

U.S. Geological Survey

- **Tools and Products**

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USGS Coastal Storm Team

USGS Coastal Storm Team is a large multi-disciplinary group comprised of USGS and Partner Agencies that is activated as necessary in response to tropical and extratropical storms.

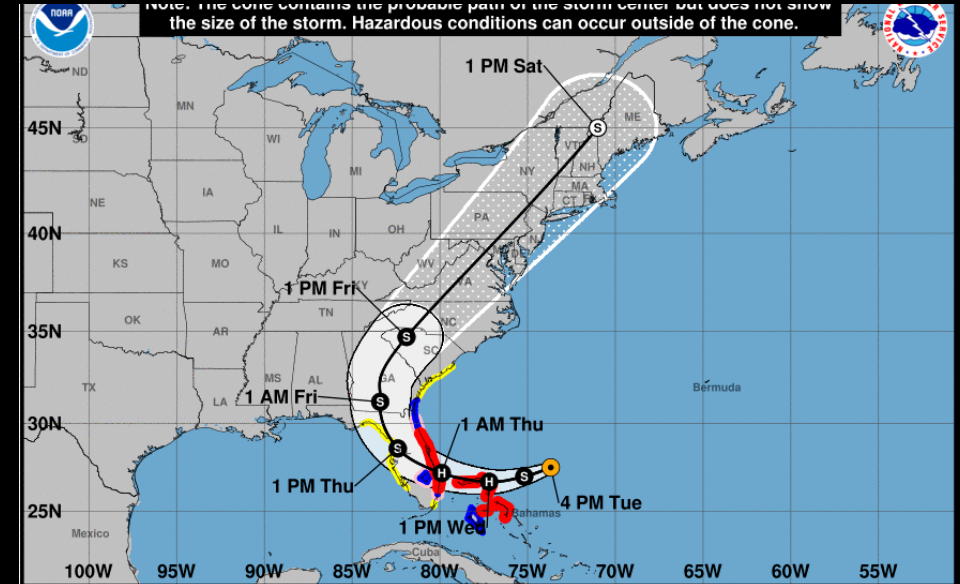
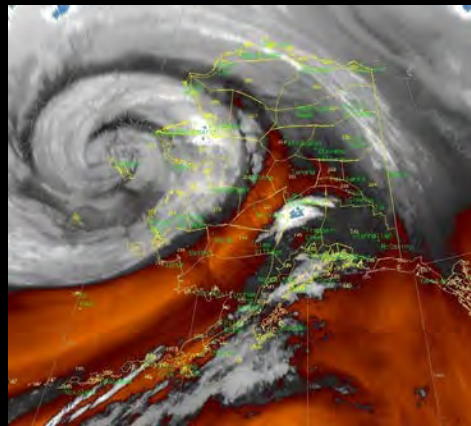
Partner Agencies

- NOAA
 - National Hurricane Center
 - National Weather Service
 - National Ocean Service
 - COASTAL Act
- FEMA
- USACE
- DOTs, EMs
- USFWS, NPS
- ICAMS/DIAP
- NIST
- Academia (NEER, SECOORA)
- Other



2022 Coastal Storm Team

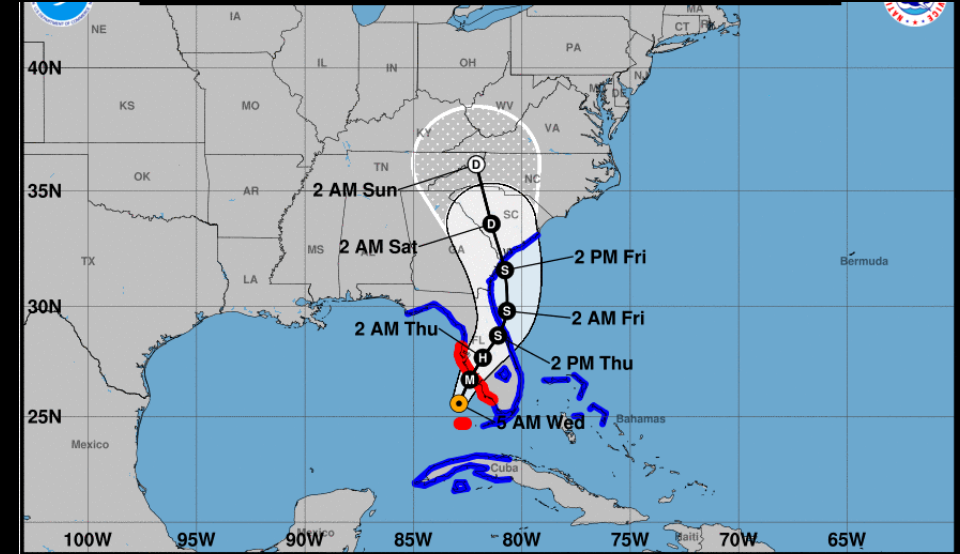
- TS Alex
- Hurricane Fiona
- Alaska Extratropical Storm
- Hurricane Ian
- Hurricane Nicole



Tropical Storm Nicole
Tuesday November 08, 2022
4 PM EST Advisory 7

Current information: ● Tropical Cyclone ○ Post/Potential TC
Center location 27.5 N 73.7 W
Maximum sustained wind 65 mph

Forecast positions: ● Tropical Cyclone ○ Post/Potential TC
Sustained winds: D < 39 mph
S 39-73 mph H 74-110 mph M > 110 mph



Hurricane Ian
Wednesday September 28, 2022
5 AM EDT Advisory 22
NWS National Hurricane Center

Current information: ● Tropical Cyclone ○ Post/Potential TC
Center location 25.6 N 82.9 W
Maximum sustained wind 140 mph
Movement NNE at 10 mph

Forecast positions: ● Tropical Cyclone ○ Post/Potential TC
Sustained winds: D < 39 mph
S 39-73 mph H 74-110 mph M > 110 mph



USGS Response Activities Tropical & Extratropical Storms

- Realtime data
 - Permanent streamgages
 - Temporary streamgages (Rapid Deployment Gages)
- Observed data
 - Barometric
 - Storm Tide & Wave
 - High Water Marks

****FEMA MA****

Alaska Extra Tropical Storm (remnant of Typhoon Merbok)

- [Flood Event Viewer \(usgs.gov\)](https://www.usgs.gov/flood-event-viewer)
- [STN Event Photos \(usgs.gov\)](https://www.usgs.gov/stn-event-photos)
- 440 HWMs
- USGS adding HWMs collected by state of AK as furnished data



USGS Flood Event Viewer

EVENT
2022 September AK
Extratropical Cyclone

GET DATA >

Use buttons to access event-based data, reflecting the filters chosen above. See the STN Data Dictionary for field names and definitions.

Sensor Data ▾

High-water Mark Data ▾

Peak Summary Data ▾

Visit the STN Data Portal for broader data retrieval capability.

POWERED BY WIM

HIGH WATER MARK | 2022 SEPTEMBER AK
EXTRATROPICAL CYCLONE

STN Site No.: AKNOM32480
HWM Label: 2049
Elevation(ft): 16.953
Datum: NAVD88
Height Above Ground: 0
Approval status: Approved
Type: Other (Note in Description box)
Marker: Other (Note in Description box)
Quality: Good: +/- 0.10 ft
Waterbody: Norton Sound
County: Nome Census Area County
State: AK
Latitude, Longitude (DD): 64.5425, -163.0381
Description: Westside town. Eroded road edge along west side of road by large green tank. Same road as 2037-2043.

High Water Mark Detail: View Details

1:4,513 | 17
64.5440 | -163.0354

MAP LAYERS

Real-time Event Data

- Real-time Streamgage
- Real-time Rain Gage
- Tidal Gage
- SOFAR Buoy
- NOAA National Buoy
- Rapid Deployment Gage
- NOAA Tides and Currents Stations

