

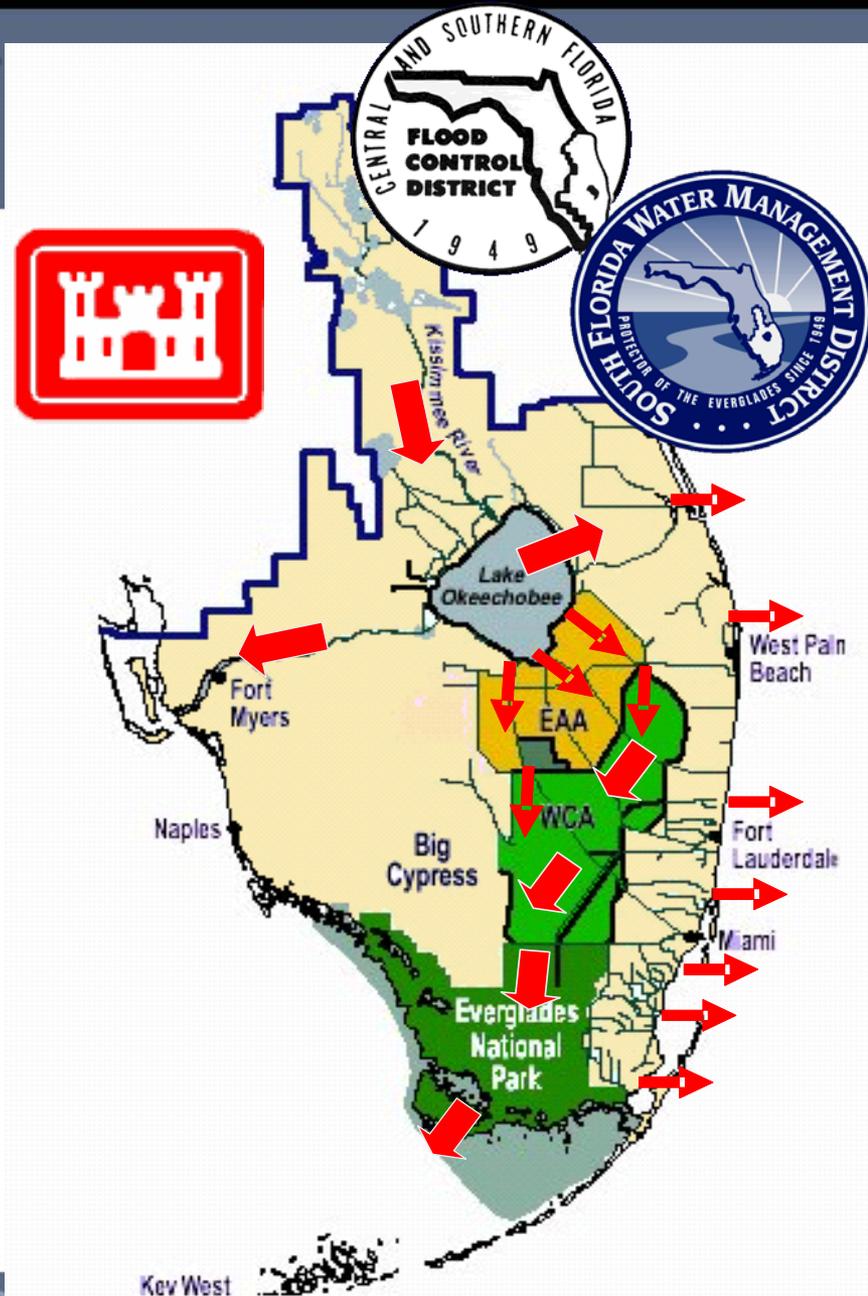
Flood Control Operations and Wet Season Readiness

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Operations, Maintenance & Construction

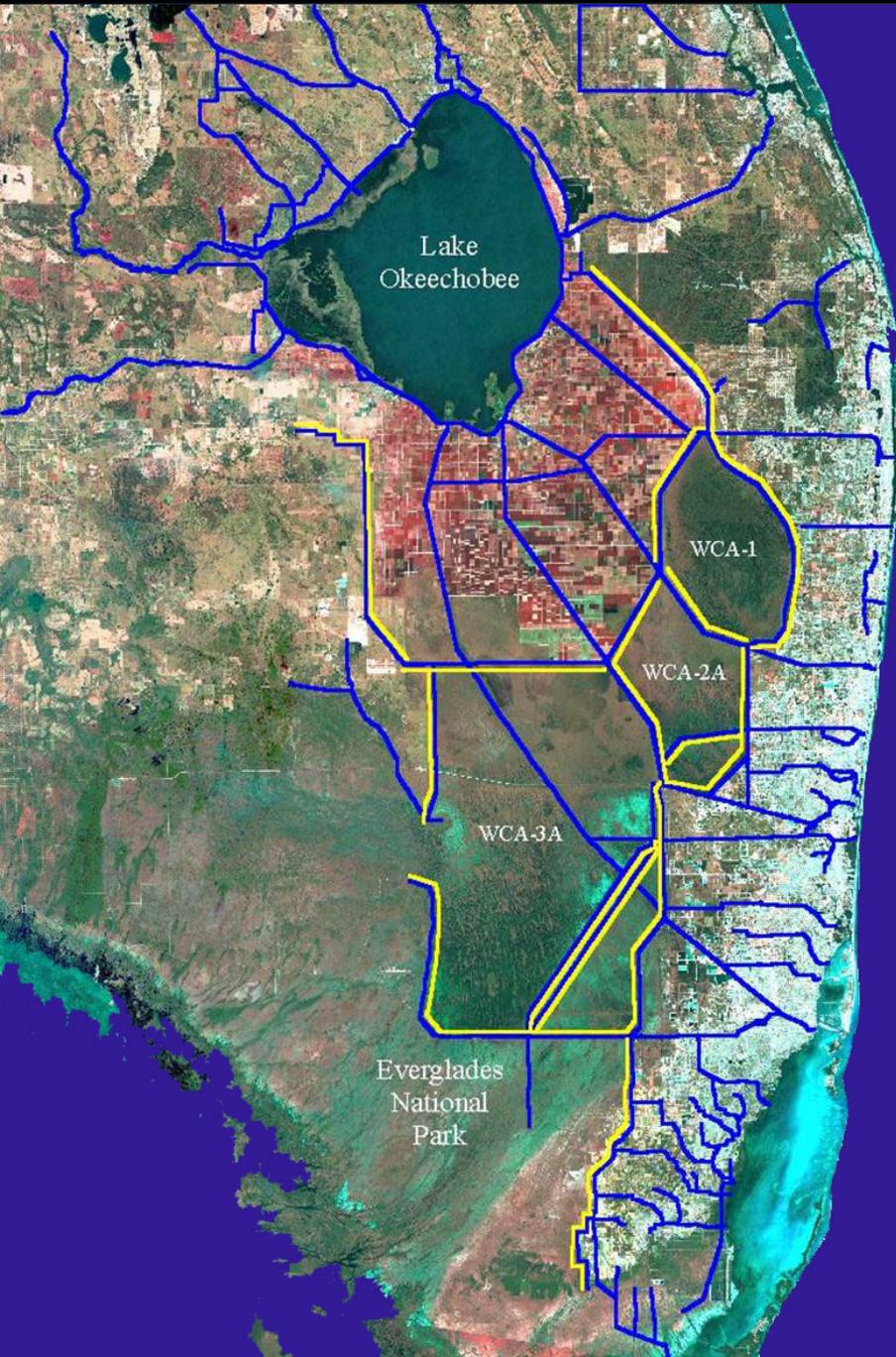
Governing Board Workshop
June 13, 2013

Central and Southern Project for Flood Control & Other Purposes

- Designed for multiple purposes
- Initially authorized in 1949 and constructed between 1950 & 1970
- The C&SF FCD was created by the legislature to serve as local sponsor
- Operated and maintained by SFWMD in accordance with USACE criteria



