

Hello And Welcome!

- While we're getting ready for the training, please ensure the ArcGIS Survey123 and ArcGIS QuickCapture applications are downloaded to your tablet or smart phone (whichever device you are collecting data with)
 - Non-SFWMD staff do not need to download QuickCapture
- Please clearly print your contact information on the sign in sheet that is being/will be passed around
 - Participants must sign in for verification of training completion – contact information will be used to notify participants to create South Florida Flood Information Resource Accounts for access to the 2025 Wet Season High Water Mark Survey



**ArcGIS
Survey123**
(Also accessible
via web browser)



**ArcGIS
QuickCapture**
(SFWMD Staff only)



Flood Survey And High Water Mark Training

April 2025

Introductions

- Your name, what you do, and your organization/agency
- Your experience* with flooding and/or high water marks
- Your experience* with GIS applications/mobile mapping
 - Please also mention if you have attended one of SFWMD's Flood Survey and High Water Mark training sessions in previous years

*If your answer is none or very little – that's okay! We'll cover it today.

Objectives



- By the end of this training, our goal is that all participants:
- Understand the importance of flood observation and high water mark (HWM) data collection
 - Know which resources to use and how to effectively capture data with them
 - Know how to safely and accurately identify and collect high water marks
 - Submit test data using the different applications to ensure users are ready and prepared for the upcoming wet season

Agenda

- An overview of the SFWMD Resiliency Program and the importance of flood/high water mark data collection
- Training on how to use data collection resources
 - Which application to use and when
 - How to completely and properly collect data
- How to take high water marks
- Testing



Introduction



Ana Carolina Coelho Maran, Ph.D., P.E.

Chief of District Resiliency

SFWMD Resiliency

➤ District Resiliency | South Florida Water Management District (sfwmd.gov)

Resiliency is the capacity for natural and manmade systems to cope with and adapt to acute and chronic stressors as climate conditions evolve.

SFWMD's resiliency efforts focus on:

- Assessing how sea level rise, extreme flood and rainfall events, and other evolving conditions happen today and, in the future, and how they affect water resources management.
- Planning for and making infrastructure adaptation investments that are needed to successfully implement SFWMD's mission of safeguarding and restoring South Florida's water resources and ecosystems, protecting communities from flooding, and meeting the region's water needs while connecting with the public and stakeholders.
- Implementing priority resiliency projects.

The Office of District Resiliency collaborates District-wide resiliency activities, working closely with internal stakeholders on resiliency initiatives and jointly develop resiliency projects, as well with local, state, and federal partners.

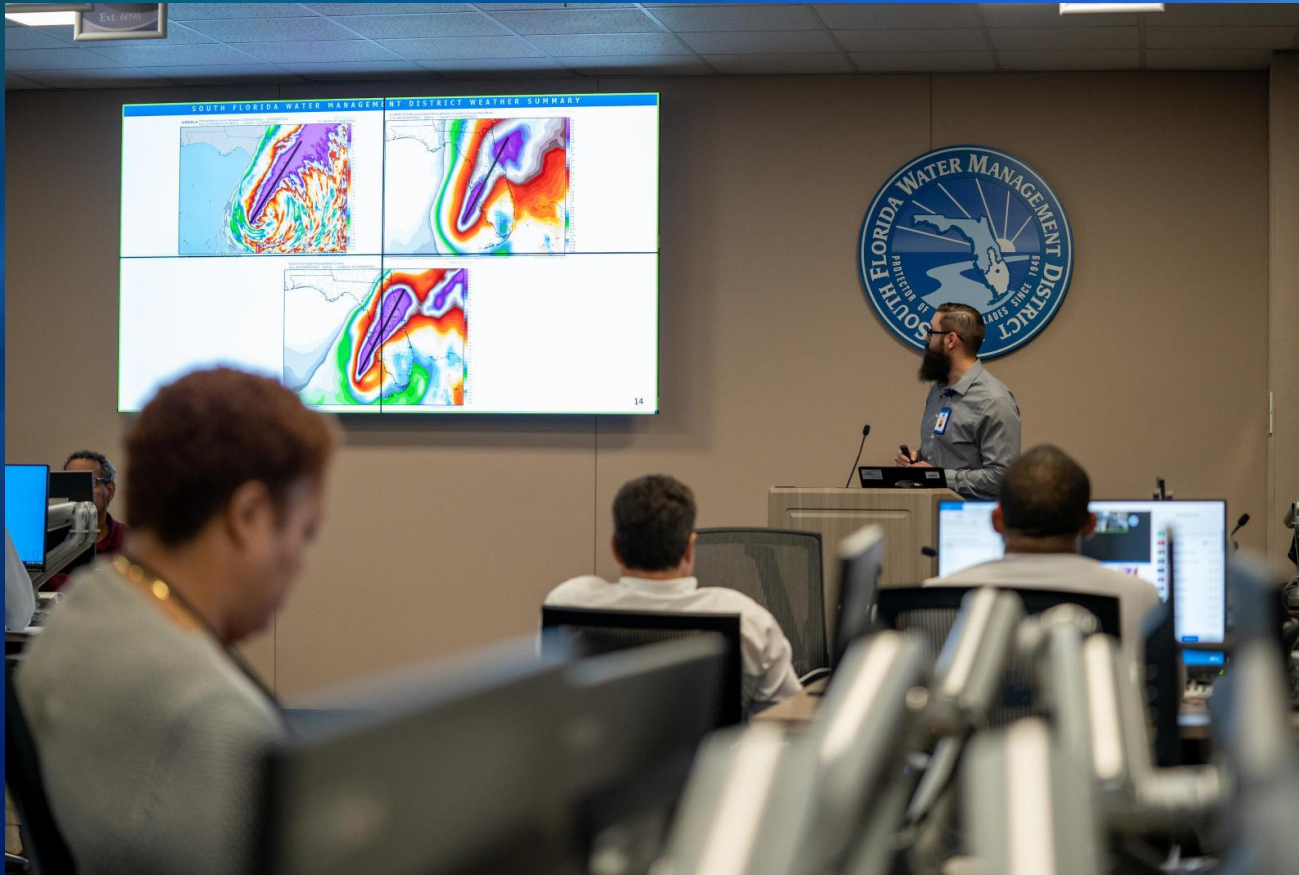
Objectives And Importance Of Data Collection

➤ Data collected in these applications

- Gives SFWMD and our local government partners critical information about flooding – when and where it occurs, and the severity of impacts
- Provides insights into vulnerable areas and root causes