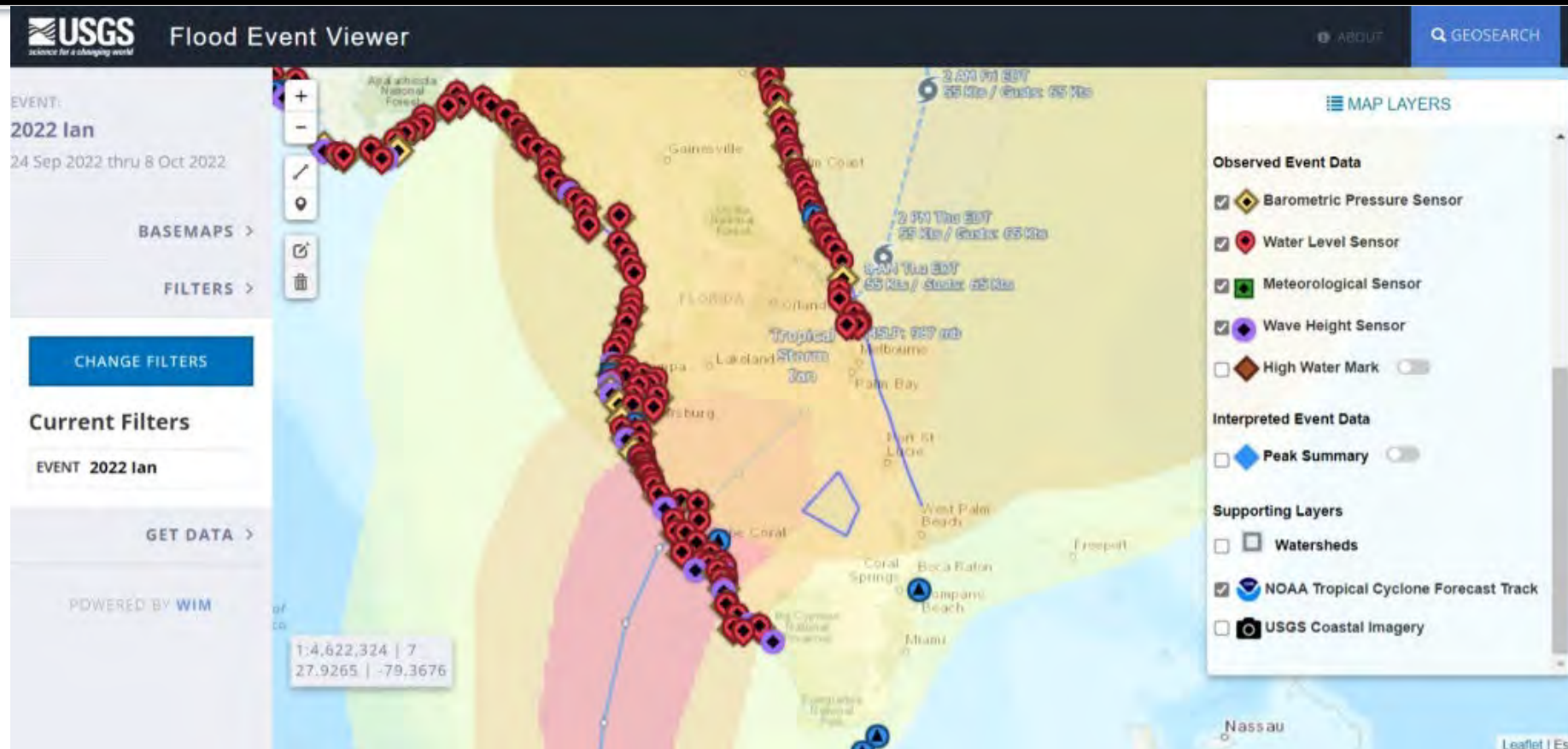
Observed Event Data

- Barometric Pressure Sensor
- Water Level Sensor
- Meteorological Sensor
- Wave Height Sensor
- High Water Mark

Golovin

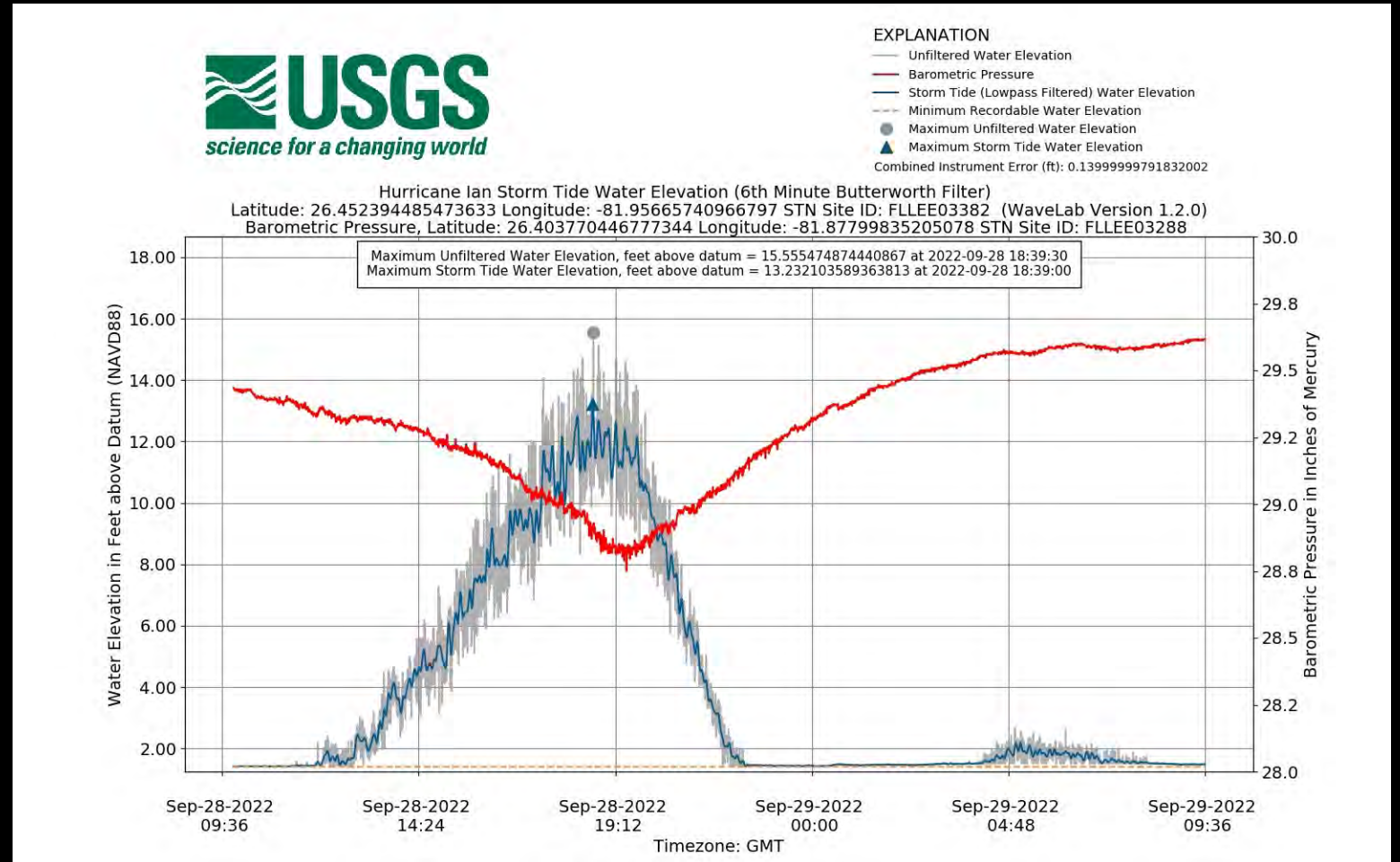
Hurricane Ian

- [Flood Event Viewer \(usgs.gov\)](https://www.usgs.gov/flood-event-viewer)
- [STN Event Photos \(usgs.gov\)](https://www.usgs.gov/stn-event-photos)
- 1 Met, 392 pressure transducers
 - 121 Barometric Pressure
 - 242 Water Level
 - 28 Wave Height
 - 365 HWMs
- 54 RDGs



Hurricane Ian

- Sensor Data @ Ft. Meyers
- Raw data, 15.56 feet above NAVD88
- Filtered data, 13.23 feet above NAVD88



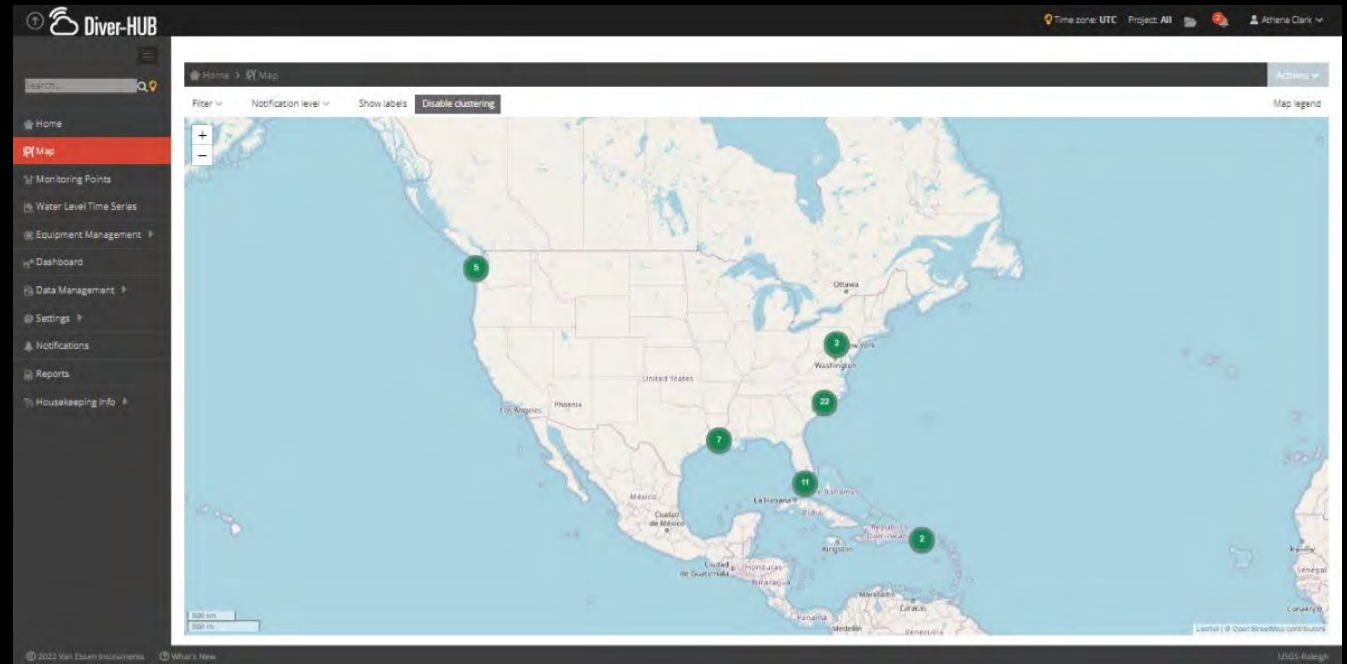
Real-time Storm Tide

Concept of Operations

National network of permanent or seasonal real-time storm tide (or wave sensors) that we can operate remotely