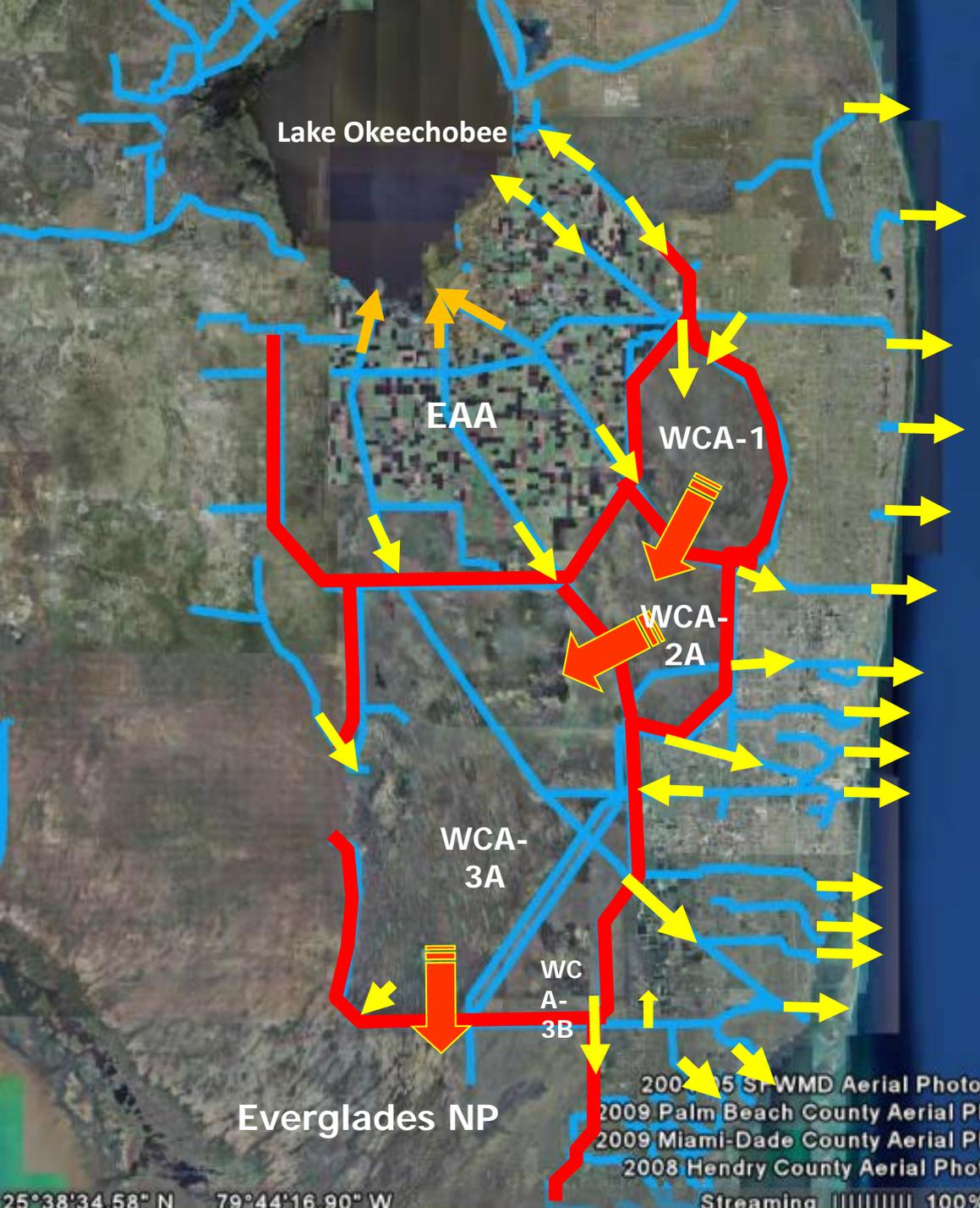
Plan to Reduce Flooding



- Wall off the Everglades
 - East Coast Protective Levee
 - EAA Levees
- Drain to the Ocean
 - Relatively Inexpensive
 - Effective
 - Minimal footprint on high priced lands
 - Water lost, but we had too much

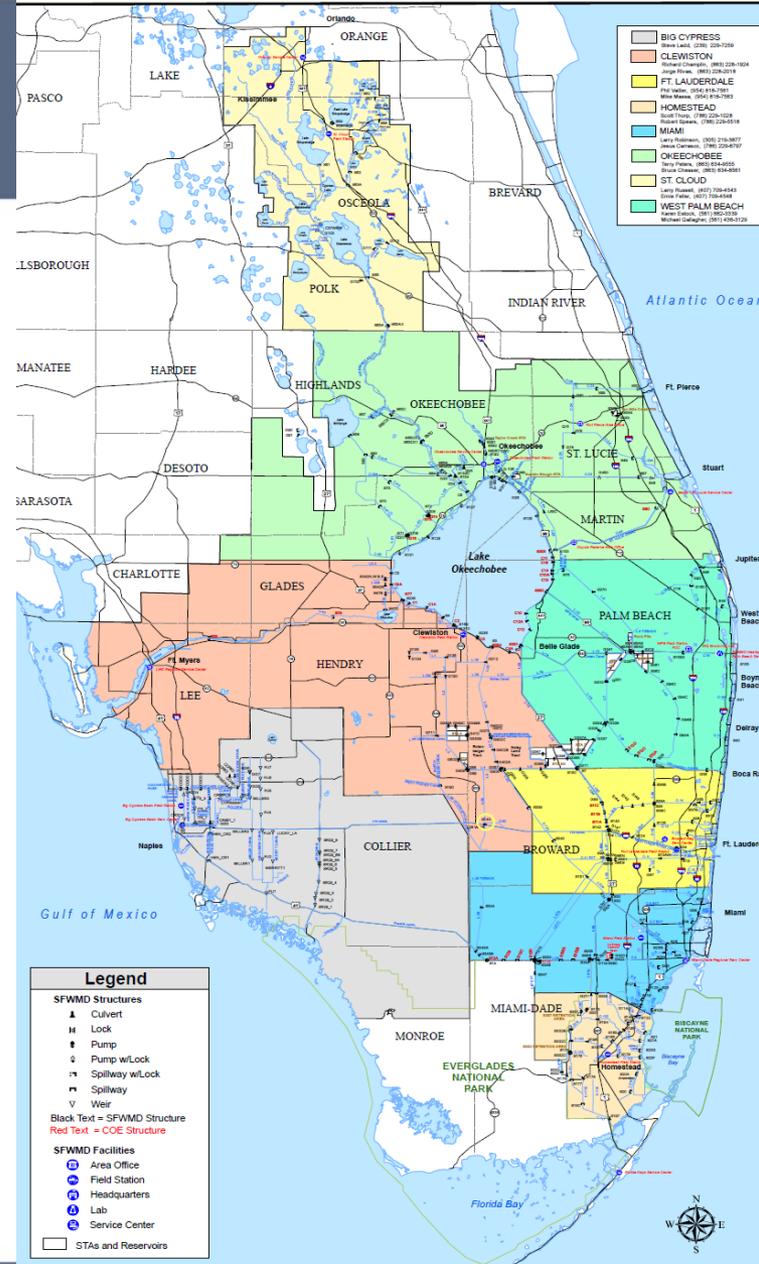
Overview of Flood Control Operations

Maximizing water away from residential, urban and agricultural areas to Lake Okeechobee, WCAs and out to tide.

