HURRICANE HELENE
September 26, 2024

View from Turner Beach (Captiva) looking toward Sanibel at sunset on 9/26/24

Bimini Bait Shack
Seafood · $$
Punta Rassa Rd
Tesla Destination Charger
Sea n Red
Fishing Charters
Punta Rassa Rd
Sanibel Dolphin Tours
Sanibel Toll Facility
Sanibel Causeway
Sanibel Causeway
Sanibel Causeway

Rain Gauge	Rainfall Amount
Beach Rd. Weir	1.78"
Rabbit Rd.	1.96"
Tarpon Bay Weir	1.78"
Tarpon Bay Rd. @ River	2.8"
Bowman's Helipad	2.73"
Average	**2.2"**

Intersection of Lindgren Blvd. and East Gulf Dr.
Storm Surge

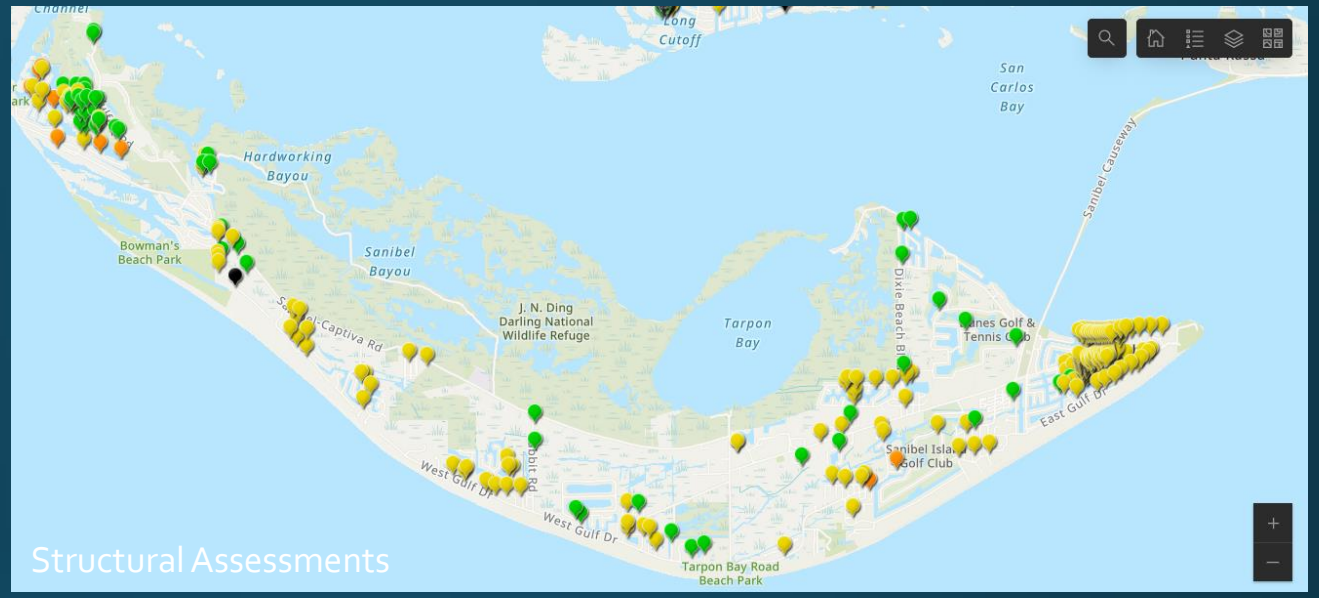
Intersection of Periwinkle Way and Casa Ybel Rd.
Storm Surge


Blind Pass

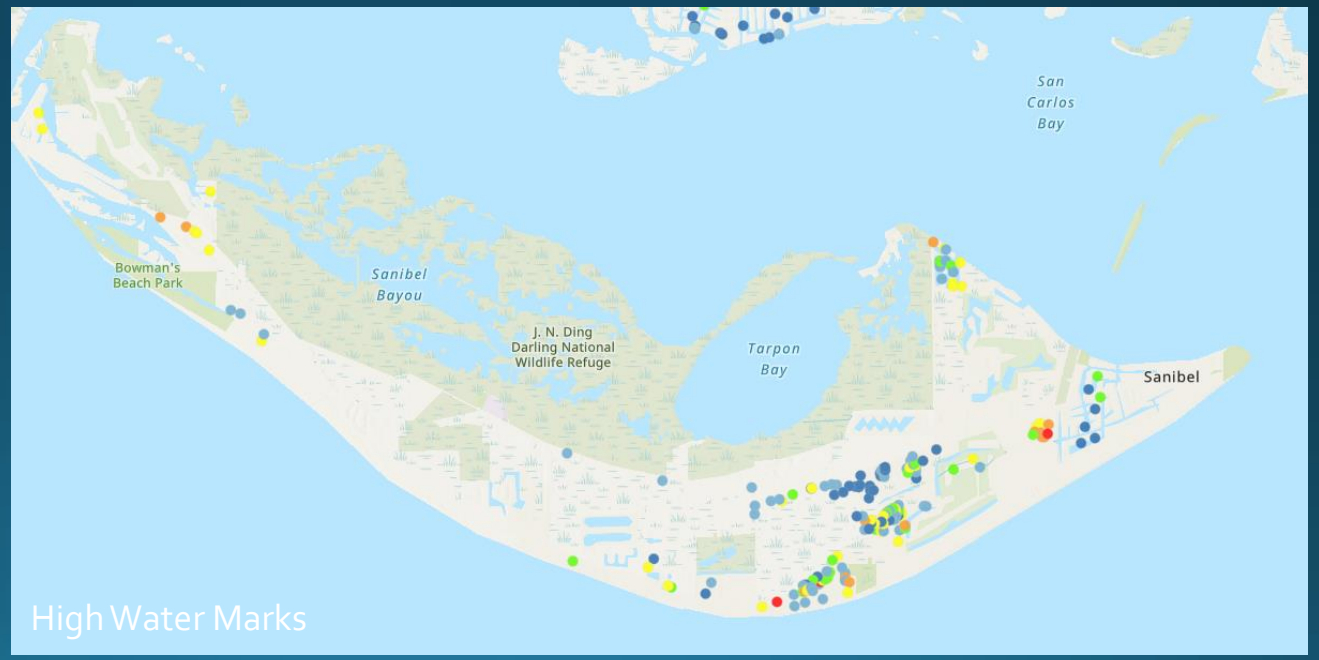

$150 FINE
ENFORCED
NO
PARKING
ANY TIME

Hurricane Helene

- Approximately 470 structures damaged or affected
- Majority - Minor Damage category
- Majority structures experienced flood waters 24 inches or less into primary living area or ground floor area (i.e. garage or storage under elevated house) receiving "minor" or "affected" damage assessment classification
- Few structures experienced more than 24 inches but less than 36 inches into primary living area, receiving "major" damage assessment classification
- Damage Assessment is an ongoing process



Structural Assessments



High Water Marks

What's next? Permits…

Houses rehabilitating after Hurricane Ian, with an issued permit:

Revise the scope of work to address any damage from Hurricane Helene – increase in scope of work must still comply with FEMA 50% rule.

Houses with closed permits after Hurricane Ian, or had no damage from Hurricane Ian, but have damage from Hurricane Helene:

Required to submit a building permit application, which will be reviewed for FEMA 50% rule based on the current scope of work (there is no cumulative or "look-back" for calculating FEMA 50%).

Surface Water Management

Weir Policy & Operations

Sanibel City Council Meeting

October 1, 2024

Oisin Dolley, City Engineer, Public Works

Holly Milbrandt, Director, Natural Resources

Surface Water Management

- Sanibel Plan
  - Section 3.3.6. Storm Drainage Element Pursuant to Section 163.3177(3), Florida Statutes.
  - *An invaluable resource to the Island-wide natural drainage system is the interior wetlands. This 3,500-acre depression in the central area of the Island, roughly bordered by Periwinkle Way and Sanibel-Captiva Road on the north and Gulf Drive on the south, plays an important role in terms of stormwater storage during both high frequency as well as more intense storms. The main drainage way of the interior wetland is the Sanibel River.*
- Surface Water Management Plan / Stormwater Master Plan
- Required & approved by DEP

Objectives, Surface Water Management Plan (Sanibel Plan, Pg 125-126)

1. **To reduce extreme flooding in developed areas and the length of time of flooding in order to keep roads, driveways, house pads and septic systems drained** to the greatest extent possible.

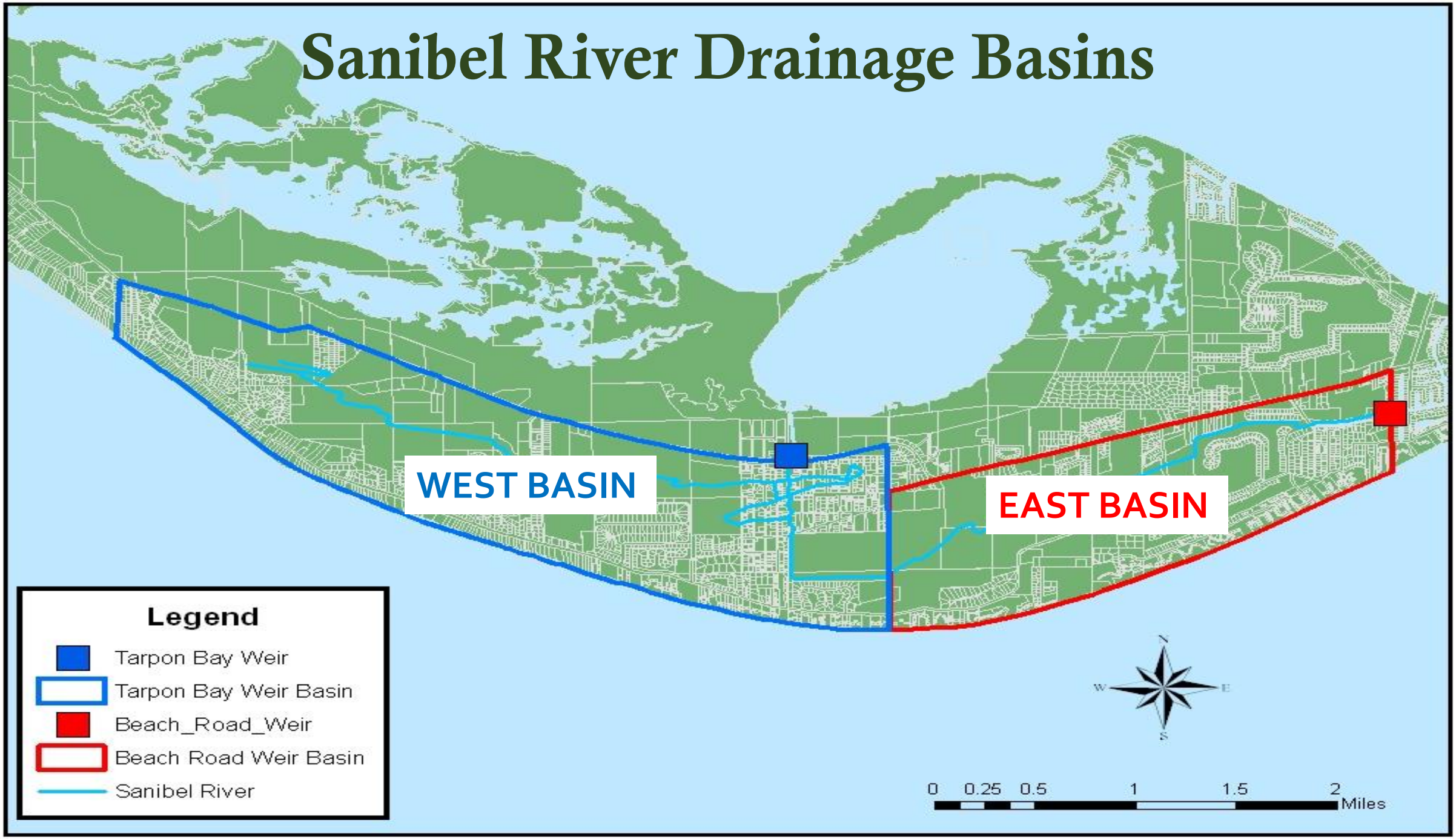
2. **To use surface water management as one of many tools in undeveloped areas in order to encourage and support the return to savannah and marsh vegetation as well as other native habitat types**, including but not limited to ridge hammocks, buttonwood sloughs and transition zones, and to discourage the continued invasion of exotic plants.

- To identify undeveloped areas for habitat preservation and restoration that are large enough to support representative plant and animal populations, economically and physically feasible to manage and compatible with the water management needs of developed areas

- **To increase rainfall detention in undeveloped areas to encourage the recharging of the water table aquifer** and to return to conditions of environmental extremes in surface water and water table elevations natural characteristics in the past

3. To use natural drainage methods wherever possible with minimum change to the environment, using minimal amounts of human-made structures and arriving at a system requiring minimal maintenance.

Sanibel River Drainage Basins



Tarpon Bay Weir
West Basin

- Four mechanically operated, bottom release flow gates.
- Top of weir = 3.2’

Beach Road Weir East Basin

- Two mechanically operated, bottom release flow gates.
- Top of weir = 2.7’
- Outfitted with reverse flow salinity gates reaching elevation 3.8’

Sanibel Weir System

Maintains over 1,600 acres of unique interior freshwater wetlands

- Benefits of proper hydrology
  - Desirable wetland plant communities and wildlife
  - Water storage and reduced upland flooding
  - Wetlands filter and absorb excess nutrients
  - Reduced wildfire risk
  - Minimization of saltwater intrusion

Minimizes the frequency of discharges of polluted stormwater runoff from the interior portions of the island to our coastal waters

- The Sanibel Slough, Pine Island Sound & San Carlos Bay have all been designated as "impaired" by the Florida Department of Environmental Protection due to nutrient enrichment

City of Sanibel
Weir Control Policy

Developed in 1994 following the adoption of the 1992 update to the Surface Water Management Plan. Placed into action in 1997.