Benefit:

- Not chasing storms
- Decreased field time
- Increased safety
- Data NOW ... Real-time data streaming for emergency response
- ... + more 😊



Real-time Storm Tide



Florida



Alabama



Mississippi

Real-time Storm Tide



North Carolina



Maryland



Maryland

Real-time Storm Tide



New Jersey

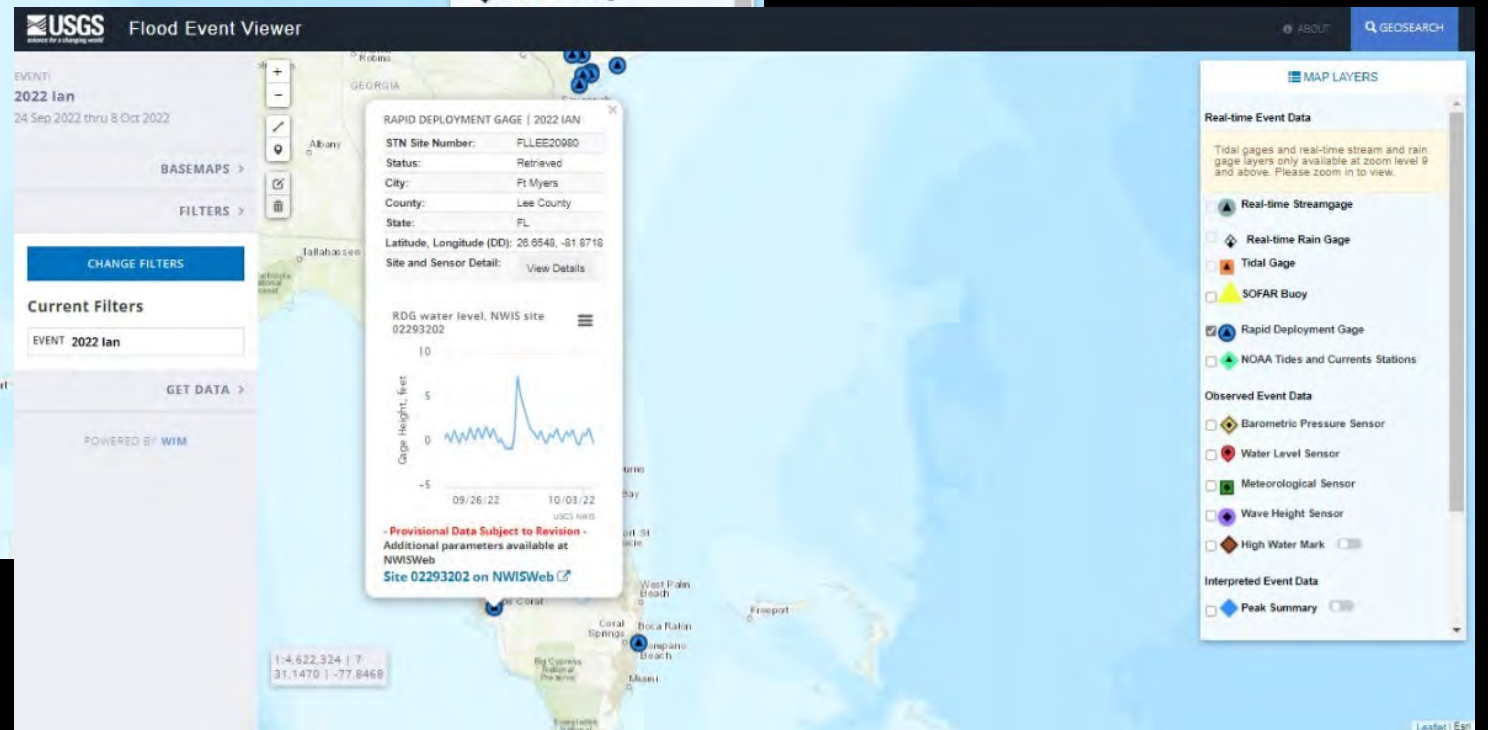
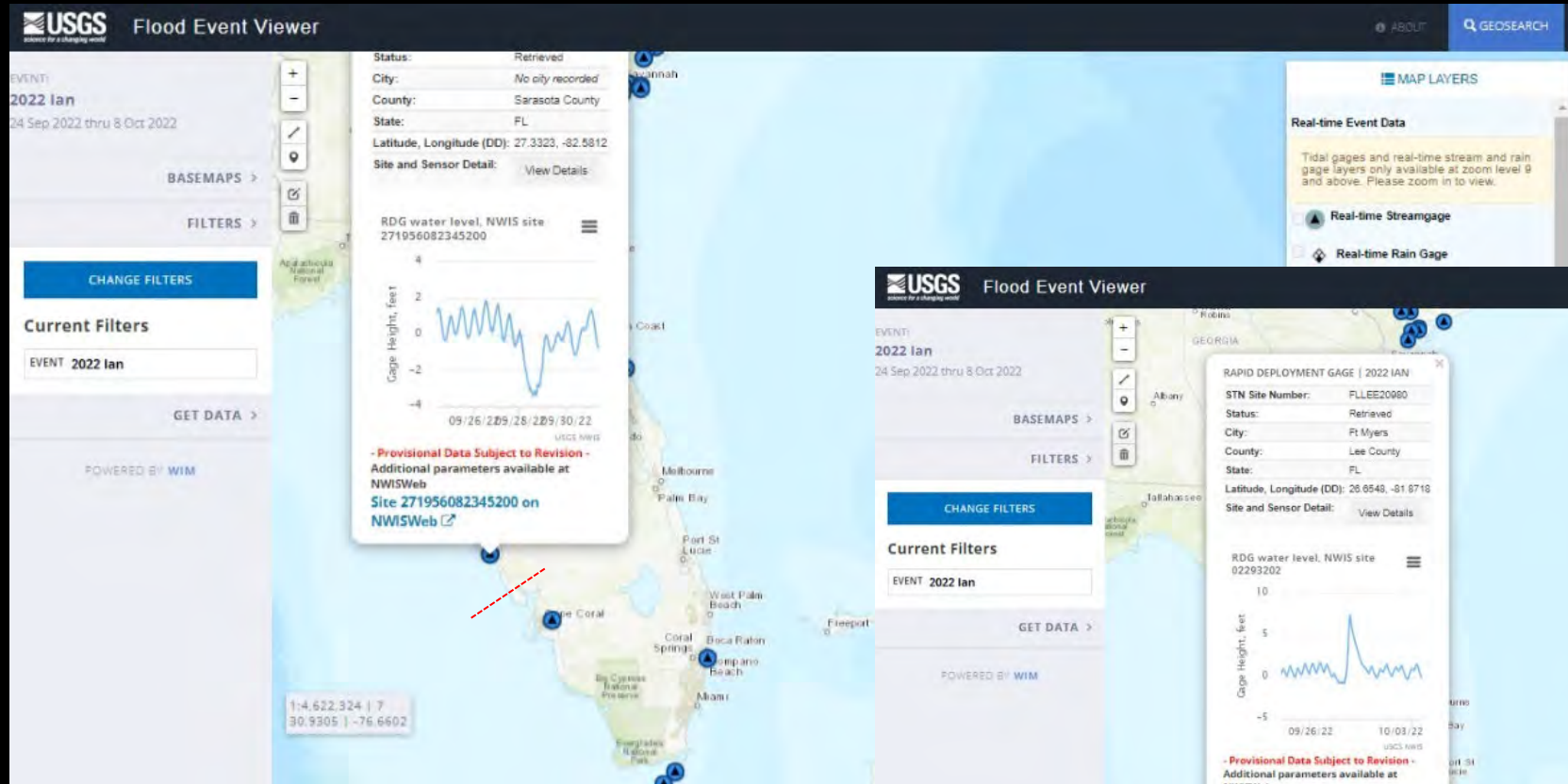


Pennsylvania



Mississippi

Real-time Storm Tide Hurricane Ian Successful Demonstration



USGS Tools & Products

WaterWatch

Description

WaterWatch (<http://waterwatch.usgs.gov>) is a U.S. Geological Survey (USGS) World Wide Web site that displays maps, graphs, and tables describing real-time, recent, and past streamflow conditions for the United States. The real-time information generally is updated on an hourly basis. WaterWatch provides streamgage-based maps that show the location of more than 3,000 long-term (30 years or more) USGS streamgages; use colors to represent streamflow conditions compared to historical streamflow; feature a point-and-click interface allowing users to retrieve graphs of stream stage (water elevation) and flow; and highlight locations where extreme hydrologic events, such as floods and droughts, are occurring.