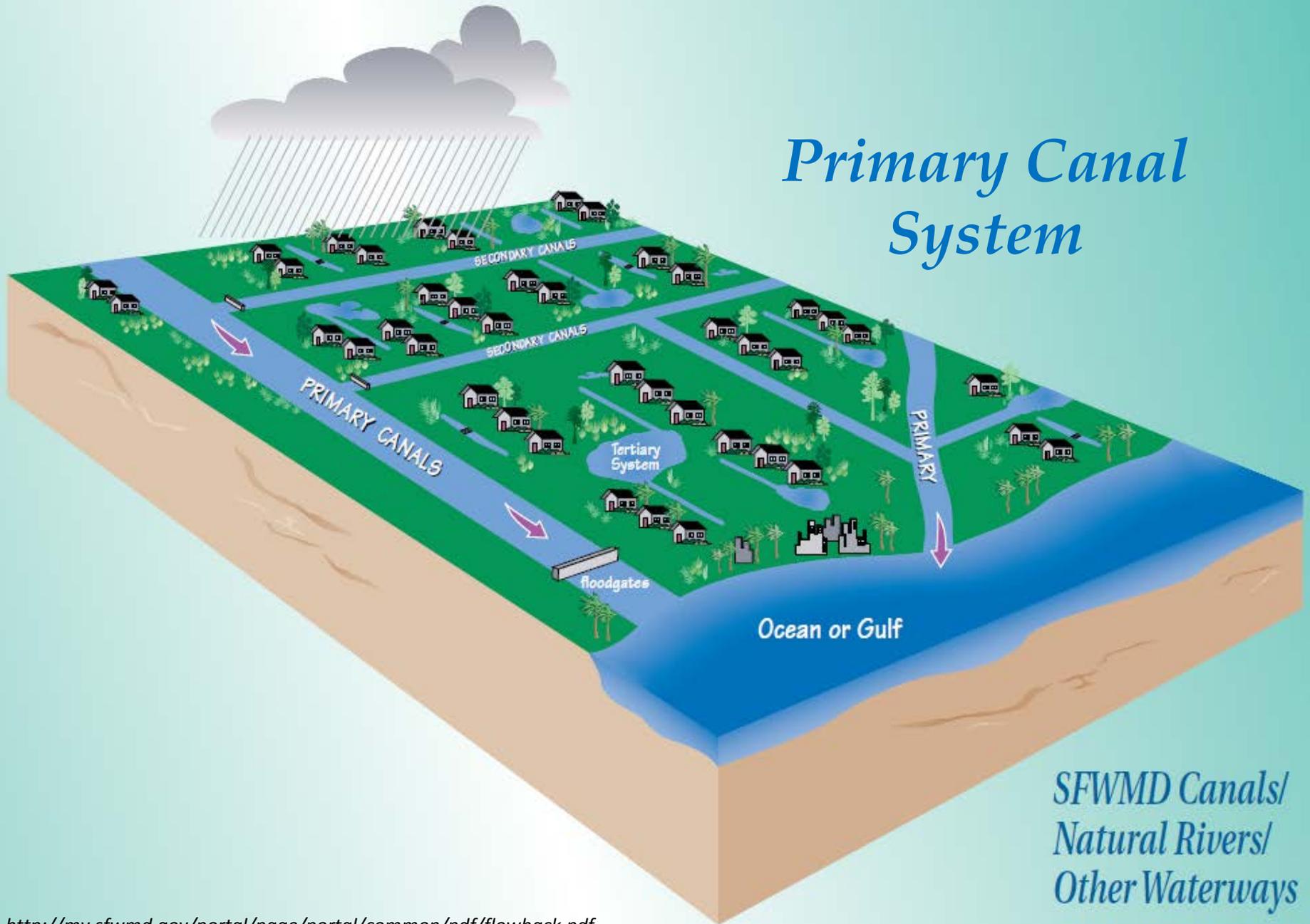


Regional Field Stations

- 8 Field Stations
 - 2 hour response time
- Maintenance
 - Structures, Pump Stations, Canals & Levees
 - Overhauls & Preventive maintenance
 - Vegetation control (mowing, spraying, tow boats)
 - Shoal removal / erosion repair
- Operations
 - Pump station staffing
 - often 24/7
 - Manual structure operations as required



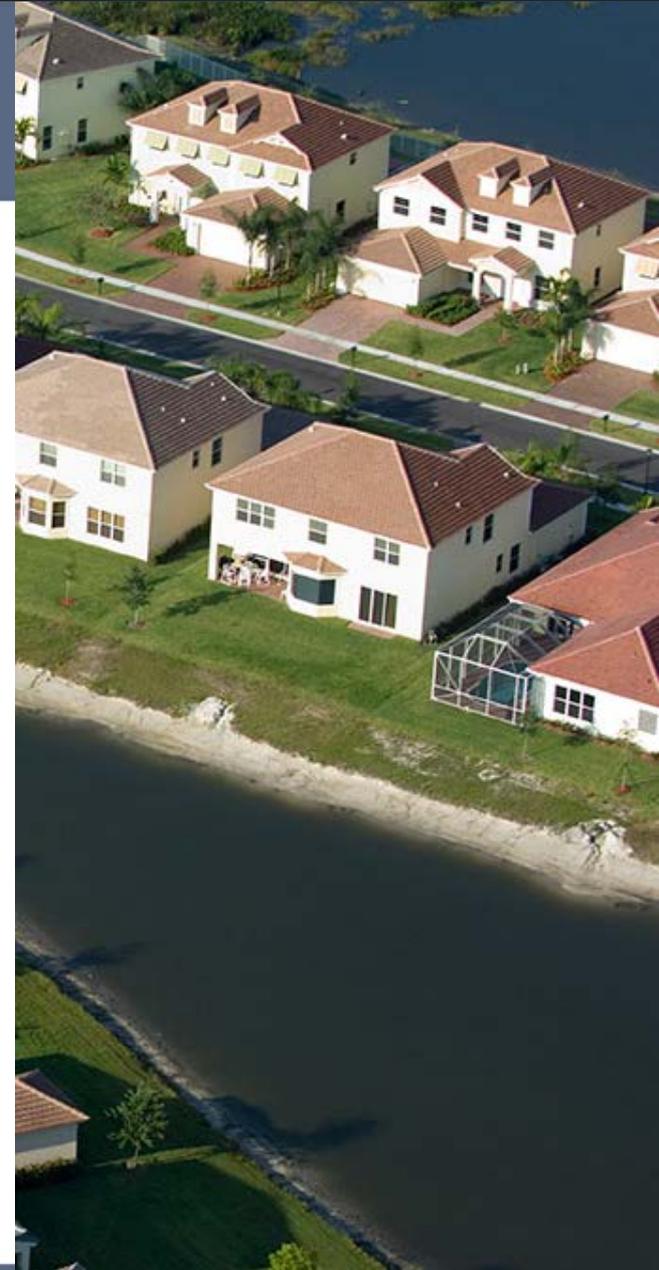
Primary Canal System



*SFWMD Canals/
Natural Rivers/
Other Waterways*

Surface Water Regulation

- Enhanced benefit of the C&SF system by limiting inflows to avoid overwhelming the system
- Requires water storage systems for new development to limit storm flows into the primary canal system
- This insures that no increase in the peak rate of flow is discharged to the canals after development occurs
 - Has been a key in avoiding having to increase canal capacity over time (unlike the highway system)





STORM SEASON READINESS

Emergency Management

In preparation for the hurricane season...

