

February 25, 2021
Drainage Workshop
Tropical Storm Eta



Introduction



- South Florida Water Management District
- South Broward Drainage District
- Central Broward Water Control District

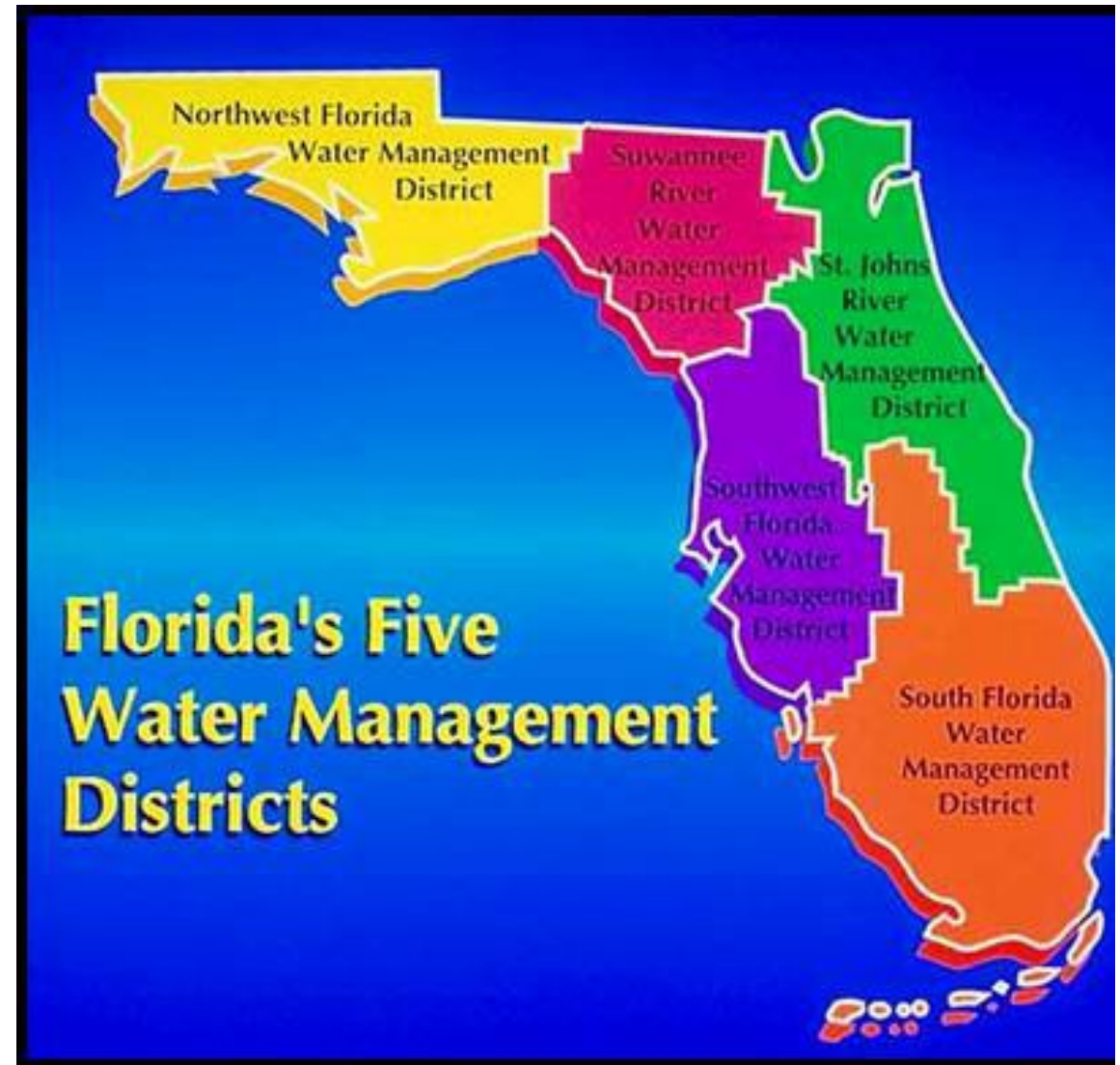


Three-Tiered Drainage System

- **Primary**
 - SFWMD
- **Secondary**
 - Special Districts – SBDD & CBWCD
- **Tertiary**
 - Town
 - Private Landowners

Role of SFWMD

- **Primary drainage system – receiving waters**
- **State-wide regulations & permitting**
- **Monitoring of meteorological conditions**
- **Coordination with National Hurricane Center**
- **Coordination with local drainage districts and municipalities**





- **Maintain & operate the secondary drainage system**
- **Provide water quality & discharge control**
- **Permitting & inspections**
- **Monitoring and operation of local facilities**
- **Coordination with SFWMD and Southwest Ranches**
- **Respond to resident concerns**
- **Pre-Storm and post-storm activities**