More Information

<https://waterwatch.usgs.gov/>

Graphic or Visualization

The screenshot displays the USGS WaterWatch website. At the top left is the USGS logo with the tagline "science for a changing world". At the top right are links for "USGS Home", "Contact USGS", and "Search USGS". A yellow notice banner reads: "NOTICE: In January 2020, USGS WaterWatch began operating in maintenance-only mode. Existing tools, features, and web data services are being fully maintained as before, but new tools and enhancements will no longer be developed. Please click [here](#) for more information or contact [USGS WaterWatch](#) if you have any questions." Below the notice is the "WaterWatch" title and a search bar labeled "Search WaterWatch ...". On the left is a vertical navigation menu with links: Home, Special Features, Current Streamflow, Flood, Drought, Past Flow/Runoff, Animation, Toolkit, Annual Summaries, Data Services, Additional Information, and About WaterWatch. The main content area features four maps of the United States: "Current Streamflow" (Thursday, April 15, 2021 03:30:01), "Drought" (Wednesday, April 14, 2021), "Flood" (Thursday, April 15, 2021 03:30:01), and "Past Flow/Runoff" (Wednesday, April 14, 2021). Each map includes the USGS logo and a search bar labeled "Search USGS streamgage".

National Water Dashboard

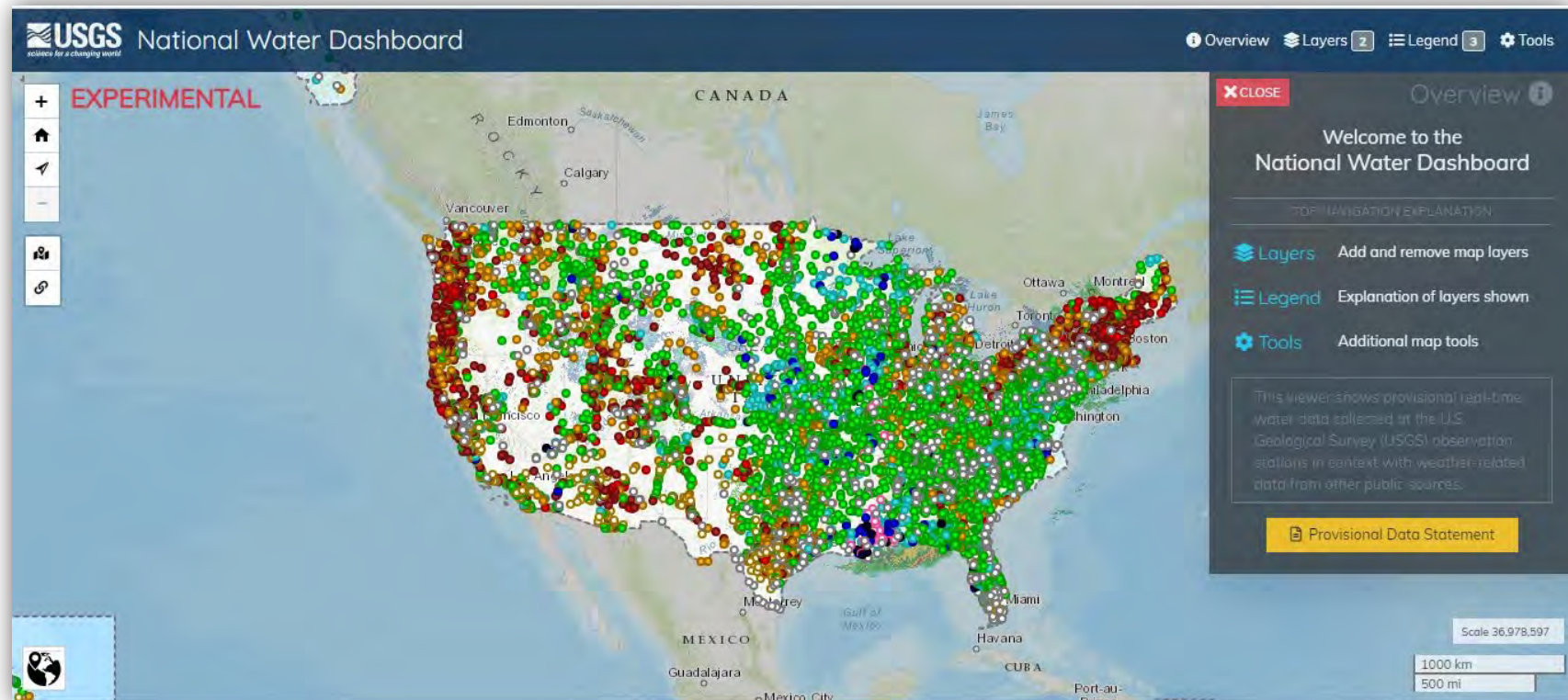
Description

This viewer shows provisional real-time water data collected at the USGS observation stations in context with weather-related data from other public sources.

More Information

<https://dashboard.waterdata.usgs.gov>

Graphic or Visualization



WaterAlert

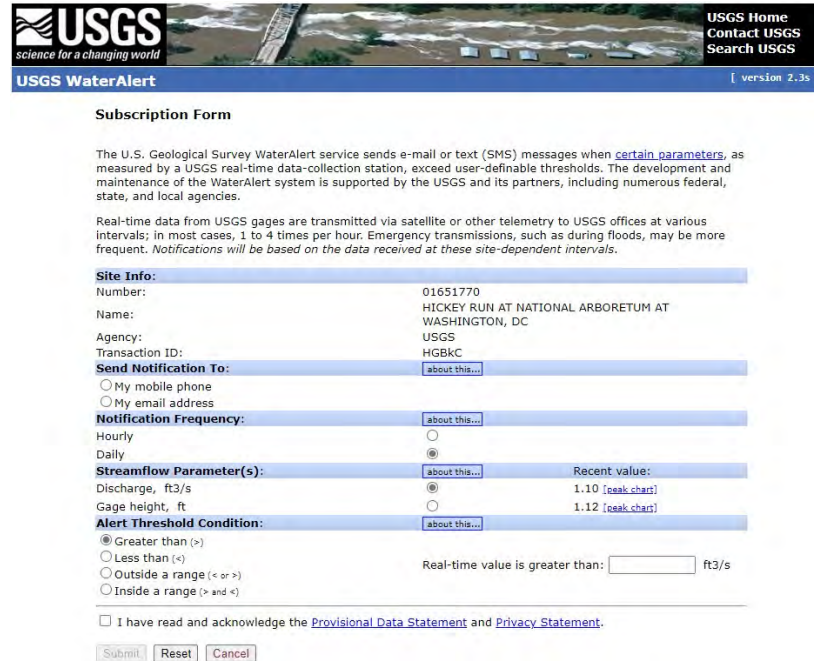
Description

WaterAlert is a popular subscription service that allows users to subscribe to email or text messages when certain parameters, as measured by a USGS monitoring location, exceed user-definable thresholds.

More Information

[USGS WaterAlert](#)

Graphic or Visualization



The screenshot shows the USGS WaterAlert subscription form. At the top, there is a USGS logo with the tagline "science for a changing world" and a navigation bar with links for "USGS Home", "Contact USGS", and "Search USGS". The page title is "USGS WaterAlert" and the version is "version 2.3s".

Subscription Form

The U.S. Geological Survey WaterAlert service sends e-mail or text (SMS) messages when certain parameters, as measured by a USGS real-time data-collection station, exceed user-definable thresholds. The development and maintenance of the WaterAlert system is supported by the USGS and its partners, including numerous federal, state, and local agencies.

Real-time data from USGS gages are transmitted via satellite or other telemetry to USGS offices at various intervals; in most cases, 1 to 4 times per hour. Emergency transmissions, such as during floods, may be more frequent. *Notifications will be based on the data received at these site-dependent intervals.*

Site Info:

Number:	01651770
Name:	HICKEY RUN AT NATIONAL ARBORETUM AT WASHINGTON, DC
Agency:	USGS
Transaction ID:	HGBkC

Send Notification To: [about this...](#)

My mobile phone
 My email address

Notification Frequency: [about this...](#)

Hourly
Daily

Streamflow Parameter(s): [about this...](#) **Recent value:**

Discharge, ft ³ /s	<input checked="" type="radio"/>	1.10 [peak chart]
Gage height, ft	<input type="radio"/>	1.12 [peak chart]

Alert Threshold Condition: [about this...](#)

Greater than (>)
 Less than (<)
 Outside a range (< or >)
 Inside a range (> and <)

Real-time value is greater than: ft³/s

I have read and acknowledge the [Provisional Data Statement](#) and [Privacy Statement](#).

