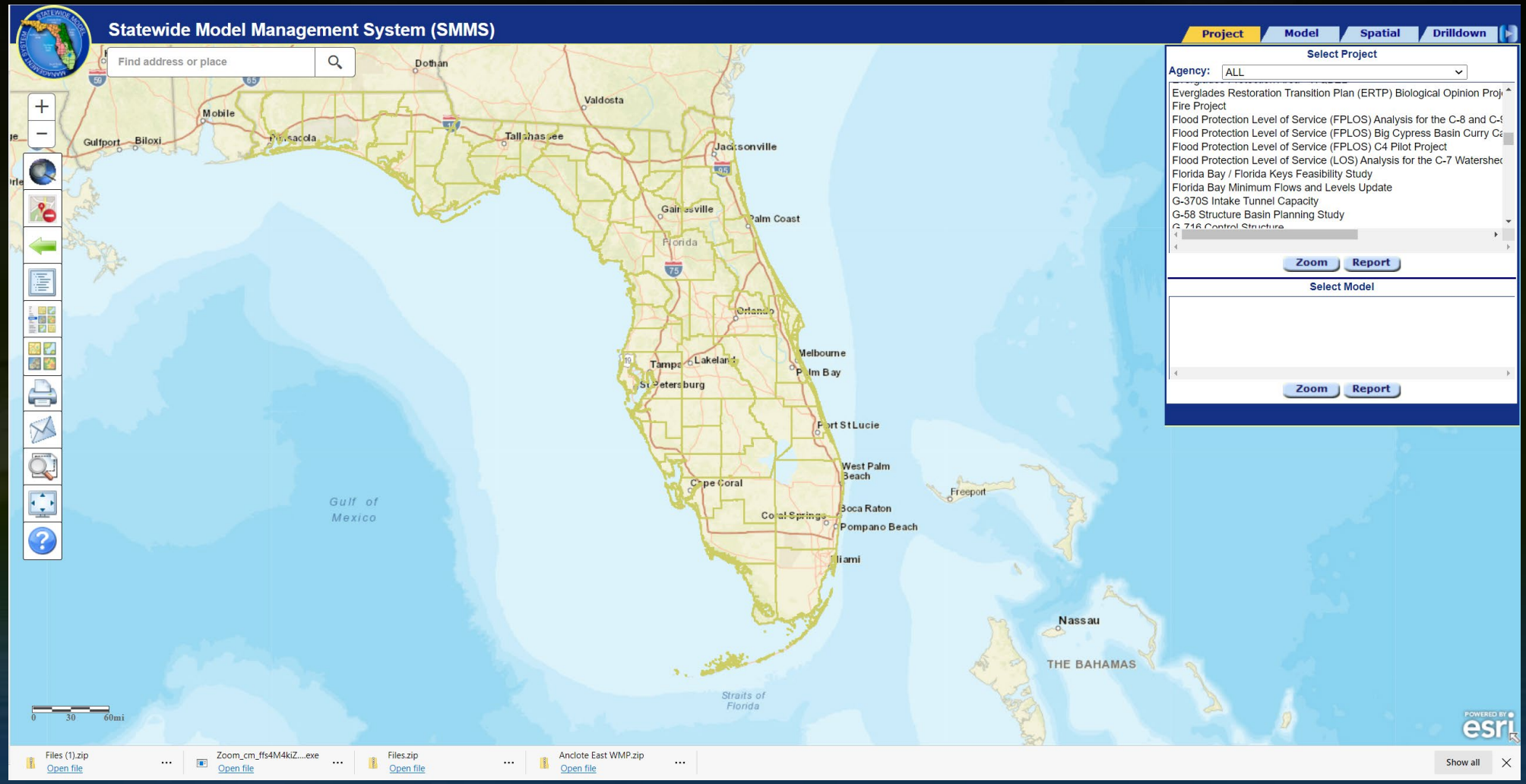
Important Takeaway Message

- Some structures are seeing a reduction in efficiency
- Without adaptation and mitigation strategies, basins they serve, including inland areas will see reduction in Flood Protection Level of Service
- Flood impact increase with Sea Level Rise

It is important and urgent that we advance no-regret strategies and projects in order to start addressing the identified needs, even as we continue our studies.

Statewide Model Management System

H&H Models/Tools Repository



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