- Conducted on-site tabletop exercises at all 8 field stations
- Provided District-wide training on assigned emergency roles and responsibilities as well as the WebEOC system



- Coordinated activities with all four water management districts, the Department of Transportation and the Department of Environmental Protection
- Coordinated the renewal of contracts for District-wide debris operations

Emergency Management

Annual Hurricane Freddy Exercise

- Simulated impacts from a Category 4 storm
- Full activation of EOC
- Activation of the Citizen Information Line
- Clewiston Field Station COOP simulation
- Participation from external partners

Response & Recovery Objectives

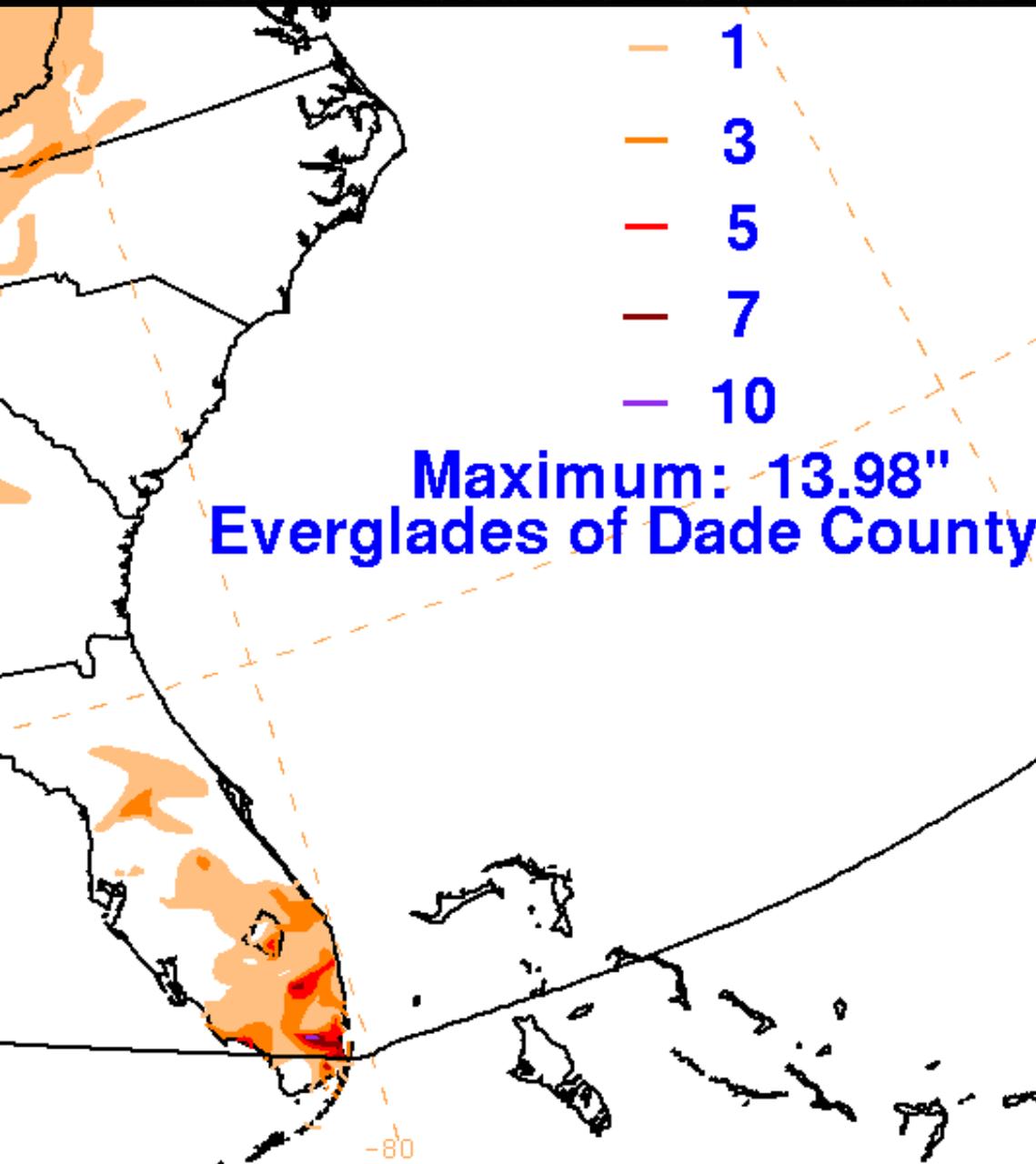
- Deployment of Specialized Teams
- Prioritizing the need for competing resources
- Implementation of a long-term recovery
- Mapping Freddy's activities and documenting District actions



HURRICANE/TROPICAL STORM OPERATIONS & HISTORY

Tropical System Operations

- Pre-Storm Operations (Based on NHC Watches/Warnings)
 - Facility and field inspections
 - Lowering of regional canal levels
 - 298 / Local government / USACE coordination
- Storm Onslaught
 - EOC / Pump Station Manned and locked down
 - Continually monitor and operate the flood control system
- Post-Storm Operations
 - Deploy post-storm inspection teams
 - Implement recovery operations