Objective: To maintain as much fresh water on island as possible to benefit the island's Interior Wetland System, so long as developed areas are not adversely impacted.

Sanibel Ordinance 94-75

Adopted by Sanibel City Council and Approved by Florida DEP

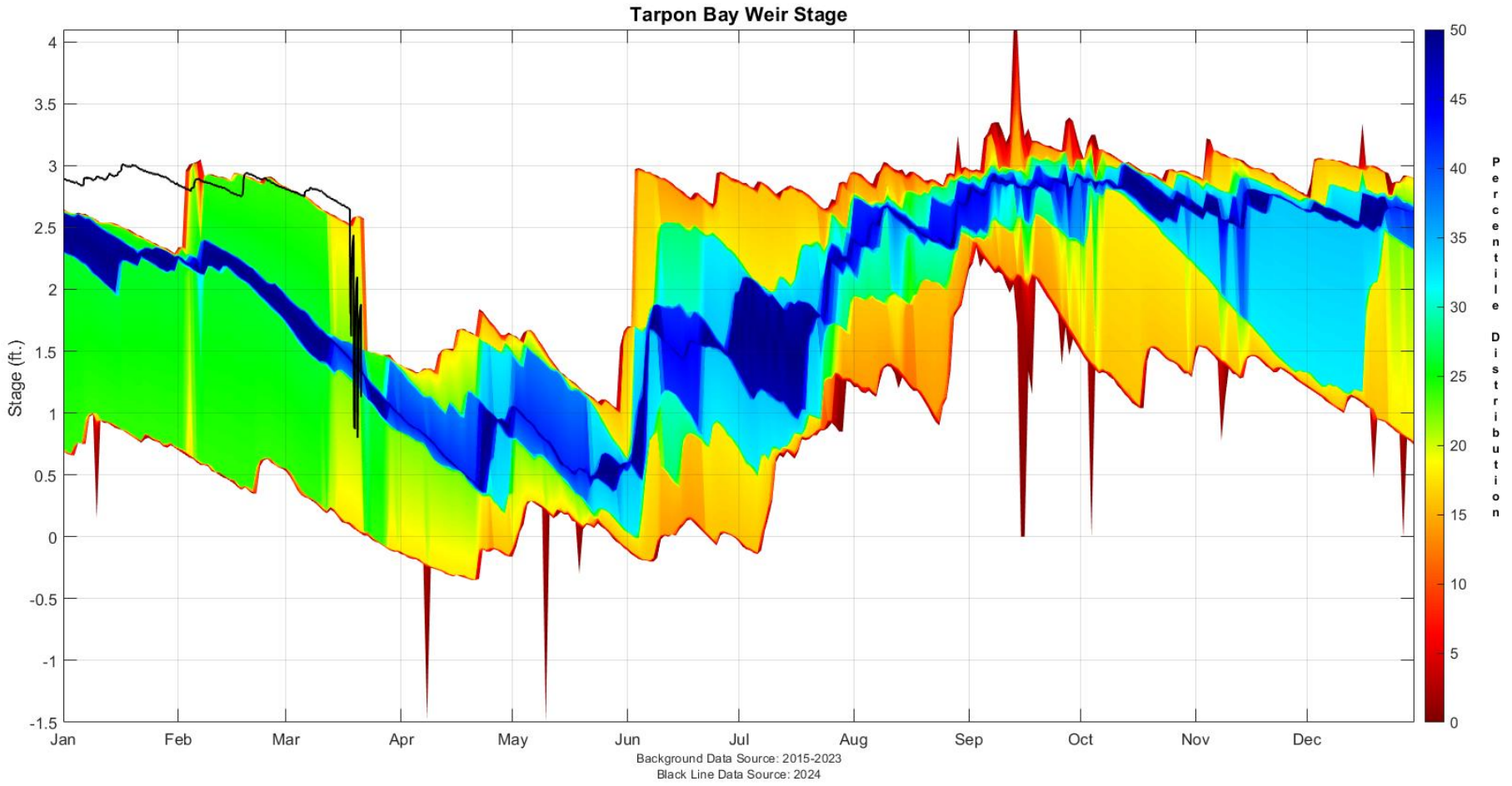
City of Sanibel
Weir Control Policy

Established through City Council approval in 1997.

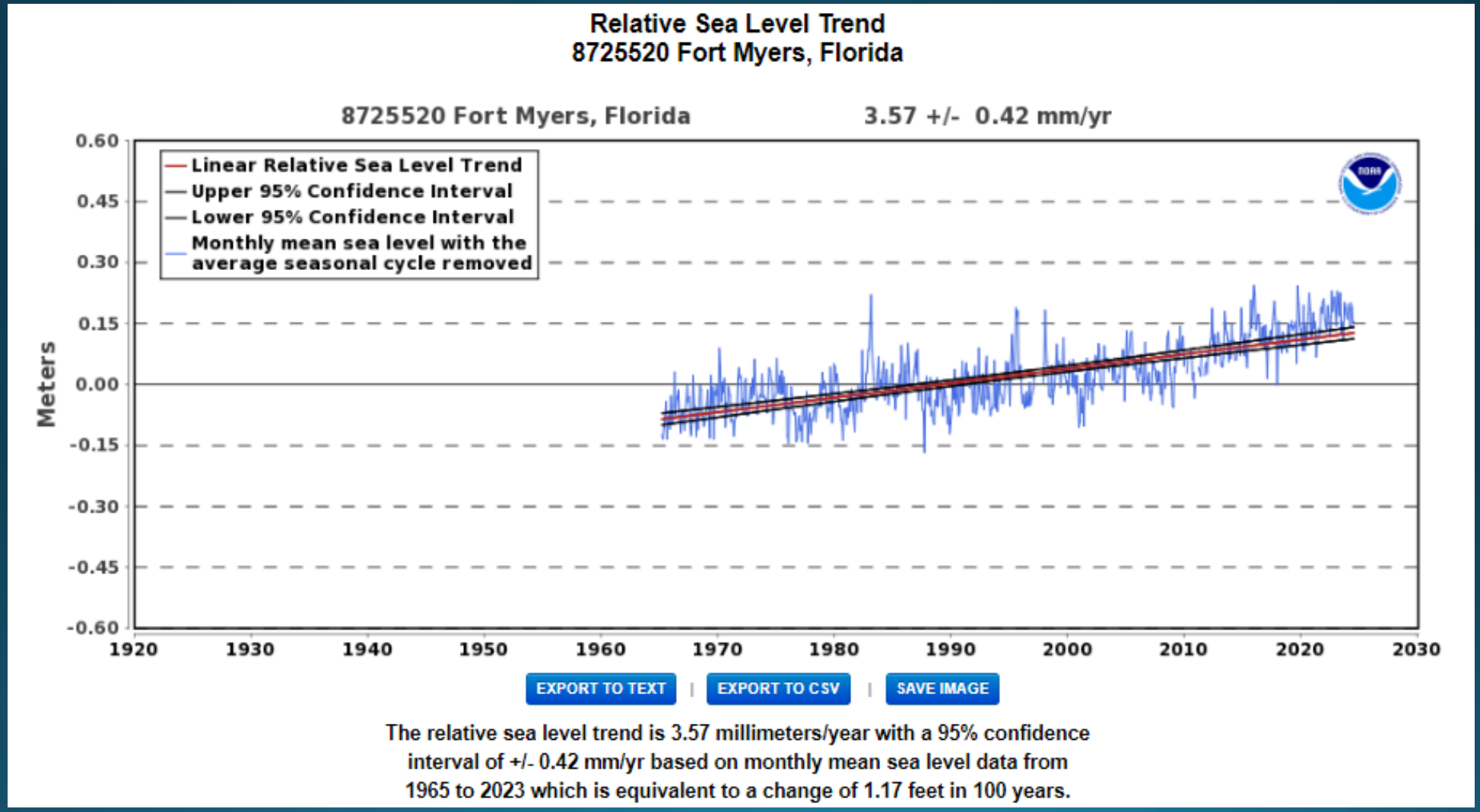
Weirs are opened if:

1) **Interior Flooding Conditions**
   a. Public or private streets impassible
   b. When one of river gauges in west basin adjacent to Gulf Pines, Rabbit Road or San-Cap Rd. = or > 3.3′ NGVD for 24 hour period; 2.8′ NGVD in east basin
2) **Pre-Storm Conditions**
   a. Opened up to 36 hours in advance of storm (>3.2′;2.7′)
3) **Surface Water Duration Conditions**
   a. 3.2′ NGVD west gauges for 90 consecutive days – reduce to 3.0′ NGVD for remainder of calendar year
4) **Miscellaneous Conditions**
   a. When deemed necessary by City Manager for the prevention of immediate harm to persons, property, or the environment.

Typical Water Levels--2015 thru 2023



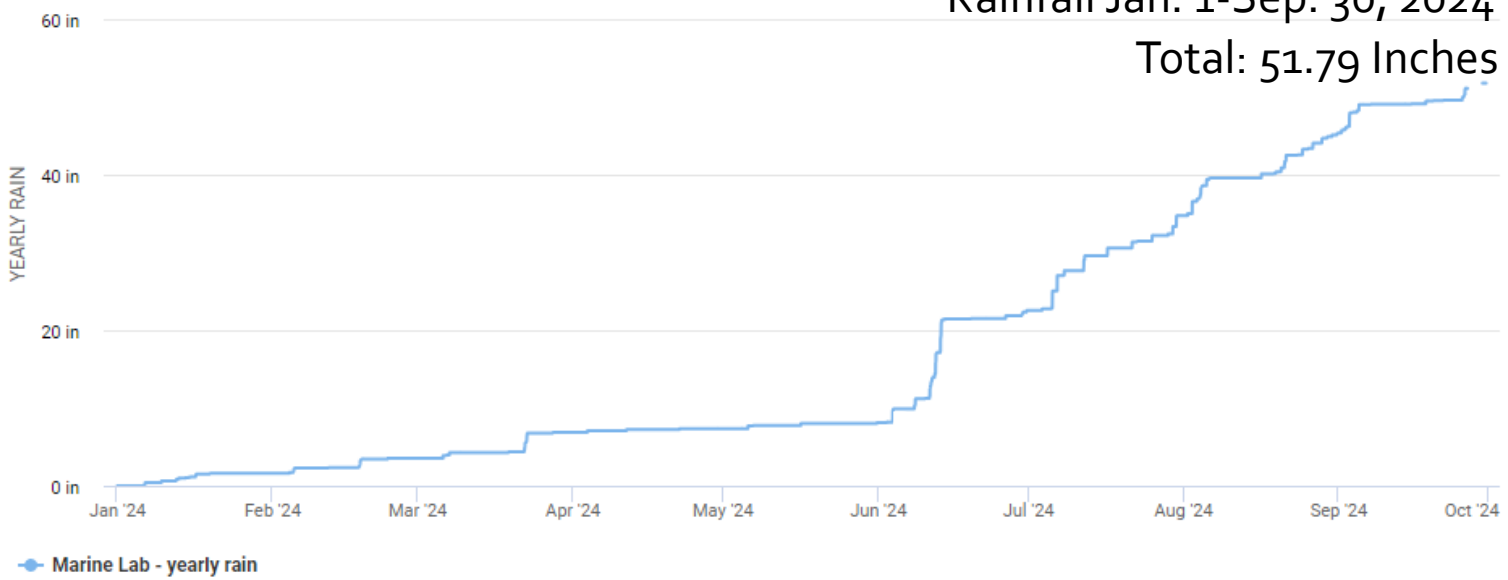
Pre-Storm Environmental Conditions
Sea Level Trend



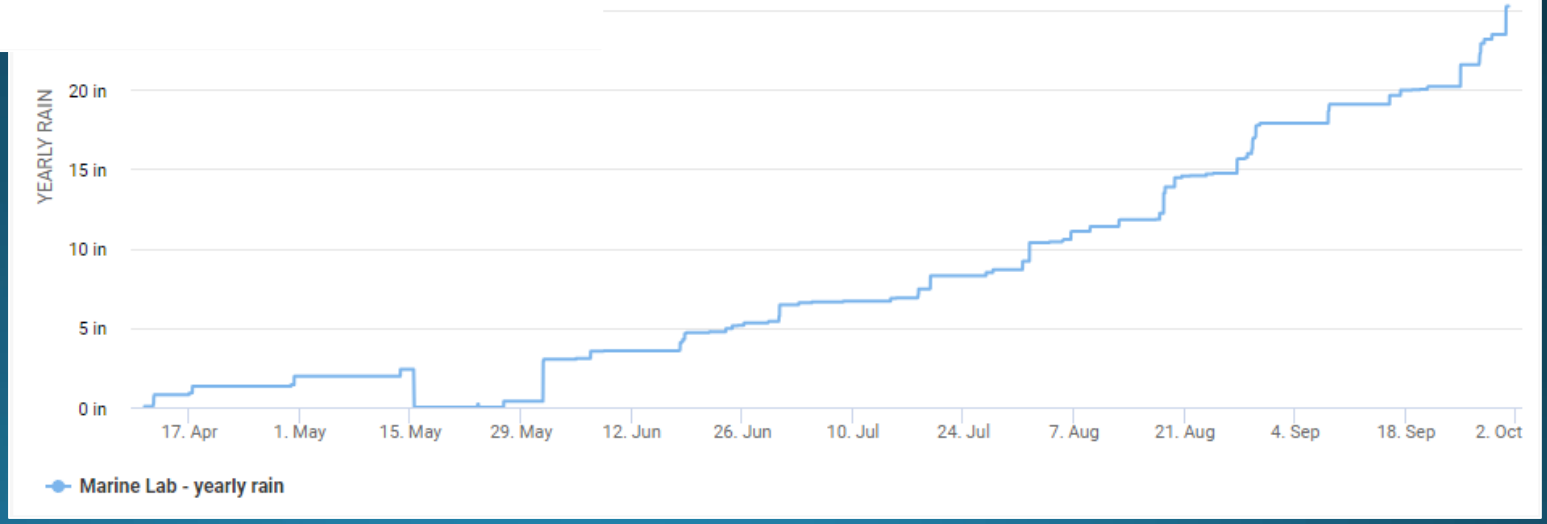
https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?id=8725520#tab50yr