Shown: WaterAlert Subscription Form

Flood Inundation Mapping (FIM)

Description

The **USGS Flood Inundation Mapping (FIM) Program** helps communities protect lives and property by providing tools and information to help them understand their local flood risks and make cost-effective mitigation decisions.

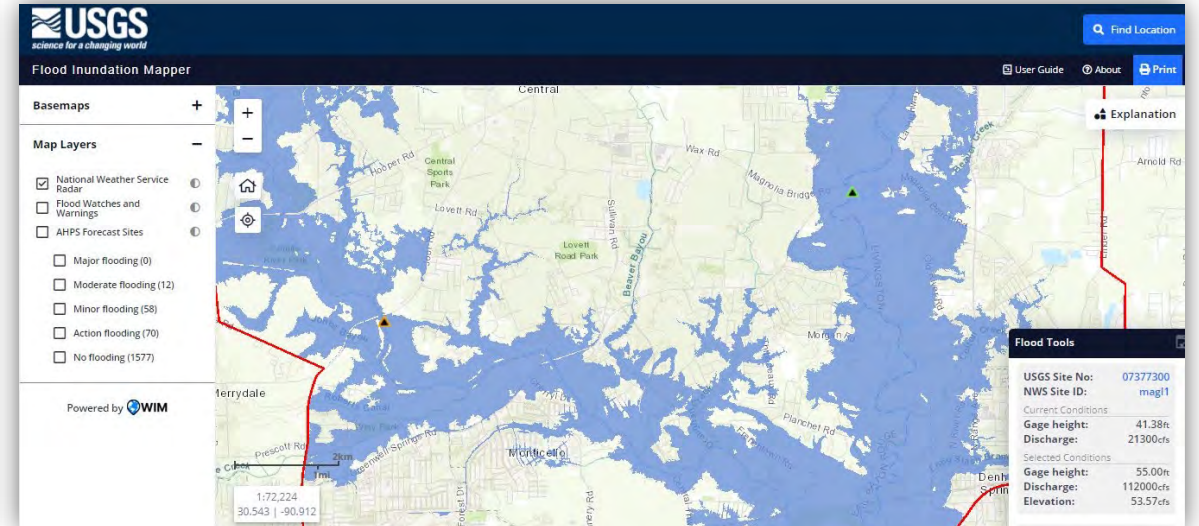
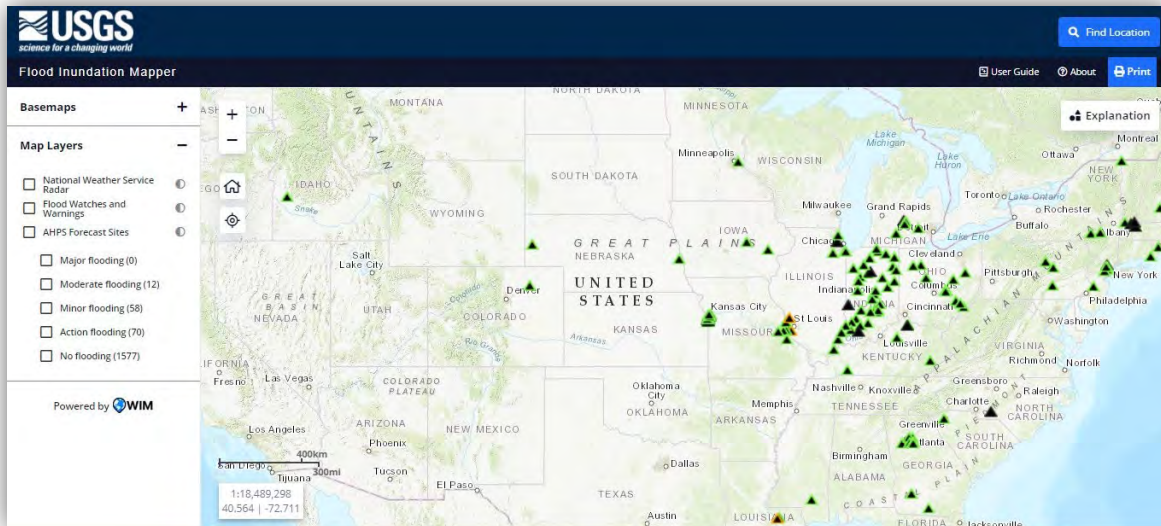
The USGS Flood Inundation Mapping Program has two main functions:

- 1) Partner with local communities to assist with the development and validation of flood inundation map libraries.
- 2) Provide online access to flood inundation maps along with real-time streamflow data, flood forecasts, and potential loss estimates.

More Information

<https://fim.wim.usgs.gov/fim/>

Graphic or Visualization



Flood Event Viewer

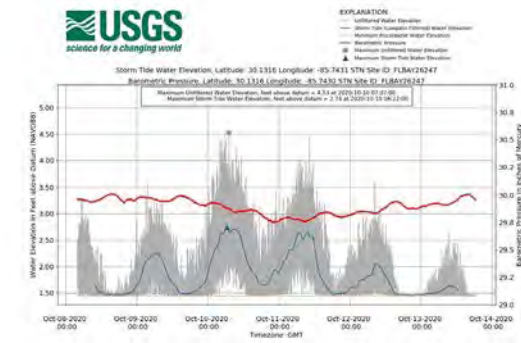
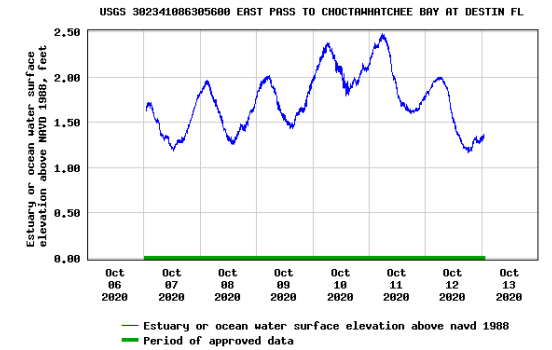
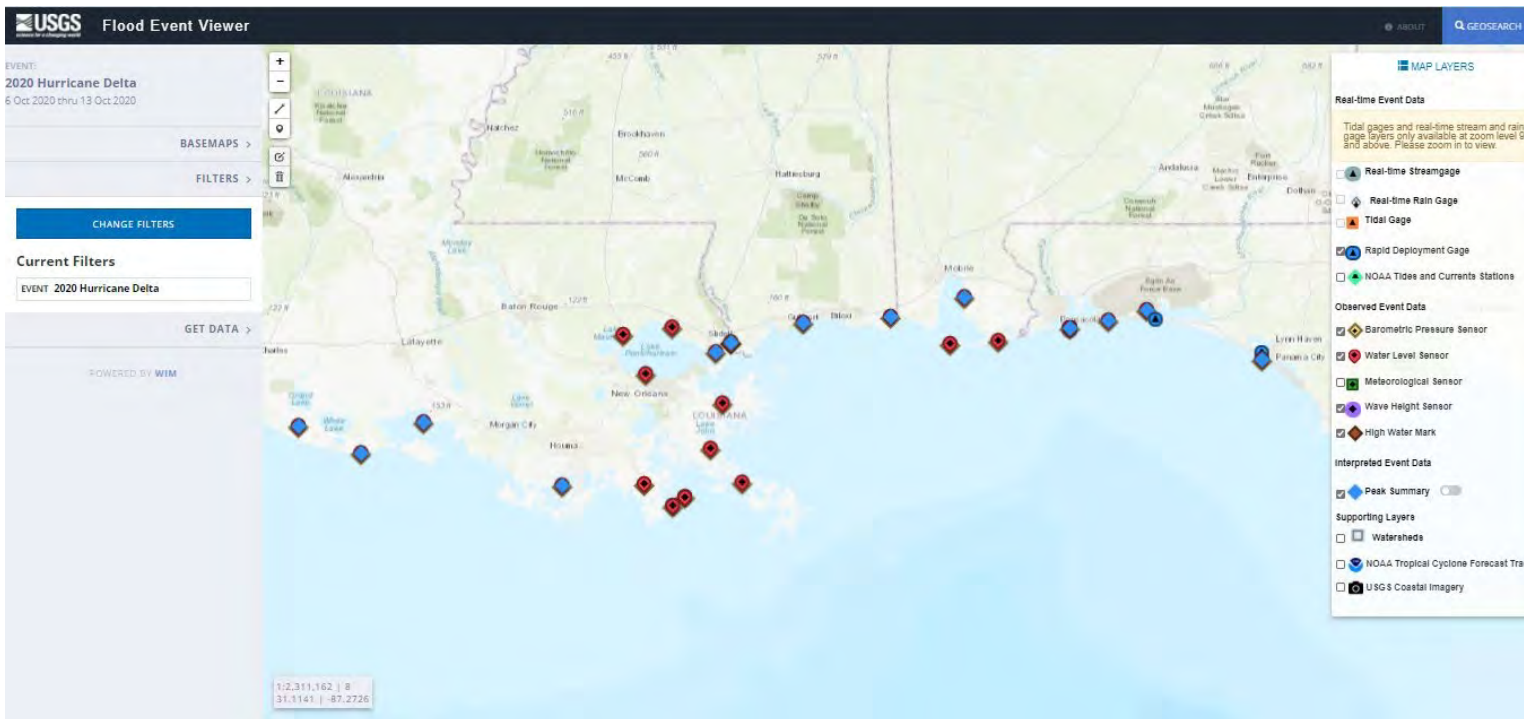
Description

The USGS Flood Event Viewer or FEV was created by the USGS to provide public access to coordinated, snippets (lengths) of coastal and riverine water-level and highwater marks recorded corresponding to major storms or other short-term events.