1992 HURRICANE ANDREW

Hurricane Andrew 1992



JUNE IS FLOOD AWARENESS MONTH

Hurricane Andrew 1992



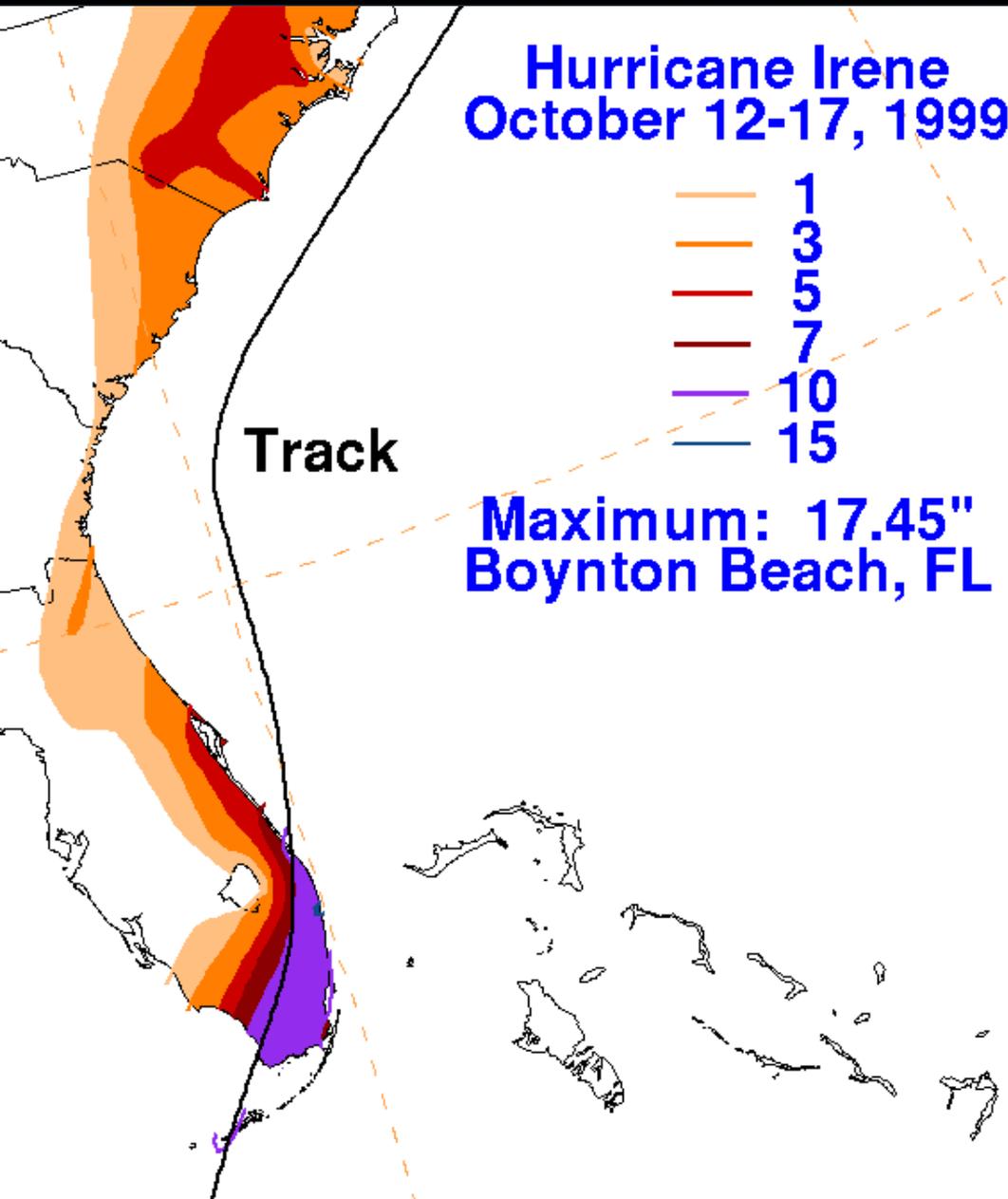
JUNE IS FLOOD AWARENESS MONTH

Hurricane Andrew 1992



Hurricane Andrew 1992

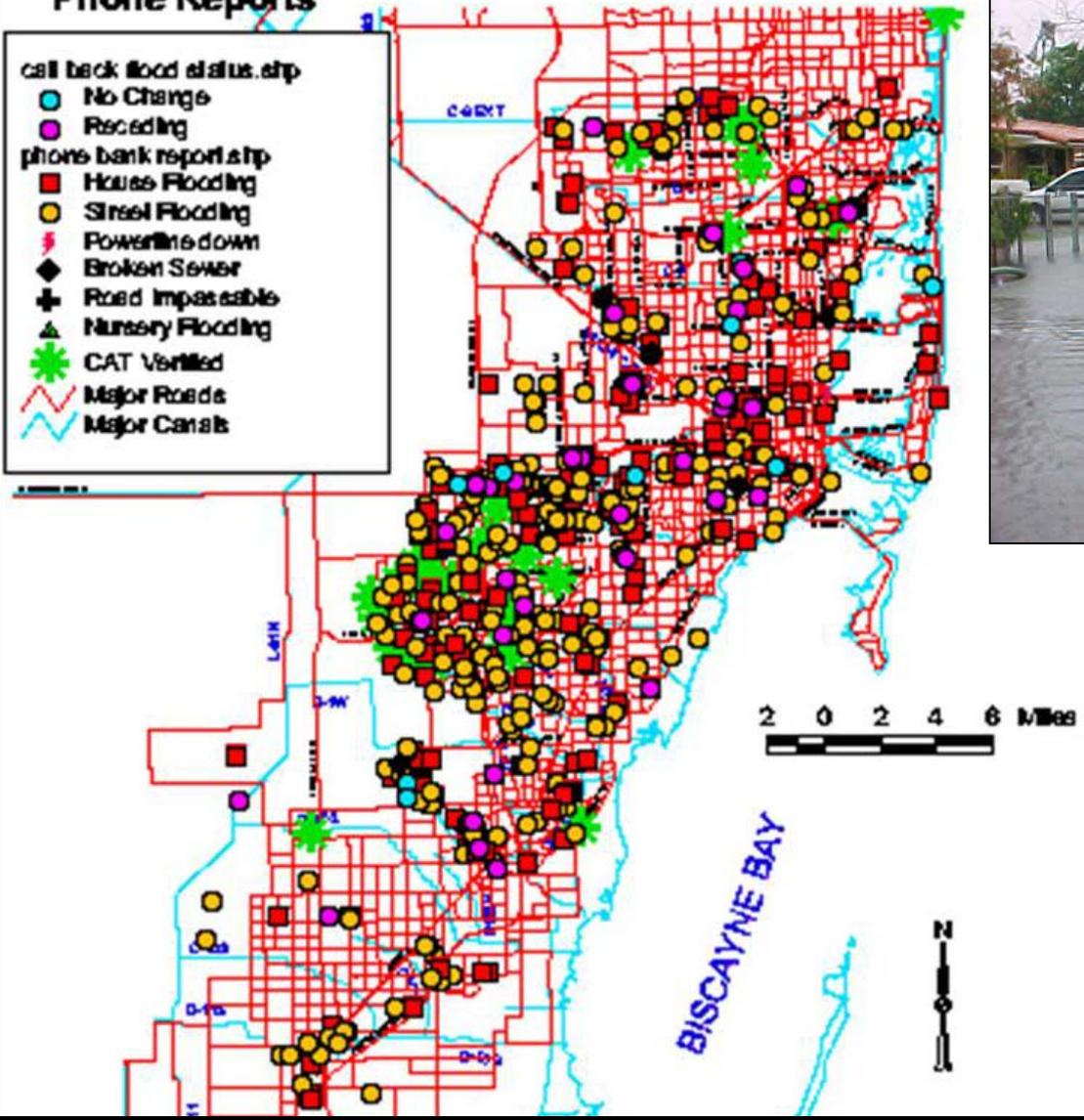




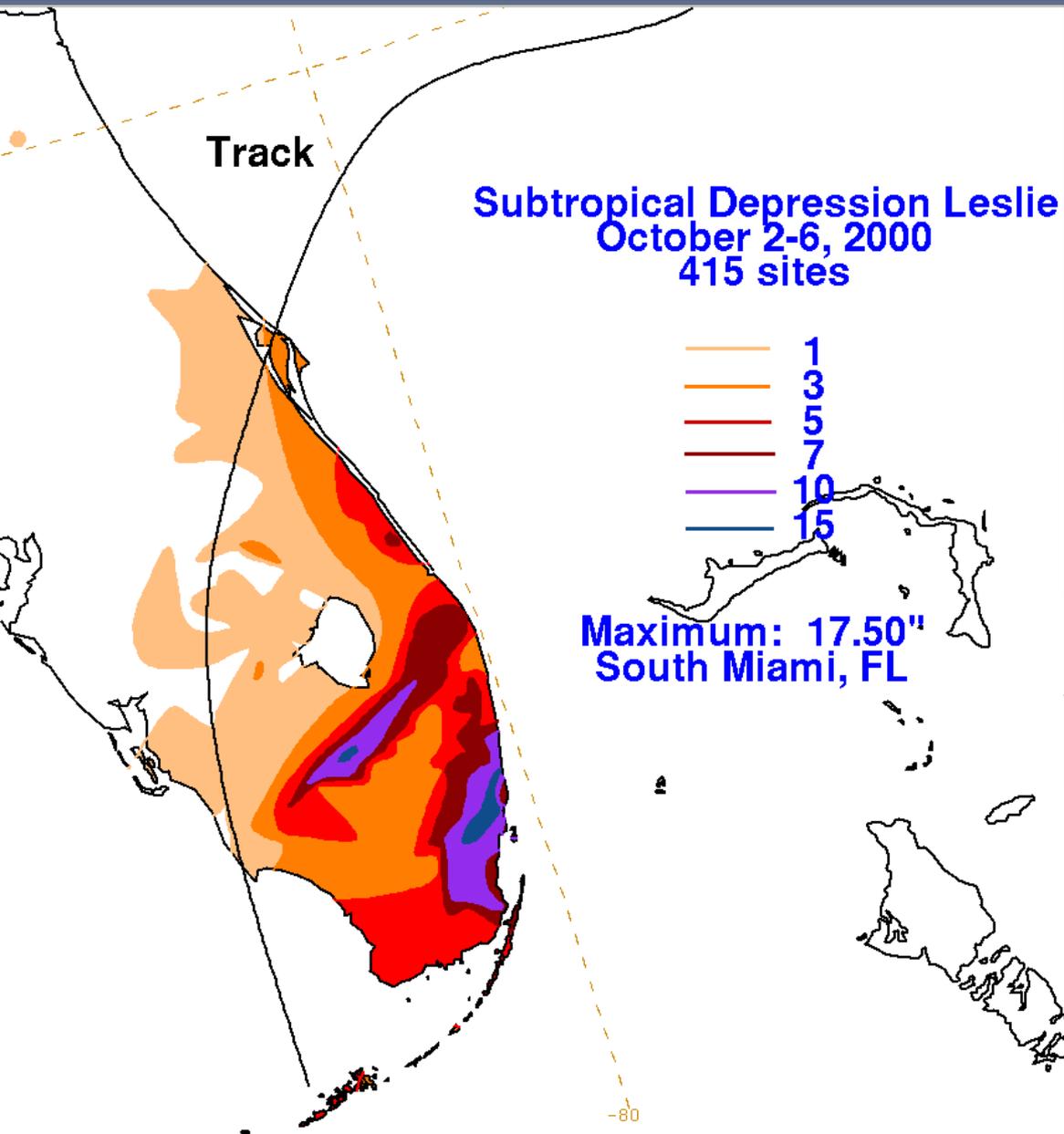
1999 HURRICANE IRENE

**Miami-Dade County
Phone Reports**

- call back flood status.sfp
- No Change
- Receding
- phone bank report.sfp
- Houses Flooding
- Street Flooding
- ⚡ Powerline down
- ◆ Broken Sewer
- ⊕ Road Impassable
- ▲ Nursery Flooding
- ★ CAT Verified
- Major Roads
- Major Canals