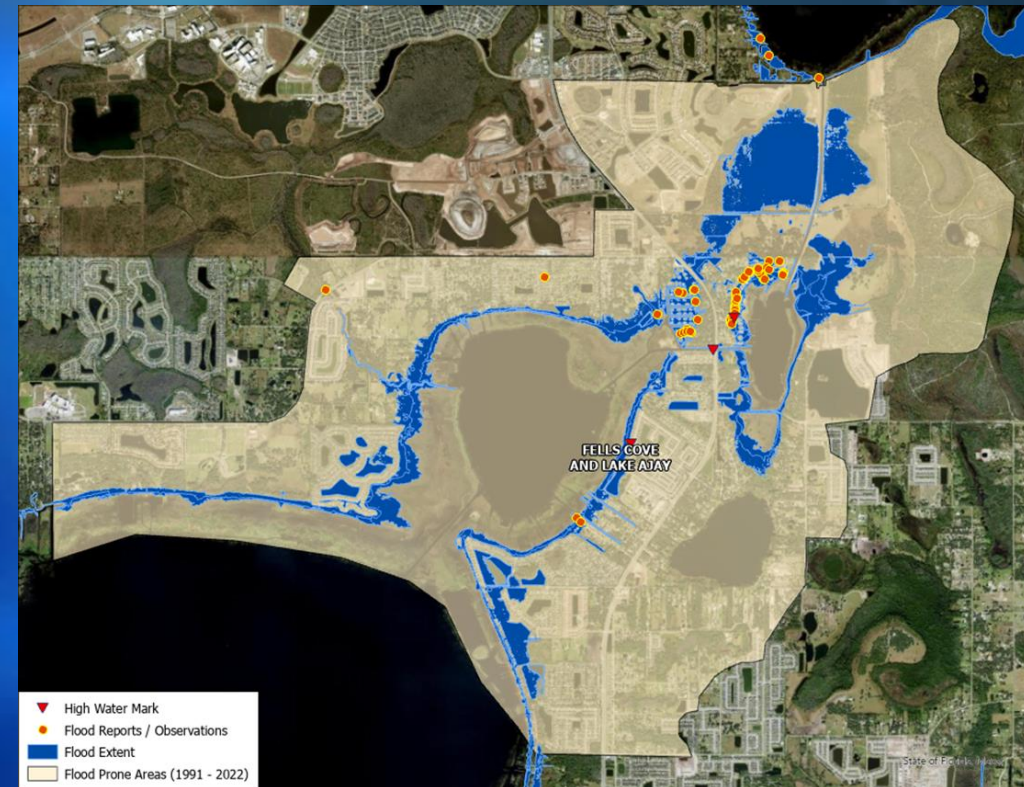
Objectives And Importance Of Data Collection



- During heavy rainfall events and EOC activations, this data will provide increased understanding of conditions on-the-ground, improve awareness of local impacts, and inform water management operations.

Objectives And Importance Of Data Collection

- Determination of flood extents is critical to understanding the root causes of flooding, which are needed for effective operations response and adaptation planning.
- Flood observations tell us where flooding is occurring and where to deploy teams to mark and measure high water marks
- High water marks are used to estimate flood extents and validate remote sensing and model results

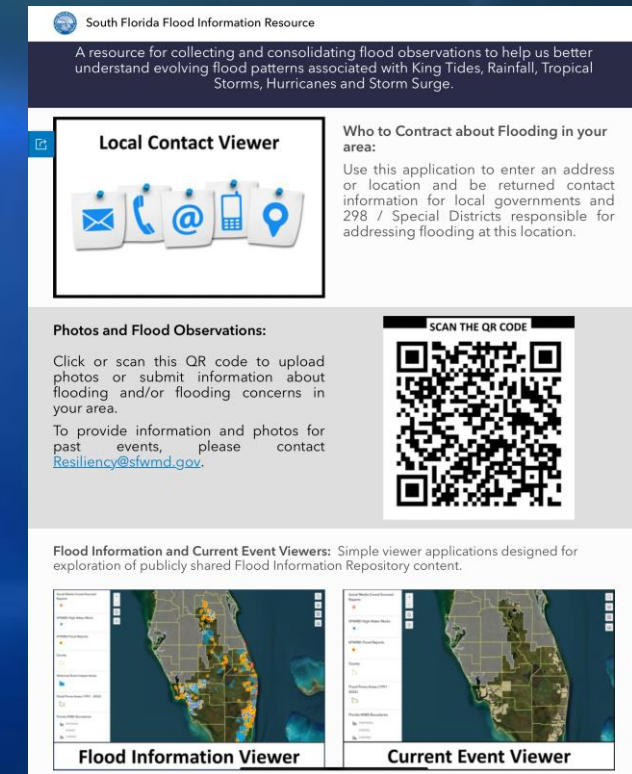


Hurricane Ian September 2022, East Lake Tohopekaliga / Fells Cove

SFWMD South Florida Flood Information Resource

South Florida Flood Information Resource

- Find local contacts
- View flood observations
- View event data



Additional information can be found at [Resiliency and Flood Protection | South Florida Water Management District](https://www.sfwmd.gov/resiliency-and-flood-protection)

Local Contact Notification System

- SFWMD is implementing a “Local Contact Notification System” to alert flood control partners in South Florida.
- System will notify County, City, and Local Drainage District contacts via email when flooding is reported in their area.
- Notifications will include a URL to the South Florida Flood Information Resource application for report access.
- Local contacts must have a South Florida Flood Information Resource account to view reports.
- Training on account creation and application use will be provided in May 2025.
- Local contacts encouraged to participate in the annual Flood Observation and High-Water Mark training in April.
- Local contacts are urged to respond to flood notifications using SFWMD-provided tools.



Additional information can be found at [Resiliency and Flood Protection | South Florida Water Management District](#)

SFWMD Weather

- Current Weather Conditions: Florida Radar Loop | South Florida Water Management District (sfwmd.gov)
- Site Status Reports (sfwmd.gov)
- Stay informed on regional and local conditions

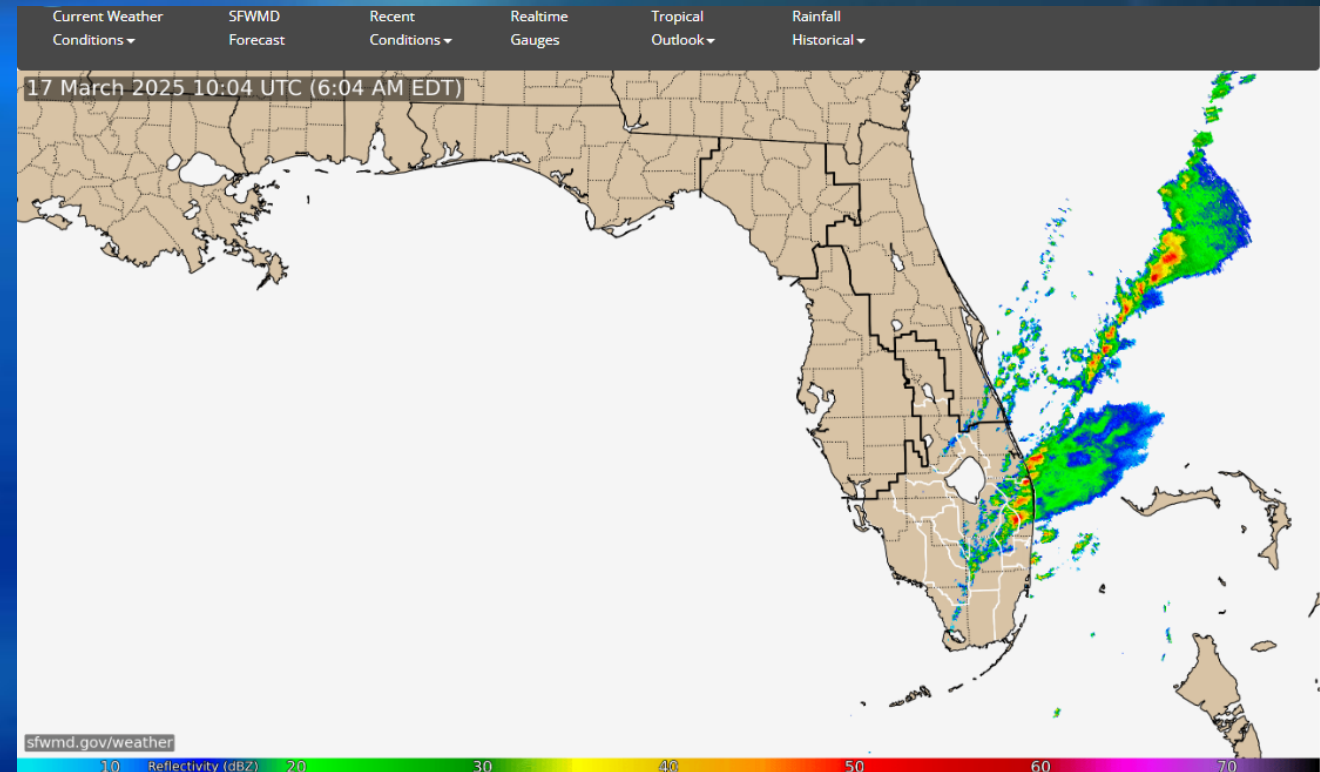
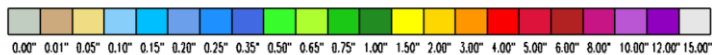
SFWMD Forecast