More Information

<https://stn.wim.usgs.gov/FEV>

Graphic or Visualization



NOAA/NWS and USGS Total Water Level and Coastal Change Forecasts

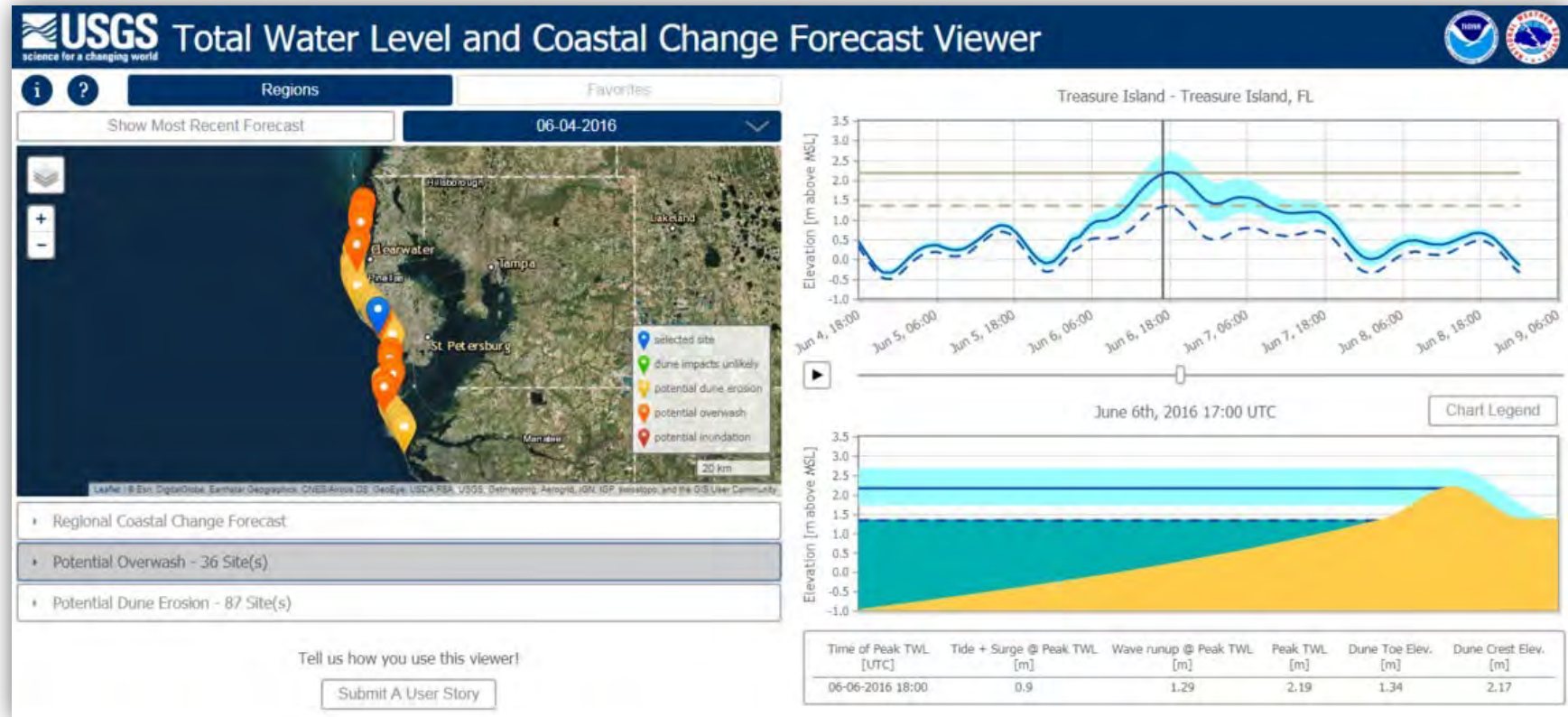
Description

The **Total Water Level and Coastal Change (TWL-CC) Forecast Viewer** is a tool that estimates **water levels** and the potential for **coastal change** along sandy shorelines based on local tides, storm surge, waves, and beach characteristics.

More Information

<https://coastal.er.usgs.gov/hurricanes/research/twlvviewer/>

Graphic or Visualization



Coastal Change Hazards Portal

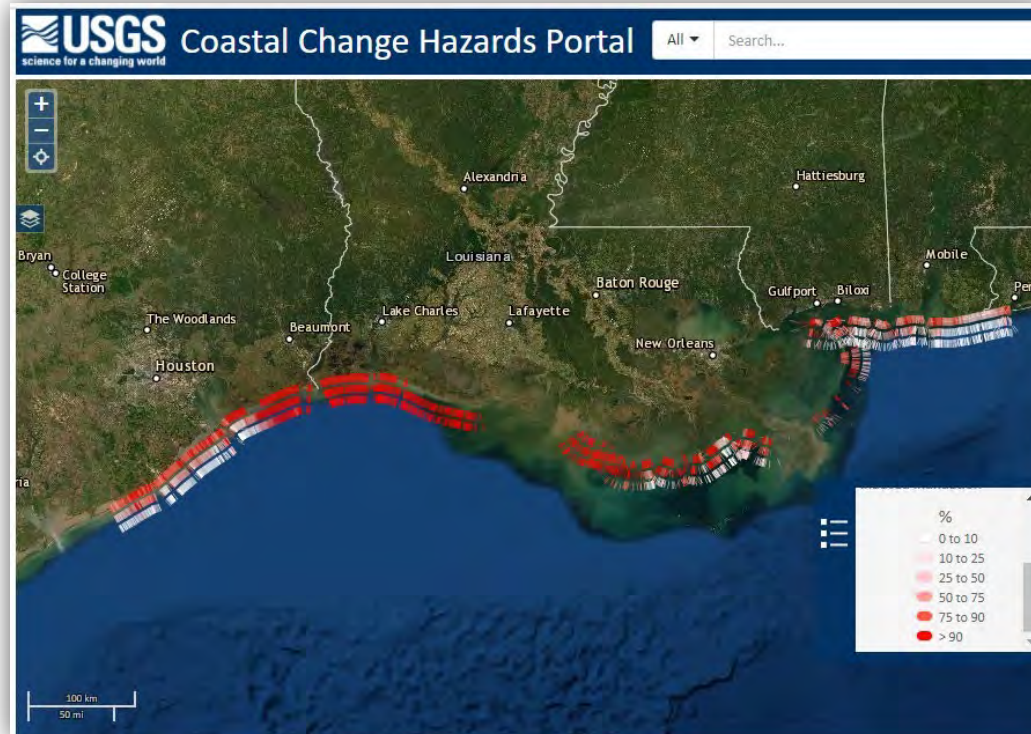
Description

This portal provides scientifically credible data suitable for use in land use planning projects, storm response and recovery protocols, and infrastructure, ecosystem, and cultural resource management decision-making. Resources are organized under three coastal hazard themes: extreme storms, shoreline change, and sea level rise.

More Information

<https://marine.usgs.gov/coastalchangehazardsportal/>

Graphic or Visualization



Shown: Forecast of likely coastal change during Hurricane Laura. The forecast was made prior to hurricane landfall, using inputs from NOAA. Colors indicate probability of dune erosion (inner band), over wash (middle), and inundation (outer).