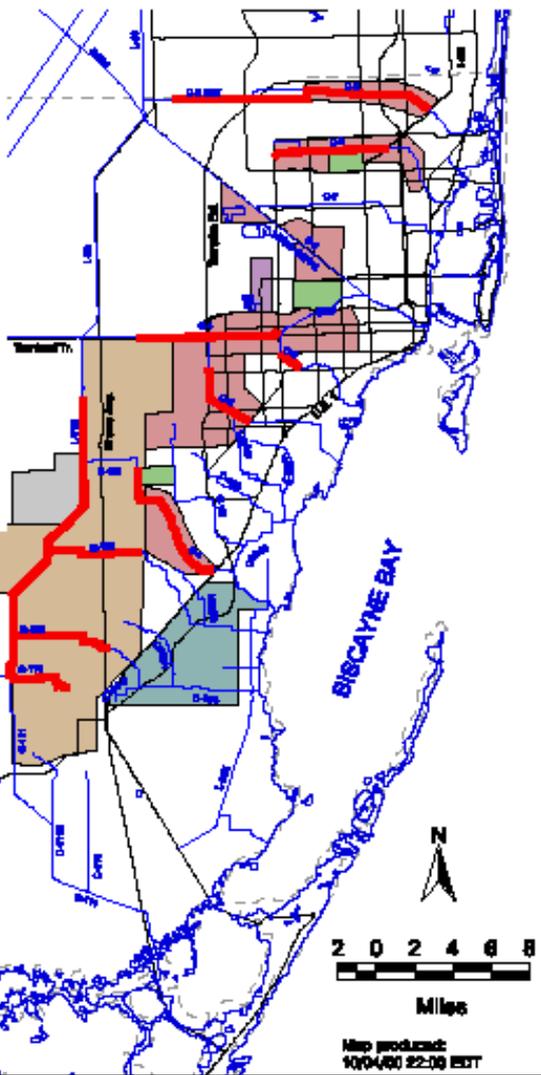
In October of 1999, Hurricane Irene passed over Miami-Dade County causing severe flooding.



**2000
“NO
NAME”
STORM**

Miami-Dade County Flood Areas

-  Canals Out of Bank
-  8.5 Sq. Mile Area Severe Flooding
-  Agricultural Lands East of U.S. 1
-  Entire Area Flooded
-  All Agricultural Land in Entire Area Flooded
-  Airport Severe Flooding Tarmac & Runway Open
-  Residential Street Flooding Severe to Moderate
-  Severe Street Flooding



One year later, in October of 2000, the “No-Name Storm” (TS Leslie) hit causing severe flooding.

Task Force Formed – Post Irene

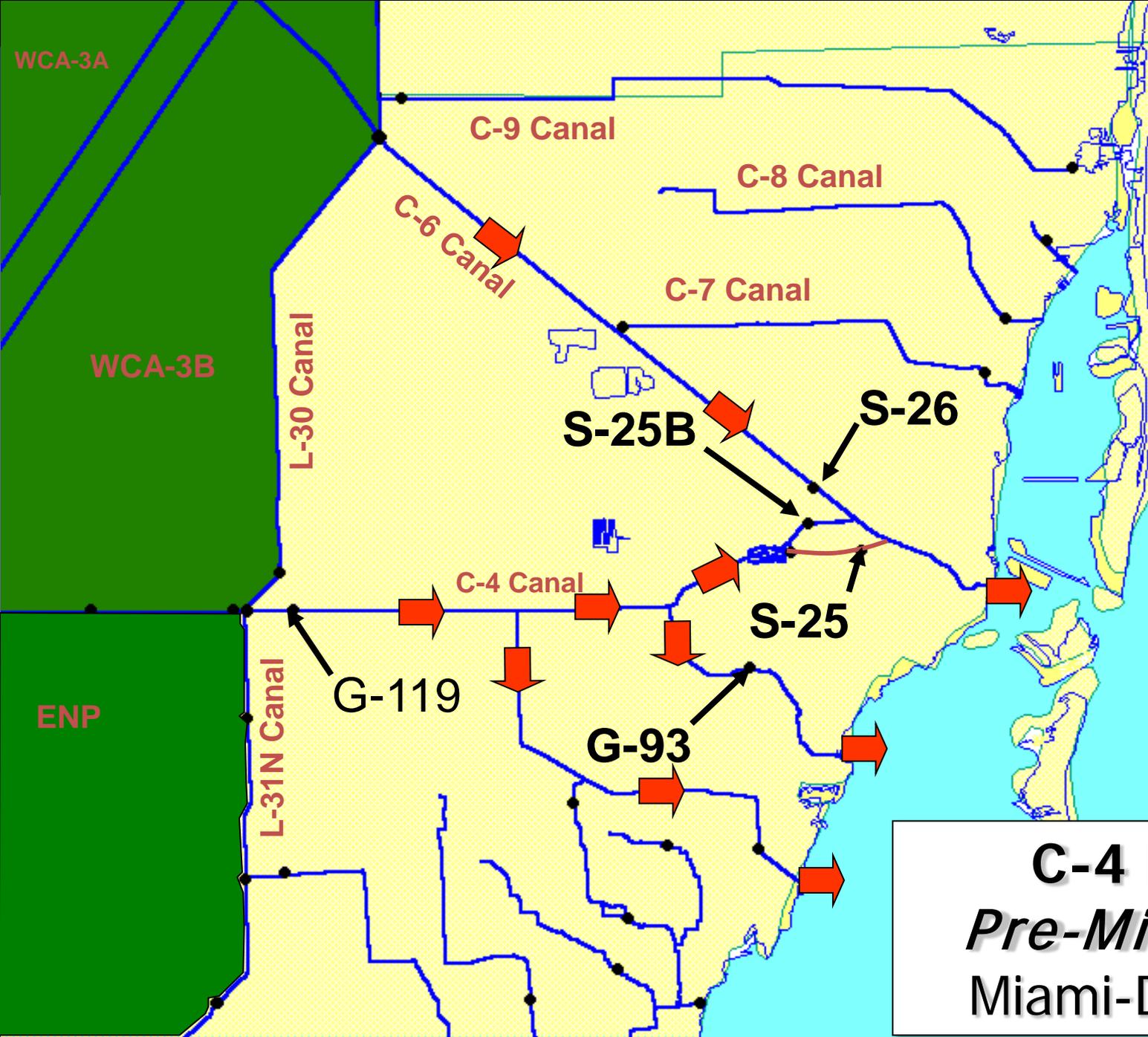
- **Miami-Dade Flood Management Task Force was formed following Hurricane Irene**
 - SFWMD
 - Communities within the affected basins
 - Miami Dade Office of Emergency Management
 - Miami-Dade Department of Environment Resources Management
 - Florida Division of Emergency Management
 - U.S. Army Corps of Engineers