Current Weather Conditions ▾ SFWMD Forecast Realtime Gauges ▾ Raindar Estimates ▾ Tropical Outlook ▾

NHC Forecast Tracks Hurricane Model Plots Rainfall Historical ▾

[SFWMD TEXT FORECAST](#)

Daily Quantitative Precipitation Forecasts



SFWMD Tidal Outlook

➤ sfwmd.gov/HighTidePredictions

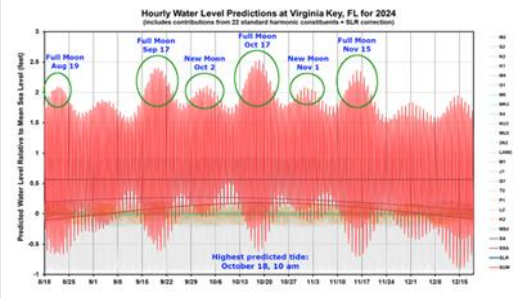
- Stay informed on high tide events and flooding risks
- 2025 King Tide Season: September – December
- Weekly Tidal Outlooks

Weekly King Tide Forecast

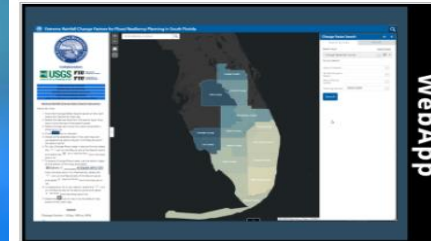
The South Florida Water Management District's Tidal Outlook for the forecast period of November 12, 2024 through November 21, 2024, is now available. Tidal water levels along Florida's southeast coast and the Florida Keys are expected to reach or exceed the National Weather Service (NWS) "Moderate Flooding" threshold. On Florida's southwest coast, tidal water levels are expected to exceed the NWS "Minor Flooding" threshold.

View the daily forecast [HERE](#).

SFWMD is continuing efforts for the monitoring, operational response and documentation of these events. These weekly updates are intended to be informational for interested stakeholders and the public. If conditions warrant, additional updates may be issued throughout the forecast period.



➔ Future Outlook in Regional Resiliency



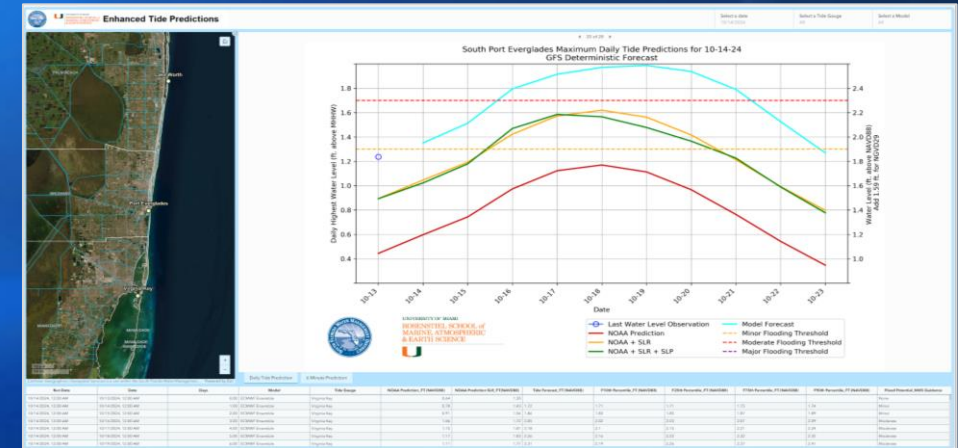
Future Extreme Rainfall Change Factors for Flood Resiliency Planning in South Florida Web Application

This tool provides access to future extreme rainfall change factors for resiliency planning for the 16 counties and 14 rainfall areas within...



Enhanced Tide Predictions

Locally Relevant Tide Forecasts to Support Effective Planning and Response



Geospatial Products Site, Internal And External Resources

- [Geospatial Products Site \(sfwmd.gov\)](http://sfwmd.gov)
 - [Mobile GIS | Geospatial Products Site \(sfwmd.gov\)](http://sfwmd.gov)
- [South Florida Flood Information Resource](#)
- [| South Florida Water Management District \(sfwmd.gov\)](http://sfwmd.gov)
 - [Geospatial/Geographic Information Systems \(GIS\) | South Florida Water Management District \(sfwmd.gov\)](http://sfwmd.gov)

TOOLS & RESOURCES ▾ HUMAN

APPLICATIONS

EMPLOYEE SELF-SERVICE

FORMS ▾

FACILITIES, MEETINGS & TRAVEL

GEOSPATIAL PRODUCTS

PHOTOS, LOGOS & IMAGES

POLICIES & PROCEDURES

PROJECT MGT & CONTROLS

RESET YOUR PASSWORD

WEBEOC

Overview Of Flood And High Water Mark Data Collection

➤ Flood Survey

- Survey123 or browser
- Public Tool for Agency Use and Public Distribution

➤ High Water Mark Survey

- Survey123 or browser
- Requires a Flood Information Resource Account
- Florida Division of Emergency Management-Derived

➤ Damage/Flood Assessment

- QuickCapture
- Internal SFWMD tool for post event preliminary damage assessment from vehicle or helicopter



ArcGIS
Survey123



ArcGIS
QuickCapture

Signing Into Survey123

- Sign in is not required to access the Flood Observation Survey, but is required for the High Water Mark Survey
 - The Flood Observation Survey is open to the public
 - The High Water Mark Survey is restricted to trained individuals with Flood Information Resource Accounts
- For today's training, you will not have to sign in to the High Water Mark Survey
 - We've made temporary updates to the sharing permissions to allow this
 - Non-SFWMD participants should have received information about setting up their Resource Accounts, and will receive a follow up email
 - For SFWMD staff, we will go through the sign in process on the following slides

Signing Into Survey123 (SFWMD Staff)

- Choose “Sign in with ArcGIS Online”
- Choose to login with the ArcGIS organization URL
- Type in SFWMD
- Sign in using your District credentials
 - Use your full email (@sfwmd.gov) and regular password
- If prompted, go to the Microsoft Authenticator application on your trusted device and enter in the code to authenticate
 - If you don’t have the MFA app, please let us know after the presentation, and follow the instructions on the next slide



The screenshot shows the ArcGIS login form. It has fields for 'Username' and 'Password', a 'Keep me signed in' checkbox, and a 'Sign In' button. Below the button are links for 'Forgot username?' and 'Forgot password?'. A red arrow points to the 'Your ArcGIS organization's URL' dropdown menu.

Do not type
Account info
in these boxes,
it will not work.

The screenshot shows the 'Your ArcGIS organization's URL' form. It has a text input field with 'SFWMD' and a dropdown menu with '.maps.arcgis.com'. Below the input field is a 'Remember this URL' checkbox. A red arrow points to the 'Continue' button.