Pre-Storm Environmental Conditions
Rainfall

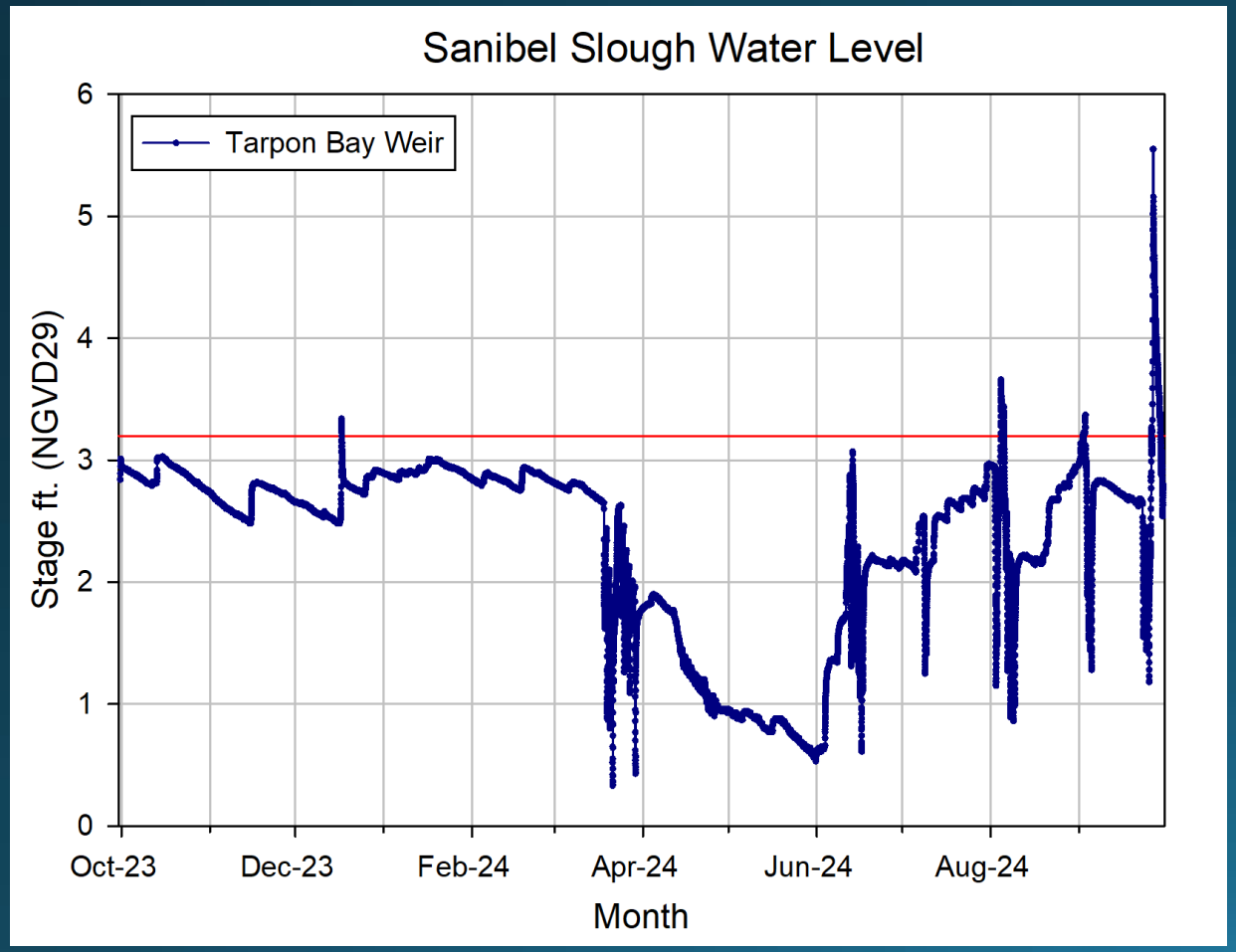
Rainfall Jan. 1-Sep. 30, 2024
Total: 51.79 Inches

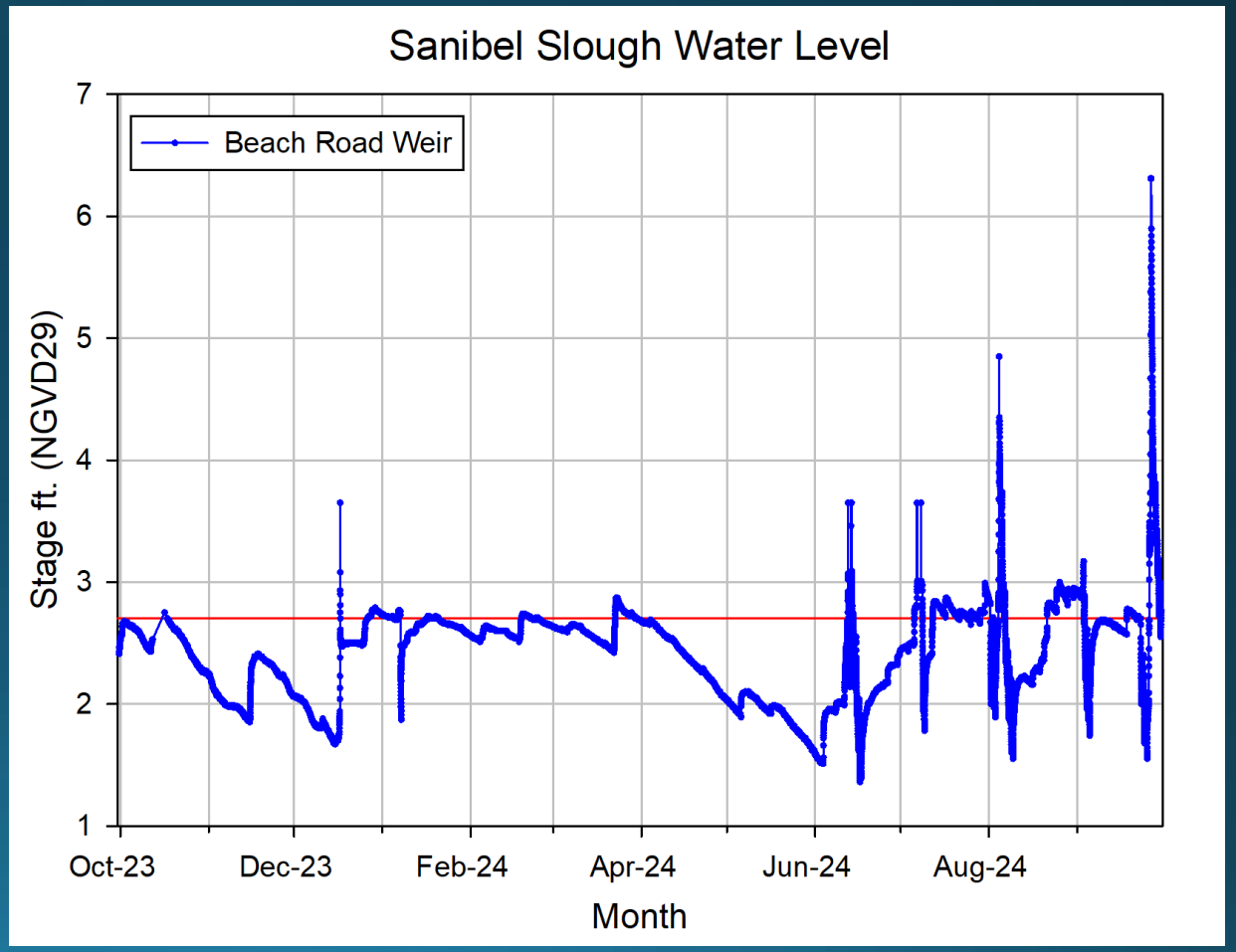


Rainfall Jan. 1-Sep. 30, 2023
Total: 25.24 Inches



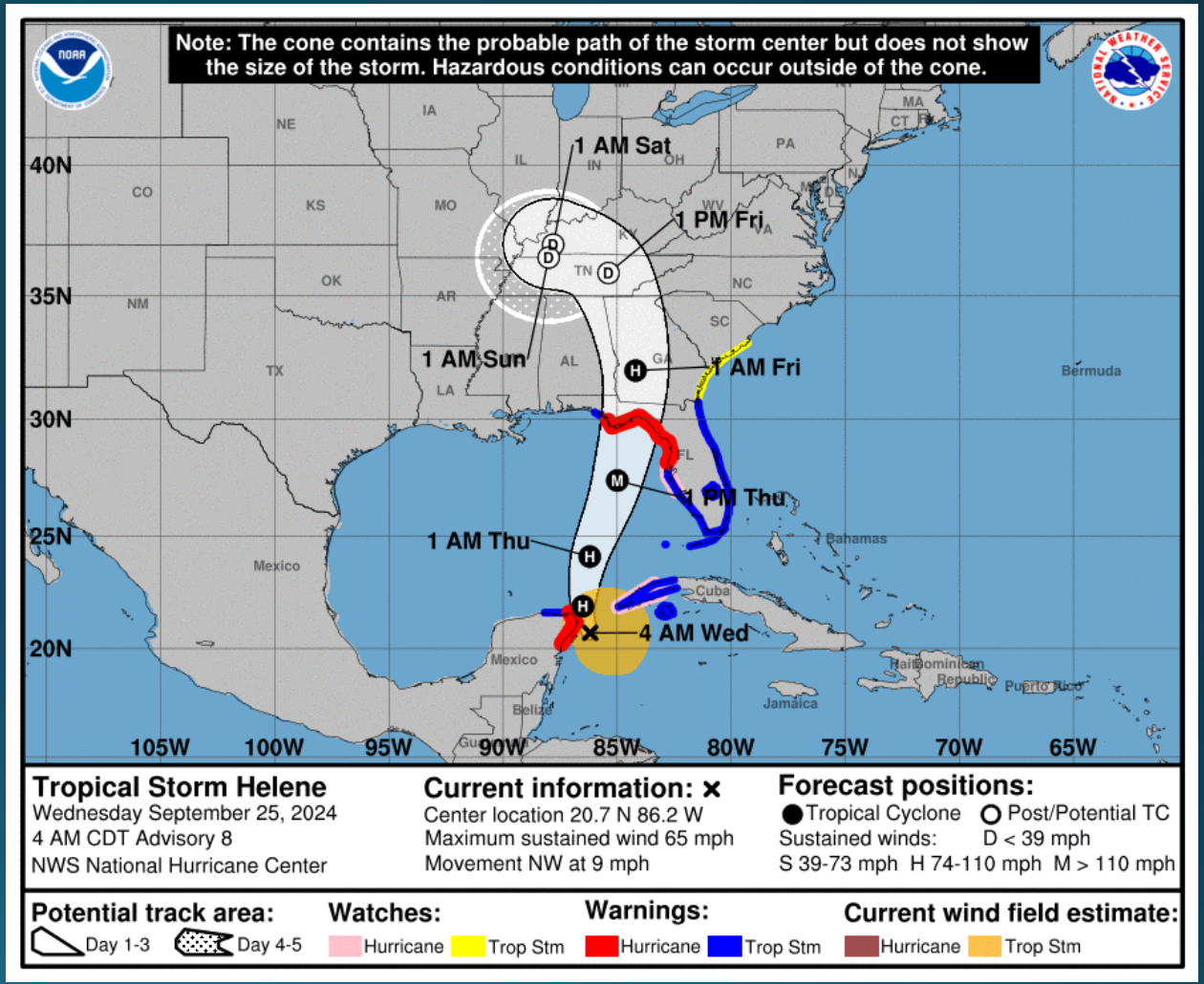
Weir Operations – October 2023-September 2024

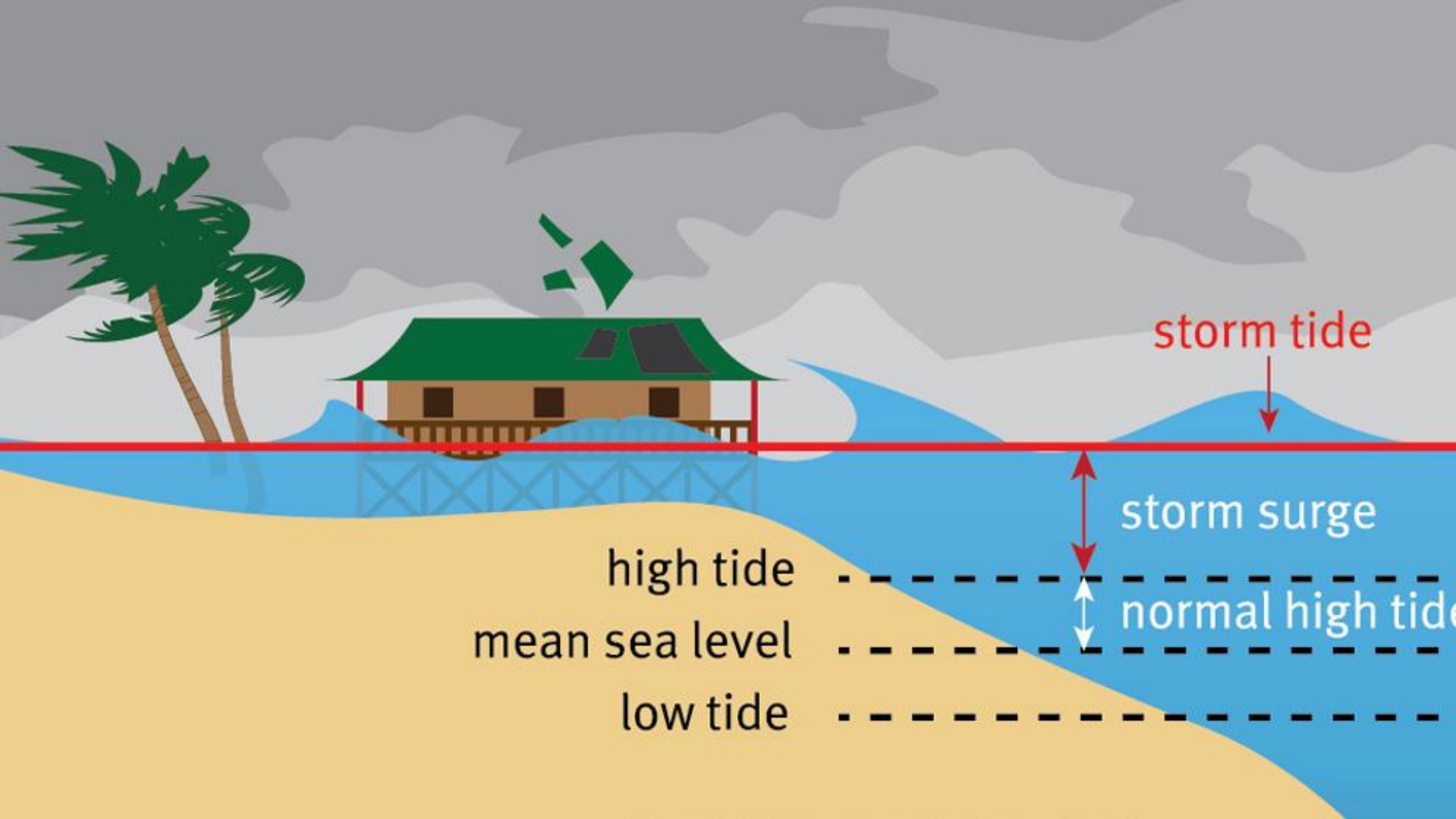




Hurricane Helene

	Forecast	Actual
Rainfall	4-6”	2-3”
Winds	Up to 50 mph	30 mph sustained; >50 mph gusts
Storm Surge	Up to 6 feet	