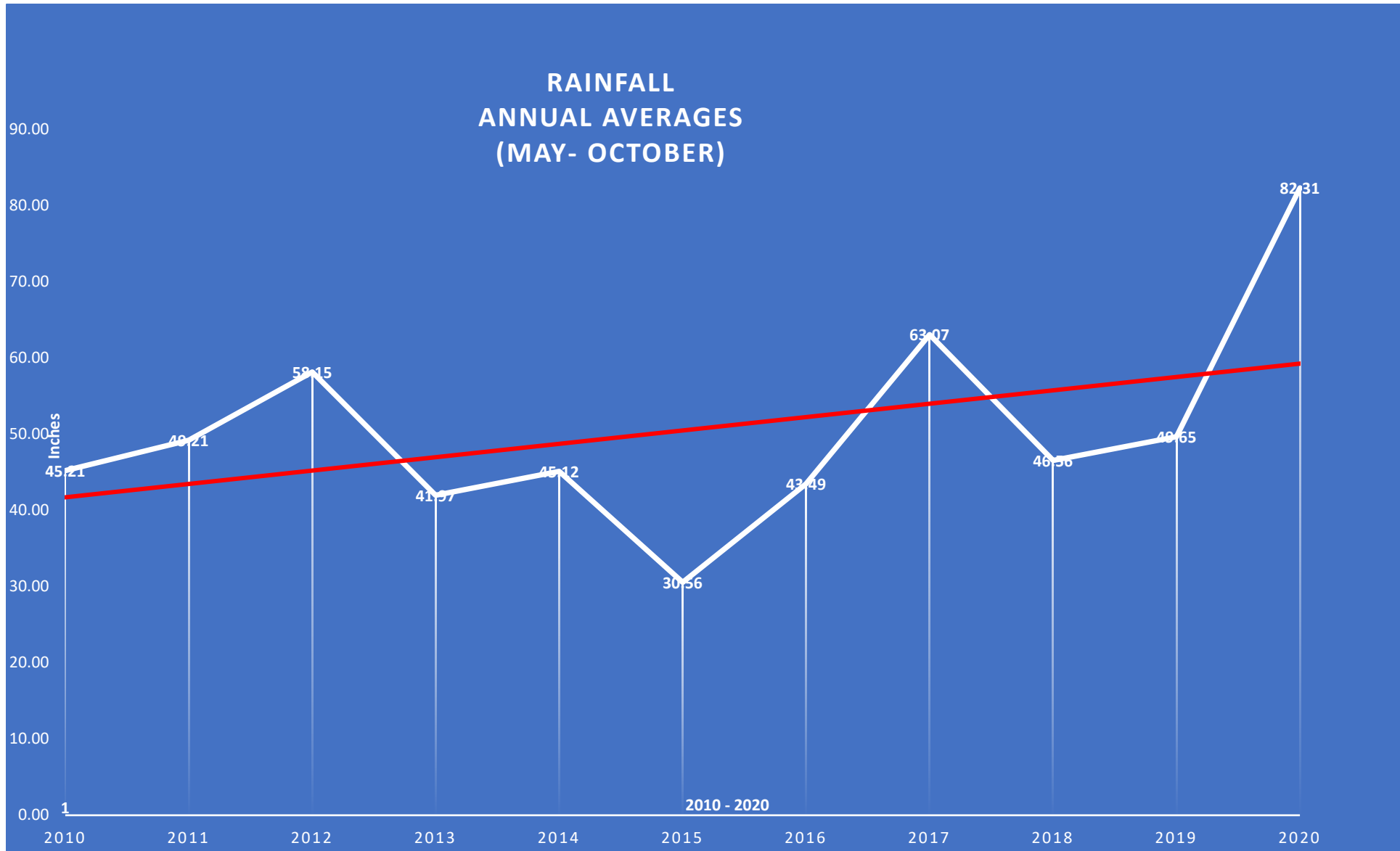
Role of Secondary Drainage Districts



Recap of November Rain Event

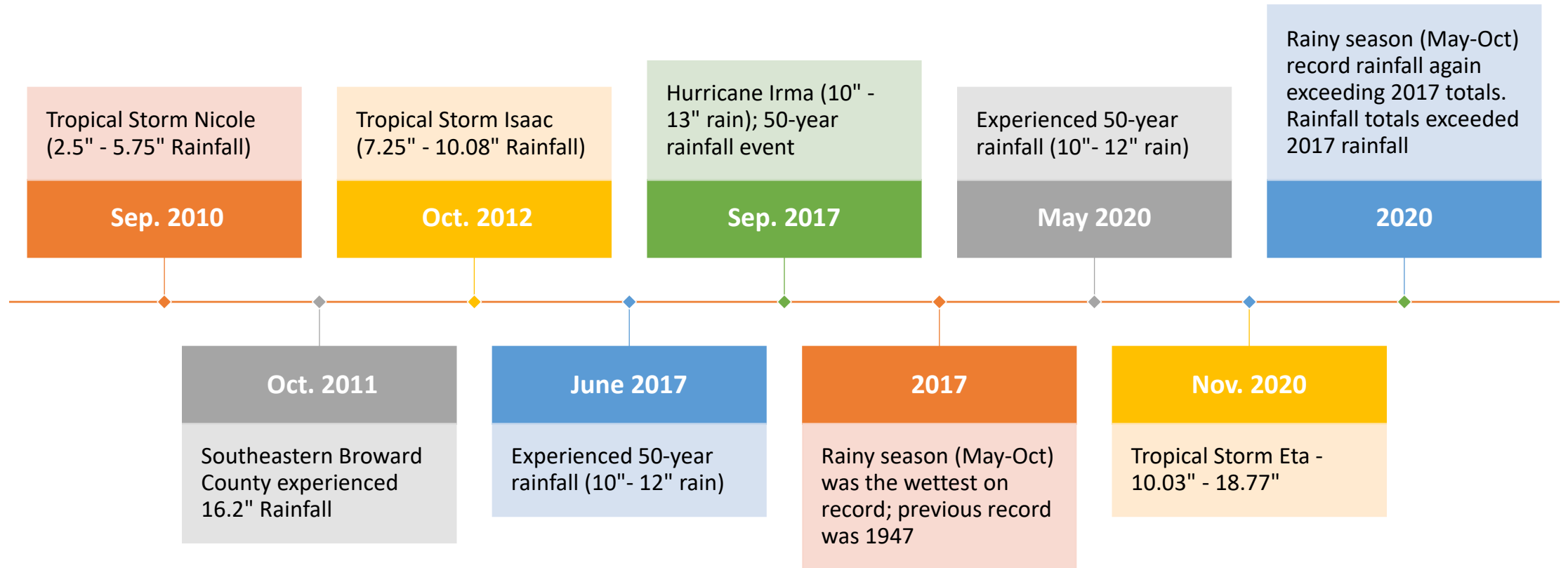
Tropical Storm Eta





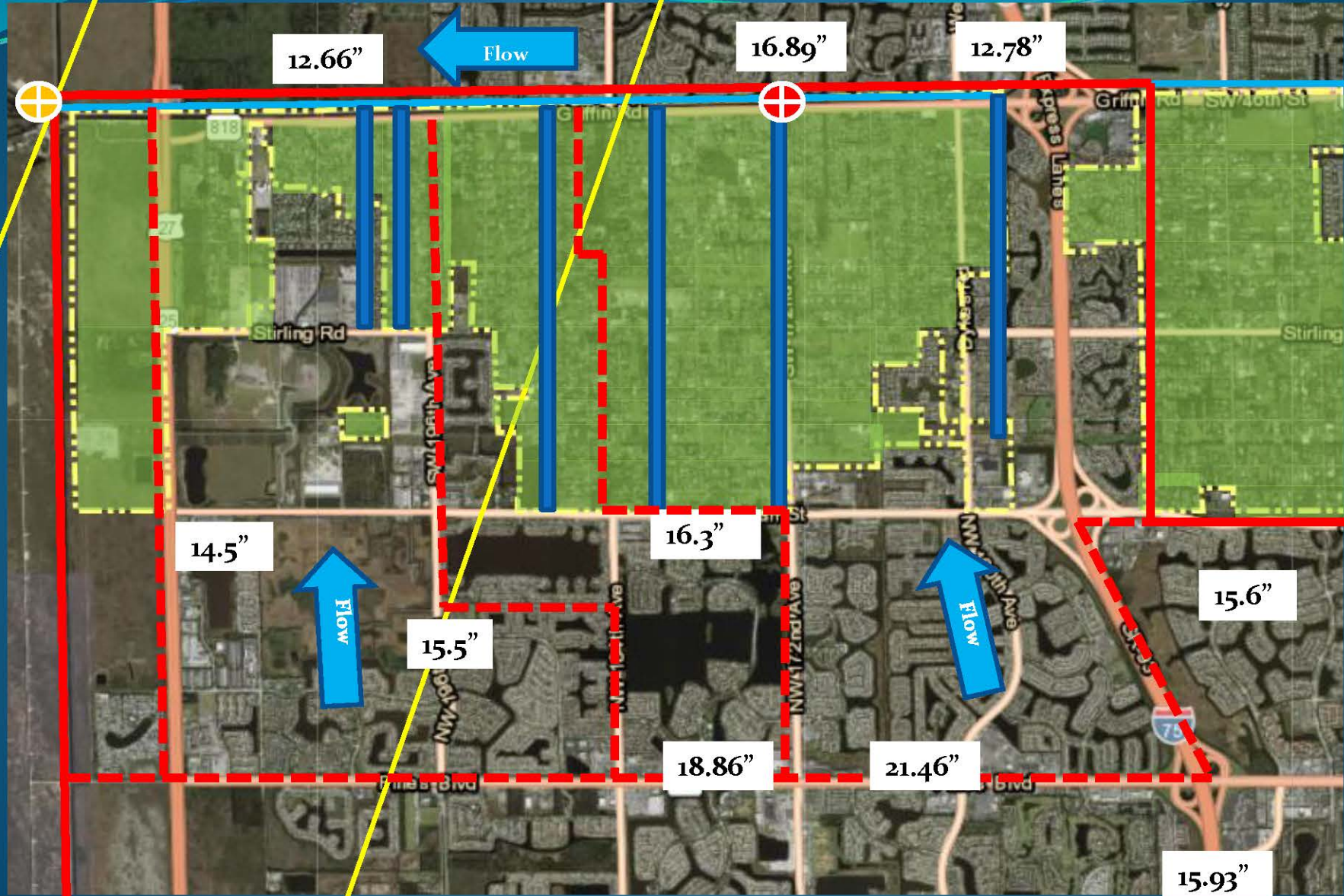
Historical Rainfall 2010 - 2020

Historical Rain Events



SFWMD 100-year, 3-day rainfall
14" - 15"

SFWMD 100-year, 3-day rainfall
16" - 18"



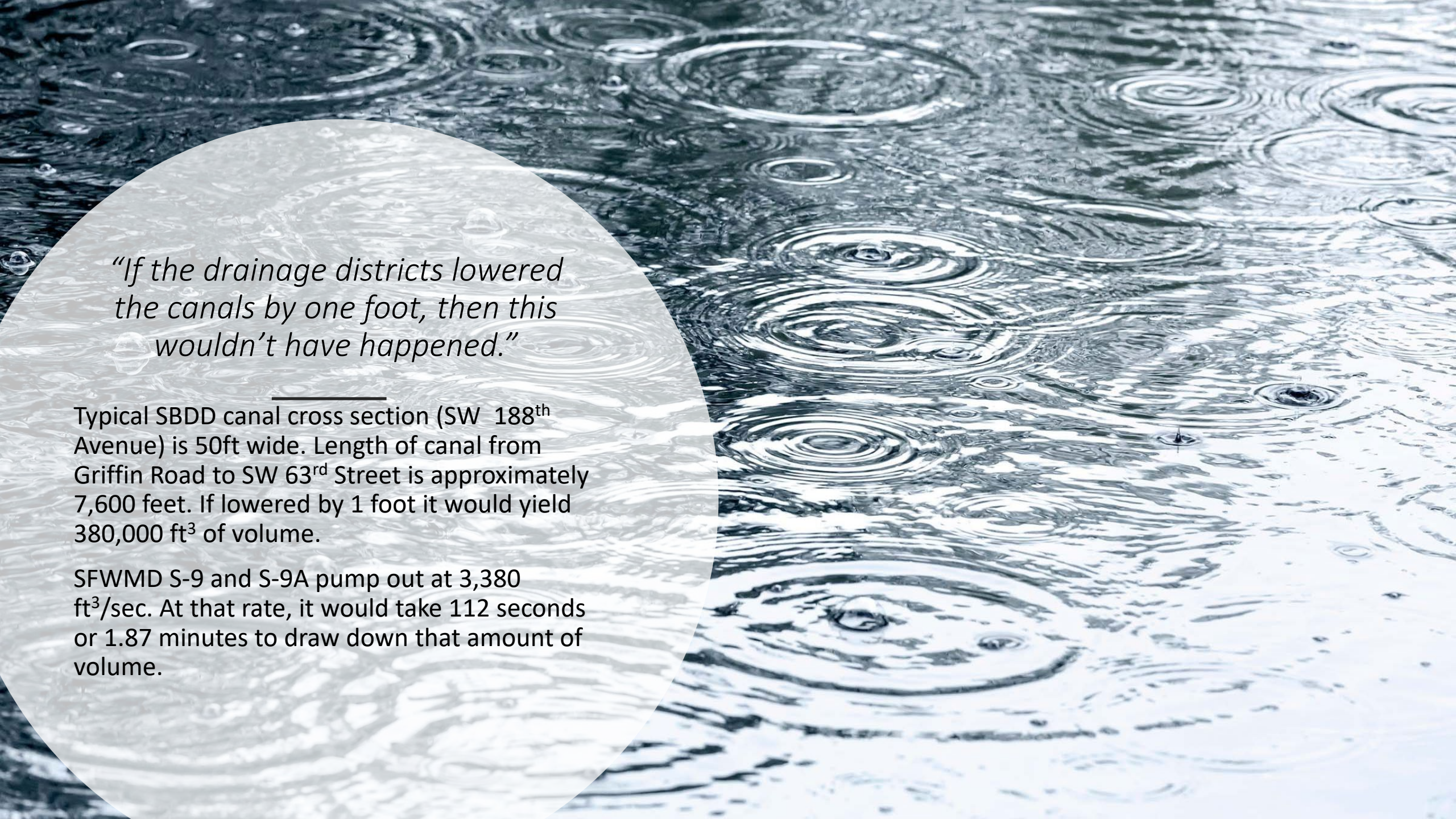
Rainfall Totals

Source: SBDD & City of Pembroke Pines



Tropical Storm Eta


- SBDD recorded between 10.03" And 18.77" of rainfall over a 59-hour period
- Exceeded the intensity and rainfall amount for a 100-yr, 3-day design storm in Basins S-8 and S-9/S-10
- Prior to TS Eta, SBDD received over 20" rainfall during the month of October, including 2.76" - 4.87" between 10/30 & 11/1



“If the drainage districts lowered the canals by one foot, then this wouldn’t have happened.”

Typical SBDD canal cross section (SW 188th Avenue) is 50ft wide. Length of canal from Griffin Road to SW 63rd Street is approximately 7,600 feet. If lowered by 1 foot it would yield 380,000 ft³ of volume.

SFWMD S-9 and S-9A pump out at 3,380 ft³/sec. At that rate, it would take 112 seconds or 1.87 minutes to draw down that amount of volume.



How our
Partners
Prepared for
the Storm



The South Florida Water Management District is the oldest and largest of the state's five water management districts, managing water resources in a 16-county region that stretches from Orlando to the Florida Keys, serving a population of 8.7 million.