Signing Into The App

➤ If you do not have the Microsoft Multi-Factor Authentication (MFA) application or are not SFWMD staff:

➤ For now, choose “Continue without signing in”

- You can always choose this option if you’re collecting data in the Flood Observation Survey

➤ SFWMD staff

- Please let us know after the presentation/before the testing time if you don’t have the MFA app



Signing Into The App

- **SFWMD Staff:** Please be sure you have signed in using the sign in sheet so we can look into your license level and permissions in ArcGIS Online.
- **Non-SFWMD Staff:** You should have already received instructions detailing how to create your Flood Information Resource Account, which will be required for submitted the High Water Mark Survey beyond this training. Please speak with a member of the Resiliency team if you need assistance or email Resiliency@sfwmd.gov.

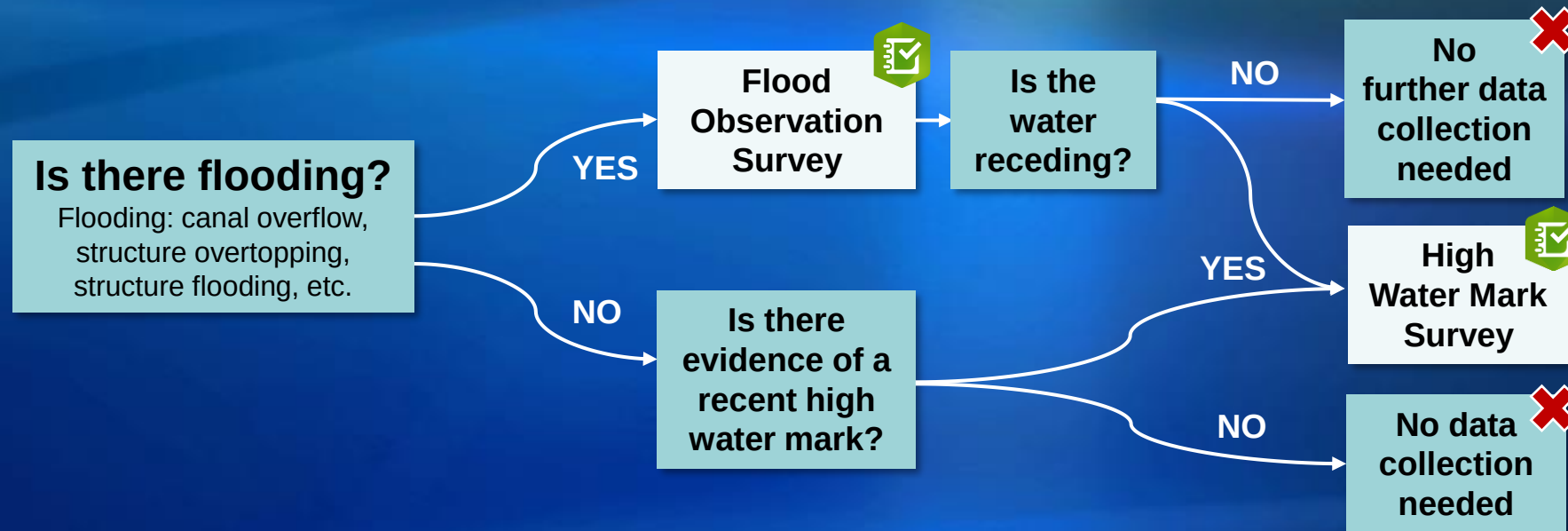
Defining Flooding

- Flooding is water in areas that are not designed to hold it or where it is not normal for it to occur
 - Not water in swales, wetlands, or retention ponds, unless it is rising quickly or there is cause for other concern



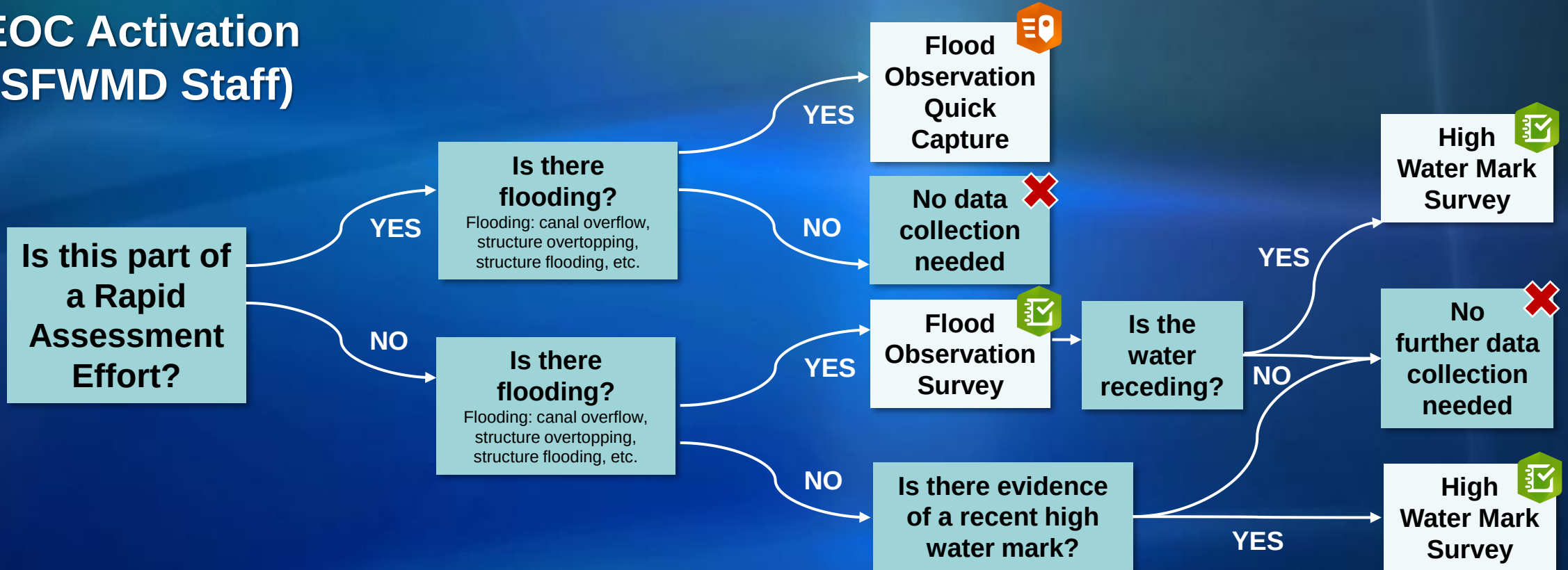
Which Survey Should I Use, And When?

Non-EOC Activation / King Tide



Which Survey Should I Use, And When?