storm tide
storm surge
high tide
normal high tide
mean sea level
low tide

01 to 02 feet above ground

02 to 03 feet above ground

03 to 04 feet above ground

04 to 05 feet above ground

05 to 06 feet above ground

06 to 07 feet above ground

07 to 08 feet above ground

08 to 09 feet above ground

09 to 10 feet above ground

10 to 11 feet above ground

11 to 12 feet above ground

12 to 13 feet above ground

13 to 14 feet above ground

14 to 15 feet above ground

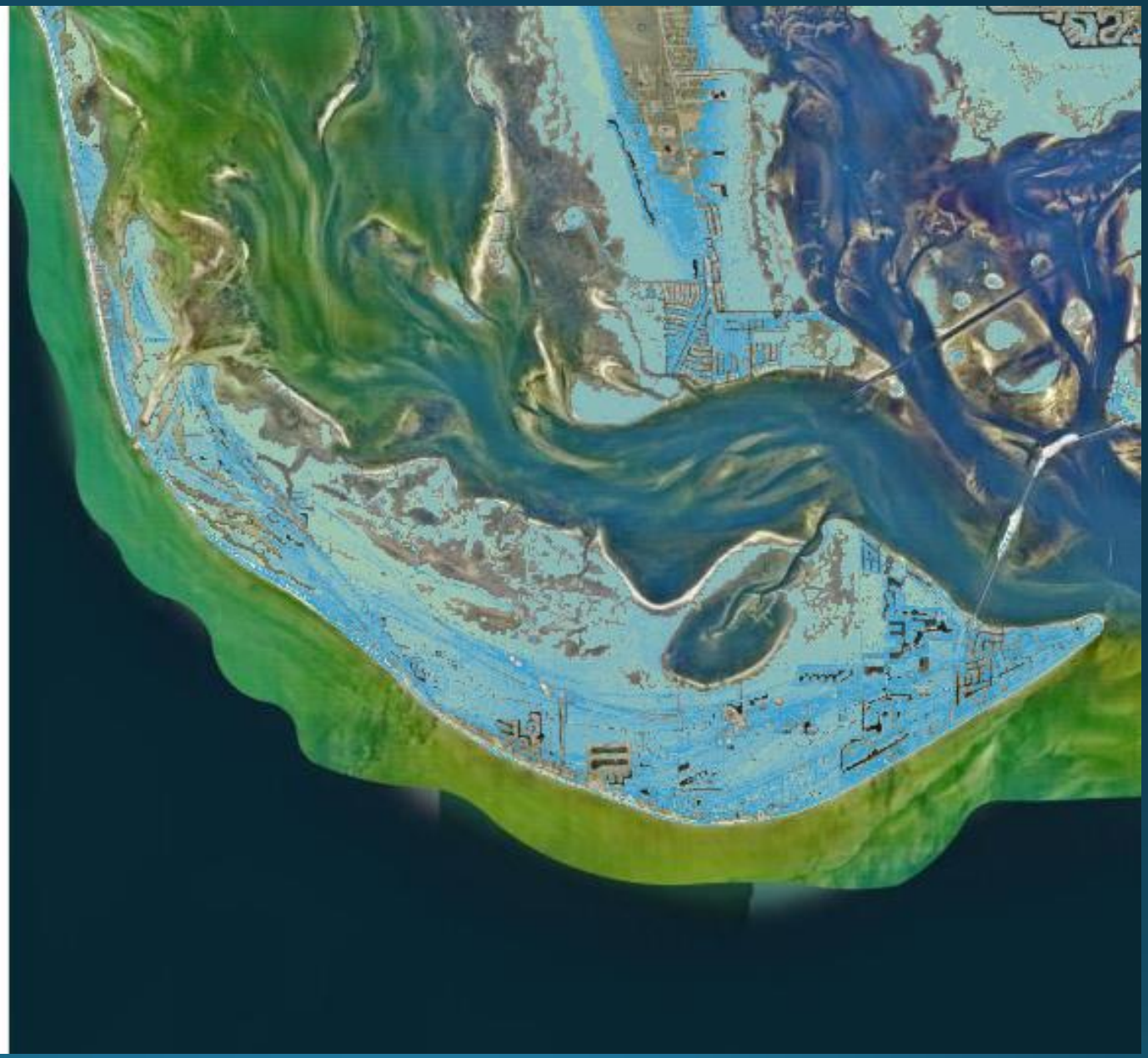
15 to 16 feet above ground

16 to 17 feet above ground

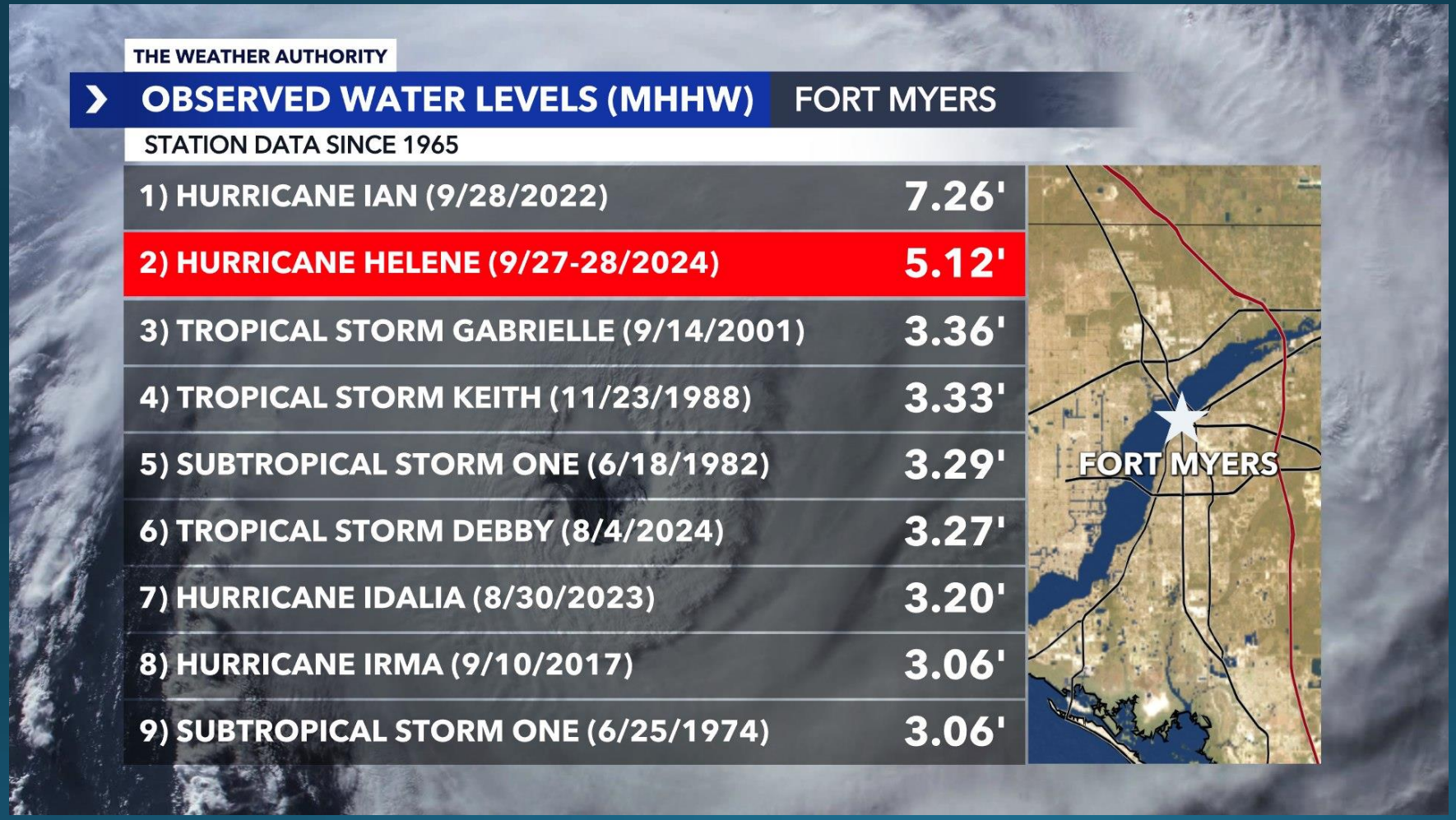
17 to 18 feet above ground

18 to 19 feet above ground

19 to 20 feet above ground

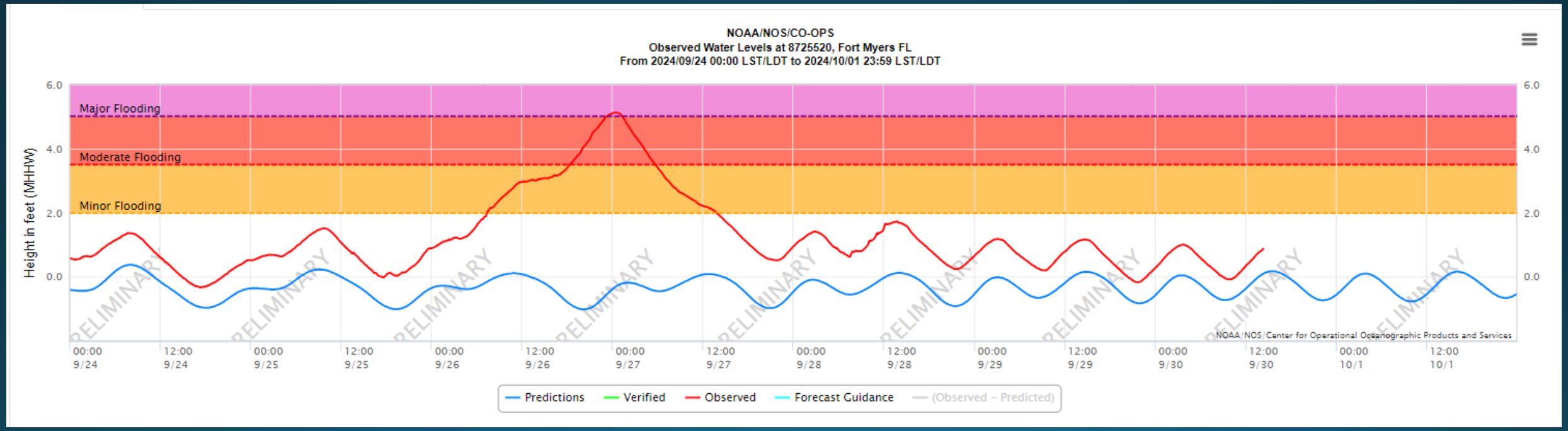


Hurricane Helene Water Levels



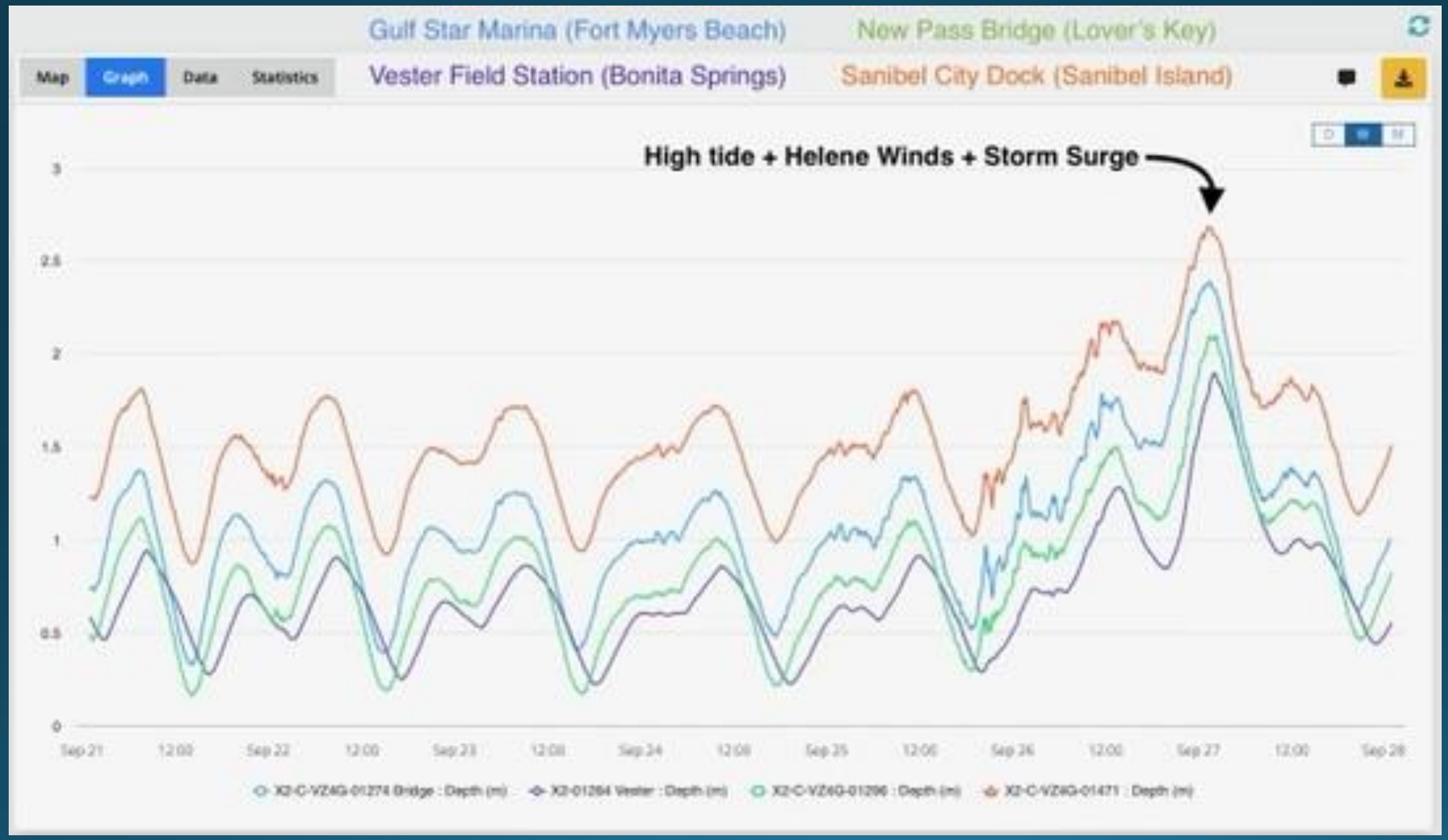
Source: Matt Devitt, Chief Meterologist WINK News
https://www.facebook.com/photo/?fbid=1085970596224935&set=pcb.1085977112890950

Hurricane Helene Water Levels



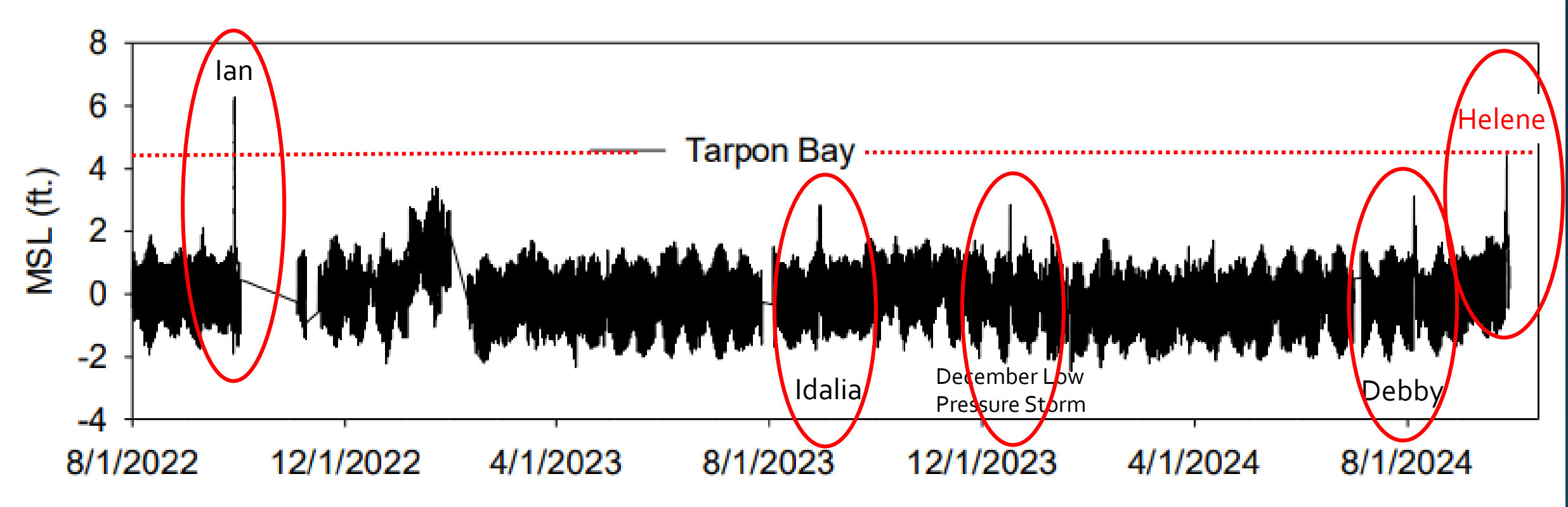
Source: NOAA Tides and Currents