SFWMD
Actions
Before,
During and
After the
Storm

C-11 Operating Ranges



Normal Operating Ranges:
 C11 East (between S13 and S13AW)
 Normal operating range: 1.4 to 1.8 feet NGVD.

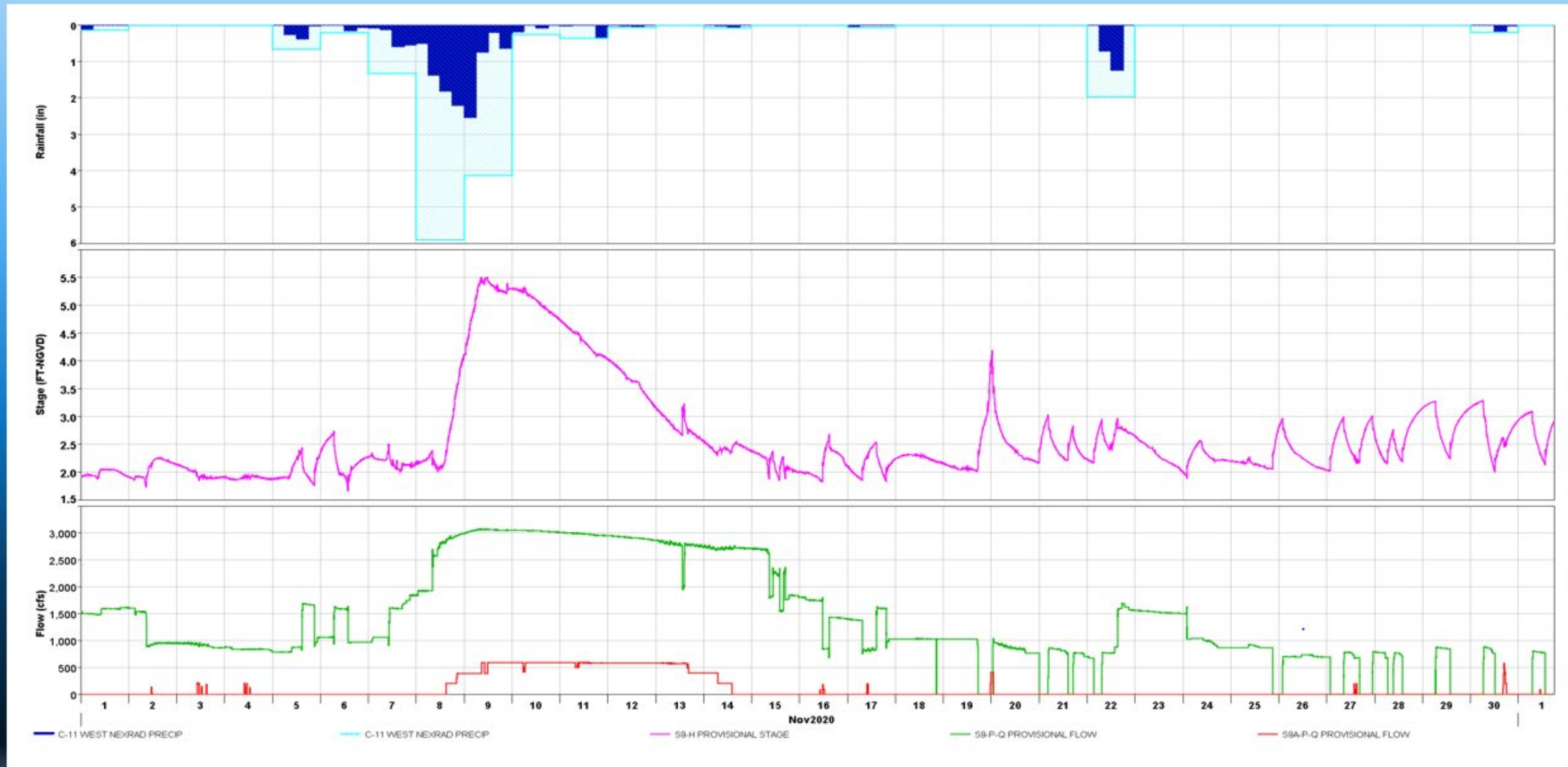
C11 West (between S13AW and S9/S9A with S381 weirs lowered (open flow))
 Normal operating range: 3.0 to 3.4 feet NGVD. Note that when S9 pumps, stage is brought down to 2.0/2.2 feet NGVD before reducing/securing pumps.

Normal Operating Ranges when the S381 weirs are raised (closed no flow at S381); primarily to return seepage to WCA by pumping using S9A:

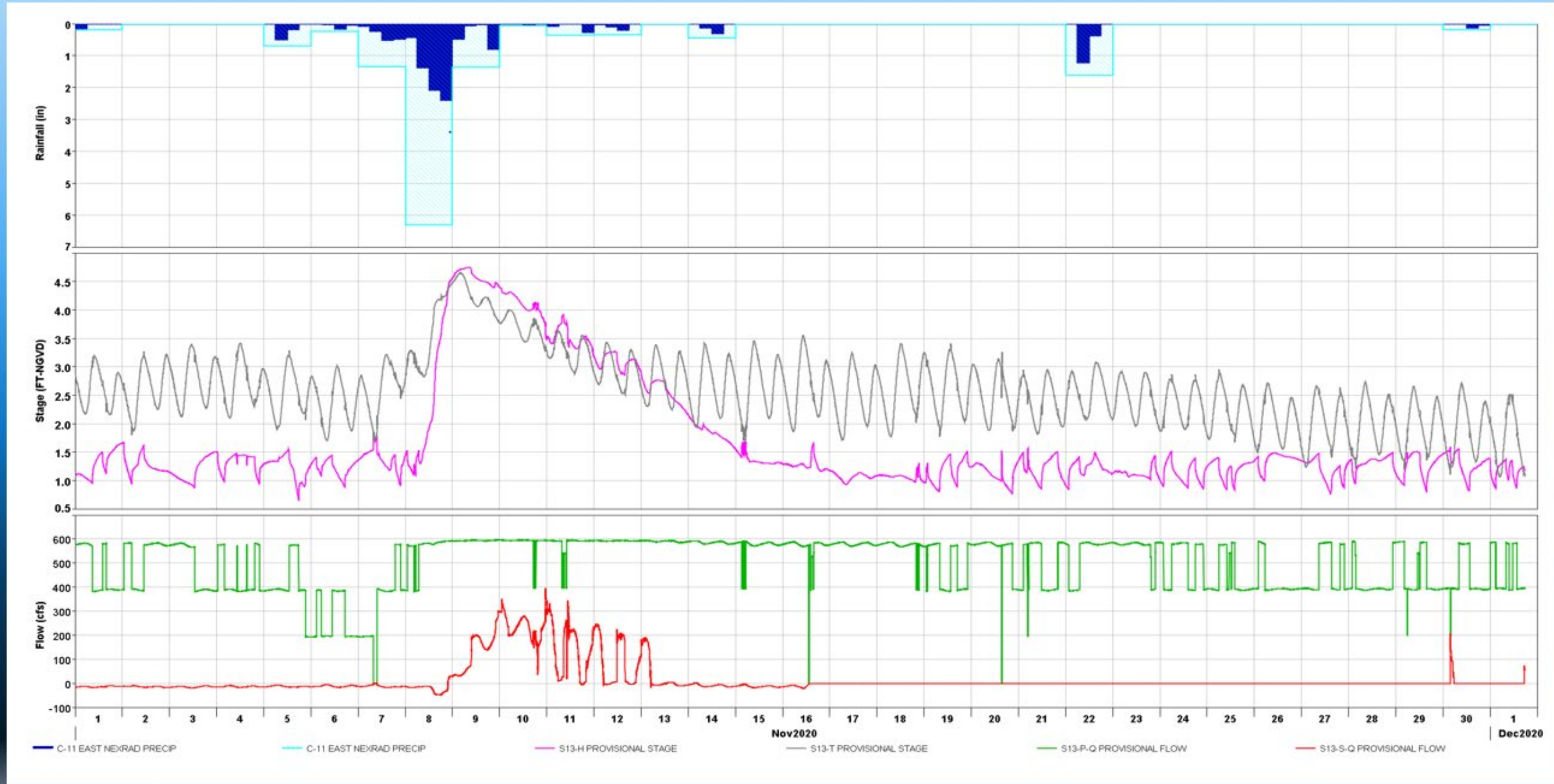
C11 West (between S13AW and S381 with S381 weirs raised)
 Normal operating range: 3.0 to 3.6 feet NGVD