EOC Activation (SFWMD Staff)

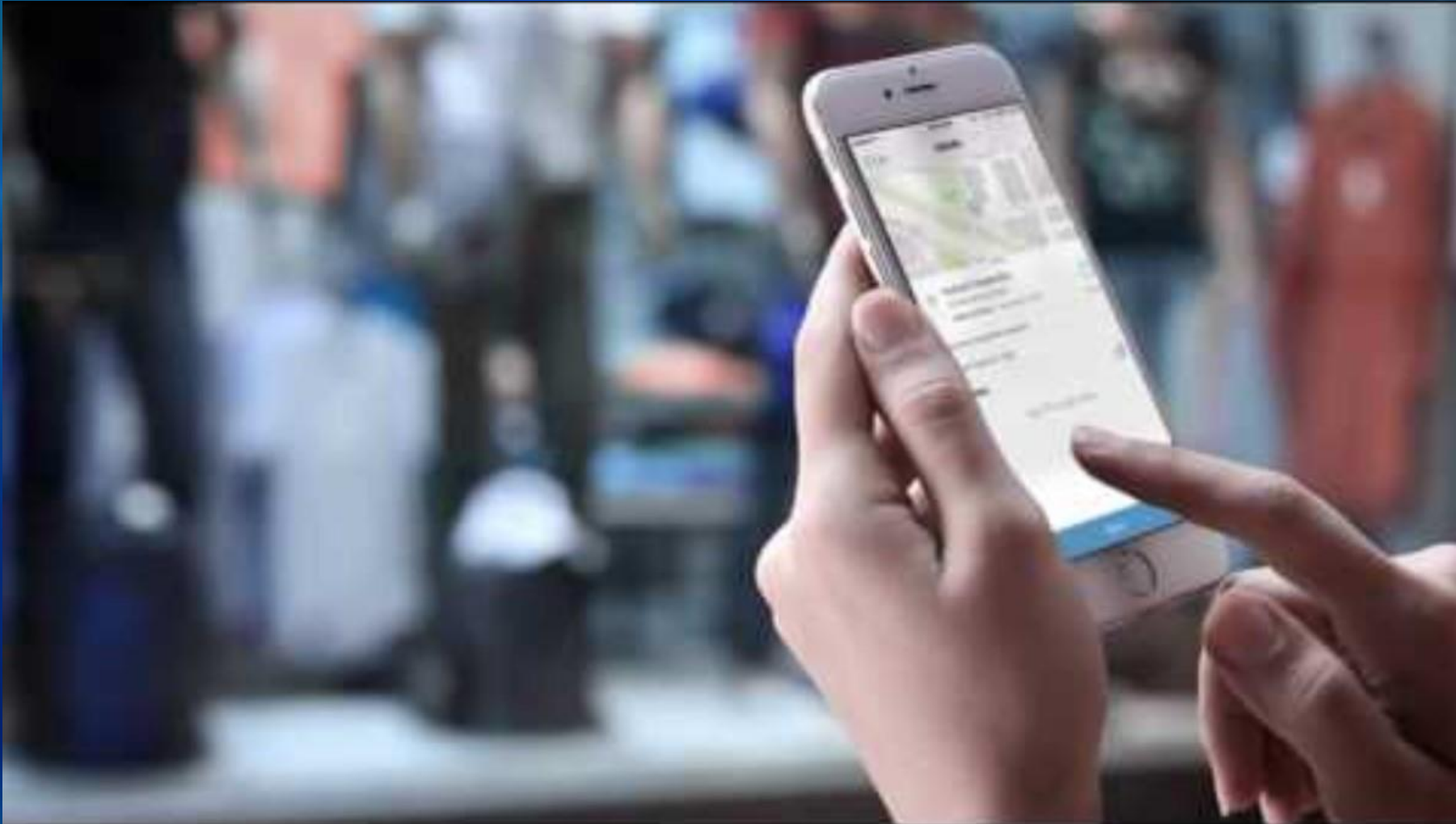


ArcGIS Survey123





ArcGIS Survey123



[Introduction to ArcGIS Survey123 \(youtube.com\)](#)

Flood Observation Survey

➤ [SFWMD.gov/floodingapp](https://sfwmd.gov/floodingapp)

- This survey is open to the public and will not require a sign in



Flood Observation Survey

Report Flooding and Early Concerns



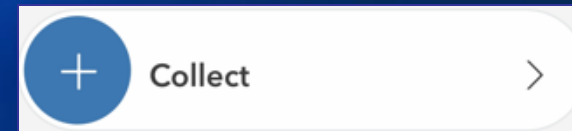
The information collected in this survey is used by agencies to better understand flooding conditions in Central and Southern Florida. This survey does not replace the need to contact your local drainage operator.

All flooding that poses a risk to your home or property should be reported to your local drainage operator. Life-threatening flooding should always be reported to 9-1-1.

To learn who to contact, go to [SFWMD.gov/FloodControl](https://www.sfwmd.gov/FloodControl) and enter your address.

Questions with a red * are required.

➤ If you've already submitted or saved data, you may see other options/folders in addition to "Collect" at the bottom of your screen.



Flood Observation Survey

Reporting Category:*

☐ Flooding

☐ Flooding Concern

Date of Flooding:

 MM/DD/YYYY

Photos (1 required)*

Submit up to 3 photos.

➤ **Reporting Category:**
Flooding or a Flooding Concern

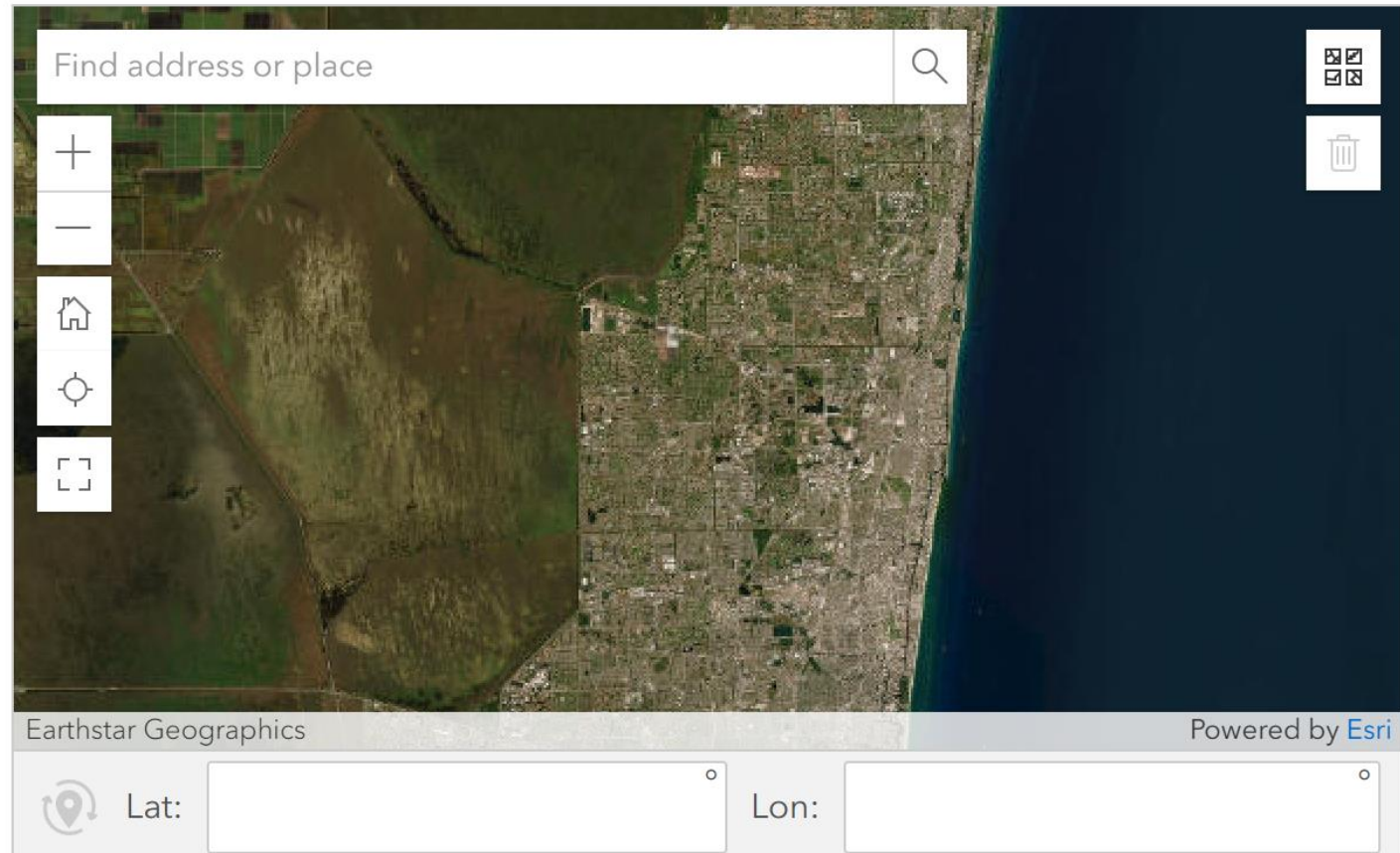
- A flooding concern may refer to water rising around a control structure