Task Force Formed – Post No-Name Storm

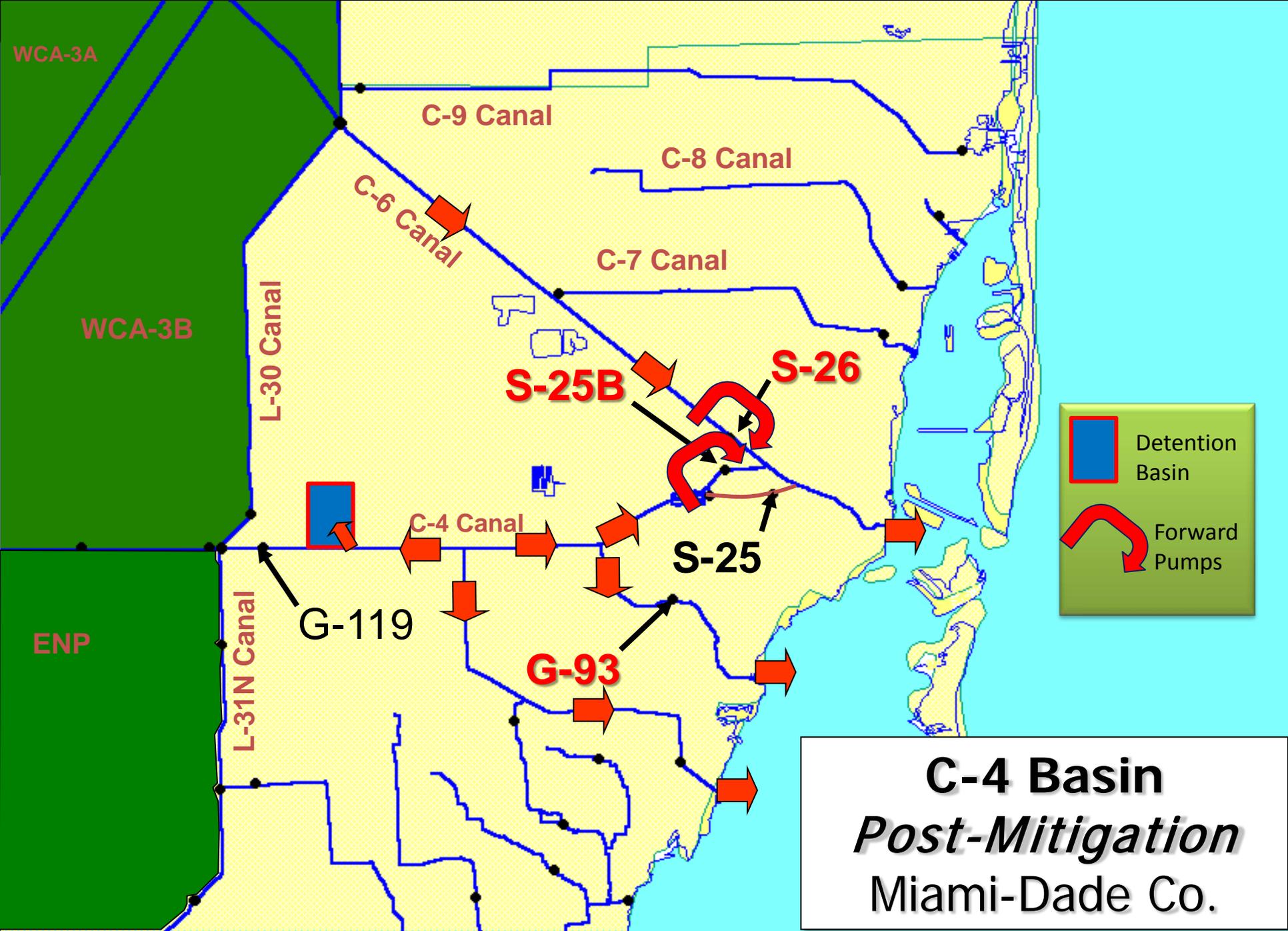
- **Governor's South Florida Flood Task Force following the October 2000 storm**
 - Miami-Dade Department of Environmental Resources Management (DERM),
 - Miami-Dade Office of Emergency Management (DEM)
 - Miami-Dade Public Works (PWD)
 - Miami-Dade Water and Sewer Department (WASD)
 - Florida Department of Transportation (FDOT)
 - South Florida Water Management District (SFWMD)
 - U.S. Army Corps of Engineers (COE)
 - United States Department of Agriculture (USDA), the
 - National Park Service (NPS)
 - FEMA including the National Flood Insurance Program (NFIP)
 - Municipalities.

SFWMD Recovery Task Force

- **The Recovery Task Force reviewed projects identified in:**
 - Hurricane Irene After Action Assessment (SFWMD)
 - Miami-Dade Flood Management Task Force
- **The Task Force focused primarily on conveyance improvement as the most effective means to mitigate flooding impacts**
 - Forward Pumping
 - Canal Conveyance / Storage Improvement
 - Secondary System Improvement
 - Local Community Drainage Improvement



C-4 Basin
Pre-Mitigation
Miami-Dade Co.



C-4 Basin
Post-Mitigation
 Miami-Dade Co.

C4 Emergency Detention Basin



Pump station at the C-4 Emergency Detention Basin (EDB). The EDB is made up of two reservoirs of nearly 500 acres each, which allows for approximately 4,000 acre/feet of water to be diverted from the C-4

Forward Pump S-25B

The forward pump on the C-4 Canal at Structure S25B is designed to push water flow downstream against the incoming tide thus allowing the system to continuously drain.