C11 West (between S381 and S9/S9A with S381 weirs raised)
 Normal operating range: 4.0 to 4.5 feet NGVD

C-11 West Rainfall, Stage and Flows



C-11 East Rainfall, Stage and Flows



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- The District spans a 45-square mile area in six municipalities that incorporates approximately 107 miles of canals.
 - The District covers Southwest Ranches from Flamingo Road to SW 148th Avenue.
 - The secondary stormwater drainage system operated by the District is almost exclusively gravity-driven. The District operates only one stormwater pumping structure, which serves the West Hollywood area.



CENTRAL BROWARD WATER CONTROL DISTRICT BOUNDARY AREA

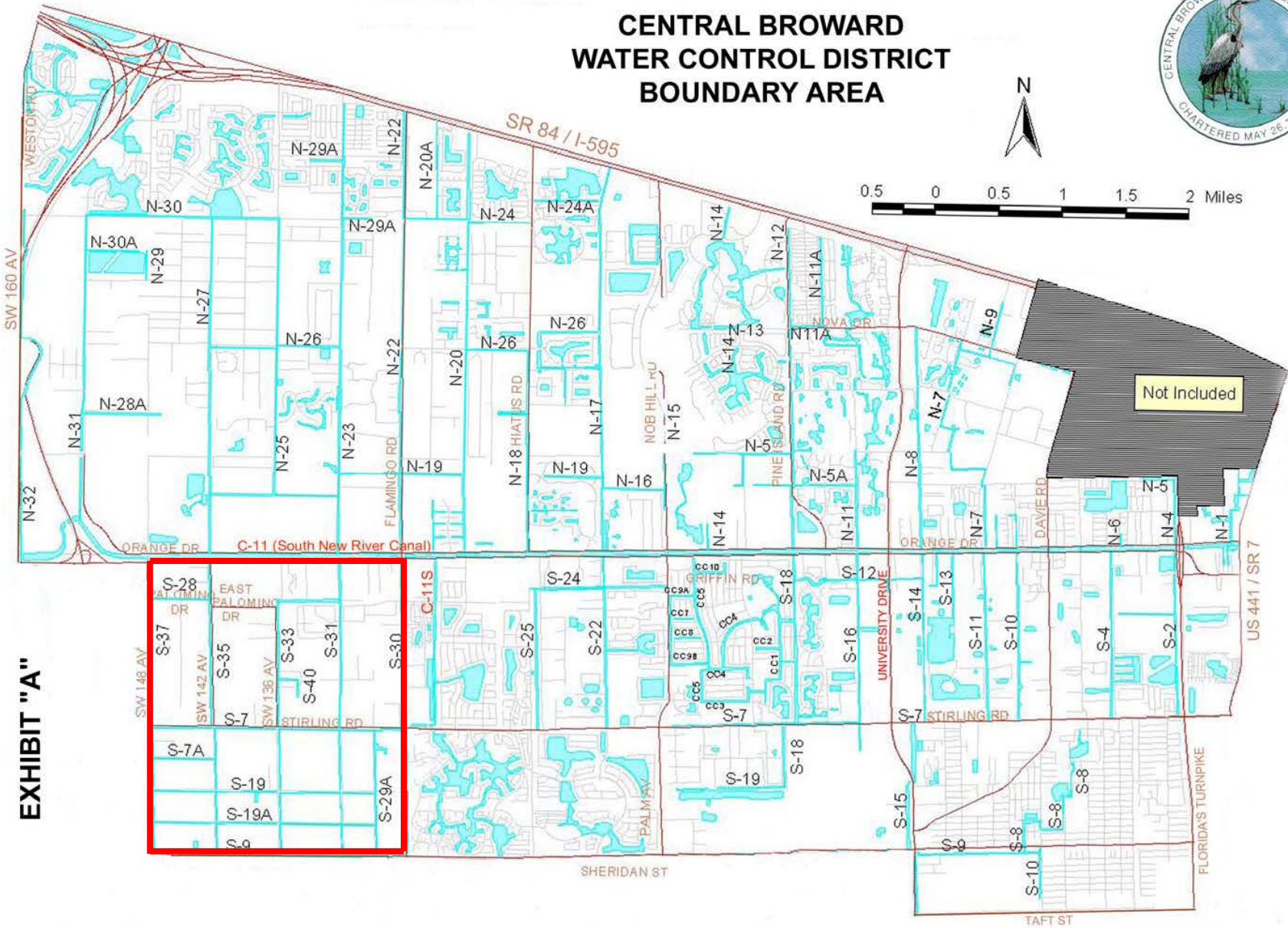


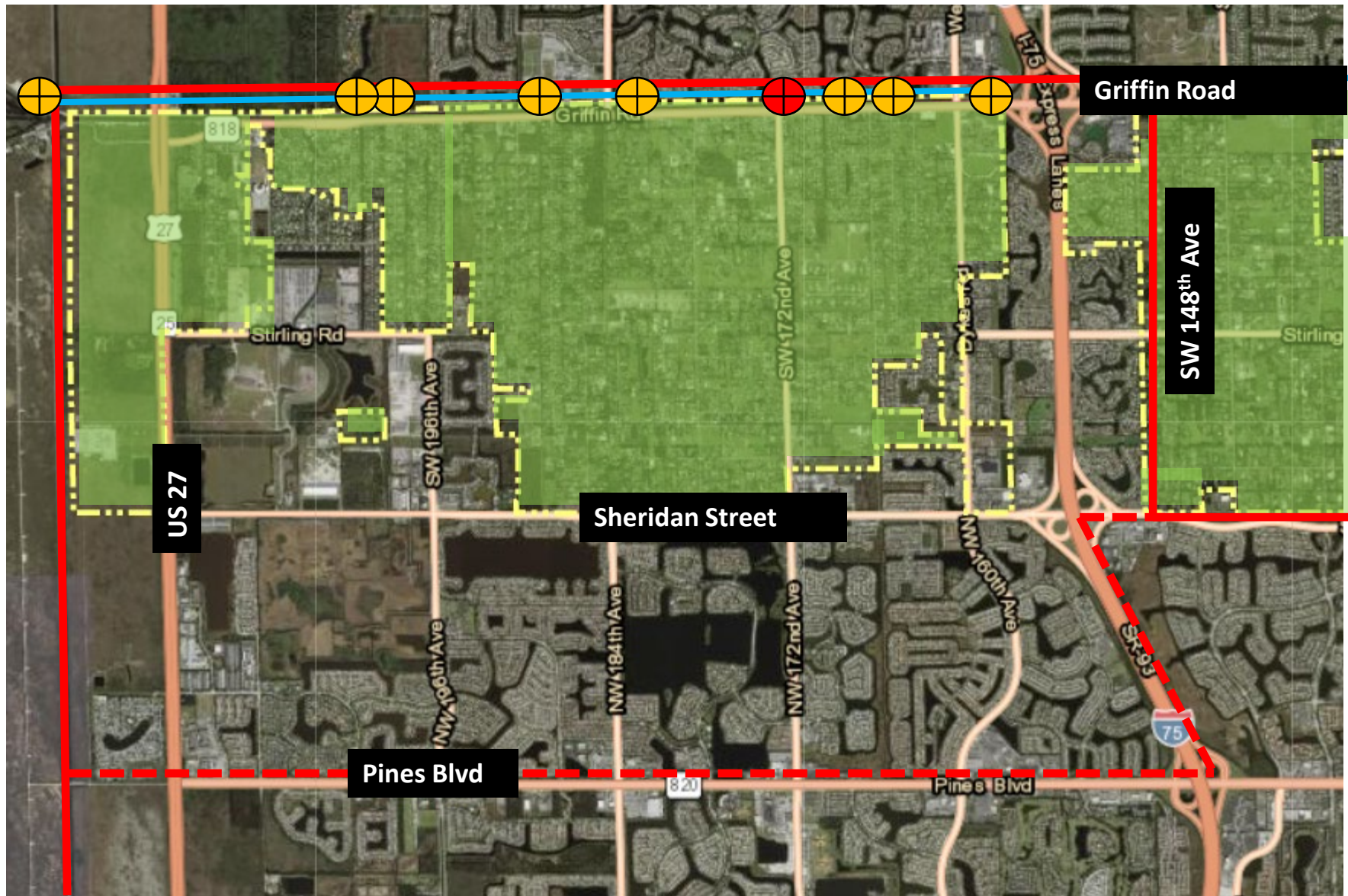
EXHIBIT "A"



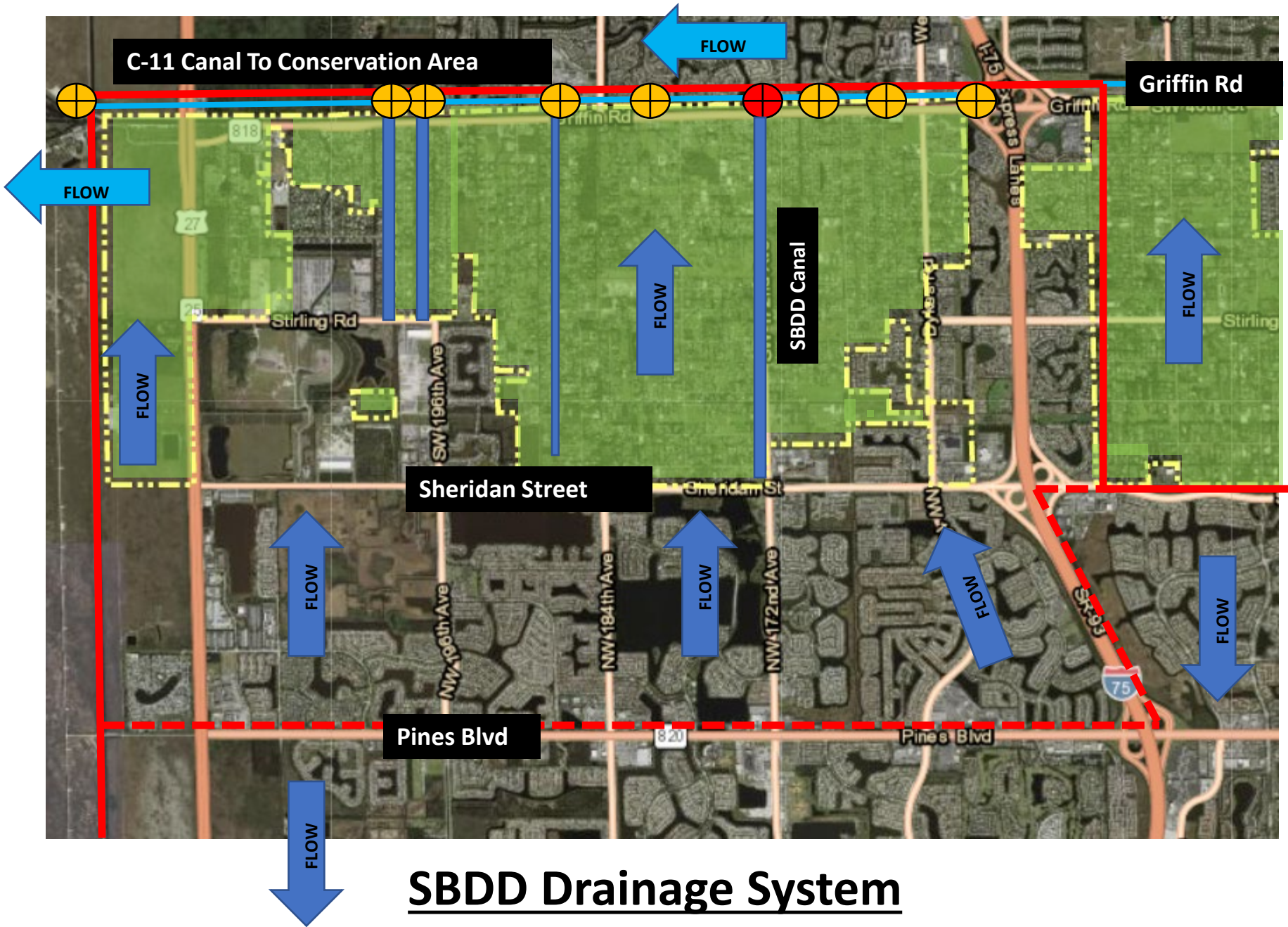
CBWCD Actions Before, During & After the Storm