➤ **Date of Flooding**

➤ **Photos** of the flooding or flooding concern (at least one photo is required)

Flood Observation Survey

Flood Location*



The screenshot shows a web-based map interface. At the top, there is a search bar labeled "Find address or place" with a magnifying glass icon. Below the search bar is a map showing a coastal area with a large body of water on the right and a city grid on the left. To the left of the map is a vertical toolbar with icons for zooming in (+), zooming out (-), home (house icon), location (target icon), and full screen (four arrows icon). To the right of the map is a vertical toolbar with icons for layers (two overlapping squares), a trash can, and a print icon. At the bottom of the map, there is a text input field for "Lat:" and another for "Lon:". The text "Earthstar Geographics" is visible in the bottom left corner of the map area, and "Powered by Esri" is visible in the bottom right corner.

➤ **Flood location:** choose the location of the flooding on the map

- Either find an address in the search bar, type in coordinates, use the map to select the location, or select the “find my location” button (under the “home” icon) to zoom to your location

Flood Observation Survey

- Select the appropriate button for the water depth and previous flooding information

Flood Depth:



A horizontal line with six circular selection buttons. Below each button is a text label.

Selection Button	Label
1	Less than ankle deep
2	Ankle deep
3	Knee deep
4	Greater than knee deep
5	Don't know / NA
6	Other

Has this location flooded before?



A horizontal line with five circular selection buttons. Below each button is a text label.

Selection Button	Label
1	Never
2	Whenever it rains
3	Only during tropical events
4	Sometimes
5	Don't know /NA

Flood Observation Survey

Property Type:

☐ Agriculture	☐ Airport	☐ Commercial
☐ Governmental	☐ Industrial	☐ Mixed Use
☐ Natural Area / Open Land / Recreational	☐ Residential	

Affected Areas:

☐ Building / Structure	☐ Driveway / Garage	☐ Parking Lot	
☐ Road / Street	☐ Seawall	☐ Storm Drain	☐ Swale
☐ Yard	☐ Field / Open / Natural Area	☐ Don't know	
☐ Other			

➤ **Property Type:** select the type of affected property from the options

- Agriculture, Airport, Commercial, Governmental, Industrial, Natural Area/Open Land/Recreational, or Residential

➤ **Affected areas:** choose the option that is representative of the area that has been flooded

- Building/Structure, Driveway/Garage, Parking Lot, Road/Street, Seawall, Storm Drain, Swale, Yard, Field/Open/Natural Area, Don't Know, or Other (if other, type in more information)

Flood Observation Survey

General Observations (Optional):

Name

Email

Phone Number

Submit

- Use the General Observations field to report additional information, explain the flooding situation, share details about the photos or location, etc.
- Enter in Name, Email, and Phone Number



Break



What is a High Water Mark?

➤ A high water mark (HWM) is physical evidence that indicates the highest water level that was present during a flooding event

- This may be in the form of debris, mud, seed lines, stain lines, or vegetation lines
- High Water Marks are used to understand flooding extents



Hurricane Ian – September 2022

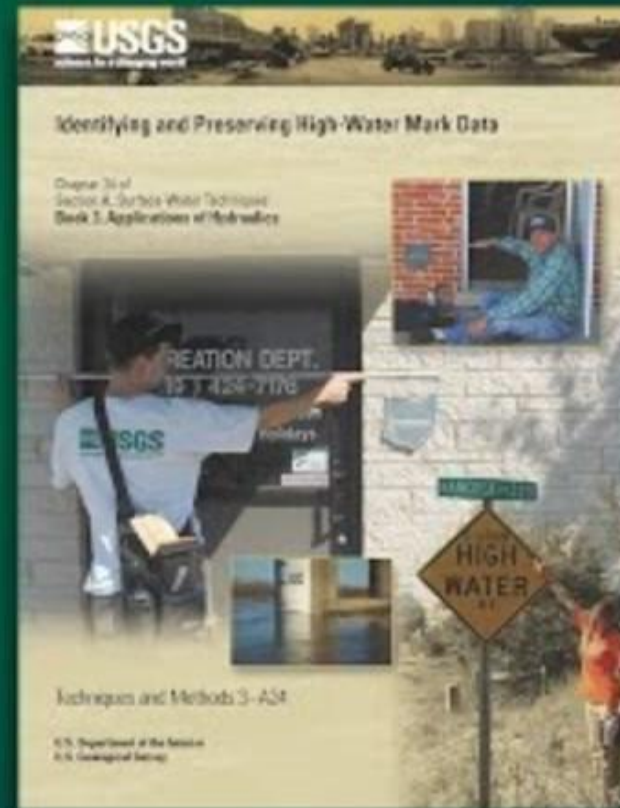
What is a High Water Mark?



Hurricane Ian – September 2022

High Water Mark Guide (Source: USGS)

A USGS GUIDE FOR FINDING AND INTERPRETING HIGH-WATER MARKS



Timestamps:

0:00-2:00

4:08-5:50

14:30-15:45

[A USGS Guide for Finding and Interpreting High-Water Marks](#)

Collecting High Water Marks

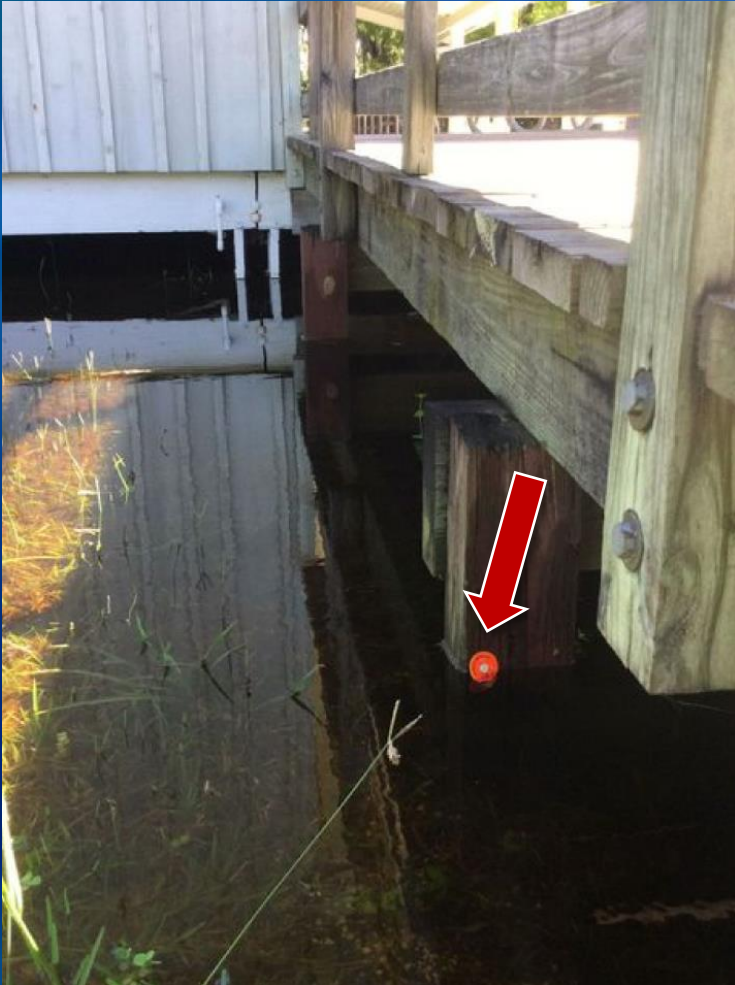


Note: High water marks/ tags should not be placed on roadways or private property