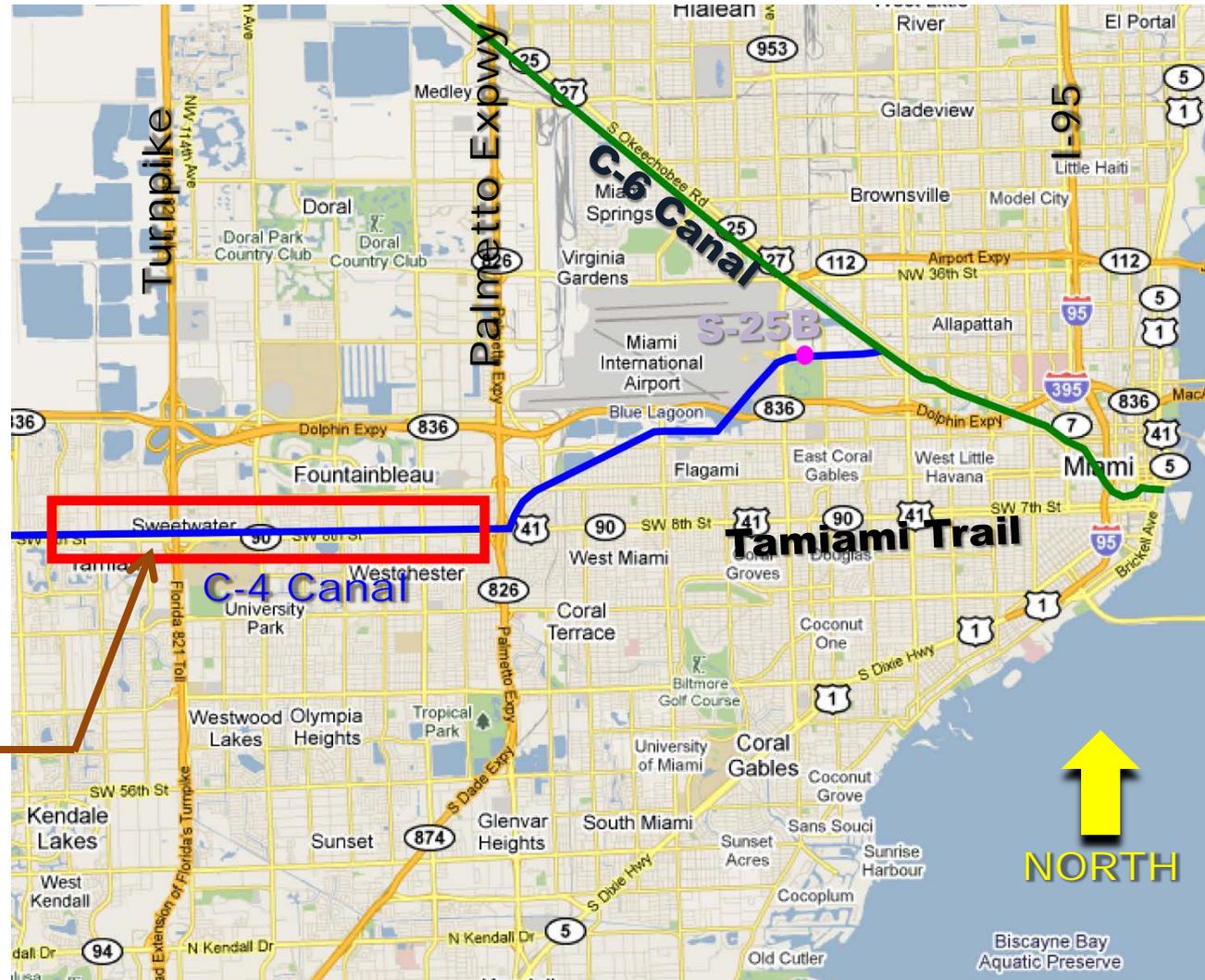


Forward Pump S-26

The forward pump at S-26 on the Miami River (C-6) is designed to counter the effects of the forward pump on the C-4 and prevent the C-4 Canal outflow from overwhelming the river thus causing flooding up-river.



C-4 Canal Bank Improvements Area Map



Floodwalls/Berms

3 completed

3 under design



C-4 Canal Bank Flood Protection Projects



- Total of 6 Floodwall and/or Berm Segments
- 2 Floodwalls & 1 Berm Segment already constructed
- Remaining 3 Floodwalls and/or Berm Segments currently under design

C-4 Canal Bank Flood Protection Projects

Completed Canal Bank Projects



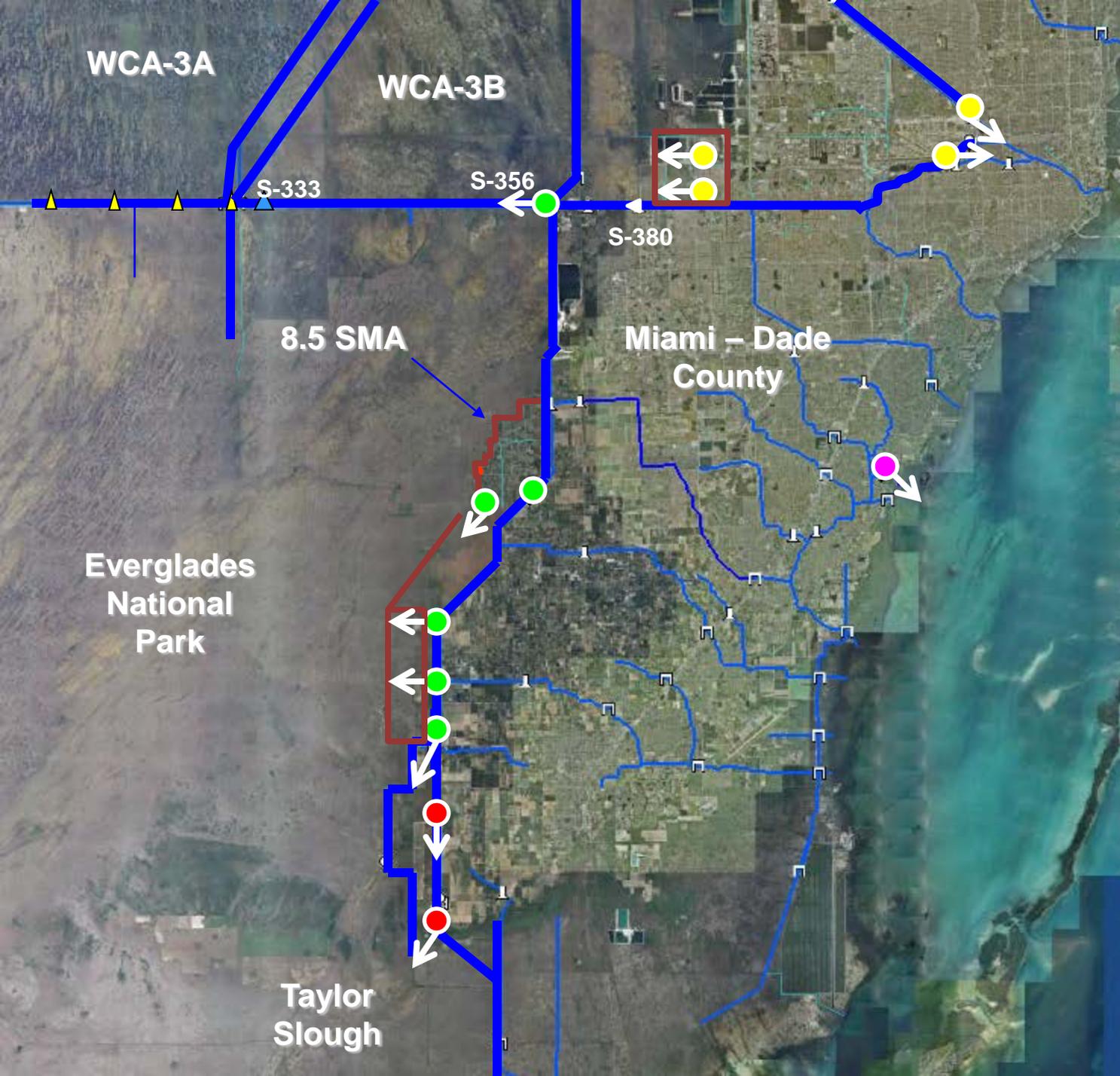
Belen Phase I



Quick Start



Linear Park



Pump Stations

C-4

- S25B
- S26
- G420
- G422

South Dade

- S331 C&C
- S332B
- S332C
- S332D
- S356
- S357
- S25B

C-111 Spreader

- S199
- S200

Deering Estate

- S700

C-111 Spreader Canal Project

- Frog Pond Detention Basin
 - S-200 Pump Station (225 cfs)
 - Concrete lined inlet channel (4,625 LF)
 - Earthen Header Channel (18,200 LF)
 - Detention Impoundment (590 ac.)
- Construction Costs
 - PIR Estimate: \$46M
 - Const. Costs: \$16M



C-111 Spreader Canal Project

- Aerojet Canal Ext.
 - Pump Station S-199 (225 cfs)
 - Concrete lined inlet channel (4,750 LF)
 - Earthen channel (2,125 LF)
- Construction Costs
 - PIR Est.: \$16.7M
 - Const. Cost: \$12.3M



Biscayne Bay Coastal Wetlands Project

- Deering Estates Pump
 - Pump Station S-700 (100 cfs)
 - Constructed Wetland (2.5 ac.)
 - Canal Extension (580 LF)
 - Concrete Pipe (560 LF)
 - Outfall Water Control Structure
 - Old Cuttler Rd. Culvert Crossing
- Construction Costs
 - PIR Est.: \$7.4M
 - Const. Cost: \$4.9M



VALUABLE PARTNERSHIPS...

Forecast Calls for National Weather Service to Continue as a Key SFWMD Partner

- 15 years of forecast coordination to help operate the system
- Participation in the U.S. Drought Monitor
- Emergency weather communications
- ***StormReady*** Designation



Joint NWS/SFWMD Press Briefing

QUESTIONS