- **Independent special taxing district established and authorized by the legislature**
- **Created in 1927**
- **46,600 acres (73 sq miles)**
- **150 linear miles of canals**
- **7,500 acres of lakes**
- **7 stormwater pump stations - automated**

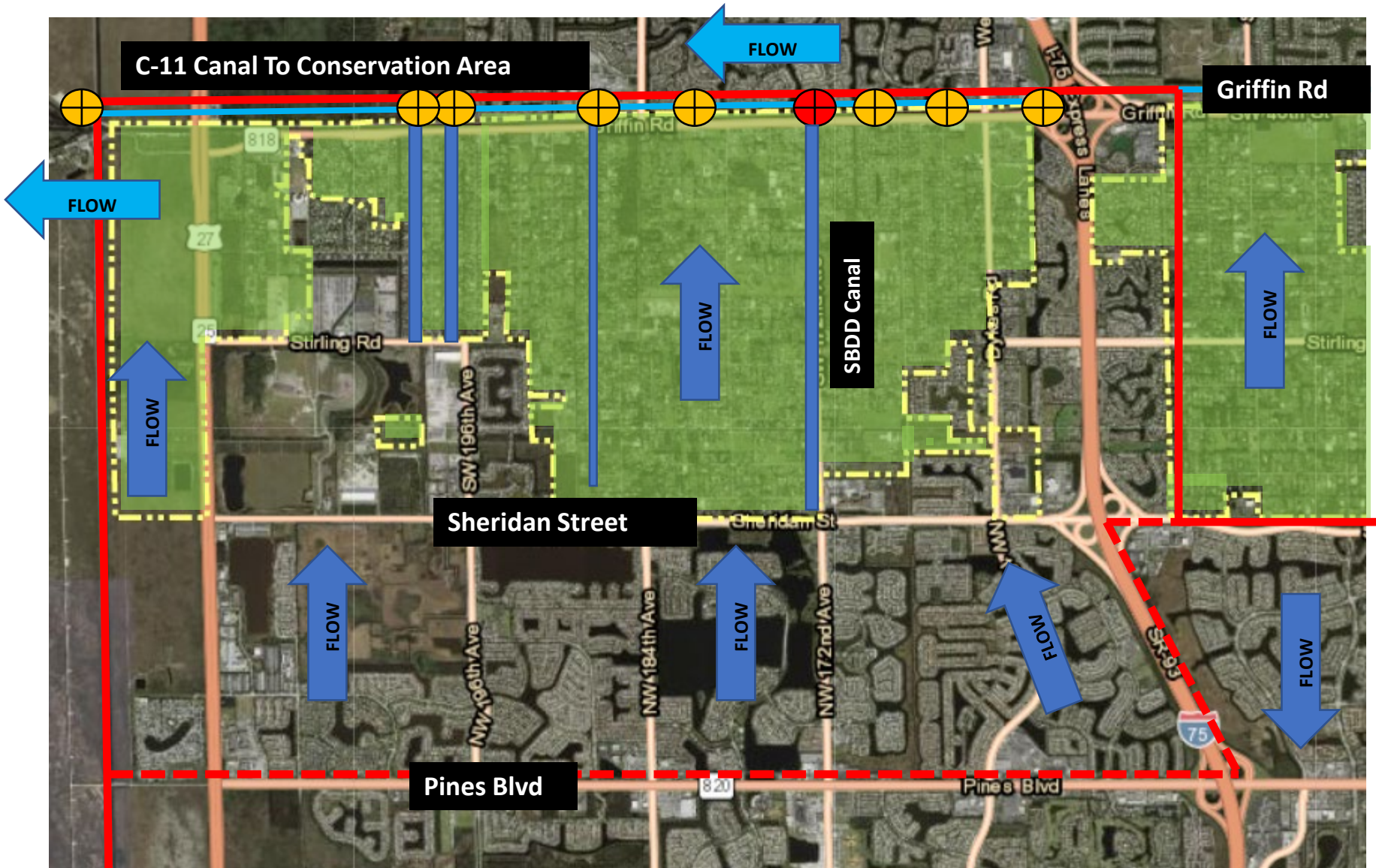




SBDD/SW Ranches Boundary Map



SBDD Drainage System



- SFWMD Operates & Manages the C-11 Canal
- SBDD Operates & Manages the Internal Canals

SBDD Actions Before the Storm

- Lowered water levels
- On-going maintenance, inspections, and testing of all SBDD facilities
 - pump stations
 - engines
 - gates
 - primary canals
 - major culverts
- Coordination with SFWMD on system conditions and weather
- Continuous monitoring of the storm

SBDD Actions Before the Storm

- **Continuous monitoring of SBDD systems and controls**
- **Daily system checks and maintenance of pump stations as needed**
- **Daily maintenance of pump station trash racks to ensure no blockages & full flow**
- **On-going inspections & maintenance of flood control gates to ensure no blockages & full flow**

SBDD Actions After the Storm

- **District-wide inspection of post-storm conditions and SBDD facilities**
- **Coordination with SFWMD on post-storm systems conditions**
 - **requested approval to increase permitted discharge rates in critical areas**
- **Daily system checks and maintenance of pump stations as needed**
- **Daily maintenance pump station trash racks to ensure no blockages & full flow**

SBDD Actions After the Storm

- **On-going inspections & maintenance of flood control gates to ensure no blockages & full flow**
- **Coordination with Town of Southwest Ranches**
- **Respond to resident concerns**



Improvements Made to Stormwater System

SWR Drainage Projects Completed in the Last 10 Years

- Installed the 3 intermediate flood control structures along the Pembroke Pines/SW Ranches boundary (C-12 Canal, C-13 Canal & C-13A Canal). This was pilot project with [SFWMD](#) and [SBDD](#).
 - In 2013, [SBDD](#) & SWR successfully modified the [SFWMD](#) Permit to make this a permanent, year-round project.
 - Const. SW 54th Place Drainage ([SFWMD](#))
 - Const. Headwall & Pipe Extensions at SW 52nd Street
 - Const. outfall at SW 172nd Avenue at SW 63rd Manor
 - Const. outfall at SW 210th Terrace at SW 54th Place
 - Const. outfall at Hancock Road and Lake Lane ([CBWCD](#))
 - Const. outfall at NE corner of Hancock Road and Mustang Trail ([CBWCD](#))
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SWR Drainage Projects Completed in the Last 10 Years