Hurricane Helene Water Levels



Source: Adam Catasus & Kayla Hughes, FGCU Water School

Tarpon Bay Water Level- Hurricane Ian to Hurricane Helene

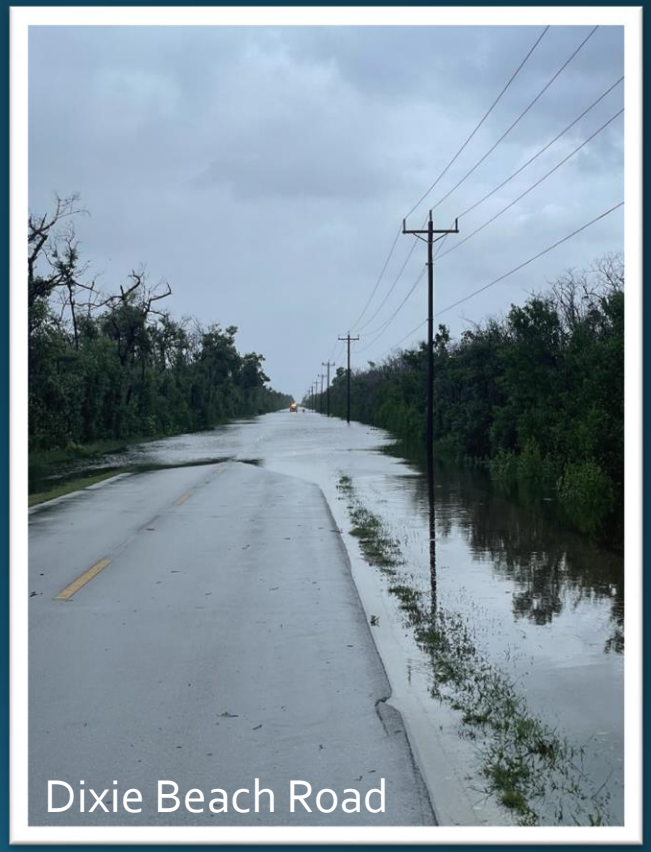


Source: SCCF RECON, Tarpon Bay

Island-wide Flooding

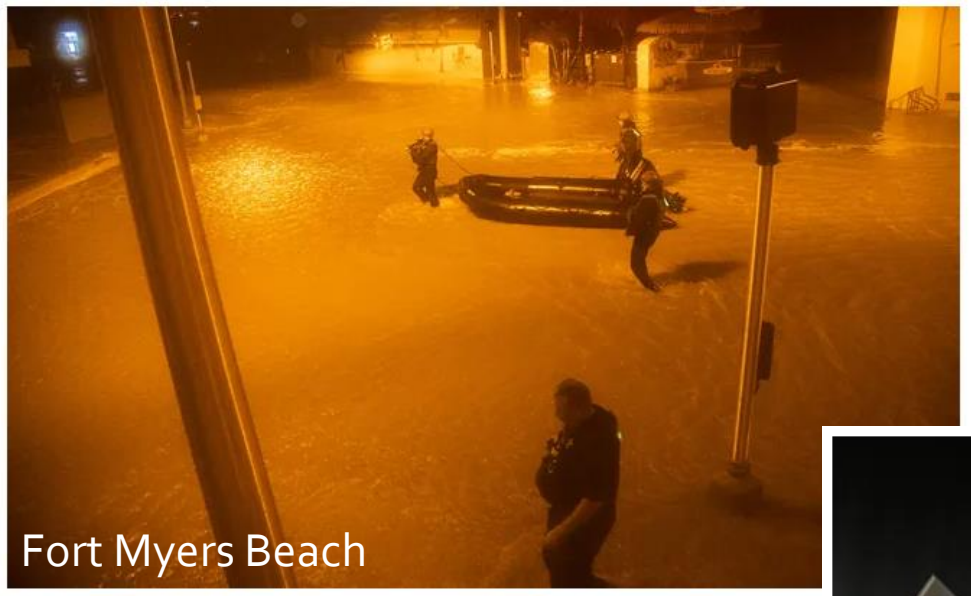

Pine Cove-West Gulf Dr


Bailey Road


Dixie Beach Road

Flooding—Southwest Florida & Beyond

This surge event impacted FL from Everglades City to the Big Bend Area



Fort Myers Beach

Members of law enforcement gather on Estero Boulevard with a boat as Hurricane Helene passes by on F
Fla. on Thursday, Sept. 26, 2024. Estero Island was flooded by by the hurricane. *Andrew West/The News-*
Network

Marco Island

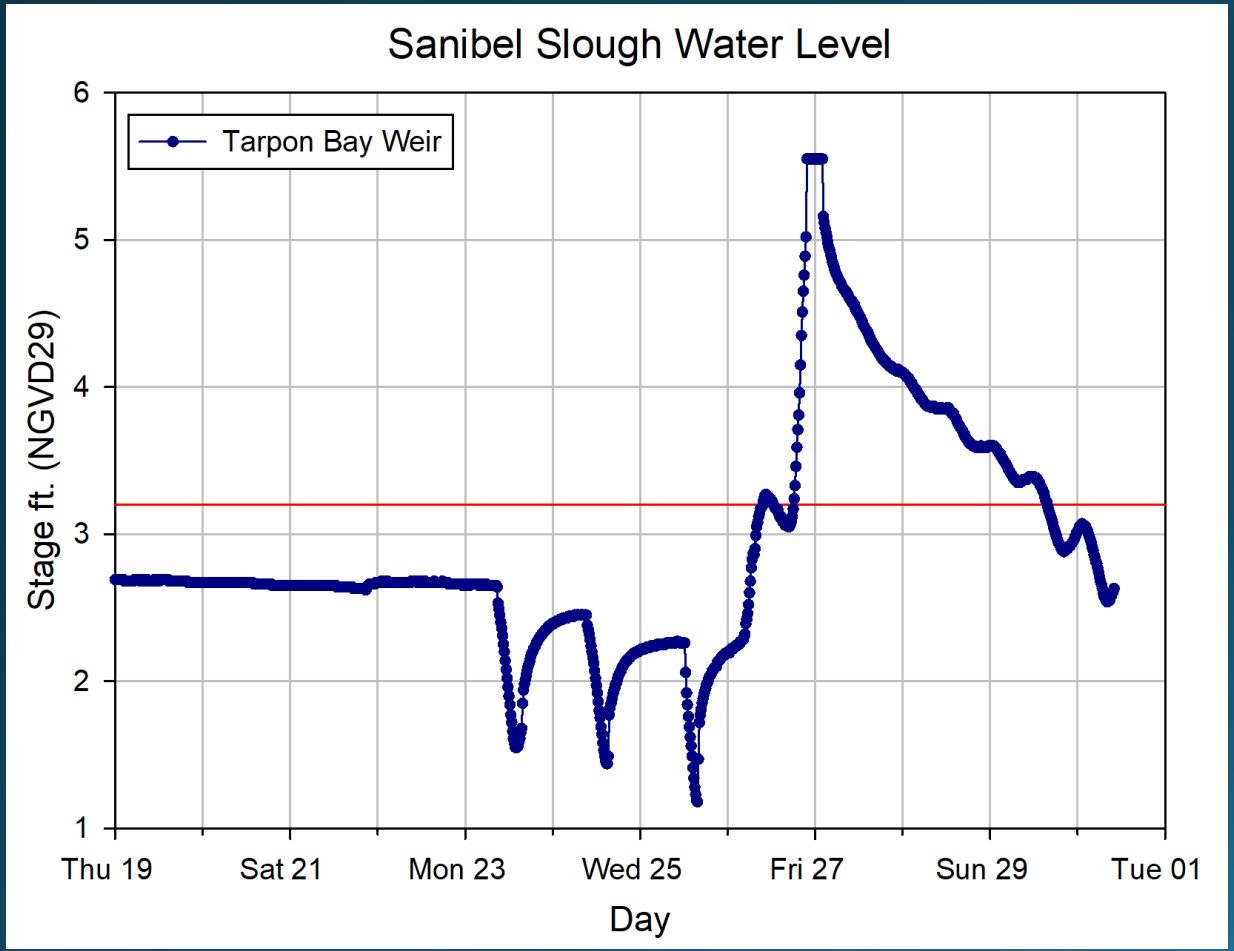
Bald Eagle Drive in Marco Island, Florida, was under water about two hours before high tide Thursday night. Roads were flooded throughout the largest of the Ten Thousand Islands as Hurricane Helene started to come ashore north in Big Bend, about 165 miles north. *J. Kyle Foster/Naples Daily News*