Real-time Flood Impact Map (Experimental)

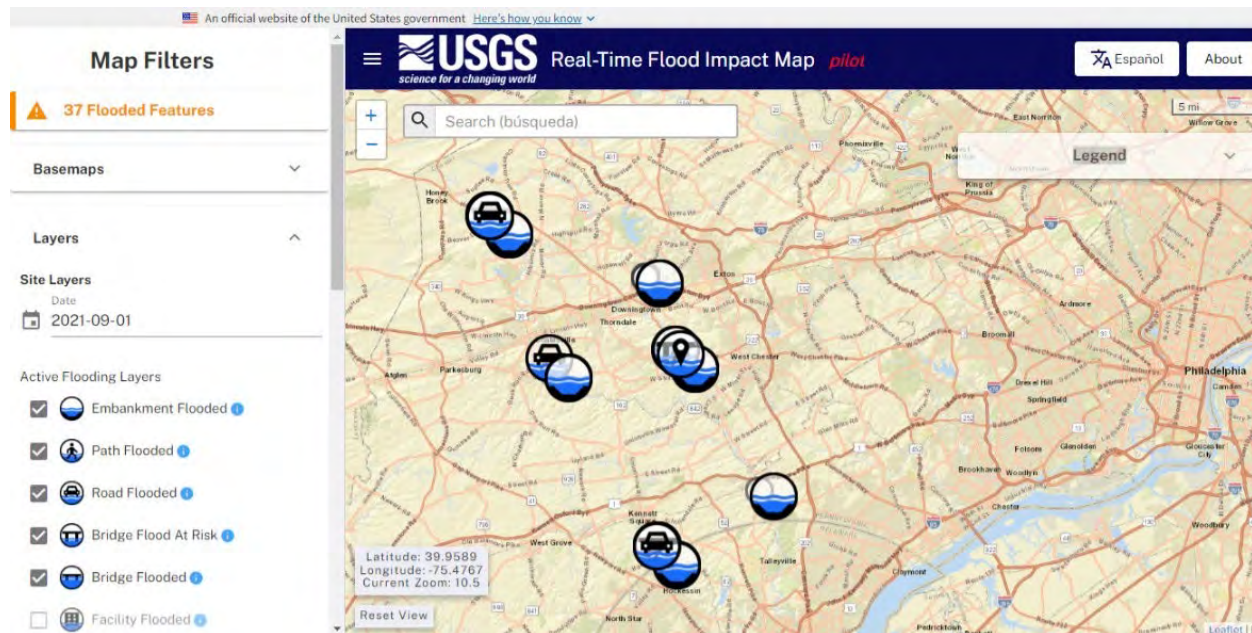
Description

This product shows flood impacts of critical or safety infrastructure features (stream or river embankment, roads, bridges, pedestrian paths, and more) near participating USGS streamgages.

More Information

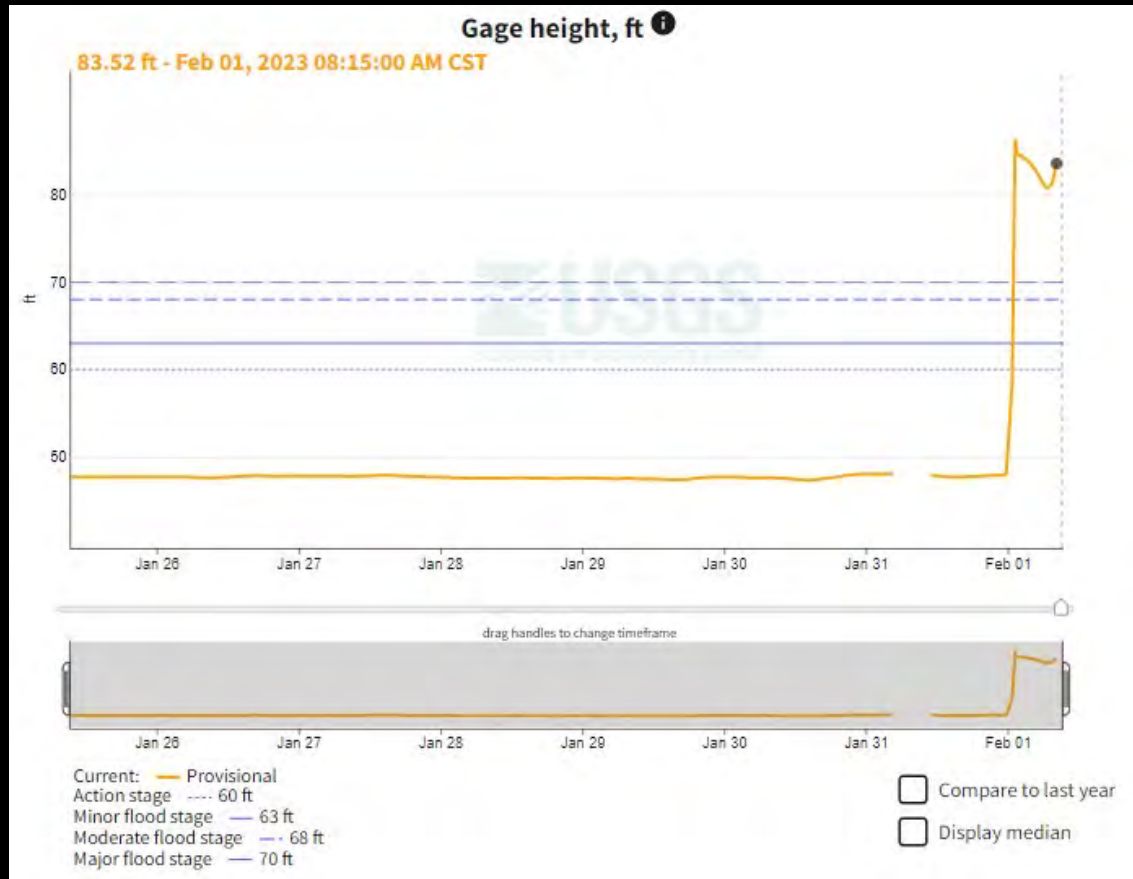
[thresholds \(usgs.gov\)](https://www.usgs.gov/thresholds)

Graphic or Visualization

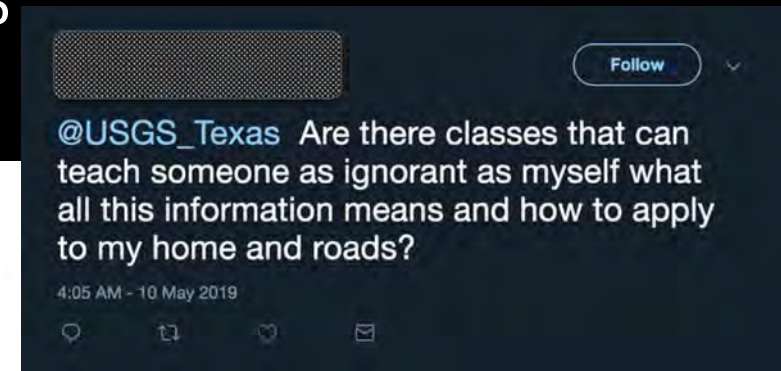


Shown: Flood impacts near USGS streamgages in Pennsylvania during 2021 Hurricane Ida.

USGS Real-time Flood Impact Map



- I used to be a USGS Cooperator and user of USGS data.
- Gage height, ft –
 - So what? What does this mean to me?
 - How can I apply this to my roads and home?



Resent-From: <gs-w-txpublic.info@usgs.gov>
From: <kevinzn53@gmail.com>
Date: June 7, 2019 at 7:26:14 AM CDT
To: <gs-w-tx_NWISWeb_Data_Inquiries@usgs.gov>
Cc: <archive_ask@usgs.gov>
Subject: Site Number: 08044500,Road flooding at gage site