- Const. two outfalls on SW 166th Avenue between SW 64th Street and cul-de-sac.
- Const. Headwall & Pipe Extensions at Thoroughbred Lane (FDEP)
- Construct a catch basin and pipe under SW 54th Place and connect to existing inlet at NE corner SW 196th Lane (FDEP)
- Construct pipes to connect drainage on SW 54th Place from SW 195th Terrace to SW 196th Lane drainage system. And then outfall to SBDD Canal 13 (Backbone System) (FDEP)
- Const. outfall from 5801 SW 195th Terrace at 5801 thru 5800 SW 196th Ln to Canal (FDEP)
- Const. outfall from 5601 SW 195th Terrace thru 5600 SW 196th Ln to Canal (FDEP)
- Const. Outfall from East Side of Dykes Road to Canal (SBDD)



SWR Drainage Projects Completed in the Last 10 Years

- Const. Roadside Drainage on SW 63rd Street from SW 185th Way to Canal west of SW 188th Avenue (FDEP)
- Construct 380 LF drainage outfall from east side of SW 210 Terrace at SW 50th Street towards west to canal (FDEP & [SBDD](#))
- Construct an outfall from Town boundary at 20500 SW 205th Avenue towards canal to the east or thru existing inlet at SW 50th Street
- Construct outfall from SW 186th Avenue at SW 55th Street north towards canal to the east ([SBDD](#))
- Construct outfall from Frontier Trails and Connect to existing SW 54th Place and SW 195th Terrace drainage system (FDEP)





SWR Drainage Projects Completed in the Last 10 Years

- Dykes Road Drainage Channel and Wetlands: Calusa Corners Park ([SFWMD](#) & [SBDD](#))
- Construct catch basin on west side of Holatee Tr (SW 136th Ave) at 5501 SW 136th Ave and a headwall at canal at east side of Holatee Trail ([FDEP](#))
- Restoration of eastside swale and upgrade culverts along Dykes Road eastside streets from Huntridge Dr to Tom Thumb ([FDEP](#) & [SBDD](#))
- SW 201 Avenue Drainage ([FDEP](#))
- Green Meadows Drainage Phase I ([FDEM](#))

SWR Drainage Projects Completed in the Last 10 Years

- TSDOR Roadside Swales
 - SW 205 Ave, SW 208 Ln, SW 209 Ave, SW 210 Ter and Side Streets
 - SW 128 Ave, SW 56 St, Melaleuca Rd, and Appaloosa Trail
 - SW 188 Ave and Side Streets, SW 63 St, and SW 186 Way





SWR Drainage Projects Underway

- Green Meadows Drainage Phase II
- SW 50th Street and SW 182 Terrace (SBDD & Broward County)
- Dykes Road Slip Lining and Connection (SBDD)
- SW 202/ SW 50 - Construct drainage outfall system from the gate on SW 202 Avenue north to existing canal (SBDD)

SBDD Projects Completed in SWR

- Installed motors on four, adjustable flood gates along the C-11 Canal and tied these gates into SBDD's telemetry system (Ivanhoe FG, 164th Ave FG, SW 170 Ave FG & Rolling Oaks FG).
- SBDD successfully modified the SFWMD Basin S-8 Permit to incorporate these 4 flood gates into SBDD's year-round operations.
- SW 210th Avenue drainage improvements (lateral ditches and drainage outfalls).
- SW 205th Avenue drainage improvements.
- SW 196th Lane rear-yard drainage improvements.
- SW 185th Avenue drainage ditch improvement.
- Replaced a drainage ditch west of SW 205 Ave with a rear-yard, underground drainage pipe.
- Replaced or relined all drainage culverts along the Rolling Oaks Canal (Sheridan Street to Griffin Road).
- Replaced or relined all drainage culverts along the SW 164th Avenue Canal.



SBDD Projects Completed in Southwest Ranches

- Replaced or relined all drainage culverts along the SW 164th Avenue Canal.
- Installation of a 48" by-pass culvert and sluice gate at the S-8 pump station.
- Upgrades to the equipment and telemetry system at the S-8 stormwater pump station.
- Installed outfall swale north of Landmark Ranch Estates.
- Tree removal & excavation work along SW 184th Ave canal.
- SW 199th Ave – west ditch improvements.
- Purchased pipe for SW 199th Ave - east swale improvements.
- Miscellaneous tree trimming projects.
- Miscellaneous culvert cleaning.



6/17/19 @ 1:24 PM



6/18/19 @ 11:00 AM



Lessons Learned

Photo from Sun-Sentinel

Lessons Learned

- Town should evaluate the stormwater design requirements
- Town should review fill permit process
- Town must identify high ground for animals
- Town needs to budget for ongoing maintenance of stormwater systems
- Town should utilize monthly newsletter as an educational tool
- Town should continue to seek funding for drainage improvements
- Town needs to develop Stormwater Master Plan

Stormwater Master Plan

\$250,000 Rebuild Florida Grant

Purpose of Stormwater Master Plan

- The Stormwater Master Plan (SWMP) is intended to provide the Town with long-range comprehensive stormwater management system planning.
- This will be achieved through the accumulation and evaluation of data such as:
 - Topography
 - Hydrology
 - Stormwater inventory
 - Condition assessments of current flooding and water quality problem areas.

Stormwater Master Plan Goals

The primary goal of the SWMP is to create a unified document that:

- Clearly identifies and prioritizes areas of the Town that need stormwater infrastructure
- Provides a formalized 10-year Capital Improvement Plan highlighting the necessary improvements with associated costs that clearly illustrates a path to:
 - Reduce flood risk
 - Increase water quality and attenuation
 - Help ensure compliance with drainage related aspects of the Town's Comprehensive Plan.

Community Involvement

Town Elected Officials

Town Administration

Town's Drainage and Infrastructure Advisory Board

Residents

Other stakeholders, including:

- South Broward Drainage District
- Central Broward Water Control District
- South Florida Water Management District
- Broward County
- South Florida Regional Planning Council

Stay Informed

To sign up to be notified via voice message, text and email for important public safety information during a storm visit:

<http://southwestbranches.org/rapid-notify/>

and

[Broward.org/Emergency/Pages/AlertBroward.aspx.](http://Broward.org/Emergency/Pages/AlertBroward.aspx)

Get a Flood
Insurance Policy



Flood Insurance

If your property is in the Special Flood Hazard Area and you have a mortgage from a federally regulated or insured lender, flood insurance is required. Even if you do not have a mortgage and you live in the SFHA or you live outside of the SFHA, all property owners and renters should carefully consider the benefits of flood insurance to protect against significant financial losses from floods. For more information visit the following sites: Floodsmart.gov and FEMA.gov/national-flood-insurance-program.

Financial Assistance Advice

If your home or business is damaged by a flood, you may be required to meet certain building requirements to reduce further flood damage by coming into compliance with local, state, and federal criteria. To help with these costs, financial assistance such as grants, loans, rebates and the NFIP's Increased Cost of Compliance Coverage may be available.

For assistance regarding financial assistance options, please contact the Town's Engineering Department at (954) 434-0008, Broward County's Mitigation Coordinator at (954) 831-3900 or visit [Disasterassistance.gov](https://www.disasterassistance.gov).



Question and Answer