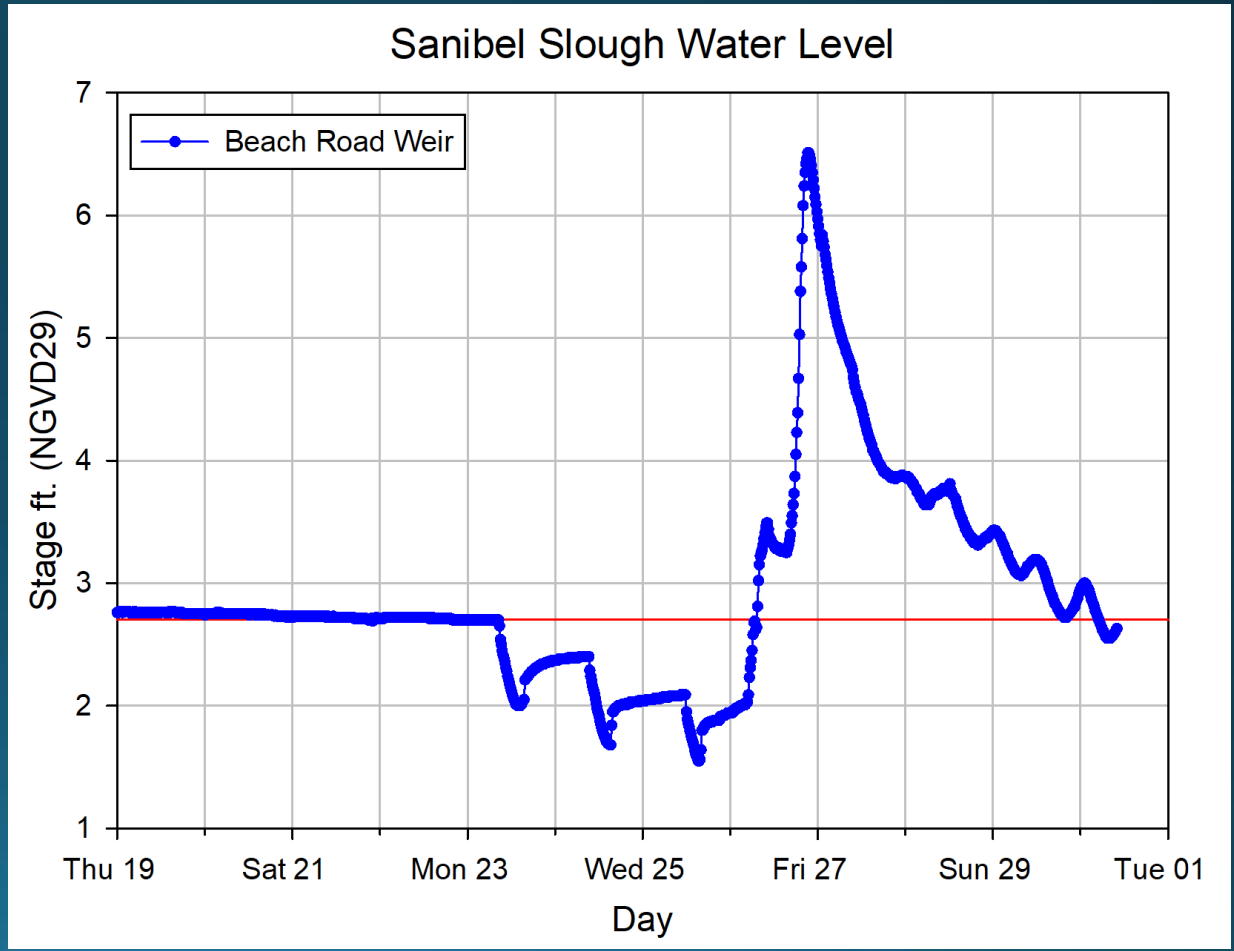
Naples

n the Know: Water remains off Venetian Way in North Naples on Friday Sept. 27, 2024 after Hurricane Helene's storm surge. *Phil Fernandez/USA TODAY NETWORK*

Images from News Press Sep. 28, 2024

Sanibel Slough Water Levels

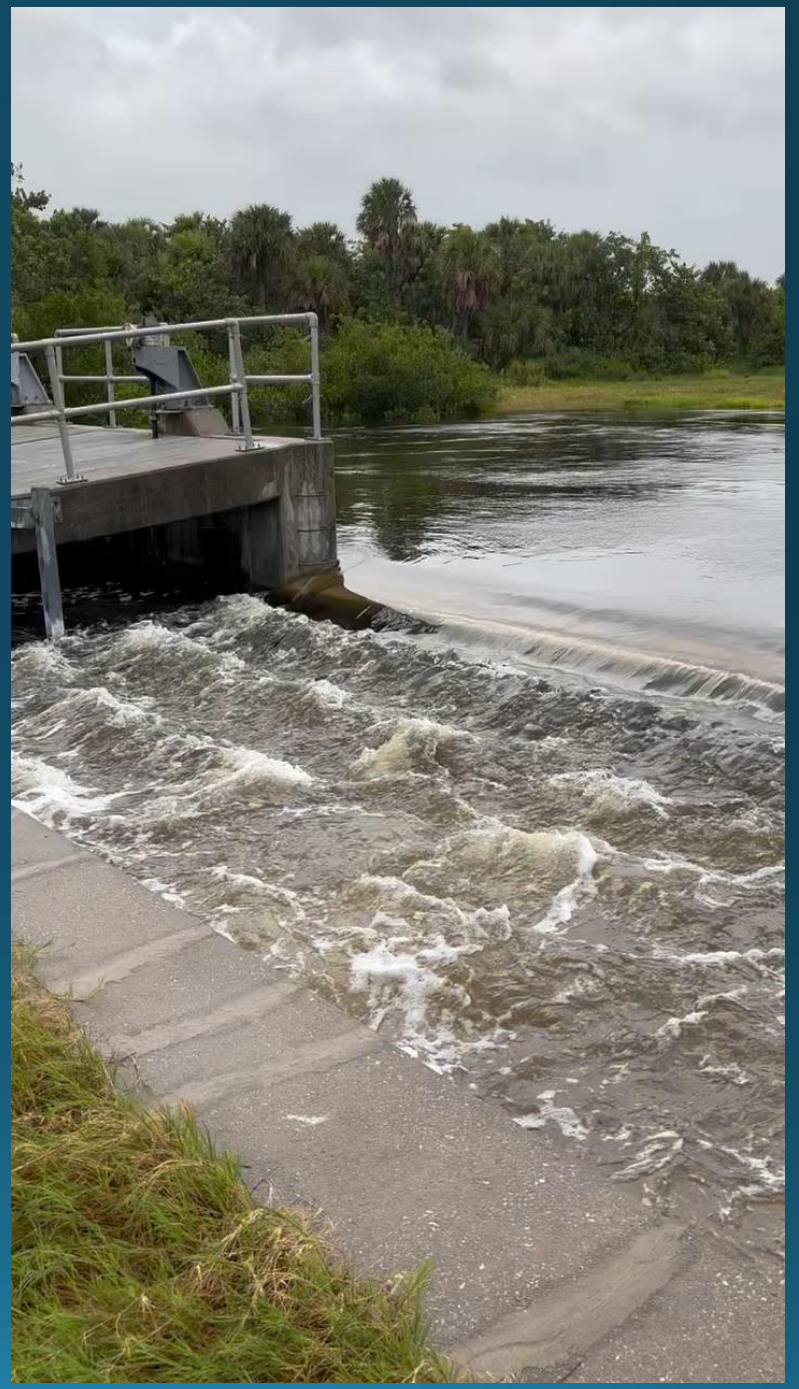




Over the 3 days preceeding the storm, slough levels were lowered from 2.66/2.65 to 1.82/1.81