Collecting High Water Marks



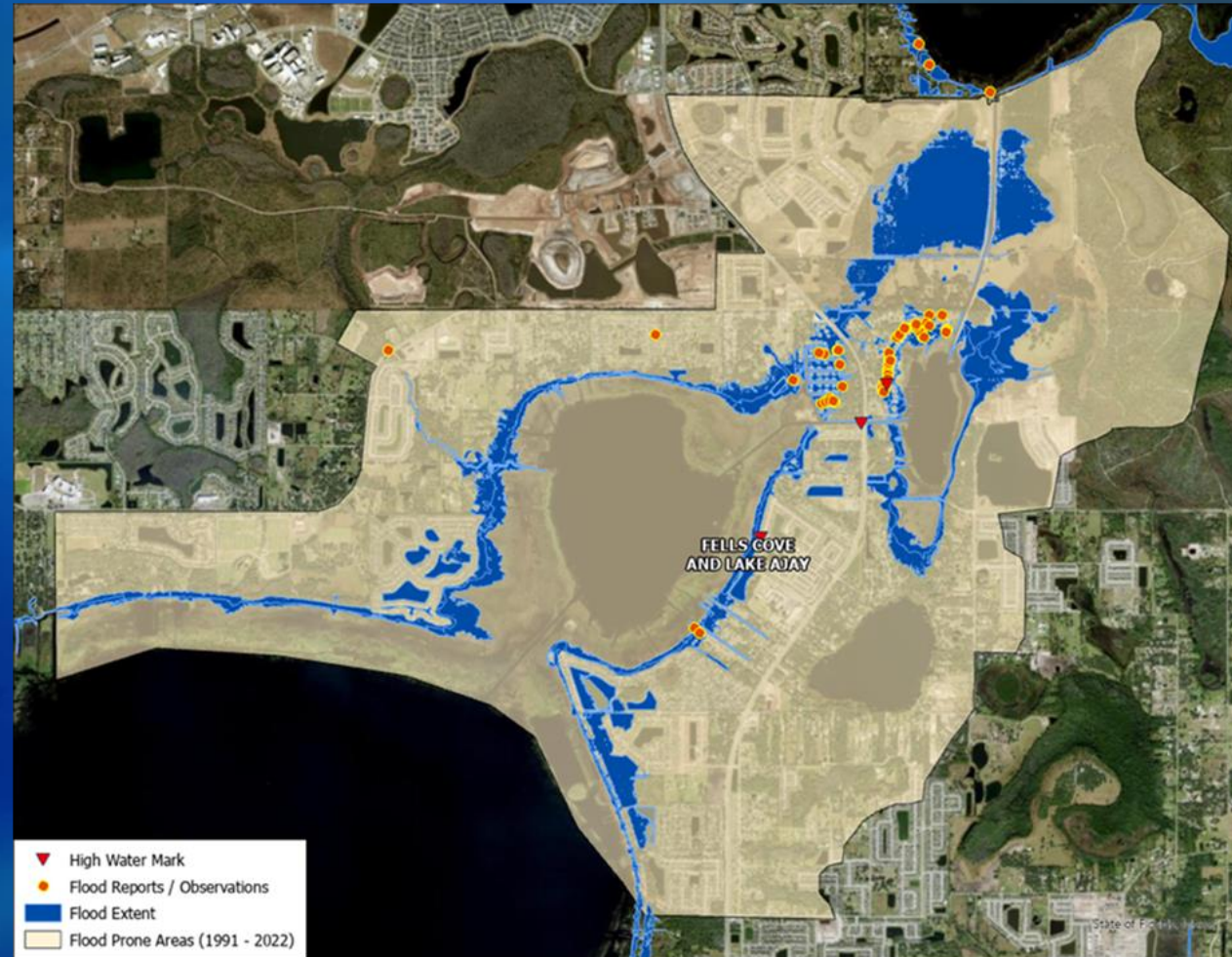
Collecting High Water Marks



Collecting High Water Marks



Determining Flood Extents



Hurricane Ian September 2022, East Lake Tohopekaliga / Fells Cove

Best Practices - IMPORTANT

- When taking the location of the high water mark in the map, always be as close as possible to the actual high water mark
 - This is the location that is used in data analysis – representing the high water mark as elsewhere (ex: from your vehicle, back in the office, etc.) can lead to misinterpretation of the results and/or inaccurate conclusions about the flooding event

High Water Mark Survey

➤ SFWMD HWM Survey (arcgis.com)

- You will need to sign into the Survey123 application in order to collect data in this survey beyond the training period
- Do not expose yourself to any risk of harm while conducting this survey



High Water Mark Survey

SFWMD HWM Survey



Questions with a red * are required.

High Water Mark Survey

Collecting organization*

Recorder name*

Recorder email*

Date of flooding

Deployment number

- **Collecting organization:** SFWMD, or your organization
- **Recorder name:** your name
- **Recorder email:** your email
- **Date of flooding**
- **Deployment number:** this number will be given to you if it is needed (SFWMD staff)

High Water Mark Survey

Was High Water Mark tag placed?*

☐

Yes

☐

No

High Water Mark tag ID

High Water Mark type*

☐

Debris

☐

Mud

☐

Seed line

☐

Stain line

☐

Vegetation line

☐

Other

- Check **yes or no** if there was a tag placed on the high water mark
- High Water Mark tag ID: the ID/number on the tag, if the tag was placed
- **High Water Mark type**: Select the type of high water mark indicator that was used to identify the high water mark, from the options: debris, mud, seed line, stain line, vegetation line, or other
 - If other, type in more information

High Water Mark Survey

High Water Mark location description

255

Height above ground in inches*

General observations

Anything else we should know?

1000

- High Water Mark location description: include other details about where the high water mark can be found
- **Height above ground in inches:** the height of the high water mark off of the ground – Default is set to 0 to represent that the mark is on the ground
- General observations: other information about observed flooding and/or conditions

Collecting High Water Marks

If you are recording your high water mark based off this debris line, the “height above ground in inches” here would be the measurement of the red line