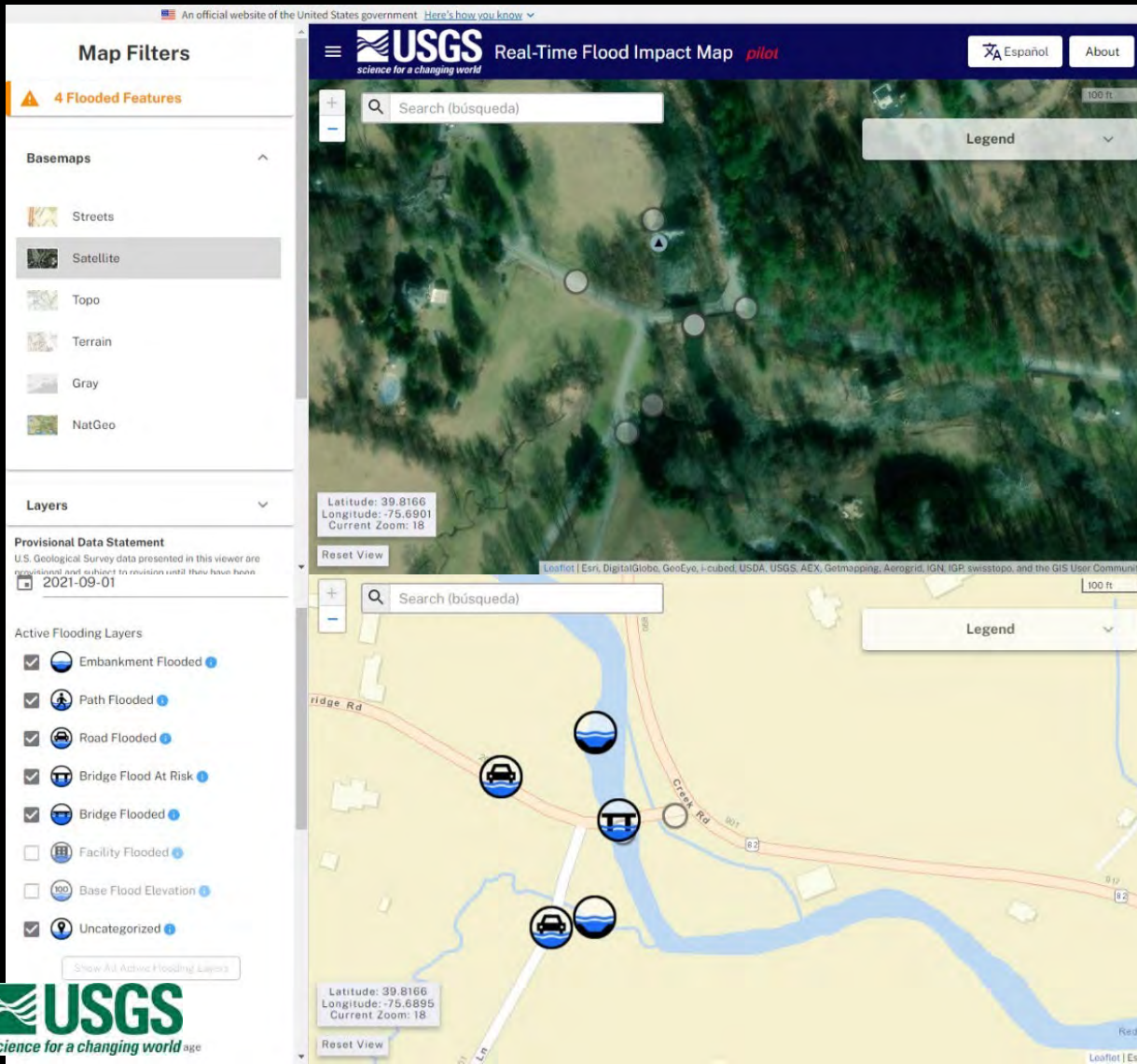
Transaction=GSFTWZ4G [07JUN2019 12:26:13UTC]
Customer email: kevinzn53@gmail.com
Customer: Kevin Enzian
Customer phone: 2144939225
Subject: Site Number: 08044500,Road flooding at gage site
Originating page: <https://waterdata.usgs.gov/monitoring-location/08044500/>
Primary response: gs-w-tx_NWISWeb_Data_Inquiries@usgs.gov
Tracking info: t=1|webchat=no|time=UTC12:22|time=UTC12:26|recipient=gs-w-tx_NWISWeb_Data_Inquiries@usgs.gov|sender=kevinzn53@gmail.com

If you are experiencing problems with this email application, please send your feedback to h2oleam@usgs.gov

Perhaps too local, but would you be able to tell me at what Gage height at 08044500 (W FK Trinity Rv nr Boyd, TX) does Hwy 730 flood?

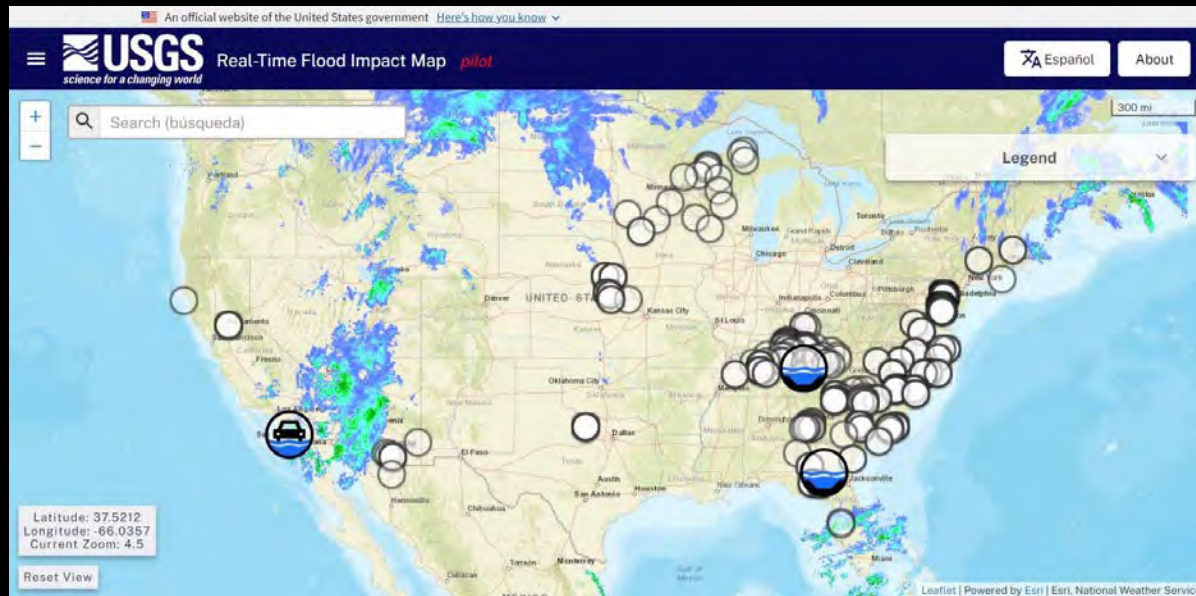
NGWOS FY21 R&D

USGS Real-time Flood Impact Map



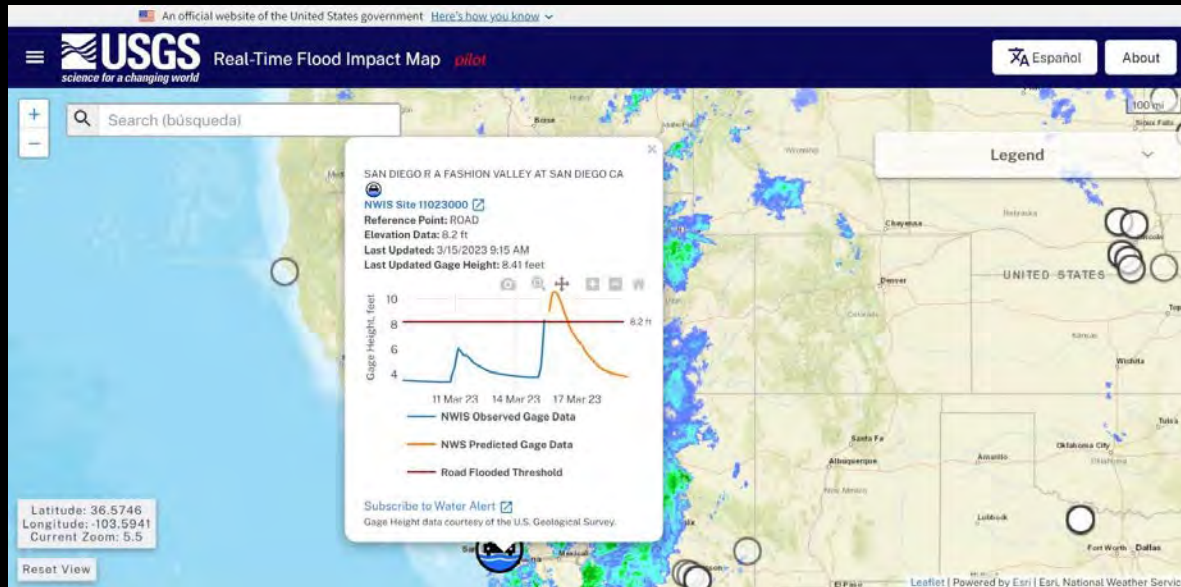
- Overcomes “So What?”
- Let the gage tell the story of flooding conditions
- USGS measures the height of critical safety or infrastructure features that may be vulnerable to flood impacts (roads, bridges, etc.)
- Flood impacts are georeferenced (x, y, z)
- The flood impacts are associated with a nearby USGS real-time streamgage.
- When the gage height exceeds the flood impact surveyed height, its icon will display on the map, showing this location may be currently flooded.

USGS Real-time Flood Impact Map



- White circles represent flood impact locations that have been measured but not currently flooding
- Date picker – retroactively view the impacts
- This product is not a flood warning system ... but it can be used to convey immediate flood risk by showing the locations where flooding may be currently or soon occurring.
- Additional flood information layers
 - All USGS real-time streamgages
 - FEMA Flood Hazard
 - NOAA National Weather Service Radar
 - NOAA National Weather Service Watches & Warnings
 - NOAA Tide and Water Level Stations
- Spanish version
- Currently scheduled for USGS EAB review
- WSCs are getting creative!
 - Washington and Idaho are working with Silver Jackets
 - USACE survey the Flood Impacts
 - USGS enter the Flood Impacts into AQ-TS as Reference Points

USGS Real-time Flood Impact Map



- Click on the icon and the pop-up will display current gage height and flood impact height.
- If the gage is a NWS River Forecast Site ... the forecast will also appear on the hydrograph ... so you will have an idea about how long the flood impact will occur.
- Subscription to Water Alert – the user has a real-world gage height ... to subscribe too!

Thank you!
Athena Clark athclark@usgs.gov