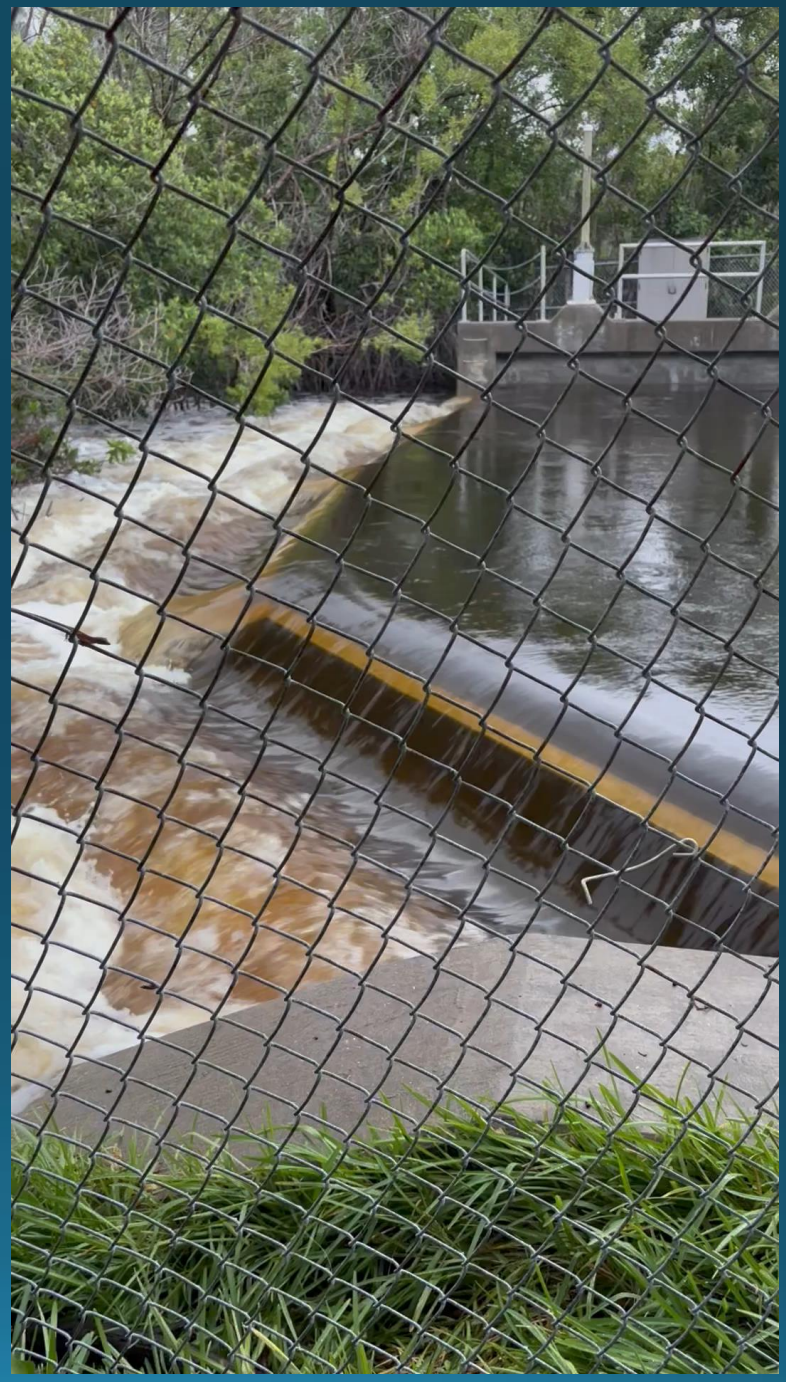
Tarpon Bay Weir Overtopping

Thursday, September 26, 2024
8:08 AM



Beach Road Weir Overtopping

Thursday, September 26, 2024
7:36 AM

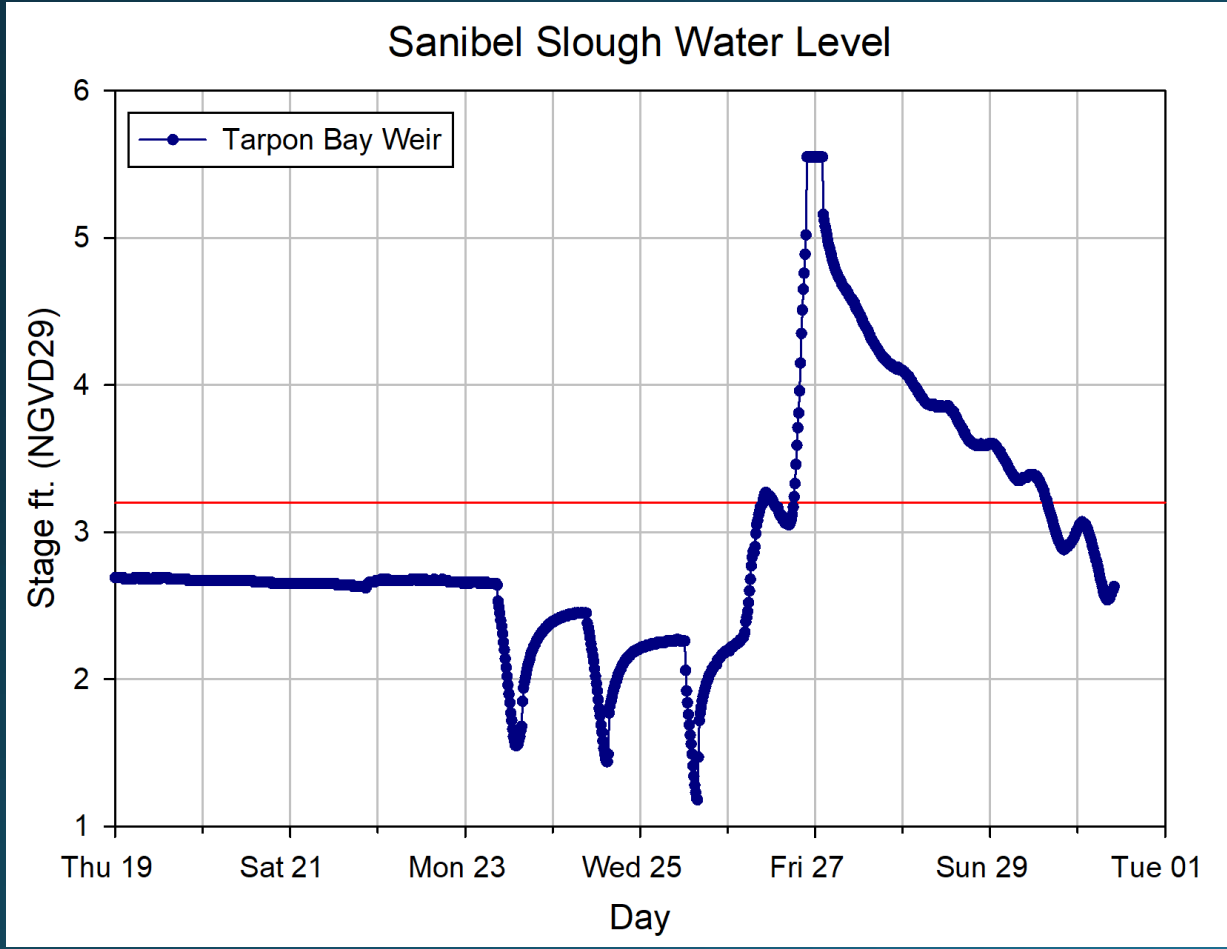


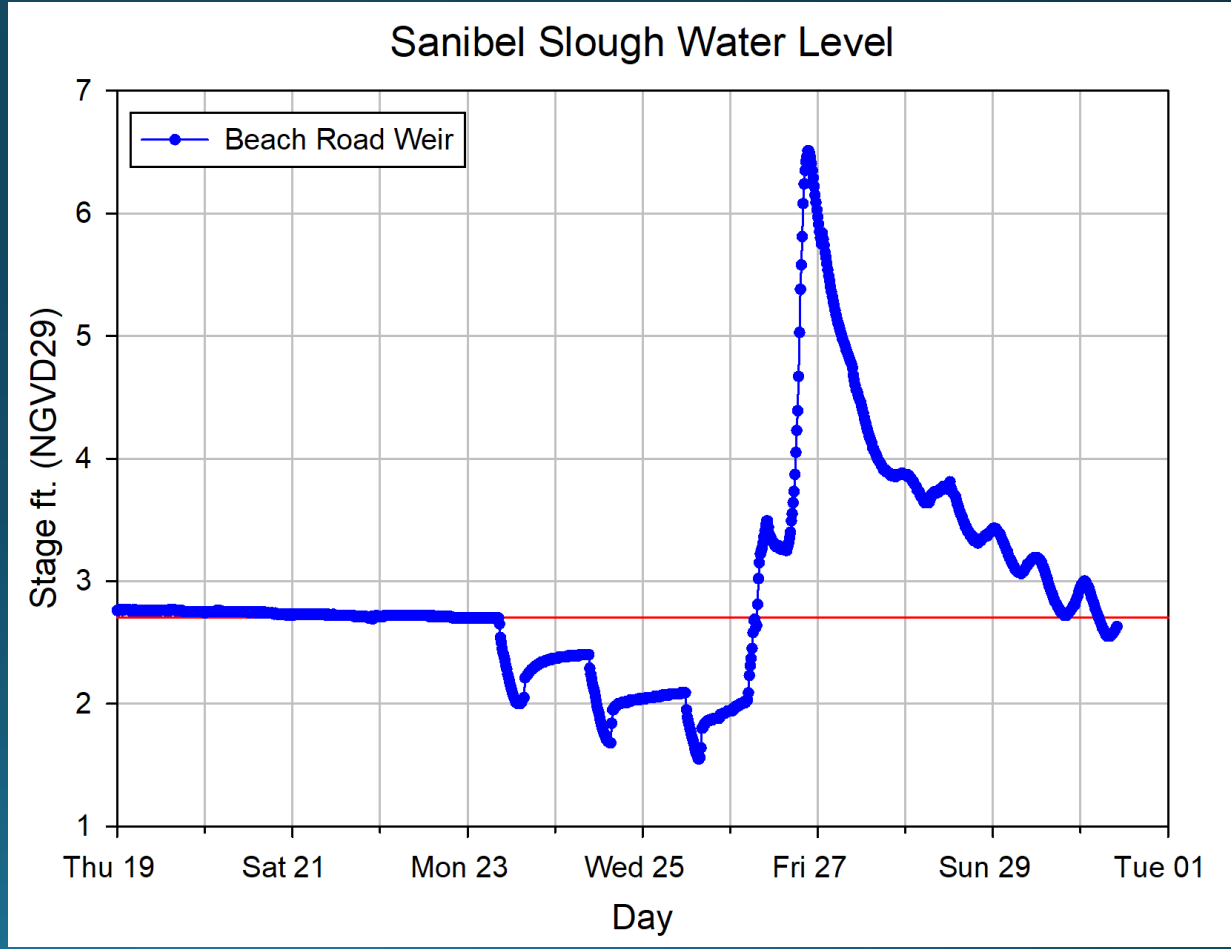
Beachview Estates – Par View Drive

Thursday, September 26, 2024, 6:30 PM

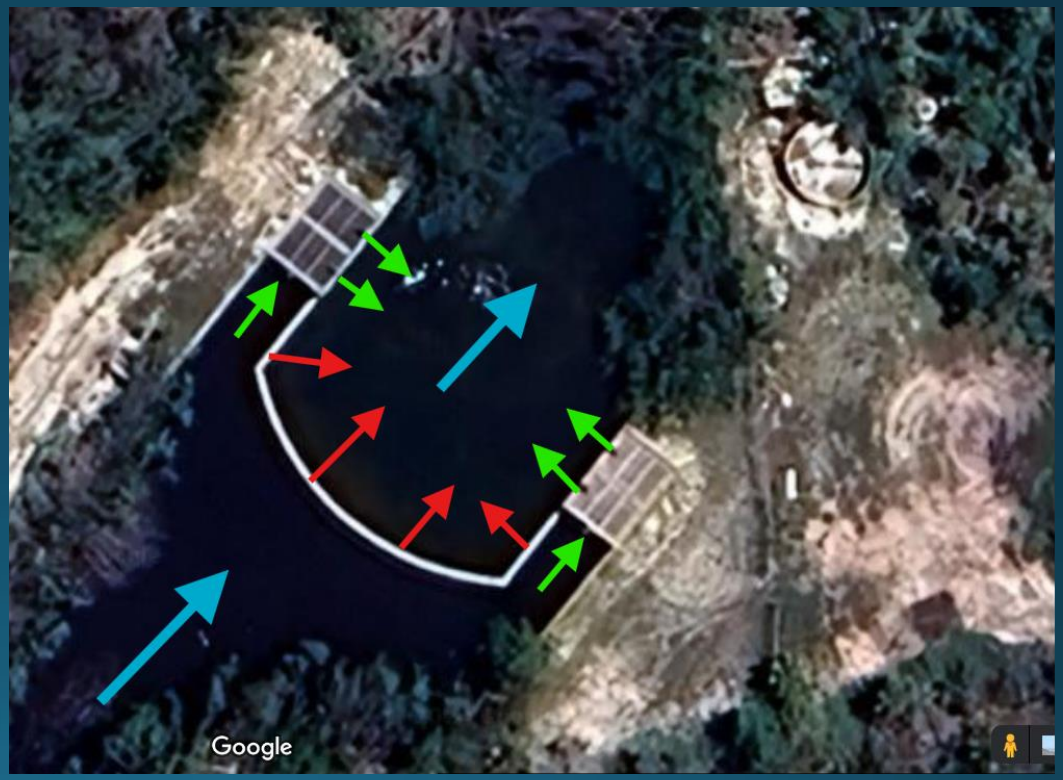
Water flowing west from Beach Road weir

Sanibel Slough- Post Storm Recession





The Water Also Goes Back Out

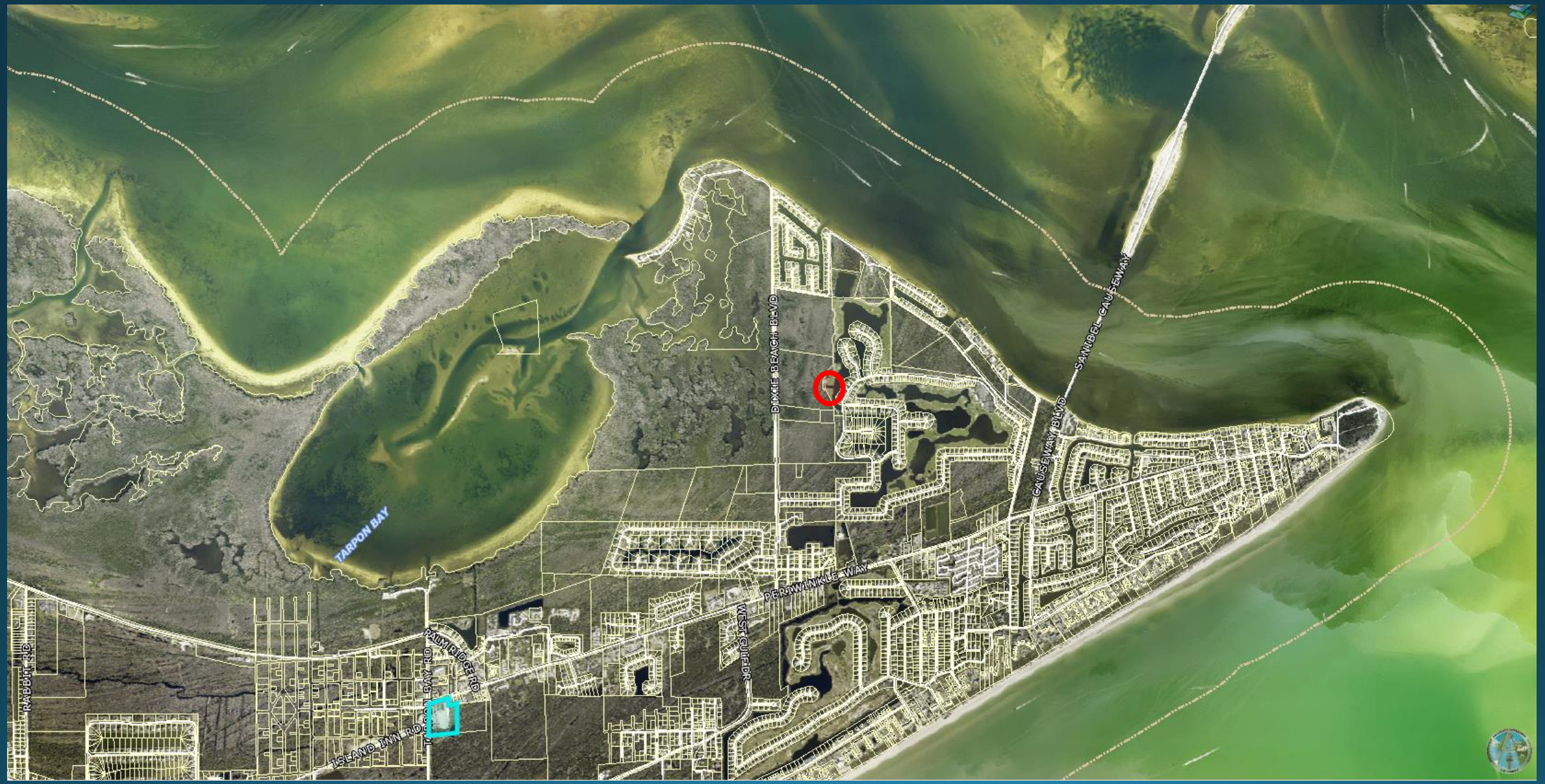


GREEN= GATES
RED= WEIR (3.2)

Stormwater outside the river basins

- Subdivision Drainage
  - Neighborhood collects and retains stormwater in a defined retention area
    - Example: Dunes, Sanctuary, Gumbo Limbo, Gulf Ride, Bayous
- Canal/Bayou Systems
  - ROW swales or on-site retention retain runoff and overflow to tidal waters
    - Example: East End, Santiva Area, Sanibel Harbours, Sanibel Isles
- Localized Drainage Areas
  - Properties retain water with no real designed overflow option
    - Gulf Front Lots, Non-Subdivision Properties

2016 Dunes Community Weir Improvements



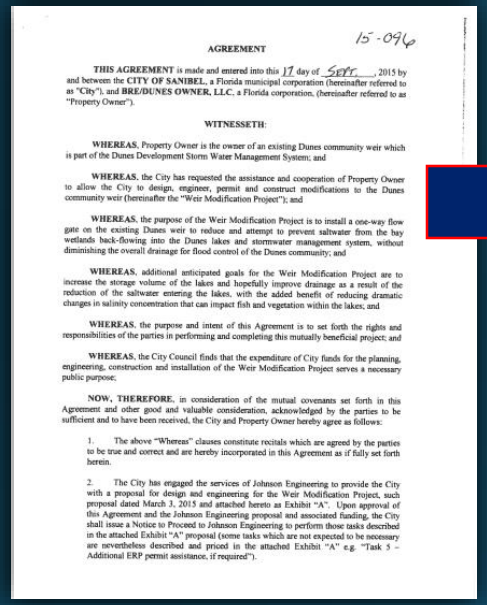
2016 Dunes Community Weir Improvements

2016 Dunes Community Weir Improvements

- SCCF flow monitoring began in 2014
- **In 2015:**
  - ~**38 million gallons** of stormwater discharged from the Dunes into Tarpon Bay
  - ~**121 million gallons** of bay water flowed into Dunes Lakes in 2015 (~90 days of net inflow)
- **Total inflow more than 3 times total outflow**

One-Way Flow Gate Design

Design based on Beach Road Weir



AGREEMENT

15-096

THIS AGREEMENT is made and entered into this 17 day of Sept., 2015 by and between the **CITY OF SANIBEL**, a Florida municipal corporation (hereinafter referred to as "City"), and **BRE/DUNES OWNER, LLC**, a Florida corporation, (hereinafter referred to as "Property Owner").