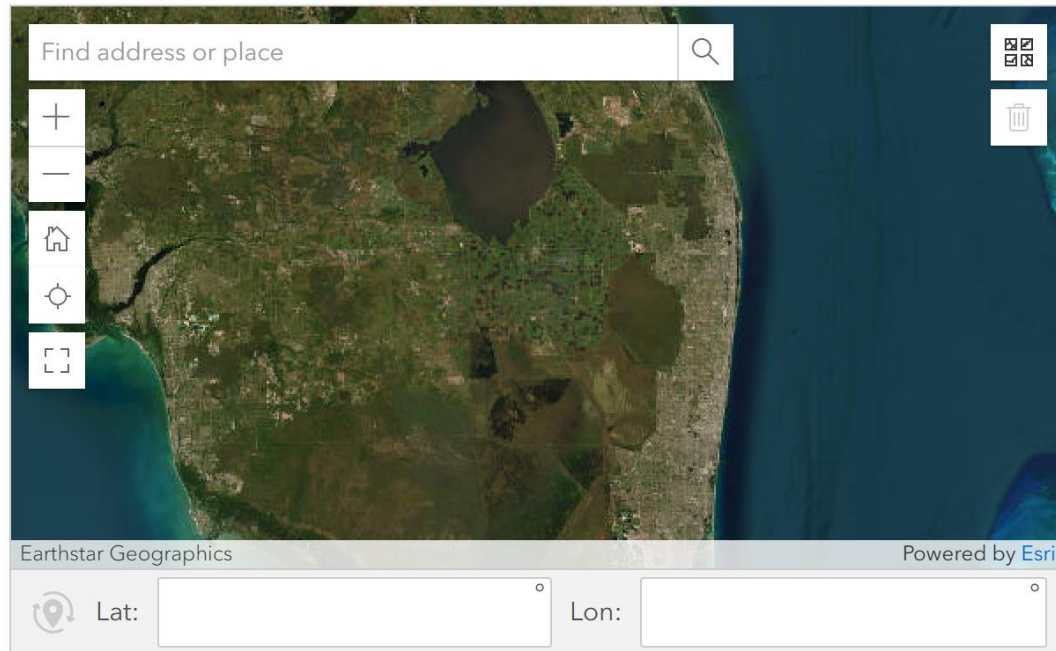


If you are recording your high water mark based off this line on the ground, “the height above ground in inches” would be 0

High Water Mark Survey

HWM location*

Tap the location icon to set the HWM to your device's current location or move the pin on the map to adjust to correct HWM location.



The screenshot shows a mobile map application interface. At the top, there is a search bar labeled "Find address or place" with a magnifying glass icon. Below the search bar is a map showing a coastal area with green land and blue water. On the left side of the map, there is a vertical toolbar with icons for zooming in (+), zooming out (-), home, location, and a full-screen view. On the right side, there are icons for a grid and a trash can. At the bottom of the map, there is a status bar that says "Earthstar Geographics" on the left and "Powered by Esri" on the right. Below the map, there are input fields for "Lat:" and "Lon:" with degree symbols.

Photos (1 required)*

Submit up to 3 photos.

➤ **HWM location:** choose the location of the flooding on the map

- Either find an address in the search bar, type in coordinates, use the map to select the location, or select the “find my location” button (under the “home” icon) to zoom to your location

➤ **Photos:** submit at least one photo of the high water mark, additional photos can be included to help provide location information/context or High Water Mark details

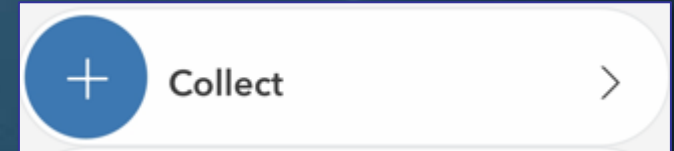
Survey123 Best Practices

➤ Always send all data as soon as you have an internet connection

- If the device is damaged, the app is deleted, etc. before the data is sent, it may be completely lost

➤ In addition to the “Collect” button on the bottom of the screen, there may also be a “Drafts,” “Outbox,” and/or “Sent” buttons

- Incomplete surveys are saved to the Drafts to be finished later
- Completed surveys that were sent while offline are stored in the Outbox



ArcGIS QuickCapture (SFWMD Staff)



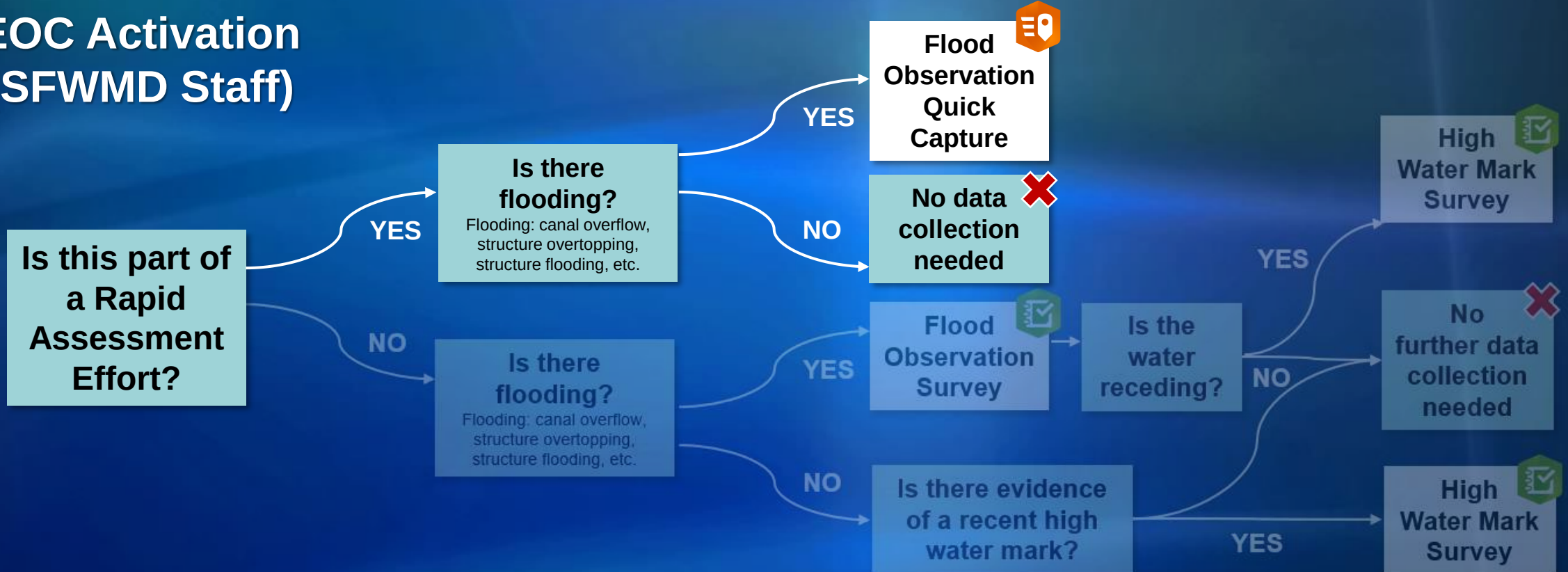
ArcGIS QuickCapture



[Introducing ArcGIS QuickCapture - YouTube](#)

Which Survey Should I Use, And When?

EOC Activation (SFWMD Staff)



Damage/Flood Assessment QuickCapture (SFWMD Staff)

1 Collector: Test  [Please use your first and last name](#)

2 Tap to start / stop


Area covered

3 Damage Category

 Canal Blockage	 Debris
 Erosion	 Facility Damage
 Flooding	 Breach
 Other	

1. Enter in your full (first and last) name
2. Tap the “Area covered” green box when you start your assessment – the app will begin tracking your location
3. Select the damage category – this will launch your camera to take a picture

All fields/steps are required

Questions & Support

- If you have any questions that come up regarding any of the materials we've gone over today, please feel free to reach out via email:
- Geospatial Services & High Water Mark Team
 - SFWMD_HWM@sfwmd.gov
- Resiliency & Flood Survey Reviewer Team
 - FloodReportReviewers@sfwmd.gov

Testing

- Please take at least one collection in Survey123 and QuickCapture, for SFWMD staff, before leaving today
 - Please include “TEST” somewhere within the surveys if possible (ex: in the Comments or Observations field)
 - Test points will be deleted once the trainings are completed
- SFWMD staff: if you do not have the Microsoft Authenticator installed on a trusted device please speak with a member of Geospatial Services before leaving for testing
- Please return to the room after collecting data



Thank You!