WITNESSETH:

WHEREAS, Property Owner is the owner of an existing Dunes community weir which is part of the Dunes Development Storm Water Management System; and

WHEREAS, the City has requested the assistance and cooperation of Property Owner to allow the City to design, engineer, permit and construct modifications to the Dunes community weir (hereinafter the "Weir Modification Project"); and

WHEREAS, the purpose of the Weir Modification Project is to install a one-way flow gate on the existing Dunes weir to reduce and attempt to prevent saltwater from the bay wetlands back-flowing into the Dunes lakes and stormwater management system, without diminishing the overall drainage for flood control of the Dunes community; and

WHEREAS, additional anticipated goals for the Weir Modification Project are to increase the storage volume of the lakes and hopefully improve drainage as a result of the reduction of the saltwater entering the lakes, with the added benefit of reducing dramatic changes in salinity concentration that can impact fish and vegetation within the lakes; and

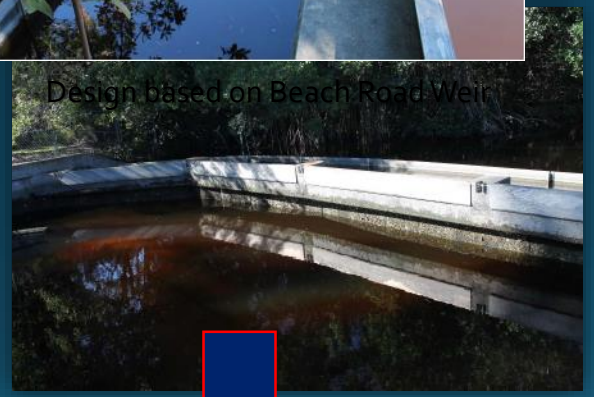
WHEREAS, the purpose and intent of this Agreement is to set forth the rights and responsibilities of the parties in performing and completing this mutually beneficial project; and

WHEREAS, the City Council finds that the expenditure of City funds for the planning, engineering, construction and installation of the Weir Modification Project serves a necessary public purpose;

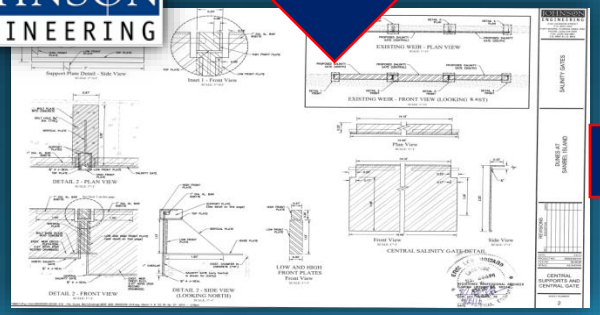
NOW, THEREFORE, in consideration of the mutual covenants set forth in this Agreement and other good and valuable consideration, acknowledged by the parties to be sufficient and to have been received, the City and Property Owner hereby agree as follows:

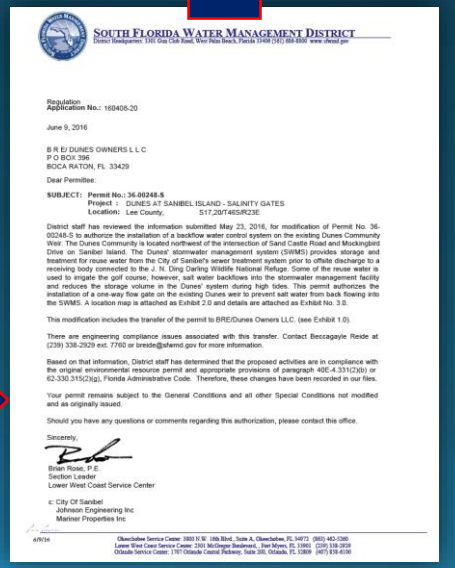
1. The above "Whereas" clauses constitute recitals which are agreed by the parties to be true and correct and are hereby incorporated in this Agreement as if fully set forth herein.

2. The City has engaged the services of Johnson Engineering to provide the City with a proposal for design and engineering for the Weir Modification Project, such proposal dated March 3, 2015 and attached hereto as Exhibit "A". Upon approval of this Agreement and the Johnson Engineering proposal and associated funding, the City shall issue a Notice to Proceed to Johnson Engineering to perform those tasks described in the attached Exhibit "A" proposal (some tasks which are not expected to be necessary are nevertheless described and priced in the attached Exhibit "A" e.g. "Task 5 – Additional ERP permit assistance, if required").



JOHNSON ENGINEERING





SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Regulation
Application No.: 160408-20

June 9, 2016

B R E/ DUNES OWNERS L L C
P O BOX 396
BOCA RATON, FL 33429

Dear Permittee:

SUBJECT: **Permit No.: 36-00248-S**
Project : DUNES AT SANIBEL ISLAND - SALINITY GATES
Location: Lee County, S17,20/T46S/R23E

District staff has reviewed the information submitted May 23, 2016, for modification of Permit No. 36-00248-S to authorize the installation of a backflow water control system on the existing Dunes Community Weir. The Dunes Community is located northwest of the intersection of Sand Castle Road and Mockingbird Drive on Sanibel Island. The Dunes' stormwater management system (SWMS) provides storage and treatment for reuse water from the City of Sanibel's sewer treatment system prior to offsite discharge to a receiving body connected to the J. N. Ding Darling Wildlife National Refuge. Some of the reuse water is used to irrigate the golf course; however, salt water backflows into the stormwater management facility and reduces the storage volume in the Dunes' system during high tides. This permit authorizes the installation of a one-way flow gate on the existing Dunes weir to prevent salt water from back flowing into the SWMS. A location map is attached as Exhibit 2.0 and details are attached as Exhibit No. 3.0.

This modification includes the transfer of the permit to BRE/Dunes Owners LLC. (see Exhibit 1.0).

There are engineering compliance issues associated with this transfer. Contact Beccagayle Reide at (239) 338-2929 ext. 7760 or breide@sfwmd.gov for more information.

Based on that information, District staff has determined that the proposed activities are in compliance with the original environmental resource permit and appropriate provisions of paragraph 40E-4.331(2)(b) or 62-330.315(2)(g), Florida Administrative Code. Therefore, these changes have been recorded in our files.

Your permit remains subject to the General Conditions and all other Special Conditions not modified and as originally issued.

Should you have any questions or comments regarding this authorization, please contact this office.

Sincerely,

Brian Rose, P.E.
Section Leader
Lower West Coast Service Center

c: City Of Sanibel
Johnson Engineering Inc
Mariner Properties Inc

4/5/16

Okeechobee Service Center: 3800 N.W. 16th Blvd., Suite A, Okeechobee, FL 34972 (863) 462-5260
Lower West Coast Service Center: 2301 McGregor Boulevard, Fort Myers, FL 33901 (239) 338-2929
Orlando Service Center: 1707 Orlando Central Parkway, Suite 200, Orlando, FL 32809 (407) 858-6100

2016 Dunes Community Weir Improvements

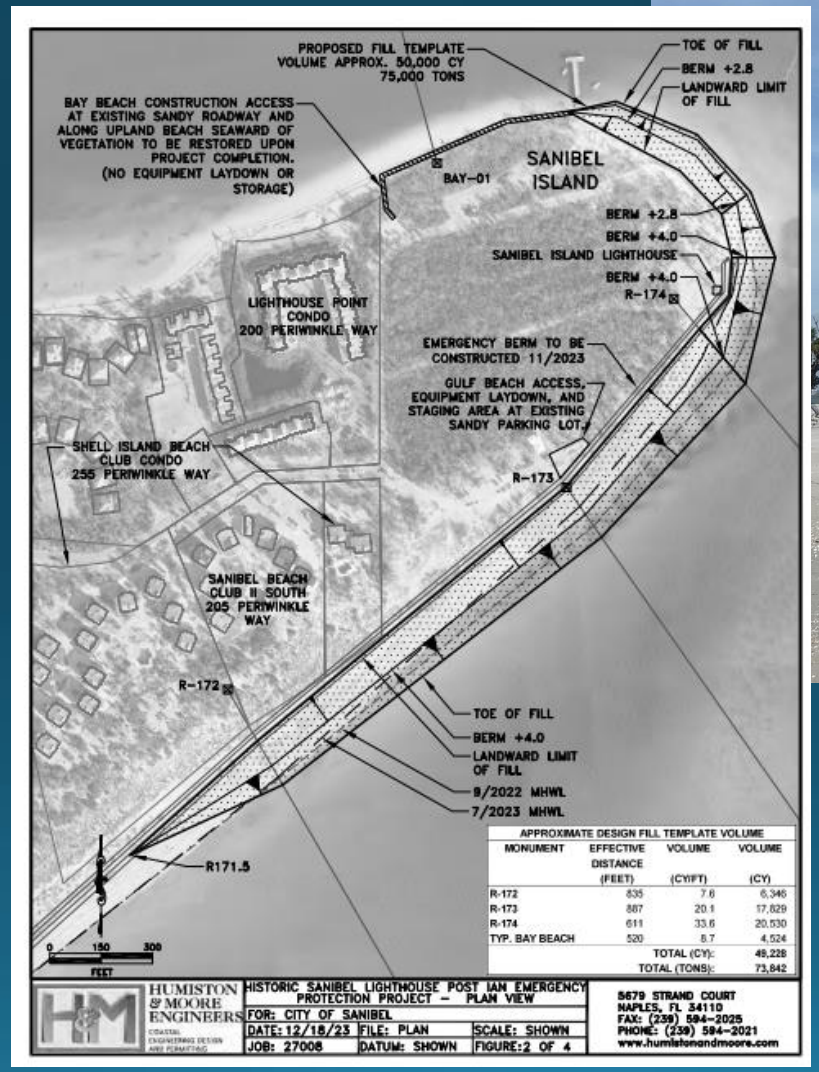
Stormwater Master Plan Update

- Topics of Focus
  - Assessment of Stormwater System Post Ian and Repair Design
  - Evaluation of Surface Water Master Plan and Weir Control Policy
  - Data Collection involving groundwater, Sanibel Slough, topographic information
  - Includes analysis of Sea Level rise and potential resiliency measures

- Prominent Steps
  - Partners Meetings (SCCF, USFWS-Ding Darling, Sanibel Fire, Mosquito Control)
  - Public Workshop (Planned for Jan/Feb)
  - Final Presentation to City Council (Late Spring/Early Summer)

Beach Conditions

- Sanibel Lighthouse
  - Additional sand placement below mean high water to begin in November 2024
- Clam Bayou
  - Breach in restored dune berm during TS Debby & Hurricane Helene
- Scours/Gullies
  - Approximately 10 gullies in new or repeat locations
  - Discussing options for repair with beach renourishment contractor
- Overwashed Sand

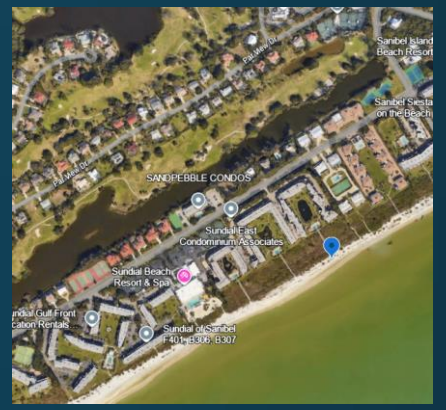


Clam Bayou

Sundial East

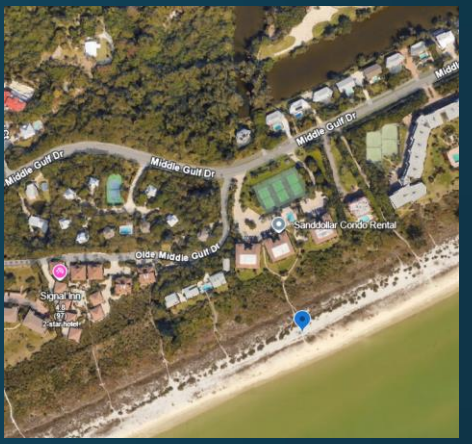
1451 Middle Gulf Drive

Inspection Date: September 30, 2024



Sanddollar Condo

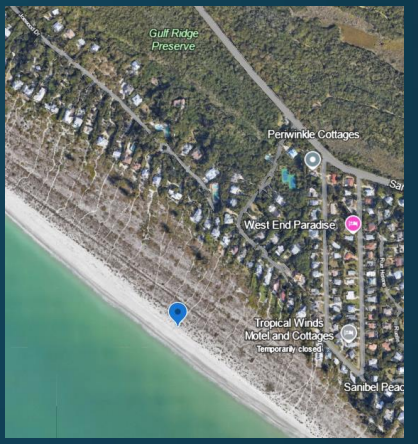
1795 Middle Gulf Drive



Inspection Date: September 30, 2024

Joewood Drive/Gulf Ridge

Inspection Date: September 30, 2024



Overwashed Sand

DEP Emergency Final Order 24-2534 (9/24/24)

Activities Requiring Local Authorization

Local governments are authorized to issue permits in lieu of Department permits to private and public property owners for the activities listed below:

(5) Return of sand to the beach dune system which has been deposited upland by the Storm. The recovered sand shall be free of debris and other foreign matter and shall not cover any Storm-generated debris or construction debris.

Overwashed Sand

Current City Requirements

- City Emergency Beach Shoreline Erosion Control Permit
  - Fee: $2326 up to 100 lineal feet, plus $431 for each additional 50 lineal feet (Sec. 90-129)
- DEP Emergency Field Permit

  Fee: $0

DEP Emergency Final Order 24-2534 (9/24/24)

SAND PLACEMENT			
Activity	**Location**	**Permits Needed**	**Conditions**
Return of storm **overwashed** sand (sand that was deposited in the upland by the storm) back to the beach or dune area	Unvegetated beach or dune area above the waterline	Local government permit or CCCL Emergency Permit **Note:** Return of clean **windblown** sand to the beach from paved roads and parking areas, beach access ramps, pools, patios, walkways, or decks is **exempt** from CCCL permit requirements	No beach scraping is allowed Excavation is not to go below pre-storm ground levels Sand must be cleaned of storm or construction debris Use existing beach access No dune or dune vegetation damage allowed Avoid sea turtles, nests and hatchlings Place sand in barren areas with no debris or plants

Overwashed Sand

Staff Recommendation

- Accept DEP authorization to issue permits on behalf of DEP for return of overwash sand only
- Waive the fee for an Emergency Beach Shoreline Erosion Control Permit for return of overwash sand only